



EUROPEAN
COMMISSION

European
Research Area

European Research Framework Programme Research on Climate Change

**Prepared for the
Third World Climate Conference (WCC-3)
and the UNFCCC Conference of the Parties (COP-15)**

GENERAL INFORMATION

EUR 23609

Interested in European research?

Research* eu is our monthly magazine keeping you in touch with main developments (results, programmes, events, etc.).

It is available in English, French, German and Spanish. A free sample copy or free subscription can be obtained from:

European Commission

Directorate-General for Research

Communication Unit

B-1049 Brussels

Fax (32-2) 29-58220

E-mail: research-eu@ec.europa.eu

Internet: <http://ec.europa.eu/research/research-eu>

This publication can be downloaded from webpage:

<http://ec.europa.eu/research/environment/pdf/cop-15.pdf>

Photo on cover page © 1995 PhotoAlto

Reprint June 2010

EUROPEAN COMMISSION

Directorate-General for Research

Directorate I — Environment

Unit I.5— Climate Change and Environmental Risks Unit

E-mail: rtd-climate-change@ec.europa.eu

E-mail: elisabeth.lipiatou@ec.europa.eu

Tel. (32-2) 29-86323

Fax (32-2) 29-95755

Edited by Philippe Tulkens, Eleni Ferner and Thomas Lange Myhrvold-Hanssen

European Research Framework Programme
Research on Climate Change

**Prepared for the
Third World Climate Conference (WCC-3)
and the UNFCCC Conference of the Parties (COP-15)**

***EUROPE DIRECT is a service to help you find answers
to your questions about the European Union***

**Freephone number:
00 800 6 7 8 9 10 11**

(*) Certain mobile telephone operators do not allow access to 00 800 numbers
or these calls may be billed.

LEGAL NOTICE:

Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use which might be made of the following information.

The views expressed in this publication are the sole responsibility of the author and do not necessarily reflect the views of the European Commission.

A great deal of additional information on the European Union is available on the Internet.
It can be accessed through the Europa server (<http://europa.eu.int>).

Cataloguing data can be found at the end of this publication.

Luxembourg: Office for Official Publications of the European Communities, 2009

ISBN 978-92-79-10280-6

doi 10.2777/28294

© European Communities, 2009

Reproduction is authorised provided the source is acknowledged.

Printed in Belgium

PRINTED ON WHITE CHLORINE-FREE PAPER

FOREWORD

Adapting to and mitigating climate change are now recognised as major challenges for the world community. Enough evidence have been gathered to justify policy action on climate change, but knowledge needs to progress further on the understanding of the climate system, on the evaluation of the impacts and on the identification and assessment of options for mitigation and adaptation. This endeavour currently requires and will continue to necessitate sustained significant support to research activities on climate change at the EU level.

The present publication has been prepared for the Third World Climate Conference (Geneva, September 2009) and the 15th Conference of the Parties to the United Framework Convention on Climate Change (COP-15, Copenhagen, December 2009). It provides an overview of recently completed and ongoing climate research projects undertaken under the 6th and 7th Research Framework Programmes of the European Community. EC-funded research projects selected for this publication contribute to the understanding of the climate system ranging from climate processes and their modelling, to the assessment of climate change impacts and the costs of response measures. Projects supporting European research infrastructure and grants provided by the European Research Council (ERC) contributing to climate change research are also accounted for. The diversity of activities reported confirms that climate change is an encompassing matter touching on nearly every dimension of our society.

134 projects representing an overall budget of 543 million € from the European Community contribution are referred to in this publication. These research activities on climate are complemented by other activities funded by the Framework Programme, notably in the areas of energy and transport, which contribute to the identification and development of mitigation options through progress on energy efficiency, renewable energy and more environmentally friendly transport systems.

As shown by the number of research institutions involved, the European Union research activities exhibit a strong international dimension structuring the European Research Area (ERA) and going well beyond European borders. This catalogue aims to help researchers and other stakeholders know better the coverage of EC-funded research projects. This information may enhance wider use of the results from those projects and potentially generate new innovative initiatives. We believe that these projects will help answer key scientific and policy questions related to climate change, which is a prerequisite for sound action and securing people's support.



A stylized handwritten signature in black ink, consisting of several fluid, connected loops.

José Manuel Silva Rodríguez
Director-General
Directorate-General for Research

TABLE OF CONTENTS

FOREWORD 1

DESCRIPTION OF FUNDING INSTRUMENTS 11

I. CLIMATE PROCESSES, OBSERVATIONS AND PROJECTIONS. 13

DYNAMITE — Understanding the Dynamics of the Coupled Climate System 14

ENSEMBLES — Ensemble based Predictions of Climate Changes and their Impacts. 17

**COMBINE — Comprehensive Modelling of the Earth system for better climate prediction
and projection 22**

IS-ENES — InfraStructure for the European Network for Earth System Modelling 25

AMMA — African Monsoon Multidisciplinary Analysis. 28

AMMA TTC — African Monsoon Multidisciplinary Analysis — Extension 32

THOR — Thermohaline Overturning Circulation — at Risk 35

ATP — Arctic Tipping Points 37

**IPY-CARE — Climate of the Arctic and its Role for Europe (CARE) — A European component
of the International Polar Year. 39**

WATCH — Water and Global Change. 42

**PHYTOCHANGE — New Approaches to Assess the Responses of Phytoplankton to Global
Change. 45**

**ENHANCE — Enhancing the European Participation in Living with Climate Variability and
Change: Understanding the Uncertainties and Managing the Risks 47**

**EMIS — An Intense Summer Monsoon in a Cool World, Climate and East Asian Monsoon
during Interglacials 500,000 years ago and before. 50**

EPICA-MIS — New Paleoreconstructions from Antarctic Ice and Marine Records. 52

**PACEMAKER — Past Continental Climate Change: Temperatures from Marine and
Lacustrine Archives 54**

MATRICES — Modern Approaches to Temperature Reconstructions in Polar Ice Cores 56

ICEPROXY — Novel Lipid Biomarkers from Polar Ice: Climatic and Ecological Applications . . 58

MILLENNIUM — European Climate of the Last Millennium 60

**SEARCH for DAMOCLES — Study of Environmental Arctic Change —
Developing Arctic Modelling and Observing Capability for
Long-term Environment Studies 64**

DAMOCLES — Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies	67
DAMOCLES-TTC — Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies — Extension	72
ALOMAR EARI — Arctic Lidar Observatory for Middle Atmosphere Research enhanced Access to Research	75
ARCFAC V — The European Centre for Arctic Environmental Research	77
ERICON-AB — The European Polar Research Icebreaker Consortium Aurora Borealis	79
EURO ARGO — Global Ocean Observing Infrastructure	81
 II. GLOBAL CARBON AND NITROGEN CYCLES — GREENHOUSE GAS EMISSIONS	 83
CARBOEUROPE — Assessment of the European Terrestrial Carbon Balance	84
CARBO-Extreme — The terrestrial Carbon cycle under Climate Variability and Extremes. A Pan-European synthesis	89
CARBO-NORTH — Quantifying the Carbon Budget in Northern Russia: Past, Present and Future.	91
CARBOAFRICA — Quantification, understanding and prediction of carbon cycle, and other GHG gases, in Sub-Saharan Africa	94
QUASOM — Quantifying and Modelling Pathways of Soil Organic Matter as affected by abiotic Factors, Microbial dynamics and transport processes	97
CARBO-OCEAN — Marine Carbon Sources and Sinks Assessment	99
GRACE — Genetic Record of Atmospheric Carbon Dioxide	103
ICOS — Integrated Carbon Observation System	104
IMECC — Infrastructure for Measurement of the European Carbon Cycle	108
INSEA — Integrated Sink Enhancement Assessment	110
NEU-CO₂-III — Continuation of the “International Network Non-energy use and CO ₂ emissions (NEU-CO ₂)”, Phase III.	112
PAN-AMAZONIA — Project for the Advancement of Networked Science in Amazonia	114
NITROEUROPE — The Nitrogen Cycle and its Influence on the European Greenhouse Gas Balance	116
SOGE-A — System for Observation of Halogenated Greenhouse Gases in Europe and Asia	120
 III. CLIMATE INTERACTIONS WITH STRATOSPHERIC OZONE	 122
THE MAIN AIM QOS2004 — Quadrennial Ozone Symposium 2004	123
SCOUT-O3 — Stratosphere-Climate Links with Emphasis on the UTLS	124

SHIVA — Stratospheric ozone: Halogen Impacts in a Varying Atmosphere	128
RECONCILE — Reconciliation of essential process parameters for an enhanced predictability of arctic stratospheric ozone loss and its climate interactions. .	130
ATTICA — European assessment of the Transport Impacts on Climate Change and Ozone Depletion	131
HCFCWORKSHOPS — International Workshop on HCFC Alternatives and Intermediate Reduction Steps for Developing Countries	134
 IV. CLIMATE INTERACTIONS WITH ATMOSPHERIC COMPOSITION CHANGE	 136
ACCENT — Atmospheric Composition Change: A European Network	137
EUCAARI — European Integrated Project on Aerosol Cloud Climate and Air Quality Interactions	142
ATMNUCLE — Atmospheric Nucleation: from Molecular to Global Scale	146
C8 — Consistent Computation of the Chemistry-Cloud Continuum and Climate Change in Cyprus.	147
EUROHYDROS — A European Network for Atmospheric Hydrogen Observation and Studies.	149
HYMN — Hydrogen, Methane and Nitrous oxide: Trend variability, Budgets and Interactions with the Biosphere.	152
MAP — Secondary Marine Aerosol Production from Natural Sources	154
OOMPH — Organics over the Ocean Modifying Particles in both Hemispheres.	157
CITYZEN — megaCITY — Zoom for the Environment	159
MEGAPOLI — Megacities: Emissions, urban, regional and Global Atmospheric POLLution and climate effects, and Integrated tools for assessment and mitigation . . .	161
AIR4EU — Air Quality Assessment for Europe from Local to Continental	163
NATAIR — Improving and Applying Methods for the Calculation of Natural and Biogenic Emissions and Assessment of Impacts on Air Quality	165
GEOMON — Global Earth Observation and Monitoring.	168
COPAL — Community heavy-payload long endurance instrumented aircraft for tropospheric research in environmental and geo-sciences	171
EARLINET ASOS — European Aerosol Research Lidar Network: Advanced Sustainable Observation System	174
EUFAR — European Facility for Airborne Research Lidar Network: Advanced Sustainable Observation System.	177
EUROCHAMP — Integration of European Simulation Chambers for Investigating Atmospheric Processes	180

EUSAAR — European Supersites for Atmospheric Aerosol Research	184
IAGOS — Integration of Routine Aircraft Measurements into a Global Observing System . .	187
IAGOS-ERI — In-service Aircraft for a Global Observing System — European Research Infrastructure	189
LAPBIAT — Lapland Atmosphere-Biosphere Facility	191
STAR — Support for Tropical Atmospheric Research	192

V. CLIMATE CHANGE IMPACTS 194

Ice2sea — Estimating the future contribution of continental ice to sea-level rise.	195
EPOCA — European Project on Ocean Acidification	197
ACQWA — Assessment of Climatic change and impacts on the Quantity and quality of Water	200
EURO-LIMPACS — Integrated Project to Evaluate the Impacts of Global Change on European Freshwater Ecosystems	202
GENESIS — Groundwater and Dependent Ecosystems: New Scientific Basis on Climate Change and Land-Use Impacts for the Update of the EU Groundwater Directive	205
HERMIONE — Hotspot Ecosystem Research and Man's Impact on European seas	207
INCREASE — An integrated network on climate change research activities on shrubland ecosystems	209
ESCAPE — European Study of Cohorts for Air Pollution Effects	211
MACROCLIMATE — Quantitative Dynamic Macroeconomic Analysis of Global Climate Change and Inequality	213
QUANTIFY — Quantifying the Climate Impact of Global and European Transport Systems	214
QUANTIFY-TTC — Quantifying the Climate Impact of Global and European Transport System — Extension.	217
CECILIA — Central and Eastern European Climate Change Impact and Vulnerability Assessment	219
CLAVIER — Climate Change and Variability: Impact on Central and Eastern Europe	223
CIRCE — Climate Change and Impact Research: the Mediterranean Environment	226
CIRCLE — Climate Impact Research Co-ordination for a Larger Europe	232
CLARIS — A Europe-South America Network for Climate Change Assessment and Impact Studies.	234
CLARIS — LPB — A Europe-South America network for climate change assessment and impact studies in La Plata Basin	236

CENSOR — Climate variability and el niño southern oscillation: implications for natural coastal resources and management	238
BASIN — Basin-scale Analysis, Synthesis, and Integration: Resolving the impact of climatic processes on ecosystems of the North Atlantic Basin and shelf seas.	240
RECLAIM — Resolving Climatic Impacts on fish stocks	242
ArcRisk — Arctic Health Risks: Impacts on health in the Arctic and Europe owing to climate-induced changes in contaminant cycling	244
EDEN — Emerging diseases in a changing European environment.	246
CLEAR — Climate change, Environmental contaminants and Reproductive health	249
ICEPURE — The impact of climatic and environmental factors on personal ultraviolet radiation exposure and human health.	251
CLIMATE FOR CULTURE — Damage Risk Assessment, macroeconomic Impact and Mitigation for Sustainable Preservation of Cultural Heritage in the Times of Climate Change	253
NOAHS ARK — Global Climate Change Impact on Built Heritage and Cultural Landscapes .	255
WRECKPROTECT — Strategies for the Protection of shipwrecks in the Baltic Sea against forthcoming attack by wood degrading marine borers. A synthesis and information project based on the effects of climatic changes. . . .	257
EUROPOLAR — European Polar Consortium: Strategic Coordination and Networking of European Polar RTD Programmes	259
MESMA — Monitoring and Evaluation of Spatially Managed Areas	263
 VI. CLIMATE RELEVANT PROJECTS ON NATURAL HAZARDS AND EXTREME EVENTS.	 265
MOVE — Methods for the improvement of Vulnerability Assessment in Europe	266
GAGOS — Assessing and Forward Planning of the Geodetic and Geohazard Observing Systems for GMES Applications	268
NOVAC — Network for Observation of Volcanic and Atmospheric Change.	269
CapHaz-Net — Social capacity building for natural hazards: Toward more resilient societies.	271
XEROCHORE — An Exercise to Assess Research Needs and Policy Choices in Areas of Drought	273
HYDRATE — Hydrometeorological data resources and technologies for effective flash flood forecasting.	275
IMPRINTS — Improving Preparedness and Risk maNagementT for flash floods and debris flow events	277
SafeLand — Living with landslide risk in Europe: Assessment, effects of global change, and risk management strategies	279

ENSURE — Enhancing resilience of communities and territories facing natural and na-tech hazards	281
MICRODIS — Integrated health social & economic impacts of extreme events: evidence, methods & tools.	283
IRASMOS — Integral Risk Management of Extremely Rapid Mass Mouvements	285
MICORE — Morphological Impacts and Coastal Risks induced by Extreme storm events. . .	287

VII. CLIMATE CHANGE ADAPTATION, MITIGATION AND POLICIES 289

ADAM — Adaptation and Mitigation Strategies: Supporting European Climate Policy	290
CCTAME — Climate Change — Terrestrial Adaption and Mitigation in Europe	294
ClimateCost — Full Costs of Climate Change	296
LONG-TERM RISKS — Evaluation and Management of Collective Long-Term Risks	298
MEECE — Marine Ecosystem Evolution in a Changing Environment	299
ADAGIO — Adaptation of agriculture in the European regions at Environmental risk under climate change	301
MOTIVE — Models for Adaptive Forest Management	303
NEWATER — New Approaches to Adaptive Water Management under Uncertainty.	305
ClimateWater — Bridging the gap between adaptation strategies of climate change impacts and European water policies.	308
MACIS — Minimisation of and Adaptation to Climate change: Impacts on biodiversity. . . .	310
HighNoon — Adaptation to changing water resources availability in northern India with Himalayan glacier retreat and changing monsoon pattern	311
FUTURESOC — Forecasting Societies Adaptive Capacities to Climate Change	313
U4IA (Euphoria) — Emerging Urban Futures and Opportune Repertoires of Individual Adaptation	315
GAINS-ASIA — Greenhouse Gas and Air Pollution Interactions and Synergies	317
SERPEC-CC — Sectoral Emission Reduction Potentials and Economic Costs for Climate Change.	319
REDD-ALERT — Reducing Emissions from Deforestation and Degradation through Alternative Landuses in Rainforests of the Tropics	321
PICCMAT — Policy Incentives for Climate Change Mitigation Agricultural Techniques	323
SAFEWIND — Forecast with emphasis to extreme weather situations for a secure large-scale wind power integration	325
GILDED — Governance, Infrastructure, Lifestyle Dynamics and Energy Demand: European Post-Carbon Communities	327
PACT — Pathways for Carbon Transitions	329

PLANETS — Probabilistic Long-Term Assessment of New Technology Scenarios	331
POEM — Policy Options to engage Emerging Asian economies in a post-Kyoto regime . . .	334
TETRIS — Technology Transfer and Investment Risk in International Emissions Trading . . .	336
TOCSIN — Technology-Oriented Cooperation and Strategies in India and China: Reinforcing the EU dialogue with Developing Countries on Climate Change Mitigation	339
ENCI-LowCarb — European Network engaging Civil Society in Low Carbon	341
IMPLICC — Implications and risks of engineering solar radiation to limit climate change . .	343
INDEX BY ACRONYM.	345

Information on EC-funded research projects referred to in this publication is available on the CORDIS web site:

For FP7 projects: http://cordis.europa.eu/fp7/projects_en.html

For FP6 projects: <http://cordis.europa.eu/fp6/projects.htm>

Description of funding instruments

The research Framework Programmes promote the integration and strengthening of the European Research Area through the implementation of a set of funding instruments. Brief descriptions of these instruments referred to in this publication for the 7th and 6th Framework Programmes are given below:

FP7 Funding Instruments (2007-2013)

Collaborative projects

Support for research projects carried out by consortia with participants from different countries, aiming at developing new knowledge, new technology, products, demonstration activities or common resources for research. The size, scope and internal organisation of projects can vary from field to field and from topic to topic. Projects can range from small or medium-scale focused research actions to large-scale integrating projects for achieving a defined objective. Projects will also be targeted to special groups such as SMEs and other smaller actors.

Networks of Excellence

Support for a Joint Programme of Activities implemented by a number of research organisations integrating their activities in a given field, carried out by research teams in the framework of longer term cooperation. The implementation of this Joint Programme of Activities will require a formal commitment from the organisations integrating part of their resources and their activities.

Coordination and support actions

Support for activities aimed at coordinating or supporting research activities and policies (networking, exchanges, trans-national access to research infrastructures, studies, conferences, etc.). These actions may also be implemented by means other than calls for proposals.

Support for 'frontier' research

Support for projects carried out by individual national or transnational research teams. This scheme will be used to support investigator-driven 'frontier' research projects funded in the framework of the European Research Council.

Support for training and career development of researchers

Support for training and career development of researchers, mainly to be used for the implementation of the Marie Curie actions.

Research for the benefit of specific groups (in particular SMEs)

Support for research projects where the bulk of the research and technological development is carried out by universities, research centres or other legal entities, for the benefit of specific groups, in particular SMEs or associations of SMEs. Efforts will be undertaken to mobilise additional financing from the EIB and other financial organisations.

FP6 Funding Instruments (2003-2006)

Networks of excellence (NOE)

Multipartner projects aimed at strengthening excellence on a research topic by networking the critical mass of resources and expertise. This expertise is networked around a joint programme of activities aimed primarily at creating a progressive and lasting integration of the research activities of the network partners while, at the same time advancing knowledge on the topic.

Integrated Projects (IP)

Multipartner projects to support objective-driven research, where the primary deliverable is knowledge for new products, processes, services etc. They should bring together a critical mass of resources to reach ambitious goals aimed either at increasing Europe's competitiveness or at addressing major societal needs.

Specific Targeted Research Projects (STREP)

Multipartner research, demonstration or innovation projects whose purpose is to support research, technological development and demonstration or innovation activities of a more limited scope and ambition, particularly for smaller research actors and participants from candidate countries.

Co-ordination actions (CA)

Actions aiming to promote and support the networking and coordination of research and innovation activities. They will cover the definition, organisation and management of joint or common initiatives as well organisation of conferences, meetings, the performance of studies, exchanges of personnel, the exchange and dissemination of good practices, setting up common information systems and expert groups.

Specific Support Actions (SSA)

Single or multipartner activities intended to complement the implementation of FP6 and may be used to help in preparations for future Community research policy activities. Within the priority themes, they will support, conferences, seminars, studies and analyses, working groups and expert groups, operational support and dissemination, information and communication activities, or a combination of these.

Note: specific funding instruments are used for research infrastructure projects.

A detailed description of the financial instruments for the 6th Framework Programme is provided on the Cordis web site:

ftp://ftp.cordis.europa.eu/pub/fp6/docs/annex_instruments.pdf

Nota Bene

Every care has been taken in the preparation of this synopsis and the information is provided in good faith. This synopsis is a compilation of abstracts of the projects. Some abstracts were corrected to create a more uniform presentation. Nevertheless, the contents cannot be guaranteed to be accurate or complete, and remains under the responsibility of the coordinators of these projects. Neither the European Commission nor any person acting on behalf of the Commission can be held responsible for the contents or for the use which might be made of them. In all cases where up-to-date information is sought regarding a particular project, contact should be made with its coordinator.

I. CLIMATE PROCESSES, OBSERVATIONS AND PROJECTIONS

DYNAMITE — Understanding the Dynamics of the Coupled Climate System

CT — 003903

<http://dynamite.nersc.no/>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/03/2005
Duration:	36 months
Total project cost:	3.122.214 €
EC Contribution:	1.999.998 €
Coordinating organisation:	Nansen Environmental and Remote Sensing Center Bergen — Norway
Co-ordinator:	Helge Drange (helge.drange@nersc.no)
EC Office:	Environment Directorate

Abstract

Deeper understanding of the intrinsic variability and stability properties of the main climate variability modes is needed to assess confidence in the detection, attribution and prediction of global and regional climate change, to improve seasonal predictions, and to understand the shortcomings of current prediction systems. DYNAMITE will explore the fundamental dynamical mechanisms of two of the most important modes of climate variability: the North Atlantic Oscillation/Arctic Oscillation (NAO/AO) and the El Niño-Southern Oscillation (ENSO). The project will elucidate key theoretical and practical aspects of the NAO/AO and ENSO through analyses of available observations, application of classical and new theory, and use of idealised and state-of-the-art numerical models of the atmosphere, ocean, land-surface, sea-ice, marine biology, and the coupled climate system. Specifically, DYNAMITE will advance the understanding of strongly and weakly coupled processes underlying the natural variability of ENSO and NAO/AO; it will evaluate the representation of the coupled processes underlying ENSO and the NAO in state-of-the-art models used to predict climate change; it will advance understanding of the response of ENSO and NAO/AO to climate change; and it will assess the role of ocean biology in the variability of the tropical coupled climate system, including ENSO. DYNAMITE will be implemented by a partnership of world class climate research institutions, including a candidate country and several SMEs. All of the results and findings gained in DYNAMITE will be transferred to the climate modelling community both in and outside Europe by bi-annual electronic newsletters and a dedicated and open DYNAMITE model workshop at the end of the project. DYNAMITE will improve the European capability to make predictions of the state of the climate system from seasons to centuries ahead, thereby contributing to the competitiveness and sustainability of the European Union.

Objectives

Progress in understanding the fundamental modes of the climate system, in particular the coupled ocean-atmosphere system, is essential to improve the detection, attribution and prediction of global and regional climate change. DYNAMITE will explore the fundamental dynamics of, and the similarities and differences between, two of the most important modes of climate variability:

the North Atlantic Oscillation/Arctic Oscillation (NAO/AO) and the El Niño-Southern Oscillation (ENSO).

The project will elucidate key theoretical and practical aspects of NAO/AO and ENSO through a coordinated, focussed and open effort based on analyses of available observations, application of classical and new theory, and use of idealised and state-of-the-art numerical atmosphere, ocean/sea ice, coupled atmosphere-ocean/sea ice and coupled atmosphere-ocean/sea ice-ecosystem General Circulation Models (GCMs).

DYNAMITE will advance understanding of the intrinsic characteristics of NAO/AO and ENSO, and also the response of these modes to enhanced concentrations of greenhouse gases. Based on this, the specific objectives of DYNAMITE are:

- To quantify strongly and weakly coupled processes underlying the natural variability of ENSO and NAO/AO;
- To evaluate the representation of the coupled processes underlying ENSO (wind stress, weather noise, phase synchronisation and locking, tropical scale interactions, wave activity) and the NAO (SST, snow cover, sea ice cover, troposphere/stratosphere coupling) in state-of-art models used to predict climate change;
- To identify the response of ENSO and NAO/AO to climate change;
- To quantify the role of ocean biology in the variability of the tropical coupled climate system, including ENSO.

A central part of DYNAMITE is a set of co-ordinated model experiments. Detailed protocols for experimental design, implementation and analysis have been defined with the aim to address:

- How the ocean responds to realistic and idealised NAO-forcing,
- How the atmosphere responds to realistic and idealised SST and sea ice anomalies,
- How the short and long term atmosphere-ocean coupling strength influence ENSO,
- How NAO and ENSO may change as a result of global warming,
- How the marine biota may influence the coupled atmosphere-ocean climate system,
- How NAO and ENSO are coupled.

An open workshop will be held at the end of DYNAMITE. Here all interested European and non-European climate research scientists and groups will be informed about the research, findings, results and knowledge obtained in DYNAMITE. Special focus will be put on distributing information about the basic operation of NAO/OA and ENSO, and how climate models should be constructed (particularly linked to model formulation and resolution) to improve climate scenario integrations, climate prediction experiments and regional downscaling.

Partners

N°	Organisation	Country
1.	Stiftelsen Nansen Senter for Fjernmaaling	Norway
2.	University of Reading	UK
3.	Centre Européen de Recherche et de Formation avancée en Calcul Scientifique	France
4.	Met Office	UK

5.	Centre National de la Recherche Scientifique	France
6.	Chinese Academy of Sciences — Institute of Atmospheric Physics	China
7.	Leibniz Institut für Meereswissenschaften	Germany
8.	Istituto Nazionale di Geofisica e Vulcanologia	Italy
9.	Administratia Nationala de Meteorologie	Romania
10.	Vestas Asia Pacific A/S	Denmark
11.	Bergenshalvoeens Kommunale Kraftselskap Raadgiving As	Norway
12.	Societa Generale di Ingegneria — S.G.I. Spa di Rubano	Italy
13.	Vexcel UK Limited	UK

ENSEMBLES — Ensemble based Predictions of Climate Changes and their Impacts

CT — 505539

<http://www.ensembles-eu.org>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/09/2004
Duration:	60 months
Total project cost:	22.793.436 €
EC contribution:	15.000.000 €
Coordinating organisation:	Met Office, Hadley Center Exeter — UK
Co-ordinator:	Paul Van Der Linden (paul.vanderlinden@metoffice.gov.uk)
EC Office:	Environment Directorate

Abstract

Prediction of both natural climate variability and human impact on climate is inherently probabilistic, due to uncertainties in forecast initial conditions, representation of key processes within models, and climatic forcing factors. Hence, reliable estimates of climatic risk can only be made through ensemble integrations of Earth — System Models in which these uncertainties are explicitly incorporated. For the first time ever, a common ensemble forecast system will be developed for use across a range of timescales (seasonal, decadal, and longer) and spatial scales (global, regional, and local). This model system will be used to construct integrated scenarios of future climate change, including both non-intervention and stabilisation scenarios. This will provide a basis for quantitative risk assessment of climate change and climate variability, with emphasis on changes in extremes, including changes in storminess and precipitation, and the severity and frequency of drought, and the effects of “surprises”, such as the shutdown of the thermohaline circulation. Most importantly, the model system will be extensively validated. Hind casts made by the model system for the 20th century will be compared against quality-controlled, high-resolution gridded datasets for Europe. Probability forecasts made with the model system on the seasonal and decadal timescales will also be validated against existing data. The exploitation of the results will be maximised by linking the outputs of the ensemble prediction system to a wide range of applications. In turn, feedbacks from these impact areas back to the climate system will also be addressed. Thus ENSEMBLES will have a structuring effect on European research by bringing together an unprecedented spectrum of world-leading expertise. This expertise will be mobilised to maintain and extend European pre-eminence in the provision of policy-relevant information on climate and climate change and its interactions with society.

Objectives

The overall goal of ENSEMBLES is to maintain and extend European pre-eminence in the provision of policy relevant information on climate and climate change and its interactions with society. ENSEMBLES will achieve this by:

- Developing an ensemble prediction system based on the principal state-of-the-art, high resolution, global and regional Earth System models developed in Europe, validated against quality controlled, high resolution gridded datasets for Europe, to produce for the first time, an objective probabilistic estimate of uncertainty in future climate at the seasonal to decadal and longer timescales;
- Quantifying and reducing the uncertainty in the representation of physical, chemical, biological and human-related feedbacks in the Earth System (including water resource, land use, and air quality issues, and carbon cycle feedbacks);
- Maximising the exploitation of the results by linking the outputs of the ensemble prediction system to a range of applications, including agriculture, health, food security, energy, water resources, insurance and weather risk management.

To meet the Project Goal the project is split into a number of scientific and technological objectives with a number of operational goals. The work in the project is conducted through 10 closely connected Research Themes (RTs), each of which has Major Milestones (MMs) which are the means of assessing progress towards the project objectives and operational goals.

ENSEMBLES will be a major step forward in climate and climate change science. Over the next five years the major progress in climate science is expected mainly to take place in six areas:

The production of probabilistic predictions from seasonal to decadal and longer timescales through the use of ensembles

The integration of additional processes in climate models to produce true Earth System models

Higher resolution climate models to provide more regionally detailed climate predictions and better information on extreme events

Reduction of uncertainty in climate predictions through increased understanding of climate processes and feedbacks and through evaluation and validation of models and techniques

The increased application of climate predictions by a growing and increasingly diverse user community.

The increased availability of scientific knowledge within the scientific community and to stakeholders, policymakers and the public.

ENSEMBLES will make major scientific contributions in all these areas and, most importantly, will ensure that these six strands are all taken forward in an integrated and co-ordinated way. This will be possible because ENSEMBLES encases each of these elements within a planned and actively managed programme.

All of the major groups in Europe, who would individually be involved in the six elements, are participants in the project. In numerous ways ENSEMBLES will extend the state of the art in the prediction of climate change and its impacts at seasonal to decadal and longer timescales. Foremost in this will be the development of the first global, high resolution, fully comprehensive, ensemble based, modelling system for the prediction of climate change and its impacts. This will confirm and maintain Europe's position as the world leader in climate change prediction. The integrated system to be developed for this project will deal with issues related to:

- natural variability of climate in the context of a changing chemical environment,

- non-linearity in the response both at the global and regional scale,
- quantitative estimates of uncertainty guided by observations, relevant to policy makers.

This will require:

- Inclusion of the non-linear feedbacks between climate and the impacts of climate change (e.g. water resource management, changes in land use, energy needs). This requires a more integrated approach to the assessment of the impacts of climate change than has hitherto been undertaken within a sophisticated, state-of-the-art earth system model;
- Quantifying uncertainty in individual components of the earth system and in the interaction between individual components, through the use of (i) different model constructions and (ii) ensemble-based “perturbed physics” versions of each model. The incorporation of “perturbed physics” techniques within the modelling framework allows for an exploration of uncertainties associated with the representation of individual processes (particularly relevant for those which cannot be resolved at the model grid-scale), and together with the multi-model approach will provide a much more complete estimate of uncertainty than has thus far been possible;
- Construction of an ensemble of earth system models to provide estimates of climate and other environmental change for the next 10 to 100 years. Model diversity is a key essential for providing a level of confidence to European predictions of climate change;
- Derivation of an objective method of deriving probability distributions using ensembles of models, weighted according to the ability of an individual model to represent key aspects of observed climate. Evaluation of model skill is an essential part of the process, which will involve the development of new methodologies for diagnosing key processes and phenomena in models and for confronting them with satellite and in situ observations;
- Using the probability distributions of the impacts of climate change from the integrated system (including water management, land use, air quality, carbon management and energy use) to determine the social and economic effects and provide a risk assessment for selected emissions scenarios (policies);
- Developing a comprehensive approach to the validation of climate change ensembles and the impacts assessments, which includes the exploitation of seasonal to decadal predictability studies, thereby providing for the first time a sound, quantitative measure of confidence in future scenarios.

Thus, ENSEMBLES will begin to move the state of the art in climate prediction from a small number of deterministic predictions with no quantitative assessment of relative confidence towards an end-to-end multi-model ensemble prediction system (quantitatively validated against recent past climates and against the ability to predict future climate at the seasonal to decadal timescales) which would be able to provide probabilistic estimates of future climate change and its impacts on key sectors, at the European and global scales.

Partners

N°	Organisation	Country
1.	Met Office, Hadley Center	UK
2.	Météo France, Centre National de Recherches Météorologiques	France
3.	Centre National de la Recherche Scientifique	France
4.	Danmarks Meteorologiske Institut.	Denmark

5.	European Centre for Medium-Range Weather Forecasts	UK
6.	International Institute for Applied Systems Analysis	Austria
7.	Istituto Nazionale di Geofisica e Vulcanologia	Italy
8.	Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
9.	University of Bristol	UK
10.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
11.	National Observatory of Athens	Greece
12.	Sveriges Meteorologiska och Hydrologiska Institut	Sweden
13.	University of East Anglia	UK
14.	Université de Fribourg	Switzerland
15.	Universität Hamburg	Germany
16.	University of Reading	UK
17.	Agenzia Regionale per la Prevenzione e l'Ambiente dell'Emilia-Romagna Servizio Meteorologico Regionale'	Italy
18.	Aristotle University of Thessaloniki	Greece
19.	Bureau of Meteorology Research Centre	Australia
20.	Centre Européen pour la Recherche et la Formation Avancée en Calcul	France
21.	Cesky Hydrometeorologický Ústav	Czech Rep.
22.	Cicero Senter for Klimaforskning	Norway
23.	Climapact	France
24.	Consiglio Nazionale delle Ricerche	Italy
25.	Univerzita Karlova v Praze	Czech Rep.
26.	Danmarks Jordbrugsforskning	Denmark
27.	Università degli Studi di Firenze	Italy
28.	Deutscher Wetterdienst	Germany
29.	Electricité de France	France
30.	Ecole Normale Supérieure	France
31.	Eidgenössische Technische Hochschule Zürich	Switzerland
32.	Fondazione Eni Enrico Mattei	Italy
33.	Fundación Para la Investigación del Clima	Spain
34.	Ilmatieteen Laitos	Finland
35.	Fachhochschule für Technik Stuttgart	Germany
36.	Freie Universität Berlin	Germany
37.	Gkss Forschungszentrum Geesthacht GmbH	Germany
38.	Ústav fyziky atmosféry AV ČR	Czech Rep.
39.	The Abdus Salam International Centre for Theoretical Physics	Italy
40.	Institut für Meereskunde an der Universität	Germany
41.	Instituto Nacional de Meteorología	Spain
42.	The Trustees of Columbia University in New York City	USA

43.	Institut Universitaire Kurt Boesch	Switzerland
44.	Universität Stuttgart	Germany
45.	Commission of the European Communities — Joint Research Centre	Belgium
46.	London School of Economics and Political Science	UK
47.	London School of Hygiene and Tropical Medicine	UK
48.	Meteorologisk Institutt	Norway
49.	Meteoschweiz	Switzerland
50.	Nansen Environmental and Remote Sensing Center	Norway
51.	Institutul National de Hidrologie si Gospodarire a Apelor Bucuresti	Romania
52.	Administratia Nationala de Meteorologie	Romania
53.	Research Centre for Agricultural and Forest Environment Polish Academy of Sciences	Poland
54.	Potsdam-Institut für Klimafolgenforschung E.V.	Germany
55.	Rijksinstituut voor Volksgezondheid en Milieu	The Netherlands
56.	Société de Mathématiques appliquées et de Sciences Humaines	France
57.	Suomen Ympäristökeskus	Finland
58.	Universidad de Cantabria	Spain
59.	Université Catholique de Louvain	Belgium
60.	Universidad de Castilla la Mancha	Spain
61.	Universitetet i Oslo	Norway
62.	Lunds Universitet	Sweden
63.	Universität Kassel	Germany
64.	University of Liverpool	UK
65.	University of Oxford	UK
66.	Université Joseph Fourier Grenoble 1	France
67.	Met Eireann	Ireland

COMBINE — Comprehensive Modelling of the Earth system for better climate prediction and projection

CT — 226520

<http://www.combine-project.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/05/2009
Duration:	48 months
Total project cost:	11.423.157 €
EC Contribution:	7.922.679 €
Coordinating organisation:	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V. Hamburg — Germany
Co-ordinator:	Marco Giorgetta (marco.giorgetta@zmaw.de)
EC Office:	Environment Directorate

Abstract

The European integrating project COMBINE brings together research groups to advance Earth system models (ESMs) for more accurate climate projections and for reduced uncertainty in the prediction of climate and climate change in the next decades. COMBINE will contribute to better assessments of changes in the physical climate system and of their impacts in the societal and economic system. The proposed work will strengthen the scientific base for environmental policies of the EU for the climate negotiations, and will provide input to the IPCC/AR5 process.

COMBINE proposes to improve ESMs by including key physical and biogeochemical processes to model more accurately the forcing mechanisms and the feedbacks determining the magnitude of climate change in the 21st century. For this purpose the project will incorporate carbon and nitrogen cycle, aerosols coupled to cloud microphysics and chemistry, proper stratospheric dynamics and increased resolution, ice sheets and permafrost in current Earth system models. COMBINE also proposes to improve initialisation techniques to make the best possible use of observation based analyses of ocean and ice to benefit from the predictability of the climate system in predictions of the climate of the next few decades. Combining more realistic models and skilful initialisation is expected to reduce the uncertainty in climate projections.

Resulting effects will be investigated in the physical climate system and in impacts on water availability and agriculture, globally and in 3 regions under the influence of different climate feedback mechanisms. Results from the comprehensive ESMs will be used in an integrated assessment model to test the underlying assumptions in the scenarios, and hence to contribute to improved scenarios. COMBINE will make use of the experimental design and of the scenarios proposed for IPCC AR5. Therefore the project will be able to contribute to the AR5, by its relevant research and by the contribution of experiments to the IPCC data archives.

Objectives

The COMBINE project has the following major objectives:

- To improve Earth system models by incorporating additional processes and representing more Earth system parameters. The processes selected for this project represent: C- and N-cycle; aerosols coupled with clouds and chemistry; stratospheric dynamics and increased resolution, and ice sheets, sea ice and permafrost for the cryosphere.
- To improve initialisation and error correction schemes for decadal climate predictions.
- To use the Earth system models for decadal climate prediction and climate projection experiments following the protocols of the Coupled Model Intercomparison Project for IPCC AR5 simulations.
- To understand and quantify how single or combined new process components influence different climate feedbacks and the magnitude of projected climate change in the 21st century.
- To understand how the initialisation by itself or initialisation combined with improved process components or improved resolution can reduce the uncertainty in decadal climate prediction.
- To analyze projected climate change in three different climate regions: the Arctic, the Eastern Mediterranean and the Amazon basin; where different feedbacks are important. To analyse effects of selected new components in each region.
- To test if high spatial resolution has significant influence on strength of feedbacks.
- Quantify the impacts in two sectors: water availability and agriculture, globally and within the regions, and analyze the effect of selected new components on these impacts.
- Use Earth system models to find CO₂ emissions that are compatible with representative concentration scenarios specified for IPCC AR5 climate projections, and use an integrated assessment model to revise the scenarios accordingly.
- Contribute to IPCC AR5 by relevant research and by disseminating climate prediction and projection data to IPCC data archives.

The research effort of COMBINE will result in several deliverables (cf. section B1.3.4). Important waypoints are checked by the milestones listed in section B1.3.7. Deliverables and milestones will document the progress towards the major objectives listed above in the course of the project life time.

Partners

N°	Organisation	Country
1.	Max-Planck-Gesellschaft	Germany
2.	Met Office	UK
3.	Centre National de la Recherche Scientifique	France
4.	Centro Euro-Mediterraneo per i Cambiamenti Climatici	Italy
5.	Météo-France — Centre National de Recherches Météorologiques	France
6.	Het Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
7.	University of Bergen	Norway
8.	Danish Meteorological Institute	Danemark

9.	European Centre for Medium-Range Weather Forecast	UK
10.	Eidgenössische Technische Hochschule Zürich	Switzerland
11.	Finnish Meteorological Institute	Finland
12.	Planbureau voor de leefomgeving	The Netherlands
13.	Swedish Meteorological and Hydrological Institute	Sweden
14.	Wageningen University & Research Centre	The Netherlands
15.	University of Helsinki	Finland
16.	European Centre for Research and Advanced Training in Scientific Computation	France
17.	Université Catholique de Louvain	Belgium
18.	University of Bristol	UK
19.	University of Kassel — Center for Environmental Systems Research (CESR)	Germany
20.	Technical University of Crete	Greece
21.	Cyprus Research and Educational Foundation	Cyprus
22.	Instituto Nacional de Pesquisas Espaciais	Brazil

IS-ENES — InfraStructure for the European Network for Earth System Modelling

CT — 228203

<http://www.enes.org/IS-ENES.429.0.html>

Funding instrument:	Collaborative Project (CP) — /Cooperation and Support Action (CSA)
Contract starting date:	01/03/2009
Duration:	48 months
Total project cost:	10.666.284 €
EC Contribution:	7.591.851 €
Coordinating organisation:	Centre National de la Recherche Scientifique (CNRS)/Institut National de Sciences de l'Univers (INSU) Paris — France
Co-ordinator:	Sylvie Joussaume (sylvie.joussaume@lsce.ipsl.fr)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

IS-ENES proposes to develop a virtual Earth System Modelling Resource Centre (vERC) integrating the European Earth system models (ESMs) and their hardware, software, and data environments. The overarching goal of this e-infrastructure is to further integrate the European climate modelling community, to help the definition of a common future strategy, to ease the development of full ESMs, to foster the execution and exploitation of high-end simulations, and to support the dissemination of model results and the interaction with the climate change impact community. The vERC encompasses models, the tools to prepare, evaluate, run, store and exploit model simulations, the access to model results and to the European highperformance computing ecosystem — in particular the EU large infrastructures DEISA2 and PRACE. The vERC proposed by IS-ENES is based on generic ICT, Grid technology and subject-specific simulation codes and software environments. The European Network for Earth System Modelling (ENES) proposes IS-ENES. This network gathers the European climate and Earth system modelling community working on understanding and prediction of future climate change. This community is strongly involved in the assessments of the Intergovernmental Panel on Climate Change and provides the predictions on which EU mitigation and adaptation policies are elaborated. IS-ENES combines expertise in Earth system modelling, in computational science, and in studies of climate change impacts. ISENES aims to provide a service on models and model results both to modelling groups and to the users of model results, especially the impact community. Joint research activities will improve the efficient use of high-performance computers, model evaluation tool sets, access to model results, and prototype climate services for the impact community. Networking activities will increase the cohesion of the European ESM community and advance a coherent European Network for Earth System modelling.

Objectives

- Foster the integration of the European climate and Earth system modelling community
- Further integrate the European ESM community, through networking activities (=NA) focusing on the development of the future ENES strategy, the exchange of expertise and the development of training activities (NA1 and NA3)
- Develop a virtual Earth System Modelling Resource Centre (v.E.R.C.), using ICT technologies to integrate the different distributed facilities currently existing or developed during this project (NA2)
- Foster the development of Earth System Models for the understanding of climate change
- Increase the services around ESMs, by enhancing model documentation and developing a service on common tools and model components (NA3 and service activity SA1)
- Foster the joint development and common evaluation of the European ESMs through networking activities and joint research activities on ESM software environment (i.e. the tools to prepare, run, store, evaluate and exploit model simulations) and ESM components (NA2, JRA1 and JRA3)
- Foster high-end simulations enabling to better understand and predict future climate change
- Ensure an efficient access and execution of ESMs on high-performance computing facilities, by developing a common strategy, by enhancing the interface with and access to the EU large infrastructures DEISA2 and PRACE, by improving model performance on different computer architectures (NA1 and JRA2)
- Foster the application of Earth system model simulations to better predict and understand future climate change impacts
- Enhance the dissemination of model results, by enhancing the service around model results following the INSPIRE EU directive and developing more efficient tools to access data (SA2 and JRA4)
- Enhance the interaction with decision makers and user communities, mainly concerned by climate change impact studies, through service activity and joint research development on data access as well as more adapted indicators. This will help Europe prepare for adaptation as recommended by the 2007 EU Green paper “Adapting to climate change in Europe” (NA1 and JRA5)

Partners

N°	Organisation	Country
1.	Centre National de la Recherche Scientifique IPSL	France
2.	Max-Planck-Gesellschaft zur Förderung der Wissenschaften	Germany
3.	Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique	France
4.	Deutsches Klimarechenzentrum GmbH	Germany
5.	Finnish Meteorological Institute	Finland
6.	University of Manchester	UK
7.	Academy of Athens — Centre for Atmospheric, Physics and Climatology	Greece

8.	Science and Technology Facilities Council	UK
9.	Centro Euro-Mediterraneo per i Cambiamenti Climatici	Italy
10.	METOFFICE	UK
11.	Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
12.	Météo France — Centre National de Recherches Météorologiques	France
13.	Sveriges Meteorologiska och Hydrologiska Institut	Sweden
14.	NEC Laboratories Europe — IT Research Division	UK
15.	Linköpings Universitet	Sweden
16.	Barcelona Supercomputing Centre	Spain
17.	Wageningen Universiteit	The Netherlands
18.	Institutul National de Hidrologie si Gospodarie a Apelor	Romania
19.	Deutsches Zentrum Für Luft- und Raumfahrt in der Helmholtz Gemeinschaft	Germany
20.	Program for Climate Model Diagnosis and Intercomparison	USA

AMMA — African Monsoon Multidisciplinary Analysis

CT — 004089

<http://www.amma-eu.org>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/01/2005
Duration:	60 months
Total project cost:	36.214.755 €
EC Contribution:	12.951.960 €
Coordinating organisation:	Centre National de la Recherche Scientifique (CNRS) Paris — France
Co-ordinator:	Jan Polcher (jan.polcher@lmd.jussieu.fr)
EC Office:	Environment Directorate

Abstract

The dramatic change in the region of the West African monsoon (WAM) from wet conditions in the 50s and 60s to much drier conditions from the 70s to the 90s represents one of the strongest inter-decadal signals on the planet in the 20th century. Marked inter-annual variations in recent decades have resulted in extremely dry years with devastating environmental and socio-economic impacts. The abrupt decrease of water resources in the Sahel divided by two the cattle population and some exportation cultures disappeared. Vulnerability of West African societies to climate variability is likely to increase in the next decades as demands on resources increase due to the rapidly growing population. The situation may be exacerbated by the effects of climate change, land degradation caused by the growing population and water pollution.

Motivated by the need to develop strategies to reduce the socioeconomic impacts of climate variability and change in WAM we aim:

- To improve our ability to predict the WAM and its impacts on intra-seasonal to decadal timescales,
- To improve our ability to predict the consequences of climate change on WAM variability and its impacts.

These objectives will be achieved in the African Monsoon Multidisciplinary Analysis (AMMA) project by re-enforcing the regional environmental monitoring systems and conducting intensive field campaigns. This will lead to a better understanding of the mechanisms involved and in-fine improve our models and their predictive skills. The observational system will cover the regional water cycle, the atmospheric dynamics and chemistry, the land-surface and oceanic conditions. It will cover 3 time scales:

- a long term monitoring,
- an enhanced observing period of two years and
- a special observing periods over one rainy season. In order to monitor the human dimension of the West African monsoon variability crop yields, water resources and health will be monitored with the same strategy.

Objectives

Based on the objectives and the state of environmental monitoring and forecasting today, the AMMA consortium has chosen five goals to focus the effort of all partners and to allow each one to evaluate our progress and achievements during the course of the project:

1. Short to medium range weather forecasting

The intensive field campaign AMMA will provide the data needed to ascertain hypotheses on tropical convection, its interaction with the large scale dynamics and its role in the regional water cycle. Within this project the process studies on convection will be integrated with our improved knowledge of land-surface processes, interactions with aerosols and chemistry in order to be translated into improved parameterizations for the large scale models used in forecasting. Kilometric resolution models able to explicitly represent the convection will be used. Fine scale analyses integrating a maximum of data collected during the Special Observing Period (SOP) will be performed through variational assimilation.

2. Seasonal to climate forecasting

The long term monitoring of the water cycle put into place within AMMA will improve our understanding of the characteristics of the inter-annual rainfall variability. This will provide leads as to which of the slow components in the system have the strongest predictive skill and which of the processes need to be better understood. Key to any significant progress will be an integrative approach which views the monsoon as an object built out of internal interactions but with strong external influences. An improved conceptual view of the monsoon will help the statistical as well as the dynamic seasonal forecasts and allow us to estimate error bars for the climate change studies. The land surface data assimilation system will be improved over the AMMA region thanks to observational effort. This will allow the evaluation for the first time of the potential predictability of rainfall associated with soil moisture, which is believed to be high. Systematic observations of chemical composition over West Africa during AMMA will provide constraints on models, which will be used to assess the processing, export and impact of emissions from West Africa. The strong meridional gradients of the vegetation types and soil moisture of West Africa lead to strong gradients in certain emissions, and small changes in synoptic, seasonal or interannual climate may have large effects on the emissions from West Africa. Thus the interactions of the land surface and monsoon dynamics with the chemistry will be a critical part of this analysis.

3. Food security management

AMMA will produce estimates of a range of direct and indirect effects of changes in WAM on food security to define the vulnerability context over the region and to improve the prediction of seasonal production to serve as input for Early Warning Systems. The direct effects will include changes in yields of rain-fed crops and changes in water resources available for irrigated cultivation. Indirect effects will evaluate changes in agricultural and livelihood strategies as well as land use. Effects of, and adaptations to, climate change interact with a range of other development trends such as economic demographical evolutions. AMMA will develop scenarios for such complex situations, as a basis for analysing the specific sensitivity to WAM changes for each of them, and will test their application in operational Early Warning Systems for food security supporting the decision making process.

4. Environmental monitoring

AMMA will implement a multi-scale and integrated monitoring network providing key parameters for multidisciplinary scientific investigation. One of the issues is to determine future monitoring

strategies to be implemented in an operational mode. Within the AMMA project we will upgrade the radiosonde network and provide the personnel with the appropriate training to maintain them over the long term. The project will demonstrate the benefit for weather and climatic forecasting of these enhancements in the upper air soundings to motivate their funding at international level. Some key catchments will be instrumented to demonstrate to the local authorities the value of environmental monitoring for water resource management. AMMA will also demonstrate the impact of emissions at regional scales on local air quality. AMMA aims to improve and to evaluate satellite products which are critical for West Africa (precipitation is one of the key parameters). AMMA will also provide the basis for a system of satellite-based environmental monitoring procedures, focusing on crop and vegetation productivity, and hydrology.

5. Training and education

AMMA will show that the African monsoon is a topic of fundamental research which can mobilise the best scientists in Europe. This will entice African students and scientists to enter this field of research. This movement will be fostered by the organisation of summer schools and university PhD programs locally to provide the interested students with access to the expertise they sought abroad and allow the build up of a critical mass which will then enable a continuous scientific activity on African environmental issues. In gathering together African and European students and scientists in a motivating project, AMMA will contribute to consolidate both the scientific expertise and the long term collaboration at European and African scale.

Partners

N°	Organisation	Country
1.	Centre National de la Recherche Scientifique	France
2.	Institut de Recherche pour le Développement	France
3.	Universität zu Koeln	Germany
4.	Deutsches Zentrum für Luft und Raumfahrt E.V.	Germany
5.	University of Leeds	UK
6.	Natural Environment Research Council	UK
7.	Koebenhavns Universitet	Denmark
8.	Centre National de Recherches Météorologiques, Météo France	France
9.	Medias France	France
10.	Université de Bourgogne: Dijon	France
11.	Université Paris XII — Val de Marne	France
12.	Université Paul Sabatier — Toulouse III	France
13.	Centre de Coopération Internationale en Recherche Agronomique pour le Développement	France
14.	Universität Bremen	Germany
15.	Forschungszentrum Karlsruhe Gmbh	Germany
16.	Leibniz Institut für Meereswissenschaften	Germany
17.	Ludwig-Maximilians-Universität Muenchen	Germany
18.	Rheinische Friedrich-Wilhelms — Universität Bonn	Germany
19.	University of East Anglia	UK

20.	The University of Liverpool	UK
21.	University of York	UK
22.	University of Leicester	UK
23.	The University of Manchester	UK
24.	University of Cambridge	UK
25.	Consiglio Nazionale delle Ricerche	Italy
26.	Ente Per Le Nuove Tecnologie, l'Energia e l'Ambiente	Italy
27.	Università degli Studi di Perugia	Italy
28.	Universidad de Castilla — La Mancha	Spain
29.	Universidad Complutense de Madrid	Spain
30.	Universidad Politecnica de Cartagena	Spain
31.	Université Catholique de Louvain	Belgium
32.	European Centre for Medium — Range Weather Forecasts	UK
33.	Centre Regional de Formation et d'Application en Agrometeorologie et Hydrologie Operationnelle	Niger
34.	Centre de Recherche Médicale et Sanitaire	Niger
35.	Ecole Inter-Etats d'Ingénieurs de l'Equipement Rural Faso	Burkina
36.	African Centre for Meteorological Application for Development	Niger
37.	Vaisala Oyj	Finland
38.	Ocean Scientific International	UK
39.	Koninklijk Nederlands Meteorologisch Instituut (KNMI)	The Netherlands
40.	Agence pour la Sécurité de la Navigation Aerienne en Afrique et à Madagascar	Senegal
41.	Universität Karlsruhe (Technische Hochschule)	Germany
42.	Université Cheikh Anta Diop de Dakar	Senegal
43.	Université de Ouagadougou	Burkina-Faso
44.	Université de Bamako	Mali
45.	Université Abdou Moumouni de Niamey	Niger
46.	Université Abomey Calavi (Cotonou)	Benin
47.	Direction de la Météorologie du Mali	Mali
48.	Direction de la Météorologie du Niger	Niger
49.	Direction de la Météorologie du Sénégal	Senegal
50.	Direction de la Météorologie de Guinée	Guinea
51.	Kwame Nkrumah University of Science and Technology	Ghana
52.	Ghana Meteorological Agency	Ghana
53.	Institut Sénégalais de Recherches Agricoles	Senegal
54.	Centre d'Etudes Régional pour l'Amélioration de l'adaptation à la Sècheresse	Senegal
55.	Institut de l'Environnement et de Recherches Agricoles	Burkina-Faso
56.	Institut d'Economie Rurale	Mali
57.	Centre de Suivi Ecologique	Senegal
58.	University of Jos	Nigeria

AMMA TTC — African Monsoon Multidisciplinary Analysis — Extension

CT — 045954

<http://www.amma-eu.org>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/01/2007
Duration:	36 months
Total project cost:	1.335.960 €
EC Contribution:	1.251.960 €
Coordinating organisation:	Centre National de la Recherche Scientifique (CNRS) Paris — France
Co-ordinator:	Jan Polcher (jan.polcher@lmd.jussieu.fr)
EC Office:	Environment Directorate

Abstract

The overarching purposes of AMMA-TTC are to:

- Assist in the achievement of the UN Millennium Development Goals in Africa and the implementation of the EU Strategy for Africa, which includes action to counter the effects of climate change and the development of local capabilities to generate reliable information on the location, condition and evolution of environmental resources, food availability and crisis situations;
- Add to the African participation and ownership of AMMA research activities, and strengthen the linkages between European research institutions and the West African research community;
- Ensure that the further development of national expertise is maintained beyond the AMMA project.

To help meet these high level objectives, the specific objectives of AMMA-TTC are to:

- Identify short and longer term impacts that changes in the WAM are likely to have on agriculture and land productivity, land use, water resources, health and food security;
- Investigate the options for adaptation to the above impacts;
- Improve the ability of operational centres to forecast seasonal variation in the WAM;
- Compile the results of this research and communicate them to the user communities.

The overall strategy for the implementation of the extension of the project have been to define a complementary partnership with universities, research institutions and operational centres that constitute a long term knowledge base to feed expertise, methods and tools to operational centres. AMMA-results will be extended to include investigation of the impacts of changes and variability of the West African Monsoon, and also options for adaptation to the variability and changes. AMMA-TTC will promote the multidisciplinary approach to WAM research, by integrating geophysical research on biophysical processes with broader-based impacts. AMMA-knowledge

will be disseminated to participating centers, allowing the services provided to decision makers to be improved.”

Objectives

The AMMA project is providing underpinning science that will create new knowledge of the functioning of the West African Monsoon (WAM), the processes which drive its variability and how the timing and intensity of the monsoon may change in a future climate. This extension, AMMA-TTC, will exploit that new knowledge for the benefit of those West African states in the Sahel-Sudan zone, which will be most affected by the impacts of climate change on the region.

AMMA-TTC will reinforce the existing interactions and partnerships between European and African researchers, but expand them to create a new, stronger synergy, which combines the latest European developments in WAM research with the insights gained from regional knowledge and understanding. The African scientific community are best placed to transfer new AMMA knowledge to the policy and decision makers faced with the need to implement adaptive strategies; AMMA-TTC will empower them to do this.

The overarching purpose of AMMA-TTC is to assist in the achievement of the UN Millennium Development Goals in Africa and the implementation of the EU Strategy for Africa, which includes “action to counter the effects of climate change” and “the development of local capabilities to generate reliable information on the location, condition and evolution of environmental resources, food availability and crisis situations.” The three ‘Rio-conventions’ on climate change, biological diversity and desertification deal with strongly interrelated issues, not least when seen in a West African perspective. Research taking its point of departure in the climate domain will have important implications for understanding the likely development pathways with respect to land degradation and ecosystem structure and functioning. This calls for linking of geophysical and ecological research. To help meet these high level objectives, the specific objectives of AMMA-TTC are:

- To identify short and longer term impacts that changes in the WAM are likely to have on agriculture and land productivity, land use, water resources, health and food security;
- To investigate the options for adaptation to the above impacts;
- To improve the ability of operational centres to forecast seasonal variation in the WAM;
- To compile the results of this research and communicate them to the user communities.

These objectives will be achieved through the following activities:

- Exploiting AMMA results to investigate the impacts of, and options for adaptation to, changes in the WAM;
- Providing funding to strengthen the African participation in, and ownership of, AMMA research activities;
- Strengthening the linkages between European research institutions and African universities 4/66 AMMA-TTC 09/11/06 and research centres;
- Promoting a multidisciplinary approach to WAM research, integrating geophysical research on bio-physical processes with broader-based impacts;
- Providing regional and national operational centres with better tools and knowledge, allowing the services provided to decision makers to be improved;

- Ensuring that the further development of national expertise is maintained beyond the AMMA project.

To achieve its objectives AMMA-TTC will focus on a range of issues and research tasks. Although these issues are also addressed by AMMA, there is a new emphasis which extends the work from basic geophysical research into processes, towards research aimed at understanding the impacts of change in the WAM and the options for adaptations to those changes. These issues thus require translation of the geophysical research results of AMMA on the functioning and change of the WAM into scenarios of climate change, defining the relevant impacts and adaptation strategies to be studied.

The research issues are:

- How can better seasonal forecasting be used to improve farmers' strategies and decision making?
- What are the climate change adaptation options and strategies available to farmers and pastoralists?
- How should water resource management adapt to the impacts of hydrological change at the river basin scale?
- What is the impact of climate variability on disease transmission and then the consequences of climate change on the epidemiological patterns of malaria and rift valley fever in West Africa?
- How can AMMA results be translated into improved seasonal forecasts of the WAM?

Partners

N°	Organisation	Country
1.	Université Cheikh Anta Diop de Dakar	Senegal
2.	Université de Ouagadougou	Burkina-Faso
3.	Université de Bamako	Mali
4.	Université Abdou Moumouni de Niamey	Niger
5.	Université Abomey Calavi (Cotonou)	Benin
6.	Direction de la Météorologie du Mali	Mali
7.	Direction de la Météorologie du Niger	Niger
8.	Direction de la Météorologie du Sénégal	Senegal
9.	Direction de la Météorologie de Guinée	Guinea
10.	Kwame Nkrumah University of Science and Technology	Ghana
11.	Ghana Meteorological Agency	Ghana
12.	Institut Sénégalais de Recherches Agricoles	Senegal
13.	Centre d'Etudes Régional pour l'Amélioration de l'adaptation à la Sécheresse	Senegal
14.	Institut de l'Environnement et de Recherches Agricoles	Burkina-Faso
15.	Institut d'Economie Rurale	Mali
16.	Centre de Suivi Ecologique	Senegal
17.	University of Jos	Nigeria

THOR — Thermohaline Overturning Circulation — at Risk

CT — 212643

<http://www.eu-thor.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/12/2008
Duration:	48 months
Total project cost:	12.948.294 €
EC Contribution:	9.274.425 €
Coordinating organisation:	Institute of Oceanography — University of Hamburg Hamburg — Germany
Co-ordinator:	Detlef Quadfasel (detlef.quadfase@zmaw.de)
EC Office:	Environment Directorate

Abstract

THOR will establish an operational system that will monitor and forecast the development of the North Atlantic THC on decadal time scales and assess its stability and the risk of a breakdown in a changing climate. Together with pre-existing data sets, ongoing observations within the project will allow precise quantitative monitoring of the Atlantic THC and its sources. This will, for the first time, allow an assessment of the strength of the Atlantic THC and its sources in a consistent manner and will provide early identification of any systematic changes in the THC that might occur. Analysis of palaeo observations covering the last millennium and millennium time scale experiments with coupled climate models will be carried out to identify the relevant key processes and feedback mechanisms between ocean, atmosphere, and cryosphere. In THOR, the combined effect of various global warming scenarios and melting of the Greenland ice sheet will also be thoroughly assessed in a coupled climate model. Through these studies and through the assimilation of systematic oceanic observations at key locations into ocean circulation models, THOR will forecast the development of the Atlantic THC and its variability until 2025, using global coupled ocean-atmosphere models. THOR will also assess induced climate implications of changes in the THC and the probability of extreme climate events with special emphasis on the European/North Atlantic region. THOR builds upon techniques, methods and models developed during several projects funded within FP5 and FP6 as well as many nationally funded projects. The project will contribute to Global Monitoring for Environment and Security (GMES), to Global Observing Systems such as to the Global Ocean Observing system (GOOS), and to the International Polar Year (IPY).

Partners

N°	Organisation	Country
1.	University of Hamburg UHAM (coord.)	Germany
2.	Max-Planck Gesellschaft MPG-M	Germany
3.	British Meteorological Office Met O	UK
4.	Université Pierre et Marie Curie UPMC/OCEAN	France

5.	University of Bergen UiB	Norway
6.	The University of Reading UREAD	UK
7.	European Centre for Medium-Range Weather Forecasts ECMWF	UK
8.	Leibniz-Institute of Marine Science at the University of Kiel IFM-GEOMAR	Germany
9.	Royal Netherlands Meteorological Institute KNMI	The Netherlands
10.	Danish Meteorological Institute DMI	Denmark
11.	Fiskirannsóknarstofan FFL	Faroe Islands
12.	Finnish Institute of Marine Research FIMR	Finland
13.	Marine Research Institute MRI	Iceland
14.	Royal Netherlands Institute for Sea Research NIOZ	The Netherlands
15.	The Centre for Environment, Fisheries and Aquaculture Science CEFAS	UK
16.	Scottish Association for Marine Science SAMS	UK
17.	Natural Environment Research Council NERC	UK
18.	Nansen Environmental and Remote Sensing Centre NERSC	Norway
19.	Centre National de la Recherche Scientifique CNRS	France
20.	Commissariat à l'Energie Atomique CEA	France

ATP — Arctic Tipping Points

CT — 226248

<http://www.eu-atp.org/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/02/2009
Total project cost:	6.545.464 €
Duration:	36 months
Total project cost:	6.545.464 €
EC Contribution:	4.998.098 €
Coordinating organisation:	University of Tromsø Tromsø — Norway
Co-ordinator:	Paul Wassmann (Paul.Wassmann@nfh.uit.no)
EC Office:	Environment Directorate

Abstract

The broad interdisciplinary consortia assembled in the Arctic Tipping Points (ATP) project will be managed (WP1) to identify the elements of the Arctic marine ecosystem likely to show abrupt changes in response to climate change, and establish the levels of the corresponding climate drivers inducing the regime shift for these tipping elements. ATP will evaluate the consequences of crossing those tipping points, and the associated risks and opportunities for economic activities dependent on the Arctic marine ecosystem. Historical records of Arctic climate change and projections of future changes in Arctic sea climate and ice systems are compiled (WP2), and time series of Arctic ecosystem components analysed using novel statistical tools to detect regime shifts and ecological thresholds and tipping points, and evaluate their sensitivity to climatic forcing (WP3). Experimental manipulations and comparative analyses across broad climatic ranges will be used to detect climatic thresholds and tipping points of Arctic organisms and ecosystems, using genome-wide analyses to develop genomic markers of climate-driven stress useful as early-warning indicators of the proximity of tipping points (WP4). A biological-physical coupled 3 D model will be used to generate future trajectories of Arctic ecosystems under projected climate change scenarios and to identify their consequences for the Arctic ecosystem (WP5). The impacts of abrupt changes in the Arctic ecosystems for activities of strategic importance for the European Arctic and the associated impacts on employment and income will be elucidated, and policies and legislative frameworks to adapt and mitigate these impacts will be analysed (WP 6). The effectiveness of possible alternative, post-Kyoto policies and stabilization targets in avoiding climate-driven thresholds in the Arctic ecosystem will be examined, and the results and projections will be conveyed to policy makers, economic sectors and the public in general (WP7).

Objectives

There is mounting evidence that ecosystem response to certain types or magnitudes of extrinsic pressures (climate, human impacts, etc.) is often abrupt and non-linear, leading to a significant reorganization of system properties and processes. These ecosystem changes are known as regime shifts (Scheffer et al. 2001). Such non-linear responses are often initiated by qualitative changes in

the structure or function of the ecosystem, and are so fundamental that the impacted ecosystems respond to new pressures in completely different manners than the original ecosystem did (May 1977). Regime shifts arise, for instance, from the introduction of alien species or the loss of key species in the ecosystems. These changes can result in alterations of the most basic ecosystem parameters, including food-web structure, the flow of organic matter and nutrients through the ecosystem, or the patterns of space occupation, leading to a cascade of changes in the ecosystem. Climate drives both community structure and key organismal functions, so it is hardly surprising that regime shifts identified from marine ecosystems are often linked to climate (Cushing 1982, Steele 2004).

Partners

N°	Organisation	Country
1.	Universitetet i Tromsø	Norway
2.	Consejo Superior de Investigaciones Científicas	Spain
3.	Akvaplan-niva AS	Norway
4.	SINTEF Fiskeri og havbruk AS	Norway
5.	Aarhus Universitet	Denmark
6.	Institute of Oceanology Polish Academy of Sciences	Poland
7.	University of Cambridge, Department of Applied Mathematics and Theoretical Physics	UK
8.	Université de Pierre et Marie Curie — Paris 6	France
9.	Centre of Marine Sciences	Portugal
10.	Shirshov Institute of Oceanology, Russian Academy of Sciences	Russia
11.	Greenland Institute of Natural Resources	Greenland
12.	Svenska Vitskapsakademin, Beijer Institute for Ecological Economics	Sweden
13.	Max-Planck-Gesellschaft zur Förderung der Wissen- schaften, Institut für Meteorologie	Germany

IPY-CARE — Climate of the Arctic and its Role for Europe (CARE) — A European component of the International Polar Year

CT — 010292

<http://www.ipy-care.org/>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/07/2005
Duration:	21 months
Total project cost:	409.000 €
EC Contribution:	395.000 €
Coordinating organisation:	Nansen Environmental and Remote Sensing Center Bergen — Norway
Co-ordinator:	Ola M. Johannessen (ola.johannessen@nersc.no)
EC Office:	Environment Directorate

Abstract

The overall objective of IPY-CARE is to create, co-ordinate and prepare a Pan-European science and implementation plan for Arctic climate change and ecosystems research programme as contribution to the International Polar Year.

The Arctic has over the last 2-3 decades warmed more than other regions of the world, and the sea ice cover has decreased in the order of 10% in the same period. Climate models furthermore indicate that anthropogenic global warming will be enhanced in the northern high latitudes due to complex feedback mechanisms in the atmosphere–ocean–ice system. At the end of this century, the Arctic Ocean is predicted to be “a blue ocean” during summer time. The Arctic may therefore encounter the most rapid and dramatic changes during the 21st century, with significant consequences for environment and human activities.

The IPY-CARE Specific Support Action will create a coordinated plan for European Arctic climate and ecosystem research programme by organising expert groups who will develop a science and implementation plan for a coordinated pan-European IPY-CARE programme. Expert groups will be established for the following six modules which represent the main components of the programme: M1: Processes determining Arctic climate variability and changes; M2: Marine biological processes in response to climate change; M3: Air-sea-ice meso-scale processes and climate variability; M4: Past climate variability; M5: Remote sensing and new technology for climate data provision, and M6: Assessment of Arctic climate change impacts on climate in Europe including the Mediterranean area and socio-economic consequences for Europe. An important part of the expert groups’ activities will be to organize an Arctic climate symposium open for all.

IPY-CARE will require large and multi-disciplinary resources that can only be mobilized by a joint effort of a broad consortium, which includes all the major polar research institutions and groups in Europe. IPY-CARE will build up promotion and outreach activities to raise the awareness of the importance of the Arctic for global climate, resource exploitation, transport and environmental

vulnerability. Furthermore, IPY-CARE will develop education and training programmes in the area of Arctic climate research for young scientists in Europe.

Objectives

The overall objective of the IPY-CARE Project is to explore, quantify and model Arctic climate change, its interaction with the climate in lower latitudes and its impact on Arctic marine ecosystem, and to assess the socio-economic consequences for Europe.

Its specific objectives can be summarized as follows:

- To determine the processes responsible for the past and present variability and changes in the Arctic climate system and to improve their representation in regional and global climate models.
- To understand the degree to which recent variability and changes in the Arctic climate system, e.g., shrinking sea-ice cover, thawing permafrost and increased methane emission, are of natural or anthropogenic origin.
- To understand and quantify the response of marine biological processes to climate change and their effects on Arctic marine ecosystems and the air-sea CO₂ fluxes and to improve their representation in ecosystem models and inclusion in global climate models.
- To quantify the Arctic freshwater budget and its linkages to the global thermohaline circulation (THC) and climate, and to assess its potential in causing rapid climate change, sea-level change and sequestration of CO₂.
- To improve capabilities to predict Arctic climate on decadal and longer time scales and design optimal components of an integrated monitoring and forecasting system.
- To assess the impact of climate change in the Arctic on the THC, marine ecosystems and fisheries, transportation, offshore industry and oil and gas production, coastal infrastructures, and on climate in Europe.

Partners

N°	Organisation	Country
1.	Nansen Environmental and Remote Sensing Center	Norway
2.	Alfred Wegener Institute for Polar Research	Germany
3.	Max Planck Institute for Meteorology	Germany
4.	The Norwegian Polar Institute	Norway
5.	Academy of Sciences Mainz/Institute for Polar Ecology & Geomar Center for Marine Germany Geosciences	Germany
6.	University of Bergen, The Bjerknes Centre for Climate Research	Norway
7.	Pierre et Marie Curie University (Upmc)/Lodyc	France
8.	Finnish Institute of Marine Research	Finland
9.	Göteborg University (Ugot), Department of Chemistry	Sweden
10.	Scottish Association for Marine Science	UK
11.	Danish Meteorological Institute	Denmark
12.	State Research Center Arctic and Antarctic Research Institute	Russia
13.	Nansen International Environmental and Remote Sensing Center	Russia

14.	Centre National de la Recherche Scientifique	France
15.	Foundation for Research and Technology	Greece
16.	National Meteorological Administration	Romania
17.	Institute de Ciencia i Tecnologia Ambientals	Spain
18.	Institute of Oceanology, Polish Academy of Sciences	Poland
19.	International Polar Foundation	Belgium

WATCH — Water and Global Change

CT — 036946

<http://www.eu-watch.org>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/02/2007
Duration:	48 months
Total project cost:	13.818.339 €
EC Contribution:	9.980.096 €
Coordinating organisation:	Natural Environment Research Council UK — Swindon
Co-ordinator:	Richard Harding (rjh@ceh.ac.uk)
EC Office:	Environment Directorate

Abstract

The Integrated Project (WATCH) which will bring together the hydrological, water resources and climate communities to analyse, quantify and predict the components of the current and future global water cycles and related water resources states, evaluate their uncertainties and clarify the overall vulnerability of global water resources related to the main societal and economic sectors.

WATCH project will:

- Analyse and describe the current global water cycle, especially causal chains leading to observable changes in extremes (droughts and floods).
- Evaluate how the global water cycle and its extremes respond to future drivers of global change (including greenhouse gas release and land cover change).
- Evaluate feedbacks in the coupled system as they affect the global water cycle.
- Evaluate the uncertainties in the predictions of coupled climate-hydrological- land-use models using a combination of model ensembles and observations.
- Develop an enhanced (modelling) framework to assess the future vulnerability of water as a resource, and in relation to water/climate related vulnerabilities and risks of the major water related sectors, such as agriculture, nature and utilities (energy, industry and drinking water sector).
- Provide comprehensive quantitative and qualitative assessments and predictions of the vulnerability of the water resources and water-/climate-related vulnerabilities and risks for the 21st century.
- Collaborate intensively with the key leading research groups on water cycle and water resources in USA and Japan.
- Collaborate intensively in dissemination of its scientific results with major research programmes worldwide (WCRP, IGBP).
- Collaborate intensively in dissemination of its practical and applied results with major water resources and water management platforms and professional organisations worldwide (WWC, IWA) and at a scale of 5 selected river basins in Europe.

Objectives

WATCH will develop a new consolidated dataset, and a new, highly consistent modelling framework for water resources, hydrology and climate studies. This framework, however, will not be attempting to fully link individual model segments into a fully coupled modelling system. Instead, WATCH analyses, data consolidation and modelling efforts will focus on building a new generation of interfaces between water resources, hydrological and climate models, attempting a maximum possible consistency in spatial and time scales involved, and in related process descriptions. This will comprise one of the main innovative components of WATCH. A key component of WATCH will be the attribution of changes in rainfall and the hydrological cycle at both global and regional levels to external drivers, both natural and anthropogenic, and internal variability.

WATCH will consolidate global datasets available from the hydrological (river flow, evaporation, groundwater, river regulation, irrigation use) and climate (CRU, ERA40, ELDAS, GSWP) communities at a scale of approximately 50 km, with regional datasets down to 10 km. These datasets will be used for the assessment of the water cycle in the 20th century. Compatible datasets from the climate modelling (and scenario) communities (such as those from the PRUDENCE consortia and ENSEMBLES IP) will also be incorporated into this data framework. Finally, water use reconstructions and scenarios will be produced and also be incorporated into this data framework, so that:

- the same modelling systems, developed and validated on the 20th century datasets, can be run into the future;
- consistent downscaling algorithms are used;
- the uncertainties in future simulations can be assessed (using the ensembles of climate and associated hydrology model simulations for the 20th century and the consolidated global and regional databases).

A number of hydrological models with a wide range of processes and influences (sub-grid and global, physical and human) and data that describe the past and future water use (irrigation etc.) will be incorporated in the modelling framework.

By bringing together hydrologists, water cycle experts and climate modellers, WATCH will develop new methods to obtain the relevant information (means, extremes and uncertainties) from global datasets and climate model outputs. The end product (threats to future water resources) will drive the combination of this new hydro-climatological approach of assessing floods and droughts in the 21st century with assessments of human and ecological water demands.

Partners

N°	Organisation	Country
1.	Natural Environment Research Council	UK
2.	Wageningen Universiteit	The Netherlands
3.	Vereniging voor Christelijk Hoger Onderwijs Wetenschappelijk Onderzoek en Patientenzorg	The Netherlands
4.	Danmarks Meteorologiske Institut	Denmark
5.	Centre National du Machinisme Agricole, du Génie Rural, des Eaux et des Forêts	France
6.	Johann Wolfgang Goethe Universität Frankfurt Am Main	Germany

7.	The Abdus Salam International Centre For Theoretical Physics	Italy
8.	Met Office	UK
9.	Max Planck Gesellschaft Zur Förderung Der Wissenschaften E.V	Germany
10.	Zakladu Badan Srodowiska Rolniczego I Lesnego — Polskiej Akadeemii Nauk	Poland
11.	Potsdam Institut für Klimafolgenforschung	Germany
12.	Technical University of Crete	Greece
13.	Universitetet I Oslo	Norway
14.	Universitat de Valencia	Spain
15.	The Chancellor, Masters and Scholars of the University of Oxford	UK
16.	International Institute for Applied System Analysis — Iiasa	Austria
17.	Centre National de la Recherche Scientifique	France
18.	Fundacao da Faculdade de Ciencias da Universidade de Lisboa	Portugal
19.	Univerzita Komenskeho V Bratislave.	Slovakia
20.	Consejo Superior De Investigaciones Cientificas	Spain
21.	Universität Kassel	Germany
22.	Kiwa Nv	The Netherlands
23.	Observatoire De Paris	France
24.	Vyzkumny Ustav Vodohospodarsky T.G. Masaryka	Czech Rep
25.	Noregs Vassdrags- Og Energidirektorat	Norway

PHYTOCHANGE — New Approaches to Assess the Responses of Phytoplankton to Global Change

CT — 205150

<http://www.awi.de/en/go/PhytoChange>

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/06/2008
Duration:	60 months
Total project cost:	1.399.984 €
EC Contribution:	1.399.984 €
Coordinating organisation:	Alfred-Wegener-Institut für Polar- und Meeresforschung Bremerhaven — Germany
Co-ordinator:	Catherine Audebert (catherine.audebert@awi.de)
EC Office:	Implementation of the "Ideas" Programme Directorate

Abstract

Phytoplankton are responsible for a major part of global primary production due to the immensity of the marine realm and are heavily implicated in global biosphere equilibriums by driving elemental chemistry in surface oceans, exporting massive amounts of C to sediments and influencing ocean-atmosphere gas exchange. Climate change will alter the marine environment within the next 100 years. Increasing atmospheric CO₂ has already caused higher aquatic pCO₂ levels and lower pH (ocean acidification) and rising temperature will impact ocean stratification, and hence light and nutrient conditions. Phytoplankton will be affected by these Earth system transformations in many ways, altering the complex balance of biogeochemical cycles and climate feedback mechanisms. Prediction of how phytoplankton may respond at the cellular and ecosystem levels is a key challenge in global change research.

The proposed project will investigate physiological reactions of 3 important phytoplankton groups (diatoms, coccolithophores, cyanobacteria) to environmental factors which will be affected by global change (pCO₂/pH, light, nutrients). Using an innovative combination of cutting-edge mass-spectrometric and fluorometric techniques, a suite of in vivo assays will be applied in lab and field experiments to develop a process-based understanding of cellular responses. Specific biogeochemical issues will be addressed since diatoms are the main drivers of vertical organic C fluxes, coccolithophores regulate ocean alkalinity through calcification, and N₂-fixing cyanobacteria control availability of reactive N. These are relevant in different marine zones, from Southern Ocean to equatorial oligotrophic waters. Data will significantly improve understanding of key processes in phytoplankton and will be exploited in multidisciplinary contexts ranging from molecular to ecological processes and, through cellular and ecosystem models, to predictions of marine biosphere responses to future global change.

Objectives

The overall aim of our research group is to quantify as well as to understand marine phytoplankton responses to the projected changes. Working on different phytoplankton groups and specific

oceanic regions complementary issues are addressed. To develop a process-based understanding of observed responses, a combination of mass-spectrometric and fluorimetric techniques is applied. Our research topics will include:

- Community shifts and productivity changes in the Southern Ocean
- The future of pelagic calcification
- The future of oceanic nitrogen fixation
- Competitive interactions of dinoflagellates under ocean acidification

Partners

N°	Organisation	Country
1.	Alfred-Wegener-Institut für Polar- und Meeresforschung	Germany

ENHANCE — Enhancing the European Participation in Living with Climate Variability and Change: Understanding the Uncertainties and Managing the Risks

CT — 036895

<http://www.livingwithclimate.fi/>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	1/05/2006
Duration:	9 months
Total project cost:	424.822 €
EC Contribution:	60.000 €
Coordinating organisation:	Finnish Meteorological Institute Helsinki — Finland
Co-ordinator:	Jaakko Helminen (jaakko.helminen@fmi.fi)
EC Office:	Environment Directorate

Abstract

Climate change is becoming a sensitive factor in human socio-economical activities as anthropogenic activities alter the Earth system. This can entail rising losses and damage associated with climatic hazards, thus requiring urgent and purposeful adaptation to climate conditions and managing climate-related risks.

The conference “WMO Conference on Living with Climate Variability and Change: Understanding the uncertainties and managing the risks” (LWCVC) to be held in Espoo, Finland, 17- 21 July 2006, co-sponsored by the World Meteorological Organization, the Finnish Meteorological Institute, and the International Research Institute for Climate Prediction will review possibilities and constraints in integrating climate risks and uncertainties into the main decision-making areas that are critically sensitive to climate variability and change. The conference will draw on the experiences of public and private organizations worldwide that have been engaged in creating and using climate information and predictions to assess and manage related risks. Particular efforts will be devoted to the dissemination of the conference recommendations to key stake holders.

The focus of the conference is on decision-processes in a real-world context with critical climate relationships. Europe has a responsibility in global impacts but certainly much to offer worldwide in terms of political will, technological expertise and management practices. It is thus timely that Europe takes a leading role in this endeavour to harness management, technological and institutional issues at stake.

The goal of the conference is to make substantial progress in the establishment of an operative agenda for laying down adaptation measures to climate variability and change, to launch a lasting process for future initiatives and to enhance European participation in these. The conference will also contribute to the achievements of the international development goals established under the 2000 United Nations Millennium Declaration.”

Objectives

The proposed project will deliver all arrangements as to organizational and implementation aspects of the WMO Conference on Living with Climate Variability and Change: Understanding the uncertainties and managing the risks (LWCVC) on 17 — 21 July, 2006 in Dipoli, Espoo, Finland. The LWCVC is being co-organized by the World Meteorological Organization (WMO), the Finnish Meteorological Institute (FMI) and the International Research Institute for Climate and Society (IRI), while the FMI is the host of the conference.

The LWCVC is being convened by the co-organizing organizations in recognition that climate can no longer be taken for granted by any community, country, region of the world as a whole. Furthermore, societies are becoming increasingly interdependent in the provision of food, water, and energy resources. The climate system is changing and losses associated with climate hazards are rising.

In its structure the LWCVC will cover decision making research and the following five key sectors that are especially sensitive to climate variability and change: agriculture and food security, disasters and early warning, energy and built environment, human health and disease control, and water resources. The sectors will be considered from three different perspectives: business, society, and environmental protection.

In addition, the scientific organizing committee (SOC) has suggested for the LWCVC five cross-cutting issues: long-term planning & development: from the perspective of the public and private sector, risk assessment & risk management, interdisciplinary applied research, financial mechanisms, and long-term planning & development: from the perspective of developing countries. The LWCVC itself will decide the final cross-cutting themes to be considered in the breakout sessions.

Through the project, the LWCVC will shed light on how best to integrate climate information, including current information, predictions, and scenarios, into strategic planning, day-to-day decision-making and risk management, recognizing that climate will frequently be only one of several contributing information streams.

The LWCVC will:

- encompass all planning horizons (1 month -> 100 years) relating to climate variability and change, where climate variability is expressed as distributions of describing variables, like monthly mean temperatures, while climate change allows for changes in the distribution;
- take up the combined consequences of increasing or decreasing climate variability, and of monotonic change;
- investigate how to meet the needs for climate data and information on all planning horizons and at all spatial scales relevant to the functioning of societies, e.g. data in the form of distributions pertinent to the user in the context of decision making;
- consider how to ensure that regional predictions, scenarios and other forms of climate information are brought to the fore whenever plans are being formulated and decisions being made in areas of food security, health, environmental management, water management, and overall sustainable development;

examine in detail the technical methods for and difficulties associated with integrating data and information of disparate forms, including climate, for planning, making decisions and managing risks;

- draw participants from many disciplines in both the private and public sectors, including mathematics, psychology, climate, agriculture, health, hydrology, sociology, governance, development, energy and environment;
- explore how climate information, knowledge, predictions and scenarios can contribute to societal planning, decision processes and risk management — where there are demonstrated sensitivities to climate variability and change.

The LWCVC will also provide the opportunity to discuss options to initiate the design of an on-going process through which the results of climate science will continue to be promoted and brought routinely and more effectively into the mainstreams of societal planning, decision processes and risk management. In this regard, the WMO views the LWCVC as an important preparatory step for the convening of the Third World Climate Conference ⁽¹⁾.

The state of the art in the topics to be covered by the LWCVC is both in its early development and relatively scattered among some institutes and organizations. One important achievement has been the establishment of regional climate outlook forums starting from tropical regions. The SOC of the LWCVC is well aware of these developments. In addition one of the co-organizers, IRI, is pursuing active research in this area with cooperative field experiments mainly in several tropical locations. All this has demonstrated the growing need for multi-scientific and multi-organizational cooperation between the climate information suppliers and users. From this context rises also the need to design and develop on-going processes to support the decision making by assessing the total risk and the risks for climate as a part of it. The computational Bayesian methods represent one interesting development in the modern probabilistic methods to be applied in these risk assessments and related fusion of different information sources.

Partner

N°	Organisation	Country
1.	Ilmatieteen Laitos	Finland

(1) The First World Climate Conference in 1979 led to the establishment of the World Climate Programme, while the Second World Climate Conference in 1990, together with the first assessment report of the Intergovernmental Panel on Climate Change (IPCC), laid much of the scientific groundwork for the establishment of the UN Framework Convention on Climate Change.

EMIS — An Intense Summer Monsoon in a Cool World, Climate and East Asian Monsoon during Interglacials 500,000 years ago and before

CT — 227348

(¹)

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/11/2008
Duration:	60 months
Total project cost:	893.880 €
EC Contribution:	893.880 €
Coordinating organisation:	Université Catholique de Louvain Louvain-la-Neuve — Belgium
Co-ordinator:	Anne Bovy (anne.bovy@uclouvain.be)
EC Office:	Implementation of the "Ideas" Programme Directorate

Abstract

Asian monsoon is a spectacular occurrence in the climate system. What make it so powerful are the combination of thermal contrast between the Worlds largest landmass (Eurasian continent) and ocean basin (the Indo-Pacific Ocean) and the presence of the Worlds largest ridge, the Tibetan Plateau. Climatologically, monsoon regions are the most convectively active areas and account for the majority of global atmospheric heat and moisture transport. Moreover, the economy, culture and rhythms of life of 60% of humanity are critically influenced by the evolution and variability of the Asian monsoon. The need to better understand the monsoon leads inevitably to the close inspection of its activity during the geological times to provide a long-term perspective from which any future change may be more effectively assessed. Our research proposal aims to understand the seeming paradox of the exceptionally intense East Asian summer monsoon (actually the strongest over the last one million years) which occurred during the relatively cool interglacial (MIS-13), 500,000 years ago. This will be done using first a model of intermediate complexity (LOVECLIM) to achieve a number of sensitivity experiments to the astronomical forcing, the Eurasian and North American ice sheets, the Tibetan Plateau and the Ocean. Ocean-atmosphere coupled general circulation models will then be used to confirm the main processes underlined by LOVECLIM, in particular those related to the wave train topographically induced by the Eurasian ice sheet, to the Tibetan Plateau, to the sea-surface temperature and to their role in reinforcing the East Asian summer monsoon. This monsoon of MIS-13 will be compared with the monsoon which occurred during the other interglacials of the upper Pleistocene and Holocene (about the last 700,000 years). All simulation results will be compared with the available proxy records, in particular-but not exclusively-those coming from the loess-soil sequences in China.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Université Catholique de Louvain	Belgium

EPICA-MIS — New Paleoreconstructions from Antarctic Ice and Marine Records

CT — 003868

<http://www-lgge.ujf-grenoble.fr/epica-mis/>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/12/2004
Duration:	42 months
Total project cost:	5.470.257 €
EC Contribution:	2.500.000 €
Coordinating organisation:	Centre National de la Recherche Scientifique Grenoble — France
Co-ordinator:	Dominique Raynaud (raynaud@lgge.obs.ujf-grenoble.fr)
EC Office:	Environment Directorate

Abstract

The objective of the Specific Targeted Research Project EPICA-MIS is to produce palaeoreconstructions and integrated climate analysis through marine and ice core studies. It will contribute to the development of novel paleoreconstruction methods by providing unique paleorecords and developing new proxies of critical properties of the climate system. The two Antarctic deep ice cores will be completed and they will for the first time reveal atmospheric records of greenhouse gases like CO₂ and methane reaching 800,000 years back in time. Novel multi-parameter and high-resolution records of climate-relevant parameters like ice isotopes, greenhouse gases, dust and soluble impurities will be produced from the new Antarctic ice cores. They will be compared and correlated with palaeoreconstructions from marine, Greenland and other Antarctic regions. A key task here is to produce common timescales for the records by comparing the individual datings and by investigating novel tephra and paleomagnetic correlation methods. The produced multiproxy reconstructions will provide an outstanding platform for understanding and modelling the past and present climate. Because the reconstructions from both ocean and ice cores will be integrated and will use novel indicators for instance for sea ice, Antarctic insolation, iron or opal isotopes, climatic issues like the carbon cycle, sea surface temperature, and the climatic coupling between the northern and southern hemispheres can be addressed with new perspectives. As strategies for mitigation and adaptation to global change have to be based on predictions on future climate, the EPICA-MIS novel palaeoreconstructions will produce new evidence about climate dynamics and variability necessary to improve and test policy-relevant models. The Research Project described here goes a step further in integrating the European ice core research groups with marine palaeoclimate research groups, thus forming a strong European Research Area.

Objectives

The Project's strategic objectives can be summarized as follows:

- State of knowledge
- Completion of the EPICA drillings
- Extending the ice record
- Developing novel proxies for paleoclimatic reconstruction
- Paleoreconstruction and integrated climate analysis through marine and ice core studies

Partners

N°	Organisation	Country
1.	Centre National de la Recherche Scientifique	France
2.	Alfred-Wegener-Institut für Polar — und Meeresforschung	Germany
3.	Consorzio Nazionale Interuniversitario per le Scienze del Mare	Italy
4.	Université Libre de Bruxelles	Belgium
5.	Koebenhavns Universitet	Denmark
6.	Institut Polaire Français — Paul Emile Victor	France
7.	Utrecht University	The Netherlands
8.	Stockholms Universitet	Sweden
9.	Norwegian Polar Institute	Norway
10.	University of Bern	Switzerland
11.	Natural Environment Research Council	UK
12.	University of Cambridge	UK
13.	Commissariat à l'Energie Atomique	France
14.	Consorzio per L'attuazione del Programma Nazionale di Ricerche in Antartide	Italy

PACEMAKER — Past Continental Climate Change: Temperatures from Marine and Lacustrine Archives

CT — 226600

(¹)

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/01/2009
Duration:	60 months
Total project cost:	2.498.040 €
EC Contribution:	2.498.040 €
Coordinating organisation:	Stichting Koninklijk Nederlands Instituut voor Zeeonderzoek (NIOZ) AB Den Burg (Texel) — The Netherlands
Co-ordinator:	Maarten A. van Arkel (Maarten.van.Arkel@nioz.nl)
EC Office:	Implementation of the "Ideas" Programme Directorate

Abstract

Global climate change is a topic of major interest as it has a large impact on human societies. Computer models used to predict directions of future climate change are validated by means of retrospective analysis of past climate changes. Detailed reconstruction of past climates, especially temperature, is, therefore, of considerable importance. Several tools (proxies) are available to reconstruct absolute sea surface temperatures. Continental temperature reconstructions, however, are hampered by a lack of quantitative temperature proxies and, consequently, are often qualitative rather than quantitative.

Recently, my group discovered a new quantitative continental temperature proxy, the MBT index, which is based on the distribution of membrane lipids of soil bacteria. Their composition is a function of annual mean air temperature (MAT). These lipids are transported by rivers to the ocean and deposited in marine sediments. Determination of the MBT index in cores from river fans can, thus, potentially be used to reconstruct continental, river basin-integrated, temperatures from a marine record in front of large river outflows.

We will study the mechanisms of transport of the soil bacterial membrane lipids to the ocean in many river systems and compare the down-core changes in their composition with conventional MAT proxies. We will also investigate the potential of lake sediments as archives of continental climate change using our new MBT palaeothermometer and apply this thermometer in the assessment of continental climate change during the transition from a hothouse to an icehouse Earth in the last 100 million years. This project that combines aspects of microbiology, molecular ecology, lipid biogeochemistry and paleoclimatology will bring this novel continental palaeothermometer to maturity. If we can ground-truth the use of the MBT-proxy, it will open up

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

new windows in palaeoclimatological research and thus contribute to improvement of current climate models.

Partners

N°	Organisation	Country
1.	Stichting Koninklijk Nederlands Instituut voor Zeeonderzoek (NIOZ)	The Netherlands
2.	Universiteit Utrech	The Netherlands

MATRICS — Modern Approaches to Temperature Reconstructions in Polar Ice Cores

CT — 226172

(¹)

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/01/2009
Duration:	60 months
Total project cost:	2.100.000 €
EC Contribution:	2.100.000 €
Coordinating organisation:	Universität Bern Bern — Switzerland
Co-ordinator:	Doris Raetz (raetz@climate.unibe.ch)
EC Office:	Implementation of the “Ideas” Programme Directorate

Abstract

The recent anthropogenic global warming makes a detailed knowledge of variations in the Earth climate system and of the coupling processes between climate and biogeochemical cycles of pressing importance. Studies of climate changes in the past represent a vital part of climate change research which is essential to assess the current warming against the background of natural climate variability. Due to strong limitations in direct observations, climate reconstructions for the past can only be achieved using natural climate archives. The paleoclimatic archive in ice cores provides not only information on climate variability over many thousands of years in high resolution but also on greenhouse gases, aerosol concentrations and more. Crucial questions on climate variability on interannual to orbital time scales and on the coupling processes and teleconnections in the climate system remain still open. To answer these questions novel climate parameters on polar ice cores are needed that go beyond previous studies in terms of temporal resolution, spatial coverage as well as quantitative representativeness. This proposal intends to develop such methods based on latest advances in analytical techniques and to apply them to polar ice cores. The common theme of the new approaches within MATRICs is the reconstruction of new, quantitative temperature information from different regions of the Earth all on the same core avoiding crucial crossdating issues.

This comprises

- continuous quantitative reconstructions of local temperature changes on polar ice sheets in seasonal resolution using new approaches,
- estimates of climate changes in continental, not permanently ice covered regions based on concurrent changes in the methane cycle and
- new physical ice core gas thermometer for mean global ocean temperature.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Successful implementation of the studies in MATRICs will make a significant contribution to maintain the world leading position of European ice core science.

Partners

N°	Organisation	Country
1.	Universität Bern	Switzerland

ICEPROXY — Novel Lipid Biomarkers from Polar Ice: Climatic and Ecological Applications

CT — 203441

(¹)

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/10/2008
Duration:	60 months
Total project cost:	1.888.593 €
EC Contribution:	1.888.593 €
Coordinating organisation:	Centre National de la Recherche Scientifique (CNRS) Paris — France
Co-ordinator:	Liliane Flabbée (secretariat@dr2.cnrs.fr)
EC Office:	Implementation of the “Ideas” Programme Directorate

Abstract

It is widely acknowledged that polar sea ice plays a critical role in global climate change. As such, sea ice reconstructions are of paramount importance in establishing climatic evolution of the geological past. In the current project, some well characterised organic chemicals (biomarkers) from microalgae will be used as proxy indicators of current and past sea ice in the Arctic and Antarctic regions. These biomarkers, so-called highly branched isoprenoids (HBIs), possess a number of characteristics that make them attractive as sea ice proxies. Firstly, some HBIs are unique to sea ice diatoms, so their presence in polar sediments can be directly correlated with the previous occurrence of sea ice. Secondly, they are relatively resistant to degradation, which extends their usefulness in the geological record. Thirdly, their relative abundance makes them straightforward to measure with a high degree of geological resolution.

One component of this project will consist of performing regional calibrations of the proxies. Concentrations of selected biomarkers in recent Arctic and Antarctic sediments will be correlated with the sea ice abundances determined using satellite technology over the last 30 years. The successful calibration of the proxies will then enable reconstructions of past sea ice extents to be performed at unprecedented high resolution. Sediment cores will be obtained from key locations across both of the Arctic and Antarctic regions and the data derived from these studies will be used for climate modelling studies.

As a complement to these physico-chemical studies on sea ice, a second component of the project will investigate the use of these biomarkers for studying sea ice-biota interactions and, by examining the transfer of these chemicals through food chains, new tools for determining the consequences of future climate change on polar ecosystems will be established.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Centre National de la Recherche Scientifique (CNRS)	France

MILLENNIUM — European Climate of the Last Millennium

CT — 017008

<http://137.44.8.2/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/01/2006
Duration:	54 months
Total project cost:	15.411.376 €
EC Contribution:	12.600.000 €
Coordinating organisation:	University of Wales Swansea Swansea — UK
Co-ordinator:	Danny McCarroll (D.McCarroll@swansea.ac.uk)
EC Office:	Environment Directorate

Abstract

Millennium will answer one of the most critical questions in climate research: does the magnitude and rate of 20th Century climate change exceed the natural variability of European climate over the last millennium? Existing climate reconstructions rely on inadequate data and underestimate variability. Improved GCM parameterization requires more accurate reconstructions and integrated modelling. We will supply high-resolution chronologies that capture the magnitude and rate of change and the magnitude and frequency of extreme events over the last 1000 years. Our multi-disciplinary team will use innovative and developing technologies to extract quantitative palaeoclimate information from documentary and natural archives, including trees, lakes, mires and ice cores. A multi-proxy approach provides seasonal palaeoclimate signals with quantified precision. Advances in dating allow us, for the first time, to place terrestrial and marine proxy records on the same timescale, allowing lead and lag relationships in ocean-atmosphere forcing to be captured. Annually banded seashells will be cross-dated like tree rings, and tephra-rich sediments used to construct a marine chronology independent of P14PC dating. This can be used to reconstruct changes in ventilation linked directly to the strength of North Atlantic circulation. Millennial reconstructions of European climate, at a range of scales, will define whether recent climate change is unusual in the context of past variability. Millennium proxy-based reconstructions will be fused with a hierarchy of models, run over both millennium and century time scales using a purpose-built PC cluster and the huge resources of the Climateprediction.net distributed computing network. Integrated hind- and forecast modelling, (using HadCM3) will allow us to test whether current empirically reconstructed climate records based on regression methods underestimate climate sensitivity or if current GCM simulations give overestimates.

Objectives

Millennium has a single clear objective: to determine with quantifiable precision whether the magnitude and rate of 20th Century climate change exceeds the natural variability of European climate over the last millennium. To do this the project will use the very best documentary, biological and sedimentary archives available across Europe and apply the most powerful techniques to extract palaeoclimate signals. By harnessing some of the best laboratory facilities

available we will produce multi-proxy climate reconstructions of unparalleled accuracy and precision. Combined with existing instrumental and proxy palaeoclimate data, our results will allow us to model the past and future impacts of anthropogenic climate forcing using realistic patterns of natural climate variability across Europe.

The Millennium project will achieve six aims:

- It will produce a database of the best data on past climate.
- It will produce new millennial-length palaeoclimate data using the most powerful and innovative methods.
- It will combine the existing and new data to reconstruct the climate of Europe for the last one thousand years at a range of spatial scales.
- It will use the reconstructions to define the natural variability of European climate, over both space and time, and taking account of changes in seasonality.
- It will test the ability of the most commonly used climate model to reproduce the magnitude of natural climate variability in the past.
- It will predict the probability of European climate passing critical thresholds, taking full account of the natural variability as well as greenhouse forcing.

To place recent climate change in a longer term context, several studies have developed millennial length, annually resolved reconstructions of northern hemispheric temperatures. However, despite the high profile status of some of these data-sets, they are limited for a variety of reasons:

- Such time-series provide only a large-scale picture of the mean state of one climate parameter — i.e. mean temperature. The spatial complexity of climate change cannot be assessed from these data.
- The fidelity/robustness of these reconstructions quickly diminishes back in time as very few proxies were included in the early portions of these series.
- Methods used to develop these reconstructions can potentially underestimate the temperature amplitude change over the whole millennium. A more precise assessment of the absolute reconstructed temperature amplitude change is needed to help quantify the relative influences of forcing mechanisms in climate models.
- Due to the strong bias to tree ring-width data, the reconstructions are also likely biased to the summer season, despite the fact that greatest recent changes have been observed in the winter months.

There is therefore a need for complementary investigations at small and intermediate scales with the expressed aim of reconstructing other climatic parameters (e.g. precipitation) and not just temperature. The record breaking central European floods in and the widespread European drought in 2003, demonstrate the need for a better understanding of precipitation variability in this region. The Millennium project will focus its investigations on Europe where previous research has shown a more varied climate compared to the large-scale Northern Hemisphere reconstructions. The project is built on the rationale that a multi-proxy research approach represents the most productive route towards understanding climate variability, and more specifically for placing the 20th and 21st century climates in the context of the last millennium.

Europe is unique in that there exist long high-quality instrumental records with which assessment of proxy series can be made. This project will not only utilise existing proxy records (e.g. tree-ring

and documentary sources), but will emphasise the development of isotopic tree-ring records as well as incorporating a range of new exciting proxy sources (e.g. isotopic records from molluscs, high resolution sedimentary archives and Alpine ice cores). The resulting multi-proxy data-base will not only be rigorously calibrated and furnished with realistic error estimates, but separate calculations for specific parameters, regions, times and time-scales will also be developed. From these data the project will provide the best available information on characteristic modes and magnitudes of natural climate variability for comparison with the natural forcing histories and outputs from climate models. The important questions about the nature, and the significance, of recent climate change can be addressed in separate model-based, and observational domains and ultimately, the issue of attribution can be explored using the combined information from both approaches.

Millennium directly addresses the central objective of Sub-Priority 1.1.6.3 'Global Change and Ecosystems' by strengthening the scientific basis for understanding the processes and factors controlling global change and hence contributes to the protection of ecosystems and the preservation of biodiversity. Ultimately, the project will focus clearly on the most critical unresolved question concerning climate change in Europe, specifically: does the magnitude and rate of 20th Century climate change exceed the natural variability of European climate over the last millennium?

Partners

N°	Organisation	Country
1.	University of Wales Swansea	UK
2.	University of Oulu	Finland
3.	Masaryk University of Brno	Czech Rep.
4.	University Court of The University of St Andrews	UK
5.	Swiss Federal Research Institute Wsl	Switzerland
6.	Scottish Association for Marine Science	UK
7.	University of Tromsø	Norway
8.	University of Oxford	UK
9.	University of Bern	Switzerland
10.	Paul Scherrer Institut	Switzerland
11.	Slovenian Forestry Institute	Slovenia
12.	Dm Technology Limited	UK
13.	Cox Analytical Systems Sweden Ab	Sweden
14.	Anglia Polytechnic University	UK
15.	Helsingin Yliopisto	Finland
16.	Ufz — Umweltforschungszentrum Leipzig — Halle GmbH	Germany
17.	Stockholms Universitet	Sweden
18.	University of Wales, Bangor	UK
19.	Utrecht University	The Netherlands
20.	Forschungszentrum Juelich GmbH	Germany
21.	Finnish Forest Research Institute	Finland

22.	Norwegian Polar Institute	Norway
23.	University of Aarhus	Denmark
24.	Science Institute, University of Iceland	Iceland
25.	Nerc Isotope Geosciences Laboratory, British Geological Survey	UK
26.	Umeå University	Sweden
27.	Hohenheim University	Germany
28.	Universitat de Barcelona	Spain
29.	Adam Mickiewicz University	Poland
30.	Institute of Geography Russian Academy of Sciences	Russia
31.	Albert-Ludwigs-Universität Freiburg	Germany
32.	The University of Edinburgh	UK
33.	University of Sunderland	UK
34.	Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
35.	Institute of Meteorology and Water Management	Poland
36.	University of Szeged	Hungary
37.	Centre for Ecology and Hydrology	UK
38.	University of Exeter	UK
39.	Italian National Research Council	Italy

SEARCH for DAMOCLES — Study of Environmental Arctic Change — Developing Arctic Modelling and Observing Capability for Long-term Environment Studies

CT — 037111

<http://www.damocles-eu.org/>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/10/2006
Duration:	44 months
Total project cost:	605.000 €
EC Contribution:	605.000 €
Coordinating organisation:	Université Pierre et Marie Curie Paris — France
Co-ordinator:	Jean-Claude Gascard (gascard@lodyc.jussieu.fr)
EC Office:	Environment Directorate

Abstract

SEARCH for DAMOCLES is proposing an SSA that is based on recent initiatives started in Europe and the USA in the field of Arctic marine ecosystems and Global change, with specific emphasis on Arctic Ocean long-term observatories. The SSA will capitalize on opportunities and significant benefits arising from coordination of large scale research programmes such as the European Integrated Project DAMOCLES (Developing Arctic Modelling and Observing Capabilities for Long-term Environmental studies) and the US research program SEARCH (Study of Environmental Arctic Change). SEARCH for DAMOCLES, positioned in the domain of Arctic Science, will be particularly timely in the context of the International Polar Year and will significantly contribute to the coordinated implementation of the DAMOCLES and SEARCH work programmes in the field of Global Change and Ecosystems. Close synchronization of these programmes will enhance the acquisition of pan-arctic data sets, and their analysis, the dissemination and archiving of results, as well as heightening public awareness. International workshops and conferences including other partners such as Canada, Russia, and Asian countries (Japan, China, and South Korea), will enable translation of the results into planning of integrated, future activities that will be based on the SSA SEARCH for DAMOCLES. The coordination and synchronization of Arctic programs such as DAMOCLES and SEARCH, through an SSA is a unique opportunity to ensure the necessary pan-arctic coverage of observations and data evaluation for understanding Arctic system variability, avoiding major gaps and unnecessary overlaps. This EU-US SSA will also contribute to promotion and facilitation of future RTD activities via prospective studies, exploratory measures and pilot actions. The EU-US SSA SEARCH for DAMOCLES is proposed for 3 years covering the 3 last years of the 4-year DAMOCLES Integrated Project (2006-2009) and the 2 years of the IPY (2007-2008).

Objectives

Recently the two independent pan-Arctic, long-term research programmes SEARCH (Study of Environmental Arctic Change) and DAMOCLES (Developing Arctic Modelling and Observing

Capabilities for Long-term Environmental Studies) have been designed in the US and Europe, respectively, to increase our capability for predicting Arctic Climate changes. Both programmes propose elements of an integrated observing and forecasting system on seasonal to climate time scales. These programmes have been funded independently: SEARCH by a US interagency consortium (NSF, NOAA, NASA etc.) and DAMOCLES by the European Union under the 6th Framework Programme. Both projects have set out ambitious goals that challenge the intellectual and infrastructural resources of the Arctic science community. In spite of these challenges, they certainly will constitute one of the highlights of the upcoming International Polar Year (IPY) in 2007 and 2008. DAMOCLES represents a major effort in Europe gathering 45 institutions (more than 100 principal investigators) in 12 European countries (including Russia). SEARCH reaches similarly deep into the US Arctic science community. The main objective of the Specific Support Action “SEARCH for DAMOCLES” is to explore and realize opportunities and benefits to coordinate these two large research programmes that represent major efforts by EU and US scientists and have largely common goals and objectives. This EU-US SSA will be a key enabling mechanism for the two programmes SEARCH and DAMOCLES to successfully tackle one of the largest challenges Arctic scientists have faced. The SSA will also contribute to reinforce the international cooperation to develop long-term environmental research programme in the Arctic regions to answer the key questions underlying the observed rapid changes and their impact on physical, biological and human domains in a fragile and delicately balanced Arctic system.

The overall objectives of SEARCH for DAMOCLES are to:

- Coordinate across the Atlantic the scientific efforts to make systematic observations of atmospheric and oceanic variables in the Arctic and subarctic domain, including those of sea-ice, so as to improve forecasting of the Arctic marine and atmospheric environment, as well as projections of long-term trends.
- Consolidate long-term observations required for documentation and modelling of change and in particular prediction of extreme climate events.
- Establish common data bases and contribute to international programmes (ISAC, IPY, CliC, CLIVAR, AOSB).

The specific objectives of SEARCH and DAMOCLES are to coordinate the research conducted within the SEARCH and DAMOCLES programmes required for answering fundamental scientific questions with the goal to:

- Determine the processes responsible for present variability and changes in the Arctic Climate system.
- Improve our capabilities to Predict Arctic Climate changes in particular extreme climate events.
- Design optimal components of a long-term integrated monitoring and forecasting system for the Arctic Ocean.
- Assess impacts of an extreme climate event such as the disappearance of the Arctic perennial Sea-Ice.

Partners

N°	Organisation	Country
1.	Université Pierre et Marie Curie	France
2.	Colombia University	USA

3.	Norwegian Meteorological Institute	Norway
4.	University of Alaska Fairbanks	USA
5.	Swedish Meteorological and Hydrological Institute	Sweden
6.	Center for International and Environmental Research	Norway
7.	Alfred-Wegener-Institut für Polar- und Meeresforschung	Germany
8.	University of Alaska	USA
9.	National Snow and Ice Data Center, University of Colorado	USA



Climate Focused Project

DAMOCLES — Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies

CT — 018509

<http://www.damocles-eu.org/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/12/2005
Duration:	48 months
Total project cost:	25.092.239 €
EC Contribution:	16.522.614 €
Coordinating organisation:	University Pierre and Marie Curie Paris — France
Co-ordinator:	Jean-Claude Gascard (gascard@lodyc.jussieu.fr)
EC Office:	Environment Directorate

Abstract

All state-of-the-art climate models predict that the perennial sea-ice of the Arctic Ocean will disappear within a few decades or less. Important questions remain as to whether this expectation is justified, and if so when this change will take place and what effect it will have on climate on a regional-to-global scale. Such a dramatic physical affront to the ocean-atmosphere-cryosphere system in northern latitudes which corresponds to a change in surface albedo from more than 0.8 to less than 0.3 over a surface larger than Europe, is bound to have radical effects on human activities with immediate impacts on the indigenous inhabitants of the circum-Arctic region and the ecosystem on which they depend, and widespread effects on socio-economic activity on hemispheric scale.

We propose an Integrated Project for Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies (DAMOCLES) with the following objectives:

- identify and understand the changes occurring in the Sea-Ice, Atmosphere and Ocean of the Arctic and Sub arctic domain,
- improve the realism by which these changes are simulated in models, thus extending the lead-time prior to the onset of extreme climate events,
- determine appropriate adaptation strategies for a range of anticipated socio-economic impacts following the disappearance of the perennial Sea-Ice.

At a time when the International Polar Year (IPY) will focus on the science of the polar regions and on the human dimension of polar change, DAMOCLES will provide a contribution to reflect both the skills of European Sciences and the importance to European interests. DAMOCLES represents the integrated efforts of 45 European research institutions including 10 SMEs distributed among 12 European countries, and coordinated with the USA, Russia, Canada and Japan.

Objectives

The main objective of DAMOCLES is to reduce the uncertainties in our understanding of climate change in the Arctic and in the impacts thereof. To meet this objective DAMOCLES will, following the approach of Numerical Weather Prediction Centers, develop an integrated system for obtaining relevant geophysical observations, transferring them to a central databank, distributing them to the modelling centers, and producing nowcasts and forecasts of the Arctic climate. But since there exists no such thing as an Arctic Ocean Observing System, nor fully validated models for Arctic climate, nor accepted methods for forecasting of climate, a number of specific objectives need to be met in DAMOCLES:

— Synoptic observational coverage of the Arctic Ocean sea-ice cover

The variability of sea-ice thickness, extent, concentration, ice-type and drift will be monitored by remote and in-situ systems in near real-time. Sea-ice dynamics and thermodynamics will be scrutinized to better understand their role for the large-scale ice-atmosphere-ocean system

— Synoptic observation and investigation of atmospheric key processes

Aimed at a better predictability of the Arctic weather and climate key processes are investigated in a combined observational/process-modelling effort: the effects of Arctic cyclone on sea-ice in terms of heat and moisture transport, an improvement of boundary-layer physics over ice and ocean, an improvement of the radiative transfers and its interaction with snow and sea-ice.

— Synoptic observation of the Arctic Ocean circulation and key processes

An observational system will be set up with the aim to improve the understanding of the large-scale circulation of the Arctic Ocean and its vertical and lateral exchanges as well as the communication between central basins and the shelves. New techniques will be used to assess synoptically the state of the ocean under the ice and the fluxes of heat, salt and volume across the boundaries.

— Integration and assimilation of observations with large-scale models

Model sensitivities will be investigated and performance be improved by model-model and model-data comparison, aiming at an improved predictability. Observations will be enhanced by a set of assimilation activities to deliver reanalysed Arctic variables in time and space. To address the question of potential impacts of climate change in the Arctic the following specific objective of DAMOCLES can be formulated:

— Assessment of impact on environment and humans

The observationally supported model improvements, the model sensitivities and past ranges of variability will be combined with new field data. The aim is to evaluate improved predictability and its consequences, as well as the impact of projected changes on adaptation capabilities and vulnerability of the environment and human activities. DAMOCLES will not work in isolation — it serves the European community. Exploitation and dissemination of the results are key elements of the project. Thus, a 6th specific objective is:

— User-friendly return of information to the community

A website will be available; giving the community updated information about the state of the Arctic (e.g. real-time information of key atmospheric, ice and ocean variables) as well as information about the progress of the science of DAMOCLES. Education will be provided, through workshops and student scholarships.

The main technological objective of DAMOCLES is to develop a prototype for an Arctic Ocean Observing System (AOOS) including major innovations and breakthrough in High Technology instrumentation adapted to a remote and harsh environment such as the Arctic Ocean. The DAMOCLES AOOS prototype system will be composed of very modern and sophisticated instruments for in situ measurements involving near real time transmission and remote sensing such as:

- Satellite radar altimetry, Scatterometers (QuickSCAT), passive microwave radiometers (SSM/IS, AMSR-E), SAR imagery (ENVISAT, RADARSAT).
- Ice Tethered Platforms equipped with vertical CTD profilers for taking daily profiles of temperature and salinity versus depth.
- Sea-Gliders like autonomous underwater vehicles measuring 1000s of slanted profiles of temperature and salinity along transects between ITPs and Moorings equipped with acoustic transponders.
- Neutrally buoyant floats drifting at constant depth and equipped with Upward Looking Sonars to measure Sea-Ice draft from underneath.
- Tiltmeters for detecting flexural-gravity waves propagating through the ice and deducing sea-ice thickness over an averaged area.
- One of the most important challenges of DAMOCLES is related to multi-faceted applications of underwater acoustic technology such as:
 - Upward Looking Sonar (ULS) mounted on neutrally buoyant isobaric drifting floats and/or on moorings for measuring sea-ice draft.
 - Long range navigation using Sound Fixing and Ranging (SOFAR/RAFOS) technique for navigating underwater Floats and Sea-Gliders under sea-ice.
 - Short range navigation and data transfer using acoustic modems on all the instruments fixed on moorings (eulerian) or freely drifting (lagrangian) for near real time data transmission.
 - Acoustic Doppler profilers measuring vertical profiles of horizontal currents.
 - Tomography for measuring temperature along vertical sections after inversion.
 - Acoustic based technology will also be used in the atmosphere for measuring winds with sonic anemometers.

DAMOCLES will for the first time achieve a systematic approach to observing, understanding and quantifying climate change in the Arctic through:

- Developing and deploying an advanced observing system that provides for the synoptic, continuous and long-term monitoring of the lower atmosphere, sea-ice and the upper ocean.
- Evaluating and improving global and regional climate forecasting models based on validation by, and assimilation and integration of observed data.
- Designing and testing an integrated ice-atmosphere-ocean monitoring and forecasting system.

The ultimate deliverable will be to lengthen the lead-time of extreme climate changes predicted to occur in the Arctic within this century and thus to improve the ability of society to mitigate for their impacts. DAMOCLES research will provide a substantial step forward from the present state-of-the-art by:

- improving monitoring capabilities of the Arctic Ocean, ice and atmosphere through innovative technological advances;
- improving the data transfer from instruments to users, through innovative technological advances, the use of an operational databank, and unprecedented data delivery and format agreements between all partners;
- increasing the knowledge concerning dynamics and thermodynamics of the Arctic Ocean Sea-ice cover and the understanding of its interaction with the Ocean and the Atmosphere in the northern hemisphere climate system;
- improving significantly the ability to predict extreme climate events in the Arctic, such as the disappearance of the perennial ice-cover;
- contributing to the development and implementation of observing and forecasting systems to make long-term systematic observations of marine and atmospheric parameters of the Arctic Environment necessary for global change research and management strategies;
- improving the knowledge on the adaptive capacity and vulnerability of human activities and the environment with respect to such an event, and thus enhance the European Union's preparedness in terms of environmental and societal terms.

Partners

N°	Organisation	Country
1.	Université Pierre et Marie Curie	France
2.	Alfred Wegener Institute for Polar and Marine Research	Germany
3.	Swedish Meteorological and Hydrological Institute	Sweden
4.	Nansen Environmental and Remote Sensing Center	Norway
5.	Finnish Institute of Marine Research	Finland
6.	Meteorologisk Institut	Norway
7.	Norwegian Polar Institute	Norway
8.	Arctic Centre University of Lapland	Finland
9.	Goteborg University	Sweden
10.	Institute of Marine Research	Norway
11.	The Secretary of State for Environment Food and Rural Affairs Acting	UK
12.	Danish Meteorological Institute	Denmark
13.	University of Cambridge	UK
14.	University of Bremen	Germany
15.	University College London	UK
16.	Stockholm University	Sweden
17.	University of Bergen	Norway
18.	Foundation for Research and Technology — Hellas	Greece
19.	University Of Hamburg	Germany

20.	Instytut Oceanologii, Polska Akademia Nauk	Poland
21.	Optimare Sensorsysteme Ag	Germany
22.	Finnish Meteorological Institute	Finland
23.	The University Centre in Svalbarb	Norway
24.	Institut Français de Recherche pour l'Exploitation de la Mer	France
25.	Centre National de la Recherche Scientifique	France
26.	Université de Savoie	France
27.	Institut Polaire Français — Paul Emile Victor	France
28.	Technical University of Denmark	Denmark
29.	Danish National Space Center	Denmark
30.	State Research Center Arctic and Antarctic Research Institute	Russia
31.	Tartu Uelikool	Estonia
32.	P.P. Shirshov Institute Of Oceanology, Russian Academy Of Science	Russia
33.	The University of Reading	UK
34.	Ecole Nationale Supérieure des Ingénieurs des Etudes et Techniques d'Armement	France
35.	Scottish Association for Marine Science	UK
36.	O.A. Sys — Ocean Atmosphere Systems	Germany
37.	International Polar Foundation	Belgium
38.	Center for International and Environmental Research	Norway
39.	Martec Serpe lesm	France
40.	Fastopt Ralf Giering and Thomas Kaminski Gbr	Germany
41.	Naxys As	Norway
42.	Helsinki University of Technology	Finland
43.	Aanderaa Instruments A:S	Norway
44.	Aquatec Telemetry Limited	UK
45.	Cerpolex	France
46.	Caisse des Dépôts et Consignations	France

DAMOCLES-TTC — Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies — Extension

CT — 045928

<http://www.damocles-eu.org/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/11/2006
Duration:	36 months
Total project cost:	422.914 €
EC Contribution:	422.914 €
Coordinating organisation:	Université Pierre et Marie Curie Paris — France
Co-ordinator:	Jean-Claude Gascard (gascard@lodyc.jussieu.fr)
EC Office:	Environment Directorate

Abstract

DAMOCLES IP aims at reducing the uncertainties in our understanding of climate change in the Arctic and their impacts. Over the last 3 decades, the Arctic has warmed more than any other regions of the world, and the sea-ice cover has decreased significantly. DAMOCLES is the largest ever effort to assemble simultaneous observations of the Arctic atmosphere-ice-ocean system. The observational time period coincides with the International Polar Year (IPY) and DAMOCLES will be an outstanding contribution, from the European Community to the IPY. The DAMOCLES data set will be assimilated in models for quantitative estimates of circulation and used for:

- Validating and improving numerical models.
- Increasing our understanding of the processes and mechanisms underpinning the Arctic climate system.
- Initialising ensemble forecasts of the future state of the Arctic DAMOCLES Extension (DAMOCLESTTC) programme and will enhance quite significantly 2 major issues of DAMOCLES IP undertaken by 4 new TTC partners.

One of the main objectives of the DAMOCLES Extension proposal is to investigate the Arctic sea ice by means of extensive data archives from Russian satellites and Arctic expeditions, as well as from new observations by Russian satellites and field experiments in 2007 — 2009. Satellite data archive and in situ measurements from expeditions, represent a unique wealth of information about the Arctic. Russian and Belarus experts involved in sea-ice, satellite remote sensing and modelling will provide high value data sets and analyses for DAMOCLES.

Objectives

The DAMOCLES Extension (DAMOCLES TTC) programme of activities will enhance quite significantly two major issues of the DAMOCLES Integrated Project undertaken by four new TTC partners.

The first major issue concerns DAMOCLES work dedicated to Sea-Ice which is one of the central and most important theme of DAMOCLES. Three new partners, one from Belarus and two from Russia, will contribute to an extension over 4 different tasks: Sea-Ice thickness, Snow characteristics, Sea-Ice categories and Sea-Ice types, and Sea-Ice thermodynamics.

The second major issue concerns DAMOCLES work dedicated to modelling and in particular model sensitivity studies taking into account some oceanic, atmospheric and terrestrial specific effects such as tides for instance which have not been addressed into the DAMOCLES IP work programme. One new partner from the Russian Academy of Sciences, Institute of Numerical mathematics in Moscow will contribute to dedicated studies of ocean tidal dynamics on long-term development of sea-ice, hydrography and ocean currents. DAMOCLES work will also greatly benefit from Russian ice data to be made available.

The extension work to be performed by the new partners will include:

- Provision of extensive archives of Russian satellite data of arctic sea-ice as well as new high resolution optical and IR images supporting DAMOCLES field experiments.
- Data analysis of ice thickness, density, freeboard, snow cover from previous Russian expeditions needed for validation of satellite altimeter retrievals of ice thickness.
- Investigation of retrieval of thin ice thickness from satellite IR data in combination with models, complementing other ice thickness observing methods performed during DAMOCLES IP.
- Improvement of multiyear ice concentration retrieval using combination of passive microwave and scatterometer data. Use of Okean SLR data with similar capacity as scatterometer to identify MYI, will be investigated.
- Dedicated studies of leads and polynyas by integrating optical, IR and radar satellite data, both with Russian and non Russian data supported by field experiments.
- Investigation of sea-ice thermodynamics using surface temperature retrievals from satellites in combination with in situ data from field experiments.
- Performing field investigations of sea-ice and snow cover from the Russian drifting station and expedition by the Russian icebreaker A. Fedorov during the International Polar Year (2007-2008).
- Retrieval of snow grain size and snow pollution in the Arctic from optical satellite sensors.
- Improvement of estimation of sea-ice dynamical and thermodynamical properties.
- Improvement for large scale modelling and forecasting capabilities.
- Dedicated studies of ocean tidal dynamics on long-term development of sea-ice, hydrography and ocean currents.
- Model sensitivity experiments including boundary conditions, atmospheric forcing and river run-off, based on a finite-element model including tidal effects.
- Adding value to the integrated DAMOCLES model intercomparison and sensitivity studies by extending the range of parameters.
- Data dissemination according to DAMOCLES IP specifications.

Partners

N°	Organisation	Country
1.	Université Pierre et Marie Curie	France

- | | | |
|----|---|---------|
| 2. | B.I. Stepanov Institute Physics, National Academy of Sciences | Belarus |
| 3. | Institute Numerical Mathematics, Russian Academy of Sciences | Russia |
| 4. | Nansen International Environmental Remote Sensing Center | Russia |
| 5. | Research Centre Earth Operative Monitoring | Russia |

ALOMAR EARI — Arctic Lidar Observatory for Middle Atmosphere Research, enhanced Access to Research

CT — 506208

<http://alomar.rocketrange.no/>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/01/2004
Duration:	60 months
Total project cost:	2.501.829 €
EC Contribution:	2.500.000 €
Coordinating organisation:	Andoya Rocket Range AS Andenes — Norway
Co-ordinator:	Barbara Lahnor (barbara@rocketrange.no)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

Under the ALOMAR eARI (“enhanced” ARI) we offer the exceptional opportunity to investigate the physics, chemistry and dynamics of the Arctic atmospheric by access to a worldwide unique ensemble of sophisticated ground-based instruments (ALOMAR) and a new service of in-situ measurements through a rocket-launch “Hotel Payload” (HotPay).

Since 1998, ALOMAR gives funding for researchers using the facility under a Transnational Access contract. From 2000 to 2003 we enjoyed a significant increase in the number of applications to our infrastructure. Participants of 14 nationalities have applied. The number of participating countries, together with the permanent groups at ALOMAR, rises the unique opportunity for participants, especially for those from candidate states, to contribute to common research approaches (e.g. Global Change), which yields to a more coherent research and hence structures the ERA. ALOMAR is a part of the Andoya Rocket Range (ARR), a launch site for sounding rockets and a SME in the terms of 6th FP. Numerous scientific projects take the advantage of the synergy created by the ALOMAR facility and the ARR, concurrently. Hence our services under the new ALOMAR eARI are enhanced. It includes the well-established access services from ALOMAR and the new opportunity to fly rocket-borne instruments. We offer two rocket-launches that can explore two different physical regimes, the middle atmosphere/lower ionosphere (50-120 km) and the auroral ionosphere (50-250 km). Each rocket can typically carry five to ten instruments measuring a variety of parameters. The rocket is the only platform that can bring scientific instruments into these height regimes. The ALOMAR eARI provides the launch vehicle, the operations, and the structure with a flexible service module including power and telemetry. The scientists contribute with their own instruments.

“Hotel Payload” (HotPay), ARR’s latest innovation, is a very cost efficient way of bringing instruments into the middle atmosphere. Simplicity, standardisation and cost sharing ensure that the costs are significantly lower than for traditional sounding rocket programmes. HP is the crucial key to offer the launch services under the eARI. For the majority of the European researches the

ALOMAR eARI would be the only way participating in in-situ studies of this special height regime. Consequently the ALOMAR eARI will be a fascinating bottom up approach for new co-operations on the background of an expanding Europe.

Partners

N°	Organisation	Country
1.	Andoya Rocket Range AS	Norway

ARCFAC V — The European Centre for Arctic Environmental Research

CT- 026129

<http://arcfac.npolar.no/>

Funding instrument:	Specific Actions to promote research infrastructures
Contract starting date:	01/05/2006
Duration:	48 months
Total project cost:	1.850.412€
EC Contribution:	1.833.600 €
Coordinating organisation:	Norwegian Polar Institute Tromsø — Norway
Co-ordinator:	Trond Svenøe (trond@npolar.no)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

Located at the high latitude of 78° 55' N, 11° 56' E, the Ny-Ålesund International Research and Monitoring Facility is one of the world's northernmost human settlements, situated on Svalbard, Norway. This site represents an ideal permanent research platform in the European Arctic, with its mild climate, clean environment and easy accessibility by plane and boat. Together with the well-developed infrastructure with highly specialised research facilities established and used by a broad international research community, Ny-Ålesund strongly demonstrates its value as The European Centre for Arctic Environmental Research.

Six Research Platforms form the basis of this Research Infrastructure, together with the General Infrastructure providing accommodation and transportation as well as Logistical Services offered for field campaigns. The high latitude location and multidisciplinary research environment are ideal for research and monitoring within a broad range of contemporary Arctic Environmental Research with emphasis on: — Climate change and ecosystem response, — UV-radiation and biological effects, Long-range transported pollutants and ecotoxicology as well as many other disciplines.

The European Centre for Arctic Environmental Research form the northernmost (Arctic) baseline node within several climate research programmes and international networks. It is unique in Europe in light of the multitude of different environmental research and monitoring programmes running simultaneously at the same site, providing excellent conditions for multi- and interdisciplinary co-operation projects and data-exchange. As a modern research station in a clean natural laboratory, the European Centre for Arctic Environmental Research will continue to play an important role in Europe, providing access to a large number of scientists from an increasing number of countries taking part in Arctic research.

Partners

N°	Organisation	Country
1.	NorwegianPolar Institute	Norway
2.	Alfred Wegener Institute for Polar and Marine Research	Germany
3.	Consiglio Delle Recherche	Italy
4.	Norwegian Mapping Authority	Norway
5.	Natural Environment Research Council	UK
6.	Institut Polaire Francaise — Paul Emil Victor	France
7.	Norwegian Institute of Air Research	Norway
8.	Kings Bay Company As	Norway

ERICON-AB — The European Polar Research Icebreaker Consortium Aurora Borealis

CT — 211796

<http://www.eri-aurora-borealis.eu/en/home/>

Funding instrument:	Collaborative Project (CP) and Coordination and Support Action (CSA)
Contract starting:	01/03/2008
Duration:	48 months
Total project cost:	5.283.880 €
EC Contribution:	4.498.243 €
Coordinating organisation:	European Science Foundation, Polarboard Strasbourg — France
Co-ordinator:	Paul Egerton (pegerton@esf.org)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

The ERICON-AB project will generate the strategic, legal, financial and organisational frameworks required from National Governments and the European Commission to commit financial resources to the construction and running of the European Polar Research Icebreaker AURORA BOREALIS. Scientific management frameworks will be assessed including mechanisms to handle dedicated large-scale multi-year or special mission specific research programmes. The strategic integration of the facility into the fabric of the European Research Area shall be achieved by connecting the national research priorities and the demand of ship time of the stakeholder countries with a European level facility. The relevance of the facility in promoting science and technology cooperation with EU strategic partner countries such as the Russian Federation will be specifically analysed. Deliverables will focus on moving the project from the preparatory phase to the construction phase by addressing key barriers especially in relation to engineering initial financial models that allow the mixed participation of EU member states and Non-EU partner countries. Consortium Beneficiaries and legal experts will develop the environment for frameworks for joint ownership and operation of a multi-country research facility. A dedicated legal implementation structure for managing and operating the AURORA BOREALIS will be proposed and its connection with other existing research assets such as Polar Stations, air support and supporting satellite assets will be analysed. The final deliverables of this project will be concerned with reaching a decision point and agreement with nations ready to move forward with the construction phase. It is anticipated that a series of natural decision points for agencies/governments to pass on their individual degree of integration into the project will be programmed in to the ERICON — AB Stakeholder councils meetings.

Objectives

The European Polar Research Icebreaker Facility AURORA BOREALIS will be the most advanced Polar Research Vessel in the world with a multi-functional role of drilling in deep ocean basins and

supporting climate/environmental research and decision support for stakeholder governments for the next 35-40 years. The new technological features will include azimuth propulsion systems, satellite navigation and ice-management support and the deployment and operation of Under-water autonomous vehicles from the twin moon-pools* (opening in the ships hull for deployment of equipment). The most unique feature of the vessel is the permanent deep drilling rig, which will enable sampling of the ocean floor and sub-sea up to 4000 m water and 1000 m penetration at the most inhospitable places on earth. The drilling capability will be deployed in both Polar Regions and AURORA BOREALIS will be the only vessel worldwide that could undertake this type of scientific investigation. The possibility to flexibly equip the ship with laboratory and supply containers, and the variable arrangement of other modular infrastructure (in particular, winches, cranes, etc.), free deck-space and separate protected deck areas, will allow the planned research vessel to cover the needs of most disciplines in marine research. The ship can be deployed as a research icebreaker in polar seas because it will meet the specifications of the highest ice-class for polar icebreakers. A large fuel capacity is required because of the excessive power requirements for drilling and maintaining station in the central Arctic (or other severely ice infested waters) during what are envisaged to be long expeditions. This factor is decisive for the large size of the ship. The construction of AURORA BOREALIS requires several new technical solutions and will provide an extended technical potential and knowledge for marine technologies and the ship building industry. The research vessel would be an example for the qualification of the European maritime industry and would help to explore future markets in special ships and marine technology. This is especially relevant in the light of the recent move by the European Union to develop a maritime policy and the responsibilities that this incurs on member states.

Partners

N°	Organisation	Country
1.	Fondation Européenne de la Science (Coordinator)	France
2.	Alfred Wegener Institute for Polar und Marine Research in the Helmholtz Association	Germany
3.	Consiglio Nazionale delle Ricerche	Italy
4.	Programme Nazionale di Ricerche in Antartide	Italy
5.	Centre National de la Recherche Scientifique-Institut National des sciences L'Univers	France
6.	Arctic and Antarctic Research Institute	Russia
7.	Institut Polaire Français Paul Emile Victor	France
8.	Merentutkimuslaitos (Finnish Institute Marine Research)	Finland
9.	The Netherlands Organisation for Scientific Research	The Netherlands
10.	University of Bergen	Norway
11.	Bundesministerium für Bildung und Forschung	Germany
12.	Fonds National de la Recherche Scientifique	Belgium
13.	Bulgarian Antarctic Institute	Bulgaria
14.	Fundatia Antarctica Romana	Romania
15.	Aker Arctic technology Inc	Finland

EURO ARGO, Global Ocean Observing Infrastructure

CT — 211597

<http://www.ifremer.fr/euro-argo/>

Funding instrument:	Collaborative Project (CP) and Contract starting date: 01/01/2008 Coordination and Support Action (CSA) Duration: 30 months
Total project cost:	4.210.105 €
EC Contribution:	2.995.859 €
Coordinating organisation:	Institut Français de Recherche pour l'Exploitation de la MER (IFREMER) Brest — France
Co-ordinator:	Pierre-Yves LE TRAON (Pierre.Yves.Le.Traon@ifremer.fr)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

The main objective of the Euro-Argo preparatory phase is to undertake the work needed to ensure that by 2010 Europe will be able to:

- Deploy, maintain and operate an array of 800 floats. This will require Europe to deploy 250 floats per annum worldwide.
- Provide a world-class service to the research (climate) and environment monitoring (e.g. GMES) communities.

The main expected outcome of the preparatory phase proposal is an agreement between member states and other funding agencies for long term (> 10 years) operation of Euro-Argo (financial, governance, organisation, technical). To reach such an agreement, it will be necessary to work on several key technical (float technology, data management and delivery system) and organizational (logistics for deployment, coordination of national contributions) issues, to consolidate and broaden the user community and to demonstrate further the impact and utility of the infrastructure for Europe.

The preparatory phase proposal workpackages will inter alia focus on:

- The consolidation and strengthening of existing national contributions to the infrastructure.
- The development of a direct EC-wide contribution through GMES.
- The development of legal and governance arrangements for the Euro-Argo infrastructure.
- Evaluation and improvement of the European contribution to the Argo data management and delivery system.
- Enhancing European float technological capabilities (performances, sensors, communication systems) and working towards using Argo to study aspects of ocean biogeochemistry
- The development of a vigorous European Argo user community.
- Exploiting the open access to Argo data as an educational “window” on the oceans and their role in climate.

- Developing new partnerships between European Argo nations, new European countries and nations outside Europe.
- Integrating the European observing array into the international system.
- Developing a ten year implementation plan.

Partners

N°	Organisation	Country
1.	Ifremer/Institut Français de Recherche pour l'Exploitation de la Mer	France
2.	BSH/Federal Maritime and Hydrographic Agency	Germany
3.	KDM/ Konsortium Deutsche Meeresforschung	Germany
4.	NERC/Natural Environment Research Council	UK
5.	UKMO/Met Office	UK
6.	KNMI/Royal Netherlands Meteorological Institute	The Netherlands
7.	IEO/Instituto Español de Oceanografía	Spain
8.	OGS/Istituto Nazionale di Oceanografia e di Geofisica Sperimentale	Italy
9.	MI/Marine Institute	Ireland
10.	IMR/Institute of Marine Research	Norway
11.	SHOM/Service Hydrographique et Océanographique de la Marine	France
12.	FFCUL/Fundacao da Faculdade de Ciencias da Universidade de Lisboa	France
13.	HCMR/Hellenic Centre for Marine Research	Greece
14.	IOPAS/Institute of Oceanology Polish Academy of Sciences	Poland
15.	USOF/University of Sofia	Bulgaria

II. GLOBAL CARBON AND NITROGEN CYCLES — GREENHOUSE GAS EMISSIONS

CARBOEUROPE — Assessment of the European Terrestrial Carbon Balance

CT — 505572

<http://www.carboeurope.org/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/01/2004
Duration:	60 months
Total project cost:	23.656.645 €
EC Contribution:	16.310.000 €
Coordinating organisation:	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V. Jena — Germany
Co-ordinator:	Ernst-Detlef Schulze (dschulze@bgc-jena.mpg.de)
EC Office:	Environment Directorate

Abstract

The overarching aim of the CARBOEUROPE-IP is to understand, quantify and predict the terrestrial carbon balance of Europe and the uncertainty at local, regional and continental scale. This is achieved by:

- executing a strategically focussed set of surface based ecological measurements of carbon pools and CO₂ exchange,
- further enhancement of an atmospheric high precision observation system for CO₂ and other trace gases,
- execution of a regional high spatial resolution experiment and
- integration of these components by means of innovative data assimilation systems and modelling.

The key innovation of the CARBOEUROPE-IP is solving the scientific challenge of quantifying the terrestrial carbon balance at different scales and with known, acceptable uncertainties. The increase in spatial and temporal resolution of the observational and modelling program will allow for the first time a consistent application of a multiple constraint approach of bottom-up and top-down estimates to determine the terrestrial carbon balance of Europe with the geographical patterns and variability of sources and sinks. CARBOEUROPE-IP aims at providing a system for carbon accounting for the European continent, and it will further investigate the main controlling mechanisms of carbon cycling in European ecosystems. CARBOEUROPE-IP integrates and expands the research efforts of 95 European institutes. CARBOEUROPE-IP addresses basic scientific questions of high political relevance.

Objectives

The overarching aim of the CARBOEUROPE-IP is to understand and quantify the present terrestrial carbon balance of Europe and the associated uncertainty at local, regional and continental scale. In order to achieve this, the project addresses the three major topics:

1. Determination of the carbon balance of the European continent, its geographical patterns, and changes over time. This is achieved by (1) executing a strategically focussed set of surface based ecological measurements of carbon pools and CO₂ exchange, (2) further enhancement of an atmospheric high precision observation system for CO₂ and other trace gases, (3) execution of a regional high spatial resolution experiment, and (4) integration of these components by means of innovative data assimilation systems, bottom-up process modelling and top-down inverse modelling. The key innovation of the CARBOEUROPE-IP is in its conception as to apply single comprehensive experimental strategy, and its integration into a comprehensive carbon data assimilation framework. It is solving the scientific challenge of quantifying the terrestrial carbon balance at different scales and with known, acceptable uncertainties. The increase in spatial and temporal resolution of the observational and modelling program will allow for the first time a consistent application of a multiple constraint approach of bottom-up and top-down estimates to determine the terrestrial carbon balance of Europe with the geographical patterns and variability of sources and sinks.
2. Enhanced understanding of the controlling mechanisms of carbon cycling in European ecosystems, and the impact of climate change and variability, and changing land management on the European carbon balance. This is achieved by (1) the partitioning of carbon fluxes into their constituent parts (assimilation, respiration, fossil fuel burning), at local, regional and continental scales, (2) the quantification of the effects of management on net ecosystem carbon exchange based on data synthesis, and (3) the development, evaluation and optimisation of ecosystem process models.
3. Design and development of an observation system to detect changes of carbon stocks and carbon fluxes related to the European commitments under the Kyoto Protocol. This is achieved by (1) atmospheric measurements and a modelling framework to detect changes in atmospheric CO₂ concentrations during the time frame of a Kyoto commitment period, and (2) the outline of a carbon accounting system for the second Commitment period based on measuring carbon fluxes, stock changes by soil and biomass inventories, vegetation properties by remote sensing, and atmospheric concentrations. CARBOEUROPE-IP integrates and expands the research efforts of 67 European contractors and around 30 associated institutes. CARBOEUROPE-IP addresses basic scientific questions of high political relevance.

Strategic Objectives

The overarching aim of the CARBOEUROPE-IP is to understand and quantify the terrestrial carbon balance of Europe and associated uncertainties at local, regional and continental scale. In order to achieve this strategic objective, the project addresses the following topics and associated questions:

- The European Carbon Balance”What is the carbon balance of the European continent and its geographical pattern, and how does it change over time?
- ”Processes and Modelling”What are the controlling mechanisms of carbon cycling in European ecosystems? How do external parameters such as climate change and variability, and changing land management affect the European carbon balance?

- “Detection of Kyoto” Can the effective CO₂ reduction in the atmosphere in response to fossil fuel emission reduction and enhanced carbon sequestration on land be detected in the context of the Kyoto commitments of Europe?

Main Objectives

The European Carbon Balance

- To determine the time-varying distribution of atmospheric concentrations of CO₂ and other Carbon Cycle related tracers by taking high precision measurements as input to top-down inverse modelling techniques (MO1).
- To determine net ecosystem carbon fluxes from eddy covariance towers, changes in carbon pools from land carbon inventories, and biophysical parameters from remote sensing as input to bottom-up process modelling (MO2).
- To develop an innovative data assimilation framework for the application of a multiple constraint approach where observations of different nature will optimally quantify the European carbon balance (MO3).

Processes and Modelling

- To determine the partitioning of carbon fluxes into its constituent parts (assimilation, respiration, fossil fuel burning), at local, regional and continental scales and its relation to external parameters, and present human activities (MO4).
- To quantify the effects of management on net ecosystem carbon exchange based on data synthesis (MO5).
- To develop, evaluate and optimise ecosystem process models (MO6).

Detection of Kyoto

- To provide an observation system of atmospheric measurements and a modelling framework to detect changes in atmospheric CO₂ concentrations during the time frame of a Kyoto commitment period (MO7).
- To develop the outline of a carbon accounting system for the second Commitment period based on measuring carbon fluxes, stock changes by soil and biomass inventories, vegetation properties by remote sensing, and atmospheric concentrations (MO8).

Specific Objectives

The Main Objectives are met by organising the IP into four “Components” that deal with:

- ecosystem level measurements (Component 1),
- high precision continental scale atmospheric measurements (Component 2),
- a regional experiment aimed at reducing uncertainties in scaling (Component 3), and
- a Continental Integration Component (Component 4) that merges the various data streams into a comprehensive assessment of the European carbon balance.

Partners

N°	Organisation	Country
1.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
2.	Università degli Studi della Tuscia	Italy

3.	Vrije Universiteit Amsterdam	The Netherlands
4.	Commissariat à l'Energie Atomique	France
5.	University of Edinburgh	UK
6.	University of Aberdeen	UK
7.	Institut National de la Recherche Agronomique	France
8.	Faculté Universitaire des Sciences Agronomiques de Gembloux	Belgium
9.	Météo France	France
10.	Consiglio Nazionale delle Ricerche	Italy
11.	Energieonderzoek Centrum Nederland	The Netherlands
12.	Ruprecht-Karls-Universität Heidelberg	Germany
13.	Alterra B.V.	The Netherlands
14.	Commission of the European Communities — Joint Research Centre	Belgium
15.	Joanneum Research Forschungsgesellschaft GmbH	Austria
16.	Met Office	UK
17.	Potsdam Institut für Klimafolgenforschung	Germany
18.	Provincia Autonoma di Bolzano	Italy
19.	Centro di Ecologia Alpina	Italy
20.	Fundacion Centro de Estudios Ambientales	Spain
21.	Natural Environment Research Council	UK
22.	Centre National de la Recherche Scientifique	France
23.	Centre Tecnologic Forestal de Catalunya	Spain
24.	Eidgenoessische Forschungsanstalt für Agrarökologie und Landbau	Switzerland
25.	Ilmatieteen Laitos	Finland
26.	Institute of Landscape Ecology of the Czech Academy of Sciences	Czech Rep.
27.	Instituto Superior Tecnico	Portugal
28.	Lunds Universitet	Sweden
29.	Om Forskningscenter Risoe	Denmark
30.	Sveriges Lantbruksuniversitet	Sweden
31.	Nationaal Instituut voor Ruimteonderzoek	The Netherlands
32.	Seconda Università degli Studi di Napoli	Italy
33.	Trinity College Dublin	Ireland
34.	Technische Universität Dresden	Germany
35.	Technische Universität Muenchen	Germany
36.	Universiteit Antwerpen	Belgium
37.	Universität Bayreuth	Germany
38.	National University of Ireland Cork	Ireland
39.	Szent Istvan Egyetem	Hungary
40.	Helsingin Yliopisto	Finland
41.	Instituto Superior de Agronomia	Portugal

42.	August Cieszkowski Agricultural University of Poznan	Poland
43.	Université de Paris-Sud XI	France
44.	Wageningen Universiteit	The Netherlands
45.	Martin-Luther-Universität Halle-Wittenberg	Germany
46.	Université de Liège	Belgium
47.	Cesi — Centro Elettrotecnico Sperimentale Italiano 'Giacinto Motta' Spa	Italy
48.	Rijks-Universiteit Groningen	The Netherlands
49.	Lorand Eoetvoes University	Hungary
50.	Ente per le Nuove Tecnologie, l'Energia e l'Ambiente	Italy
51.	Stockholms Universitet	Sweden
52.	Universitat de Barcelona	Spain
53.	Univesitaet Bern	Switzerland
54.	Akademia Gorniczo-Hutnicza	Poland
55.	Universität Stuttgart	Germany
56.	European Forest Institute	Finland
57.	Danmarks Miljoeundersoegelser	Denmark
58.	Tueringer Landesanstalt für Wald, Jagd und Fischerei	Germany
59.	Philippe Saugier International Educational Projects	France
60.	Kobenhavns Universitet	Denmark
61.	Universidade de Aveiro	Portugal

CARBO-Extreme — The terrestrial Carbon cycle under Climate Variability and Extremes — A Pan-European synthesis

CT — 226701

<http://www.carbo-extreme.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/06/2009
Duration:	48 months
Total project cost:	4.577.523 €
EC Contribution:	3.312.754 €
Coordinating organisation:	Max-Planck-Gesellschaft zur Förderung der Wissenschaften Jena — Germany
Co-ordinator:	Markus Reichstein (mreichstein@bgc-jena.mpg.de)
EC Office:	Environment Directorate

Abstract

The aim of this project is to achieve an improved knowledge of the terrestrial carbon cycle in response to climate variability and extremes, to represent and apply this knowledge over Europe with predictive terrestrial carbon cycle modelling, to interpret the model predictions in terms of vulnerability of the terrestrial — in particular soil — carbon pools and give according advice to EU climate and soil protection policies. This objective will be achieved by integrating three major types of recent and new solid scientific carbon cycle data, from: (i) soil process studies, (ii) a network of established ecosystem manipulation experiments, and (iii) long-term observations spanning several times-scales (e.g. eddy covariance data, tree rings and growth, crop yields, long-term remote sensing data on soil moisture and vegetation activity and soil carbon inventories). The integration will be reached by establishing a consistent and harmonized data base and by confronting the terrestrial carbon cycle models with the multiple data sets within a Bayesian model identification and improvement procedure. Specific model development concerning processes affected by extreme events (e.g. soil carbon destabilization, tree growth response incl. lag effects and mortality) will be included and followed by model testing and improvement against the data made available in the project. The improved models will simulate terrestrial processes relevant to carbon balance and soil erosion at pan- European scale using regionalized climate scenarios with explicit inclusion of extreme climatic events. Since we are using several climate scenarios and an ensemble of models we will be able to characterize the uncertainties in prediction coming from models and climate scenarios. We will interpret the empirical evidence from the observational work and the model simulations in a framework of vulnerability assessment and disseminate and discuss results with stakeholders at EU level.

Partners

N°	Organisation	Country
1.	Max Planck Gesellschaft zur Förderung der Wissenschaften	Germany
2.	Commissariat Energie Atomique CEA	France
3.	Consiglio Nazionale delle Ricerche	Italy
4.	Eidgenössische Technische Hochschule Zuerich	Switzerland
5.	Institut National de la Recherche Agronomique	France
6.	Potsdam Institut für Klimafolgenforschung	Germany
7.	Universiteit Antwerpen	Belgium
8.	The University Court of the University of Aberdeen	UK
9.	Universita degli Studi della Tuscia	Italy
10.	Centre National de la Recherche Scientifique (CNRS)	France
11.	Cranfield University	UK
12.	Danmarks Tekniske Universiteit	Denmark
13.	Institutul de Cercetari si Amenajari Silvice	Romania
14.	Internationales Institut für Angewandte Systemanalyse	Austria
15.	Instituto Nacional de Investigacion y Tecnologia Agraria y Alimentaria	Spain
16.	Met Office	UK
17.	Natural Environment Research Council	UK
18.	Sveriges Lantbruksuniversiteit	Sweden
19.	Universität Innsbruck	Austria
20.	Vereniging voor Christelijk Hoger Onderwijs Wetenschappelijk Onderzoek en Patientenzorg	The Netherlands
21.	Eidgenoessische Forschungsanstalt WSL	Switzerland
22.	Gottfried Wilhelm Leibniz Universität Hannover	Germany
23.	Lunds Universitet	Sweden
24.	Fundacion Centro de Estudios Ambientales del Mediterraneo	Spain
25.	Université Paris-Sud XI	France

CARBO-NORTH — Quantifying the Carbon Budget in Northern Russia: Past, Present and Future

CT — 036993

<http://www.carbonorth.net/>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/11/2006
Duration:	42 months
Total project cost:	3.622.074 €
EC Contribution:	3.099.822 €
Coordinating organisation:	Stockholms Universitet Stockholm — Sweden
Co-ordinator:	Peter Kuhry (peter.kuhry@natgeo.su.se)
EC Office:	Environment Directorate

Abstract

CARBO-North aims at quantifying the carbon budget in Northern Russia across temporal and spatial scales. Activities address rates of ecosystem change, effects on the carbon budget (radiative forcing), and global climate and policy implications (Kyoto). Recent research on the impacts of climate change in high latitude regions has mostly assessed the equilibrium response of ecosystems, for instance what is the potential location of the arctic treeline or the southern limit of permafrost under conditions of global warming. However, transient responses are of much greater importance from a policy perspective.

- How quickly will the arctic treeline migrate?
- How quickly will permafrost thaw?
- How quickly will enhanced soil organic matter decay result in increased greenhouse gas emissions and leaching?

Different time lags in these processes will cause significant deviations from equilibrium response. Proposed field study areas in Northeast European Russia are characterized by gradual lowland transitions in vegetation and permafrost conditions. Dedicated climate models will provide requested variables and time slices as input to ecosystem studies. Analyses will be conducted to assess the sensitivity of climate model output to a suite of land cover, ground and permafrost schemes. Proxydata will be used to evaluate rates of ecosystem change under past climatic changes. The present environment will be studied from the plot to landscape scales with a variety of approaches, including assessments of human-induced and natural disturbances. Detailed monitoring and mapping of vegetation, soil and permafrost will provide input for process-oriented studies (treeline patch dynamics; tundra/forest/river carbon fluxes; ground subsidence, etc) and GIS-based upscaling to regional levels. Results are used for integrated ecosystem modeling, calculation of net radiative effects and assessment of the sensitivity of climate model predictions to transient environmental changes.

Objectives

The CARBO-North project integrates state-of-the-art science in the areas of flux measurements, carbon stock inventories, ecological understanding and Earth System modeling to quantify the long-term fluxes of greenhouse gases from the Northern Russian land mass, in order to support implementation of the Kyoto Protocol. Specifically, it will produce regional carbon budgets for Northern Russia for successive time slices of the 21st century (and beyond) that are used to calculate changes in net radiative forcing and effects on future global climate predictions.

Carbon sinks and sources are investigated across spatial and temporal scales. Assessments at the plot to landscape levels carried out at intensive study sites in Northeast European Russia will be upscaled to regional and panarctic levels using GIS and modelling approaches. Investigations will focus on the rate at which critical ecosystem processes take place, including effects of human-induced and natural disturbances. For this purpose we will reconstruct past changes in climate and environment, monitor and interpret present-day processes, and model future 'transient' and 'equilibrium' ecosystem responses for the next 100 years and beyond. All components of the regional carbon balance are studied, including tundra, taiga, wetlands, aquatic ecosystems and river export and their interconnections, with an integration of results through the application of a regional ecosystem model, the calculation of net radiative effects, and an assessment of the sensitivity of climate model predictions to expected ecosystem changes.

Through a comparison of regional carbon budgets under past and recent natural climate variability with future 'transient' and 'equilibrium' responses under global warming, an attribution of the relative importance of anthropogenic climate change and natural variability can be made. Results will aid EU policymakers to adjust criteria in greenhouse gas emission reduction targets.

SMEs involved in the project will perform an important role through dissemination and popularization of project objectives and results, both in Western Europe and Russia.

Partners

N°	Organisation	Country
1.	Stockholms Universitet	Sweden
2.	Lunds Universitet	Sweden
3.	Alfred-Wegener-Institut für Polar und Meeresforschung	Germany
4.	Ernst-Moritz-Arndt-University of Greifswald	Germany
5.	Danmarks Meteorologiske Institut	Denmark
6.	Kobenhavns Universitet	Denmark
7.	Institute of Biology of Komi Scientific Center of the Rural Branch of the Russian Academy Of Sciences	Russia
8.	Met Office	UK
9.	University College London.	UK
10.	University of Nottingham	UK
11.	Helsingin Yliopisto	Finland
12.	Kuopion Yliopisto	Finland

13.	Universiteit Utrecht	The Netherlands
14.	Wageningen Universiteit	The Netherlands
15.	Ensis Ltd	UK
16.	Chermet	Russia

CARBOAFRICA — Quantification, understanding and prediction of carbon cycle, and other GHG gases, in Sub-Saharan Africa

CT — 037132

http://www.carboafrika.net/index_en.asp

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/10/2006
Duration:	36 months
Total project cost:	3.808.758 €
EC Contribution:	2.810.044 €
Coordinating organisation:	Università degli Studi della Tuscia Viterbo — Italy
Co-ordinator:	Riccardo Valentini (rik@unitus.it)
EC Office:	Environment Directorate

Abstract

Africa is a region highly vulnerable to climatic change due to both ecological and socio-economic factors; however it is the least well-covered region by studies on climate change. For these reasons, the overarching goal of this project is to set up a first attempt of a GHG fluxes monitoring network of Africa, in order to quantify, understand and predict, by a multi-disciplinary integrated approach, GHG emissions in Sub-Saharan Africa and its associated spatial and temporal variability. We will start building on the state of the art of the carbon studies in Africa, filling the gaps of knowledge, and then we will utilize and expand existing carbon observing systems, together with the establishment of new infrastructures, improving the required monitoring systems. We also conduct specific regional studies in key areas, considering both carbon sources and sinks. The components of the African greenhouse gas budget have so far not been adequately determined, and the implementation of the Kyoto Protocol requirements is far to be achieved. There is consequently a significant need for an assessment of the current land use change, evaluating the potential for carbon sequestration in Sub-Saharan Africa in the context of the Kyoto Protocol. The existing GHG observations capabilities for fluxes and stocks of carbon, their geographical distribution, the end users requirements for UNFCCC and IPCC guidelines implementation, will be used to design an optimal monitoring system network and the identification of its components. The CARBOAFRICA network will contribute to the enhancement of an Earth observations system, strengthening the capacity of Europe to understand global change process. The scientific and technological results, in addition to the capacity building activities foreseen by this project, will promote the integration of the environmental dimension in the social and economic context, supporting Sub-Saharan African countries on the path of a sustainable development.

Objectives

The overarching goal of this project is to set up a first attempt of a GHG fluxes monitoring network of Africa, in order to quantify, understand and predict, by a multi-disciplinary integrated approach,

greenhouse gas emissions in Sub-Saharan Africa and its associated spatial and temporal variability. We will start building on the state of the art of the carbon studies in Africa filling the gaps of knowledge, and then we will utilize and expand existing carbon observing systems, together with the establishment of new infrastructures, improving the required monitoring systems. We also conduct specific regional studies in key areas, considering both carbon sources and sinks. Moreover, there is a growing interest in the implementation of the Kyoto protocol through its flexible mechanism, such as CDM (Clean Development Mechanism) in the context of land use change and forestry in Africa, therefore CARBOAFRICA will address the potential for carbon sequestration in Sub-Saharan Africa by means of specific studies. The improvement of an African GHG network will contribute to the enhancement of an Earth observations system, strengthening the capacity of Europe to understand global change for the future orientation of mitigation strategy. The scientific and technological results, in addition to the capacity building activities foreseen by this project, will promote the integration of the African environmental dimension in its social and economic context, giving African people the skills to start out on the path of a sustainable development.

Objective 1: Consolidate and expand terrestrial carbon and other GHG fluxes monitoring network of Sub-Saharan Africa

CARBOAFRICA project will expand and improve the existing carbon observing systems in Africa. We will collect existing knowledge and coordinate existing efforts through harmonization and exchange of methodologies for flux measurements and ecological sampling across the regions. We will enhance the monitoring capabilities by expanding flux towers and ecological measurements in different ecosystem types, representative of the Africa's biodiversity and will be the first initiative to cover tropical forest which was not considered so far. Those actions will be the base for setting up a full greenhouse gas monitoring system in Sub-Saharan Africa. We will also integrate the TEMS (Terrestrial Ecosystem Monitoring Sites) existing network for input to model parameterization.

Objective 2: Provide an analysis of the requirements in order to establish a terrestrial GHG monitoring systems for Sub-Saharan Africa

One of the aims of CARBOAFRICA is to make use of the existing GHG observations capabilities for fluxes and stocks of carbon, their current geographical distribution, the end users requirements for UNFCCC and IPCC guidelines implementation, to design an optimal monitoring system network and the identification of its components.

Objective 3: Understand quantify and predict the GHG budget of Sub-Saharan Africa and its associated spatial and temporal variability

By an integrated approach, considering flux measurements together with specific models which assimilate data on soil, atmosphere, agriculture, hydrology, fires and ecological variables, we will identify the links between carbon cycle and nutrients, hydrology, fires, and land use, which will be used as a first broad attempt to produce spatial distribution of sources and sinks and their time behaviour. Water and the nutrient cycles are important drivers of the carbon dynamics in savannas, and fires control carbon allocation as well, both directly and indirectly. A complex interaction between these factors also controls vegetation types and dynamics, thus indirectly carbon allocation. Data assimilation will comprise own measurements around the identified core sites with flux towers but also integrating the relevant amount of knowledge that was achieved during seven decades of ecological research in Africa. Models will be validated using flux tower

data at specific locations. A specific activity will be conducted to evaluate models estimates at regional scale by using aircraft based measurements across a regional transect in west Africa. The process level understanding will help to consolidate reviews of the greenhouse gas budget for all relevant Sub- Sahara African ecosystem-types (tropical forests, savannas, scrublands, grasslands, deserts). The results of this work will provide the knowledge elements necessary for reducing uncertain and bias in GHG budget estimates and to contribute to the revision of the IPCC guidelines.

Objective 4: Assess the current land use change and evaluate the potential for carbon sequestration in Sub-Saharan Africa in the context inter alia of the Kyoto Protocol

An attainable objective will be the recommendations regarding the potential of natural ecosystems to act as carbon sinks, and the management actions that would need to take place to achieve this, thus implementing the strategies necessary to mitigate global change. In particular also the potential role of CDM mechanisms concerning afforestation and reforestation will be evaluated in Sub-Saharan Africa. Within this objective we will provide: the dissemination of data on carbon sequestration and other GHG fluxes to States and Stake Holders; recommendations for a sustainable use of land and a rational use of natural resources in the main African ecosystems.

Partners

N°	Organisation	Country
1.	Università degli Studi della Tuscia	Italy
2.	Max Planck Institute for Biogeochemistry	Germany
3.	Lunds Universitet	Sweden
4.	Global Terrestrial Observing System Food and Agriculture Organization of the United Nations	Italy
5.	Centre de Coopération Internat. en Recherche Agronomique pour le Développement	France
6.	Natural Environment Research Council Centre for Ecology and Hydrology	UK
7.	Consiglio Nazionale delle Ricerche	Italy
8.	Istituto Agronomico per L'oltremare	Italy
9.	Seconda Università di Napoli	Italy
10.	Council for Scientific and Industrial Research	South Africa
11.	Unité de Recherche sur la Productivité des Plantations Industrielles	Congo
12.	Agricultural Research Corporation	Sudan
13.	Commissariat à l'Energie Atomique	France
14.	Centre Nationale de la Recherche Scientifique	France
15.	King's College London	UK

QUASOM — Quantifying and Modelling Pathways of Soil Organic Matter as affected by abiotic Factors, Microbial dynamics and transport processes

CT — 208516

<http://www.bgc-jena.mpg.de/bgc-mdi/index.php/Main/Quasom>

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/09/2008
Duration:	60 months
Total project cost:	946.800 €
EC Contribution:	946.800 €
Coordinating organisation:	Max Planck Gesellschaft zur Förderung der Wissenschaften e.v. Munich — Germany
Co-ordinator:	Petra Bauer (petra.bauer@bgc-jena.mpg.de)
EC Office:	Implementation of the “Ideas” Programme Directorate

Abstract

Soils play a critical role in the coupled carbon-cycle climate system. However, our scientific understanding of the role of soil biological-physicochemical interactions and of vertical transport for biogeochemical cycles is still limited. Moreover the representation of soil processes in current models operating at global scale is crude compared to vegetation processes like photosynthesis. Hence, the general aim of this project is to improve our understanding of the key interactions between the biological and the physicochemical soil systems that are often not explicitly considered in current experimental and modeling approaches and are likely to influence the biogeochemical cycles for a large part of the terrestrial biosphere and thus have the potential to significantly impact the Earth System as a whole. This will be achieved through an approach that integrates new soil mesocosm experiments, field data from ongoing European projects and soil process modeling. In mesocosm tracer experiments the fate of fresh and autochthonous soil organic matter will be followed under varying temperature and moisture regimes in bacterial and fungal dominated soils and the hypothesis tested that transfer coefficients between soil organic matter pools are constant as implemented in current soil organic matter models. A new soil model structure will be developed that may explicitly account for the role of microbes and transport for soil organic matter dynamics. This will be supported by multiple-constraint model identification techniques, which allows testing and achieving model consistency with several observation types. An incorporation of such new soil module into a global dynamic vegetation model (DGVM) is foreseen.

Objectives

- overall: to improve our understanding of the key interactions between the biological and the physicochemical soil systems
- to clarify, how the partitioning of fresh carbon flow between different pathways of ‘stabilization’ (i.e. incorporation into soil organic matter, bacteria and fungi) and respiration varies with environmental conditions.

- to clarify the interactions between fresh organic matter and autochthonous soil organic matter, mediated by microbes, from modeling and experimental perspectives.
- to develop and parameterize new model structures that overcome the limitations of the 'dead-soil-box paradigm' and take into account both the role of microbial groups and transport processes
- to apply the developed alternative soil models as soil-sub modules of a dynamic global vegetation model in a first global impact and sensitivity analysis

Partners

N°	Organisation	Country
1.	Max Planck Gesellschaft zur Förderung der Wissenschaften e.v.	Germany

CARBO-OCEAN — Marine Carbon Sources and Sinks Assessment

CT — 511176

<http://www.carboocean.org>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/01/2005
Duration:	60 months
Total project cost:	19.225.486 €
EC Contribution:	14.498.400 €
Coordinating organisation:	Universiteteit Bergen Bergen — Norway
Co-ordinator:	Christoph Heinze (heinze@gfi.uib.no)
EC Office:	Environment Directorate

Abstract

CARBOOCEAN IP aims at an accurate assessment of the marine carbon sources and sinks. Target is to reduce the present uncertainties in the quantification of net annual air-sea CO₂ fluxes by a factor of 2 for the world ocean and by a factor of 4 for the Atlantic Ocean. The IP will deliver description, process oriented understanding and prediction of the marine carbon sources and sinks with special emphasis on the Atlantic and Southern Oceans on a time scale -200 to +200 years from now. Expected breakthroughs by CARBOOCEAN IP will be firm answers to the following as yet unresolved questions: How large are the Atlantic and Southern Ocean CO₂ sinks precisely, i.e. how efficient is the downward transport of carbon in the deep-water production areas of the world ocean? What do European rivers and shelf seas contribute to the large scale CO₂ sources and sinks pattern of the North Atlantic Ocean in relation to uptake within Western Europe? What are the key biogeochemical feedbacks that can affect ocean carbon uptake and how do they operate? What is the quantitative global and regional impact of such feedbacks when forced by climatic change in the next 200 years? CARBOOCEAN IP will answer these questions through basic research in a strategic combination of extensive large-scale observations, process studies and advanced computer models focusing on all quantitatively important aspects to the problem. The project is based on three elements — observations, process studies, and integrative modelling — equivalent to description, understanding and prediction: A marine carbon balance for the last 200 years based on high quality observations. A process-based understanding of the marine carbon cycle response to a change in forcing as derived from process studies in the field, in the laboratory, and through modelling. Integrated carbon budgets for the interval -200 to +200 years from now by synthesis of a modelling framework with observation and new feedback processes.

Objectives

The CARBOOCEAN Integrated Project aims at an accurate scientific assessment of the marine carbon sources and sinks within space and time. It focuses on the Atlantic and Southern Oceans and a time interval of -200 to +200 years from now. CARBOOCEAN will determine the ocean's quantitative role for uptake of atmospheric carbon dioxide (CO₂), the most important manageable

driving agent for climate change. The ocean has the most significant overall potential as a sink for anthropogenic CO₂. The correct quantification of this sink is a fundamental necessary condition for all realistic prognostic climate simulations. CARBOOCEAN will thus create scientific knowledge, which is essential to a quantitative risk/uncertainty judgement on the expected consequences of rising atmospheric CO₂ concentrations. Based on this judgement, it will be possible to guide the development of appropriate mitigation actions, such as management of CO₂ emission reductions within a global context (e.g., Kyoto Protocol, United Nations, 1997). CARBOOCEAN combines the key European experts and scientific resources in the field through an integrated research effort. The effort complements other major research programmes on oceanic, atmospheric, and terrestrial carbon cycling and is linked to these programmes.

Potential impact

The main goal of this ambitious IP (reducing the uncertainties in the quantification of net annual air-sea CO₂ fluxes by a factor of 2) has major implications:

- clarifying the impact of European emissions on a regional and global scale
- input into international negotiations
- input into climate policy strategies

In order to achieve this goal, a joint effort such as this project is pursuing at the European level, is not only of added value, but also vital. It will increase the competitiveness of European research. It integrates current efforts and initiatives into a coordinated and larger scale project. Exploitation and dissemination plans are fully described and appropriate for a project of this kind. The relevant stakeholders are targeted as recipients of the results. Scientific and technological excellence in research and innovation: The IP has clearly defined objectives through the definition of 5 Core Themes and 3 Overarching Activities. If achieved, they will result into a significant progress of the current state-of-the-art. An interdisciplinary approach is pursued covering the relevant aspects of ocean physics, biogeochemistry and ecology based on observational programmes, process studies and a hierarchy of coupled models. Altogether this will provide a unique data set. The probability to reach the ambitious goals is very high.

Quality of the consortium

The consortium includes high profile scientists and institutions from Europe and is further strengthened by leading US partners who either participate directly in or collaborate with the consortium. It is a very complementary partnership of field experimentalists and modellers from a range of European countries closely resembling the relative contribution of each member state to this field of research. They have a proven track record of success in European projects as coordinators and partners.

Quality of the management

The project is horizontally and vertically well structured. The responsibilities for different WP's and activities are clearly defined. Two boards offer a clear hierarchy in the project. The data management is planned very well and the related manpower adequate. There is an extensive plan for the management of knowledge, intellectual property and of other innovation-related activities.

Mobilisation of resources

The allocated resources are coherent with the project's tasks. The consortium includes large European research institutions which are expected to contribute significantly to the overall costs of the project by matching the requested funding. A commitment should be obtained from the national agencies to deliver their part of the funding.

Partners

N°	Organisation	Country
1.	Universiteteit Bergen	Norway
2.	Université Libre de Bruxelles	Belgium
3.	Alfred-Wegener-Institut für Polar und Meeresforschung	Germany
4.	Leibniz-Institut für Meereswissenschaften	Germany
5.	Consejo Superior de Investigaciones Cientificas	Spain
6.	Commisariat à l'énergie Atomique	France
7.	Université Pierre et Marie Curie — Paris VI	France
8.	Stichting Nederlands Instituut voor Onderzoek der Zee	The Netherlands
9.	University of East Anglia	UK
10.	Université de Liège	Belgium
11.	Universität Bern	Switzerland
12.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
13.	Technische Universität Hamburg Harburg	Germany
14.	Universität Bremen	Germany
15.	Danmarks Miljoeundersogelser	Denmark
16.	Universidad de las Palmas de Gran Canaria	Spain
17.	Institut Francais de Recherche pour l'exploitation de la Mer	France
18.	Centre National de la Recherche Scientifique	France
19.	Université de Perpignan	France
20.	Hafrannsoknastofnunin	Iceland
21.	Institut National de Recherche Halieutique	Morocco
22.	Rijksuniversiteit Groningen	The Netherlands
23.	Koninklijke Nederlandse Akademie van Wetenschappen	The Netherlands
24.	Stiftelsen Nansen Senter for Fjernmaaling	Norway
25.	Norsk Institutt for Luftforskning	Norway
26.	Instytut Ocanologii — Polskiej Akademii Nauk	Poland
27.	Goeteborgs Universitet	Sweden
28.	Met Office	UK
29.	Natural Environment Research Council	UK
30.	University of Essex	UK
31.	Fastopt Gbr	Germany

32.	Intergovernmental Oceanographic Commission of Unesco	France
33.	Nilu Polska Ltd.	Poland
34.	Philippe Saugier International Educational Projects	France
35.	Princeton University	USA

GRACE — Genetic Record of Atmospheric Carbon Dioxide

CT — 200915

<http://oceanbug.earth.ox.ac.uk/projects/grace>

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/09/2008
Duration:	60 months
Total project cost:	1.652.907 €
EC Contribution:	1.652.907 €
Coordinating organisation:	the Chancellor, masters and scholars of the University of Oxford Oxford — UK
Co-ordinator:	Gill Halstead (gillh@earth.ox.ac.uk)
EC Office:	Implementation of the “Ideas” Programme Directorate

Abstract

Two key variables, temperature and atmospheric carbon dioxide ($p\text{CO}_2$), define the sensitivity of the Earth's climate system. The geological record provides our only evidence of the past climate sensitivity of the Earth system, but there is no direct quantitative measure of $p\text{CO}_2$ or temperature beyond the 650 kyr extent of the Antarctic ice cores. The reconstruction of past climate, on timescales of millions of years, relies on the analysis of chemical or isotopic proxies in preserved shells or organic matter. Such indirect approaches depend upon empirical calibration in modern species, without understanding the biological mechanisms that underpin the incorporation of the climate signal. The intention of this ERC grant proposal is to establish a research team to investigate the “living geological record” to address this major gap in climate research. I hypothesise that direct climate signals of the past are harboured within, and can ultimately be deciphered from, the genetic make up of extant organisms. Specifically, I propose an innovative approach to the constraint of the evolution of atmospheric $p\text{CO}_2$ during the Cenozoic. The approach is based on the statistical signal of positive selection of adaptation within the genetic sequences of marine algal Rubisco, the notoriously inefficient enzyme responsible for photosynthetic carbon fixation, but supplemented by analysis of allied carbon concentrating mechanisms. As a calibration, I will characterise the biochemical properties of Rubisco in terms of specificity for $p\text{CO}_2$, isotopic fractionation and kinetics, from a range of marine phytoplankton. The prime motivation is a history of $p\text{CO}_2$, but the project will yield additional insight into the feedback between phytoplankton and climate, the carbon isotopic signatures of the geological record and the mechanistic link between genetic encoding and specific

Partners

N°	Organisation	Country
1.	The Chancellor, masters and scholars of the University of Oxford	UK

ICOS — Integrated Carbon Observation System

CT -211574

<http://icos-infrastructure.ipsl.jussieu.fr/>

Funding instrument:	Collaborative Project (CP) and Coordination and Support Actions (CSA)s
Contract starting date:	01/04/2008
Duration:	48 month
Total project cost:	5.696.669 €
EC contribution:	4.299.996 €
Coordinating organisation:	CEA-CNRS-UVSQ (Laboratoire des Sciences du Climat et de l'Environnement, L'Orme des Merisiers CEA Saclay) Gif sur Yvette — France
Co-ordinator:	Philippe Ciais (philippe.ciais@lsce.ipsl.fr)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

The goal of the ICOS Preparatory Phase is to initiate across Europe and adjacent regions a network for standardized long-term high precision monitoring of atmospheric greenhouse gas concentrations and ecosystem fluxes and essential carbon cycling variables. These measurements will allow daily determination of sources and sinks at scales down to about 100 km², and will be a basis for understanding the carbon exchange processes between the atmosphere, the terrestrial surface and the ocean. The ICOS Research Infrastructure relies on the following facilities:

- A Project Co-ordination Office which co-ordinates all activities, and which is responsible for data management, data diffusion and outreach. Associated with the co-ordination office will be the established a data centre, the Carbon Portal, providing free access to the ICOS data.
- A Central Analytical Laboratory for calibration, quality control and atmospheric analyses for the entire network.
- An Atmospheric Thematic Center responsible for continuous and discontinuous air sampling, instrument development/servicing and data processing.
- An Ecosystem Thematic Centre responsible for total ecosystem flux measurements and component fluxes and carbon pools, including data processing and instrument development.
- Main Observation Sites which are connected in a distributed network of about 30 atmospheric and 30 ecosystem sites located across Europe, and are expected to be operated for 20 years.

The implementation of ICOS will take place in two steps:

- During the Preparatory Phase starting in 2008 until 2011, the funding commitments will have to be endorsed by the governments and mother institutions, the building of the central facilities will be initiated, and the project will be technically developed up to the level of a demonstration year of full operation, but with a reduced number of observational sites.

- During the follow-up Operational Phase from 2012 until 2031, the network will be run in an operational mode, and greenhouse gas concentrations and fluxes will be determined on a routine basis.

The list of variables covered in ICOS is that of GEOSS (Global Earth Observation System of Systems) recommended to 'support the development of observational capabilities for Essential Climate Variables (ECVs) such as CO₂, CH₄ and other greenhouse gases' (10-years GEOSS Implementation Plan, page 64-65). Further, ICOS contributes to the GEOSS aims by implementing in Europe an Integrated Global Observing Strategy for Atmospheric Chemistry Observations (IGACO) and for Global Carbon Cycle Observations (IGCO).

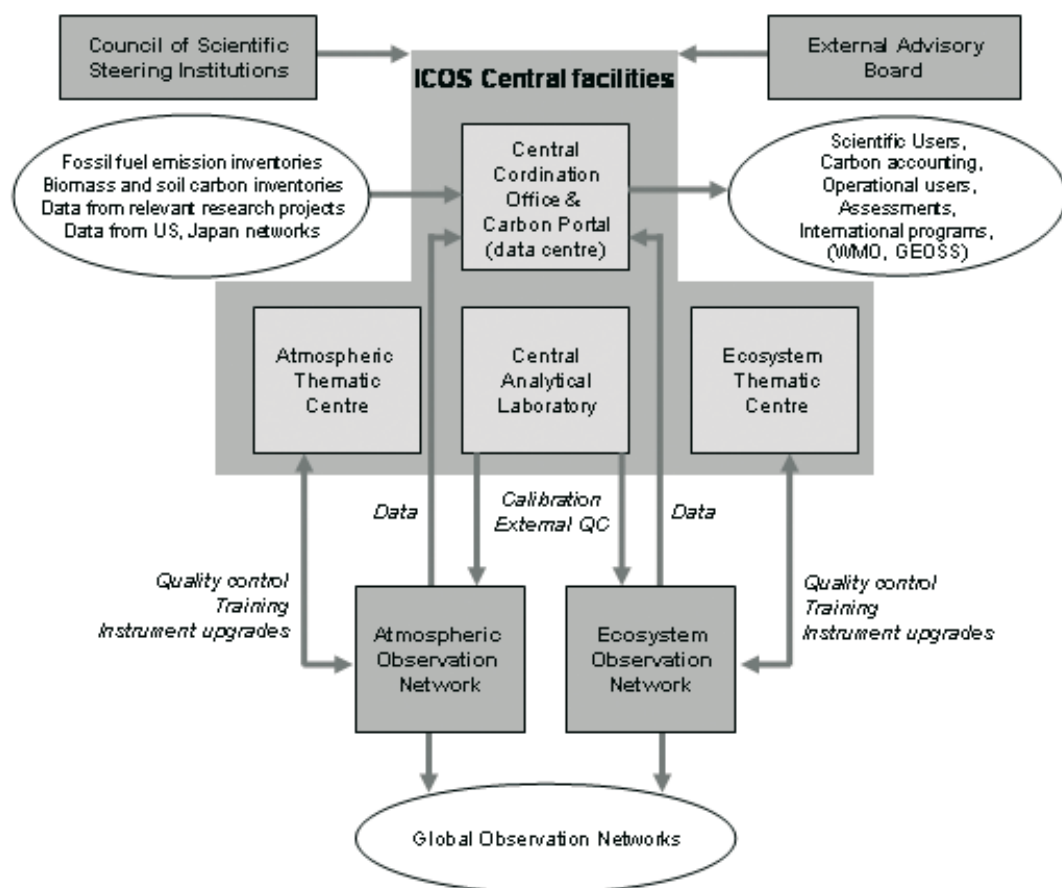


Figure 1 — The ICOS concept

Objectives

- To establish an efficient coordination of the infrastructure at the European level that will guide the process of building the distributed components and organize the expenditure assessment, the fund raising, and the outreach at the project level.

⇒ A management scheme with a centralized coordination will be established in WP 1

- To reach a mutual agreement of the involved countries and obtain their funding commitment to ensure the construction of the infrastructure, and its long term viability at the operational level.
 - ⇒ A legal organization and governance model will be analyzed, selected and negotiated between the partners in WP 2 that will lay the foundation for building the infrastructure,
 - ð Funding commitments for beginning the construction of ICOS by the end of the Preparatory Phase will be researched in WP 3
- Involve the providers of external datasets in ICOS.
 - ⇒ Identifying external datasets and their sources, negotiating data exchange and access will be done in WP4
- To select the best sensors for making routine measurements of the core parameters, based upon best available technology.
- To select optimal sites for atmospheric and ecosystem observations for the future operational network.
 - ⇒ Carrying out network design studies to optimally select approximately 30 main atmospheric sites and 30 main ecosystem sites, and additional associated regional sites. Regularly updating the list of ICOS core and secondary atmospheric and ecosystem parameters is the object of WP 5,
- Establish the operational measurement criteria for atmospheric and ecosystem parameters, and test and evaluate new sensors in order to select the best available technology for the ICOS observing sites.
- To harmonize and further develop methods for preparing the establishment of the central facilities of the infrastructure: A Central Analytical Laboratory, an Atmospheric Thematic Centre and an Ecosystem Thematic Centre.
 - ⇒ Developing the hardware and software for the Atmospheric Thematic Centre and the Ecosystem Thematic Centre, and reporting on the function and requirements for the Central facilities is done in WP 6,
- To run the prototype sensors and data analysis system as a short demonstration study of 6 months.
 - ⇒ This will be executed in WP 7, key to demonstrate to funding agencies that the infrastructure is ready to be constructed at the end of the Preparatory Phase,
- Develop dissemination tools providing access to the infrastructure services and relevant carbon cycle data.
 - ⇒ Establishing a web-based Carbon Portal, giving access to ICOS data products and to all relevant carbon cycle datasets, in particular fossil fuel emission maps, is the object of WP 8.

Partners

N°	Organisation	Country
1.	Commissariat à l’Energie Atomique	France
2.	Max-Planck-Gesellschaft	Germany
3.	University of Tuscia	Italy
4.	University of Heidelberg	Germany

5.	Vrije University Amsterdam	The Netherlands
6.	University of Helsinki	Finland
7.	University of Edinburgh	UK
8.	Centre National de la Recherche Scientifique-Institut National des Sciences de l'Univers	France
9.	Lunds universitet Forskningscenter Risø	Sweden
10.	Danmarks Tekniske Universitet	Denmark
11.	SJ Berwin LLP	Belgium
12.	Universiteit Antwerpen	Belgium
13.	Fundación Centro de Estudios Ambientales del Mediterraneo	Spain
14.	Ústav systémové biologie a ekologie AV ČR, v.v.i.	Czech Republic
15.	Eidgenoessische Technische Hochschule Zurich	Switzerland
16.	Institut Scientifique de Recherche Agronomique	France

IMECC — Infrastructure for Measurement of the European Carbon Cycle

CT — 026188

<http://imecc.ipsl.jussieu.fr/>

Funding instrument:	Specific actions to promote research infrastructures
Contract starting date:	01/04/2007
Duration:	48 months
Total project cost:	8.683.006 €
EC Contribution:	6 729 300 €
Coordinating organisation:	CEA — Commissariat à l'Energie Atomique Paris — France
Co-ordinator:	Peter Rayner (peter.rayner@cea.fr)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

The IMECC project aims to build the infrastructure for a coordinated, calibrated, integrated and accessible dataset for characterizing the function of the European terrestrial biosphere. Such an infrastructure is necessary since the critical measurements are spatially dispersed. Their interpretation, however, relies on precise knowledge of the spatial and temporal structures of measured quantities. Thus the measurements must be of the highest quality and precisely calibrated in order to be useful. They should also be well planned, that is subject to some coordinated and targeted experimental design and should be accessible to a wide range of researchers. IMECC will deliver these services to the range of measurements within various European projects. As an added benefit, the improved measurements will also be increasingly compatible with the range of global measurements. IMECC will not only provide these services for the life of the project but will aid the development of strategies and techniques to streamline this coordination into the future.

Objectives

The IMECC project aims to build the infrastructure for a coordinated, calibrated, integrated and accessible dataset for characterizing the carbon balance of Europe. It will achieve this by:

- Improving the comparability of atmospheric and ecosystem measurements of greenhouse gases and isotopic composition so that measurements made by diverse and widespread research programmes can be reliably combined. Progress will be reported routinely on a documented and accessible web-site built by IMECC.
- Coordinating optimal development of infrastructure via comprehensive experimental design studies. IMECC will provide a web-based tool to calculate the impact of proposed measurements on knowledge of the European carbon cycle.
- Improving access to existing and future atmospheric and ecosystem data for research and for other integrated projects via a coordinated data delivery centre.

- Improving access to data on ecosystem parameters and state-of-the-art facilities for ecosystem measurement and manipulation for the European research community.
- Tying European terrestrial data into emerging remotely-sensed datasets on atmospheric composition. IMECC will develop a transfer standard between European atmospheric measurements and satellite measurements using ground-based remote sensing. The quality of the transfer standard will be tested with routine aircraft profiling.

Partners

N°	Organisation	Country
1.	Commissariat à L'Energie Atomique, Gif-sur-Yvette	France
2.	Finnish Meteorological Institute, Helsinki	Finland
3.	Faculté des Sciences Agronomiques de Gembloux, Gembloux	Belgium
5.	Ente per le Nuove Tecnologie Rome	Italy
6.	Vrije Universiteit, Amsterdam	The Netherlands
7.	University of Edinburgh, Edinburgh	UK
8.	Max Planck Society for the Advancement of Science, Jena	Germany
9.	The Provost, Fellows and Scholars of the College of the Holy and Undivided Trinity of Queen Elizabeth, Dublin	Ireland
10.	FastOpt, Hamburg	Germany
11.	Eötvös Loránd University, Department of Meteorology, Budapest	Hungary
12.	University of Bern, Physics Institute, Bern	Switzerland
13.	Lunds Universitet, Lund	Sweden
14.	University of Bologna, Department of Tree Sciences, Bologna	Italy
15.	Rijksuniversiteit Groningen, Centrum voor Isotopen Onderzoek	The Netherlands
17.	Royal Holloway and Bedford New College, Egham	UK
18.	University of Bremen, Institute of Environmental Physics, Bremen	Germany
19.	Instituto Superior de Agronomia, Department of Forestry, Lisbon	Portugal
20.	Risoe National Laboratory, Biosystems Department, Roskilde	Denmark
21.	Centre national de la Recherche Scientifique, Montpellier	France
22.	Akademia Gorniczo-Hutnicza, Krakow,	Poland
24.	Fundación Centro de Estudios Ambientales del Mediterráneo, Valencia	Spain
25.	University of Bristol, Quest-Department of Earth Sciences, Bristol	UK
26.	Institute National de La Recherche Agronomique, Paris	France
28.	Università Degli Studi Della Toscana, Department Disafri, Viterbo	Italy
29.	Energy Research Centre of the Netherlands, Petten	The Netherlands
30.	Helsingin Yliopisto, Department of Physical Sciences, Helsingin Yliopisto	Finland
31.	National University of Ireland Galway, Galway	Ireland
32.	Parc Científic de Barcelona, Climate Research Laboratory, Barcelona	Spain
33.	Istituto di Biometeorologia, — Consiglio Nazionale delle Ricerche	Italy

INSEA — Integrated Sink Enhancement Assessment

CT — 503614

<http://www.insea-eu.info/>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/01/2004
Duration:	30 months
Total project cost:	2.553.530 €
EC Contribution:	1.488.750 €
Coordinating organisation:	International Institute for Applied Systems Analysis Laxenburg — Austria
Co-ordinator:	Michael Obersteiner (oberstei@iiasa.ac.at)
EC Office:	Environment Directorate

Abstract

Among the key global public goods that require special attention and governance, the climate, global food security, the protection of natural resources, and the supply of sustainable energy are unprecedented challenges. The Integrated Sink Enhancement Assessment (INSEA) project aims at an understanding of how the forestry and agricultural sectors contribute to the production of these public goods and, eventually, how these two sectors can contribute to a sustainable development process by the adoption of environmental technologies mitigating anthropogenic greenhouse gas (GHG) emissions. The project aims at developing a transparent toolbox that can be trusted, understood, and shared by stakeholders, as well as sharing scientifically validated data. Greenhouse-gas mitigation measures in agriculture and forestry are part of the Bonn/Marrakech Accords within the Kyoto Protocol. If adopted, these measures could turn out to be instrumental in attaining climate-mitigation goals in an efficient manner, contribute to sustainable farming and also to become a major driver of how terrestrial ecosystems are managed. A thorough integrated economic and environmental assessment of the economic and sustainable potentials of these measures has yet to be carried out, however, either for the European Union or internationally. The INSEA project seeks to develop appropriate analytical tools for policy assessment of these practices and thus contribute to the climate negotiation process as well as support the implementation of the Kyoto Protocol commitments and the post-Kyoto negotiations. By their very nature, land use, land-use change, and forestry (LULUCF) activities occupy space. Starting with a thorough analysis and modelling of the emission balance of agriculture, forestry and livestock activities as a function of technologies, the INSEA approach seeks to integrate farm-level and forest-plot models with regional and national models for an assessment of the potential economic and environmental impacts of policy change. A multifaceted approach across different scales should guarantee robustness and consistency in the assessment of sustainable and cost-effective GHG emission mitigation policies. The bottom-up approach on the one hand will facilitate the validation of aggregate results and, on the other, will help illustrate behavioural change on the micro scale that the policies seek to influence. Right from the start, a common database will be made available to all partners and, with some restrictions, to the outside. Common GHG accounting and cost accounting standards will be developed providing input to detailed biophysical models assessing GHG — mitigation effects due to management change as a consequence of technological

adoption. Likewise, system boundaries and baselines all the way to scenario assumptions will be harmonized. The final structure will form the basis for incremental improvement to tailor the approach to the requirements of the stakeholders within an integrated policy framework.

Partners

N°	Organisation	Country
1.	International Institute for Applied Systems Analysis	Austria
2.	Joint Research Center (Ispra)	Italy
3.	Federal Institute for Geosciences and Natural Resources	Germany
4.	Soil Science and Conservation Research Institute	Slovakia
5.	Lulea University of Technology	Sweden
6.	University of Hohenheim	Germany
7.	Institut National de la Recherche Agronomique	France
8.	Joanneum Research	Austria
9.	University of Bodenkultur	Austria
10.	Centre de Coopération International en Recherche Agronomique pour le Developpement	France
11.	European Forest Institute	Finland

NEU-CO₂-III — Continuation of the “International Network Non-energy use and CO₂ emissions (NEU-CO₂)”, Phase III

CT — 505345

<http://www.chem.uu.nl/nws/www/nenergy/>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/09/2004
Duration:	24 months
Total project cost:	289.656 €
EC Contribution:	289.656 €
Coordinating organisation:	Universiteit Utrecht Utrecht — Netherlands
Co-ordinator:	Martin Patel (m.patel@chem.uu.nl)
EC Office:	Environment Directorate

Abstract

A significant fraction of fossil fuels is consumed as non-energy use, i.e. as feedstock for the manufacture of synthetic materials and chemical products, e.g. plastics, paints, solvents, lubricants and bitumen. In the long run, these products contribute substantially to CO₂ emissions. In Western Europe, non-energy use represents 11-12% of the total amount of fossil fuels for final consumption. In other parts of the world, the manufacture of non-energy products is increasing very rapidly, e.g. in China. CO₂ emissions from non-energy use continue to be a major source of uncertainty in national greenhouse gas (GHG) emission accounting. The NEU-CO₂ network has been working on this issue since 1999. In this proposal the continuation of the network is applied for (Phase III). Given the success of the network to date, the goals of Phase III are: to expand the existing network by a Chinese, German, South Korean & South African partner, to develop the so-called Simplified Approach, which requires much less data than the NEAT model (developed in Phase I&II) and can hence be applied worldwide more easily, to apply it to all countries represented in the NEU-CO₂ network and to evaluate the accuracy of the results by comparison with detailed country-specific estimation methods, to pool bottom-up information on materials with complicated pathways in production, use and waste management such as solvents and lubricants, to monitor the experience made with the improved IEA/EUROSTAT energy balance questionnaire and to make further steps towards harmonisation, to initiate and accompany national analyses similar to those for the Netherlands, Austria & Flanders in Belgium, to contribute to rewriting of the IPCC Guidelines for National GHG emission inventories in order to improve the terminology, remove ambiguity & contradictions and to introduce improved estimation methods, to disseminate the results by two workshops, by the website and by other means.

Partners

N° Organisation Country

- | | | |
|----|--|-----------------|
| 1. | Universiteit Utrecht | The Netherlands |
| 2. | Ente per le Nuove Tecnologie, l'Energia e l'Ambiente | Italy |

3.	Avonlog Ltd	UK
4.	Institut für Industrielle Oekologie	Austria
5.	Risoe National Laboratory	Denmark
6.	Centre Interprofessionnel Technique d'Etudes de la Pollution Atmosphérique	France
7.	Vlaamse Instelling voor Technologisch Onderzoek	Belgium
8.	Center for Energy Efficiency	Russia
9.	Ecofys Polska Sp Z.O.O.	Poland
10.	The Energy and Resources Institute	India
11.	Inha University	Korea Rep.
12.	Icf Consulting, Ltd.	UK
13.	University of Cape Town.	South Africa
14.	Energieonderzoek Centrum Nederland	The Netherlands
15.	International Energy Agency	France

PAN-AMAZONIA — Project for the Advancement of Networked Science in Amazonia

CT — 505335

<http://www.eci.ox.ac.uk/research/ecodynamics/panamazonia/>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/01/2004
Duration:	36 months
Total project cost:	400.000 €
EC Contribution:	400.000 €
Coordinating organisation:	University of Edinburgh Edinburgh — UK
Co-ordinator:	Yadvinder Malhi (yadvinder.malhi@ouce.ox.ac.uk)
EC Office:	Environment Directorate

Abstract

PAN-AMAZONIA encompasses three integrated scientific networks designed to meld together currently disparate research efforts across the Amazon Basin in terms of global change and tropical forest ecosystem function. Specifically addressing current European Union carbon cycle and biodiversity priorities, PAN-AMAZONIA will form and strengthen transnational networks covering forest diversity and dynamics, tree biodiversity and whole ecosystem physiology and carbon dynamics, involving around 70 researchers from ten Latin American countries linked together with the overall aim of advancing our long term understanding of Amazonian forest structure and function in the face of global change. With the specific support of the Inter-American Institute for Global Change Research, training of Latin American early stage researchers will form a key focus of PAN-AMAZONIA, with six Advanced Study Workshops to be held with instruction provided by leading European and South American scientists. Early on in the project exceptional students will be identified at the early post graduate level for Investigador Pan-Amazonia Fellowships. Those selected will work in close liaison with top-level European scientists on previously identified projects that specifically address comparison and integration of research across the Amazon Basin. Integration of global change research in the Amazon will be further strengthened by producing a comprehensive set of multi lingual manuals and by synthesizing existing knowledge of forest biodiversity, ecology and change into authoritative database products. By forming new Regional Research Networks and strengthening European co-operation with Latin American partners, PAN-AMAZONIA will develop the critical mass of human capacity and techniques for monitoring and understanding the Amazon ecosystem's role in climate change and maintenance of biodiversity, and the effects of global change on the Amazon ecosystem. The project therefore simultaneously addresses the ENRICH objectives of strengthening co-operation with partners in the developing world on issues such as climate change, biodiversity, ecosystems, natural risks and hazards.

Partners

N°	Organisation	Country
1.	University of Oxford	UK
2.	University of Leeds	UK
3.	Vrije Universiteit Amsterdam	The Netherlands
4.	Centre National de la Recherche Scientifique	France
5.	Alterra B.V.	The Netherlands
6.	Universiteit Utrecht	The Netherlands
7.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
8.	Instituto Nacional de Pesquisas da Amazonia	Brazil
9.	Museu Paraense Emilio Goeldi	Brazil
10.	Museo de Historia Natural Noel Kempff Mercado	Bolivia

NITROEUROPE — The Nitrogen Cycle and its Influence on the European Greenhouse Gas Balance

CT — 017841

<http://www.neu.ceh.ac.uk/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/02/2006
Duration:	60 months
Total project cost:	26.861.499 €
EC Contribution:	16.600.000 €
Coordinating organisation:	Natural Environment Research Council Swindon — UK
Co-ordinator:	Mark Sutton (ms@ceh.ac.uk)
EC Office:	Environment Directorate

Abstract

The NitroEurope IP — or NEU for short — addresses the major question: What is the effect of reactive nitrogen (Nr) supply on net greenhouse gas budgets for Europe? The objectives are to:

- establish robust datasets of N fluxes and net greenhouse-gas exchange (NGE) in relation to C-N cycling of representative European ecosystems, as a basis to investigate interactions and assess long-term change;
- quantify the effects of past and present global changes (climate, atmospheric composition, land-use/land-management) on CN cycling and NGE;
- simulate the observed fluxes of N and NGE, their interactions and responses to global change/land-management decisions, through refinement of plot-scale models;
- quantify multiple N and C fluxes for contrasting European landscapes, including interactions between farm-scale management, atmospheric and water dispersion, and consideration of the implications for net fluxes and strategies;
- scale up Nr and NGE fluxes for terrestrial ecosystems to regional and European levels, considering spatial variability and allowing assessment of past, present and future changes;
- assess uncertainties in the European model results and use these together with independent measurement/inverse modelling approaches for verification of European N₂O and CH₄ inventories and refinement of IPCC approaches.

These objectives are met by a programme that integrates:

- an observing system for N fluxes and pools,
- a network of manipulation experiments,
- plot-scale C-N modelling,
- landscape analysis,
- European up-scaling

- uncertainty and verification of European estimates. Cross-cutting activities address management, databases, training & dissemination.

NEU will advance the fundamental understanding of C-N interactions at different scales and deliver: process-based models, landscape-level assessments, European maps of C-N pools, Nr fluxes and NGE, and independent verification of GHG inventories, as required under the Kyoto Protocol.

Objectives

The NitroEurope IP — or NEU for short — addresses the major question: What is the effect of reactive nitrogen (Nr) supply on net greenhouse gas budgets for Europe? The objectives are to:

- establish robust datasets of N fluxes and net greenhouse-gas exchange (NGE) in relation to C-N cycling of representative European ecosystems, as a basis to investigate interactions and assess long-term change;
- quantify the effects of past and present global changes (climate, atmospheric composition, land-use/land-management) on CN cycling and NGE;
- simulate the observed fluxes of N and NGE, their interactions and responses to global change/land-management decisions, through refinement of plot-scale models;
- quantify multiple N and C fluxes for contrasting European landscapes, including interactions between farm-scale management, atmospheric and water dispersion, and consideration of the implications for net fluxes and strategies,
- scale up Nr and NGE fluxes for terrestrial ecosystems to regional and European levels, considering spatial variability and allowing assessment of past, present and future changes;
- assess uncertainties in the European model results and use these together with independent measurement/inverse modelling approaches for verification of European N₂O and CH₄ inventories and refinement of IPCC approaches.

NEU will advance the fundamental understanding of C-N interactions at different scales and deliver: process-based models, landscape-level assessments, European maps of C-N pools, Nr fluxes and NGE, and independent verification of GHG inventories, as required under the Kyoto Protocol.

Partners

N°	Organisation	Country
1.	Natural Environment Research Council	UK
2.	Stichting Energieonderzoek Centrum Nederland	The Netherlands
3.	Forschungszentrum Karlsruhe, Institute for Meteorology and Climate Research	Germany
4.	Forskningsscenter Risoe, Risoe National Laboratory	Denmark
5.	Alterra Green World Research	The Netherlands
6.	Institut National de la Recherche Agronomique	France
7.	Seconda Università degli Studi Napoli	Italy
8.	European Commission — Directorate General Joint Research Centre	Italy

9.	Agroscope Fal Reckenholz, Swiss Federal Research Station for Agroecol & Agriculture	Switzerland
10.	Center For Skov, Landskab, Og Planlægning, Kvl	Denmark
11.	Max Planck Gesellschaft Zur Förderung der Wissenschaften E.V.	Germany
12.	Consiglio Nazionale delle Ricerche	Italy
13.	Federal Office and Research Centre for Forests	Austria
14.	Helsingin Yliopisto, University of Helsinki	Finland
15.	Danmarks Jordbrugsforskning	Denmark
16.	Scottish Agricultural College	UK
17.	University of Aberdeen	UK
18.	International Institute for Applied Systems Analysis	Austria
19.	Wageningen University	The Netherlands
20.	The August Cieszkowski Agricultural, University of Poznan	Poland
21.	Ilmatieteen Laitos, Finnish Meteorological Institute	Finland
22.	Forest Research Institute	Hungary
23.	Meteorological & Hydrolog. Service Of Croatia	Croatia
24.	Norsk Institutt for Luftforskning	Norway
25.	Slovenský Hydrometeorologický Ústav,	Slovakia
26.	Trinity College Dublin	Ireland
27.	The Netherlands Organisation for Applied Scientific Research	The Netherlands
28.	The University of Manchester	UK
29.	University of Cork, National University of Ireland	Ireland
30.	The University of Edinburgh	UK
31.	Università degli Studi della Tuscia,	Italy
32.	Odessa National University	Ukraine
33.	Göteborg University	Sweden
34.	Den Kongelige Veterinaer- Og Landbohøjskole	Denmark
35.	St Stephens University	Hungary
36.	Universiteit Gent	Belgium
37.	University of Zimbabwe	Zimbabwe
38.	Leibniz-Zentrum Für Agrarlandschafts und Landnutzungsforschung E.V.	Germany
39.	Kungliga Tekniska Högskolan	Sweden
40.	Chinese Academy Of Sciences	China
41.	Indian Agricultural Research Institute	India
42.	Russian Academy of Sciences,	Russia
43.	Polish Academy of Science, Research Centre for Agricultural and Forest Environment	Poland
44.	Justus-Liebig-Universität Giessen,	Germany
45.	Commissariat à l'énergie Atomique	France

46.	Rijksinstituut voor Volksgezondheid en Milieu	The Netherlands
47.	Meteorologisk Institutt	Norway
48.	Meteorological Office	UK
49.	Centro di Ecologia Alpina	Italy
50.	Fundacion Centro de Estudios Ambientales del Mediterraneo	Spain
51.	Bundesforschungsanstalt für Landwirtschaft	Germany
52.	Centre Nationale de la Recherche Scientifique	France
53.	Russian Academy of Sciences, A.N.Severtsov Institute of Ecology and Evolution	Russia
54.	Eotvos Lorand Tudományegyetem	Hungary
55.	Tartu Ülikool	Estonia
56.	Centre de Recerca Ecològica i Aplicacions Forestals	Spain
57.	Instituto Superior de Agronomia, Universidade Técnica de Lisboa	Portugal
58.	Swedish Environmental Research Institute	Sweden
59.	Universiteit van Amsterdam	The Netherlands
60.	Lunds Universitet	Sweden
61.	Universidad Politécnica de Madrid	Spain
62.	Eidgenössische Forschungsanstalt	Switzerland
63.	Roskilde Universitetscenter	Denmark
64.	Suomen Ympäristökeskus	Finland
65.	Szegedi Tudományegyetem	Hungary

SOGE-A — System for Observation of Halogenated Greenhouse Gases in Europe and Asia

CT — 505419

(¹)

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/06/2004
Duration:	36 months
Total project cost:	828.500 €
EC Contribution:	380.000 €
Coordinating organisation:	Norsk Institutt for Luftforskning Kjeller — Norway
Co-ordinator:	Frode Stordal (Frode.Stordal@geo.uio.no)
EC Office:	Environment Directorate

Abstract

SOGE-A will provide a European contribution to extension of an international observation system for greenhouse gases by setting up a Chinese measurement system. The project builds upon SOGE, an existing integrated system for observation of halogenated greenhouse gases in Europe, funded through the Energy, Environment and Sustainable Development Program (FP5) and national contributions. The gases that are in focus, CFCs, HCFCs and MFCs, are included in the Montreal and the Kyoto protocols, as they contribute to depletion of the stratospheric ozone layer as well as global warming.

The setting-up of a measurement system in China includes installing in instrument for measurements of halogenated compounds, linking and harmonization of the Chinese station to SOGE, and estimation of emissions by combining measurements with meteorological data and model tools. The project also focuses on teaching, training and dissemination of results to end-users. China still (legally) emits significant amounts of CFCs. China's importance as a source of HCFC and HFC is increasing rapidly.

SOGE-A will be linked to the SOGE network that has been developed between four stations in Europe with full intercalibration. SOGE is collaborating with the international network of Advanced Global Atmospheric Gases Experiment (AGAGE), which is funded partly by NASA in the US and partly by the governments of Australia, United Kingdom and Japan. AGAGE collaborates with the network of National Ocean and Atmosphere Administration (NOAA) in the US. NASA and NOAA, and also the Global Atmosphere Watch (GAW) program, support the establishment of observations in China, due to significant emissions and missing observations in the region.'

Partners in the consortium are in the forefront on the development of instrumentation for observations of halogenated greenhouse gases and they have developed the instrumentation

(¹) The website for this project can be found by searching on the following site:
<http://cordis.europa.eu/fp6/projects.htm>

currently used. Extension of the international observational system will thus imply a transfer of technologies and competencies, and an educational programme will be a part of the project.

Partners

N°	Organisation	Country
1.	Norsk Institutt for Luftforskning	Norway
2.	Chinese Academy of Meteorological Sciences	China
3.	University of Bristol	UK
4.	Eidgenoessische Materialpruefungs- Und Forschungsanstalt	Switzerland
5.	Università degli Studi di Urbino "Carlo Bo"	Italy

III. CLIMATE INTERACTIONS WITH STRATOSPHERIC OZONE

THE MAIN AIM QOS2004 — Quadrennial Ozone Symposium 2004

CT — 505404

<http://www.qos2004.gr>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/10/2003
Duration:	12 months
Total project cost:	232.000 €
EC Contribution:	63.000 €
Coordinating organisation:	National and Kapodistrian University of Athens Athens — Greece
Co-ordinator:	Christos Zerefos (zerefos@geol.uoa.gr)
EC Office:	Environment Directorate

Abstract

The project aims to support preparation and organisation of the next Quadrennial Ozone Symposium (QOS2004). This will be achieved through making local arrangements and providing support for young scientists and for scientists from accession countries to attend. A well-organised meeting is planned in which all current issues in stratospheric research are discussed. EU and other countries are supporting substantial programmes of research on stratospheric ozone and related issues (UV) and it is important to ensure that maximum benefit is gained from this research. The relevance and innovative nature of future work will be promoted through the discussions between scientists from all over the world, enhancing also cooperation of EU with other international projects. The Symposium provides an excellent forum for researchers carrying out innovative work in the areas of field measurements, laboratory measurements, modelling and theoretical research in the ozone layer, which ensures that the latest findings will be widely discussed and disseminated. As such it will facilitate communication between researchers, in each area covered by the Symposium, so promoting exchange of knowledge, encourage scientific collaboration across the sub-disciplines of the field and world-wide, assist in the early identification of key concepts and questions and so help to direct resources and research towards the critical issues in the field. At the QOS2004 the discussions and presentations will include research on future stratospheric ozone levels affected by halogens, aerosols, water and greenhouse gas emissions and how physical, radiative and chemical changes in the global stratosphere will be affected by climate change.

Partners

N°	Organisation	Country
1.	National and Kapodistrian University of Athens	Greece

SCOUT-O3 — Stratosphere-Climate Links with Emphasis on the UTLS

CT — 505390

http://www.ozone-sec.ch.cam.ac.uk/scout_o3

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/05/2004
Duration:	64 months
Total project cost:	23.547.532 €
EC Contribution:	15.000.000 €
Coordinating organisation:	University of Cambridge Cambridge — UK
Co-ordinator:	John Adrian Pyle (john.pyle@atm.ch.cam.ac.uk)
EC Office:	Environment Directorate

Abstract

Reliable prediction of the future evolution of the ozone layer and surface UV is urgently required as a basis for informed decisions by European policy makers. The state of the ozone layer over the next decades will depend on the interplay between climate change and the impact and evolution of ozone depleting substances such as CFCs. The Montreal Protocol has successfully in reduced emissions and atmospheric concentrations of CFCs, which should return to their pre-ozone hole concentrations by about 2050. However, the ozone layer will most likely not return to its pre-ozone hole state and so the central question of the Montreal process — how and when will ozone and UV radiation recover as CFC concentrations fall? — remains. Indeed, in order to provide essential advice to policy makers, the answer to that question is required within the next years. In this ambitious integrated project, the European predictive capability will be strengthened by focusing effort on 6 main interlinked areas of research: coupled chemistry/climate models; the tropical UTLS; extra-tropical ozone and water vapour; UV radiation; global modelling; and fundamental chemical and microphysical processes. Strong scientific management, built on Europe's excellent previous experience in stratospheric science, will bring together a critical mass of European experts in laboratory studies, atmospheric measurements and modelling. It will exploit new satellite data, such as from ENVISAT, and new modelling approaches (e.g. fully-coupled chemistry-climate models; and the growing interaction with the numerical weather forecasting community), and take advantage of new and existing research facilities being developed at the national level. Valuable information for the assessment of the atmospheric impact of aviation will be obtained. This integrated project will thus provide essential information to European government and industry and will maintain Europe's leading position in stratospheric research.

Objectives

The central aim of this research is to provide best scientific knowledge for international assessments on ozone depletion and climate change for the Montreal and Kyoto Protocols. These protocols, and the associated energy, environment and emission policies, are of fundamental importance to European quality of life and competitiveness. We are providing new knowledge to the EU and

national governments to develop the European position in discussions related to the Protocols with policies for sustainable development. SCOUT-O3 maintains the excellence of the European atmospheric science community and leads to further integration of its activities. SCOUT-O3 involves the research efforts of 59 partners and more than 100 scientific groups and takes full advantage of new and existing research facilities developed at the national level.

Reliable prediction of the future evolution of the ozone layer and surface UV is urgently required as a basis for informed decisions by European policy makers. The state of the ozone layer over the next decades will depend on the interplay between climate change and the impact and evolution of ozone depleting substances such as CFCs. The Montreal Protocol has successfully reduced emissions and atmospheric concentrations of CFCs, which should return to their pre-ozone hole concentrations by about 2050. However, the ozone layer will most likely not return to its pre-ozone hole state and so the central question of the Montreal process — how and when will ozone and UV radiation recover as CFC concentrations fall? — remains. Indeed, in order to provide essential advice to policy makers, the answer to that question is required within the next years.

The research in this ambitious integrated project is focused on strengthening the European predictive capability through improving the use of coupled chemistry/climate models (CCMs). An improved understanding of model performance is gained from on-going validation and comparisons from existing and new measurements. Interpretation of the measurements is achieved using a variety of models operating on all spatial scales.

Lack of knowledge about the tropical stratosphere and upper troposphere is addressed through tropical field campaigns involving aircraft and balloons to investigate the detailed mechanisms by which air passes from the troposphere to the stratosphere. New fundamental information about chemical and microphysical processes gained from laboratory studies will improve the models used to interpret these measurements. Understanding of the larger scale importance is gained through analysis of satellite measurements (e.g. from ENVISAT and CALIPSO), meteorological analyses and other global fields.

Denitrification in the polar vortices is being studied to remove one of the major uncertainties regarding polar ozone loss. Better understanding of processes in the UTLS through modelling and data analysis and studies of the long-term variability in extra-tropical large scale transport are also being performed to improve long-term predictions of mid- and high latitude ozone and UV. Past and present variability in UV radiation is determined using re-evaluated and quality controlled data sets. Focussed studies involving measurements and modelling are used to improve understanding of how clouds and aerosols modify atmospheric radiation.

The integration of process studies within a modelling framework will enable SCOUT-O3 to analyse and predict the current status and future evolution of the ozone layer and surface UV-levels with high confidence. A comprehensive range of scenarios is used in the CCMs to provide the basis for a comprehensive study of the evolution and feedback of the coupled chemistry / climate system.

Partners

N°	Organisation	Country
1.	University Of Cambridge	UK
2.	Stiftung Alfred-Wegener-Institut Für Polar und Meeresforschung	Germany
3.	Belgisch Instituut voor Ruimte Aeronomie	Belgium

4.	Central Aerological Observatory	Russian
5.	Centre National de la Recherche Scientifique	France
6.	Chalmers Tekniska Hogskola Ab	Sweden
7.	Kemiai Kutatokozpont — Magyar Tudomanyos Akademia	Hungary
8.	Consiglio Nazionale delle Ricerche	Italy
9.	Cesky Hydrometeorologicky Ustav	Czech Rep.
10.	Danmarks Meteorologiske Institut	Denmark
11.	Physikalisch-Meteorologisches Observatorium Davos und Welstrahlungszentrum	Switzerland
12.	Democritus University of Thrace	Greece
13.	Deutsches Zentrum für Luft und Raumfahrt E.V.	Germany
14.	Deutscher Wetterdienst	Germany
15.	Ente per le Nuove Tecnologie, l'Energia e L'ambiente	Italy
16.	Eidgenoessische Technische Hochschule	Switzerland
17.	Ilmatieteen Laitos	Finland
18.	Freie Universität Berlin.	Germany
19.	Forschungszentrum Juelich GmbH	Germany
20.	Forschungszentrum Karlsruhe GmbH	Germany
21.	Imperial College of Science, Technology and Medicine.	UK
22.	Instituto Nacional de Tecnica Aeroespacial	Spain
23.	Istituto Nazionale di Geofisica e Vulcanologia	Italy
24.	Istituto Nazionale di Ottica Applicata	Italy
25.	Johannes Gutenberg Universität Mainz	Germany
26.	Universität Graz	Austria
27.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
28.	Météo-France	France
29.	National and Kapodistrian University of Athens.	Greece
30.	Norsk Institutt for Luftforskning	Norway
31.	Observatoire Cantonal de Neuchatel	Switzerland
32.	Paul Scherrer Institut	Switzerland
33.	Rijksinstituut voor Volksgezondheid en Milieu	The Netherlands
34.	Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
35.	Sveriges Meteorologiska Och Hydrologiska Institut	Sweden
36.	Stratosphere — M, Ltd	Russia
37.	Universität Bern	Switzerland
38.	Universität Bremen	Germany
39.	Universidad de Buenos Aires	Argentina
40.	University of Crete	Greece
41.	Johann Wolfgang Goethe Universität Frankfurt Am Main	Germany

42.	Goteborgs Universitet.	Sweden
43.	Universität Hannover.	Germany
44.	Ruprecht-Karls-Universität Heidelberg.	Germany
45.	Medizin Universität Innsbruck	Austria
46.	Universität Karlsruhe (Technische Hochschule)	Germany
47.	Lancaster University	UK
48.	Università degli Studi de l'Aquila	Italy
49.	University of Leeds.	UK
50.	University of Leicester	UK
51.	University of Manchester Institute of Science and Technology	UK
52.	University of Oslo	Norway
53.	Aristoteleio Panepistimio Thessalonikis	Greece
54.	University of Wyoming	US
55.	The Regents of the University of California	US
56.	Met Office	UK
57.	University of East Anglia	UK
58.	Universität für Bodenkultur	Austria
59.	Weather Informatics Ltd	UK

SHIVA — Stratospheric ozone: Halogen Impacts in a Varying Atmosphere

CT — 226224

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/07/2009
Duration:	36 months
Total project cost:	4.748.334 €
EC Contribution:	3.499.995 €
Coordinating organisation:	Ruprecht-Karls-Universität Heidelberg Heidelberg — Germany
Co-ordinator:	Klaus Pfeilsticker (Klaus.Pfeilsticker@iup.uni-heidelberg.de)
EC Office:	Environment Directorate

Abstract

SHIVA aims to reduce uncertainties in present and future stratospheric halogen loading and ozone depletion resulting from climate feedbacks between emissions and transport of ozone depleting substances (ODS). Of particular relevance will be studies of short and very short-lived substances (VSLs) with climate-sensitive natural emissions. We will perform field studies of ODS production, emission and transport in understudied, but critical, regions of the tropics using ship, aircraft and ground-based instrumentation. We will parameterise potential climate sensitivities of marine and terrestrial emissions based on inter-dependencies derived from our own field studies, and surveys of ongoing work in this area. We will study the chemical transformation of ODS during transport from the surface to the tropical tropopause layer (TTL), and in the stratosphere, using a combination of aircraft and balloon observations together with process-oriented meso-scale modelling. These investigations will be corroborated by space-based remote sensing of marine phytoplankton biomass as a proxy for the ocean-atmosphere flux of ODS. From this the first systematic global emission inventory of VSLs ODS will be established to allow construction of future-climate scenarios. The impact of climate-sensitive feedbacks between transport and the delivery of ODS to the stratosphere, and their lifetime within it, will be studied using tracer observations and modelling. Further global modelling will assess the contribution of all ODS, including VSLs (which have hitherto normally been excluded from such models) to past, present and future ozone loss. Here, the sensitivity of natural ODS emissions to climate change parameters will be used in combination with standard IPCC climate model scenarios in order to drive measurement-calibrated chemical transport model (CTM) simulations for present and future stratospheric ozone; to better predict the rate, timing and climate-sensitivity of ozone-layer recovery.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Ruprecht — Karls-Universität Heidelberg	Germany
2.	University of East Anglia	UK
3.	Johann Wolfgang Goethe Universität Frankfurt AM Main	Germany
4.	Alfred-Wegener-Institut für Polar und Meeresforschung	Germany
5.	Institut d'Aeronomie Spatiale de Belgique	Belgique
6.	The Chancellor, Masters and Scholars of the University of Cambridge	UK
7.	Leibniz-Institut für Meereswissenschaften an der Universität Kiel	Germany
8.	Centre National de la Recherche Scientifique	France
9.	University of Leeds	UK
10.	Norsk Institutt for Luftforskning	Norway
11.	Universität Bremen	Germany
12.	Deutsches Zentrum für Luf-und Raumfahrt E.V.	Germany

RECONCILE — Reconciliation of essential process parameters for an enhanced predictability of arctic stratospheric ozone loss and its climate interactions.

CT — 226365

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/03/2009
Duration:	48 months
Total project cost:	4.656.564 €
EC Contribution:	3.499.782 €
Coordinating organisation:	Forschungszentrum Juelich GmbH Juelich — Germany
Co-ordinator:	Marc Von Hobe (m.von.hobe@fz-juelich.de)
EC Office:	Environment Directorate

Abstract

The extent of polar stratospheric ozone loss — often referred to as the “Ozone Hole” — is significantly influenced by climate change, and in turn, stratospheric ozone has been recognized as an important component in the climate system. To accurately quantify the effects of climate change on stratospheric ozone and the related feedback mechanisms, as well as to make reliable predictions of future ozone loss and the so-called recovery date, a correct representation of all relevant processes is indispensable. However, a number of gaps in the understanding of these processes still exist. The issues where the lack of understanding is most palpable are (a) the catalytic ClOx/BrOx chemistry, (b) chlorine activation on cold stratospheric aerosol, (c) NAT nucleation mechanisms, and (d) mixing and transport of processed air to lower latitudes. The RECONCILE project sets out to address all these issues using a comprehensive approach that includes laboratory and field experiments together with microphysical and chemical transport modelling. RECONCILE will produce and test reliable parameterisations of the key processes in Arctic stratospheric ozone depletion and bridge these to large scale chemistry climate models (CCMs), thereby greatly enhancing their ability to realistically predict the future evolution of Arctic stratospheric ozone loss and the interaction with climate change.

Partners

N°	Organisation	Country
1.	Forschungszentrum Juelich GMBH	Germany
2.	The Chancellor, Masters and Scholars of the University of Cambridge	UK
3.	Deutsches Zentrum für Luft und Raumfahrt E.V.	Germany

(¹) The website for this project can be found by searching on the following site: http://cordis.europa.eu/fp7/projects_en.html

4.	Alfred-Wegener Institut für Polar und Meeresforschung	Germany
5.	Eidgenössische Technische Hochschule	Switzerland
6.	Norsk Institutt for Luftforskning	Norway
7.	Centre National de la Recherche Scientifique	France
8.	Bergische Universität Wuppertal	Germany
9.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	UK
10.	CSEM Centre Suisse d'Electronique et de Microtechnique	Switzerland
11.	Consiglio Nazionale delle Ricerche	Italy
12.	Central Aerological Observatory	Russia
13.	Ruprecht Karls Universität Heidelberg	Germany
14.	Forschungszentrum Karlsruhe GMBH	Germany
15.	Eötvös Loránd Tudományegyetem	Hungary
16.	National Aeronautics and Space Administration	US
17.	Met Office	UK

ATTICA — European assessment of the Transport Impacts on Climate Change and Ozone Depletion

CT — 036746

<http://www.pa.op.dir.de/attica/>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/06/2006
Duration:	42 months
Total project cost:	680.000 €
EC Contribution:	680.000 €
Coordinating organisation:	Deutsches Zentrum für Luft- und Raumfahrt e.v. Köln — Germany
Co-ordinator:	Robert Sausen (robert.sausen@dlr.de)
EC Office:	Environment Directorate

Abstract

The ATTICA consortium offers to provide the European community with a coherent series of assessments of the impact of transport emissions on climate change and ozone depletion. Three assessments will cover the emissions of single transport sectors, viz. of aviation, shipping, and road and rail traffic. Another assessment deals with metrics that allow to describe, quantify, and compare in a fair way the effects of the transport emissions in the atmosphere. Finally, a synthesis of the foregoing assessments will be written that will provide the overview of the impacts of the emissions of all transport sectors on climate change and the ozone layer.

For the first time, different modes of transport will be consistently assessed. The consistent assessment allows the interested citizen to estimate in principle their own contribution to environmental problems and to compare it to that of others. Apart from policy and decision makers, the synthesis assessment will help journalists, teachers, and others, to digest the results and to present them in public media, in schools and universities, ensuring wide spread of the results.

The assessments and the synthesis report will inform the EU in developing its policy and will strengthen its position in international climate conventions and other international agreements. It will help finding emission reduction and mitigation strategies, and give advice for industry on design of future engines and vehicles, thereby strengthening the European position.

Objectives

The main goal of the Specific Support Action ATTICA is to assess the current state of knowledge how transport impacts climate change and ozone depletion.

Our main goal will be approached through the following objectives:

- To assess the impact of aviation on climate change and ozone depletion,
- To assess the impact of shipping on climate change and ozone depletion,

- To assess the impact of land surface transport (road and railroad traffic) on climate change and ozone depletion,
- To assess current metrics of climate change and ozone depletion,
- To synthesise the results on the individual modes of transport and on metrics.

We plan that the assessments will be based on the results of recently finished FP 5 projects (e.g. AEROCHEM-2, TRADEOFF, SCENIC, METRIC), on results already available from on-going FP 6 projects (e.g. QUANTIFY, SCOUT-O3, ACCENT, ECATS, HISAC), on results from national projects (e.g. SeaKLIM) and on information available from other sources, such as peer-reviewed scientific papers.

The transport sector contributes about 22% to the total global anthropogenic CO₂ emissions from fossil fuel burning and the annual growth rate of transport related greenhouse gas emissions is larger than for other mature industrial sectors. In the light of the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and possible follow-up Protocols, this rate of increase creates a severe problem when trying to achieve emission reduction targets. In addition, the impact of the transport sector on climate is complex and is mediated through more than just the list of gases in the Kyoto Protocol¹. Furthermore, transport emissions contribute to the change of the ozone concentration (ozone production at low altitude and ozone depletion at high altitudes), which may interfere with the goals of the Montreal Protocol and its and Copenhagen amendment.

Nonetheless, the global and European economic systems are largely dependent on an efficient transport system. This dependency has intensified during recent decades: changes in life style, mobility and the availability of cheaper transport in developed countries are also increasing demand and placing additional pressure on environmental initiatives and policies. Because of these factors, strong growth of the transport sector is expected in developing countries and indeed, is already evident. In the long term, a sustainable transport system is needed that satisfies in an optimal way the demands of economy and population whilst following the constraints of limiting climate change and not impeding recovery of the ozone layer. In order to meet these constraints, clear information on the impact of transport on climate change and ozone depletion is needed.

Partners

N°	Organisation	Country
1.	Deutsches Zentrum für Luft und Raumfahrt E.V	Germany
2.	Cicero Senter for Klimaforskning	Norway
3.	Univerzita Karlova V Praze	Czech Rep.
4.	The Manchester Metropolitan University	UK
5.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
6.	The Chancellor, Masters And Scholars of the University of Cambridge	UK
7.	University of Oslo	Norway
8.	Università degli Studi dell'Aquila	Italy
9.	The University of Reading	UK

HCFCWORKSHOPS — International Workshop on HCFC Alternatives and Intermediate Reduction Steps for Developing Countries

CT — 044312

(¹)

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/01/2007
Duration:	18 months
Total project cost:	300.000 €
EC Contribution:	300.000 €
Coordinating organisation:	ICF Consulting Ltd London — UK
Co-ordinator:	Abyd Karmali (akarmali@icfconsulting.com)
EC Office:	Environment Directorate

Abstract

The production and consumption of ozone-depleting HCFCs used as refrigerants, blowing agents, solvents, aerosols, and fire suppressants are increasing rapidly in developing countries, as they are being gradually phased out in developed countries under the Montreal Protocol. Because developing countries are not required under the Protocol to freeze consumption until 2016, or reduce consumption until 2040, global HCFC consumption could remain excessively high for the next 35 years, undermining the phaseout efforts of developed countries and threatening the recovery of the ozone layer and human health. Currently, there are only limited discussions on the post-2016 phaseout of HCFCs in developing countries.

To address this issue, ICF is pleased to submit a proposal to support DG RTD/DG ENV in organising an innovative international workshop to target the reduction of HCFC consumption in developing countries between now and 2015, and yield a draft agreement on intermediate reduction steps between 2016 and 2040. Specifically, the workshop will provide developing country stakeholders with the technical tools needed to phaseout HCFCs (e.g., information on viable alternatives, technology transfer, funding opportunities) and to build consensus among stakeholders on an intermediate phaseout schedule to be implemented under the Montreal Protocol.

Objectives

More than 190 countries have signed the Montreal Protocol, a landmark international agreement that aims to restore the Earth's deteriorating stratospheric ozone layer. The global success of this effort to protect our environment requires that the world's developing (Article 5(1)) and developed (non-Article 5(1)) countries eliminate emissions to the atmosphere of most ozone depleting substances (ODS). Chlorofluorocarbons (CFCs) and halons are some of the most

(¹) The website for this project can be found by searching on the following site:
<http://cordis.europa.eu/fp6/projects.htm>

damaging ODS, and their phaseout in developed countries was implemented in 1996 and 1994, respectively. In developing countries, CFC and halon consumption will be completely phased out by 2010. Hydrochlorofluorocarbons (HCFCs), used in large part as replacements for CFCs, also deplete stratospheric ozone and are controlled under the Montreal Protocol as Annex C Group 1 substances. In developed countries, HCFC consumption is being reduced progressively to reach complete phaseout in 2030. In developing countries, the Montreal Protocol requires that HCFC consumption freeze in 2016 and complete phaseout will occur in 2040, but no intermediate reduction steps are in place.

If no action is taken in the next few years to ensure that consumption of HCFCs in developing countries does not expand unchecked, it will be more difficult to effectively reduce consumption in a step-wise manner between 2016 and 2040. In particular, it is important that the 2015 base level of consumption in developing countries not become inflated with excessive use of HCFCs between now and the cut-off date. Additionally, it is critical that efforts undertaken to reduce HCFC consumption in developed countries over the last 10 years not be overshadowed by run-away consumption in developing countries. Moreover, if action is not taken to establish an agreement on intermediate reduction steps for developing countries between 2016 and 2040, HCFC consumption could remain excessively high for the next 35 years, threatening the recovery of the ozone layer and human health. Currently, there are only limited discussions on the post-2016 phaseout of HCFCs.

The objective of this workshop is to assess and discuss policy options to help enable developing countries to phase-out their consumption ahead of the schedule currently provided under the Montreal Protocol, by negotiating a series of interim reduction steps. By gathering representatives of industry, international experts, and developing country representatives at these workshops, a cross-fertilisation of ideas, success stories, and technologies can take place. Additionally, a broad consensus on interim reduction steps can be reached among stakeholders worldwide. Ozone depletion is a global problem, and the health of all people in developing and developed countries will be at risk if the goals of the Montreal Protocol are not augmented and achieved.

The International Workshop will provide an action-oriented forum to advance the goals of the Montreal Protocol by proactively fostering the technical means and political commitment to reduce consumption of HCFCs in developing countries — where they are otherwise projected to grow significantly — over the coming decades.

Partner

N°	Organisation	Country
1.	ICF Consulting LTD	UK

IV. CLIMATE INTERACTIONS WITH ATMOSPHERIC COMPOSITION CHANGE



ACCENT — Atmospheric Composition Change: A European Network

CT — 505337

<http://www.accent-network.org>

Funding instrument:	Network of Excellence (NoE)
Contract starting date:	01/03/2004
Duration:	70 months
Total project cost:	11.220.000 €
EC Contribution:	11.220.000 €
Coordinating organisation:	Consiglio Nazionale delle Ricerche Roma — Italy
Co-ordinator:	Sandro Fuzzi (s.fuzzi@isac.cnr.it)
EC Office:	Environment Directorate

Abstract

Changes in atmospheric composition directly affect many aspects of life, determining climate, air quality and atmospheric inputs to ecosystems. In turn, these changes affect the fundamental necessities for human existence: human health, food production, ecosystem health and water. Atmospheric composition change research is therefore fundamental for the future orientation of Europe's Sustainable Development strategy. The overall goals of ACCENT are to promote a common European strategy for research on atmospheric composition change, to develop and maintain durable means of communication and collaboration within the European scientific community, to facilitate this research and to optimise two-way interactions with policy-makers and the general public. ACCENT will establish Europe as an international leader in atmospheric composition change research, able to steer research agendas through its involvement in major international programmes. ACCENT furthermore aims to become the authoritative voice in Europe on issues dealing with atmospheric composition change and sustainability. The ACCENT joint research programme focuses on aerosols, biosphere-atmosphere interaction and transport and transformation of pollutants and it also looks for new partnership in economic and Earth System analysis. Integration will be achieved by creating common facilities and activities including: a dedicated interactive web portal, models, data-bases, measurement platforms, training and education opportunities, quality assurance procedures and facilities, integrated assessment and synthesis of scientific results and an interface with the general public. The excellence and the commitment of the ACCENT Partnership guarantee an effective and durable integration of the European atmospheric composition change research and that it becomes a pillar of the European Research Area.

Objectives

The overall goals of ACCENT are to promote a common European strategy for research on atmospheric composition sustainability, to develop and maintain durable means of communication and collaboration within the European scientific community, to facilitate this research and to optimise the interactions with policy-makers and the general public. In so doing, ACCENT will

establish Europe as an international leader in atmospheric composition research, able to steer research agendas through its involvement in major international programmes. ACCENT will also reinforce European environmental policy-making and will support Member States and the European Union in international negotiations and agreements.

ACCENT aims to become the authoritative voice in Europe on issues dealing with atmospheric composition sustainability and its societal implications. Such authority will be based on the integration of competencies and activities of the Partners and of the wider European scientific community in the field, and on the interaction with the international scientific community.

ACCENT deals with important societal problems, and will therefore endeavour to set up a dialogue with society, involving different players such as policy-makers, non-governmental organisations and the general public as participants and contributors in its activities.

The overall goal of ACCENT will be pursued through specific objectives which can be classified as:

- a) a joint research programme
- b) tasks for integration and
- c) outreach tasks

Joint research programme

A broad common research agenda agreed by the Partners in the ACCENT Network, also in collaboration with the wider European research community, is the basis for a real integration of the European research efforts in this field, and for linking national programmes to joint European and international research projects. A biennial European Symposium would be a prime tool for defining, promoting and updating a common research agenda. The understanding of atmospheric composition sustainability requires further advancement in a number of specific areas in atmospheric research which have been identified as currently having major gaps in knowledge or showing the need for integration with other research areas. These are:

- the importance of aerosols for air quality and climate;
- the biosphere-atmosphere exchange as a source and receptor of atmospheric chemical species;
- the transport and transformation of atmospheric constituents at different spatial and temporal scales;
- the linkages between economics, policy-making, Earth System analysis and atmospheric composition change research.

Subprojects will be set up, each with its own organisation, to focus and streamline European research within these areas. The subprojects, each led by a Co-ordinator and a Steering Committee, will organise their activities to:

- evaluate the state of the art of research in the respective areas;
- compile and disseminate information on national research programmes in the respective areas;
- organise workshops on key issues;
- propose and execute joint research activities at European and international level;
- synthesise and integrate research results for policy-makers and the general public.

Tasks for integration

ACCENT will provide a framework for co-ordination and communication among the Partners in the Network and the wider European research community. It will thereby have the effect of restructuring European research on the sustainability of atmospheric composition, leading to a durable integration. This will be accomplished through a number of tasks organised by ACCENT:

- Fostering interactions with the international community. European research has the potential to lead in setting the research agenda world-wide. ACCENT will promote and co-ordinate European contributions to international programmes such as the International Global Atmospheric Chemistry project (IGAC) of the International Geosphere-Biosphere Programme (IGBP), the Global Atmospheric Watch (GAW) of the World Meteorological Organisation (WMO), the European Monitoring and Evaluation Programme (EMEP) under the Convention on Long-range Transboundary Air Pollution (CLRTAP) and the Intergovernmental Panel on Climate Change (IPCC).
- ACCENT web portal. An extensive use of Internet-based techniques will be made within ACCENT to facilitate communication within the atmospheric chemistry community, provide access to information for all and to implement a number of ACCENT activities. The web portal will also be an invaluable instrument for training activities and to reach out to policy-makers and the general public.
- Modelling. The main goal of this task is to establish a basis for co-ordinated research activities in atmospheric modelling at different scales, from local to global, within the European research community, making the results from these activities available for the science community at large and for training purposes.
- Access to information (organisation of databases). Emission inventories, data from monitoring networks, experimental campaigns, laboratory experiments, models and model output, and remote sensing data are essential tools for scientists, but they are presently dispersed across a multitude of institutions. ACCENT aims at rationalising the compilation and ease of access to such data, thereby increasing their usefulness for research and training.
- Access to research infrastructures. Rectifying the lack of truly European, large-scale facilities for atmospheric research (aircraft, field stations, laboratory facilities, etc.) requires co-ordination between national facilities for joint European research. ACCENT will collect and provide information on available relevant infrastructures and will facilitate the access to them for research and training. At the same time a mechanism will be created to improve the co-ordinated activities of such infrastructures.
- Satellite remote sensing of atmospheric constituents. The exploitation of satellite data for tropospheric research is currently poorly focused within Europe. One of the tasks of ACCENT will be to co-ordinate and promote the use of the satellite data for tropospheric research and environmental policy applications. This represents an exciting and challenging opportunity to make a significant impact on the generation, interpretation and exploitation of these novel data.
- Data quality assurance (QA). Data of known and high quality are essential for the veracity of results on atmospheric composition change and for enhancing their impact. ACCENT will evaluate and define data quality objectives and will organise instrument comparisons in relevant areas, also in connection with other national and international programmes.

Outreach tasks

ACCENT involves European institutions and scientists at the highest level of excellence in the field of atmospheric composition research. However, in order to reach its overall objectives, ACCENT must reach out to the whole of the scientific community in Europe and raise the standards of European research. An important aspect of this is the fostering of new expertise, in particular in the area of sustainability research, and the creation of interactive links with policy and the public.

Providing training and education. Preparing the new generation of atmospheric scientists and increasing the expertise to a common level across Europe (including Accession Countries) is essential for the future of scientific endeavour in the field. Furthermore, the subject of atmospheric composition change has become sufficiently important to be part of the curricula of educational institutions at different levels. Outreach to the developing world is also important. An effective web-based management system will serve to administer training and education activities.

Synthesising research results for the policy and the public. Scientific knowledge needs to be integrated and synthesised by an authoritative body before it can be used as reference in the policy-making process and in the creation of public awareness. For this purpose, ACCENT will set up points of contact between the scientific community and policy-makers (EMEP, CAFÉ, IPCC) to facilitate a two-way communication process. ACCENT also aims at providing information on research results on atmospheric composition change and the environmental implication to the general public, directly or through the media. Internet-based information tools will again play an important role for this task

Partners

N°	Organisation	Country
1.	Consiglio Nazionale delle Ricerche	Italy
2.	Commission of the European Communities — Joint Research Centre	Belgium
3.	International Institute for Applied System Analysis	Austria
4.	Universität für Bodenkultur	Austria
5.	Belgisch Instituut voor Ruimte Aeronomie	Belgium
6.	National Institute of Meteorology and Hydrology of the Bulgarian Academy of Sciences	Bulgaria
7.	Risoe National Laboratory	Denmark
8.	Helsingin Yliopisto	Finland
9.	Centre National de la Recherche Scientifique	France
10.	Météo-France	France
11.	Forschungszentrum Juelich GmbH	Germany
12.	Leibniz Institut für Troposphärenforschung E.V.-	Germany
13.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
14.	Universität Bremen	Germany
15.	Ruprecht-Karls-Universität Heidelberg.	Germany
16.	University of Crete	Greece

17.	Aristoteleio Panepistimio Thessalonikis	Greece
18.	Veszpremi Egyetem	Hungary
19.	National University of Ireland	Ireland
20.	Latvijas Universitate	Latvia
21.	Institute of Physics	Lithuania
22.	Norsk Institutt for Luftforskning	Norway
23.	University of Oslo	Norway
24.	Institute of Environmental Protection	Poland
25.	Universidade de Aveiro	Portugal
26.	Fundacion Centro de Estudios Ambientales del Mediterraneo	Spain
27.	Stockholms Universitet.	Sweden
28.	University of Berne	Switzerland
29.	Paul Scherrer Institut	Switzerland
30.	Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
31.	Natural Environment Research Council	UK
32.	Universita degli Studi di Urbino "Carlo Bo"	Italy
33.	University of Kuopio	Finland
34.	Ilmatieteen Laitos	Finland
35.	Deutsches Zentrum für Luft und. Raumfahrt E.V	Germany
36.	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek	The Netherlands
37.	Rijksinstituut voor Volksgezondheid en Milieu	The Netherlands
38.	Energieonderzoek Centrum Nederland	The Netherlands
39.	Imperial College of Science, Technology And Medicine	UK
40.	University of Cambridge	UK
41.	University of Leicester	UK
42.	University of East Anglia	UK
43.	University of Manchester Institute of Science and Technology	UK

EUCAARI — European Integrated Project on Aerosol Cloud Climate and Air Quality Interactions

CT — 036833

<http://www.atm.helsinki.fi/eucaari/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/01/2007
Duration:	48 months
Total project cost:	14.952.335 €
EC Contribution:	9.999.627 €
Coordinating organisation:	Helsingin yliopisto Helsinki — Finland
Co-ordinator:	Markku Kulmala (markku.kulmala@helsinki.fi)
EC Office:	Environment Directorate

Abstract

The European Integrated project on Aerosol Cloud Climate and Air Quality Interactions, EUCAARI, brings together the leading European research groups, state-of-the-art infrastructure and key players from third countries to investigate the role of aerosol on climate and air quality. The objectives of EUCAARI are:

- Reduction of the current uncertainty of the impact of aerosol particles on climate by 50% and quantification of the relationship between anthropogenic aerosol particles and regional air quality, and
- Quantification of the side effects of European air quality directives on global and regional climate, and provide tools for future quantifications for different stakeholders.

EUCAARI will also contribute to technological developments in the aerosol measurement industry, enhancing future experiments and air-quality monitoring networks.

The project is organised into four scientific elements designed to maximize the integration of methodologies, scales and ultimately our understanding of air quality and climate. New ground-based, aircraft and satellite measurements will be integrated with existing data to produce a global consistent dataset with the highest possible accuracy. A European measurement campaign will be designed around simultaneous multi-station observations, Lagrangian aircraft measurements and carefully selected "super-sites". A hierarchy of models will be developed based on the results of the laboratory and theoretical investigations. The models will be used to interpret the measurements and will be integrated in regional air quality and global climate models.

The result will be measurable improvements in the project's climate and air quality models. The outcomes (scenarios, recommendations, models, harmonized datasets and new knowledge) will be disseminated to authorities, policy makers, the research community, industry, instrument designers, and the EU-ESA Global Monitoring for Environment and Security (GMES).

Objectives

EUCAARI will make progress on the following ten scientific problems with the greatest uncertainty:

- in-situ formation (nucleation) of aerosols;
- number and mass emissions of primary aerosol from natural and anthropogenic sources at urban, regional, and global scales;
- formation of secondary organic aerosol and the partitioning of semi-volatile compounds between the gas and aerosol phases;
- ageing of aerosols and evolution of their properties during their atmospheric lifetime;
- attribution of the different aerosol mass components in Europe to specific sources;
- current and future contributions of natural versus anthropogenic, and primary versus secondary sources to particle number concentrations;
- long-range transport of aerosol particles and their precursors from and to Europe as well as their transport within Europe;
- the impact of aerosols and trace gases on cloud droplet activation, cloud lifetime, and extent (the aerosol indirect effect);
- interactions between the aerosol cycle, the water cycle, and the biosphere;
- climatic feedbacks related to anthropogenic/biosphere-aerosol-cloud-climate interactions.

In this EUCAARI focuses on quantification of key processes and the impact of aerosols on climate and air quality. It also completes other ongoing efforts in Europe such as the EU-FP6-IP-ENSEMBLES ("Methods to reconcile disparate national forecasts of medium and long-range atmospheric dispersion") and EU-FP6- SCOUT-O3 (Stratosphere-Climate Links with Emphasis on the UTLS) projects as well as integrate national and international activities related to air quality and climate change issues. This wide-angle perspective supports European governmental policy, since most European countries have also signed the Vienna Convention on the Protection of the Ozone Layer and the Convention of Long-Range Transport of Air Pollutants.

EUCAARI integrates all important aerosol processes (formation, emission, physical and chemical transformations, transport, and removal) at all relevant scales (from nano to global scale) to address the role of atmospheric aerosol in climate change and air quality. EUCAARI investigates the complex system involving atmospheric dynamics, chemical composition and interactions within the overall Earth system, and stresses the importance of links between air quality and climate.

EUCAARI aims to reduce the uncertainty associated with the impact of aerosol on climate by 50%. It will also better constrain the impact of emission control strategies on climate and air quality over Europe. An integrated modelling approach involving molecular-level calculations, process models, as well as regional and global scale models will be developed, tested and used. These model simulations will culminate in extensive improvements to aerosol schemes in the project's climate models. Model evaluation will make full use of existing measurement networks and will add new aircraft and ground-based measurements during co-ordinated field measurement campaigns over Europe. On the technological side, EUCAARI will develop and test aerosol instruments by working with specialist SMEs. The project will also make significant improvements to regional and global scale chemical transport models and cloud models usable in future operational models.

Partners

N°	Organisation	Country
1.	Helsingin Yliopisto	Finland
2.	Centre National de la Recherche Scientifique	France
3.	Max-Planck-Gesellschaft Zur Förderung der Wissenschaften E.V	Germany
4.	Leibniz Institute for Tropospheric Research	Germany
5.	Consiglio Nazionale delle Ricerche — Istituto di Scienze dell' Atmosfera e del Clima	Italy
6.	Swiss Federal Institute of Technology Zurich	Switzerland
7.	The Netherlands Organisation for Applied Scientific Research	The Netherlands
8.	The Netherlands Royal Meteorological Institute	The Netherlands
9.	Max-Planck-Society for the Advancement of Science	Germany
10.	University of Leeds	UK
11.	Lund University	Sweden
12.	University of Veszprem	Hungary
13.	Ilmatieteen Laitos	Finland
14.	European Commission Directorate General — Joint Research Centre	Italy
15.	Met Office	UK
16.	Norsk Institutt for Luftforskning	Norway
17.	Meteorologisk Institutt	Norway
18.	National University of Ireland	Ireland
19.	Paul Scherrer Institut	Switzerland
20.	University of Oslo	Norway
21.	Institute of Chemical Engineering & High Temperature Chemical Processes	Greece
22.	Ustav Chemických Procesu — Akademie Ved Ceske	Czech Rep.
23.	Météo-France — Centre National de Recherches Météorologiques	France
24.	Forschungszentrum Juelich GmbH	Germany
25.	North-West University	South Africa
26.	The Energy and Resources Institute	India
27.	University of Copenhagen	Denmark
28.	University of East Anglia	UK
29.	University of Kuopio	Finland
30.	The University of Manchester	UK
31.	Instituto De Fisica da Universidade de Sao Paulo	Brazil
32.	Airel Ltd	Estonia
33.	University of Birmingham	UK
34.	Deutsches Zentrum für Luft- Und Raumfahrt E.V.	Germany
35.	University of Crete	Greece

36.	The Hebrew University of Jerusalem	Israel
37.	International Institute of Applied Systems Analysis	Austria
38.	Stockholm University	Sweden
39.	Warsaw University	Poland
40.	University of Aveiro	Portugal
41.	Institute of Environmental Physics, University of Tartu	Estonia
42.	Johannes Gutenberg-Universität Mainz	Germany
43.	Peking University	China
44.	Chinese Academy of Meteorological Sciences	China
45.	University of the Aegean	Greece
46.	Commissariat à l'Energie Atomique	France
47.	Risoe National Laboratory	Denmark
48.	Deutscher Wetterdienst	Germany

ATMNUCLE — Atmospheric Nucleation: from Molecular to Global Scale

CT — 227463

(¹)

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/01/2009
Duration:	60 months
Total project cost:	2.000.000 €
EC Contribution:	2.000.000 €
Coordinating organisation:	Helsingin Yliopisto Helsinki — Finland
Co-ordinator:	Satu Väisänen (e-mail contact available at CORDIS Anonymous Mail Facility)
EC Office:	Implementation of the “Ideas” Programme Directorate

Abstract

Atmospheric aerosol particles and trace gases affect the quality of our life in many ways (e.g. health effects, changes in climate and hydrological cycle). Trace gases and atmospheric aerosols are tightly connected via physical, chemical, meteorological and biological processes occurring in the atmosphere and at the atmosphere-biosphere interface. One important phenomenon is atmospheric aerosol formation, which involves the production of nanometre-size particles by nucleation and their growth to detectable sizes. The main scientific objectives of this project are: 1) to quantify the mechanisms responsible for atmospheric new particle formation and 2) to find out how important this process is for the behaviour of the global aerosol system and, ultimately, for the whole climate system. Our scientific plan is designed as a research chain that aims to advance our understanding of climate and air quality through a series of connected activities. We start from molecular simulations and laboratory measurements to understand nucleation and aerosol thermodynamic processes. We measure nanoparticles and atmospheric clusters at 15-20 sites all around the world using state of the art instrumentation and study feedbacks and interactions between climate and biosphere. With these atmospheric boundary layer studies we form a link to regional-scale processes and further to global-scale phenomena. In order to be able to simulate global climate and air quality, the most recent progress on this chain of processes must be compiled, integrated and implemented in Climate Change and Air Quality numerical models via novel parameterizations.

Partners

N°	Organisation	Country
1.	Helsingin Yliopisto Finland	Finland

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

C8 — Consistent Computation of the Chemistry-Cloud Continuum and Climate Change in Cyprus

CT — 226144

(¹)

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/01/2009
Duration:	60 months
Total project cost:	2.196.000 €
EC Contribution:	2.196.000 €
Coordinating organisation:	the Cyprus Research and Educational Foundation Nicosia — Cyprus
Co-ordinator:	Bruno Rostand (b.rostand@cyi.ac.cy)
EC Office:	Implementation of the “Ideas” Programme Directorate

Abstract

We have developed a new numerical method to consistently compute atmospheric trace gas and aerosol chemistry and cloud processes. The method is computationally efficient so that it can be used in climate models. For the first time cloud droplet formation on multi-component particles can be represented based on first principles rather than parameterisations. This allows for a direct coupling in models between aerosol chemical composition and the continuum between hazes and clouds as a function of ambient relative humidity. We will apply the method in a new nested global-limited area model system to study atmospheric chemistry climate interactions and anthropogenic influences. We will focus on the Mediterranean region because it is a hot spot in climate change exposed to drying and air pollution. The limited area model will also be applied as cloud-resolving model to study aerosol influences on precipitation and storm development. By simulating realistic meteorological conditions at high spatial resolution our method can be straightforwardly tested against observations. Central questions are:

- How does the simulated haze-cloud continuum compare with remote sensing measurements and what is the consequence of abandoning the traditional and artificial distinction between aerosols and clouds?
- How are cloud and precipitation formation influenced by atmospheric chemical composition changes?
- To what extent do haze and cloud formation in polluted air exert forcings of synoptic meteorological conditions and climate?
- Can aerosol pollution in the Mediterranean region exacerbate the predicted and observed drying in a changing climate?

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

The model system is user-friendly and will facilitate air quality and climate studies by regional scientists. The project will be part of the Energy, Environment and Water Centre of the newly founded Cyprus Institute, provide input to climate impact assessments and contribute to a regional outreach programme.

Partners

N°	Organisation	Country
1.	The Cyprus Research and Educational Foundation	Cyprus

EUROHYDROS — A European Network for Atmospheric Hydrogen Observation and Studies

CT — 036916

<http://www.meteor.uni-frankfurt.de/eurohydros/>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/08/2006
Duration:	36 months
Total project cost:	3.528.800 €
EC Contribution:	2.838.000 €
Coordinating organisation:	Johann Wolfgang Goethe Universität Frankfurt — Germany
Co-ordinator:	Andreas Engel (an.engel@meteor.uni-frankfurt.de)
EC Office:	Environment Directorate

Abstract

We propose to initialise a European Network for observations of molecular Hydrogen and to put in place a new and consistent calibration scale for molecular Hydrogen. The observational network will have 12 continuous measurements sites in Europe, 7 flask sampling sites in Europe and 6 global flask sampling sites. Concerning the European sites, a range of observation from clean air stations for measurements of atmospheric background to moderately polluted (e.g. urban outflow) and urban (i.e. polluted) sites was chosen. This will enable to improve the understanding of hydrogen in the global background atmosphere and of the impact of European emissions on the present day atmosphere, e.g. using local modelling techniques and radon flux calculations. We further propose to perform budget studies of molecular hydrogen (on a global and regional scale) and to study sinks and sources. Especially the important soil sink will be studied (mechanistically and experimentally). A first systematic study of isotopic composition of molecular hydrogen in the atmosphere is proposed, using observations from global and European flask sampling sites and global models, which hydrogen isotope fractionation processes will be incorporated. Global and regional models will be used to investigate the budget of atmospheric hydrogen, by comparing mixing ratios and isotope ratios between model and observations and by varying underlying model emission patterns. The Proposal further includes some studies to assess the impact of atmospheric hydrogen on the present day atmosphere, i.e. the influence on the oxidation capacity of the troposphere, the lifetimes of greenhouse gases like CH₄ and on the stratospheric budgets of water vapour and ozone. Some exploratory studies will be carried out to investigate these impacts under changed atmospheric hydrogen levels, associated with the use of hydrogen as a carrier of economy.

Little is known about the biogeochemical cycle of hydrogen, its emissions into and removal from the atmosphere, and to a large extent this is due to the limited number of measurements performed to this date. For the most part hydrogen observations have been sporadic and they have often been limited to remote background sites. The two existing long-term records of global atmospheric H₂ surface mixing ratios yield contradictory results on whether tropospheric mixing ratios were decreasing or rising during the 1990s. As fossil fuel sources will run out in the

future and the emission of greenhouse gases into the atmosphere must be reduced in order to mitigate the effects of climate change, molecular hydrogen is certain to play an important role in the energy supply chain of the coming decades. A future wide-spread use of hydrogen and the expected Earth surface temperature rise might significantly alter the sources and sinks of atmospheric hydrogen. It is therefore crucial to quantify and monitor the present day global and regional distribution of molecular hydrogen, and to analyze its budget and the recent trends of its atmospheric concentration before these changes occur. Initial studies suggest that a hydrogen economy may bring both atmospheric benefit and danger although especially the results concerning possibly negative effects on the atmosphere are ambiguous.

A better understanding of molecular hydrogen in the environment is important for the following reasons:

1. While molecular hydrogen does not influence the radiation budget of the atmosphere directly, it affects its oxidation capacity, through reaction with the OH radical. Increased atmospheric hydrogen levels lead to an increased lifetime of many atmospheric constituents (e.g. Methane), making H₂ an indirect greenhouse gas.
2. Changes of molecular hydrogen in the atmosphere will also influence water vapour (H₂O) in the stratosphere. This in turn influences the radiation budget of the atmosphere (increased water vapour will cool the stratosphere) and is expected to enhance polar ozone depletion, as the condensation of stratospheric particles will occur more rapidly, leading to a wider spread heterogeneous activation of chlorine and more ozone depletion in the stratosphere.

The microbiological uptake of atmospheric H₂ in soils constitutes the major sink term in the global H₂ budget, but remains very poorly understood. While it appears rather unlikely at present, it is nevertheless conceivable that future climate or atmospheric composition changes could lead to perturbations in the soil system, which could have a major influence on atmospheric hydrogen, and in turn greenhouse gas concentrations. Finally, a robust understanding of the atmospheric hydrogen budget, atmospheric hydrogen concentration trends, and the isotopic signature of atmospheric hydrogen might add important contributions to the understanding of other important environmental issues, for example the poorly understood trends in stratospheric water vapour or the global budget of carbon monoxide

Partners

N°	Organisation	Country
1.	Johann Wolfgang Goethe Universität Frankfurt Am Main	Germany
2.	Royal Holloway and Bedford New College.	UK
3.	University of Oslo	Norway
4.	Ruprecht-Karls-Universität Heidelberg	Germany
5.	Akademia Gornicz-Hutnicza	Poland
6.	Eidgenoessische Materialpruefungs und Forschungsanstalt	Switzerland
7.	Ilmatieteen Laitos (Finnish Meteorological Institute)	Finland
8.	Centre National de la Recherche Scientifique	France
9.	Commissariat à l'énergie Atomique (Cea)	France
10.	Università degli Studi di Urbino Carlo Bo	Italy

- | | | |
|-----|---|-----------------|
| 11. | Met Office | UK |
| 12. | University of Bristol | UK |
| 13. | Universiteit Utrecht | The Netherlands |
| 14. | University of East Anglia | UK |
| 15. | Max-Planck-Gesellschaft Zur Förderung der Wissenschaften E.V. | Germany |
| 16. | Norsk Institutt for Luftforskning | Norway |
| 17. | Forschungszentrum Juelich GmbH | Germany |
| 18. | Voeikov Main Geophysical Observatory Research Center for Atmospheric Remote Sensing | Russian Fed. |

HYMN — Hydrogen, Methane and Nitrous oxide: Trend variability, Budgets and Interactions with the Biosphere

CT — 037048

<http://www.knmi.nl/samenw/hymn/>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/09/2006
Duration:	36 months
Total project cost:	2.325.711 €
EC Contribution:	1.772.933 €
Coordinating organisation:	Koninklijk Nederlands Meteorologisch Instituut De Bilt — Netherlands
Co-ordinator:	Peter Van Velhoven (velthove@knmi.nl)
EC Office:	Environment Directorate

Abstract

The global atmospheric cycles of methane, nitrous oxide and hydrogen, are coupled and include various interactions with the biosphere. Apart from classical surface observations of these gases that are part of the GAW and CMDL networks, new detailed information on the regional scale about methane and nitrous oxide can and will be obtained from recently become available satellite observations by SCIAMACHY and IASI and from remote sensing observations by FTIR. In Hymn these observational data sets will be homogenised and evaluated against each other in order to derive consistent long-term time series. The error statistics of the observations will be carefully determined. By subsequently applying advanced emission inversion and data assimilation techniques to the validated observations in atmospheric chemistry models coupled to a new biosphere model, the sources and sinks of these gases will be quantified on regional scales (up to 1x1 degree). The coupling between the cycles of these gases and OH will be investigated focussing on presently not well understood relations between variations in their trends. The new models will furthermore be applied to investigate the effects of a future transfer to a hydrogen economy and of the associated reduction in fossil fuel burning emissions (NO_x, CO, VOCs) on the coupled cycles of H₂, CH₄, OH, and O₃ taking into account interactions with the biosphere.

Objectives

- To improve the process modelling of the land-biosphere-atmosphere exchange of the HYMN gases and to provide global and regional estimates of their natural sources and sinks.
- To contribute to global monitoring by provision of multi-year global satellite data sets of the CH₄ and CO distribution and long-term time series for CH₄ and N₂O at a range of observing stations.
- To provide advice on the further optimisation of monitoring networks for the HYMN gases.
- To quantify atmospheric loss of CH₄ and H₂ and the impact of changing anthropogenic and natural (climate-induced) emissions on regional OH trends and on current and future global CH₄ and H₂ levels.

- To quantify how the possible future change to a hydrogen economy will affect the H₂ distribution and the distribution of CH₄ and O₃ through changes in emissions of H₂ and pollutants (NO_x, CO, VOCs).
- To evaluate the simulations with a novel coupled atmospheric chemistry-biosphere model for CH₄, N₂O and H₂ by comparison with ground based and satellite observations on a global and regional scale.
- To make new estimates of the sources and sinks of CH₄ and H₂ including their temporal and spatial variability.

HYMN will make use of several basic methods to improve knowledge on global and regional natural sources and sinks of atmospheric gases: up-scaling of local (flux) measurements, process-based land-biosphere modelling and top-down inverse modelling using atmospheric concentration variabilities. HYMN will use these three methods in their optimal combination and confront the obtained results with satellite and surface-based observations.

The direct coupling of land-biosphere processes to anthropogenic emission distribution patterns, atmospheric chemistry and long-range transport models will allow to quantify important feedback mechanisms related to wetlands, permafrost, wildfires, soil moisture and temperature, and vegetation changes.

Using the newly developed modelling and inversion tools HYMN will be able to provide advice on future emission reduction strategies based on improved knowledge on the budgets, biogeochemical cycles and spatio-temporal distributions of sources and sinks of the HYMN gases.

Partners

N°	Organisation	Country
1.	Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
2.	University of Bristol	UK
3.	University of Oslo	Norway
4.	Ruprecht-Karls-Universität Heidelberg.	Germany
5.	Centre National de la Recherche Scientifique (CNRS)	France
6.	Universität Bremen	Germany
7.	Belgisch Instituut voor Ruimte Aeronomie	Belgium
8.	Université de Liège.	Belgium
9.	Chalmers Tekniska Högskola Aktiebolag	Sweden
10.	Forschungszentrum Karlsruhe GmbH	Germany
11.	Universität Karlsruhe (Technische Hochschule)	Germany
12.	Commissariat à l'énergie Atomique (CEA)	France

MAP — Secondary Marine Aerosol Production from Natural Sources

CT — 018332

<http://macehead.nuigalway.ie/map/>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	15/09/2005
Duration:	42 months
Total project cost:	3.049.816 €
EC Contribution:	2.599.515 €
Coordinating organisation:	National University of Ireland Ireland
Co-ordinator:	Colin O'Dowd (colin.odowd@cmas.demon.co.uk)
EC Office:	Environment Directorate

Abstract

Marine aerosol contributes significantly to the global radiative budget and consequently, changes in marine aerosol abundance and/or chemical composition will impact on climate change. Various climate feedback mechanisms have been proposed involving the sulphur, sea-salt, iodine and organic sea-spray cycles; however, all cycles and their impacts on aerosol haze and cloud layers remains poorly quantified. MAP will consolidate the current state-of-the-art in the fields of aerosol nucleation and growth and primary marine aerosol (PMA) production to quantify the key processes associated with primary and secondary marine aerosol (SMA) production from natural sources. MAP will focus on the newly identified aerosol formation mechanisms involving iodine oxides, for secondary aerosol production, and the primary production of marine organic matter aerosols produced by plankton and transferred to the atmosphere via the bubble bursting process at the ocean surface. Key processes will be identified, parameterized and implemented in a Global/Regional-scale chemical transport model and in a regional climate model. Combining the knowledge gathered on key processes with satellite-derived information on oceanic and meteorological parameters, an algorithm will be developed to produce a Sea-Spray Source Function (S3F) which will subsequently be used in large scale models to quantify the impacts of marine aerosols. The algorithm and its application will be proposed as a service contributing to GMES/GEOSS. Similarly, an organo-iodine source function will also be developed. The impact of marine aerosol on atmospheric chemistry, radiative forcing and climate will be evaluated using the large-scale models.

Objectives

- To elucidate the dominant condensable vapours driving secondary marine aerosol (SMA) formation.
- To quantify the number and size flux of primary inorganic and organic marine sea-spray aerosol (PMA).
- To produce a PMA and iodo-carbon source function using integrated Global Earth Observing satellite data and in-situ data.

— To quantify the impact of SMA and PMA on radiative forcing and atmospheric chemistry.

MAP will integrate Europe's leading expertise in aerosol physics and chemistry and marine biogeochemistry to quantify the production of primary and secondary marine aerosol formation from natural sources. The project will build on the current state-of-the-art and recent ground-breaking results and will focus on the key questions highlighted above.

The field component of MAP will focus on quantifying marine secondary and primary aerosol formation as a function of season and biological activity over the North Atlantic and determine the relative contributions of natural and anthropogenic sources to North Atlantic aerosol. With continuous measurements of aerosol micro-physics, 10 and detailed aerosol chemistry, with improved analytical techniques and higher time resolution, the seasonal dependence of SMA and PMA formation on biological activity will be quantified. It should be noted that while there are clearly coastal influence on SMA, a careful analysis on the potential coastal contribution to PMA at Mace Head has illustrated that such sources account <5% to the Aitken and accumulation mode aerosol fields (O'Dowd et al. 2004). To contrast with the cleaner North Atlantic aerosol, parallel measurements of size resolved aerosol chemistry will be made in the more polluted Mediterranean which is subject to a greater variety of aerosol sources. This component will result in an urgent seasonal quantification of aerosol chemical characteristics and formation processes.

The most advanced suite of aerosol and gas analytical technology will be deployed during one ship-borne Intensive Observation Period (IOP) over the North Atlantic during the period of peak plankton activity. In particular, state-of-the-art instruments for measuring aerosol precursors such as iodine oxides, 12, organo-iodine compounds, sulphuric acid, 502 and organic vapours -all key species involved in secondary new particle formation, will be deployed alongside the most advanced suite of aerosol- and ion/cluster physics measurements. This will provide the most appropriate suite of instrumentation to address key issues associated with new particle formation in the marine boundary layer.

In terms of aerosol chemistry, the best available-technology and analytical tools for the characterisation and quantification of both the inorganic and organic components of marine aerosol, and their hygroscopic properties will be deployed. Particular attention will focus on the organic component of marine aerosol and the characterisation of its properties. A wide range of techniques ranging from HNMR to mass spectrometry will be used. Innovative techniques, recently evaluated, will be used to identify biological components, and in particular, DNA associated with airborne organic particles. This DNA fingerprinting will provide a direct quantitative link between marine aerosols and specific plankton blooms and life cycles. Micro-meteorological fluxes and fluxes of PMA, surface water speciation of organic matter, sea-air transfer of iodine precursors, and in-situ bubble-mediated aerosol production experiments during the campaign will also represent the state-of-the-art in these areas. It should be noted that while MAP will quantify PMA fluxes and composition up to 10 microns, the main focus will be on the sub-micron component since this dominates the PMA number concentration rather than mass concentration.

The extensive field results will be combined with laboratory results of bubble-mediated sea-air aerosol and gas transfer in the presence of surfactants to develop a more thorough understanding of the key processes relating to primary and secondary aerosol formation. In particular, PMA aerosol production and its chemical speciation and iodine vapour sea-air transfer will be quantified as a function of in-situ characterisation of organic matter at the ocean surface and as a function of satellite derived chlorophyll, wind fields and white cap coverage. This integration of the field, lab, remote-sensing and process model studies will form two GEOSS products which can

be integrated into the large scale models to quantify the source of primary aerosol over the ocean and to provide an estimate of the global sea-air transfer of organo-iodine. The resulting modelling tools and integrated GEOSS products will significantly advance our capability of quantifying the impact of marine aerosol on marine boundary layer chemistry, direct and indirect radiative forcing, and impacts on climate and will provide the first assessment of marine aerosol effects with particular attention to iodine-forming aerosols and biogenic bubble-mediated aerosol formation. The large scale models, integrating the most advanced knowledge of marine aerosols into their predictions, will represent the most comprehensive advance in our quantification of the impacts of marine aerosols on atmospheric chemistry and climate.

Partners

N°	Organisation	Country
1.	National University of Ireland, Galway	Ireland
2.	The Netherlands Organisation for Applied Scientific Research	The Netherlands
3.	Consiglio Nazionale delle Ricerche	Italy
4.	University of Helsinki	Finland
5.	University of Kuopio	Finland
6.	Finnish Meteorological Institute	Finland
7.	University of Manchester	UK
8.	University of York	UK
9.	University of East Anglia	UK
10.	Stockholms Universitet	Sweden
11.	Ruprecht-Karls-Universität Heidelberg	Germany
12.	Max-Planck-Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
13.	Johannes Gutenberg-Universität Mainz	Germany
14.	Joint Research Centre	Italy
15.	University of Crete	Greece
16.	Ecotechsystems	Italy

OOMPH — Organics over the Ocean Modifying Particles in both Hemispheres

CT — 018419

<http://www.atmosphere.mpg.de/enid/oomph>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/09/2005
Duration:	36 months
Total project cost:	2.477.167 €
EC Contribution:	1.931.648 €
Coordinating organisation:	Max-Planck-Institut für Chemie Mainz — Germany
Co-ordinator	Jonathan Williams (williams@mpch-mainz.mpg.de)
EC Office:	Environment Directorate

Abstract

Considering its size and potential importance, the ocean is surprisingly poorly characterised in terms of organic gases that play important roles in global atmospheric chemistry. In this project we aim to characterise the nature of organic trace species, in particular organic oxygenates, and the rate of emissions from marine biology. The oxidation of these compounds in air is directly linked to the global ozone budget while the oxidation pathways in seawater are largely unknown. We will conduct laboratory experiments on seawater samples and specific phytoplankton types to determine the effect of basic biophysical parameters (e.g. temperature, pH, plankton growth rate and physiological state) on the emission of organic species. The photooxidation rates and products of these species will be examined through measurements. Marine aerosols, with emphasis on the organic fraction, will also be investigated in terms of physical, chemical (mass closure), hygroscopic and optical properties. Two shipborne research cruises will be performed to assess both emission and uptake in the open ocean, and contrast the pristine tropical Southern Hemispheric with the more strongly anthropogenically affected Northern Hemisphere. Based on the laboratory and field measurements an interactive atmosphere-ocean chemistry model will be developed, basic to global Earth system simulations.

Objectives

The science plan comprises of five main components:

- a technology development phase,
- a laboratory intensive phase,
- a shipborne experiment in the northern hemisphere tropical Atlantic,
- a shipborne experiment, as well as extensive monitoring activities in the pristine southern hemisphere,
- a data analysis phase.

With the objectives:

- To determine which organic species are emitted by ocean biology into seawater and air,
- To determine fluxes for key organic species between sea and air,
- To determine main driving factors for organic species emission in the marine boundary layer,
- To determine which oxygenated products are formed by the oxidation of primary emissions in seawater and in air,
- To determine which organic chemical species are found on marine aerosols,
- To determine the role of organic species in the physical properties of marine aerosols,
- To construct an air/sea/aerosol box model of organic species in the marine boundary layer.
- To use proven box model chemistry in a global model.

Partners

N°	Organisation	Country
1.	Max-Planck-Institut für Chemie	Germany
2.	Centre National de la Recherche Scientifique	France
3.	Istituto di Biometeorologia — Consiglio Nazionale delle Ricerche	Italy
4.	University of Crete	Greece
5.	University of East Anglia	UK
6.	Leibniz Institut für Meereswissenschaften	Germany
7.	Universiteit Antwerpen	Belgium
8.	Universiteit Gent	Belgium
9.	University of Veszprém	Hungary

CITYZEN — megaCITY — Zoom for the Environment

CT — 212095

<https://wiki.met.no/cityzen/start/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/09/2008
Duration:	36 months
Total project cost:	3.959.273 €
EC Contribution:	2.915.000 €
Coordinating organisation:	Meteorologisk institutt Michael Gauss (Michael.gauss@met.no)
EC Office:	Environment Directorate

Abstract

We will determine the air pollution distribution and change in and around hotspots over the last decade from extensive satellite and in-situ observations and we will employ a series of different scale models in order to analyze the impacts of air pollution hot spots on regional and global air quality including potential future changes for various climate scenarios. Focus is on ozone and particulate matter with chemical and physical characterization, and their precursors. The Eastern Mediterranean (Istanbul, Athens, Cairo), the Po Valley, the BeNeLux region, the Pearl River Delta in China (with megacities Guangzhou and Hong Kong) and the hot and polluted European summer 2003 are chosen for intensive case studies. The consortium includes groups from China, Turkey, Greece and Italy, in addition to France, Germany, UK and Norway, with experts on the observations, emission data and models. A set of chemical transport models which connect all the most important spatial and temporal scales will be developed and used to quantify how the observed air pollution arises. The models and emission inventories will be evaluated, errors identified and improved on the urban, regional and global spatial scales. Climate change may cause changes in air pollution in and around hotspots, and hotspot pollution can change precipitation and temperature/albedo. These feedbacks will be studied in scale-bridging model systems based on global climate model scenarios, and in a coupled high resolution chemistry-climate model. The model systems evaluated in the project will be applied to analyse mitigation options in and around hotspots, also taking into account climate change. Best available technologies and sectoral changes will be studied. Several partners have key roles in the technical underpinning of policy. They will ensure that the improved emission inventories, scale-bridging model systems and the systematic observational evidence will have a significant, broad and lasting impact.

Objectives

The objectives of CityZen are:

- Quantify and understand current air pollution distribution and development in and around selected megacities/hot spot regions, including the interaction across the different spatial scales

- Estimate the future impact from emission changes with a focus on the effect of rapid growth in the population of megacities/hot spots and the increasing background of pollutants (concentrate on ozone O₃, particulate matter PM, and their precursors)
- Estimate how megacities/hot spots influence climate change
- Estimate how megacities are responding to climate forcing which can influence transport patterns, chemical oxidation and biogenic emissions (especially biogenic volatile organic compounds BVOC)
- Study mitigation options, e.g. by introducing biofuel, to keep the air pollution load in and around megacities/hot spots within sustainable limits in terms of human health effects and climate impact.
- Develop tools to estimate interactions between different spatial scales (megacities to global)
- Bring the scientific results and methods developed and applied during the course of the project to semi-operational use with those consortium partners that on a more permanent basis provide technical underpinning of policy work, that is, ensure an excellent return on the investment in the project both during and after the project has ended.

Partners

N°	Organisation	Country
1.	Consiglio Nazionale delle Ricerche	Italy
2.	University of Crete	Greece
3.	Cairo University	Egypt
4.	Universität Bremen	Germany
5.	National Observatory of Athens	Greece
6.	Norsk Institutt for Luftforskning	Norway
7.	Institut National de l'Environnement et des Risques Ineris	France
8.	Förderverein des Rheinischen Instituts für Umweltforschung an der Universität zu Köln	Germany
9.	Peking University	China
10.	Universitetet i Oslo	Norway
11.	Internationales Institut für Angewandte Systemanalyse	Austria
12.	Centre National de la Recherche Scientifique (CNRS)	France
13.	University of Leicester	UK
14.	Middle East Technical University	Turkey
15.	Forschungszentrum Jülich GmbH	Germany

MEGAPOLI — Megacities: Emissions, urban, regional and Global Atmospheric POLLution and climate effects, and Integrated tools for assessment and mitigation

CT — 212520

<http://megapoli.dmi.dk/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/10/2008
Duration:	36 months
Total project cost:	5.094.507 €
EC Contribution:	3.399.000 €
Coordinating organisation:	Danish Meteorological Institute Copenhagen — Denmark
Co-ordinator:	Alexander Baklanov (alb@dmu.dk)
EC Office:	Environment Directorate

Abstract

The MEGAPOLI project brings together leading European research groups, state-of-the-art scientific tools and key players from third countries to investigate the interactions among megacities, air quality and climate. MEGAPOLI will bridge the spatial and temporal scales that connect local emissions, air quality and weather with global atmospheric chemistry and climate.

The main objectives are:

- to assess impacts of megacities and large air-pollution hot-spots on local, regional and global air quality,
- to quantify feedbacks among megacity air quality, local and regional climate, and global climate change,
- to develop improved integrated tools for prediction of air pollution in megacities.

In order to achieve these objectives we will:

- Develop and evaluate integrated methods to improve megacity emission data;
- Investigate physical and chemical processes starting from the megacity street level, continuing to the city, regional and global scales;
- Assess regional and global air quality impacts of megacity plumes;
- Determine the main mechanisms of regional meteorology/climate forcing due to megacity plumes;
- Assess global megacity pollutant forcing on climate;
- Examine feedback mechanisms including effects of climate change on megacity air quality;
- Develop integrated tools for prediction of megacity air quality;
- Evaluate these integrated tools and use them in case studies;

- Develop a methodology to estimate the impacts of different scenarios of megacity development on human health and climate change;
- Propose and assess mitigation options to reduce the impacts of megacity emissions.

We will follow a pyramid strategy of undertaking detailed measurements in one European major city, Paris, performing detailed analysis for 12 megacities with existing air quality datasets and investigate the effects of all megacities on climate. The results will be disseminated to authorities, policy community, researchers and the other megacity stakeholders.

Partners

N°	Organisation	Country
1.	Danish Meteorological Institute	Denmark
2.	Foundation for Research and Technology, Hellas, University of Patras	Greece
3.	Max Planck Institute for Chemistry	Germany
4.	ARIANET Consulting (SME)	Italy
5.	Aristotle University Thessaloniki	Greece
6.	Centre National de Recherche Scientifique	France
7.	Laboratoire Inter-universitaire des Systèmes Atmosphériques	France
8.	Laboratoire des Science du Climat et de l'Environnement	France
9.	Laboratoire de Météorologie et de Physique	France
10.	Groupe d'étude de l'Atmosphère Météorologique	France
11.	Laboratoire de Glaciologie et de Géophysique de l'Environnement)	France
12.	Finnish Meteorological Institute	Finland
13.	Joint Research Center, Ispra	Italy
14.	International Centre for Theoretical Physics	Italy
15.	King's College London	UK
16.	Nansen Environmental and Remote Sensing Center	Norway
17.	Norwegian Institute for Air Research	Norway
18.	Paul Scherrer Institute	Switzerland
19.	TNO-Built Environment and Geosciences	The Netherlands
20.	UK MetOffice	UK
21.	University of Hamburg	Germany
22.	University of Helsinki	Finland
23.	University of Hertfordshire — Centre for Atmospheric and Instrumentation Research	UK
24.	University of Stuttgart	Germany
25.	World Meteorological Organization	Switzerland
26.	Charles University, Prague	Czech Republic
27.	Institute of Tropospheric Research	Germany
28.	Centre for Atmospheric Science, University of Cambridge	UK

AIR4EU — Air Quality Assessment for Europe from Local to Continental

CT — 503596

<http://www.air4eu.nl>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/01/2004
Duration:	36 months
Total project cost:	2.927.506 €
EC Contribution:	1.958.181 €
Coordinating organisation:	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek Delft — Netherlands
Co-ordinator:	Peter Bultjes (p.j.h.bultjes@mep.tno.nl)
EC Office:	Environment Directorate

Abstract

AIR4EU addresses the needs for policy-orientated research on integrated air quality (AQ) assessment by monitoring methods and modelling at different temporal and spatial scales for regulated components in Europe: PM₁₀ (and PM_{2.5}), NO₂, CO, SO₂, O₃ and benzene. Policy support on AQ assessment has been recognised a priority issue within the “Clean Air for Europe- CAFE” programme. There are a wide variety of AQ assessment methods based upon monitoring and modelling, but these methods depend on the spatial and temporal scales, and are often not or only partially compatible. Consequently, there is a need for scientific sound and practical recommendations on how to integrate monitoring and modelling methods into internally consistent, comprehensive and cost-effective assessment methods. The aim of AIR4EU is to provide recommendations on AQ assessment for different temporal and spatial scales: ranging from hourly to annual and from “hotspot”/street to continental scale. Case studies are implemented with partners in Paris, Rome, Prague, London, Athens, Rotterdam and Oslo, to test and further develop the recommendations. AIR4EU will also prepare AQ maps at different scales in Europe based upon available data sets (monitoring, meteorology and emissions) and the recommended methods. The cooperation of European top-scientists from six member states representing four universities, two research institutes and eight user-partners will support the establishment of the European Research Area. AIR4EU will co-operate with on-going relevant projects (e.g. ENV-e-CITY; OSCAR; CLEAR; MERLIN) and networks (e.g. INTEGAIRE, CITY-Delta; POLIS), and specific liaison will be established with the CAFE programme. AIR4EU will disseminate its results by a Website and through Newsletters and Workshops to the scientific community, environmental authorities, policy makers and other stakeholders in AQ in Europe.

Objectives

The overall aims of the project AIR4EU are:

- To formulate a guidance document on best practices for the combined use of monitoring methods and models to assess AQ in Europe from hotspot/street level to continental level for various users on local, regional, national and European level and for various purposes.

- To prepare maps of air quality in Europe based on the available European wide data sets and best technique of assessment. AIR4EU will present AQ maps covering the European scale, including examples of the hotspot, street, urban, agglomeration and regional level for PM₁₀, PM_{2.5}, NO₂, O₃, CO, SO₂ and benzene. These maps will illustrate the application of the recommendations, which have been validated in a number of case studies.

Operational objectives include:

- To set the policy framework for AIR4EU and identify the user needs in relation to air quality assessment methods.
- To establish and implement the consultation with the high-level Expert group, policy makers, authorities, practitioners and other stakeholders.
- To review and examine the benefits and drawbacks, including the variability and uncertainty of a range of monitoring and modelling air quality assessment methods relevant to local/hotspot, urban/agglomeration and regional/EU spatial scales and at various temporal scales.
- To review and assess the procedures for quantifying the main natural and anthropogenic sources and emissions and to estimate the quality of such data relevant to local/hotspot, urban/agglomeration and regional/EU spatial scale air quality assessment.
- To synthesise and harmonise the benefits and drawbacks of AQ assessment methods and their variability and uncertainties, as well as procedures for quantification of natural and anthropogenic emissions.
- To prepare draft recommendations on best techniques for assessment of air quality relevant to local/hotspot, urban/agglomeration and regional/EU spatial scales and at various temporal scales.
- To specify the criteria and develop the protocols for case studies: objectives, contents and types of results.
- To prepare, implement and evaluate case studies in the seven application cities according to the protocols and reflect the appropriateness of the draft recommendations.

Partners

N°	Organisation	Country
1.	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek	The Netherlands
2.	Norsk Institutt for Luftforskning	Norway
3.	Aristoteleio Panepistimio Thessalonikis	Greece
4.	Universität Stuttgart	Germany
5.	University of Hertfordshire	UK
6.	Universidade de Aveiro	Portugal
7.	Airparif	France
8.	Societa Trasporti Automobilistici Spa	Italy
9.	Environment Agency	UK
10.	Utvar Rozvoje Hlavního Mesta Prahy	Czech Rep.
11.	Enveco S.A. Environmental Protection Management And Economics	Greece
12.	Gemeentewerken Rotterdam	The Netherlands
13.	Dcmr Milieudienst Rijnmond	The Netherlands
14.	Oslo Kommune Helsevernetaten	Norway

NATAIR — Improving and Applying Methods for the Calculation of Natural and Biogenic Emissions and Assessment of Impacts on Air Quality

CT — 513699

<http://natair.ier.uni-stuttgart.de>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/01/2005
Duration:	30 months
Total project cost:	956.586 €
EC Contribution:	600.000 €
Coordinating organisation:	Universität Stuttgart Stuttgart — Germany
Co-ordinator:	Rainer Friedrich (Rainer.Friedrich@ier.uni-stuttgart.de)
EC Office:	Environment Directorate

Abstract

The proposed project aims to improve methods for the calculation of natural and biogenic emissions from various sources and the assessment of impacts on air quality policy implementation. Air pollutants from natural and biogenic sources contribute to ambient air concentrations in the same way as anthropogenic emissions; however, the knowledge about the uncertainty of current methods for the estimation of these natural and biogenic emissions is vast. At the same time, with anthropogenic emissions currently decreasing due to emission control activities in many sectors, the relative importance of other sources increases. Thus, it is essential to develop new and improve existing methods for the quantification of emissions from natural and biogenic sources. The proposal takes into account the latest research results on air pollutant emissions and their impacts, covering all relevant substances (NO_x , SO_x , NH_3 , PM, NMVOC; CH_4 , CO, DMS) from natural and biogenic sources in Europe, e.g. the results from the "Nature Panel" of the EMEP/CORINAIR Atmospheric Emission Guidebook and includes anthropogenic emissions officially reported to EMEP by countries. Furthermore, the National Reports for the NEC directive for SO_x , NO_x , NH_3 and NMVOC will be taken into account, as well as, the results of ED research project such as NofRETETE or the results from the EUROTRAC Subproject GENEMIS. As a major innovation, satellite data are used e.g. for the improvement of calculations from forests in general as well as forest fires in particular. In order to assess the impacts of emissions from natural and biogenic sources on air quality policy implementation; the project is designed to advance the current state-of-the-art in methodology for the calculation of natural and biogenic emissions. After the analysis of temporal and spatial variabilities and the assessment of uncertainties and sensitivities, some test cases on EU and local scale will be modelled with the chemical transport model CHIMERE to calculate ambient air concentrations of the pollutants considered under "low anthropogenic emission" scenario conditions.

Objectives

This project aims to improve methods for the calculation of natural and biogenic emissions from various sources and the assessment of impacts on air quality policy implementation. Air pollutants from natural and biogenic sources contribute to ambient air concentrations in the same way as anthropogenic emissions, however, the knowledge about these sources is limited, and uncertainty introduced by an inadequate coverage of natural emissions to assess anthropogenically induced effects may be considerable. As emission control activities successfully decrease anthropogenic emissions in many sectors over time, the relative importance of other sources even increases. Thus, it is essential to develop new and improve existing methods for the quantification of emissions from natural and biogenic sources.

The project takes into account state-of-the-art research results on air pollutant emissions and their impacts, covering all relevant substances (NO_x , SO_x , NH_3 , PM, NMVOC; CH_4 , CO, DMS) responsible for direct and indirect (secondary) air pollution. As it is difficult to strictly distinguish between anthropogenic and natural sources, the work will include a clear definition of a system boundary, i.e. which sources to cover. Clearly, natural sources, i.e. those fully unaffected from human activities, will be included, as well as emissions from biogenic processes. Domestic animal activities, sometimes considered to be semi-natural, will not be considered. The work will be based on most recent scientific results in the area, including the contributions from the "Nature Panel" within the UNECE Task Force Emission Inventories and Projection to the Convention on Long Range Transboundary Air Pollution (CLRTAP), the results of EU research projects such as NofRETETE1 or the results from the EUROTRAC Subproject GENEMIS2. As a major innovation, satellite data will be used e.g. for the improvement of calculations of emissions from forests in general as well as forest fires in particular. In order to assess the impacts of emissions from natural and biogenic sources on air quality policy implementation, the project is designed to advance the current state-of-the-art in methodology for the calculation of natural and biogenic emissions. After the analysis of the temporal and spatial variability and the assessment of uncertainties and sensitivities, selected test cases on European scale will be modelled with the chemical transport model CHIMERE to calculate ambient air concentrations of the pollutants considered under "low anthropogenic emission" scenario conditions. These anthropogenic emissions will be taken from the official country reports to EMEP3 as well as the National Reports for SO_x , NO_x , NH_3 and NMVOC emissions for 2010 according to the NEC directive.

Finally, policy instruments applied by the EU and in the frame of the UNECE CLRTAP to reduce anthropogenic emissions will be assessed in the view of these new results and recommendations for the future design of air quality policies and the ongoing reviews of existing directives and protocols will be derived.

While policy analysis and detailed evaluation will be limited to EU25 (European Union as of May 2004), excluding overseas territories, all emission assessments will, as much as data allow, be extended to the whole geographical area of Europe and include all accession countries. Furthermore, due to the known influence to Europe, Saharan dust emissions will also be considered.

Partners

N°	Organisation	Country
1.	Universität Stuttgart	Germany
2.	Arc Systems Research GmbH	Austria

3.	Forschungszentrum Karlsruhe GmbH	Germany
4.	AEA Technology Plc	UK
5.	Institute for Ecology of Industrial Areas	Poland
6.	Centre National de la Recherche Scientifique	France
7.	Agenzia per la Protezione dell'ambiente e per i Servizi Tecnici	Italy
8.	Joensuun Yliopisto (University of Joensuu)	Finland
9.	Commission of the European Communities — Joint Research Centre	Belgium

GEOMON — Global Earth Observation and Monitoring

CT — 036677

<http://geomon.ipsl.jussieu.fr/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/02/2007
Duration:	48 months
Total project cost:	10.045.640 €
EC Contribution:	6.621.740 €
Coordinating organisation:	Commissariat à l'Energie Atomique Paris — France
Co-ordinator:	Philippe Ciais (philippe.ciais@cea.fr ; cecilia.garrec@cea.fr)
EC Office:	Environment Directorate

Abstract

The overall goal of the GEOMON project is to sustain and analyze European ground-based observations of atmospheric composition, complementary with satellite measurements, in order to quantify and understand the ongoing changes. GEOMON is a first step to build a future integrated pan-European Atmospheric Observing System dealing with systematic observations of long-lived greenhouse gases, reactive gases, aerosols, and stratospheric ozone. This will lay the foundations for a European contribution to GEOSS and optimize the European strategy of environmental monitoring in the field of atmospheric composition observations. Specifically, we will unify and harmonize the main European networks of surface and aircraft-based measurements of atmospheric composition parameters and integrate these measurements with those of satellites. The access to data and data-products will be coordinated at a common data centre for more efficient use. GEOMON will support data gathering at existing networks if necessary, rescue and compile existing ground-based data, and develop new methodologies to use these data for satellite validation and interpretation.. In addition, GEOMON will enable innovative ground-based measurements complementary to satellites, made by upward looking ground based remote sensing instruments Max-DOAS, FTIR, and LIDAR and by systematic measurement programmes of upper-tropospheric composition using passenger aircrafts CARIBIC and MOZAIC. These data will serve to reduce biases and random errors in satellite observations and facilitate interpretation of the columnar measurements in combination with surface data. This will result in a significant improvement in the use of existing and future satellite data. Common techniques and modelling tools will be used in order to add value to the GEOMON data observations, to facilitate their use in satellite validation and help design an optimal network.

Objectives

The overarching aim of GEOMON is to construct a prototype system for atmospheric composition monitoring for climate applications, by the combination of ground-based with satellite observations. This strategic objective will answer the three overarching scientific questions:

- What are the regional European trends and variability of greenhouse gases, tropospheric and stratospheric ozone, aerosols, and pollutants in relation to changes in surface emissions?

- How to validate top-down satellite observation of the changing atmospheric composition, and integrate them with ground based stations and airborne observations into a coherent picture?
- What are the global trends of atmospheric composition from ground-based and satellite observations assimilated in modelling studies, and what key measurements should be added for reducing uncertainties on surface emissions and atmospheric processes?

Question 1: Quantify atmospheric composition trends over Europe

- Sustain long-term measurements of atmospheric composition in the European air shed, from existing ground-based networks. Priority is given to continuing programs which have demonstrated excellence, but are today in funding hiatus, and to develop new Near Real Time data products.
- Provide quality assured, harmonized, and select regionally representative long-term datasets for the chemical and aerosol composition of the boundary layer over the European air shed, using surface observations.

Question 2: Integrate satellite and ground-based observation

- Develop innovative methodologies combining ground-based upward looking remote sensing and surface in-situ measurements to validate satellite retrievals.
- Provide quality assured and integrated chemical composition measurements of the global free.
- troposphere, with focus on CO₂, CH₄, ozone and precursors including CO using instrumented passenger aircraft programs and link them to satellite with model studies.
- Support continuation of the acquisition of the target parameters at the Network for Detection of Atmospheric Composition Change (NDACC) stations operated by European partners, and develop innovative model tools to integrate these data with complementary satellite observations.

Question 3: Quantify global trends and uncertainties

- Analyse time series of ground-based and satellite observations to identify long-term trends in tropospheric and stratospheric composition related to climate change, and compare the observed trends to global Chemical Transport Models results.
- Develop integrated data products combining ground-based networks and remote sensing fields to assess the spatial and temporal distributions of greenhouse gases, aerosols, chemical pollutants, and stratospheric ozone.

Establish a Data Centre to provide users with comprehensive and easy access to key European atmospheric composition data and data-products and ensure appropriate dissemination at various levels of the quality assured and integrated data sets to assist scientific and policy communities, in compliance with GEOSS aims. These main objectives are met by organizing the IP into six complementary main “Activities” which provide essential ground-based observations of CO₂ and CH₄ greenhouse gases (Activity 1), reactive gases (Activity 2), aerosols (Activity 3) and stratospheric ozone and related species (Activity 4) to assess the long term trends and enable understanding of their controlling processes (Activity 5), and ensure access and dissemination of these results (Activity 6).

Partners

N°	Organisation	Country
1.	Commissariat à l'Energie Atomique	France
2.	Finnish Meteorological Institute	Finland
3.	Royal Holloway and Bedford New College, University of London	UK
4.	Energy Research Center of the Netherlands	The Netherlands
5.	University of Bremen	Germany
6.	University of Leicester	UK
7.	European Centre for Medium-Range Weather Forecasts	UK
8.	Eidgenoessische Materialpruefungs- und Forschungsanstalt	Switzerland
9.	Norsk Institutt for Luftforskning	Norway
10.	Belgisch Instituut voor Ruimte Aeronomie	Belgium
11.	World Meteorological Organization	Zwitzerland
12.	National and Kapodistrian University of Athens	Greece
13.	Max-Planck-Society for the Advancement of Sciences	Germany
14.	Ruprecht-Karls-Universität Heidelberg	Germany
15.	Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
16.	The Netherlands Organisation for Applied Scientific Research	The Netherlands
17.	Paul Scherrer Institut	Switzerland
18.	Consiglio Nazionale delle Ricerche	Italy
19.	National University of Ireland, Galway	Ireland
20.	Natural Environment Research Council	UK
21.	University of Bern	Switzerland
22.	Alfred-Wegener-Institut für Polar- und Meeresforschung	Germany
23.	Danish Meteorological Institute	Denmark
24.	Instituto Nacional de Técnica Aeroespacial Esteban Terradas	Spain
25.	University of Liège — Institute of Astrophysics and Geophysics	Belgium
26.	Chalmers University of Technology	Sweden
27.	University of Leeds	UK
28.	Universitetet i Oslo	Norway
29.	Institut National de l'Environnement Industriel et des Risques	France
30.	Unité Mixte de Recherche. Icare UMS-2877	France
31.	Université de Versailles Saint-Quentin en Yvelines	France
32.	Forschungszentrum Karlsruhe GmbH	Germany
33.	Universität Karlsruhe	Germany
34.	Parc Cientific de Barcelona	Spain
35.	A.N.Severtsov Institute of Ecology and Evolution, Academy of Sciences	Russian Fed.
36.	CNRS — Institut National des Sciences de l'Univers	France
37.	Centre National d'Etudes Spatiales	France

COPAL — Community heavy-payload long endurance instrumented aircraft for tropospheric research in environmental and geo-sciences

CT 212205

<http://www.eufar.net/>

Funding instrument:	Collaborative Project (CP) and Coordination and Support Action (CSA)
Contract starting:	01/11/2007
Duration:	48 months
Total project cost:	1.165.269 €
EC Contribution:	1.000.000 €
Coordinating organisation:	Météo France France
Co-ordinator:	Jean-Louis Brenguier (bureau@eufar.net)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

COPAL has the objective of providing the European scientific community with a unique research aircraft platform, capable of reaching and operating in any remote area in the world and offering a heavy-payload for integration of large panoply of instruments for research in environmental and Geo-sciences. It will offer an unprecedented opportunity to countries that are not yet operating research aircraft to develop expertise in airborne measurements and participate to international multidisciplinary experiments.

The Consortium includes 10 national research funding institutions, a SME and, a pan-European law firm. Among the national institutions, 6 are research councils, 3 are meteorological services supporting research, and one is a national aerospace research institution. 7 participants are members of the EUFAR network of European aircraft operators for research in Geo-sciences.

User requirements will be refined and translated into specifications for aircraft performance and modifications for research. The acquisition, modification, and maintenance costs will be precisely quoted. Procedures will be defined for the selection of the aircraft and data management operators. A network of academic centres of excellence and SMEs will be constituted for the development and airborne certification of innovative instruments for the community aircraft. New governance schemes will be elaborated for evaluation of access proposals and allocation of time slots, which reconcile the Pan-European use of the aircraft, with national authority in term of scientific programming. These activities will be coordinated with EUFAR, with the operator of community research aircraft in the USA, and with the other Preparatory Phase studies, especially those with points of similarity with COPAL, such as the research vessels. They will supply with technical and logistic solutions the research institutions which will develop a new organizational model for the COPAL European distributed infrastructure.

Objectives

COPAL has the objective of providing the European scientific community in the field of environmental and Geo-sciences, with a unique research aircraft platform, capable of reaching and operating in any remote area in the world. It will offer an unprecedented opportunity to countries that are not yet operating research aircraft to develop expertise in airborne measurements and participate to international multidisciplinary experiments.

Parallel with the development of Earth simulators in numerical modelling, experimental research in environmental and Geo-sciences is evolving towards multidisciplinary studies of the atmospheric and climate systems at the global scale. Consequently, the on-board instrument configuration must now include in-situ measurements of turbulence, atmospheric state parameters, and cloud microphysics, sampling inlets for on board gas and aerosol analysis, and a combination of passive and active remote sensing systems. The endurance must be sufficient for long range studies over remote area such as the oceans, the Polar Regions and continental areas with limited ground infrastructures, such as the Sahara desert or the Amazon. Even with the UK BAE-146, offering the largest payload of 4.5 tones in the European fleet of instrumented aircraft investigators have to accept compromises because the complete panoply of instruments available in Europe cannot be integrated, without significantly reducing the endurance of the aircraft. Moreover, all the aircraft of the European fleet are presently limited to an endurance of 5 hours. With a payload of 6 tones or more and an endurance of 12 hours, a heavy-payload, long endurance (HPLE) aircraft will more than double the capabilities offered to European scientists.

The objective is thus to move from the national approach in the development of airborne research infrastructures, that led to duplication and inefficient use of the facilities, to a pan-European approach that will allow to construct a facility that does not exist yet in Europe and operate it at the most efficient level by attracting a much broader community of users. In order to reach an agreement and financial commitments from potential shareholders, the COPAL consortium will analyze possible models for a joint management of a research infrastructure, that are adapted to the context of airborne operation, will precisely estimate the costs for the construction, modification for research, maintenance and operation of a HPLE aircraft, and will propose a governance model for the selection of scientific proposals and allocation of access at the European level. The first 20 months of the project will be dedicated to the analysis of possible models and the estimation of the costs that will be presented to the Governing Board of national representatives. During the following 20 months of the project, the Governing Board will examine models and select solutions for the project consortium to elaborate on the most suited models of management and governance and refine the cost estimation. During the last 8 months of the project, an agreement will be submitted for signature to the member organizations, with comprehensive information on the legal and governance structures, accurate estimation of the costs and a work plan to proceed with the construction and scientific operation of the new airborne infrastructure.

Partners

N°	Organisation	Country
1.	Météo-France, Centre National de Recherches Météorologiques	France
2.	Instituto Nacional de Técnica Aeroespacial	Spain
3.	Finish Meteorological Institute	Finland
4.	Natural Environment Research Council	UK

5.	Fundação para a Ciência e a Tecnologia	Portugal
6.	Consiglio Nazionale delle Ricerche	Italy
7.	General Secretariat for Research and Technology	Greece
8.	University of Warsaw, Institute of Geophysics	Poland
9.	Enviscope GmbH	Germany
10.	The Meteorological Office	UK
11.	Centre National de la Recherche Scientifique	France
12.	SJ Berwin LLP	UK/Belgium
13.	Deutsches Zentrum für Luft- und Raumfahrt E.V.	Germany

EARLINET ASOS — European Aerosol Research Lidar Network: Advanced Sustainable Observation System

CT — 025991

<http://www.earlinet.org/>

Funding instrument:	Coordination Actions (CA)
Contract starting date:	1/03/2006
Duration:	60 months
Total project cost:	2.760.199 €
EC Contribution:	2.760.199 €
Coordinating organisation:	CNR — Consiglio Nazionale delle Ricerche Rome — Italy
Co-ordinator:	Gelsomina Pappalardo (pappalardo@imaa.cnr.it)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

The present knowledge of the aerosol distribution is far from sufficient to properly estimate the role of aerosols in changes of the global and regional environmental conditions and climate. Improving the observation system for aerosols will contribute to almost all areas of societal benefits listed in the GEOSS Implementation Plan. Since it is in particular the information on the vertical distribution that is lacking, advanced laser remote sensing is the most appropriate tool to close the observational gap.

EARLINET-ASOS, starting on the European Aerosol Research Lidar Network (EARLINET) infrastructure, consisting of 20 lidar stations distributed over Europe, will contribute to the improvement of continuing observations and methodological developments that are urgently needed to provide the multi-year continental scale data set necessary to assess the impact of aerosols on the European and global environment and to support future satellite missions.

The main objective is to improve the EARLINET infrastructure resulting in a better spatial and temporal coverage of the observations, continuous quality control for the complete observation system, and fast availability of standardized data products. This will be reached by strengthening the co-operation among the partners with several networking activities: exchange of expertise with the main goal of defining and disseminating best practice and knowledge; quality assurance program for both algorithms and instruments for assessing and assuring common high quality standards; optimization of instruments for achieving a better temporal coverage and standardization of performance; optimization of data processing with the goal of establishing an automatic processing from raw data to final products; establishing a database provided with a user interface for dissemination of data.

The expected outcome is the most comprehensive data source for the 4-D spatio-temporal distribution of aerosols on a continental scale.

Objectives

The overall objectives are:

- To extend the development of the European Aerosol Research Lidar Network as a world-leading instrument for the observation of the 4-dimensional spatio-temporal distribution of aerosols on a continental scale, resulting in accurate, well-defined, and easily accessible data products for use in science and environmental services.
- To enhance the operation of this instrument to foster aerosol-related process studies, validation of satellite sensors, model development and validation, assimilation of aerosol data into operational models, and to build a comprehensive climatology of the aerosol distribution.
- To play a leading role in the development of a global observation network for the aerosol vertical distribution as a major innovative element of GEOSS, by setting the standards for instruments, methodology, and organization in this specific area.

To facilitate the verification of achievements more specific technical objectives are defined:

- Maintain quality assurance for all 20 stations at the highest possible level. This includes spreading of good practice for system control and operation as well as end-to-end checks of performance.
- Establish common standards for advanced aerosol lidar instruments with improved temporal coverage, operation procedures, data processing, and retrieval of optical, microphysical, and other derived parameters.
- Extend an observation scheme of regularly scheduled measurements and additional measurements for special purposes towards better temporal coverage.
- Collect data, including auxiliary data, in a comprehensive data base and implement a user interface providing fast and easy access to well structured data for both internal and external users, e.g., atmospheric researchers, global and regional climate modellers, satellite community, and environmental agencies.
- Establish a platform for cooperation and coordination with the relevant observation and user communities, and serve as a nucleus for a world-wide aerosol lidar network.

Partners

N°	Organisation	Country
1.	Consiglio Nazionale delle Ricerche — Istituto di Metodologie per l'Analisi Ambientale, Potenza	Italy
2.	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V. represented by Max-Planck-Institut für Meteorologie, Hamburg	Germany
3.	Aristotle University of Thessaloniki, Thessaloniki	Greece
4.	Universitat Politècnica de Catalunya, Department of Signal Theory and Communications, Barcelona	Spain
5.	Ludwig-Maximilians-Universität München, Meteorologisches Institut, Department of Physics, Munich	Germany
6.	Leibniz Institut für Troposphärenforschung e. V., Physics department, Leipzig	Germany
7.	Rijksinstituut voor Volksgezondheid en Milieu, Bilthoven	The Netherlands

- | | | |
|-----|---|-------------|
| 8. | Universität Potsdam, Institute of Mathematics, Potsdam | Germany |
| 9. | B.I. Stepanov Institute of Physics — National Academy of Sciences of Belarus, Minsk | Belarus |
| 10. | Norsk Institutt for Luftforskning, Norwegian Institute for Air Research at the Polar Environmental Centre, Tromsø, | Norway |
| 11. | Observatoire Cantonal de Neuchatel, Neuchatel | Switzerland |
| 12. | National Technical University of Athens, Mathematics and Physical Sciences, Athens | Greece |
| 13. | Università degli Studi di Lecce, Department of Physics, Lecce | Italy |
| 14. | Università degli Studi dell'Aquila — Dipartimento di Fisica — CETEMPS, L'Aquila | Italy |
| 15. | Ecole Polytechnique Fédérale de Lausanne, Lausanne | Switzerland |
| 16. | Institute of Geophysics, Polish Academy of Sciences, Warsaw | Poland |
| 17. | Consorzio Nazionale Interuniversitario per le Scienze Fisiche della Materia Unita' di Napoli- Dipartimento di Scienze Fisiche, Napoli | Italy |
| 18. | Institute of Electronics, Bulgarian Academy of Sciences, Sofia | Bulgaria |
| 19. | Forschungszentrum Karlsruhe GMBH, Institut für Meteorologie und Klimaforschung, Garmisch-Partenkirchen, | Germany |
| 20. | Centre National de la Recherche Scientifique — Institut Pierre Simon Laplace, Paris | France |
| 21. | Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas Department of Environment Air Pollution Unit, Madrid | Spain |

EUFAR — European Facility for Airborne Research Lidar Network: Advanced Sustainable Observation System

CT — 227159

<http://www.eufar.net/>

Funding instrument:	Integrated Infrastructure Initiative
Contract starting:	01/10/2008
Duration:	48 months
Total project cost:	9.567.878 €
EC Contribution:	8.000.000 €
Coordinating organisation:	Météo France France
Co-ordinator:	Jean-Louis Brenguier (bureau@eufar.net)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

EUFAR is an Integrated Infrastructure Initiative that brings together 23 leading European institutions and companies involved in airborne research, operating more than 30 instrumented aircraft.

EUFAR, being a user-driven project, aims at:

- co-ordinating the network for exchanging knowledge, sharing developments, and building the unified structure that is required for improving access to the infrastructures;
- providing users with Transnational Access (TA) to the infrastructures;
- extending TA to national funding sources;
- promoting airborne research in the academic community;
- developing research activities in airborne instrumentation.

Networking activities:

- The ESF Scientific Advisory Committee (N1ESF-SAC), constituted of independent eminent scientists, supervises the activities of the EUFAR I3.
- The Transnational Access Coordination (N2TAC) provides a unified management structure for all EUFAR TA activities.
- Future of the Fleet (N3FF): aims at providing technical solutions for extending TA beyond EU support, and elaborating on possible enhancements of the fleet.
- Expert Working Groups (N4EWG) are supported for exchanging knowledge and promoting best practice and investments in airborne instrumentation.
- Education & Training (N5ET): aims at promoting the airborne research in the academic community.

- E-Communication (N6EC): elaborates efficient solutions for the dissemination of the information and the evaluations of TA applications.

Transnational Access Activities:

Access is offered to 23 instrumented aircraft, including scientific and engineering support for integration of instruments, planning of field campaigns, and data analysis.

Joint Research Activities:

The objective of the EUFAR JRA1 “Airborne Aerosol Reference Pod” is to design and construct an Aerosol Reference Pod that can be flown on several aircraft and will serve as a true basis for intercalibration of airborne aerosol instrumentation.

Objectives

The EUFAR I3 brings together most of the leading European institutions and companies involved in airborne research, and integrates the activities of 13 governmental organisations, 8 non-profit organisations and 2 private commercial organisations operating instrumented aircraft and airborne instruments in Europe. EUFAR aims at integrating the activities of the European operators of airborne research infrastructures, through:

- Co-ordinating the activities and services provided, including instrumented aircraft, airborne instrumentation, and calibration facilities, for exchanging knowledge, sharing developments, and building a unified management structure that is required for improving access to the infrastructures;
- Supporting an independent committee of reputed scientists, under the umbrella of the European Science Foundation (ESF) Standing Committee for the Life and Environmental Sciences (LESC), for a user-driven evolution of the EUFAR I3;
- Providing Transnational Access (TA) to the infrastructures under European support, and extending the TA to national support under multi-lateral agreements;
- Promoting airborne research in the academic community;

Developing Joint Research Activities (JRA) in airborne instrumentation.

Integration of airborne research activities in Europe requires a novel organisation scheme between the various actors, namely the scientific users of the infrastructures, the operators, the experts in airborne instrumentation, and the National Research Funding Institutions (NRFI), members of the European Science Foundation (ESF). The ESF-Scientific Advisory Committee acts as the respective interface.

Partners

N°	Organisation	Country
1.	Météo-France, Toulouse	France
2.	Fondation Européenne de la Science, Strasbourg, E S F	France
3.	Deutsches Zentrum für Luft- und Raumfahrt e.V., Köln, DLR	Germany
4.	Stichting Nationaal Lucht- en Ruimtevaartlaboratorium, Amsterdam NLR	The Netherlands
5.	Enviroscope GmbH, Frankfurt/Main	Germany

6.	Institut National des Sciences de l'Univers Centre National de la Recherche Scientifique, INSU-CNRS Paris	France
7.	Met Office, Exeter,	UK
8.	Natural Environment Research Council, Swindon, NERC (ARSF/BGS)	UK
9.	Instituto Nacional de Técnica Aeroespacial, Madrid, INTA	Spain
10.	Tel Aviv University, Tel Aviv, TAU	Israel
11.	Geologian tutkimuskeskus (Geological Survey of Finland), GTK Espoo	Finland
12.	Institute of Flight Guidance and Control, Technical University Braunschweig, TU-BS Braunschweig	Germany
13.	Freie Universität Berlin, Berlin; FUB	Germany
14.	MetAir AG — airborne measurements and consulting, Hausen am Albis, METAIR	Switzerland
15.	CNR — Istituto Sistemi Agricoli e Forestali Mediterranei, Ercolano, CNR-ISAFoM	Italy
16.	Forschungszentrum Karlsruhe GmbH, Karlsruhe, FZK	Germany
17.	Stockholms Universitet, Stockholm, MISU	Sweden
18.	Max-Planck-Society for the advancement of the science represented by Max-Planck-Institute for Chemistry, Mainz, MPI-C	Germany
19.	National University of Ireland, Galway, NUIG	Ireland
20.	University of Manchester Institute of Science and Technology, Manchester, UNIMAN	UK
21.	Leibniz-Institut für Troposphärenforschung, Leipzig, IFT	Germany
22.	National Meteorological Administration, Bucharest, ANM	Romania
23.	Geophysica-EEIG, Sesto Fiorentino, Geophysica EEIG	Italy
24.	Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, AWI	Germany

EUROCHAMP — Integration of European Simulation Chambers for Investigating Atmospheric Processes

CT — 505968

<http://www.eurochamp.org/>

Funding instrument:	Specific Actions to promote research infrastructures
Contract starting date:	01/06/2004
Duration:	60 months
Project total cost:	4.768.639 €
EC Contribution:	3.900.000 €
Coordinating organisation:	Bergische Universität Wuppertal Wuppertal — Germany
Co-ordinator:	Peter Wiesen (wiesen@uni-wuppertal.de)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

The project integrates the most important environmental reaction chambers in Europe for studying atmospheric processes into a Europe-wide infrastructure. The consortium of partners provide their expertise and experience in atmospheric chemistry to researchers of different disciplines, policy and industry and offer an infrastructure that can be used by interested parties for solving a large variety of problems related to atmospheric science.

The major goals of the project are:

- the initiation of an effective interdisciplinary collaboration between the community of atmospheric scientists and colleagues from other disciplines that are closely related to it. This will be achieved through the three networking activities of EUROCHAMP.
- the optimisation and further development of the infrastructures' performance. In order to meet these goals, two corresponding research activities are defined in the EUROCHAMP work programme, namely the development and refinement of analytical equipment and the development of chemical modelling techniques.

Besides the project partners, a number of selected associated user groups with a high grade of expertise in the different fields of interest provide their experience either as advisers to special topics or as potential users of the infrastructure.

Objectives

The fundamental objective of the project is the integration of existing European research facilities to a grid of reaction chambers. These facilities were created by multinational initiatives to study the impact of atmospheric processes on regional photochemistry, global change, as well as cultural heritage and human health effects under most realistic conditions.

Although initial advances in the application of large chambers occurred in the United States, Europe now leads the world in the use of large, highly instrumented chambers for atmospheric model development and evaluation. Smaller chambers that were designed for specific purposes and are operated by experts in their fields excellently support such chambers. The integration of all these environmental chamber facilities within the framework of the EUROCHAMP infrastructure promotes retention of Europe's international position of excellence in this area and is unique in its kind worldwide.

The mobilisation of a large number of stakeholders dealing with environmental chamber techniques provides an infrastructure to the research community at a European level that offers a maximum support for a broad community of researchers from different disciplines. The EUROCHAMP project initiates a currently not existing structuring effect of atmospheric chemistry activities performed in European environmental chambers, since it offers the full availability of corresponding facilities for the whole European scientific community.

With respect to the project objectives mentioned above, three network activities and two joint research activities are formulated and cross-linked in the EUROCHAMP project.

Networking activities

The major objective of the networking activities within the EUROCHAMP project is the initiation of an effective interdisciplinary collaboration between the community of atmospheric scientists and colleagues from other disciplines that are closely related to it. This will be achieved through the three networking activities of EUROCHAMP.

Networking activity N1

The objective of networking activity N1 is the generation and application of standardised rules as a method of quality assurance for raw data analyses of the experiments in each facility. For this purpose a number of inter-comparison studies applying analytical devices in reference experiments will be carried in the different chambers, which provides an indirect measure of the infrastructures' excellence.

Networking activity N2

In order to make the results of experiments performed in the partners' facilities most transparent and accessible to the scientific community, a standardised data protocol for chamber studies will be defined. This standardised form will be the basis for the central database of environmental chamber studies to be constructed within the project. This WWW-based database will be made accessible to the whole scientific community, leading to a most effective dissemination of the results.

Networking activity N3

Within networking activity N3 four larger international conferences / workshops on infrastructure-related topics will be organised. In order to reach a maximum of success, internationally established experts on the corresponding topics will be invited to join these conferences. The results will be published in suitable proceedings for dissemination to the scientific community.

Joint research activities

The major objective of the joint research activities within the EUROCHAMP project is the optimisation and further development of the infrastructures' performance. In order to meet these goals, two corresponding research activities are defined in the EUROCHAMP work programme, namely the development and refinement of analytical equipment and the development of chemical modelling techniques.

Joint research activity JRA1

The development of novel and the refinement of existing analytical devices of environmental chambers in order to successfully detect atmospheric trace species or to characterise aerosol particles is an essential task to be followed over the whole lifetime of the EUROCHAMP research facilities. The increasing demands for more comprehensive analytical techniques caused by the more and more complex scientific questions to be answered, requires a continuous improvement of the technical possibilities of a chamber.

Accordingly, the project includes a number of research activities focused on this topic:

- characterisation of oxygenated volatile organic compounds (OVOCs),
- radical measurements (OH, HO₂, RO₂),
- nitric acid measurements,
- characterisation of aerosols.

Besides the *optimisation* of existing devices (1st objective), a number of analytical devices will be completely *new* designed and introduced for the first time in an environmental chamber (2nd objective).

The highly specific equipment will be developed in a mobile form, so that such instruments may be transported to a chamber of choice and used in selected experiments independent of localisation. This philosophy strengthens the idea of a real grid of environmental chambers forming a powerful infrastructure. In addition, the instruments to be developed will be of great use for future field campaigns for which sophisticated, improved analytical instrumentation is urgently required.

Joint research activity JRA2

The field of chemical modelling is directly coupled to each type of environmental chamber studies. The analysis of chamber experiments without any model application is mostly not possible. Accordingly, model activities are urgently necessary and a permanent companion of each experimental task.

1. Since the quality of simulation studies strongly depends on the question how exactly the chemical behaviour of the chamber itself is characterised, sensitive parameters urgently required for simulations have to be determined for each facility of the infrastructure (1st objective). The dissemination of each result from such studies serves for a better interpretability of environmental chamber studies as a whole.
2. The second objective for model applications is the test of complex chemical mechanisms used for multi-phase model applications related to chamber experiments. An established chemical code for interpretation of chamber studies that can be applied to all facilities increases the

quality of the whole infrastructure and offers new possibilities for solving open questions of interest for the European researchers' community.

3. Furthermore, chemical models to be developed can be applied in the EUROCHAMP network for the solution of specific problems in atmospheric chemistry, e.g. development and validation of degradation mechanisms of organic pollutants that are of paramount importance, the investigation of atmospheric reactivity as an overall property under various conditions or the influence of alternative fuels or solvents as well as bio fuels on tropospheric chemistry (3rd objective).

In conclusion, this philosophy strengthens the idea of a real grid of environmental chambers as powerful tool for system analysis increasing the value of the whole chambers infrastructure for the European research community.

Partners

N°	Organisation	Country
1.	Bergische Universität Wuppertal, Wuppertal	Germany
2.	Joint Research Centre, Ispra	Italy
3.	Forschungszentrum Jülich, Jülich	Germany
4.	Fundación Centro de Estudios Ambientales de Mediterráneo, Valencia	Spain
5.	Universität Bayreuth, Bayreuth	Germany
6.	University College Cork, Cork	Ireland
7.	Centre National de la Recherche Scientifique (CNRS-LCSR), Orleans	France
8.	Paul-Scherrer-Institute, Villigen	Switzerland
9.	Forschungszentrum Karlsruhe, Karlsruhe	Germany
10.	University of Leeds, Leeds	United Kingdom
11.	SP Swedish National Testing and Research Institute, Borås	Sweden
12.	Leibniz-Institut für Troposphärenforschung, Leipzig	Germany

EUSAAR — European Supersites for Atmospheric Aerosol Research

CT-026140

<http://www.eusaar.net/>

Funding instrument:	Specific Actions to promote research infrastructures
Contract starting date:	01/04/2006
Duration:	60 months
Total project cost:	6.127.703 €
EC Contribution:	5.100.000 €
Coordinating organisation:	Centre National de la Recherche Scientifique Laboratoire de Météorologie Physique (LAMP) Paris — France
Co-ordinator:	Andrea Flossmann (A.Flossmann@opgc.univ-bpclermont.fr)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

The objective of the project EUSAAR is the integration of measurements of atmospheric aerosol properties performed in a distributed network of 20 high quality European ground-based stations. This integration contributes to a sustainable and reliable operational service in support of policy issues on air quality, long-range transport of pollutants and climate change. The project will be coordinated by CNRS in Clermont-Ferrand and activity leaders are world-recognized experts in the field of aerosol research.

The lack of coordination programs for non-regulated measurements of aerosol properties is considered a major gap in Earth Observation that urgently needs to be filled. The objective of the networking activities is to ensure most efficient use of available resources by 1) harmonization and validation of current measurement of particle optical, physical and chemical properties performed at Supersites as these are critical to ensure their scientific value (N2, N3, N4); 2) centralization of the validated measurements in a common data base accessible to all users (N5); 3) spreading good practices and disseminate information on new protocols both within and outside the project.

Trans-National Access (TA1-TA11) is provided for 11 Supersites with long record of international access, outstanding instrumentation for atmospheric research and highly relevant long-term monitoring data series.

The joint research activities have the common objectives to develop affordable and sustainable solutions to improve monitoring strategies and products that will advance up-to-date data reporting across Europe. This concerns retrieval of the aerosol column with a novel technology (JRA1), development of a new generation of humidity-controlled instruments (JRA2) and new methodologies for real-time acquisition of aerosol parameters (JRA3).

A major concern of EUSAAR is that activities consolidate current observation efforts and ensure their continuation beyond the present project.

Objectives

The objective of the project EUSAAR is the integration of measurements of atmospheric aerosol properties performed in a distributed network of 20 high quality European ground-based stations (Supersites). Although particulate matter has become a priority under the Convention in relation to the envisaged review and possible revision of the Gothenburg Protocol, it is only measured at comparably few regional background stations. The present situation is, therefore, clearly not sufficient in the context of an integrated atmospheric observing system for air quality and climate studies. The non-regulated aerosol properties of interest to air quality and global climate modelling are the following:

Table 1: Aerosol parameters of interest to air quality and climate studies

	Parameter	Air Quality	Climate	Status
Chemical Properties	Aerosol inorganic composition	yes	yes	Implemented within EMEP (level 1)
	Aerosol organic composition (OC/EC)	yes	yes	Suggested as EMEP level 2
Physical Properties	Aerosol size distribution (dN/dlogD)	yes	yes	Suggested as EMEP level 3
	Aerosol Mass	yes		Implemented within EMEP (level 1)
Optical Properties	Light scattering coefficient		yes	
	Light absorption coefficient		yes	
	Aerosol Optical depth		yes	Implemented inhomogeneously within AERONET/PHOTON/GAW
3D — distribution	Aerosol Vertical profile	yes	yes	Implemented within Earlinet (currently not continued)

(*) Grey area: parameters proposed to be integrated within EUSAAR. Dashed area: these parameters will be integrated only if performed outside of existing networks.

Because these measurements are performed outside of coordinated protocols, access to this information is, at present, rather uneasy and not provided in a coherent manner. EUSAAR is particularly focussing on four key parameters, indicated in grey in Table II.1, for which a clear lack of coordination exists. These parameters are the basic information required to detect any long-term change in aerosol source emissions and assess possible climatic effects of aerosols that may result from these changes.

The major goal of EUSAAR, through its 6 networking activities, is to provide easy access to high quality data bases and promote standardised measurement protocols, intercomparability of observations and quality assurance common to all research sites for the 4 aerosol parameters listed in Table 1.

The networking activities will be complemented by three joint research activities aimed at developing future tools for aerosol monitoring and dissemination of information. These developments can only be achieved through transnational coordinated research projects sharing experience, know-how and human capital, as offered by the proposed infrastructure. Each one of the JRAs will support and improve the implementation of one or more of the networking activities.

Partners

N°	Organisation	Country
1.	Centre National de la Recherche Scientifique, LaMP, Clermont-Ferrand	France
2.	Paul-Scherrer-Institut, Villigen	Switzerland
3.	Stockholm Universitet, Stockholm	Sweden
4.	European Commission — Joint Research Centre, Ispra,	Italy
5.	The Netherlands Organisation for Applied Scientific Research, The Hague	The Netherlands
6.	Leibniz Institute for Tropospheric research, Leipzig	Germany
7.	Norwegian Institute for Air Research, Keller	Norway
8.	Consiglio Nazionale delle Ricerche, ISAC, Bologna	Italy
9.	University of Helsinki, Helsinki	Finland
10.	National University of Ireland, Galway	Ireland
11.	University of Crete, Heraklion	Greece
12.	Finnish Meteorological Institute, Helsinki	Finland
13.	Pannon University, Veszprem	Hungary
14.	Institute of Chemical Process Fundamentals, Prague	Czech Republic
15.	Ruprecht-Karls-Universität Heidelberg, Heidelberg	Germany
16.	Institute for Nuclear Research and Nuclear Energy, Sofia	Bulgaria
17.	The University of Birmingham, Birmingham	United Kingdom
18.	Institute of Physics, Vilnius	Lithuania
19.	Lund University, Lund	Sweden
20.	Consejo Superior de Investigaciones Científicas, Barcelona	Spain
21.	Hoffmann Messtechnik GmbH, Rauenberg	Germany

IAGOS — Integration of Routine Aircraft Measurements into a Global Observing System

CT -011902

<http://www.fz-juelich.de/icg/icg-2/iagos>

Funding instrument:	Specific actions to promote research infrastructures
Contract starting:	15/04/2005
Duration:	57 months
Total project cost:	4.528.611 €
EC Contribution:	2.577.000 €
Coordinating organisation:	Forschungszentrum Jülich Jülich — Germany
Co-ordinator:	Andreas Volz-Thomas (a.volz-thomas@fz-juelich.de)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

IAGOS is a design study pursuing the preparation of a resilient distributed infrastructure for routine observations of atmospheric composition, aerosols, clouds and contrails on the global scale from commercial in-service aircraft. Observations in the Upper Troposphere and Lower Stratosphere (UTLS) are critical for improving the scientific understanding of chemistry-climate interactions, particularly those associated with the roles of clouds, aerosols and chemical composition. This information is essential for improving the scientific basis related to predictions of global climate change and for the assessment of surface air pollution, including the influence of aviation impacts and of emissions from other parts of the world on Europe.

In IAGOS, new instrument packages will be developed which include state of the art developments based on the former MOZAIC instrumentation for O₃, H₂O, CO and NO_y/NO_x with significant reductions in size and weight. A central element is the certification of the packages for installation and deployment on Airbus longrange aircraft and for maintenance in compliance with aeronautical regulations. New instrumentation will be designed for aerosol, cloud particles and for stratospheric water vapour. Another important element is the design of real time data provision from the new instruments to meteorological services. Finally, IAGOS will establish the logistic and financial boundary conditions for the operation of the new infrastructure and will initiate the dialog between scientific partners, users and airlines interested in supporting the new infrastructure.

IAGOS is expected to make a significant step forward in the development of a globally operated in situ observation network for the climate system.

Objectives

The overall objective of IAGOS is to explore and prepare the ground for a new virtual infrastructure comprising a distributed sustainable *in situ* observation system for atmospheric composition with global coverage, especially in the UTLS, from commercial aircraft on the basis of the former EU-

funded MOZAIC project. The need for continuation and strengthening routine observations from commercial aircraft platforms has been explicitly expressed in the IGACO theme report to IGOS ⁽¹⁾.

In order to reach this goal, the design study addresses several scientific, technological and logistic elements. These include the exploration of the logistic and financial basis for the new virtual infrastructure and the design of new instrumentation, including certification studies for the new prototypes for installation on Airbus longrange aircraft.

Partners

N°	Organisation	Country
1.	Forschungszentrum Jülich, FZJ	Germany
2.	Centre National de la Recherche Scientifique, Paris, CNRS	France
3.	Météo-France, Centre National de Recherches Météorologiques Toulouse CNRM	France
4.	The University of Manchester, Manchester, UNIMAN	UK
5.	The Chancellor, Masters and Scholars of the University of Cambridge, Cambridge, UCAM	UK
6.	Deutsches Zentrum für Luft- und Raumfahrt e.V., Köln, DLR	Germany
7.	AIRBUS UK LTD, Bristol, AUK	UK
8.	British Airways plc, Harmondsworth, BA	UK
9.	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V., München, MPG	Germany

⁽¹⁾ IGOS (Integrated Global Observing Strategy) is an international partnership of agencies and organisations with the aim of developing a global observation system (see: <http://ioc.unesco.org/igospartners/index.htm>). IGACO (Integrated Global Atmospheric Chemistry Observations) is the strategy document for the atmospheric chemistry part.

IAGOS-ERI — In-service Aircraft for a Global Observing System — European Research Infrastructure

CT — 212128

<http://www.iagos.org/>

Funding instrument:	Collaborative Project (CP) and Coordination and Support Actions (CSA)
Contract starting:	01/09/2008
Duration:	48 months
Total project cost:	4.337.544 €
EC Contribution:	3.300.000 €
Coordinating organisation:	Forschungszentrum Jülich Jülich — Germany
Co-ordinator:	Andreas Volz-Thomas (a.volz-thomas@fz-juelich.de) Forschungszentrum Jülich, Germany
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

It is proposed to establish a sustainable distributed infrastructure for global observations of atmospheric composition from a large fleet of in-service aircraft. This will be achieved by installing autonomous instrument packages aboard initially 10-20 longrange aircraft of internationally operating airlines. IAGOS-ERI will provide high quality in-situ observations of greenhouse gases and reactive gases, aerosol, and cloud particles in the tropopause region, which is not adequately resolved by remote sensing from space and, on the other hand is one of the most sensitive regions for climate change. At the same time, IAGOS-ERI will provide detailed vertical profiles in the troposphere, which are of paramount importance for predicting changes in local and regional air quality and its causes. The main goals of the preparatory phase are to prepare the legal and organisational structure and funding scheme for the new RI, to obtain the necessary legal preconditions for sustainable deployment of scientific instrumentation and near-realtime data transmission on in-service aircraft, insofar not yet achieved during the design study (IAGOS-DS), the coordination with the scientific and operational user community, such as WMO, AMDAR, ECMWF, and the implementation of IAGOS-ERI into the global observing system established by WMO-GAW within GEOSS. Technical work is required for bringing CARIBIC into routine operation, the deployment of very small instrument packages on a wider fleet of aircraft, and for cooperation with WMO-AMDAR for routine water vapour measurements.

Objectives

The main objective of the Preparatory Phase (PP) for IAGOS-ERI is to develop the new distributed research infrastructure, which was initiated by a design study under FP6, to a point at which implementation and operation can start immediately.

Partners

N°	Organisation	Country
1.	Forschungszentrum Jülich	Germany
2.	Laboratoire d'Aérodynamique, Centre National de la Recherche Scientifique	France
3.	METEO-FRANCE, Centre National de Recherches Meteorologiques	France
4.	The Chancellor, Masters and Scholars of the University of Cambridge	UK
5.	University of Manchester	UK
6.	Deutsches Zentrum für Luft- und Raumfahrt	Germany
7.	Airbus UK Ltd	UK
8.	British Airways plc*	UK
9.	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V.	Germany
10.	Deutsche Lufthansa AG*	Germany
11.	enviroscope GmbH	Germany
12.	Leibniz-Institut für Troposphären-forschung	Germany
13.	World Meteorological Organization	International
14.	Natural Environment Research Council*	UK
15.	Centre National d'Etudes Spatiales*	France

* Non-funded participants

Non-signatory participants

European Centre for Medium-Range Weather Forecasting	UK
--	----

LAPBIAT — Lapland Atmosphere-Biosphere Facility

CT — 025969

<http://www.sgo.fi/lapbiat/>

Funding instrument:	Specific Support Action (SSA)
Contract starting:	01/11/2006
Duration:	48 months
Total project cost:	1.594.969 €
EC Contribution:	1.490.534 €
Coordinating organisation:	Sodankyla Geophysical Observatory Sodankyla — Finland
Co-ordinator:	Tauno Turunen (tauno.turunen@sgo.fi)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

The Lapland Atmosphere-Biosphere Facility, LAPBIAT, consists of seven installations which are spatially distributed to Finnish Lapland over 500 km range (Figure 1). Thus it offers a unique access to study the interactions between the thermosphere, mesosphere, stratosphere, troposphere, biosphere and various types of ecosystems in the vicinity or north of the Arctic Circle. This is only possible with this composition of sites, which are all fully operated 7 days a week all through the year. LAPBIAT comprises of the Finnish Meteorological Institute-Arctic Research Centre (FMI-ARC) at Sodankylä, Kevo Subarctic Research Institute, Kilpisjärvi Biological Station, Kolari Research Station, Oulanka Research Station, Värriö Subarctic Research Station and Sodankylä Geophysical Observatory (SGO), which is the organisation coordinating the infrastructure. All LAPBIAT installations have operated for 40 to 100 years and have strong support from the Finnish Universities, research institutes and local communities. LAPBIAT was selected as TARI site in FP5 under IHP Access to Research Infrastructures of the European Union and had its 29 month contract period in November 2001 — March 2004.

Objectives

LAPBIAT offers access to research facilities, monitoring sites, datasets etc. from on line satellite data to upper atmosphere, middle and lower atmosphere and to biosphere.

Partners

N°	Organisation	Country
1.	University of Oulu	Finland
2.	Finnish Meteorological Institute	Finland
3.	University of Turku	Finland
4.	University of Helsinki	Finland
5.	Finnish Forest Research Institute	Finland

STAR — Support for Tropical Atmospheric Research

CT — 506651

<http://www.knmi.nl/samenw/star>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/03/2004
Duration:	30 months
Total project cost:	448.216 €
EC Contribution:	310.000 €
Coordinating organisation:	Koninklijk Nederlands Meteorologisch Instituut De Bilt — Netherlands
Co-ordinator:	Ge Verver (ge.verver@knmi.nl)
EC Office:	Environment Directorate

Abstract

The objective of the proposed STAR project (Support for Tropical Atmospheric Research) is to strengthen the European contribution to the global observation system, and to support international cooperation in setting up these observation systems in the tropics. It is a joint effort of European, Japanese, and American research groups to establish a shared atmospheric observatory in Paramaribo, Suriname at the northern coast of South America at 5.8°N and 55.2°W. The location of the observatory is unique because of the fact that it lies very close to the Equator, at a location in the middle of the annual migration range of the Inter-Tropical Convergence Zone (ITCZ). Hence air from both hemispheres can be sampled at different times of the year. The station fills in an important gap in the global atmospheric observatory network. The proposed project will facilitate access of European and other research groups to the observatory, enhance the technical capabilities of the site, build capacity for global change research in the tropics and improve the conditions for the execution of a long-term observational program. The project will contribute to the implementation of the FP6 work program and support international networks and programs like the WMO Global Atmosphere Watch (GAW) program, GCOS, the WCRP SPARC project, and the NDSC and SHADOZ networks. The proposed STAR project involves (1) a significant upgrading of the site to be able to host additional instruments and visiting scientist, (2) development of a site coordination plan, (3) short pilot studies to assess the feasibility and requirements of operating several additional instruments at the site; (4) the development of a program to intensify the collaboration between local scientists and the other partners of the Paramaribo observatory, and (5) the retrieval and homogenisation of historical observational data from the region.

Partners

N°	Organisation	Country
1.	Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
2.	Meteorologische Dienst Suriname	Suriname
3.	Belgisch Instituut voor Ruimte Aeronomie	Belgium
4.	Ruprecht-Karls-Universität Heidelberg	Germany

- | | | |
|----|---|-----------------|
| 5. | Universität Bremen | Germany |
| 6. | Technische Universiteit Eindhoven | The Netherlands |
| 7. | Anton de Kom Universiteit van Suriname | Suriname |
| 8. | Stiftung Alfred-Wegener-Institut für Polar- und Meeresforschung | Germany |
| 9. | Hokkaido University | Japan |

V. CLIMATE CHANGE IMPACTS

Ice2sea — Estimating the future contribution of continental ice to sea-level rise

CT — 226375

<http://www.ice2sea.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/03/2009
Duration:	51 months
Total project cost:	13.632.213 €
EC Contribution:	9.994.842 €
Coordinating organisation:	British Antarctic Survey Cambridge — UK
Co-ordinator:	David G. Vaughan (dgv@bas.ac.uk)
EC Office:	Environment Directorate

Abstract

The melting of continental ice (glaciers, ice caps and ice sheets) is a substantial source of current sea-level rise, and one that is accelerating more rapidly than was predicted even a few years ago. Indeed, the most recent report from Intergovernmental Panel on Climate Change highlighted that the uncertainty in projections of future sea-level rise is dominated by uncertainty concerning continental ice, and that understanding of the key processes that will lead to loss of continental ice must be improved before reliable projections of sea-level rise can be produced. The ice2sea programme will draw together European and international partners, to reduce these uncertainties. We will undertake targeted studies of key processes in mountain glacier systems and ice caps (e.g. Svalbard), and in ice sheets in both polar regions (Greenland and Antarctica) to improve understanding of how these systems will respond to future climate change. We will improve satellite determinations of continental ice mass, and provide much-needed datasets for testing glacier-response models. Using newly developed ice-sheet/glacier models, we will generate detailed projections of the contribution of continental ice to sea-level rise over the next 200 years, and identify thresholds that commit the planet to long-term sea-level rise. We will deliver these results in forms accessible to scientists, policy-makers and the general public, which will include clear presentations of the sources of uncertainty. The ice2sea programme will directly inform the ongoing international debate on climate-change mitigation, and European debates surrounding coastal adaptation and sea-defence planning. It will leave a legacy of improved understanding of key cryospheric processes affecting development of the Earth System and the predictive tools for glacier-response modelling, and it will train a new generation of young European researchers who can use those tools for the future benefit of society.

Partners

N°	Organisation	Country
1.	British Antarctic Survey	UK
2.	Alfred-Wegener-Institut für Polar und Meeresforschung	Germany

3.	CSC — Tieteellinen Laskenta Oy	Finland
4.	Danish Meteorological Institute	Denmark
5.	DTU-Space, Danmarks Tekniske Universitet	Denmark
6.	Geological Survey of Denmark and Greenland	Denmark
7.	Institute of Earth Sciences, University of Iceland	Iceland
8.	Universiteit Utrecht	The Netherlands
9.	Centre National de la Recherche Scientifique	France
10.	UK Met Office — Hadley Centre	UK
11.	University of Oslo	Norway
12.	Université Libre de Bruxelles	Belgium
13.	Universita' degli Studi di Urbino	Italy
14.	University of Bristol	UK
15.	The University of Edinburgh	UK
16.	Vrije Universiteit Brussel	Belgium
17.	University of Copenhagen, Niels Bohr Institute	Denmark
18.	University of Liège (Department of Geography)	Belgium
19.	Department of Geography, University of Zurich	Switzerland
20.	University of Silesia	Poland
21.	Centro de Estudios Científicos	Chile
22.	Ente per le Nuove tecnologie, l'Energia e l'Ambiente	Italy
23.	Norwegian Polar Institute	Norway
24.	Instytut Geofizyki Polskiej Akademii Nauk	Poland

EPOCA — European Project on Ocean Acidification

CT — 211384

<http://www.epoca-project.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/05/2008
Duration:	48 months
Total project cost:	9.752.209 €
EC Contribution:	6.548.995 €
Coordinating organisation:	Centre National de la Recherche Scientifique France France
Co-ordinator:	Jean-Pierre Gattuso (gattuso@obs-vlfr.fr)
EC Office:	Environment Directorate

Abstract

The overall goal of the European Project on Ocean Acidification (EPOCA) is to fill the numerous gaps in our understanding of the effects and implications of ocean acidification. EPOCA aims to document the changes in ocean chemistry and biogeography across space and time. Paleo-reconstruction methods will be used on several archives, including foraminifera and deep-sea corals, to determine past variability in ocean chemistry and to tie these to present-day chemical and biological observations. EPOCA will determine the sensitivity of marine organisms, communities and ecosystems to ocean acidification. Molecular to biochemical, physiological and ecological approaches will be combined with laboratory and field-based perturbation experiments to quantify biological responses to ocean acidification, assess the potential for adaptation, and determine the consequences for biogeochemical cycling. Laboratory experiments will focus on key organisms selected on the basis of their ecological, biogeochemical or socio-economic importance. Field studies will be carried out in systems deemed most sensitive to ocean acidification. Results on the chemical, biological and biogeochemical impacts of ocean acidification will be integrated in biogeochemical, sediment and coupled ocean-climate models to better understand and predict the responses of the Earth system to ocean acidification. Special special attention will be paid to the potential feedbacks of the physiological changes in the carbon, nitrogen, odelli and iron cycles. EPOCA will assess uncertainties, risks and thresholds (“tipping points”) related to ocean acidification at scales ranging from sub-cellular, to ecosystem and from local to global. It will also assess pathways of CO₂ emissions required to avoid these thresholds and describe the state change and the subsequent risk to the marine environment and Earth system should these emissions be exceeded.

Objectives

The overall goal of the European Project on Ocean Acidification (EPOCA) is to fill numerous gaps in the understanding of the consequences of ocean acidification. EPOCA aims to document the changes in ocean chemistry and geographical distribution of marine organisms across space and time. Paleo-reconstruction methods will be used on several archives, including foraminifera and deep-sea corals, to determine the past variability in ocean chemistry (carbonate, nutrients

and trace metals) and to tie these to present-day chemical and biological observations. EPOCA will devote much effort to quantifying the impact of ocean acidification on marine organisms and ecosystems. Key climate-relevant biogeochemical processes such as calcification, primary production and nitrogen fixation will be investigated using a large array of techniques, ranging from molecular tools to physiological and ecological approaches. Perturbation experiments will be carried out both in the laboratory and in the field. Key organisms will be selected on the basis of their ecological, biogeochemical or socio-economic importance. The modelling component of EPOCA will integrate the chemical, biological and biogeochemical impacts of ocean acidification into biogeochemical, sediment and coupled ocean-climate models. Special attention will be paid to feedbacks of physiological changes on the carbon, nitrogen, modelli and iron cycles and in turn how these changes will affect and be affected by future climate change. EPOCA will assess uncertainties, risks and thresholds (“tipping points”) related to ocean acidification at molecular, cellular, organismal, local and global scales. It will also assess pathways of CO₂ emissions required to avoid the identified thresholds and describe the state change if these emissions are exceeded and the subsequent risk to the marine environment and Earth system.

EPOCA will directly address all research items of the call item ENV.2007.1.1.3.1. It will:

- Improve the understanding of the past and present spatio-temporal changes of ocean acidification due to increasing CO₂ uptake.
- Determine the impacts of ocean acidification on marine biota, their physiology, ecosystems, the potential for acclimation and adaptation, impacts on elemental cycling and production of climate-relevant gases.
- Improve understanding of future changes in ocean chemistry and biogeochemical feedbacks in terms of hotspots, uncertainties, and thresholds. It will also improve the description of the carbon cycle in coupled ocean-climate models. The key element cycles investigated are carbon, nitrogen, odelli and iron.
- Synthesize information on tipping points. This ambitious mission relies on combining the strong EPOCA consortium of 27 partners that includes 107 leading European scientists, and their field and laboratory resources. EPOCA will coordinate with major national and international projects and programmes.

Partners

N°	Organisation	Country
1.	Laboratoire d’Océanographie de Villefranche, LOV	France
2.	Centre Européen de Recherche et d’Enseignement des Géosciences de l’Environnement CEREGE	France
3.	Station Biologique de Roscoff, SBR	France
4.	Universitetet i Bergen, UiB	Norway
5.	Leibniz-Institut für Meereswissenschaften, IFMGEOMAR	Germany
6.	Natural Environment Research Council, NERC	UK
7.	Alfred-Wegener-Institut für Polar- und Meeresfosrchung AWI	Germany
8.	The Chancellor, Masters and Scholars of the University of Cambridge of the Old Schools UCAM	UK
9.	Commissariat à l’Energie Atomique, CEA	France

10.	Plymouth Marine Laboratory, PML	UK
11.	Scottish Association for Marine Science, SAMS	UK
12.	Max-Planck-Gesellschaft zur Förderung der Wissenschaften E.V, MPG	Germany
13.	The Marine Biological Association of the United Kingdom, MBA	UK
14.	Göteborgs Universitet, UGOT	Sweden
15.	Stichting Koninklijk Nederlands Instituut voor Zeeonderzoek, NIOZ	The Netherlands
16.	Universiteit Utrecht, UU	The Netherlands
17.	The Netherlands Institute of Ecology, KNAW	The Netherlands
18.	Sir Alister Hardy Foundation for Ocean Science, SAHFOS	UK
19.	GKSS-Forschungszentrum Geesthacht GmbH, GKSS	Germany
20.	Universität Bern, Bern	Switzerland
21.	Université Libre de Bruxelles, ULB	Belgium
22.	Philippe Saugier International Educational Projects, PSIEP	France
23.	Vereniging voor Christelijk Hoger Onderwijs Wetenschappelijk Onderzoek en Patientenzorg, VUA	The Netherlands
24.	Eidgenoessische Technische Hochschule Zuerich, ETH, ZURICH	Switzerland
25.	Hafrannsóknastofnunin — Marine Research Institute, HAFROMRI	Iceland
26.	University of Southampton, SOTONSOES	UK
27.	University of Plymouth Higher Education Corporation, UoP	UK
28.	Intergovernmental Oceanographic Commission of UNESCO, IOCUNESCO	France
29.	University of Bristol, UNIVBRIS	UK
30.	Centre National de la Recherche Scientifique, CNRS	France

ACQWA — Assessment of Climatic change and impacts on the Quantity and quality of Water

CT — 212250

<http://www.acqwa.ch/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/10/2008
Duration:	60 months
Total project cost:	8.563.566 €
EC Contribution:	6.493.573 €
Coordinating organisation:	University of Geneva Geneva — Switzerland
Co-ordinator:	Martin Beniston (martin.beniston@unige.ch)
EC Office:	Environment Directorate

Abstract

As the evidence for human induced climate change becomes clearer, so too does the realization that its effects will have impacts on natural environment and socio-economic systems. Some regions are more vulnerable than others, both to physical changes and to the consequences for ways of life. The proposal will assess the impacts of a changing climate on the quantity and quality of water in mountain regions. Modeling techniques will be used to project the influence of climatic change on the major determinants of river discharge at various time and space scales. Regional climate models will provide the essential information on shifting precipitation and temperature patterns, and snow, ice, and biosphere models will feed into hydrological models in order to assess the changes in seasonality, amount, and incidence of extreme events in various catchment areas. Environmental and socio-economic responses to changes in hydrological regimes will be analyzed in terms of hazards, aquatic ecosystems, hydropower, tourism, agriculture, and the health implications of changing water quality. Attention will also be devoted to the interactions between land use/land cover changes, and changing or conflicting water resource demands. Adaptation and policy options will be elaborated on the basis of the model results. Specific environmental conditions of mountain regions will be particularly affected by rapidly rising temperatures, prolonged droughts and extreme precipitation. The methodological developments gained from a European mountain focus will be used to address water issues in regions whose economic conditions and political structures may compromise capacities to respond and adapt, such as the Andes and Central Asia where complex problems resulting from asymmetric power relations and less robust institutions arise. Methodologies developed to study European mountains and their institutional frameworks will identify vulnerabilities and be used to evaluate a range of policy options.

Partners

N°	Organisation	Country
1.	Compagnia Valdostana Acque Spa	Italy
2.	Agenzia Regionale per la Protezione dell Ambiente	Italy

3.	Monterosastar SRL	Italy
4.	Ente Parco Nazionale Gran Paradiso	Italy
5.	Centre National de la Recherche Scientifique (CNRS)	France
6.	Universität für Bodenkultur Wien	Austria
7.	Consiglio Nazionale delle Ricerche	Italy
8.	Meteo-France	France
9.	Universita degli Studi di l'Aquila	Italy
10.	Universität Bern	Switzerland
11.	Universidad de la Serena	Chile
12.	ENEL produzione. s.p.a.	Italy
13.	Institute of water problems and hydropower of the kyrgyz	Kyrgyzstan
14.	Agenzia Regionale per la Protezione Ambientale del Piemonte	Italy
15.	Fondazione Montagna Sicura	Italy
16.	Centro de Estudios Cientificos	Chile
17.	Instituto Torcuato di Tella	Argentina
18.	Forschungsanstalt Agroscope Reckenholz-Taenikon	Switzerland
19.	Cesi Ricerca Spa	Italy
20.	Institut de Hautes Etudes Internationales et du Développement	Switzerland
21.	The University of Birmingham	UK
22.	Commissariat à l'Energie Atomique (CEA)	France
23.	Consejo Superior de Investigaciones Cientificas	Spain
24.	Eidgenössische Technische Hochschule Zürich	Switzerland
25.	Max Planck Gesellschaft zur Förderung der Wissenschaften e.v.	Germany
26.	Universität Graz	Austria
27.	The Abdus Salam International Centre for theoretical physics	Italy
28.	University of Dundee	UK
29.	Politecnico di Milano	Italy

EURO-LIMPACS — Integrated Project to Evaluate the Impacts of Global Change on European Freshwater Ecosystems

CT — 505540

<http://www.eurolimpacs.ucl.ac.uk/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/02/2004
Duration:	60 months
Total project cost:	19.154.659 €
EC Contribution:	12.647.141 €
Coordinating organisation:	University College London Environmental Change Research Centre, Department of Geography London — UK
Co-ordinator:	Simon Patrick (s.patrick@geog.ucl.ac.uk)
EC Office:	Environment Directorate

Abstract

Freshwater ecosystems, under stress from land-use change and pollution, face additional pressures from climate change, directly and through interaction with other drivers of change. Euro-limpacs is concerned with the science required to understand and manage the ecological consequences of these interactions. It is relevant to the Water Framework Directive and other international directives and protocols and supports the EU's Charter on Sustainable Development. The Project comprises a consortium of leading scientists to integrate river, lake and wetland ecosystem science at the catchments scale. It focuses on the key drivers of aquatic ecosystem change (land-use, nutrients, acid deposition and toxic substances) and examines their interactions with global, especially climate, change using time-series analysis, space-for-time substitution, palaeolimnology, experiments and process modelling.

It considers these interactions at 3 critical time-scales:

1. hours/days, concerned with changes in the magnitude and frequency of extreme events;
2. seasons, concerned with changes in ecosystem function and life-cycle strategies of freshwater biota;
3. years/decades, concerned with ecological response to environmental pressure, including stress reduction and ecosystem recovery.

An innovative toolkit for integrated catchments analysis and modelling will be developed to simulate hydrological, hydro chemical and ecological processes at the catchments scale for use in assessing the potential impact of global change under different climate and socio-economic scenarios. A unified system of ecological indicators for monitoring freshwater ecosystem health, and new methods for defining reference conditions and restoration strategies will be developed.

These will take into account the probable impacts of future climate change and the need for a holistic approach to restoration based on habitat connectivity.

Partners

N°	Organisation	Country
1.	University College London	UK
2.	National Environmental Research Institute	Denmark
3.	Royal Holloway and Bedford Mew College	UK
4.	Universität Duisburg-Essen	Germany
5.	University of Reading	UK
6.	Alterra b.v	The Netherlands
7.	Natural Environment Research Council	UK
8.	Consejo Superior de Investigaciones Científicas	Spain
9.	IVL Swedish Environmental Research Institute	Sweden
10.	Norwegian Institute for Water Research	Norway
11.	Sveriges Lantbruksuniversitet	Sweden
12.	Finnish Environment Institute	Finland
13.	Leopold Franzens Universität Innsbruck	Austria
14.	University of Liverpool	UK
15.	Universität für Bodenkultur	Austria
16.	Consiglio Nazionale delle Ricerche	Italy
17.	Centre National de la Recherche Scientifique	France
18.	Eidgenössische Anstalt für Wasserversorgung Abwässereinigung und Gewässerschutz	Switzerland
19.	Goulandris Natural History Museum	Greece
20.	Entera Ingenieurgesellschaft für Planung und Informationstechnologie	Germany
21.	Hydrobiologický Ústav Akademie Věd České republiky	Czech Republic
22.	Univerzita Karlova v Praze	Czech Republic
23.	Hydromod Dr K. Duwe, K. Pfeiffer, J. Prost, G. Dunkel, Dr H. Baumert	Germany
24.	Vrije Universiteit Amsterdam	The Netherlands
25.	Katholieke Universiteit Leuven	Belgium
26.	Masarykova Univerzita v Brně	Czech Republic
27.	Universitat de Barcelona	Spain
28.	Umweltforschungszentrum GMBH	Germany
29.	Universidad de Granada	Spain
30.	University of Iceland	Iceland
31.	University of Bucharest	Romania
32.	Université de Rennes I	France
33.	Universiteit Utrecht	The Netherlands

Water Problems Institute of the Russian Academy of Sciences
Trent University
Ceska Geologicka Sluzba
Macaulay Institute
Biologicke Centrum Akademie vid Ceske Republiky

Russian Feder.
Canada
Czech Republic
UK
Czech Republic

GENESIS — Groundwater and Dependent Ecosystems: New Scientific Basis on Climate Change and Land-Use Impacts for the Update of the EU Groundwater Directive

CT — 226536

www.thegenesisproject.eu

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/04/2009
Duration:	60 months
Total project cost:	9.170.633 €
EC Contribution:	6.997.200 €
Coordinating organisation:	Norwegian Institute for Agricultural and Environmental Research (Bioforsk) Ås — Norway
Co-ordinator:	Bjørn Kløve (bjorn.klove@oulu.fi)
EC Office:	Environment Directorate

Abstract

Groundwater resources are facing increasing pressure from consumptive uses (irrigation, water supply, industry) and contamination by diffuse loading (e.g. agriculture) and point sources (e.g. industry). This cause major threat and risks to our most valuable water resource and on ecosystems dependent on groundwater. New information is need on how to better protect groundwaters and groundwater dependent ecosystems (GDE) from intensive land-use and climate change. The impacts of landuse changes and climate changes are difficult to separate as they partly result in similar changes in the ecosystems affected. The effects are highly interwoven and complex. The EU groundwater directive (GWD) and the water framework directive (WFD) provide means to protect groundwater (GW) aquifers from pollution and deterioration. At present, the maximum limits for groundwater pollutant concentrations have been set for nitrate and various pesticides. Also, water of sufficient quality and quantity should be provided to ecosystems dependent on groundwater. The European aquifers differ by their geology, climate, and threats to aquifers. This must be considered when general guidelines for management of these systems are developed. The concept of the present

proposal is to base the research on different relevant aquifer sites in various European countries to test scientific issues and find new results to important problems. Seven WP are foreseen: WP1 Case studies on impacts and threats to GWs and GDEs; WP2 Groundwater dynamics, re-charge and water balance; WP3 Leaching to groundwater aquifers from different land-uses; WP4 Groundwater dependent ecosystems: groundwater-surface water interaction; WP5 Modelling processes in groundwater systems; WP6 Concepts, scenarios and risk assessment; WP7 Co-ordination.

Partners

N°	Organisation	Country
1.	Bioforsk-Norwegian Institute for Agricultural and Environmental Research	Norway

2.	University of Oulu	Finland
3.	Joanneum Research Forschungsgesellschaft mbH	Austria
4.	Swiss Federal Institute of Technology Zurich (ETH)	Switzerland
5.	Luleå University of Technology	Sweden
6.	Universitatea din Bucuresti	Romania
7.	GIS-GEOINDUSTRY, s.r.o.	Czech Republic
8.	Institut National de la Recherche Agronomique	France
9.	Alterra b.v.	The Netherlands
10.	Helmholtz Zentrum München	Germany
11.	German Research Center for Environmental Health (GmbH)	Germany
12.	Eidgenössische Anstalt für Wasserversorgung Abwasserreinigung und Gewässerschutz AGH	Switzerland
13.	University of Science and Technology	Poland
14.	Università Cattolica del Sacro Cuore	Italy
15.	University of Kent	UK
16.	IGEM Danismanlik Organizasyon Arastirma Ltd Sti	Turkey
17.	Universidad Politécnica de Valencia	Spain
18.	Democritus University of Thrace, Department of Environmental Engineering	Greece
19.	Cracow University of Technology	Poland
20.	University of Neuchâtel	Switzerland
21.	University of Ferrara	Italy
22.	Athens University of Economics and Business- Research Center	Greece
23.	University of Dundee	UK
24.	University of Zagreb — Faculty of Mining, Geology and Petroleum Engineering	Croatia
25.	Helmholtz-Zentrum für Umweltforschung GmbH — UFZ	Germany
26.	Sveriges Meteorologiska och Hydrologiska Institut	Sweden

HERMIONE — Hotspot Ecosystem Research and Man's Impact on European seas

CT- 226354

<http://www.eu-hermione.net/>

Funding instrument:	Collaborative Project
Contract starting date:	01/04/2009
Duration:	36 months
Total project cost:	10.947.728 €
EC Contribution:	7.998.955 €
Coordinating organisation:	Natural Environment Research Council Swindon — UK
Co-ordinator:	Philip P. Weaver (p.weaver@noc.soton.ac.uk)
EC Office:	Environment Directorate

Abstract

The HERMIONE project is designed to make a major advance in our knowledge of the functioning of deep-sea ecosystems and their contribution to the production of goods and services. This will be achieved through a highly interdisciplinary approach (including biologists, ecologists, microbiologists, biogeochemists, sedimentologists, physical oceanographers, modelers and socio-economists) that will integrate biodiversity, specific adaptations and biological capacity in the context of a wide range of highly vulnerable deep-sea habitats. Gaining this understanding is crucial, because these ecosystems are now being affected by climate change and impacted by man through fishing, resource extraction, seabed installations and pollution. To design and implement effective governance strategies and management plans we must understand the extent, natural dynamics and interconnection of ocean ecosystems and integrate socio-economic research with natural science. The study sites include the Arctic, North Atlantic and Mediterranean and cover a range of ecosystems including cold-water corals, canyons, cold and hot seeps, seamounts and open slopes and deep-basins. The project will make strong connections between deep-sea science and user needs. HERMIONE will enhance the education and public perception of the deep-ocean issues also through some of the major EU aquaria. These actions, together with GEOSS databases that will be made available, will create a platform for discussion between a range of stakeholders, and contribute to EU environmental policies.

Partners

N°	Organisation	Country
1.	Natural Environment Research Council (NERC-NOCS)	UK
2.	Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER)	France
3.	Stichting Koninklijke Nederlands Instituut voor Zeeonderzoek (NIOZ)	The Netherlands
4.	Universitat de Barcelona	Spain
5.	Hellenic Centre for Marine Research (HCMR)	Greece

6.	Leibniz-Institut für Meereswissenschaften an der Universität Kiel (IFM-GEOMAR)	Germany
7.	Consiglio Nazionale delle Ricerche (CNR-ISMAR)	Italy
8.	Alfred-Wegener-Institute für Polar-und-Meeresforschung (AWI)	Germany
9.	Universitet i Tromsø	Norway
10.	National University of Ireland, Galway (NUIG)	Ireland
11.	Friedrich-Alexander Universität Nuremberg-Erlangen (UERL)	Germany
12.	Universiteit Gent	Belgium
13.	Consejo Superior de Investigaciones Scientificas (CSIC)	Spain
14.	Consorzio Nazionale Interuniversitario per le Scienze del Mare (CoNISMa-ULR Ancona)	Italy
15.	Max Planck Gesellschaft zur Foederung der Wissenschaften (E.V. MPG)	Germany
16.	Centre National de la Recherche Scientifique (CNRS)	France
17.	Instituto Hidrografico (IH)	Portugal
18.	Jacobs University Bremen	Germany
19.	University of Bremen (MARUM)	Germany
20.	Cardiff University	UK
21.	Havforskningsinstituttet (Institute of Marine Research) IMR	Norway
22.	Goteborgs Universitet	Sweden
23.	University of Southampton (SOTON-SOES)	UK
24.	Koninklijke Nederlandse Akademie van Wetenschappen (KNAW-NIOO CEME)	The Netherlands
25.	University of Aberdeen	UK
26.	University of Liverpool	UK
27.	Scottish Association for Marine Science (SAMS)	UK
28.	Universidade de Aveiro	Portugal
29.	Université de Pierre et Marie Curie Paris 6 (UPMC)	France
30.	P.P. Shirshov Institute of Oceanology of Russian Academy of Sciences (IORAS)	Russia
31.	United Nations Environment Programme — WCMC (UNEP-WCMC)	UK
32.	Universidade dos Açores	Portugal
33.	MEDIAN SCP	Spain
34.	ArchimediX, Mockl & Munzel Gesellschaft bürgerlichen Rechts	Germany
35.	Panepistimio Thessalias	Greece
36.	University College Cork	Ireland
37.	National Marine Aquarium	UK
38.	Aquario di Genova	Italy

INCREASE — An integrated network on climate change research activities on shrubland ecosystems

CT — 227628

(¹)

Funding instrument:	Collaborative Project (CP) and Coordination and Support Actions (CSA)
Contract starting:	01/03/2009
Duration:	48 months
Total project cost:	7.780.186 €
EC Contribution:	5.999.764 €
Coordinating organisation:	Københavns Universitet Noerregade — Denmark
Co-ordinator:	Ivan Kristoffersen (ivk@adm.ku.dk)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

The network INCREASE consists of 6 infrastructures (large-scale field sites) with experimental manipulation of climate e.g. night time warming and extended summer drought. Within INCREASE we will improve the technology and methodology for studies of climate change effects on European shrublands.

The main objectives of INCREASE are:

- To optimize technologies and methodologies for non-intrusive field manipulation of climate change in shrubland ecosystems by development, testing and application of new technology and methods i) to optimize the field manipulations of warming to 3-4 °C (in agreement with the newest predictions of global warming by the IPCC (2007)), ii) to develop, test and apply the combination of warming and drought and the combination with CO₂.
- To improve and develop non-destructive techniques and methods for measurements of physical, chemical and biological effects of climate.
- To stimulate collaboration within the scientific community around climate manipulation experiments i) within the infrastructure by means of e.g. common research, common protocols, test of equipment, data syntheses, ii) between the infrastructure and related infrastructures beyond the proposal, and iii) scientists within relevant fields
- To provide access to a unique set of large scale climate change experiment for European scientists.
- To develop and provide access to a comprehensive data base of experimental data.
- To develop and provide access to a dynamic ecosystem model for shrubland ecosystems

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

- To test and apply non-destructive methods for ecosystem carbon assessment and important underlying processes of root dynamics and carbon transformations in the soil.

Partners

N°	Organisation	Country
1.	MTA Okologiai es Botanikai Kutatointezet	Hungary
2.	Universita degli Studi di Sassari	Italy
3.	Consiglio Nazionale delle Ricerche	Italy
4.	Universita degli Studi della Tuscia	Italy
5.	Universiteit van Amsterdam	The Netherlands
6.	Danmarks Tekniske Universiteit	Denmark
7.	Natural Environment Research Council	UK

ESCAPE — European Study of Cohorts for Air Pollution Effects

CT — 211250

<http://escapeproject.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/06/2008
Duration:	48 months
Total project cost:	8.009.931 €
EC Contribution:	5.858.973 €
Coordinating organisation:	Utrecht Universiteit Utrecht — The Netherlands
Co-ordinator:	Monique van der Hoek (M.vanderHoek@uu.nl)
EC Office:	Environment Directorate

Abstract

European policy making is hampered by considerable uncertainty about the magnitude and nature of the impacts of long term exposure to air pollution on human health. ESCAPE is a collaboration of more than 30 European cohort studies including some 900,000 subjects. It is aimed at quantifying health impacts of air pollution and at reducing uncertainty. ESCAPE will also test new hypotheses on specific health effects of air pollution. ESCAPE will focus on effects of within-city, within-area and within-country contrasts in air pollution, and so will enable Europe to remain at the cutting edge worldwide for further development and application of methods which have been largely pioneered here. ESCAPE will make measurements of airborne particulate matter and nitrogen oxides in selected regions in Europe. It will measure the chemical composition of the collected particles and it will store samples for future chemical and toxicological analyses. Escape will focus on four categories of cohort studies:

1. Pregnancy outcome and birth cohort studies.
2. Studies on respiratory disease in adults.
3. Studies on cardiovascular disease in adults.
4. Studies on cancer incidence and mortality.

ESCAPE responds to a specific FP7 call for a large collaborative project in the Environment and Health program. The call asks for research within existing cohorts among children as well as elderly adults as sensitive groups, and it asks to consider the role of other environmental exposures such as noise, and of biomarkers and gene-environment interactions. Whereas ESCAPE will focus, as requested, on air pollution and to a lesser extent traffic noise exposures, studies have been included which contain a wealth of data on other exposures (e.g., drinking water contaminants), on biomarkers and on genetics. ESCAPE will actively engage stakeholder organisations and policy makers so that results can be swiftly translated to support policy development and implementation.

Partners

N°	Organisation	Country
1.	Umea Universitet	Sweden
2.	Institut de Veille Sanitaire	France
3.	Vytauto Didziojo Universitetas	Lithuania
4.	Universität Duisburg-Essen	Germany
5.	Azienda Sanitaria Locale Roma	Italy
6.	Institut für Umweltmedizinische Forschung an der Heinrich-Heine-Universität Düsseldorf GmbH	Germany
7.	Országos Környezetegészségügyi Intézet	Hungary
8.	National Taiwan University	Taiwan
9.	National And Kapodistrian University of Athens	Greece
10.	Nasjonalt Folkehelseinstitutt	Norway
11.	Medical Research Council	UK
12.	Fundación Centre de Recerca en Epidemiologia Ambiental — CREAL	Spain
13.	Helmholtz Zentrum München Deutsches Forschungszentrum für Gesundheit und Umwelt GmbH	Germany
14.	Karolinska Institutet	Sweden
15.	Kraeftens Bekaempelse	Denmark
16.	Institute of Occupational Medicine	UK
17.	Universität Ulm	Germany
18.	Universität Basel	Switzerland
19.	Kansanterveyslaitos	Finland
20.	The University of Manchester	UK
21.	Rijksinstituut voor Volksgezondheid en Milieu	The Netherlands
22.	Imperial College of Science, Technology And Medicine	UK
23.	University of Crete	Greece
24.	Institut National de la Santé et de la Recherche Médicale (INSERM)	France

MACROCLIMATE — Quantitative Dynamic Macroeconomic Analysis of Global Climate Change and Inequality

CT — 230574

http://www.euprojekt.su.se/index.php/kb_1957/io_1956/io.html

Funding instrument: Support for Frontier Research (ERC)
 Contract starting date:²01/01/2009
 Duration:²60 months
 Total project cost: 2.100.000 €
 EC Contribution: 2.100.000 €
 Coordinating organisation:²Stockholms Universitet
 Stockholm -Sweden
 Co-ordinator: Christina Loennblad (christina.loennblad@iies.su.se)
 EC Office: Implementation of the "Ideas" Programme Directorate

Abstract

The proposal is to form a Research Centre for Quantitative Macroeconomic Research (RCQMR) at the Institute for International Economic Studies at Stockholm University. The aim of the RCQMR is to conduct research within the general area of macroeconomics and inequality. However, most of the focus during the build up period will be on a broad project on the world economy and climate change. The aim is to build a dynamic quantitative macroeconomic model of the world economy with a climate system as an integral part. The novelty, relative to existing economy-climate models, is the modelling methodology: it will use modern macroeconomic analysis---in particular the numerical tools developed to study economies with a cross-section of consumers/agents---in order to substantially enrich and generalize the description of the world economy.

Partners

N°	Organisation	Country
1.	Stockholms Universitet	Sweden

QUANTIFY — Quantifying the Climate Impact of Global and European Transport Systems

CT — 003893

<http://www.pa.op.dlr.de/quantify/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/03/2005
Duration:	60 months
Total project cost:	12.769.345 €
EC Contribution:	8.388.172 €
Coordinating organisation:	Deutsches Zentrum für Luft- und Raumfahrt e.v. Köln — Germany
Co-ordinator:	Robert Sausen (robert.sausen@dlr.de)
EC Office:	Environment Directorate

Abstract

The main goal of QUANTIFY is to quantify the climate impact of global and European transport systems for the present situation and for several scenarios of future development. The climate impact of various transport modes (land surface, shipping, aviation) will be assessed, including those of long-lived greenhouse gases like CO₂ and N₂O, and in particular the effects of emissions of ozone precursors and particles, as well as of contrails and ship tracks. The project goal includes provision of forecasts and other policy-relevant advice, which will be supplied to governments and to international assessments of climate change and ozone depletion, such as the IPCC reports (Kyoto Protocol) and WMO-UNEP ozone assessments (Montreal Protocol). Using significantly improved transport emission inventories, better evaluated and hence more reliable models, these new forecasts in QUANTIFY will represent a considerable improvement of current predictions. Long time scales are involved in the transport system and its effects on climate: Some transportation modes have long development and in-service times; some emissions have long residence times and thermal inertia of the climate system protracts possible effects. Yet the impact of short-lived species depends on location and time of the emissions. So several transport scenarios and potential mitigation options need to be assessed on a sound common basis to identify the most effective combination of short and long-term measures and to inform policymakers and industry. We aim to provide such guidance by focused field measurements, exploitation of existing data, a range of numerical models, and new policy-relevant metrics of climate change. To achieve the goal, several advances in our fundamental understanding of atmospheric processes will be required such as the mechanisms by which pollutants are transported from exhaust into the free atmosphere, the impact of pollutants on clouds and the role of absorbing aerosols.

Objectives

Long time scales are involved in the transport system and its effects on climate: some transportation modes have long development and in-service times; some emissions have long residence times and the thermal inertia of the climate system protracts possible effects. Thus, it is clear that potential mitigation procedures need to be assessed soon to provide policymakers and

industry with adequate guidance for decisions. It is our aim to provide such guidance through the QUANTIFY Integrated Project, based on new focused field measurements, further exploitation of existing observations, and a range of chemical, radiative and coupled climate models. The central project goal of QUANTIFY is to quantify the climate impact of the global and European transport systems for the present situation and for different scenarios of future development.

Our project goal requires the production of projections and other policy relevant advice, which will be supplied to governments and to international assessments of climate change and ozone depletion prepared in support of policy such as the IPCC reports (Kyoto protocol) and the WMO-UNEP ozone assessments (Montreal Protocol). The forecasts will be built on models, which will be refined and improved in this project by exploitation of existing data for model testing and validation and by the provision of new data on fundamental processes. Using significantly improved transport emission inventories and more reliable models, our new forecasts will represent a considerable improvement on current predictions. The central project goal of QUANTIFY will be achieved through the following main objectives:

- To establish consistent inventories of (direct) emissions (greenhouse gases, particles, precursors of greenhouse gases and aerosols) from present day and past transport, separately for the different modes of transport.
- To generate transport (direct) emission inventories for scenarios of future development, which are consistent with the IPCC SRES scenarios.
- To determine the fate of emissions from shipping during dilution to regions of the size of global scale models, i.e., to scales in the range from 100 to 500 km.
- To develop parameterisations for “effective emission indices” linking local emissions (at the exhaust) to scales appropriate for use in global models for all modes of transport (aviation, shipping, land surface transport).
- To consistently calculate the global chemical impact of the different modes of transport, for present day conditions and several future scenarios.
- To determine regional structures in transport-induced perturbations of the chemical composition of the atmosphere, e.g., North-South contrast, tropics versus extra-tropics, with emphasis on the UTLS region, where changes in the atmospheric composition have a particularly large radiative impact.
- To provide quantitative estimates of the impact of the different modes of transport on aerosols and clouds, in particular on cirrus (contrails and contrail-cirrus) and low marine clouds (ship tracks) in terms of, e.g. cloud cover and cloud optical properties.
- To test the hypothesis that anthropogenic aerosol causes the formation of additional cirrus clouds.
- To consistently determine the radiative forcing from transport-induced changes in atmospheric (and surface) parameters, including the separation of the contributions from different modes of transport, for present day transport and for several future scenarios.
- To determine the spatial and temporal patterns of transport-induced climate change and to search for specific fingerprints.
- To develop and evaluate policy relevant metrics that comprise all important impacts on climate and that take the particular characteristics of transport into account.
- To estimate the impact of potential transport related mitigation options on atmospheric composition and climate.

Partners

N°	Organisation	Country
1.	Deutsches Zentrum für Luft Und Raumfahrt E.V.	Germany
2.	Airbus France	France
3.	Commissariat à l'énergie Atomique	France
4.	Cambridge Environmental Research Consultants Ltd	UK
5.	Centre Européen de Recherche et de Formation Avancée en Calcul Scientifique	France
6.	Cicero Senter for Klimaforskning	Norway
7.	Météo-France	France
8.	Centre National de la Recherche Scientifique	France
9.	Univerzita Karlova V Praze	Czech Rep.
10.	Danmarks Meteorologiske Institut	Denmark
11.	Det Norske Veritas As	Norway
12.	Eidgenoessische Technische Hochschule	Switzerland
13.	Heavens-Above Gmbh	Germany
14.	Administratia Nationala de Meteorologie	Romania
15.	Universität Bremen	Germany
16.	Ivl Svenska Miljoeinstitutet Ab	Sweden
17.	Koninklijk Nederlands Meteorologisch Instituut	The Netherlands
18.	Koezlekedestudományi Intezet Koezhasznu Tarsasag	Hungary
19.	The Manchester Metropolitan University	UK
20.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
21.	National and Kapodistrian University of Athens	Greece
22.	National Institute of Meteorology and Hydrology of the Bulgarian Academy of Sciences	Bulgaria
23.	Office National d'études et de Recherches Aérospatiales	France
24.	Paul Scherrer Institut	Switzerland
25.	University of Szeged	Hungary
26.	Transport & Mobility Leuven	Belgium
27.	University of Cambridge	UK
28.	The Regents of the University of California States	United
29.	University of Oslo	Norway
30.	The Regents of the University of Michigan	US
31.	Universität Hamburg	Germany
32.	University of Oxford	UK
33.	The University of Reading	UK
34.	Uniwersytet Warszawski	Poland
35.	University of York	UK

QUANTIFY-TTC — Quantifying the Climate Impact of Global and European Transport System — Extension

CT — 045640

<http://www.pa.op.dlr.de/quantify>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/12/2006
Duration:	39 months
Total project cost:	619.172 €
EC Contribution:	388.172 €
Coordinating organisation:	Deutsches Zentrum für Luft- und Raumfahrt e.v. Köln — Germany
Co-ordinator:	Robert Sausen (robert.sausen@dlr.de)
EC Office:	Environment Directorate

Abstract

The main goal of the IP QUANTIFY is to quantify the climate impact of global and European transport systems for the present situation and for several scenarios of future development. The climate impacts of various transport modes (land, shipping, and aviation) are assessed in high resolution, including long-lived greenhouse gases like CO₂ and N₂O, and in particular the effects of emissions of ozone precursors and particles, as well as of contrails and ship tracks. The project goal includes provision of forecasts and other policy-relevant advice, which will be supplied to governments and to international assessments of climate change and ozone depletion, such as the IPCC reports and WMO-UNEP ozone assessments. Using significantly improved transport emission inventories, better evaluated and hence more reliable models, these new forecasts will represent a considerable improvement of current predictions.

Several transport scenarios and potential mitigation options need to be assessed to inform policymakers and industry. QUANTIFY provides such guidance by focused field measurements, exploitation of existing data, a range of numerical models, and new policy-relevant metrics of climate change. To achieve the goal, several advances in our fundamental understanding of atmospheric processes will be required such as the mechanisms by which pollutants are transported from exhaust into the free atmosphere, the impact of pollutants on clouds and the role of absorbing aerosols.

The QUANTIFY-TTC extension aims to enhance QUANTIFY by integrating partners from Russia, India, and China to provide transport emission and -scenario information from this rapidly developing region of the world, to obtain empirical data to significantly reduce uncertainties and to strengthen the flight campaign and cloud-aerosol interaction research by providing presently unavailable experimental data. Consequences and intervention options for European policy and technology can thus be identified.

Objectives

The basic concept behind the proposed QUANTIFY-TTC extension is to increase the knowledge base necessary to reach the main QUANTIFY goal in those areas where either modellers and cloud microphysicists can strongly benefit from presently unavailable experimental data, or where the present QUANTIFY emission inventory databases can be significantly augmented from the currently rapidly developing Russian and Asian region.

Partners

N°	Organisation	Country
1.	Deutsches Zentrum für Luft und Raumfahrt E.V.	Germany
2.	Central Aerological Observatory Fed.	Russian Fed.
3.	Skobeltsyn Institute of Nuclear Physics Fed. of Moscow State University	Russian Fed.
4.	State Unitary Enterprise Central Aerohydrodynamic Fed.	Russian Fed.
5.	Center for Sustainable Transportation, China Academy of Transportation Sciences	China
6.	Department of Environmental Sciences and Engineering, Tsinghua University	China
7.	Central Institute of Road Transport, Pune	India

CECILIA — Central and Eastern European Climate Change Impact and Vulnerability Assessment

CT — 037005

<http://www.cecilia-eu.org>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/06/2006
Duration:	43 months
Total project cost:	3.367.022 €
EC Contribution:	2.749.891 €
Coordinating organisation:	Charles University Prague — Czech Republic
Co-ordinator:	Tomas Halenka (tomas.halenka@mff.cuni.cz)
EC Office:	Environment Directorate

Abstract

The main objective of CECILIA is to deliver a climate change impacts and vulnerability assessment in targeted areas of Central and Eastern Europe. Emphasis is given to applications of regional climate modelling studies at a resolution of 10 km for local impact studies in key sectors of the region. The project contains studies of hydrology, water quality and water management (focusing at medium-sized river catchments and the Black Sea coast), air quality issues in urban areas (Black Triangle — a polluted region around the common borders of the Czech Republic, Poland and Germany), agriculture (crop yield, pests and diseases, carbon cycle), and forestry (management, carbon cycle). Very high resolution simulations over this region are necessary due to the presence of complex topographical and land use features. Climate change impacts on large urban and industrial areas modulated by topographical and land-use effects which can be resolved at the 10 km scale, are investigated by CECILIA. The high spatial and temporal resolution of dense national observational networks at high temporal resolution and of the CECILIA regional model experiments will uniquely feed into investigations of climate change consequences for weather extremes in the region under study. Comparison with the results based on statistical downscaling techniques will also be provided. Statistical downscaling methods for verification localization of model output for impact studies will be performed.

Objectives

After the political changes that occurred in countries of the former Eastern Block at the end of 80's, climate change started to be taken into account to some extent at the governmental level. In particular, from the scientific point of view, at the beginning of 90's the access to information and data started to become a reality. Around the mid 90's significant improvements in cooperation were promoted by the US Country Study Programme. Under this framework, many countries from the former Eastern Block obtained access to global climate-change scenarios and longer series of global climatological data. They participated to workshops on the use of this information for the assessment of climate-change impacts on agriculture, forestry, water management and health. Unfortunately, at that time there was very limited equipment to handle large amount of data and,

moreover, not sufficient know-how in this region to start real cooperation efforts in the field of climate-change modelling. However, this knowledge gap has been progressively eliminated and when the regional climate model RegCM appeared through ICTP in several countries of Central and Eastern Europe at the end of 90's, it proved the feasibility of carrying out regional climate-change studies performed by local users in this area. Eventually the adaptation of a commonly used NWP model in LACE countries, i.e. the model ALADIN from Météo-France, started in 2001 in Czech Republic and now this model, ALADIN-Climate, has taken part in the EC FP6 project ENSEMBLES. Thus, the door has been opened for real climate change impact and vulnerability assessments for central and eastern Europe based on locally provided high resolution regional climate modelling.

During the last decade regional climate models (RCMs) have been increasingly used to examine climate variations at scales that are not resolved by global models. To the extent that they produce realistic climate simulations, such models can be powerful tools in the study of regional climate impacts. Since the field of regional climate prediction is still evolving, the skill of RCMs in simulating climate variability has not been extensively evaluated. This is planned within the framework of the project ENSEMBLES for simulations of 50 to 25 km resolution driven by ERA40 reanalyses. As part of the ENSEMBLES project transient scenario runs of 100 — 150 year's length are also planned under different greenhouse gases (GHG) and aerosol forcing. In this proposal we plan a detailed analysis and use of the results of the project ENSEMBLES for focused initial impact studies in our target region. However, one of the main objectives of this proposal is also to adapt a few of the models used for ENSEMBLES (ALADIN-Climate and RegCM) for very high resolution (grid spacing of 10 km) simulations over selected sub-domains, which will provide additional information related to the complex terrain of the region. The assessment of the role of significant but previously not resolved topographical features and land-use patterns will be provided in these experiments as well as the evaluation of the sensitivity of the simulations to the choice and size of the model domain. Moreover, development of new features in the parameterization of high resolution physics in the models is expected (e.g. cloud microphysics, chemistry of urban areas etc.). This will provide a connection with the EC FP6 Project QUANTIFY, which aims at quantifying the impact of transportation on climate change. Our project will also provide insights on the validation and relative merits of statistical and dynamical downscaling, in particular as applied to provide local climate information.

Main goal

The main goal of the proposal is to integrate results from different previous and ongoing modelling activities and approaches to provide the basis for very high resolution climate change impact and vulnerability assessment in important human activity sectors and natural ecosystems. It is prohibitive to cover within the STREP all the sectors in their complexity, so that we target our analysis on some key areas of specific interest to the region. For example, the flood and drought conditions which occurred in recent summers over the region highlight the importance of the hydrologic cycle and water management in the Elbe and Danube river catchments in response to changes in the occurrence of precipitation extremes. Impacts on agriculture and forestry influencing the economy of countries in the region will be studied with emphasis on the main productions in the area. The 2003 heat wave demonstrated the importance of studies of the health impacts of extreme conditions that would also lead to considerable changes in air quality, both regionally and in major urban centres.

The proposed research will benefit greatly from previous and ongoing European projects and programmes with related objectives, e.g.:

- Modelling the Impact of Climate Extremes (MICE),
- Statistical and regional dynamical downscaling of extremes for European regions (STARDEX),
- Prediction of Regional scenarios and Uncertainties for Defining European Climate change risks and Effects (PRUDENCE),
- ENSEMBLE-based Predictions of Climate Changes and their Impacts (ENSEMBLES),
- Quantifying the Climate Impact of Global and European Transport Systems (QUANTIFY),

Aims

The overall aim of this proposal is to assess the impact of climate change at the regional to local scale for the territory of central and Eastern Europe, with emphasis on using very high climate resolution in order to capture the effects of the complex terrain of the region. From the viewpoint of climate scenario production, this goal will be achieved through a strategy of multiple and combined approaches, namely variable resolution models, RCMs and statistical downscaling methodologies. The primary tools, however, will be very high resolution RCMs run locally for targeted areas. From the impact viewpoint, the most important sectors for the economies and welfare of individual countries will be selected. These objectives will be achieved through the execution of the following specific tasks:

- To collect, assess and make available for first local impact studies the scenarios and climate simulations produced in previous relevant projects, especially PRUDENCE, STARTDEX, MICE and ENSEMBLES, where available.
- To adapt and develop very high resolution RCMs for the region (10 km grid spacing) and perform regional time-slice nested simulations driven by ERA40 data and by GCMs for selected GHG change scenarios.
- To verify the model results, compare RCM and statistical downscaling results, analyze and develop the methods for verification, particularly at local scales.
- To estimate the effect of global climate change on the occurrence of extreme events (heavy precipitation, heat waves, droughts) in the region, including the assessment of the added value of high-resolution experiments for the simulation of the relevant processes and feedbacks.
- To evaluate uncertainties in regional climate change projections by intercomparing results obtained in previous projects (PRUDENCE, ENSEMBLES) and the present ones.
- To assess (based on the high resolution downscaling results) the impacts of climate change on the hydrological cycle and water resources over selected catchments in the region; to study the effects of climate change on the Black Sea.
- To study (based on the high resolution downscaling results) the impacts of climate change on agriculture and forestry, carbon cycle and selected species.
- To study (based on the high resolution downscaling results) the impacts of climate change on health and air quality (photochemistry of air pollution, aerosols).

Partners

N°	Organisation	Country
1.	Univerzita Karlova V Praze	Czech Rep.
2.	The Abdus Salam International Centre for Theoretical Physics	Italy

3.	Météo-France	France
4.	Danmarks Meteorologiske Institut.	Denmark
5.	Aristotelio Panepistimio Thessalonikis	Greece
6.	Cesky Hydrometeorologický Ústav	Czech Rep.
7.	Ústav Fyziky Atmosféry AV ČR	Czech Rep.
8.	Eidgenössische Technische Hochschule Zürich	Switzerland
9.	Boku — Universität für Bodenkultur Wien	Austria
10.	Administrația Națională de Meteorologie	Romania
11.	National Institute of Meteorology and Hydrology of the Bulgarian Academy of Sciences	Bulgaria
12.	Institutul Național de Hidrologie și Gospodărire a Apelor	Romania
13.	Országos Meteorológiai Szolgálat	Hungary
14.	Národné lešnické centrum	Slovakia
15.	Politechnika Warszawska	Poland
16.	Eötvös Loránd Tudományegyetem	Hungary

CLAVIER — Climate Change and Variability: Impact on Central and Eastern Europe

CT — 037013

<http://www.clavier-eu.org/clavier/>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/09/2006
Duration:	36 months
Total project cost:	2.855.080 €
EC Contribution:	2.020.990 €
Coordinating organisation:	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V. Hamburg — Germany
Co-ordinator:	Daniela Jacob (jacob@dkrz.de)
EC Office:	Environment Directorate

Abstract

Observational records show that the global climate is changing and ongoing changes are also visible in Central Eastern Europe. About 64% of all catastrophic events in Europe since 1980 can directly be attributed to weather and climate extremes. Climate change projections show even an increasing likelihood of extremes. Certainly negative impacts of climate change will involve significant economic losses in several regions of Europe, while others may bring health or welfare problems somewhere else. Within CLAVIER three representative Central and Eastern European Countries (CEEC) will be studied in detail: Hungary, Romania, and Bulgaria. Researches from 6 countries and different disciplines, will identify linkages between climate change and its impact on weather patterns with consequences on air pollution, extreme events, and on water resources. Furthermore, an evaluation of the economic impact on agriculture, tourism, energy supply and the public sector will be conducted. This is of increasing importance for CEEC, which are currently facing a rapid economic development, but also for the European Union as e.g. Romania's and Bulgaria's high vulnerability from extreme events such as floods will impact not only the respective economic goals for joining the EU but also the EU solidarity fund. CLAVIER will focus on ongoing and future climate changes in Central and Eastern European Countries using measurements and existing regional scenarios to determine possible developments of the climate and to address related uncertainty. In addition, climate projections with very high detail will be carried out for CEEC to fulfill the need for a large amount of detail in time and space which is inherent in local and regional impact assessment. CLAVIER will establish a large data base, tools and methodologies, which contribute to reasonable planning for a successful development of society and economy in Central and Eastern European countries under climate change conditions.

Objectives

The nations in central and Eastern Europe (CEE) face triple challenges of the ongoing economic and political transition, continuing vulnerability to environmental hazards, and longer term impacts of global climate change. Most but not all nations of this region are members of the North Atlantic Treaty Organization (NATO) and the European Union (EU) or are on the way of accession. Domestic

development of market economies and democratic institutions is taking place in the context of complying the rules of these international bodies. At the same time, vulnerability to natural and human environmental hazards knows no boundaries in time and space. Examples include a series of extreme floods hitting the Tisza basin in the period of 1998-2001, the catastrophic dam failure such as the Baia Mare gold mine dam failure in Romania which resulted in cyanide pollution of the Lapus-Somes-Tisza-Danube Rivers (January 2000; ReliefWeb, 2000), a number of other flood events such as the Labe/Elbe and Danube Rivers (August 2002), a sequence of mostly flash flood disasters throughout Romania in 2005, plus the ongoing menace of air pollution, drought, deforestation, land slides and soil erosion. In addition to these challenges, long term global climate change may offer opportunities as well as threats to environment, resources, and national well-being amidst the on-going stresses of transition and capricious environmental forces (most of it citation from Climate change in Central and Eastern Europe: Introduction, GeoJournal 57, 2002: 113-115).

It is urgently needed to address the ongoing and future climatic changes and possible consequences in Central and Eastern European Countries. Therefore CLAVIER addresses the following three scientific goals:

- Investigation of ongoing and future climate changes and their associated uncertainties in Central and Eastern European Countries (CEEC);
- Analyses of possible impact of climate changes in CEEC on weather pattern and extremes, air pollution, human health, natural ecosystems, forestry, agriculture and infrastructure as well as water resources;
- Evaluation of the economic impacts of climate changes on CEEC economies, concentrating on four economic sectors, which are agriculture, tourism, energy supply and the public sector.

To meet the project goals CLAVIER is split into a number of scientific objectives:

Contribution to scientific goal 1

The objective is to provide reliable climate evolution scenarios of the first half period of the 21st century for impact researches of the project. The issue of climate change uncertainties is particularly addressed. This objective will be achieved through work according to the tasks 1.1 to 1.4 in WP1. The tasks include assembling and assessment of existing climate scenarios for the region, the validation and improvement of the regional climate models, the performance of regional climate change simulations and the detailed assessment of the associated uncertainties.

Contribution to scientific goals 1 and 2 (interfacing objective)

The major aim of WP2 is to establish and optimize the interfaces between regional climate models from WP1 and models or studies focusing on impacts of climate and climate change in Central and Eastern Europe (CEE) (WPs 3 and 4). This objective will strongly link the climate change modelling community with the needs for impact assessment.

Contribution to scientific goal 2

To reach the 2nd scientific goal of CLAVIER several objectives will be addressed which stretch through workpackages 3a to 3d. Here the analysis of the impact of climate change on specific areas is carried out, in close cooperation with WP1 and through the interface of WP2. The connected objectives include a complete analysis of weather regimes for the region of Central and Eastern Europe for the present-day climate, an investigation of future changes of weather regimes and their implication to air pollution levels, the assessment of the impact of climate change on

extreme events, the dependence of simulated extreme events on model biases and horizontal resolution, as well as the assessment of the potential impacts of climate change on forestry and water management, soil and agriculture on specific hydrological basins which could be affected by extreme events. WP3c is aiming at the production of future hydrological and agricultural scenarios based on the output of regional climate models. The analysis of the simulation results received by hydrological models serves as direct or indirect input for water management Decision Support Systems. Finally the primary aim of WP3d is to develop and apply a methodology, which provides scientifically credible information for the decision makers about the various impacts of climate change on regional and local levels.

Contribution to scientific goal 3

Finally the knowledge gained through the achievement of the scientific goals 1 and 2 and within all workpackages builds the basis for the work in WP4. The objective of WP4 is to evaluate economic impacts of Climate Change on CEEC economies, as studied in WP 1-3, while concentrating on four economic sectors of main concern. A quick study of vulnerabilities of the study regions (in a socio-economic vulnerability approach), that exist prior to and independently of hazards related to Climate Change and that put socio-economic structures at center stage are an important prerequisite and starting point of such analyses.

Partners

N°	Organisation	Country
1.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
2.	Országos Meteorológiai Szolgálat	Hungary
3.	Karl-Franzens-Universität Graz.	Austria
4.	Centre National de la Recherche Scientifique	France
5.	Joanneum Research Forschungsgesellschaft Gmbh.	Austria
6.	Vituki	Hungary
7.	Budapesti Muszaki Es Gazdasagtudományi Egyetem	Hungary
8.	Env-In-Cent Környezetvédelmi Tanácsadó Kft	Hungary
9.	National Institute of Meteorology and Hydrology of the Bulgarian Academy of Sciences	Bulgaria
10.	University of National and World Economy	Bulgaria
11.	Institutul National de Hidrologie si Gospodarie a Apelor	Romania
12.	Universitatea Babes Bolyai	Romania
13.	Institute of Geography of the Romanian Academy	Romania

CIRCE — Climate Change and Impact Research: the Mediterranean Environment

CT — 036961

<http://www.bo.ingv.it/circeip/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/04/2007
Duration:	48 months
Total project cost:	13.774.812 €
EC Contribution:	10.000.000 €
Coordinating organisation:	Istituto Nazionale di Geofisica e Vulcanologia Rome — Italy
Co-ordinator:	Antonia Navarra (navarra@bo.ingv.it)
EC Office:	Environment Directorate

Abstract

CIRCE aims at developing for the first time an assessment of the climate change impacts in the Mediterranean area. The objectives of the project are:

- To predict and to quantify physical impacts of climate change in the Mediterranean area,
 - To evaluate the consequences of climate change for the society and the economy of the populations located in the Mediterranean area,
 - To develop an integrated approach to understand combined effects of climate change,
 - To identify adaptation and mitigation strategies in collaboration with regional stakeholders
- CIRCE wants to understand and to explain how climate will change in the Mediterranean area.

The project will investigate how global and Mediterranean climates interact, how the radiative properties of the atmosphere and the radiative fluxes vary, the interaction between cloudiness and aerosol, the modifications in the water cycle. Recent observed modifications in the climate variables and detected trends will be compared.

The economic and social consequences of climate change shall be evaluated by analyzing direct impacts on migration, tourism and energy markets together with indirect impacts on the economic system. CIRCE will moreover investigate the consequences on agriculture, forests and ecosystems, human health and air quality. The variability of extreme events in the future scenario and their impacts will be assessed.

A rigorous common framework, including a set of quantitative indicators developed specifically for the Mediterranean environment will be developed and used in collaboration with regional stakeholders. The results will be incorporated in a decision support system tool and disseminated to the relevant users. Possible adaptation and mitigation strategies will be identified. The integrated results discussed by the project CIRCE will be presented in the first Regional Assessment of Climate Change in the Mediterranean area.

Objectives

The main objectives of CIRCE are to predict and to quantify the physical impacts of climate change in the Mediterranean, and to assess the most influential consequences for the population of the region. The knowledge yielded by the different specialised investigations will then be linked in an integrated inter-disciplinary approach designed to study the total effect of climate change. CIRCE will integrate cutting-edge scientific research with the needs of end-users and communities. Thus, CIRCE will be able to quantify the impact of global warming on Mediterranean climate variables, whilst also taking into account the regional social, economic and policy aspects of the process. In this way, CIRCE will make a powerful contribution to the definition and evaluation of adaptation and mitigation strategies.

Recent observed changes in climate variables will be documented. Detectable trends and variability will be identified and described, and then compared with a series of possible explanations. An optimal mix of plausible forcing factors will be derived as the best explanatory interpretation of ongoing changes. In this way, a comprehensive set of data describing the physical impacts of climate change will be developed, and then used to assess the consequences of climate change for human society and ecosystems. CIRCE will analyse a number of climate parameters including: temperature, precipitation, atmospheric humidity, wind, waves, sea-level rise, surface radiative fluxes, balance between evaporation-precipitation, saline output to the Atlantic, water vapour export, frequency and distribution of extreme events, nutrient load into the sea, and sensitivity to water stress. CIRCE will build on the extensive modelling experience already available, but it will develop specific modelling scenarios for the Mediterranean, in terms of resolution, process and feedback inclusions, understanding and specific diagnostic studies for the Mediterranean area.

The impacts of climate change will be analysed and evaluated in their oceanographic, meteorological, ecological, economic and societal dimensions. Information will be provided in terms of economically meaningful variables such as productivity changes, variation of resource stocks, shifts in technology and demand patterns. Economic consequences for agriculture will be evaluated through estimation of agricultural productivity, management and profit. Similarly, impacts on forestry and on biodiversity will be investigated. CIRCE will focus particularly on the direct economic impacts for four crucial sectors for the Mediterranean region: health, tourism, energy demand, and human migration. The project will provide the advances required to meet policy needs in these sectors. To do that CIRCE aims to build a new vision of the interactions between climate factors and socio economic evolutions trying to overcome two classical obstacles faced by a number of research projects on climate impacts.

The first obstacle is often the imbalance between physical and natural science and social sciences. In Circe this imbalance has been corrected and social sciences are a strong component of the project. CIRCE brings together the natural sciences community and social community in a new integrated and comprehensive way.

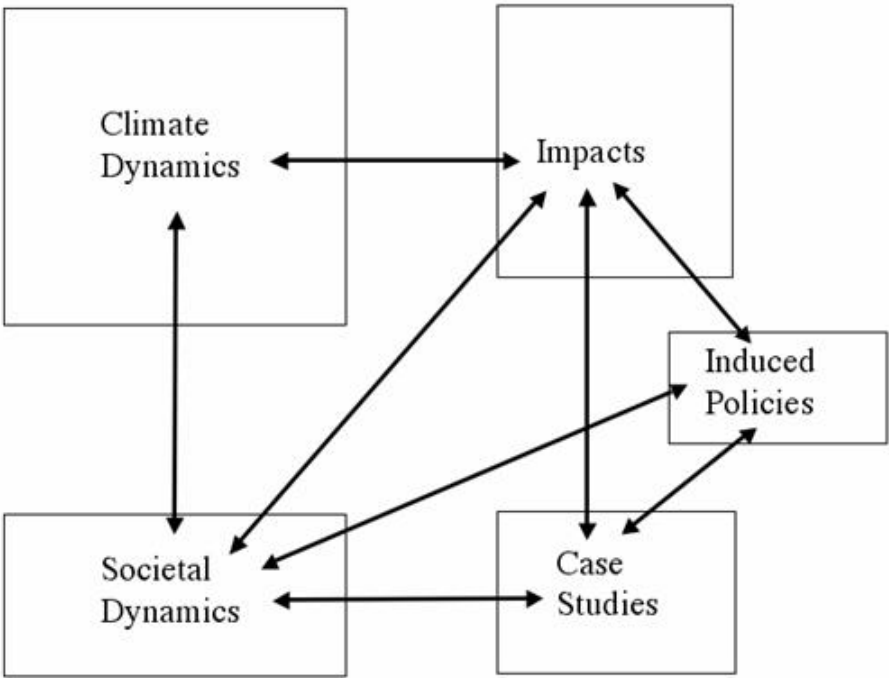


The second obstacle is linked to the first, a “climate all vision of society” that is to put climate as the major constraint of human behaviour to understand adaptation. This bias is sometimes necessary

for the needs of modelling but then produces irrelevant elements of analysis for policy making. A more realistic approach is needed to match stakeholders and policy maker’s demands.

Most climate impact assessments so far have focussed on a causal chain from climate change to economic and social impacts, adaptation policies being the direct responses to climate impacts.

CIRCE analyse climate impacts as the “joint product” of climate change and socio economic dynamics/ human behaviour which are most of the time independent of climate change. In this non linear approach, impacts of climate change are analysed with reference to specific socio economic scenarios, with particular attention to relevant sector and policies which can actually emphasize or reduce effect of climate change. On the other side responses strategies are not pure “adaptation” responses to climate change but a mix of long trends evolutions, progressive reorientation of sectoral policies which can also have positive or adverse effects on resilience or vulnerability to climate change. CIRCE makes a strong point in producing relevant research for the actors of the region. For that reason it is essential to provide assessments that can be integrated in practical decision making, therefore this more comprehensive method is necessary and more able to represent the reality as many impacts — on health, tourism, migration, etc. — cannot be reliably expressed as a function of climate change alone. The end result of the political economy of economic and social policies of the region will not be “climate first” but “development first” for a number of years to come. Keeping that framework in mind give the best chance to reach relevant actors and improve relevant strategies. That is the underlying concept of the CIRCE project



The CIRCE concept

To integrate the assessment of cross-sectoral impacts of climate change, for selected case-study regions, CIRCE will adopt a risk-based approach based on the conclusions developed in the specialised investigations. A rigorous common framework, including a set of quantitative

indicators tailored specifically for the Mediterranean environment will be developed and used in collaboration with regional stakeholders and policy makers. The results will be incorporated in a decision support system tool and disseminated to the appropriate end-users. Likely adaptation and mitigation strategies will be identified using bottom-up (via regional workshops) and top-down approaches. The case-study areas will include North African, Middle Eastern and European locations.

The end products of CIRCE will be published in the open scientific literature and summarised in less technical terms in the Final Report — Regional Assessment of Climate Change in the Mediterranean (RACCM). The Report will be organized in three parts. The first part will be a synthesis report of the entire RACCM. The second part will contain the results from the thematic assessments described in the section on Research Lines (RLs). The third part will contain the results from the test-cases for selected regions and areas, and will show how the general results obtained in the RLs can be applied and integrated to real cases.

The RACCM will be produced in close consultation with stakeholders. The startup meeting of the project will be held jointly with carefully-selected stakeholders, who will contribute to better-defined and more relevant priorities and issues. Thus CIRCE will develop an understanding of the different needs of the European Region, and enhance and develop analysis methods, models and indicators. Under the project, the interactive effects of climate change will become better understood, and predictions of risk and the prior assessment of policy effects will be improved. The project will thus provide cutting-edge scientific results that will help establish:

- The methodology for including stakeholders needs and questions in the scientific discourse.
- The information on possible climate changes for the 21st century in the Mediterranean Area.
- A framework for the preparation, reviewing and dissemination of the Regional Assessment Report.
- A set of policy-specific indicators and assessments that can be used to:

Inform environmental reporting,

Enable international comparisons in terms of quality of life, environment, economy and health,

Define a set of objectives and targets, and to monitor trends and progress towards these targets.

Partners

N°	Organisation	Country
1.	Istituto Nazionale di Geofisica e Vulcanologia	Italy
2.	Consejo Superior de Investigaciones Científicas, Instituto de Ciencias de la Tierra “Jaume Almera”	Spain
3.	Fundación Centro de Estudios Ambientales del Mediterráneo	Spain
4.	CLU Ltd	Italy
5.	Danish Meteorological Institute	Denmark
6.	University of Crete, Environmental Chemical Processes Laboratory	Greece
7.	Ente per le Nuove Tecnologie, l'Energia e l'Ambiente	Italy
8.	Fondazione ENI Enrico Mattei	Italy
9.	Universidad Complutense de Madrid	Spain

10.	Institute for Coastal Research GKSS	Germany
11.	Institute of Accelerating Systems and Applications	Australia
12.	Consiglio Nazionale delle Ricerche	Italy
13.	Potsdam Institut für Klimafolgenforschung	Germany
14.	Centre de Coopération Internationale en Recherche Agronomique pour le Développement	France
15.	Centre National de la Recherche Scientifique	France
16.	Universidad Politecnica de Madrid	Spain
17.	World Health Organisation, Regional Office for Europe	
18.	Institut du Développement durable et des relations Internationales	France
19.	Natural Environment Research Council	UK
20.	Max-Planck Society for the Advancement of Science	Germany
21.	National Observatory of Athens	Greece
22.	National Institute of Marine Sciences and Technologies	Tunisia
23.	University of Haifa	Israel
24.	University of Natural Resources and Applied Life Sciences	Austria
25.	European Commission Joint Research Centre	Italy
26.	Parc Científic de Barcelona	Spain
27.	ASL RME, Department of Epidemiology	Italy
28.	Météo France	France
29.	MET Office	UK
30.	Università degli Studi della Tuscia	Italy
31.	Stockholm Environment Institute, University of York	UK
32.	University of Birmingham	UK
33.	Universidad del País Vasco	Spain
34.	Universitat Politècnica de Catalunya	Spain
35.	National and Kapodistrian University of Athens	Greece
36.	Tel-Aviv University	Israel
37.	Universidad de Alcalá	Spain
38.	Zadigroma SRL	Italy
39.	University of East Anglia	UK
40.	Universitat de les Illes Balears	Spain
41.	Instituto de Ciência Aplicada e Tecnologia, Universidade de Lisboa	Portugal
42.	Universität Hamburg	Germany
43.	University of Aegean	Greece
44.	Centre for Environment and Development for Arab Region and Europe	Egypt
45.	University of Bern	Switzerland
46.	Università degli Studi l'Aquila	Italy
47.	Freie Universität Berlin	Germany

48.	University of Lecce	Italy
49.	European Climate Forum	Germany
50.	Vrije Universiteit Amsterdam	The Netherlands
51.	The Hebrew University of Jerusalem	Israel
52.	Università di Santiago di Compostela	Spain
53.	Centro Euro-Mediterraneo per i Cambiamenti Climatici	Italy
54.	Institute Pasteur de Tunis	Tunisia
55.	Association pour la Recherche sur le Climat et l'Environnement	Algeria
56.	International Center for Agricultural Research in the Dry Areas	Syria
57.	Hellenic Center for Marine Research	Greece
58.	University of Southampton	UK
59.	Ben-Gurion University of the Negev	Israel
60.	Paul Scherrer Institut	Switzerland
61.	Institute of Communication and Computer Systems	Greece
62.	Istituto Nazionale di Oceanografia e Geofisica Sperimentale	Italy
63.	Alma Mater Studiorum, Università di Bologna	Italy
64.	Medias — France	France

CIRCLE — Climate Impact Research Co-ordination for a Larger Europe

CT — 026058

<http://www.circle-era.net/>

Funding instrument:	Coordination Action (CA)
Contract starting date:	01/10/2005
Duration:	48 months
Total project cost:	2.765.999 €
EC Contribution:	2.765.999 €
Coordinating organisation:	Umweltbundesamt GmbH (Federal Environment Agency) Vienna — Austria
Co-ordinator:	Martin König (martin.koenig@umweltbundesamt.at)
EC Office:	European Research Area — Research programme and capacity Directorate

Abstract

Climate change is increasingly seen as one of the greatest issues facing the world in the 21st century, and Europe is taking a leading role in responding to its challenges. Whatever the success of mitigating climate change may be, certain impacts are unavoidable and European countries will need to adapt to those impacts. Their adaptation response must be informed by a coherent body of research and it is CIRCLE's prime objective to contribute to such efforts by aligning national research programmes using a complete application of the ERA-Net principles. As an ERA-Net SSA of partners from 7 countries, CIRCLE already established a sound basis for co-operation, an information base for national programme scientific content and management structures and through this preparatory work paved the way towards this CIRCLE CA with 17 countries taking part in it and remaining open for additional regional and national pertinent programmes. The means of integration comprise four serial activities leading to an in-depth integration. The partners aim to LEARN about each others programmes, will PLAN how to address specific issues (e.g. legal and financial constraints and evaluation procedures) and then will start to CONNECT their research programmes by aligning their research agendas and management procedures in order to FULFIL an in-depth integration by providing options for collaborative research (four options, including a geographical return principle). Four cross-cutting activities will support this process. The coordinator will LEAD the action; the partners will address how to CONTINUE the integration beyond the life of the CA. The programmes will be enabled to GROUP on a geo-climatic/socioeconomic scale (e.g. Mediterranean countries, Nordic countries, Continental central/eastern Europe, Alpine/Mountainous countries and Atlantic coastal countries) to address specific regional transboundary impacts. Knowledge will be SPREAD to stakeholders by designed interaction processes.

Partners

N°	Organisation	Country
1.	Umweltbundesamt GmbH	Austria
2.	Austrian Ministry for Education, Science and Culture	Austria

3.	Academy of Finland	Finland
4.	Swedish Environmental Protection Agency	Sweden
5.	Projekträger im Deutschen Zentrum für Luft- und Raumfahrt	Germany
6.	Bundesministerium für Bildung und Forschung	Germany
7.	Stichting Klimaat voor Ruimte	The Netherlands
8.	Suomen Ympäristökeskus	Finland
9.	Ministry for Environment and Water	Hungary
10.	Agence de l'Environnement et de la Maîtrise de l'Energie	France
11.	Ministère de l'Ecologie et du Développement Durable	France
12.	Federal Public Planning Service Science Policy	Belgium
13.	Fundação para a Ciência e a Tecnologia	Portugal
14.	The Research Council of Norway	Norway
15.	The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning	Sweden
16.	Ministero dell'Ambiente e della Tutela del Territorio e del Mare	Italy
17.	Ministry of the Environment, Israel	Israel
18.	Fundação da Faculdade de Ciencias da Universidade de Lisboa	Portugal

CLARIS — A Europe-South America Network for Climate Change Assessment and Impact Studies

CT-001454

<http://www.claris-eu.org>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/07/2004
Duration:	36 months
Total project cost:	1.118.479 €
EC Contribution:	499.998 €
Coordinating organisation:	Centre National de la Recherche Scientifique Paris — France
Co-ordinator:	Jean-Philippe Boulanger (jpb@lodyc.jussieu.fr)
EC Office:	Environment Directorate

Abstract

The CLARIS project aims at strengthening collaborations between Europe and South America to develop common research strategies on climate change and impact issues in the subtropical region of South America through a multi-scale integrated approach (continental-regional-local). First, CLARIS will favour the transfer of knowledge and expertise on Earth System Models, their different components and coupling procedures. Moreover, it will offer an easy access to large scale climate data sets and climate simulations mainly obtained in the context of past, present or future European projects. Second, CLARIS will provide to European and South American scientists involved in regional climate modelling in South America the framework to compare and exchange their methodologies (dynamical and statistical). Complementary to that modelling aspect, it is a major goal for CLARIS to initiate the setting-up of a high-quality daily climate database for temperature and precipitation. The European expertise acquired through the European Climate Assessment Project will be essential to meet this objective. The resulting database will be of great value to validate and evaluate the model skills in simulating climate trends and extreme event frequency changes. Finally, at a local scale, CLARIS aims at promoting three pilot actions designed to integrate multi-disciplinary components and to demonstrate the potential and feasibility of using climate information in the decision-making process in three major areas: agriculture, health and pollution. The CLARIS framework will facilitate the participation of European researchers to IAI (Inter American Institute) projects and the submission of new common research proposals. Moreover, its opening towards stakeholders (e.g. agriculture, reinsurance, hydroelectricity), associated to the project through an expert group, will promote future initiatives on climate impact analysis, thus, contributing to related sustainable development strategies.

Partners

N°	Organisation	Country
1.	Centre National de la Recherche Scientifique	France

2.	Centre de Coopération Internationale en Recherche Agronomique pour le Développement	France
3.	Consejo Nacional de Investigaciones Científicas y Técnicas	Argentina
4.	Universidad de Buenos Aires	Argentina
5.	Instituto Nacional de Pesquisas Espaciais	Brazil
6.	Universidade de Sao Paulo	Brazil
7.	Istituto Nazionale di Geofisica e Vulcanologia	Italy
8.	Consiglio per la Ricerca e Sperimentazione in Agricoltura	Italy
9.	Universidad de Castilla La Mancha	Spain
10.	Universidad de la Republica	Uruguay
11.	Plant Research International B. V.	The Netherlands
12.	Universidad de Chile	France
13.	Max Planck Society for the Advancement of Science	Germany

CLARIS –LPB A Europe-South America network for climate change assessment and impact studies in La Plata Basin

CT-212492

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/10/2008
Duration:	48 months
Total project cost:	4.279.297 €
EC Contribution:	3.358.995 €
Coordinating organisation:	Institut De Recherche Pour Le Développement Marseille — France
Co-ordinator:	Jean-Philippe Boulanger (jpb@lodyc.jussieu.fr)
EC Office:	Environment Directorate

Abstract

The CLARIS LPB Project aims at predicting the regional climate change impacts on La Plata Basin (LPB) in South America, and at designing adaptation strategies for land-use, agriculture, rural development, hydropower production, river transportation, water resources and ecological systems in wetlands. In order to reach such a goal, the project has been built on the following four major thrusts. First, improving the description and understanding of decadal climate variability is of prime importance for short-term regional climate change projections (2010-2040).

Second, a sound approach requires an ensemble of coordinated regional climate scenarios in order to quantify the amplitude and sources of uncertainties in LPB future climate at two time horizons: 2010-2040 for adaptation strategies and 2070-2100 for assessment of long-range impacts. Such coordination will allow to critically improve the prediction capacity of climate change and its impacts in the region.

Third, adaptation strategies to regional scenarios of climate change impacts require a multi-disciplinary approach where all the regional components (climate, hydrology, land use, land cover, agriculture and deforestation) are addressed in a collaborative way. Feedbacks between the regional climate groups and the land use and hydrology groups will ensure to draw a first-order feedback of future land use and hydrology scenarios onto the future regional climate change. Fourth, stakeholders must be integrated in the design of adaptation strategies, ensuring their dissemination to public, private and governmental policy-makers.

Finally, in continuity with the FP6 CLARIS Project, our project will put a special emphasis in forming young scientists in European institutes and in strengthening the collaborations between European and South American partners. The project is coordinated with the objectives of LPB, an international project on La Plata Basin that has been endorsed by the CLIVAR and GEWEX Panels.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Institutuzo National Del Agua	Argentina
2.	Universidade De Sao Paulo	Brazil
3.	Universidade Federal De Santa Catarina.	Brazil
4.	Universidad De La Republica	Uruguay
5.	Cesi Ricerca Spa	Italy
6.	Universidade Federal Do Parana	Brazil
7.	Consejo Nacional De Investigaciones Cientificas Y Tecnicas	Argentina
8.	Sveriges Meteorologiska Och Hydrologiska Institut	Sweden
9.	Universidad De Buenos Aires	Argentina
10.	Instituto Nacional De Pesquisas Espaciais	Brazil
11.	Université De Geneve	Switzerland
12.	Centro Euro-Mediterraneo Per I Cambiamenti Climatici Scarl	Italy
13.	Leibniz-Zentrum für Agrarlandschaftsforschung (Zalf) E.V.	Germany
14.	Universidad De Castilla — La Mancha	Spain
15.	Alma Mater Studiorum-Universita Di Bologna	Italy
16.	Centre National De La Recherche Scientifique (Cnrs)	France
17.	Max Planck Gesellschaft Zur Förderung Der Wissenschaften E.V.	Germany
18.	Instituto Nacional De Tecnologia Agropecuaria	Argentina
19.	University Of East Anglia	UK

CENSOR — Climate variability and el niño southern oscillation: implications for natural coastal resources and management

CT — 511071

<http://www.censor.name/pagev2/>

Funding instrument:	Specific Targeted Project (STREP)
Contract starting date:	01/10/2004
Duration:	48 months
Total project cost:	3.828.067 €
EC Contribution:	3.000.000 €
Coordinating organisation:	Alfred Wegener Institute for Polar and Marine Research Bremerhaven — Germany
Co-ordinator:	Sven Thatje (svth@noc.soton.ac.uk)
EC Office:	International Cooperation Directorate

Abstract

Marine biodiversity and the sustained exploitation of marine resources are significantly influenced by the ENSO (El Nino- Southern Oscillation) climate variation, which particularly affects the aquatic and terrestrial habitats along the Chilean-Peruvian coast of the Humboldt Current upwelling system. Both its warm phase (El Nino: EN) and its cold phase (La Nina: LN) have drastic implications for the ecology, socioeconomy and infrastructure of the countries impacted. Local artisanal fisheries represent a major activity for the domestic economy of both countries, thus a huge amount of studies (published and unpublished) exists aiming at identifying effects of EN. However, most processes and mechanisms causing these effects have not been analyzed yet. In the sea, especially artisanal fisheries and near-shore invertebrate and fish populations suffer from EN effects. Both EN and LN, however, also produce positive effects, which are not fully used by local fishermen and human communities. Therefore the aim of the CENSOR project is to enhance the detection, compilation and understanding of EN/LN effects on coastal marine environments and resources. Local artisanal fisheries and many commercial branches connected to them will benefit from the findings. Thus this project is expected to be of high economic and social interest for Chile and Peru, as well as for their environmental policy and social stability. To achieve this goal we propose a multidisciplinary approach, which enables us to build a comprehensive picture illustrating the response of the upwelling ecosystem to EN events. Scattered data on coastal benthic communities, coastal ichthyologic resources pelagic-benthic processes and riverine input on coastal systems will be compiled and analyzed comparatively under EN and non-EN conditions. Further, aquacultural demands will be addressed. All results of the CENSOR project will be integrated in a database and made available (managers & public at large).

Partners

N°	Organisation	Country
1.	Alfred Wegener Institute for Polar and Marine Research	Germany
2.	Universidad Nacional Mayor de San Marcos	Peru

3.	Center of Oceanography for the Eastern South Pacific	Chile
4.	Universidad de Antofagasta	Chile
5.	Zentrum für Marine Tropenökologie	Germany
6.	Consejo Superior de Investigaciones Científicas	Spain
7.	Universidad Arturo Prat	Chile
8.	Centro Austral de Investigaciones Científicas (CONICET)	Argentina
9.	Universidad Nacional del Mar del Plata	Argentina
10.	Instituto del Mar del Peru	Peru
11.	Institut de Recherche pour le Développement	France
12.	Universidad Nacional Agraria La Molina	Peru
13.	GeoForschungsZentrum Potsdam	Germany

BASIN — Basin-scale Analysis, Synthesis, and Integration: Resolving the impact of climatic processes on ecosystems of the North Atlantic Basin and shelf seas

CT — 037126

(¹)

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/07/2006
Duration:	21 months
Total project cost:	133.300 €
EC Contribution:	115.071 €
Coordinating organisation:	Universität Hamburg Hamburg, Germany
Co-ordinator:	Michael St. John (michael.st.john@uni-hamburg.de)
EC Office:	Environment Directorate

Abstract

The scale of influence of global change and the added value of co-ordinating the scientific activities of the EU and North American countries to assess, predict and mitigate the effects on marine ecosystems of the North Atlantic and their services is the justification for the development of the BASIN SSA. An important step towards such a co-ordinated approach is the development of an implementation plan where by jointly funded international projects can be supported. The development of such a plan is the first key goal of BASIN. The second goal of BASIN is to develop an integrated basin-scale North Atlantic research program, for submission to the EU 7th framework program, US NSF and Canadian NSERC for joint funding. Programmatic goals will be achieved in working groups including experts from both the EU and North America as well as delegates from funding organisations. As a prerequisite for the development of the research proposal, this SSA will

- assess the status of climate related ecosystem research in the North Atlantic basin and associated shelf seas,
- identify gaps in systematic observations and process understanding of atmospheric and oceanic parameters,
- identify the potential for consolidation of long-term observations from EU and international databases for modelling and prediction.

The BASIN research program will focus on: Resolving the natural variability, potential impacts and feedbacks of global change on the structure, function and dynamics of ecosystems; Improving the understanding of marine ecosystem functioning; Developing ecosystem based management strategies. Hence, BASIN will contribute significantly to the Global Earth Observation System of Systems (GEOSS) 10-Year Implementation Plan via the development of comprehensive,

(¹) The website for this project can be found by searching on the following site:
<http://cordis.europa.eu/fp6/projects.htm>

coordinated, and sustained observations of the Earth System, improved monitoring of the state of the Earth, increased understanding of Earth processes, and enhanced prediction.

Partners

N°	Organisation	Country
1.	Plymouth Marine Laboratory	UK

RECLAIM — Resolving Climatic Impacts on fish stocks

CT — 044133

<http://www.climateandfish.eu>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/01/2007
Duration:	36 months
Total project cost:	2.989.101 €
EC Contribution:	1.700.000 €
Coordinating organisation:	Wageningen IMARES B.V. The Netherlands
Co-ordinator:	Adriaan Rijnsdorp (adriaan.rijnsdorp@wur.nl)
EC Office:	Biotechnologies, agriculture and food Directorate

Abstract

Climate change will impact fisheries resources and challenge managers to develop sustainable exploitation strategies. Knowledge on the impacts of climate on fisheries resources is still fragmentary. RECLAIM will summarize current knowledge, test process understanding, improve predictive capacity and formulate future research hypotheses by examining trophic processes, geographical distributions and essential habitat requirements for marine and shellfish in the NE-Atlantic. A conceptual framework will be developed to distinguish between processes acting on individual (physiology, behaviour), population (predation, competition) and ecosystem (physical habitat qualities, biological productivity, trophic coupling) levels. The framework structures a literature review to detects gaps in knowledge and, where possible, distinguishes between climate and anthropogenic influences. A comparative analysis follows quantifying climate variability and changes in distribution and productivity of (i) individual species, (ii) selected fish and shellfish communities, and (iii) ecosystem structure and functioning. Target species represent different commercially important resources, ecosystem components (pelagics, demersals), and play key trophic roles (wasp-waist, apex predators) within NE-Atlantic ecosystems. Changes in ecosystem structure and functioning will be analysed from fisheries and scientific survey data including planktonic, benthic and fish production and consumption in relation to climate forcing and fishing. Relevant spatial and temporal scales of climate change and variability will be explored using time series analyses, spatial statistics and coupled 3-D hydrodynamic ecosystem models. Using a variety of approaches, RECLAIM will both hindcast as well as forecast the effects of climate change on the productivity and distribution of fish and shellfish stocks to formulate hypotheses and research needs to be addressed in future EU research.

Partners

N°	Organisation	Country
2.	Scottish Ministers Acting Through Fisheries Research Services	UK
3.	The Secretary Of State For Environment, Food & Rural Affairs Acting Through The Centre For Environment, Fisheries & Aquaculture Science	UK

- | | | |
|----|--|-----------------|
| 4. | Institut Français De Recherche Pour L'exploitation De La Mer | France |
| 5. | University of Hamburg | Germany |
| 6. | Danmarks Tekniske Universitet | Denmark |
| 7. | Institute Of Marine Research | Norway |
| 8. | Stichting Koninklijk Nederlands Instituut Voor Onderzoek Der Zee | The Netherlands |
| 9. | Universitetet I Bergen | Norway |

ArcRisk — Arctic Health Risks: Impacts on health in the Arctic and Europe owing to climate-induced changes in contaminant cycling

CT — 226534

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/06/2009
Duration:	54 months
Total project cost:	4.740.130 €
EC Contribution:	3.499.052 €
Coordinating organisation:	Arctic Monitoring and Assessment Programme Oslo — Norway
Co-ordinator:	Janet Pawlak (jpawlak@dahm.dk)
EC Office:	Environment Directorate

Abstract

Long-range transport of contaminants to the Arctic, the resulting exposures observed in Arctic human populations, and impacts of such exposures on human health have been the subject of considerable work in recent years, providing a baseline against which to compare future developments. Global climate change has the potential to remobilize environmental contaminants and alter contaminant transport pathways, fate, and routes of exposure in human populations. The Arctic is particularly sensitive to climate change and already exhibits clear impacts. Thus, research into contaminant exposure and its effects on human health in the Arctic, in comparison with other exposed populations in Europe, presents an opportunity to gain insight into changes that may later impact other areas. The influence of climate change on contaminant spreading and transfer and the resultant risk to human populations in the Arctic and other areas of Europe will be studied by:

- Research on the ways in which climate change will affect the long-range transport and fate of selected groups of contaminants, and possible implications for the re-distribution of contaminants (geographically and between relevant environmental media). This will involve modelling, utilizing the information base that exists on the distribution of such contaminants in the Arctic and other areas of Europe.
- Research on the impacts that changing pathways and climatic conditions will have on contaminant uptake and transfer within food webs, leading to foods consumed by humans. This will involve experimental work, process studies and targeted analytical studies, the latter focussed on supporting the modelling work and process studies related to human exposure to contaminants.
- Research focussing on human health, aimed at determining how climate-mediated changes in the environmental fate of selected groups of contaminants will result in changes in exposure of human populations, in the Arctic and in selected areas of Europe.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Arctic Monitoring and Assessment Programme	Norway
2.	Stockholms Universitet	Sweden
3.	Aarhus Universitet	Denmark
4.	Alfred-Wegener-Institut für Polar- und Meeresforschung	Germany
5.	Lancaster University	UK
6.	University Centre in Svalbard	Norway
7.	Consejo Superior de Investigaciones Científicas	Spain
8.	IVL Swedish Environmental Research Institute Ltd	Sweden
9.	University of Oulu	Finland
10.	Norsk institutt for luftforskning	Norway
11.	Jožef Stefan Institute	Slovenia
12.	O.A.Sys-Ocean Atmosphere Systems, Dres.Karcher, Kauker, Schnur GbR	Germany
13.	Max Planck Institute for Chemistry	Germany
14.	Swiss Federal Insitute of Technology	Switzerland
15.	Masaryk University	Czech Republic
16.	Norwegian Institute of Public Health	Norway
17.	University of Tromsø	Norway
18.	Northwest Public Health Research Center (Russian Ministry of Health and Sciences)	Russian Fed.
19.	Environment Canada, Aquatic Ecosystem Protection Research Division	Canada
20.	Arctic Ecosystem Health Freshwater Institute, Department of Fisheries and Oceans	Canada
21.	Health Canada, Safe Environments Programme Environmental Health	Canada

EDEN — Emerging diseases in a changing European environment

CT — 010284

<http://www.eden-fp6project.net/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/11/2004
Duration:	67 month
Total project cost:	15.371.752 €
EC Contribution:	11.497.856 €
Coordinating organisation:	Centre de Coopération International en Recherche Agronomique pour le Developpement Paris — France
Co-ordinator:	Renaud Lancelot (renaud.lancelot@cirad.fr)
EC Office:	Environment Directorate

Abstract

These last years, several vector-borne, parasitic or zoonotic diseases have (re)-emerged and spread in the European territory with major health, ecological, socio-economical and political consequences. Most of these outbreaks are linked to global and local changes resulting of climatic changes or activities of human populations. Europe must anticipate, prevent and control new emergences to avoid major societal and economical crisis (cf. SARS in Asia, West Nile in US). EDEN (Emerging Diseases in a changing European Environment) offers a unique opportunity to prepare for uncertainties about the future of the European environment and its impact on human health. EDEN's aim is to increase preparedness by developing and coordinating at European level a set of generic investigative methods, tools and skills within a common scientific framework (Landscapes, Vector and Parasite bionomics, Public Health, Animal Reservoirs). EDEN has therefore selected for study a range of diseases that are especially sensitive to environmental changes. Some of these diseases are already present in Europe (West Nile, Rodent-born, Tick-born, Leishmaniosis), others were present historically (Malaria) and so may re-emerge, whilst finally Rift Valley Fever is either on the fringes of Europe. EDEN integrates research between 42 leading institutes from 23 countries with the combined experience and skills to reach their common goals. EDEN is organised into a series of vertical Sub-Projects led and managed by an internationally recognised expert and linked by a series of Integrative Activities that include biodiversity monitoring, environmental change detection, disease modelling, remote sensing and image interpretation, information and communication. The proposed management structure, including a Scientific Board and a User Forum, takes into account both the diversity of the partners and the size of the project. Specific links with third world countries will be achieved through an Africa platform.

Partners

N°	Organisation	Country
1.	Universiteit Utrecht	The Netherlands
2.	Université Catholique De Louvain — University Of Oxford	UK

3.	European Agro-Environmental Health Associates Eeig	Belgium
4.	Universita Degli Studi Di Roma "La Sapienza"	Italy
5.	Istituto Zooprofilattico Sperimentale Dell'abruzzo E Del Molise "G. Caporale" Di Teramo	Italy
6.	Institut Pasteur	France
7.	Instituto De Salud Carlos III.	Spain
8.	Entente Interdépartementale Pour La Demoustication Du Littoral Mediterrannéen	France
9.	Ustav Biologie Obratlovcu — Akademie Ved Ceske Republiky Verejna Vyzkumna Instituce	Czech Republic
10.	Istituto Superiore Di Sanita	Italy
11.	Institut De Recherche Pour Le Développement	France
12.	Hacettepe Universitesi	Turkey
13.	Instituto De Higiene E Medicina Tropical — Universidade Nova De Lisboa	Portugal
14.	Institut National D'hygiene	Morocco
15.	Universitat De Valencia	Spain
16.	Centro Di Ecologia Alpina	Italy
17.	Department Of Infectious Diseases And Neuroinfections, Medical Academy, Byalistok	Poland
18.	Ludwig-Maximilians-Universität Muenchen	Germany
19.	Slovak Academy Of Sciences	Slovakia
20.	Tervise Arengu Instituut — National Health Development Institute	Estonia
21.	Institute For Microbiology And Immunology, Medical Faculty Of Ljubljana	Slovenia
22.	Instituto Vasco De Investigacion Y Desarrollo Agrario- Neiker Ab	Spain
23.	Orszagos Epidemiologiai Kospont	Hungary
24.	V/A "Sabiedribas Veselibas Agentura" Public Health Agency	Latvia
25.	Centre For Communicable Diseases Prevention And Control	Lithuania
26.	Metsantutkimuslaitos	Finland
27.	Institut National De La Recherche Agronomique (Inra)	France
28.	Smittskyddsinstitutet	Sweden
29.	Universiteit Antwerpen	Belgium
30.	Helsingin Yliopisto	Finland
31.	The University Of Liverpool	UK
32.	The Natural History Museum	UK
33.	Ege University Science & Technology Center	Turkey
34.	London School Of Hygiene And Tropical Medicine	UK
35.	Szent Istvan Egyetem	Hungary
36.	Universitat De Barcelona	Spain
37.	Université Montpellier I.	France
38.	University Of Crete	Greece

39.	Institut Agronomique Et Vétérinaire Hassan II	Morocco
40.	Institut Senegalais De Recherches Agricoles — Isra	Senegal
41.	National Institute Of Research — Development For Microbiology	Romania
42.	Institutul National De Cercetare Dezvoltare Delta Dunari	Romania
43.	Consejo Superior De Investigaciones Científicas	Spain
44.	Institut Pasteur d'Algérie	Algeria
45.	Allatorvos-Tudományi Kutatóintézet — Magyar Tudományos Akadémia	Hungary
46.	Institut Pasteur De Dakar	Senegal
47.	Avia-Gis	Belgium
48.	Fondazione Edmund Mach	Italy

CLEAR — Climate change, Environmental contaminants and Reproductive health

CT — 226217

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/05/2009
Duration:	48 months
Total project cost:	3.181.078 €
EC Contribution:	2.377.603 €
Coordinating organisation:	Aarhus University Hospital Århus Sygehus — Denmark
Co-ordinator:	Gunnar Toft (gunntoft@rm.dk)
EC Office:	Environment Directorate

Abstract

The research project investigates the possible impact of global climate change on reproductive health in Arctic and three local European populations. The key questions to be addressed are, first, how may climate change impact on human exposure to widespread environmental contaminants and, second, how may contaminants impact on occurrence of reproductive disorders as sensitive indicators of health? To provide affirmative answers to these questions the proposal will:

- Identify and describe mechanisms by which a changing climate may affect the exposure of arctic and other human populations to contaminants through change in chemical use and emissions, delivery to the arctic ecosystem as well as processing within the arctic physical environment and human food chain. This work relies on modelling of existing data.
- Expand the existing knowledge database on human exposure to polybrominated biphenylethers, perfluorinated surfactants and phthalates by analyses of 1200 biobanked serum samples collected in a EU FP5 project.
- Increase the limited knowledge on links between human exposure to contaminants and reproductive health. This work relies on a large existing parent-child-cohort, where a follow-up survey provide new data that are fed into risk assessment.
- Perform reviews of experimental and epidemiological literature to identify critical reproductive effects and exposure-response data for selected compounds as input to the risk modelling.
- Integrate data on relative climate induced changes in contaminant mobility and distribution and links between contaminant exposure and reproductive health into a risk evaluation providing insight into possible future risk scenarios related to global climate change. The project draws upon a network of experts in climate modelling and in experimental, epidemiological and risk assessment methodologies and builds upon four established cohorts in Greenland, Sweden, Warsaw and Ukraine.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Aarhus Universitetshospital, Aarhus Sygehus	Denmark
2.	Lunds Universitet	Sweden
3.	The Governing Council of the University of Toronto	Canada
4.	Gronlands Naturinstitut	Greenland
5.	Narodowy Instytut Zdrowia Publicznego-Panstwowy Zaklad Higieny	Poland
6.	Kharkiv National Medical University	Ukraine
7.	Ente per le Nuove Tecnologie, l'Energia e l'Ambiente	Italy
8.	Universiteit Utrecht	The Netherlands

ICEPURE — The impact of climatic and environmental factors on personal ultraviolet radiation exposure and human health

CT — 227020

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/02/2009
Duration:	36 months
Total project cost:	4.584.536 €
EC Contribution:	3.497.616 €
Coordinating organisation:	King's College London London — UK
Co-ordinator:	Paul Labbett (paul.labbett@kcl.ac.uk)
EC Office:	Environment Directorate

Abstract

We will determine the adverse and beneficial health effects of personal UVR exposure and their relationships with climatic and environmental factors that modify the solar UVR spectrum. Date and time stamped personal electronic wristwatch dosimeters will be worn to measure individual UVR exposure over extended periods. Satellite and ground station data will be gathered to establish terrestrial UVR spectral irradiance, cloud, albedo, ozone and aerosol data, at the locations and times of exposure. These dosimeters will be used in field studies in working, water, beach and snow situations in four different countries, including studies with children. The personal dosimetric data combined with diary, ground station and satellite data will show the influence of behaviour, meteorological, environmental and cultural factors on individual UVR exposure doses. The interaction between the personal exposure parameters and the satellite and ground station data will enable the development of a humanized radiative transfer model to assess the future impact of climate change on UVR exposure. This is in contrast to previous models that assume exposure to a given fraction of ambient UVR. We will also determine the effect of UVR exposure on DNA damage and immunity in field conditions. Furthermore, the relationship between UVR exposure and vitamin D status will be determined, thus enabling a direct correlation between important risk and benefit biomarkers. We will also determine the spectral relationship between erythema, UVR-induced immunosuppression and vitamin D status. These studies will determine the value of erythema as a biological weighing function for UVR related health outcomes. Finally, we will perform a systematic review of a wide range of health outcomes from UVR exposure, and integrate our personal UVR exposure and modelling data into existing epidemiological data to estimate measurement error and any effects on current UVR dose response relationships and health outcome.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	King’s College London	UK
2.	Region Hovedstaden	Denmark
3.	Uniersytet Medyczny W Lodzi.	Poland
4.	Karolinska Institutet	Sweden
5.	Fundacio Centre De Recerca En Epidemiologia Ambiental — Creal	Spain
6.	Veterinaermedizinische Universität Wien	Austria
7.	Health Protection Agency HPA	UK
8.	Danmarks Meteorologiske Institut	Denmark

CLIMATE FOR CULTURE — Damage Risk Assessment, macroeconomic Impact and Mitigation for Sustainable Preservation of Cultural Heritage in the Times of Climate Change

CT — 226973

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	under negotiation
Duration:	60 months
Total project cost:	6.599.115 €
EC Contribution:	4.964.866 €
Coordinating organisation:	Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V. München — Germany
Co-ordinator:	Dr Johanna Leissner (johanna.leissner@zv.fraunhofer.de)
EC Office:	Environment Directorate

Abstract

Climate change is one of the most critical global challenges of our time which also threatens cultural heritage. As a non-renewable important resource to the European identity, sustainable adaptation strategies are required for long term preservation. For this purpose and for the first time ever, the CLIMATE FOR CULTURE project will couple completely new high resolution (10x10km) climate change evolution scenarios with whole building simulation models to identify the risks for specific regions. The innovation lies in the elaboration of a more reliable damage assessment by connecting the future climate data with whole building simulation models and new damage assessment functions. In situ measurements at UNESCO sites throughout Europe will allow a much more precise and integrated assessment of the real damage impact of climate change on cultural heritage. Appropriate sustainable mitigation/adaptation strategies, also from previous projects, are further developed and applied on the basis of these findings simultaneously. All these results will be incorporated into an assessment of the economic impacts. In order to ensure an efficient use of resources, this project will build on the results of already concluded EU research projects (Noah's Ark). Techniques from FP5/6 projects will be reassessed for their applicability in future scenarios at different regions in Europe and Mediterranean to fully meet sustainability criteria. The proposed project will thus be able to estimate more systematically the damage potential of climate change on European cultural heritage. The team consists of 27 multidisciplinary partners from all over Europe and Egypt including the world's leading institutes in climate modelling and whole building simulation. The final achievement of the project will be a macro-economic impact report on cultural heritage in the times of climate change akin to the STERN report which would be a truly European contribution to future IPCC Reports.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Fraunhofer Gesellschaft zur Förderung der angewandten Forschung e.V.	Germany
2.	Czech Technical University in Prague	Czech republic
3.	Consiglio Nazionale delle Ricerche	Italy
4.	Faculty of Civil Engineering University of Zagreb	Hungary
5.	Foundation for Research and Technology Hellas	Greece
6.	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V.	Germany
7.	Technische Universität München	Germany
8.	Eindhoven University of Technology	The Netherlands
9.	Univerza v Ljubljani Univerza v Ljubljani	Slovenia
10.	Gradbeni inštitut ZRMK	Slovenia
11.	Gotland University	Sweden
12.	Andreas Weiß freelance conservator restorer	Germany
13.	Engineering Consulting & Software Development	Poland
14.	Krah & Grote Messtechnik	Germany
15.	Kaeferhaus GmbH	Austria
16.	Haftcourt Limited	UK
17.	Acciona Infraestructuras S.A.	Spain
18.	Bayerische Schloesserverwaltung	Germany
19.	Dörner Institut	Germany
20.	The National Trust for England, Wales and Northern Island	UK
21.	Kybertec, s.r.o.	Czech republic
22.	Glasgow Caledonian University	UK
23.	Center for documentation of Cultural & Natural Heritage	Egypt
24.	Jonathan Ashley-Smith	UK
25.	Imperial College London	UK
26.	Fondazione Salvatore Maugeri	Italy
27.	Institut National du Patrimoine	France

NOAHS ARK — Global Climate Change Impact on Built Heritage and Cultural Landscapes

CT — 501837

<http://noahsark.isac.cnr.it/>

Funding instrument:	Specific Targeted Project (STREP)
Contract starting date:	01/06/2004
Duration:	36 months
Total project cost:	1.762.380 €
EC Contribution:	1.175.520 €
Coordinating organisation:	Consiglio Nazionale delle Ricerche Istituto di Scienze dell'Atmosfera e del Clima Italy
Co-ordinator:	Cristina Sabbioni (sabbioni@isao.bo.cnr.it)
EC Office:	Environment Directorate

Abstract

Climate change over the next 100 years will likely have a range of direct and indirect effects on the natural and material environment, including the historic built environment. Important changes will include alterations in temperature, precipitation, extreme climatic events, soil conditions, groundwater and sea level. Some processes of building decay will be accelerated or worsened by climate change, while others will be delayed. The impacts on individual processes can be described, but it is difficult to assess the overall risk posed by climate change using currently available data. Linking global changes to the response of material surfaces of archaeological and historic structures remains a challenge. The objectives of the NOAH'S **ARK** Project are:

- To determine the meteorological parameters and changes most critical to the built cultural heritage.
- To research, predict and describe the effects of climate change on Europe's built cultural heritage over the next 100 years.
- To develop mitigation and adaptation strategies for historic buildings, sites, monuments and materials that are likely to be worst affected by climate change effects and associated disasters.
- To disseminate information on climate change effects and the optimum adaptation strategies for adoption by Europe's cultural heritage managers through a conference and guidelines.
- To provide electronic information sources and tools, including web-based Climate Risk Maps and vulnerability Atlas for heritage managers to assess the threats of climate change in order to visualize the built heritage and cultural landscape under future climate scenarios and model the effects of different adaptation strategies.
- To advise policy-makers and legislators through the project's Policy Advisory Panel. The results will allow the prediction of the impact of climate and pollution on cultural heritage and investigation of future climate scenarios on a European scale.

Partners

N°	Organisation	Country
1.	Consiglio Nazionale delle Ricerche	Italy
2.	University College London	UK
3.	University of East Anglia	UK
4.	Korrosionsinstitutet SCI AB	Sweden
5.	Instytut Katalizy I Fizychemii Powierzchni, Polska Akademia Nauk	Poland
6.	Ustav Teoretické a Aplikované Mechaniky, Akademie věd	Czech Republic
7.	Consejo Superior de Investigaciones Científicas	Spain
8.	Norsk Institutt for Luftforskning	Norway
9.	Ecclesiastical Insurance Group	UK
10.	Biología y Medio Ambiente, S.L.	Spain

WRECKPROTECT — Strategies for the Protection of shipwrecks in the Baltic Sea against forthcoming attack by wood degrading marine borers. A synthesis and information project based on the effects of climatic changes

CT — 226225

(¹)

Funding instrument:	Coordination and Support Action (CSA)
Contract starting date:	01/05/2009
Duration:	24 months
Total project cost:	1.104.362 €
EC Contribution:	754.812 €
Coordinating organisation:	Sp Sveriges Tekniska Forskningsinstitut AB Boras — Sweden
Co-ordinator:	Claes-Göran Krantz (claes-goran.krantz@sp.se)
EC Office:	Environment Directorate

Abstract

Today the Baltic sea is a brackish marine environment, enclosing a unique well preserved historical collection of wooden shipwrecks and settlements. These objects and constructions are protected from aggressive marine borer due to the low salinity in the waters, and therefore it is one of the few localities in the world where historical shipwrecks are found so intact and available for historical research. There are however strong indications, showed by the EU- MOSS project, that the marine borer *Teredo* spp is spreading into this area. If we are not able to protect the cultural heritage, these objects will be lost within a relatively short time due to the aggressiveness of the marine borers. A strategy to handle this alarming scenario, is to provide the museums and conservators responsible for long term preservation of cultural heritage, with tools for predicting the spread of marine borers, and efficient methods for protection of the wreck, when the degradation is established. The WreckProtect project will therefore develop two guidelines synthesised on currently available information:

- The prediction of marine borer attack in marine waters
- The protection of wrecks in situ.

These guidelines will be applicable to other European marine waters outside the Baltic. The WreckProtect project is consequently a cross-disciplinary coordination action involving partners with expertise within geographical information systems, marine archaeology, marine biology, wood microbiology and conservation. These experts will through meetings and networking exchange knowledge and synthesise it into practical tools and methods in the form of guidelines that will be disseminated in a joint action for the European managers of underwater cultural

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

heritage. A seminar, workshop and training course on practical in situ preservation of shipwreck will be organised during the project, and the guidelines will be published in international scientific journals and a monograph.

Partners

N°	Organisation	Country
1.	Swedish University of Agricultural Sciences	Sweden
2.	The National Museum of Denmark	Denmark
3.	Rijksdienst voor Archeologie Cultuurlandschap en Monumenten	The Netherlands
4.	Geological Survey of Denmark and Greenland	Denmark
5.	Göteborg University	Sweden
6.	The Viking Ship Museum	Denmark

EUROPOLAR — European Polar Consortium: Strategic Coordination and Networking of European Polar RTD Programmes

CT — 517842

<http://www.europolar.org/>

Funding instrument:	Coordination Action (CA) ERA-NET
Contract starting date:	01/03/2005
Duration:	48 months
Total project cost:	2.484.992 €
EC Contribution:	2.484.992 €
Coordinating organisation:	INSTITUT POLAIRE France — PAUL EMILE VICTOR Plouzane — France
Co-ordinator:	G�rard Jugie (gerard.jugie@ipev.fr)
EC Office:	European Research Area: Research programmes and capacity Directorate

Abstract

EUROPOLAR ERA-NET ⁽¹⁾ is a consortium of 25 Ministries, Funding Agencies and National Polar RTD Authorities from 19 European countries with a combined critical mass of Polar Programmes and Infrastructures of over 500 Million Euros per annum. It is the most significant initiative to coordinate and network European Polar RTD programmes ever attempted.

EUROPOLAR ERA-NET will exert a massive and positive impact on this domain and lead to long-term durable partnerships within Europe and Internationally. EUROPOLAR ERA-NET will encourage and support the closer relationship of National Polar RTD programme managers from Europe and the Russian Federation, fostering cooperation and leading to joint programme activities. EUROPOLAR ERA-NET will also deepen and strengthen the interactions between countries with large Polar RTD Programmes and nations with evolving Polar Programmes in central and south-eastern Europe, encouraging exchange of experiences and best practise on management and financing of programmes and infrastructures. The presence of key European and international organizations within EUROPOLAR ERA-NET will open up a vast network of human and material capital.

The structuring and coordination of European Trans-national elements will enable the construction of mechanisms to mobilise joint funding flows and the reciprocal access to Polar Research Infrastructures. The long-term goal of the European Polar Consortium is the development of a 'European Polar Entity' which will be established following the EUROPOLAR ERA-NET through dialogue and agreement at a political level and will enable Europe to maximise and direct its critical mass at the Global level.'

⁽¹⁾ ERA-NETs are aimed at the networking of national and regional research programmes and programme managers, and the mutual opening of national and regional research programmes and involve essentially funding organisations and ministries)

Objectives

Research and technology in the Polar Regions is fundamental to our understanding of the functioning of the earth system especially in relation to climate change, climate variability and its wide economic and societal impact on European and global populations. European nations have played a central role in scientific research in the Polar Regions throughout the last century. The Polar Regions are central to answering questions of global relevance and importance in modern climate research and its effects. Europe has a high capacity in both research and infrastructure terms in the Polar Regions, the combined critical mass of national polar programmes and assets across Europe exceeds 500 Million Euros per annum. There is a clearly identifiable need for Europe to optimize this high-investment and provide an enhanced utilization of research infrastructures, harmonizing scientific, human and technology capacity. Polar research from its very beginning has been a cooperative activity in large part due to the extreme nature of the environments it requires agreements on a national and more often-international scale to implement very large projects with complex logistics.

"...Europe is at the forefront of international efforts in polar research," said Research Commissioner Philippe Busquin at the launch, in Bremerhaven (DE) last February, of several Polar research projects being supported by the European Union. "The poles are unique indicators of climate change processes [making] polar research a key element in our overall research effort on global climate change..."

Former European Research Commissioner Philippe Busquin 2004

"The Northern Dimension concept covers a broad and diverse geographic area, stretching from the Arctic and sub-Arctic to the southern shores of the Baltic, and from North-West Russia in the East to Iceland and Greenland in the west. The Northern Dimension also pays special attention to regions with specific needs, such as Kaliningrad and the Arctic region."

Former External Relations Commissioner Chris Pattern 2004

The management of national programmes in the Polar Regions is subject to a great deal of variability across Europe, with a complex funding and evaluation architecture, there is a need to simplify and harmonize these systems to produce a coherent set of interlinked and fully networked agencies. The common access to a suite of world class Polar Infrastructures that are dedicated to supporting at a national level a wide range of Scientific programme disciplines. To avoid duplication of research efforts and to better understand the differences in scale of operation for Arctic and Antarctic science campaigns, EUROPOLAR ERA-NET will analyze and compare the structural and management approaches from its partner countries resulting in strategies to harmonize these systems on a trans-national basis. The Landscape of Research in Europe has been dramatically changed during the 6th framework programme with emphasis placed on the Lisbon Agenda and the development of A 'European Research Area' leading to the Europe's aspirations as becoming the most competitive knowledge based Economy in the world by 2010. EUROPOLAR ERA-NET will establish the unique conditions for a durable cooperation between European research programmes in the Polar Regions. EUROPOLAR ERA-NET will strive to enhance and maintain Europe's premier capacity for research in the Polar Regions by building a framework of sufficient scale and critical mass to facilitate, promote and sustain intellectual interchange in the international research arena. Agreements between National Polar RTD funding agencies and ministries have historically been at a bilateral level and the structures and mechanisms for internal agreement amongst European nations on multinational agreements are still lacking or need testing. This requirement for an enhanced coordination and management at a Pan-European scale in Polar Research, driven by success of programmes such as EPICA (European Project Ice

Coring in Antarctica) which has acted as a model for the way in which a group of 10 nations can implement with pooled funding a major scientific research programme which addresses global concerns. This model needs to be applied in a wider context to Polar RTD programmes on the new and exciting frontiers.

The Consortium that forms EUROPOLAR ERA-NET comprises 25 funding agencies, national ministries and Polar Authorities from 19 countries in Europe including key new accession states, candidate states to the EU and external states such as Russia Federation. The composition of the consortium represents every significant actor and European nation with Arctic and Antarctic research programme activities. EUROPOLAR therefore represents the most significant initiative to network European Polar RTD Programmes ever attempted.

General Objectives for the EUROPOLAR ERA-NET comprise:

- Creating the conditions for a gradual deepening of the interaction between National Polar RTD Programmes in order to mobilize and coordinate the existing critical mass of infrastructures, human capital to maximize the impact of European Polar activities.
- Contributing to the establishment of leading edge collaborative Polar Research Centres and supporting the intellectual development of the next generation of Polar Research specialists especially in new and candidate nations of the Union.
- Supporting the EC Northern Dimension Action Plan by creating research opportunities (RTD programmes, researcher mobility and support mechanisms) relevant for the Arctic issues.
- Generating a prototype advisory and policy support mechanism for European Governments in the Polar Regions.
- Enabling the integration of new accession and candidate states to the European Union by the stepwise and agreed mutual opening of Europe's Polar RTD Programmes and strengthening the relationship between Europe and the Russian Federation through cooperation between consortium partners.
- Optimizing the management and utilization of European Polar facilities and assets.
- Providing the focus of European strategic activities in the Polar Regions through the development of a common European planning and research implementation framework.

The principle benefits arising from EUROPOLAR ERA-NET will be:

- Structuring the environment and landscape of Europe's Polar RTD programmes to allow fully trans-national research programmes and enhanced access to Polar Research infrastructures.
- Enabling National Polar RTD Agencies to build strong multilateral partnerships within and outside Europe.
- Enabling the effective integration of new accession and candidate countries of the European Union through involvement in extensive Polar RTD activities.
- Delivering high quality science policy advice in support of European Union Policies.
- Consideration of Polar RTD issues, which are beyond the capacities of individual member states and generate sufficient critical mass Increased awareness of policy issues of relevance to the Polar Regions.
- Contributing to the strengthening of the European Research and innovation area.
- The development of common management best practice and European research strategies in the Polar Regions.

Partners

N°	Organisation	Country
1.	Institut Polaire Français Paul Emile Victor IPE	France
2.	Foundation Européenne de la Science/European Polar Board EPB-ESF	France
3.	Fonds –zur Förderung der Wissenschaftlichen Forschung FWF	Austria
4.	Fonds National de la Recherche Scientifique FNRS	Belgium
5.	Fonds Voor Wetenschappelijk onderzoek Vlannderen FWO	Belgium
6.	Belgian Federal Planning Service Science Policy BELSPO	Belgium
7.	Ministry of Foreign Affairs Republic of Bulgaria MFA	Bulgaria
8.	Ministry of Education, Youth and Sports MSMT	Czech Republic
9.	Dansk Polarcenter (Danish Polar Center) DPC	Denmark
10.	Forskningsstryrelsen (Danish Research Agency) FORSK	Denmark
11.	Eesti Teadusfond Sihtasutus (Estonian Science Foundation) EstSF	Estonia
12.	Liikenne-Ja Viestintäministerio (Ministry of Transport and Communication) MiTOC	Finland
13.	Alfred Wegener Institut für Polar und Meeresforschung AWI	Germany
14.	Bundesministerium für Bildung und Forschung BMBF	Germany
15.	Kultureqarmut, Ilinniartitaanermut, Ilisimatusarnermut, Ilageeqarnermullu Pisortaqarfik (Department for Culture Research and Church) KIIP	Greenland
16.	Ministero dell'istruzione dell' Università della Ricerca MIUR	Italy
17.	Nederlandse Organisatie Voor Wetenschappelijk onderzoek (Netherlands organisation for Scientific Research) N W O	The Netherlands
18.	The Research Council of Norway RCN	Norway
19.	Norsk Polarinstitut (Norwegian Polar Institute) NPI	Norway
20.	Ministerstwo Nauki i Informatyzacji (Ministry of Scientific Research and Information Technology) MSRT	Poland
21.	Arctic and Antarctic Research Institute of Roshydromet, Russian Federation Service for Hydrometeorology & Environmental Monitoring AARI	Russian Fed.
22.	Ministerul Educatiei Si Cercetarii (Ministry of Education and Research) MedC	Romania
23.	Ministero de Educacion y Ciencia MEC	Spain
24.	Ventenskradsradet (Swedish Research Council) VR	Sweden
25.	Natural Environment Research Council NERC	UK

MESMA — Monitoring and Evaluation of Spatially Managed Areas

CT — 226661

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	under negotiation
Duration:	48 months
Total project cost:	8.408.513 €
EC Contribution:	6.568.846 €
Coordinating organisation:	Wageningen IMARES B.V. Ijmuiden — The Netherlands
Co-ordinator:	Jan A. van Dalssen (jan.vandalsen@wur.nl)
EC Office:	Environment Directorate

Abstract

The increasing pressures upon the marine realm call for a well planned approach of further spatial development of this area. An ecosystem-based approach to fisheries, the increasing demand for sustainable energy, coastal defense systems, building materials and safe transport routes and the need to protect habitats and species all compete for the same valuable space. At the same time climate change will alter the composition and functioning of marine ecosystems, calling for a robust approach of future spatial planning that also takes cross boundary developments into account. MESMA will supply innovative methods and integrated strategies for governments, local authorities, stakeholders and other managerial bodies for planning and decision making at different local, national and European scales. This will also comprise an easy accessible information system to gain support from politicians, stakeholders and the public in general for difficult (inter)national decisions that will be needed for sustainable use and protection of this vulnerable area. This data system, containing information on the distribution of habitats and species, economic values and benefits and human uses and its effects will also be an interface between science, policy and decision makers. MESMA will supply strategic tools for sustainable development of European seas and coastal areas. The major challenge is to combine an optimized use with a sustained ecosystem of high quality, taking into account ecological and economic differences. By studying and comparing different national situations and solutions from a selected number of sites throughout Europe and by determining common features and differences, including the socio-economic settings and requirements, an integrated toolbox that can be applied on both a European and a regional scale will be made available.

Partners

N°	Organisation	Country
1.	Wageningen IMARES B.V.	The Netherlands

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

2.	University College London	UK
3.	Senckenbergische Naturforschende Gesellschaft	Denmark
4.	Universiteit Gent	Belgium
5.	Hellenic Centre for Marine Research	Greece
6.	Institute of Oceanology, Bulgarian Academy of Sciences	Bulgaria
7.	Institute of Marine Research	Norway
8.	National University of Ireland, Cork. University College Cork	Ireland
9.	Consiglio Nazionale delle Ricerche	Italy
10.	Fundación AZTI — AZTI Fundazioa	Spain
11.	Ministry for Rural Affairs and the Environment	MT
12.	Technical University of Denmark	Denmark
13.	The Secretary of State for Environment, Food & Rural	UK
14.	Affairs acting through the Centre for Environment, Fisheries & Aquaculture Science Heriot-Watt University	UK
15.	Eigen Vermogen van het Instituut voor Landbouw en Visserij Onderzoek	Belgium
16.	Stichting Deltares	The Netherlands
17.	Norsk Institutt for Vannforskning	Norway
18.	The Netherlands Organisation for Applied Scientific Research	The Netherlands

VI. CLIMATE RELEVANT PROJECTS ON NATURAL HAZARDS AND EXTREME EVENTS

MOVE — Methods for the improvement of Vulnerability Assessment in Europe

CT — 211590

<http://www.move-fp7.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/10/2008
Duration:	36 months
Total project cost:	2.650.841€
EC Contribution:	2.078.067€
Coordinating organisation:	Università degli Studi di Firenze Florence — Italy
Co-ordinator:	Sergio Boncinelli (boncinelli@unifi.it)
EC Office:	Environment Directorate

Abstract

MOVE will create knowledge, frameworks and methods for the assessment of vulnerability to natural hazards in Europe. It will use indices and indicators to help improve societal and environmental resilience. Floods, temperature extremes, droughts, landslides, earthquakes, wildfires and storms will be studied. Emphasis will be placed on clear, capable measurement and accounting for uncertainties. MOVE will identify gaps in existing methodologies. It will produce a conceptual framework that is independent of scale and hazard type. It analyse physical (technical), environmental, economic, social, cultural and institutional vulnerability. These will be measured for specific hazards and at different geographical scales. Methodologies will be tested in case study regions on vulnerable elements and appropriate hazard types. Case studies will enable the availability and quality of existing data at sub-national (NUTS 3-5) and local scales to be examined. MOVE will evaluate statistical data (for cities, from EUROSTAT, etc.) and remote sensing information. The case studies will integrate and combine economic damage and social vulnerability methods. The generic framework, data analysis and applicability tests will result in a standard approach to vulnerability assessment in Europe. Stakeholders will be consulted systematically in order to understand their needs and to enable MOVE to draw attention to the practical value of its methodologies. There will be six work-packages. First, terms will be defined and gaps in existing methodologies identified. Next, a generic framework will be developed, with variants for particular scales, hazards and situations. Thirdly, the methods will be applied to case studies. The fourth and fifth packages will develop co-operation processes with stakeholders and ensure that the framework and the methods are disseminated for the benefit of European citizens. Project co-ordination will occupy the final package.

Partners

N°	Organisation	Country
1.	Stiftelsen Norges Geotekniskeinstitut	Norway
2.	Universität Salzburg	Austria
3.	Technische Universität Dortmund	Germany
4.	Rupprecht Consult-Forschung & Beratung GMBH	Germany

- | | | |
|-----|--|----------|
| 5. | Accademia Europea per la Ricerca Applicata ed il Perfezionamento Professionale Bolzano (Accademia Europea Bolzano) | Italy |
| 6. | United Nations University Institute for Environment and Human Security | Germany |
| 7. | Faculdade de Letras da Universidade do Porto | Portugal |
| 8. | Atlas Innoglobe Tervezo es Szolgaltato KFT | Hungary |
| 9. | Bureau de Recherches Géologiques et Minières | France |
| 10. | Universität Wien | Austria |
| 11. | Centre International de Metodes Numerics en Enginyeria | Spain |
| 12. | King's College London | UK |

GAGOS — Assessing and Forward Planning of the Geodetic and Geohazard Observing Systems for GMES Applications

CT — 010329

(¹)

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/02/2005
Duration:	24 months
Total project cost:	229.620 €
EC Contribution:	229.620 €
Coordinating organisation:	GeoForschungsZentrum Potsdam Potsdam — Germany
Co-ordinator:	Markus Rothacher (rothacher@gfz-potsdam.de)
EC Office:	Environment Directorate

Abstract

Substantial improvement of our present knowledge of Earth System dynamics is paramount for the development of reliable strategies for actions vital to the human society in terms of achieving sustainable development and ensuring security. This requires for the various system components long-term integrated global data series from a large variety of sensors and networks combined with high performance rapid computing and a uniform and efficient access to distributed data archives and data information systems.

The material generated in the course of this project aims:

- to assess the status quo situation of two major components of the Earth observing system, namely the global geodetic and global geohazards observing systems as indispensable prerequisites for the consistent global monitoring of the Earth system environment and security aspects of population;
- to identify deficiencies and gaps in both components and provide advice for the implementation of necessary adaptations and potential new developments in network-, shared computing-, and information/data management task for the observing techniques involved.

Partners

N°	Organisation	Country
1.	Geoforschungszentrum Potsdam	Germany
2.	Deutsches Geodätisches Forschungsinstitut	Germany
3.	Statens Kartverk	Norway

(¹) The website for this project can be found by searching on the following site:
<http://cordis.europa.eu/fp6/projects.htm>

NOVAC — Network for Observation of Volcanic and Atmospheric Change

CT — 018354

<http://www.novac-project.eu/>

Funding instrument:	Specific Targeted Project (STREP)
Contract starting date:	01/10/2005
Duration:	54 months
Total project cost:	2.994.107 €
EC Contribution:	2.882.603 €
Coordinating organisation:	Chalmers University of Technology
Co-ordinator:	Bo Galle (bo.galle@rss.chalmers.se)
EC Office:	Environment Directorate

Abstract

The idea of the NOVAC project is to establish a global network of stations for the quantitative measurement of volcanic gas emissions by UV absorption spectroscopy making use of a novel type of instrument, the Scanning Dual-beam miniature — Differential Optical Absorption Spectrometer (Mini-DOAS) developed within the EU-project DORSIVA. Primarily the instruments will be used to provide new parameters in the toolbox of the observatories for risk assessment, gas emission estimates and geophysical research on the local scale. In addition to this, data are exploited for other scientific purposes than local volcanic gas emissions, e.g. global estimates of volcanic gas emissions, large scale volcanic correlations, studies of climate change, studies of stratospheric ozone depletion. In particular large scale validation of satellite instruments for observing volcanic gas emissions will be possible for the first time, allowing to bring observation of volcanic gas emissions from space a significant step forward.

The Scanning Dual-beam Mini-DOAS instrument represents a major breakthrough in volcanic gas monitoring, it is capable of real-time automatic, unattended measurement of the total emission fluxes of SO₂ and BrO from a volcano with better than 5 minutes time resolution during daylight. The high time-resolution of the data enables correlations with other geophysical data, e.g. seismic data, thus significantly extending the information available for real-time risk assessment and research at the volcano. By comparing high time resolution gas emission data with emissions from neighbouring volcanoes on different geographical scales, or with other geophysical events (earthquakes, tidal waves) mechanisms of volcanic forcing may be revealed.

The spectra recorded by the instrument will also be used to derive data that complement global observation systems related to climate change and stratospheric ozone depletion research. These data are particularly valuable due to the fact that many volcanoes are located in remote areas sparsely covered by existing networks.

The consortium encompasses observatories of 15 volcanoes from five continents, including some of the most active and strongest degassing volcanoes in the world. New partners are welcome to join on their own funding.

The societal need to conduct this project emanates from the fact that an estimated 500 million people live under the direct threat of volcanoes. Volcanoes also constitute a major source of certain gas input to the troposphere and stratosphere (HCl, SO₂, BrO, HF), which cause impact on both the local and global level. The state-of-the-art instrumentation planned to be used in this project will improve the possibility to predict eruptions but will also improve our understanding of the global gas emissions coming from volcanoes.

Partners

N°	Organisation	Country
1.	Chalmers University of Technology	Sweden
2.	Heidelberg University	Germany
3.	Belgian Institute for Space Aeronomy	Belgium
4.	University of Cambridge	UK
5.	IFM-GEOMAR	Germany
6.	Institut de Physique de Globe	France
7.	Istituto Nazionale di Geofisica e Vulcanologia	Italy
8.	Universidad Nacional Autonoma de Mexico	Mexico
9.	Instituto Nicaragüense de Estudios Territoriales	Nicaragua
10.	Observatorio Vulcanologico y Sismologico	Costa Rica
11.	Instituto Colombiano de Geologia y Minería	Colombia
12.	Servicio Nacional de Estudios Territoriales	El Savlador
13.	Observatoire Volcanologique de Goma	DRC
14.	Massachusetts Institute of Technology	USA
15.	Dr S University of Maryland Baltimore County	USA

CapHaz-Net — Social capacity building for natural hazards: Toward more resilient societies

CT — 227073

(¹)

Funding instrument:	Coordination-Support Action (CSA)
Contract starting date:	01/06/2009
Duration:	36 months
Total project cost:	1.130.817 €
EC Contribution:	910.000 €
Coordinating organisation:	Helmholtz-Zentrum für Umweltforschung GmbH — UFZ Leipzig — Germany
Co-ordinator:	Annette Schmidt (annette.schmidt@ufz.de)
EC Office:	Environment Directorate

Abstract

The main objectives of CapHaz-Net are to identify and assess existing practices and policies for social capacity building in the field of natural hazards and to elaborate strategies and recommendations for activities to enhance the resilience of European societies to the impacts of natural hazards. This will be achieved by bringing together different scientific disciplines and by enhancing and fostering communication between researchers, policy-makers and practitioners from across Europe. CapHaz-Net focuses on synthesising and integrating knowledge and perspectives from five topics: risk perception, social vulnerability, risk communication, risk education, risk governance. These are central for developing social capacities of societies and communities for natural hazards. For each topic, main perspectives, actions and initiatives are identified and assessed that can improve capacity building. The project is structured in three phases: In a first phase key studies and initiatives will be identified and assessed within each of the main topics, achieved through literature review work and thematic meetings. The outcome will be a living document representing the state of the art and providing initial suggestions on how to improve societies' capacity building. In the second phase these results will be down-scaled in particular regional contexts and evaluated in respect of local experiences and existing practices and tools, achieved through a series of regional hazard workshops. The network will consider three geographical areas representing different natural hazards types. During these workshops best practices and chances of improved legal tools and strategies but also gaps of knowledge are identified and assessed. In the final phase, the network will integrate findings and develop recommendations that provide a synthesis concerning specific steps to improve social capacity building of European societies' facing natural hazards and give guidance for future research.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Helmholtz-Zentrum für Umweltforschung	Germany
2.	Istituto di Sociologia Internazionale di Gorizia I.S.I.G.	Italy
3.	Middlesex University Higher Education Corporation	UK
4.	Universitat Autònoma de Barcelona	Spain
5.	Znanstvenoraziskovalni Center Slovenske Akademije Znanosti in Umetnosti	Slovenia
6.	Eidgenössische Forschungsanstalt WSL	Switzerland
7.	Dialogik Gemeinnützige Gesellschaft für Kommunikations- und Kooperationsforschung GmbH	Germany
8.	Lancaster University	UK

XEROCHORE — An Exercise to Assess Research Needs and Policy Choices in Areas of Drought

CT — 211837

<http://www.feem-project.net/xerochore/index.php>

Funding instrument:	Coordination-Support Action (CSA)
Contract starting date:	01/05/2008
Duration:	18 months
Total project cost:	1.862.182 €
EC Contribution:	1.500.889 €
Coordinating organisation:	Fondazione Eni Enrico Mattei Milan — Italy
Co-ordinator:	Martina Marian (martina.marian@feem.it)
EC Office:	Environment Directorate

Abstract

In recent years large parts of Europe suffered from extreme drought, a phenomenon that likely will become more frequent and more severe, as predicted by the climate models. This will lead to significant socio-economic and environmental impacts and associated damages. There is therefore an urgent need to develop a roadmap toward a European Drought Policy, in accordance with the EU-Water Framework Directive (WFD) and related EU Legislation and Actions. The aim is to mitigate and to adapt to droughts, and hence reduce the risks they pose in Europe.

XEROCHORE SA compiles a roadmap that comprises of:

- a state-of-the-art review and identification of the research gaps in the natural system, in impact assessment, in policy-making and in integrated water resources management, and
- an assessment of the possible impacts of droughts and guidance on appropriate responses for stakeholders.

An extended network of experts will gather inputs for the roadmap through focussed workshops, round table discussions, which integrate the various aspects, and a concluding conference. A Core Group will guide and facilitate the discussion and synthesis process, and eventually write the integrated roadmap. The project network consists of over 80 organizations including research institutes, universities, ministries, water management organizations, stakeholders, consultants, international organizations and programmes. It includes key members of the European Drought Centre and the WFD-CIS Working Group on Water Scarcity and Drought and representatives from overseas and neighbourhood countries, in particular around the Mediterranean Basin. The large number of organizations covering different aspects and geographic regions guarantee that all drought aspects will be covered. The drought network will be embedded in the already-existing European Drought Centre to reach the wider scientific and to provide research advice and policy support to the EC beyond the lifetime of this action.

Partners

N°	Organisation	Country
1.	Ministerio de Medio Ambiente	Spain
2.	Ministerio dell'Ambiente e della Tutela del Territorio e del Mare	Italy
3.	Water Management Center GBR	Germany
4.	Union Internationale pour la Conservation de la Nature et de ses Ressources	Switzerland
5.	Universitetet i Oslo	Norway
6.	National Technical University of Athens	Greece
7.	Centre National du Machinisme Agricole, du Génie Rural, Des Eaux et des Forêts	France
8.	Wageningen Universiteit	The Netherlands
9.	Commission of the European Communities — Directorate General Joint Research Centre — JRC	Belgium
10.	Natural Environment Research Council	UK

HYDRATE– Hydrometeorological data resources and technologies for effective flash flood forecasting

CT — 037024

<http://www.hydrate.tesaf.unipd.it/>

Funding instrument:	Specific Targeted project (STREP)
Contract starting date:	01/09/2006
Duration:	45 months
Total project cost:	3.422.059 €
EC Contribution:	2.350.000 €
Coordinating organisation:	Universita Degli Studi di Padova Padua — Italy
Co-ordinator:	Marco Borga (marco.borga@unipd.it)
EC Office:	Environment Directorate

Abstract

The management of flash flood hazards and risks is a critical component of public safety and quality of life. Flash-floods develop at space and time scales that conventional observation systems are not able to monitor for rainfall and river discharge. Consequently, the atmospheric and hydrological generating mechanisms of flash-floods are poorly understood, leading to highly uncertain forecasts of these events.

The HYDRATE objective is to improve the scientific basis of flash flood forecasting by extending the understanding of past flash flood events, advancing and harmonising a European-wide innovative flash flood observation strategy and developing a coherent set of technologies and tools for effective early warning systems. To this end, the project includes actions on the organization of the existing flash flood data patrimony across Europe. The observation strategy proposed in HYDRATE has the objective to collect flash flood data by combining hydrometeorological monitoring and the acquisition of complementary information from post-event surveys. This will involve a network of existing Hydrometeorological Observatories; all placed in high flash flood potential regions. HYDRATE will develop a freely accessible European Flash Flood Database to make available the collected hydrometeorological data to the international research community. The final aim of HYDRATE is to enhance the capability of flash flood forecasting in ungauged basins by exploiting the extended availability of flash flood data and the improved process understanding. The Partners include nine universities, seven government research centres, and one SME. These represent eight Member States, one Associated Candidate State and three third-countries. Thus the results of HYDRATE will benefit from assembling international knowledge and scientific expertise and lead to advancements in observation strategy for implementation not only in Europe but internationally.

Partners

N°	Organisation	Country
1.	University Of Wyoming	USA

2.	University of Kwazulu-Natal	South Africa
3.	Wuhan University	China
4.	Centre National du Machinisme Agricole, du Génie Rural, Des Eaux et des Forêts	France
5.	Wageningen Universiteit	The Netherlands
6.	HR Wallingford LTD	UK
7.	Institutul National de Hidrologie si Gospodarie a Apelor	Romania
8.	Administratia Nationala de Meteorologie R.A.	Romania
9.	Slovenska Technicka Univerzita V Bratislave	Slovakia
10.	Universitat Politecnica de Catalunya	Spain
11.	Ecole Nationale des Ponts et Chaussées (ENPC)	France
12.	Technische Universität Wien	Austria
13.	Centre National de la Recherche Scientifique (CNRS)	France
14.	Technical University of Crete	Greece
15.	Consiglio Nazionale delle Ricerche	Italy
16.	Hellenic Centre for Marine Research	Greece

IMPRINTS — Improving Preparedness and Risk maNagement for flash floods and debriS flow events

CT — 226555

<http://imprints-fp7.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	15/01/2009
Duration:	42 months
Total project cost:	4.460.191 €
EC Contribution:	3.280.000 €
Coordinating organisation:	Universitat Politècnica de Catalunya Barcelona — Spain
Co-ordinator:	Daniel Sempere-Torres (sempere@crahi.upc.edu)
EC Office:	Environment Directorate

Abstract

The aim of IMPRINTS is to contribute to reduce loss of life and economic damage through the improvement of the preparedness and the operational risk management for Flash Flood and Debris Flow [FF/DF] generating events, as well as to contribute to sustainable development through reducing damages to the environment. To achieve this ultimate objective the project is oriented to produce methods and tools to be used by emergency agencies and utility companies responsible for the management of FF/DF risks and associated effects. Impacts of future changes, including climatic, land use and socioeconomic will be analysed in order to provide guidelines for mitigation and adaptation measures. Specifically, the consortium will develop an integrated probabilistic forecasting FF/ DF system as well as a probabilistic early warning and a rule-based probabilistic forecasting system adapted to the operational use by practitioners. These systems will be tested on five selected flash flood prone areas, two located in mountainous catchments in the Alps, and three in Mediterranean catchments. The IMPRINTS practitioner partners, risk management authorities and utility company managers in duty of emergency management in these areas, will supervise these tests. The development of such systems will be carried out using and capitalising the results of previous and ongoing research on FF/DF forecasting and warning systems, in which several of the partners have played a prominent role. One major result of the project will be a operational prototype including the tools and methodologies developed under the project. This prototype will be designed under the premise of its ultimate commercialization and use worldwide. The consortium, covering all the actors involved in the complex chain of FF & DF forecasting, has been carefully selected to ensure the achievement of this. Specific actions to exploit and protect the results and the intellectual property of the partners have been also defined.

Partners

N°	Organisation	Country
1.	Universitat Politècnica de Catalunya	Spain
2.	Bundesamt für Meteorologie und Klimatologie MeteoSchweiz	Switzerland

3.	Commission of the European Community Directorate General Joint Research Centre — JRC	Belgium
4.	Lancaster University	UK
5.	Eidgenoessische Forschungsanstalt WSL	Switzerland
6.	Wageningen Universiteit	The Netherlands
7.	Cetaqua, Centro Tecnológico del Agua Fundación Privada	Spain
8.	Centro Universitario per la Previsione e Prevenzione dei Grandi Rischi	Italy
9.	University of Kwazulu-Natal	RDC
10.	Servei Meteorologic de Catalunya	Spain
11.	Hydrometeorological Innovative Solutions	Spain
12.	Service Central d'Hydrométéorologie et d'Appui à la Prévision des Inondations, Ministry of Ecology, Sustainable Development and Planning	France
13.	Agència Catalana de l'Aigua	Spain
14.	Departement Bau und Umwelt, Kanton Glarus	Switzerland
15.	Verzasca SA	Switzerland
16.	Azienda Elettrica Ticinese	Switzerland
17.	Autorità di Bacino destra Sele	Italy
18.	Empresa de Gestion MEDIOAMBIENTAL SA	Spain

SafeLand — Living with landslide risk in Europe: Assessment, effects of global change, and risk management strategies

CT — 226479

<http://www.safeland-fp7.eu/>

Funding instrument:	Collaborative Project(CP)
Contract starting date:	01/05/2009
Duration:	36 months
Total project cost:	8.724.972 €
EC Contribution:	6.610.000 €
Coordinating organisation:	Norges Geotekniske Institutt Oslo — Norway
Co-ordinator:	Bjorn Kalsnes (bjorn.kalsnes@ngi.no)
EC Office:	Environment Directorate

Abstract

SafeLand will develop generic quantitative risk assessment and management tools and strategies for landslides at local, regional, European and societal scales and establish the baseline for the risk associated with landslides in Europe, to improve our ability to forecast landslide hazard and detect hazard and risk zones. The scientific work packages in SafeLand are organised in five Areas: Area 1 focuses on improving the knowledge on triggering mechanisms, processes and thresholds, including climate-related and anthropogenic triggers, and on run-out models in landslide hazard assessment; Area 2 does an harmonisation of quantitative risk assessment methodologies for different spatial scales, looking into uncertainties, vulnerability, landslide susceptibility, landslide frequency, and identifying hotspots in Europe with higher landslide hazard and risk; Area 3 focuses on future climate change scenarios and changes in demography and infrastructure, resulting in the evolution of hazard and risk in Europe at selected hotspots; Area 4 addresses the technical and practical issues related to monitoring and early warning for landslides, and identifies the best technologies available both in the context of hazard assessment and in the context of design of early warning systems; Area 5 provides a toolbox of risk mitigation strategies and guidelines for choosing the most appropriate risk management strategy. Maintaining the database of case studies, dissemination of the project results, and project management and coordination are defined in work packages 6, 7 and 8.

Partners

N°	Organisation	Country
1.	Norges Geotekniske Institutt	Norway
2.	Universitat Politecnica de Catalunya	Spain
3.	AMRA Scarl	Italy
4.	Bureau de Recherches Géologiques et Minières	France

5.	Università degli Studi di Firenze	Italy
6.	International Institute for Applied Systems Analysis	Austria
7.	European Community represented by the European Commission Directorate General JRC	Belgium
8.	Fundación Agustín de Betancourt	Belgium
9.	Aristotle University of Thessaloniki	Greece
10.	Universita degli Studi di Milano	Italy
11.	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V.	Germany
12.	Centro euro-Mediterraneo per i Cambiamenti Climatici S.c.a.r.l.	Italy
13.	Studio Geotecnico Italiano srl	Italy
14.	Università degli Studi di Salerno	Italy
15.	International Institute for Geo-information Science and Earth Observation	The Netherlands
16.	Eidgenössische Technische Hochschule Zuerich	Switzerland
17.	Université de Lausanne	Switzerland
18.	C.S.G. S.r.l. Centro Servizi di Geoingegneria	Italy
19.	Centre National de la Recherche Scientifique	France
20.	King's College London	UK
21.	Geological Survey of Austria	Austria
22.	Ecole Polytechnique Fédérale de Lausanne	Switzerland
23.	TRL Limited	UK
24.	Geological Institute of Romania	Romania
25.	Geological Survey of Slovenia	Slovenia

ENSURE — Enhancing resilience of communities and territories facing natural and na-tech hazards

CT — 212045

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/06/2008
Duration:	32 months
Total project cost:	1.805.738 €
EC Contribution:	1.388.634 €
Coordinating organisation:	BRGM (Bureau de Recherches Géologiques et Minières) Paris — France
Co-ordinator:	Hormoz Modaressi (h.modaressi@brgm.fr)
EC Office:	Environment Directorate

Abstract

Since a long time vulnerability is a key concept in disaster literature. Nevertheless the majority of studies and grants have been allocated to hazards related research, neglecting the influence of vulnerability of exposed systems on the death toll and losses in case of natural or man made disasters. There is the need to better identify and measure also the ability of menaced and affected communities and territorial systems to respond. This is the starting point of the ENSURE project. The overall objective of ENSURE is to structure vulnerability assessment model(s) in a way that different aspects of physical, systemic, social and economic vulnerability will be integrated as much as possible in a coherent framework. The ENSURE approach starts from the recognition that for all considered hazards most of damages and most of vulnerabilities arise from the territory, including artefacts, infrastructures and facilities. They may well represent its material skeleton: physical vulnerability is therefore entirely “contained” at a territorial level. Other vulnerabilities, such as systemic, economic and social have interactions with the territory, but cannot be entirely determined at a territorial level. The project will start by assessing the state of the art in different fields related to various vulnerability aspects as they have been tackled until today in Europe and internationally. The core of the project consists in integrated models comprising already existing models to assess vulnerability and develop new ones for those aspects that have been neglected until now. The research objective is therefore to achieve progress with respect to each individual sector of vulnerability and to enhance the capability of assessing interconnections among them in a dynamic way, identifying driving forces of vulnerability that make communities change for the good or for the worse as far as their ability to cope with extreme events is concerned.

Partners

N°	Organisation	Country
1.	Universita degli Studi di Napoli Federico II.	Italy

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

2.	Harokopio University	Greece
3.	Middlesex University Higher Education Corporation	UK
4.	Potsdam Institut für Klimafolgenforschung	Germany
5.	T6 Ecosystems S.R.L.	Italy
6.	Stichting International Institute for Geo-Information Science and Earth Observation	The Netherlands
7.	Université de Genève	Switzerland
8.	Tel Aviv University	Israel
9.	Politecnico di Milano	Italy

MICRODIS — Integrated health social & economic impacts of extreme events: evidence, methods & tools

CT — 036877

<http://www.microdis-eu.be/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/02/2007
Duration:	36 months
Total project cost:	5.655.332 €
EC Contribution:	5.000.000 €
Coordinating organisation:	Université Catholique de Louvain Louvain-la-Neuve, Belgium
Co-ordinator:	Debarati Guha-Sapir (sapir@esp.ucl.ac.be)
EC Office:	Environment Directorate

Abstract

Recent events such as the Pakistan earthquake, Hurricane Katrina, the Indian Ocean tsunami and the European heat waves of 2003 reveal the vulnerability of societies to extreme events. The goal of this project is to strengthen prevention, mitigation and preparedness strategies in order to reduce the health, social and economic impacts of extreme events on communities. The objectives of the MICRODIS project are to strengthen the scientific and empirical foundation on the relationship between extreme events and their impacts; to develop and integrate knowledge, concepts, methods and databases towards a common global approach and to improve human resources and coping capacity in Asia and Europe through training and knowledge sharing. This integrated project involves partners from Asia and Europe, including research, policy and ground roots institutions. The outputs will include an evidence-base on impacts, field methodologies and tools for data compilation, impact models, and integrated vulnerability assessments. It will also strengthen standardised data collection of extreme events and their impacts at local, regional and global levels.

Partners

N°	Organisation	Country
1.	University Of Greenwich	UK
2.	University Of Northumbria at Newcastle	UK
3.	Työterveyslaitos.	Finland
4.	Jadavpur University	India
5.	University Of Delhi	India
6.	Hanoi School Of Public Health	Vietnam
7.	University Of Indonesia	Indonesia
8.	Research Institute For Mindanao Culture Inc	Philippines

9.	United Nations Office For The Coordination Of Humanitarian Affairs	US
10.	Evaplan Gmbh Am Universitätsklinikum Heidelberg	Germany
11.	Sweco Groener As	Norway
12.	Voluntary Health Association Of India	India
13.	Citizens' Disaster Response Center Foundation, Inc	Philippines
14.	Stichting Healthnet International — Transcultural Psychosocial Organization	The Netherlands
15.	Ferurbat Sarl	France
16.	Universitätsklinikum Heidelberg	Germany
17.	Hue College Of Economics — Hue University	Vietnam

IRASMOS– Integral Risk Management of Extremely Rapid Mass Movements

CT — 018412

<http://www.slf.ch/iramos>

Funding instrument:	Specific Targeted Project (STREP)
Contract starting date:	01/09/2005
Duration:	33 months
Total project cost:	4.158.386 €
EC Contribution:	2.424.014 €
Coordinating organisation:	Swiss Federal Research Institutes WSL/SLF Davos Dorf — Switzerland
Co-ordinator:	Jakob Rhyner (jrhyner@slf.ch)
EC Office:	Environment Directorate

Abstract

Rock avalanches, debris flows, and snow avalanches are landslide and landslide-related processes, subsumed under the term extremely rapid mass movements. These processes pose varying degrees of risk to land use, infrastructure, and personal security in many mountainous regions. Despite increasing efforts to quantify the risk in terms of potential damage or loss of life, most previous studies have achieved partial rather than total risk solutions. IRASMOS addresses these shortcomings by reviewing, evaluating, and augmenting methodological tools for hazard and risk assessment extremely rapid mass movements. Results will be synthesized in strategies proposed within the framework of an Integral Risk Management (IRM) in selected European mountain catchments, targeted to equally address measures pertaining to landslide and snow-avalanche disaster prevention, response, and rehabilitation. The proposed project adopts the character of a comprehensive take-up and feasibility study, recognizing fundamental problems of:

- constraints in data quality, availability and analysis,
- constraints in technical, logistical, and financial support,
- integrating the synchronous or interdependent occurrence of rapid mass movements and their potential off-site and long-term effects in a multi-risk context.

Key results include a set of IRM Best Practice Handbook for quantifying and managing total risk from rapid mass movements given possible constraints set by known environmental and administrative boundary conditions. Integrated critical thresholds needed for risk-oriented planning will be quantified and tested. A comprehensive catalogue of triggers and threshold conditions for extremely rapid mass movements, countermeasures, and sensitivity of hazard, vulnerability, and risk indicators will serve as further measures for total risk assessment, allowing customized decision-support for prevention, intervention and rehabilitation efforts in European mountain ranges.

Partners

N°	Organisation	Country
1.	Swiss Federal Research Institutes WSL/SLF	Switzerland
2.	Università degli Studi di Pavia	Italy
3.	Centre National de Recherches Météorologiques Météo	France
4.	Università degli Studi di Trento	Italy
5.	CGF	France
6.	Universität für Bodenkultur Wien	Austria
7.	Politecnico di Milano	Italy
8.	NGI	Norway

MICORE — Morphological Impacts and Coastal Risks induced by Extreme storm events

CT — 202798

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/06/2008
Duration:	36 months
Total project cost:	4.597.071 €
EC Contribution:	3.499.954 €
Coordinating organisation:	Universita Degli Studi di Ferrara Ferrara -Italy
Co-ordinator:	Franca Siena (cvp@unife.it)
EC Office:	Environment Directorate

Abstract

The project is specifically targeted to contribute to the development of a probabilistic mapping of the morphological impact of marine storms and to the production of early warning and information systems to support long-term disaster reduction. A review of historical storms that had a significant impact on a representative number of sensitive European sites will be undertaken. The nine sites are selected according to wave exposure, tidal regime and socio-economical pressures. They include outmost regions of the European Union at the border with surrounding states (e.g. the area of the Gibraltar Strait, the Baltic and Black Sea). All data will be compiled into in a homogeneous database of occurrence and related socio-economic damages, including the following information on the characteristics of the storms, on their morphological impacts, on the damages caused on society, on the Civil Protection schemes implemented after the events. Monitoring of selected sites will take place for a period of one year to collect new data sets of bathymetry and topography using state-of-the-arts technology (Lidar, ARGUS, Radar, DGPS). The impact of the storms on living and non-living resources will be done using low-cost portable GIS methods. Numerical models of storm-induced morphological changes will be tested and developed, using both commercial packages and developing a new open-source morphological model. The models will be linked to wave and surge forecasting models to set-up a real-time warning system and to implement its usage within Civil Protection agencies. The most important product of the project will be the conception of Storm Impact Indicators (SIIs) with defined threshold for the identification of major morphological changes and flooding associated risks. Finally, the results of the project will be disseminated as risk maps through an effective Web_GIS system.

Partners

N°	Organisation	Country
1.	Natural Environment Research Council	UK

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

2.	Consorzio Ferrara Ricerche	Italy
3.	Universidade do Algarve	Portugal
4.	Institute of Oceanology-Bulgarian Academy of Sciences	Bulgaria
5.	Regione Emilia Romagna	Italy
6.	Agenzia Regionale Prevenzione e Ambiente dell'Emilia-Romagna	Italy
7.	Stichting Deltares	The Netherlands
8.	International Marine and Dredging Consultants	Belgium
9.	Uniwersytet Szczecinski	Poland
10.	Bureau de Recherches Géologiques et Minières	France
11.	Fundacao da Faculdade de Ciencias da Universidade de Lisboa	Portugal
12.	Technische Universiteit Delft	The Netherlands
13.	Universidad Pablo de Olavide	Spain
14.	Universidad de Cadiz	Spain
15.	University of Plymouth	UK

VII. CLIMATE CHANGE ADAPTATION, MITIGATION AND POLICIES

ADAM — Adaptation and Mitigation Strategies: Supporting European Climate Policy

CT — 018476

<http://www.adamproject.eu/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/03/2006
Duration:	41 months
Total project cost:	18.216.125 €
EC Contribution:	12.905.000 €
Coordinating organisation:	University of East Anglia Norwich — UK
Co-ordinator:	Michael Hulme (m.hulme@uea.ac.uk)
EC Office:	Environment Directorate

Abstract

The ADAM project will lead to a better understanding of the synergies, trade-offs and conflicts that exist between adaptation and mitigation policies at multiple scales. Crucially, ADAM will support EU policy development in the next stage of the development of the Kyoto Protocol, in particular negotiations around a post-2012 global climate policy regime, and will inform the emergence of new adaptation strategies for Europe. The main impact of the ADAM project will be to improve the quality and relevance of scientific and stakeholder contributions to the development and evaluation of climate change policy options within the European Commission. This will help the Commission to deliver on its current medium-term climate policy objectives and help inform its development of a longer-term climate strategy.

With the entry into force of the Kyoto Protocol on 16 February 2005, the world embarks on a new phase in its relationship with global climate change. The first phase –which started with the discoveries of Jean-Baptiste Joseph Fourier, John Tyndall and Svente Arrhenius in the nineteenth century and which continues through to the present-day with the preparation of the IPCC Fourth Assessment Report — might be regarded as the *scientific phase*. The second phase — which commenced with the Toronto Conference on the Changing Atmosphere of June 1988 and which continues today through the annual meetings of the Conference of the Parties to the UN FCCC — might be regarded as the policy *negotiation phase*. The third — and new phase from 16 February 2005 –might be regarded as the policy *implementation phase*. All three dimensions of activity now continue in parallel –research, negotiation and implementation –and therefore the need for adequate and robust connections to be made between these three distinct, but not independent, domains of activity becomes increasingly important.

Global climate change continues to present new challenges for the development of public policy, not least the establishment of a post-2012 global climate governance regime (EC, 2005) ⁽¹⁾. The entry in force of the Kyoto Protocol is a huge landmark for global climate governance, but it in

⁽¹⁾ European Commission (2005) Winning the battle against global climate change Communication from the Commission to the Council, the European Parliament, the European Economics and Social Committee and the Committee of the Regions. COM (2005) 35 final. Commission of the European Communities, Brussels, Belgium, February 9 2005.

no way lessons the importance, urgency or difficulty of securing a new, more comprehensive, international agreement for the post-2012 period. The unique challenges presented by climate change arise because:

of the time-scales involved between policy implementation and desired outcome are much longer than in other policy areas;

- many areas of policy planning need simultaneously to be addressed, therefore placing a greater demand on the integration of policy across different realms;
- the opportunities that climate change opens up for technological innovation and comparative economic advantage for first-mover regions, whilst considerable, are not inevitable;
- the truly global nature of the problem requires national or regional policies to be designed within some framework of global strategy.

These challenges are true for all nations, yet are particularly acute for the European Union (EU) which has assumed a leading role in the design of international climate policies. Appropriate European climate change policies therefore need simultaneously to secure long-term climate protection goals, to be integrated across multiple-sectors, to secure economic benefits, and to be designed to resonate with emerging international agreements and geo-political discourses. They must also be acceptable to Europe's citizens and stakeholders, a specific challenge in democratic societies when costs may be incurred now, yet benefits are realised for future decades.

These are challenging objectives. In order to meet them, Europe will need to harness available scientific expertise to identify, illuminate and appraise the available policy options. These options must address the demands a de-stabilised climate will place on protecting citizens and valued ecosystems — i.e., *adaptation* — as well as addressing the necessity to stabilize humankind's perturbation to global climate at a minimum desirable level whilst safeguarding and transforming economic activities — i.e., *mitigation*. The appraisal of these options must recognize the existence of multiple criteria, such as cost-benefit, cost effectiveness, equity, legitimacy, societal support and environmental integrity. Such an appraisal must also identify where policy options can contribute to both objectives — i.e., *adaptation and mitigation* — and where policy trade-offs may emerge.

It is in this territory — the interface between research, negotiation and implementation, in particular providing new insights, tools and process in support of policy appraisal — that the ADAM project will operate.

Objectives

The core objectives proposed by the ADAM (Adaptation and Mitigation) Consortium are therefore:

- To assess the extent to which existing and evolving EU (and world) mitigation and adaptation policies can achieve a tolerable transition (a 'soft landing') to a world with a global climate no warmer than 2°C above pre-industrial levels, and to identify their associated costs and effectiveness, including an assessment of the damages avoided compared to a scenario where climate change continues unchecked to 5°C.
- To develop and appraise a portfolio of longer term strategic policy options that could contribute to addressing identified shortfalls both between existing mitigation policies and the achievement of the EU's 2°C target, and between existing adaptation policy development and implied EU goals and targets for adaptation.

- To develop a novel Policy-options Appraisal Framework and apply it both to existing and evolving policies, and to new, long-term strategic policy options, so as to inform: European and international climate protection strategy in post-2012 Kyoto negotiations, a re-structuring of International Development Assistance, the EU electricity sector and regional spatial planning.)

A mature climate strategy will integrate mitigation and adaptation policies and embed (mainstream) them within other non-climate policy realms, including aspects of technological and institutional innovation and economic development. The ADAM project will lead to a better understanding of the complementarities, trade-offs and distinctions that exist between adaptation and mitigation policies and policy options, in the EU and internationally. In particular, the project will support EU policy development in the context of negotiations around a post-2012 global climate governance regime, and will inform the emergence of new adaptation strategies for Europe. In research on adaptation policy options, special attention will be paid to the role of extreme events as both exposing vulnerability, as a signal for change and as a motor for adaptation.

In terms of policy development, the principal time horizon of the project will be from the present to 2025, while the time horizon for the appraisal of innovative longer-term policy options will be to 2100. The dominant unit of analysis for the project will be the EU and its current 25 member states, but will specifically include global analyses where this clearly affects the interests of EU citizens and states (for example, international emissions trading; development assistance; the dependence of Europe on the climate change policies of other continents, etc.). The ADAM Consortium includes two 3rd Country collaborating partners (in India and China) to ensure that our research is grounded in a global perspective, both benefiting from and informing non-Annex I insights and positions.

Partners

N°	Organisation	Country
1.	University of East Anglia	UK
2.	Potsdam-Institut für Klimafolgenforschung E.V.	Germany
3.	Vrije Universiteit Amsterdam	The Netherlands
4.	Center for International Climate and Environmental Research	Norway
5.	Wageningen University Research — Alterra	The Netherlands
6.	International Institute for Applied Systems Analysis	Austria
7.	Paul Scherrer Institut	Switzerland
8.	Lunds Universitet	Sweden
9.	International Centre for Integrated Studies, University of Maastricht	The Netherlands
10.	Universitat Autònoma de Barcelona	Spain
11.	Research Centre for Agricultural and Environment — Polish Academy of Forest Sciences	Poland
12.	National Institute of Public Health and the Environment	The Netherlands
13.	Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung E.V.	Germany
14.	University of Cambridge	UK
15.	European Commission Directorate General — Joint Research Centre	Belgium

16.	University of Florence	Italy
17.	Stockholm Environment Institute	Sweden
18.	Centre National de la Recherche Scientifique	France
19.	Corvinus University of Budapest	Hungary
20.	Enerdata Sa	France
21.	Deutsches Institut für Wirtschaftsforschung Berlin e.v.	Germany
22.	Eidgenoessische Technische Hochschule Zürich	Switzerland
23.	Wageningen University	The Netherlands
24.	Centre for European Policy Studies	Belgium
25.	The Energy and Resources Institute	India
26.	Regional Center for Temperate East Asia, Chinese Academy of Sciences	China

CCTAME — Climate Change — Terrestrial Adaption and Mitigation in Europe

CT — 212535

<http://www.cctame.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/06/2008
Duration:	36 months
Total project cost:	4.591.008 €
EC Contribution:	3.499.516 €
Coordinating organisation:	International Institute for Applied Systems Analysis Laxenburg — Austria
Co-ordinator:	Michael Obersteiner (oberstei@iiasa.ac.at)
EC Office:	Environment Directorate

Abstract

The project will assess the impacts of agricultural, climate, energy, forestry and other associated land-use policies, considering the resulting feed-backs on the climate system. Geographically explicit biophysical models together with an integrated cluster of economic land-use models will be coupled with regional climate models to assess and identify mitigation and adaptation strategies in European agriculture and forestry. The role of distribution and pressures from socio-economic drivers will be assessed in a geographically nested fashion. Crop/trees growth models operating on the plot level as well as on continental scales will quantify a rich set of mitigation and adaptation strategies focusing on climatic extreme events. The robustness of response strategies to extreme events will further be assessed with risk and uncertainty augmented farm/forest enterprise models. Bioenergy sources and pathways will be assessed with grid level models in combination with economic energy-land-use models. The results from the integrated CC-TAME model cluster will be used to provide: quantitative assessments in terms of cost-efficiency and environmental effectiveness of individual land-use practices; competitive LULUCF mitigation potentials taking into account ancillary benefits, trade-offs and welfare impacts, and policy implications in terms of instrument design and international negotiations. The proposed structure of the integrated CC-TAME model cluster allows us, to provide an evaluation of policy options at a great level of detail for EU25(27) in a post-Kyoto regime, as well as to offer perspectives on global longer-term policy strategies in accordance with the principles and objectives of the UNFCCC. Close interactions with policymakers and stakeholders will ensure the policy relevance of CC-TAME results.

Partners

N°	Organisation	Country
1.	European Center for Agricultural, Regional and Environmental Policy Research, Eurocare	Germany
2.	Centro de Investigacion Ecologica y Aplicaciones Forestales Consorcio	Spain

3.	Commission of the European Communities — Directorate General Joint Research Centre — JRC	Belgium
4.	Univerzita Komenskeho V Bratislave	Slovakia
5.	Vyskumny Ustav Podoznalectva a Ochrany Pody	Slovakia
6.	Danmarks Tekniske Universitet	Denmark
7.	Universität für Bodenkultur Wien	Austria
8.	Universität Hamburg	Germany
9.	Joanneum Research Forschungsgesellschaft MBH	Austria
10.	Institut National de la Recherche Agronomique	France
11.	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Germany
12.	Imperial College of Science, Technology and Medicine	UK
13.	The University Court of the University of Aberdeen	UK
14.	Metsäntutkimuslaitos	Finland

ClimateCost — Full Costs of Climate Change

CT — 212774

<http://www.climatecost.cc>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/01/2009
Duration:	32 months
Total project cost:	4.605.603 €
EC Contribution:	3.499.994 €
Coordinating organisation:	Sei Oxford Office Limited*Stockholmenvironment Institute Oxford Office Sei Ltd Oxford — United Kingdom
Co-ordinator:	Thomas Edward Downing (tomdowning.sei@gmail.com)
EC Office:	Environment Directorate

Abstract

There is increasing interest in the economics of climate change to inform policy on a) long-term targets, b) the costs of inaction (the economic effects of climate change), and c) the costs and benefits of adaptation. The objectives of this study are to advance knowledge across all three areas, i.e. the full economic costs of climate change, through the following tasks:

- To identify and develop consistent climate change and socio-economic scenarios, including mitigation scenarios.
- To quantify in physical terms, and economic costs, the 'costs of inaction' for these scenarios, with bottom-up disaggregated (spatial) modelling for market and non-market sectors (coasts, health, ecosystems, energy, water, infrastructure) in the EU and other major negotiator countries (US, China, India). To extend analysis to quantify and value the costs and benefits of adaptation, and the residual costs of climate change' after adaptation.
- To assess the physical effects and economic damages of a number of the most important major catastrophic events and major socially contingent effects.
- To update the mitigation costs of GHG emission reductions for medium and long-term reduction targets/ stabilisation goals. To include (induced) technological change, non CO2 GHG and sinks, and recent abatement technologies.
- To quantify the ancillary air quality benefits of mitigation, using a spatially detailed disaggregated approach to quantify in physical terms and monetary benefits, in Europe and major negotiator countries.
- To apply a number of complementary CGM and IAM models to incorporate the information from the tasks above.
- To bring all the information above together to provide policy relevant output, including information on physical effects and economic values, and undertake analysis of policy scenarios.

The project involves a multi-disciplinary team with leading impact and economic experts. It is innovative in developing bottom-up and top-down analysis within consistent scenarios and a

single integrated framework, providing highly dis-aggregated outputs on impacts and economic costs.

Partners

N°	Organisation	Country
1.	Universita Karlova V Prave	Czech Republic
2.	Université Pierre Mendes France	France
3.	AEA Technology PLC	UK
4.	University of the Aegean-Research Unit	Greece
5.	Metroeconomica Limited	UK
6.	National Development and Reform Commission Energy Research Institute	China
7.	Paul Watkiss Associates LTD	UK
8.	Danmarks Meteorologiske Institut	Denmark
9.	Potsdam Institut für Klimafolgenforschung	Germany
10.	Economic and Social research Institute	Ireland
11.	Institute of Communication and computer Systems	Greece
12.	Zentrum für Europaeische Wirtschaftsforschung GMBH	Germany
13.	Internationales Institut für Angewandte Systemanalyse	Austria
14.	Fondazione Eni Enrico Mattei	Italy
15.	Commission of the European Communitites — Directorate General Joint Research Centre — JRC	Belgium
16.	The Enenergy and Resources Institute	India
17.	Katholieke Universiteit Leuven	Belgium
18.	Universidad Politecnica de Madrid	Spain
19.	University of Southampton	UK
20.	London School of Hygiene and Tropical Medicine	UK
21.	University of East Anglia	UK

LONG-TERM RISKS — Evaluation and Management of Collective Long-Term Risks

CT — 230589

(¹)

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/01/2009
Duration:	60 months
Total project cost:	1.400.000 €
EC Contribution:	1.400.000 €
Coordinating organisation:	Fondation Jean-Jacques Laffont, Toulouse Sciences Economiques Toulouse — France
Co-ordinator:	Frédéric Cherbonnier (cherbonnier@cict.fr)
EC Office:	Implementation of the “Ideas” Programme Directorate

Abstract

The aim of this research proposal is to provide a unified framework to evaluate and to manage collective long-term risks, with applications to environmental risks (climate change, genetically modified organisms, nuclear wastes, non-renewable resources, biodiversity, &). What should we be willing to give up to reduce these risks? What is the best timing for action? How should the risk evaluation be adapted to the absence of objective probabilities, the conflicts between and biases in individual beliefs, the heterogeneity of individual preferences towards these risks, the ability to predict future impacts, the limited capability to share risk efficiently, or the changing expectations about long-term economic growth and about the scarcity of environmental resources? To examine these questions, we will combine various approaches from modern decision theory, the theory of finance, environmental economics and behavioural economics.

This research is also aimed at helping collective decision making by improving the standard tools of benefit-cost analysis for the specificities of long-term risks: discounting of far distant effects, risk premium for fat tails, ambiguity premium, aggregation rules for heterogeneous beliefs and preferences, and option values. We will translate general concepts as sustainable development, corporate social responsibility and precautionary principle into efficient guidelines for collective decision making.

Partners

N°	Organisation	Country
1.	Fondation Jean-Jacques Laffont	France

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

MEECE — Marine Ecosystem Evolution in a Changing Environment

CT — 212085

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/09/2008
Duration:	48 months
Total project cost:	9.025.260 €
EC Contribution:	6.499.745 €
Coordinating organisation:	Plymouth Marine Laboratory Plymouth — UK
Co-ordinator:	Julian Icarus Allen (jia@pml.ac.uk)
EC Office:	Environment Directorate

Abstract

MEECE is a scientific research project which aims to use a combination of data synthesis, numerical simulation and targeted experimentation to further our knowledge of how marine ecosystems will respond to combinations of multiple climate change and anthropogenic drivers. With an emphasis on the European Marine Strategy (EMS), MEECE will improve the decision support tools to provide a structured link between management questions and the knowledge base that can help to address those questions. A strong knowledge transfer element will provide an effective means of communication between end-users and scientists.

Partners

N°	Organisation	Country
1.	Bolding & Burchard APS	Denmark
2.	Universita degli Studi del piemonte Orientale Amedeo Avogadro	Italy
3.	Natural Environment Reseach Council	UK
4.	Fundación Azti	Spain
5.	Middle East Technical University	Turkey
6.	Instituto Español de Oceanografía	Spain
7.	Hellenic Centre for Marine Research	Greece
8.	Klaipėdos Universitetas	Lithuania
9.	Alma Mater Studiorum-Università di Bologna	Italy
10.	Institu de Recherche pour le Développement	France
11.	Universitetet I Bergen	Norway

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

12.	Universitat Hamburg	Germany
13.	Commissariat Energie Atomique CEA	France
14.	Wageningen Imares	The Netherlands
15.	The Secretary of States dor Environment, Food and Rural Affairs	UK
16.	Danmarks Tekniske Universitet	Denmark
17.	Havforskningsinstituttet	Norway
18.	Sir Alister Hardy Foundation for Ocean Science	UK
19.	Centre National de la Recherche Scientifique (CNRS)	France
20.	Syddansk Universitet	Denmark

ADAGIO — Adaptation of agriculture in the European regions at Environmental risk under climate change

CT — 044210

<http://www.adagio-eu.org>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/01/2007
Duration:	30 month
Total project cost:	564.300 €
EC Contribution:	526.300 €
Coordinating organisation:	University of Natural Resources and Applied Life Sciences Vienna, Austria
Co-ordinator:	Josef Eitzinger (josef.eitzinger@boku.ac.at)
EC Office:	Biotechnologies, agriculture and food Directorate

Abstract

Compared to the manyfold potential impacts of climate change on agroecosystems, potential adaptation measures are even more complex because of the high number of options available through the human factor. New policies must therefore be adopted under climate change conditions considering all potential and realistic adaptation measures especially on the regional and farm level to secure sustainability of agricultural crop production. Despite of the recognised relevance of climate risk assessments for agroecosystems, they have been not noticeable applied for supporting adaptation within agricultural decision-making within Europe, neither worldwide, because of its uncertainty and lack of knowledge by decision-makers. On the other hand, the European research funds concerning agricultural climate-change impact assessments have been addressed mainly to theoretical issues rather than to research-results applications. According to the above statement, a new SSA is proposed in order to analyse and evaluate potential and actual adaptation measures in agriculture for different climatic and agroecosystem regions under risk in Europe. The various questions as formulated under Task 18 of this SSP call will be investigated at the scientific level as well as at the farm level by the partners in selected vulnerable regions. The SSA will consider not only future scenarios and results based on modelling tools, but also already visible (or known) ongoing changes and adaptation measures for a better and realistic assessment of potential future adaptation measures at the regional level. Furthermore, probably changes in the European policies as the CAP or the WFD will be taken in account as well, since final decisions of farmers would be based on several issues additionally to climate risks. The SSA should establish a continuous interacting information and discussion network, connecting the research level with decision makers and support a holistic approach to solve the related problems.

Partners

N°	Organisation	Country
1.	Instituto Tecnológico Agrario de Castilla y Leon	Spain

- | | | |
|-----|---|--------------------------|
| 2. | National Institute of Meteorology and Hydrology —
Bulgarian Academy of Sciences | Bulgaria |
| 3 | Center for Meteorology and Environmental Predictions,
Faculty of Science, University of Novi Sad | Serbia and
Montenegro |
| 4. | Mendel University of Agriculture and Forestry in Brno | Czech Republic |
| 5. | Consiglio per la ricerca e la sperimentazione in agricoltura | Italy |
| 6. | National Observatory of Athens | Greece |
| 7. | Central Laboratory for Agricultural Climate | Egypt |
| 8. | August Cieszkowski Agricultural University of Poznan | Poland |
| 9. | State Hydrological Institute | Russia |
| 10. | Fundatia pentru Tehnologia Informatiei Aplicata in Mediu,
Agricultura si Schimbări Globale | Romania |

MOTIVE — Models for Adaptive Forest Management

CT — 226544

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/05/2009
Duration:	48 months
Total project cost:	9.070.934 €
EC Contribution:	6.961.073 €
Coordinating organisation:	Forstliche Versuchs- und Forschungsanstalt Baden-Wuerttemberg Freiburg — Germany
Co-ordinator:	Alfons Bieling (alfons.bieling@forst.bwl.de)
EC Office:	Environment Directorate

Abstract

The project MODELS for Adaptive forest Management (MOTIVE) will evaluate the consequences of the intensified competition for forest resources given climate and land use change. The project focuses on a wide range of European forest types under different intensities of forest management. In particular, MOTIVE examines impacts with respect to the disturbance regimes determining forest dynamics. MOTIVE seeks to develop and evaluate strategies that can adapt forest management practices to balance multiple objectives under changing environmental conditions. The evaluation of different adaptive management systems will take place within a scenario analysis and a regional landscape framework. A wide range of possible scenarios will be taken into account on different time scales. The main forest types in Europe for the most important bioclimatic regions will be covered and the most important goods and services delivered by European forests will be assessed using the most up to date models. The ultimate objective of the MOTIVE project is to provide insights, data and tools to improve policymaking and adaptive forest resource management in the face of rapidly changing climatic and land-use conditions. In order to reach its objectives, MOTIVE is organized into six scientific work packages in addition to a management-oriented work package: Baseline trends and possible futures for the EU. Development of improved models for Adaptive Forest Management. Testing and evaluating management options and risks. Evaluating and selecting good adaptive forest management strategies. Improved decision support in adaptive forest management.

Stakeholder/Decision maker interaction and Dissemination. One of the main deliverables of MOTIVE will be an Adaptive Forest Management toolbox. The toolbox will provide up-to-date methods for planning and decision making in AFM to the decision maker (forest resource manager, policy maker) for actual use in strategic and tactical forest management planning.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Forest Research Institute of Baden-Wuerttemberg	Germany
2.	Alterra BV	The Netherlands
3.	Swiss Federal Research Institute WSL	Switzerland
4.	Swiss Federal Institute of Technology	Switzerland
5.	University of Copenhagen	Denmark
6.	Universität für Bodenkultur Wien	Austria
7.	European Forest Institute	Finland
8.	Albert-Ludwigs-University Freiburg	Germany
9.	Centro de Estudos Florestais — Instituto Superior de Agronomia — Technical University of Lisbon	Portugal
10.	Institut National de la Recherche Agronomique	France
11.	University Stefan cel Mare Suceava	Romania
12.	University of Joensuu	Finland
13.	Sveriges Lantbruksuniversitet	Sweden
14.	Forestry Commission Research Agency	UK
15.	Potsdam Institute for Climate Impact Research e.V.	Germany
16.	Center for Ecological Research and Forestry Applications	Spain
17.	IFER — Institute of Forest Ecosystem research, Ltd.	Czech Republic
18.	University of Forestry, Bulgaria	Bulgaria
19.	Foreco Technologies S.L	Spain
20.	Pensoft Publishers Ltd.	Bulgaria

NEWATER — New Approaches to Adaptive Water Management under Uncertainty

CT- 511179

<http://www.newater.info/>

Funding instrument:	Integrated Project (IP)
Contract starting date:	01/01/2005
Duration:	50 Months
Project total cost:	15.118.673 €
EC contribution:	11.999.961 €
Coordinating organisation:	University of Osnabrück Institute of Environmental Systems Research (USF) Osnabrück — Germany
Co-ordinator:	Claudia Pahl-Wostl (Pahl@usf.Uni-Osnabrueck.DE)
EC Office:	Environment Directorate

Abstract

The central tenet of the NeWater project is a transition from currently prevailing regimes of river basinwater management into more adaptive regimes in the future. This transition calls for a highly integratedwater resources management concept. NeWater identifies key typical elements of the current watermanagement system and focuses its research on processes of transition of these elements to adaptiveIWRM. Each key element is studied by novel approaches. Key IWRM areas where NeWater isexpected to deliver breakthrough results include:

1. Governance in water management (methods to arrive at polycentric, horizontal broad stakeholderparticipation in IWRM)
2. Sectoral integration (integration of IWRM and spatial planning; integration with climate changeadaptation strategies, cross-sectoral optimization and cost-benefit analysis)
3. Scales of analysis in IWRM (methods to resolve resource use conflicts; transboundary issues)
4. Information management (multi stakeholder dialogue, multi-agent systems modelling; role ofgames in decision making; novel monitoring systems for decision systems in water management)
5. Infrastructure (innovative methods for river basin buffering capacity; role of storage in adaptation to climate variability and climate extremes)
6. Finances and risk mitigation strategies in water management (new instruments, role of public-private arrangements in risk-sharing)
7. Stakeholder participation; promoting new ways of bridging between science, policy and implementation.

The development of concepts and tools that guide an integrated analysis and support a stepwiseprocess of change in water management is the corner-stone of research activities in the NeWaterproject. To achieve its objectives the project is structured into six work blocks, and it

adopts a management structure that allows effective exchange between innovative and cutting edge research on integrative water management concepts.

Partners

N°	Organisation	Country
1.	Katholieke Universiteit Leuven	Belgium
2.	Instituto Geologico y Minero De España	Spain
3.	The Chancellor, Masters and Scholars of the University of Oxford	UK
4.	National Research Council	Italy
5.	Centre National du Machinisme Agricole, du Génie Rural et des Eaux et Forêts	France
6.	Rheinische Friedrich-Wilhelms-Universität	Germany
7.	Wageningen University	The Netherlands
8.	Vrije Universiteit Amsterdam-Institute for Environmental Studies	The Netherlands
9.	University of Twente	The Netherlands
10.	Universidad Politecnica de Madrid	Spain
11.	University of Exeter	UK
12.	UMEAA University	Sweden
13.	Vyzkumny Ustav Vodohospodarsky T.G. Masaryka	Czech Republic
14.	Seecon Deutschland GMBH	Germany
15.	Potsdam Institute for Climate Impact Research	Germany
16.	National Scientific Centre for Medical and Biotechnical research/ National Academy of Sciences of Ukraine	Ukraine
17.	IUCN-International Union for the Conservation of Nature and Natural resources	Switzerland
18.	Instituto de Soldadura e Qualidade	France
19.	Institute of Hydrodynamics, Academy of Sciences of the Czech Republic	Czech Republic
20.	Maastricht University	The Netherlands
21.	Ecologic-Institute for International and European Environmental Policy	Germany
22.	Universität Kassel	Germany
23.	Tashkent Institute of Irrigation and Melioration	Uzbekistan
24.	York University	UK
25.	International Institute for Applied Systems Analysis	Austria
26.	HR Wallingford LTD	UK
27.	Geological Survey of Denmark and Greenland	Denmark
28.	Alterra BV	The Netherlands
29.	Cranfield University	UK
30.	Technische Universiteit Delft	The Netherlands
31.	Rijksinstituut voor Integraal Zoetwaterbeheer en Afvalwaterbehandeling	The Netherlands
32.	Fondazione Eni Enrico Mattei	Italy

- | | | |
|-----|---|--------------|
| 33. | Natural Environment Research Council | UK |
| 34. | Manchester Metropolitan University | UK |
| 35. | Max-Planck-Gesellschaft zur Förderung der Wissenschaften E.V. | Germany |
| 36. | Isntitute of Natural Reosurces | South Africa |
| 37. | Universidad Complutense de Madrid | Spain |
| 38. | UFZ-Umweltforschungszentrum Leipzig-Halle GMBH | Germany |

ClimateWater — Bridging the gap between adaptation strategies of climate change impacts and European water policies

CT — 211894

<http://www.climatewater.org/>

Funding instrument:	Coordination and Support Action (CSA)
Contract starting date:	01/11/2008
Duration:	36 months
Total project cost:	1.171.003 €
EC Contribution:	956.932 €
Coordinating organisation:	VITUKI, Environmental Protection and Water Management Research Institute Budapest — Hungary
Co-ordinator:	Gaborne Balazs (jolankai@vituki.hu)
EC Office:	Environment Directorate

Abstract

The Project WaterClimate is aimed as the first step on the analysis and synthesis of data and information on the likely (known, assumed, expected, modelled, forecasted, predicted, estimated etc.) water related impacts of the changes of the climate with special regard to their risk and to the urgency of getting prepared to combat these changes and their impacts. The Project will identify all adaptation strategies that were developed in Europe and also globally for handling (preventing, eliminating, combating, mitigating) the impacts of global climate changes on water resources and aquatic ecosystems, including all other water related issues of the society and nature. Research needs in the field of 'climate impact on the water cycle and water users' will be identified with special regard to enable the ranking of adaptation action in the light of the magnitude of impact on water resources and the urgency of the action needed. The most important output of the project will be the identification of gaps that would hinder the implementation of the EU water policy in combating climate impacts on water.

Partners

N°	Organisation	Country
1.	Consiglio Nazionale Delle Ricerche	Italy
2.	Universität Osnabrück	Germany
3.	Malta Resources Authority	Malta
4.	Geonardo Environmental Technologies Ltd	Hungary
5.	Debreceni Egyetem	Hungary
6.	National Institute Of Marine Geology And Geoecology	Romania
7.	Sogreah Consultants Sas	France

8.	Slovensky Hydrometeorologicky Ustav	Slovakia
9.	Universität Wien	Austria
10.	University Of Leicester	UK

MACIS — Minimisation of and Adaptation to Climate change: Impacts on biodiversity

CT- 044399

<http://www.macis-project.net/>

Funding instrument:	Specific Targeted Project (STREP)
Contract starting date:	01/11/2006
Duration:	24 Months
Project total cost:	1.213.621 €
EC contribution:	900.000 €
Coordinating organisation:	Helmholtz Centre for Environmental Research — UFZ Halle — Germany
Co-ordinator:	Ingolf Kühn (ingolf.kuehn@ufz.de)
EC Office:	Environment Directorate

Abstract

MACIS will review and meta-analyse the existing projections of climate change impacts on biodiversity. It will assess the available options to prevent and minimise negative impacts for the EU25 up to 2050 and review the state-of-the-art on methods to assess the probable future impacts of climate change on biodiversity. This includes the review of possible climate change adaptation and mitigation measures and their potential effect on future biodiversity. MACIS wants to further develop a series of biodiversity and habitat models that address biodiversity impacts, and are capable of calculating the consequences of the changes in the trends in drivers as specified by the narrative scenarios provided by the IPCC. MACIS will identify policy options at EU, M S, regional and local levels to prevent and minimise negative impacts from climate change and from climate change adaptation and mitigation measures

Partners

N°	Organisation	Country
1.	Oxford Brookes University	United Kingdom
2.	South African National Biodiversity Institute	South Africa
3.	Helsingin Yliopisto	Finland
4.	Universita Degli Studi di Torino	Italy
5.	Pensoft Publishers	Bulgaria
6.	The Chancellor, Masters And Scholars of the University of Oxford	United Kingdom
7.	Centre National de la Recherche Scientifique	France
8.	Université de Lausanne	Switzerland
9.	Consejo Superior de Investigaciones Cientificas	Spain
10.	Université Catholique de Louvain	Belgium
11.	Lunds Universitet	Sweden

HighNoon — Adaptation to changing water resources availability in northern India with Himalayan glacier retreat and changing monsoon pattern

CT — 227087

<http://www.eu-highnoon.org/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/05/2009
Duration:	36 months
Total project cost:	4.279.841€
EC Contribution:	3.311.751€
Coordinating organisation:	Alterra b.v Wageningen — The Netherlands
Co-ordinator:	Eddy Moors (eddy.moors@wur.nl)
EC Office:	Environment Directorate

Abstract

The hydrological system of Northern India is based on two main phenomena, the monsoon precipitation in summer and the growth and melt of the snow and ice cover in the Himalaya, also called the “Water Tower of Asia”. However, climate change is expected to change these phenomena and it will have a profound impact on snow cover, glaciers and its related hydrology, water resources and the agricultural economy on the Indian peninsula (Singh and Kumar, 1996, Divya and Mehrotra, 1995). It is a great challenge to integrate the spatial and temporal glacier retreat and snowmelt and changed monsoon pattern in weather prediction models under different climate scenarios. Furthermore, the output of these models will have an effect on the input of the hydrological models. The retreat of glaciers and a possible change in monsoon precipitation and pattern will have a great impact on the temporal and spatial availability of water resources in Northern India. Besides climate change, socio-economic development will also have an influence on the use of water resources, the agricultural economy and the adaptive capacity. Socio-economic development determines the level of adaptive capacity. It is a challenge to find appropriate adaptation strategies with stakeholders for each of the sectors agriculture, energy, health and water supply by assessing the impact outputs of the hydrological and socio-economical models. The principal aim of the project is to assess the impact of Himalayan glaciers retreat and possible changes of the Indian summer monsoon on the spatial and temporal distribution of water resources in Northern India and to provide recommendations for appropriate and efficient response strategies that strengthen the cause for adaptation to hydrological extreme events.

Partners

N°	Organisation	Country
1.	Alterra b.v.	The Netherlands
2.	The Energy and Resources Institute	India
3.	Met Office	UK
4.	University of Salford	UK
5.	Indian Institute of Technology Delhi (Foundation for Innovation and Technology Transfer)	India
6.	University of Fribourg, Department of Geosciences	Switzerland
7.	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V.	Germany
8.	Indian Institute of Technology, Kharagpur	India
9.	Nagoya University	Japan

FUTURESOC — Forecasting Societies Adaptive Capacities to Climate Change

CT — 230195

(¹)

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/03/2009
Duration:	60 months
Total project cost:	2.438.402 €
EC Contribution:	2.438.402 €
Coordinating organisation:	Internationales Institut für Angewandte Systemanalyse Laxenburg — Austria
Co-ordinator:	Susan Riley (riley@iiasa.ac.at)
EC Office:	Implementation of the “Ideas” Programme Directorate

Abstract

This interdisciplinary project (combining social and earth sciences) addresses a key gap in the knowledge of global assessments concerning the likely consequences of future climate change on future human wellbeing. More information about the determinants of future adaptive capacity is necessary for setting policy priorities today: Should the significant funds allocated for adaptation be invested in enhancing existing infrastructure or currently practiced agricultural strategies (some of which may not be tenable under future climates), or should they invest alternatively in enhancing human empowerment through education and health which in consequence will enable affected societies to better cope with whatever challenges the future will bring?

This study is expected to bring significant progress in this difficult multidisciplinary, yet highly relevant, field through a combination of:

- New global science-based, long-term projections of human capital (population by age, sex and level of education) as a key element of adaptive capacity;
- Three empirical multi-national studies on key factors involved in past vulnerability and adaptations to the Sahelian drought, Hurricane Mitch and the Asian tsunami;
- Three prospective case studies assessing future adaptive capacity for the Phuket region, Mauritius and the Nicobar islands;
- All held together and put into perspective by the elaboration of a new demographic theory of long-term social change with predictive power.

This rather complex project structure is necessary for reaching generalizable and useful results. All components have been designed to complement each other to maximize the chances of achieving path-breaking and at the same time tangible results in this highly complex, multidisciplinary field. All components of the study will build on previous work of IIASA and Wolfgang Lutz and hence

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

minimize the need to acquire additional experience for the case study sites or for the methodology used.

Partners

N°	Organisation	Country
1.	Internationales Institut für Angewandte Systemanalyse	Austria

U4IA (Euphoria) — Emerging Urban Futures and Opportune Repertoires of Individual Adaptation

CT — 230517

(¹)

Funding instrument:	Support for Frontier Research (ERC)
Contract starting date:	01/01/2009
Duration:	60 months
Total project cost:	2.461.681 €
EC Contribution:	2.461.681 €
Coordinating organisation:	Technische Universiteit Eindhoven Eindhoven –The Netherlands
Co-ordinator:	Marius Monen (H.P.J.M.Roumen@tue.nl)
EC Office:	Implementation of the “Ideas” Programme Directorate

Abstract

Activity-based analysis and modelling has rapidly gained momentum in transportation, urban planning, and geography. It examines which activities are conducted where, when, for how long, with whom, and the transport mode and route involved at a very fine scale of spatial and temporal resolution. All currently operational models are concerned with daily activity-travel patterns and do not consider any dynamics, illustrating the limitations of current approaches.

This proposal reflects the ambition to achieve breakthroughs in the analysis and modelling of DYNAMIC activity-travel patterns, integrating long-term, mid-term and short-term time horizons: the research agenda in this field of research for the next decade. Several PhD projects will analyze and model the impact of innovative policies concerned with urban futures (focusing on new urban forms, creative pricing policies, restricted energy, community-based social networks and personalized guidance systems) on behavioural change in activity-travel patterns. Results will be integrated into a new generation multi-agent activity-based system to simulate primary and secondary effects of various types of policies on dynamic activity-travel patterns and therefore on accessibility, mobility, time use, energy consumption, social exclusion, and economic welfare.

A large scale panel survey of dynamic activity-travel patterns (supposed to be the first of its kind in the world), and (virtual reality) adaptation experiments will be used for the analyses and estimating and validating the models.

The project will lead to (i) a better understanding and an integrative framework and simulation model to assess the primary and secondary effects of various types of policies on sustainable urban environments in terms of a series of indicators (mobility, accessibility, energy use, etc.), derived from dynamics activity-travel patterns and (ii) guidelines how the effectiveness of such policies can be improved.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Technische Universiteit Eindhoven	The Netherlands

GAINS-ASIA — Greenhouse Gas and Air Pollution Interactions and Synergies

CT — 022652

http://www.iiasa.ac.at/rains/gains_asia/

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	1/11/2005
Duration:	27 months
Total project cost:	1.161.102 €
EC Contribution:	695.000 €
Coordinating organisation:	International Institute for Applied Systems Analysis Laxenburg — Austria
Co-ordinator:	Markus Amann (amann@iiasa.ac.at)
EC Office:	Environment Directorate

Abstract

GAINS-Asia brings together state-of-the-art disciplinary models on air pollution and climate change to assess technical and market based policies that maximize synergies and benefits between these policy areas. GAINS-Asia will integrate policy-relevant information from the BernCC carbon cycle model, the MESSAGE global energy scenario model, the RAINS air pollution integrated assessment model, its extension addressing mitigation potentials for greenhouse gas emissions in Europe, the TM5 hemispheric atmospheric chemistry and transport model, and the implementations of the MARKAL and IPAC energy models for India and China. GAINS-Asia will construct reduced-form representations of these models and combine these functional relationships at the meta-level into a new GAINS-Asia policy assessment framework. This tool will allow interactive analyses of the cost-effectiveness and benefits of a wide range of technical and market based policy options. Optimization approaches will be developed to identify combinations of policies aimed at reducing long-range and hemispheric air pollution alongside with greenhouse gas emissions in order to optimise overall benefits in the medium and long term.

GAINS-Asia will focus on near- to medium term policy measures for European and Asian countries that maximize synergies between areas of air pollution and greenhouse gas mitigation, while embedding them in global strategies that would achieve stabilization of greenhouse gas concentrations in the long-term.

GAINS-Asia will be implemented for 43 European countries including Russia, and for China and India. To enable analyses in a global context, the rest of the world will be represented at an aggregated level. An interactive software will be developed that allows stakeholders to use GAINS-Asia over the Internet for exploring the interactions between air pollution and climate change for their own analyses."

Objectives

- Developing a practical policy analysis framework for a comprehensive assessment of the costs and benefits of technological and market-based measures for controlling air pollution and

greenhouse gas emissions. The framework will embed the analysis of medium-term emission reduction potentials and costs at national scales into global long-term assessments of greenhouse gas stabilization strategies and explore their site-specific and near-term benefits on a range of air pollution impacts;

- Bringing together, for use in this policy analysis framework, established state-of-the-art models dealing with the most important aspects that are relevant for a joint policy analysis of greenhouse gas mitigation and air pollution control measures and their benefits;
- Deriving “reduced-form” representations of these disciplinary models that work with different time horizons and with different spatial resolutions to represent their response towards emission reductions in the GAINS-Asia policy assessment framework;
- Implementing the assessment framework with real-world data for individual countries for Europe, all provinces in China, all states in India and in aggregated form at the global scale;
- Producing an initial policy assessment of joint air pollution and climate change policies, identifying the scope for cost-effective measures both in the EU and in two important developing countries (China and India) up to 2030.

Partners

N°	Organisation	Country
1.	International Institute for Applied System Analysis — IIASA	Austria
2.	Commission of the European Communities — Joint Research Centre	Belgium
3.	Universität Bern	Switzerland
4.	Energy Research Institute	China
5.	The Energy and Resources Institute	India

SERPEC-CC — Sectoral Emission Reduction Potentials and Economic Costs for Climate Change

CT — 044109

<http://energy.jrc.ec.europa.eu/>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/10/2006
Duration:	32 months
Total project cost:	668.560 €
EC Contribution:	416.375 €
Coordinating organisation:	Ecofys B.V. Utrecht — Netherlands
Co-ordinator:	Ernst Worrell (e.worrell@ecofys.nl)
EC Office:	Environment Directorate

Abstract

The scope of the proposed work is to identify the least-cost contribution of different sectors and gases for meeting post-2012 EU-25+ (EU25, Romania, Bulgaria and if possible, Croatia and Turkey) quantitative reduction objectives for all greenhouse gases, and to determine a package of cost-effective policies and measures for all sectors and gases towards meeting these goals. The project aims for a comprehensive update of a 2002 exercise undertaken by DG Environment on “Economic Evaluation of Sectoral Emission Reduction Objectives for Climate Change”.

The project will cover:

- Techno-economical research on greenhouse gas emission reduction options, and assessment of least-cost policies and measures using the GENESIS database;
- Runs of the PRIMES model with inclusion of reduction options for non-CO₂ greenhouse gases and options that are not (or not fully) included in the PRIMES model, which will identify the least-cost allocation of objectives for different sectors and greenhouse gases.

Objectives

- Identify emerging technologies and measures to reduce greenhouse gas emissions.
- Identify the (least-cost) contribution of different sectors and gases for meeting the EU's (EU-25 plus Romania, Bulgaria, and, if possible Croatia and Turkey) future quantitative reduction for modelling gas emissions.
- Determine a package of cost-effective policies and measures for all sectors and gases towards meeting any targets set in possible post-2012 regimes.
- Identify technical control options and describe them in terms of emission reduction potentials and costs. This assessment will cover the six (groups of) greenhouse gases covered by the Kyoto Protocol: CO₂, CH₄, N₂O, HFCs, PFCs and SF₆. The description will be given by country, sector and greenhouse gas.

- Construction of greenhouse gas integrated least-cost curves for each sector and each EU-25 Member State, and for Romania and Bulgaria. (Information on reduction potentials and costs for Croatia and Turkey will be given for energy related CO₂ emissions using the PRIMES model, but only indicatively for the other gases, due to the foreseen lack of statistical and other data).
- Preparation of a “package of cost-effective policies and measures” to meet post-2012 climate policy targets.
- Evaluation of the effects of emission trading and how this may influence or even change overall results on the cost-estimates.
- Evaluation of the EU objective to reach the post-2012 climate change policy targets at a system level by using energy system partial equilibrium models that will complement (and furthermore be consistent with) a bottom-up engineering analysis.
- The implications for the European security of energy supply.

Partners

N°	Organisation	Country
1.	Ecofys B.V.	The Netherlands
2.	Institute of Communication and Computer Systems	Greece
3.	European Commission — Directorate General Joint Research Centre	Spain

REDD-ALERT — Reducing Emissions from Deforestation and Degradation through Alternative Landuses in Rainforests of the Tropics

CT — 226310

(¹)

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/05/2009
Duration:	36 months
Total project cost:	4.520.466 €
EC Contribution:	3.488.760 €
Coordinating organisation:	Macaulay Land Use Research Institute Aberdeen — UK
Co-ordinator:	Robin Matthews (r.matthews@macaulay.ac.uk)
EC Office:	Environment Directorate

Abstract

The proposal addresses Topic ENV.2008.1.1.5.1 “Addressing deforestation in tropical areas: greenhouse gas emissions, socio-economic drivers and impacts, and policy options for emissions reduction”. The overall goal of the project is to contribute to the development and evaluation of mechanisms and the institutions needed at multiple levels for changing stakeholder behaviour to slow tropical deforestation rates and hence reduce GHG emissions. This will be achieved through enhancing our understanding of the social, cultural, economic and ecological drivers of forest transition in selected case study areas in Southeast Asia, Africa and South America. This understanding will facilitate the identification and assessment of viable policy options addressing the drivers of deforestation and their consistency with policy approaches on avoided deforestation, such as Reduced Emissions from Deforestation and degradation (REDD), currently being discussed in UNFCCC and other relevant international I. At the same time, ways of improving the spatial quantification of land use change and the associated changes in GHG fluxes will be developed, thereby improving the accounting of GHG emissions resulting from land use change in tropical forest margins and peatlands. This will allow the analysis of scenarios of the local impacts of potential international climate change policies on GHG emission reductions, land use, and livelihoods in selected case study areas, the results of which will be used to develop new negotiation support tools for use with stakeholders at international, national and local scales to explore a basket of options for incorporating REDD into post-2012 climate agreements. The project will provide a unique link between international policy-makers and stakeholders on the ground who will be required to change their behaviour regarding deforestation, thereby contributing to well-informed policy-making at the international level.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Macaulay Land Use Research Institute	UK
2.	Université catholique de Louvain	Belgium
3.	Vrije Universiteit	The Netherlands
4.	Georg-August-Universität Göttingen	Germany
5.	International Centre for Research in Agroforestry (also called World Agroforestry Centre)	Kenya
6.	Center for International Forestry Research	Indonesia
7.	International Institute of Tropical Agriculture	Nigeria
8.	International Center for Tropical Agriculture	Colombia
9.	Indonesian Soil Research Institute	Indonesia
10.	Research Centre for Forest Ecology and Environment	Vietnam
11.	Institute of Agricultural Research for Development	Cameroon
12.	Instituto Nacional de Investigación Agraria	Peru

PICCMAT — Policy Incentives for Climate Change Mitigation Agricultural Techniques

CT — 044148

<http://www.climatechangeintelligence.baastel.be/piccmat>

Funding instrument:	Specific Support Action (SSA)
Contract starting date:	01/01/2007
Duration:	24 months
Total project cost:	480.165 €
EC Contribution:	480.165 €
Coordinating organisation:	Le Groupe-Conseil Baastel sprl Bruxelles, Belgium
Co-ordinator:	Olivier Beucher (olivier.beucher@baastel.be)
EC Office:	Biotechnologies, agriculture and food Directorate

Abstract

In the Kyoto protocol context, PICCMAT aims at identifying and promoting changes in land managements practices to mitigate greenhouse gas emissions. The Common Agricultural Policy includes different tools in its rural development policy to orientate farmers' practices and environmental impact. These tools (mainly agri-environment measures and cross-compliance obligations) are expected to include climate change mitigation related measures. This project will provide objective information to develop guidelines for the design of climate change mitigation policy incentives. The project has three main objectives:

- 1) To provide scientific information for the development of policy related to agricultural practices and climate change mitigation. This will be realised through an extensive analysis of the potential mitigation options in land management practices. It will involve a close cooperation with past and on-going research projects, case studies in major European climatic regions, and a modelled quantification of the global impact of the introduction of selected practices.
- 2) To reinforce the links between policy makers and scientists in the field of climate change and agriculture. During its entire duration, PICCMAT will maintain close exchanges with EU policy makers and scientists through its Project advisory board and the organisation of workshops and seminars. EU-27 National authorities involved in the elaboration of the NRDP will be identified and directly involved in the project.
- 3) To raise European farmer awareness on the impact of agriculture on climate change. Through the organisation of an awareness campaign targeted at major agricultural organisations, PICCMAT will ensure a large dissemination of its results. The consortium built for the PICCMAT project includes 10 organisations and covers 10 countries in Europe, from the north to the south and the east, including NMS and ACC.

Partners

N°	Organisation	Country
1.	The University Court of the University of Aberdeen	UK
2.	Alterra BV	The Netherlands

3. Ecologic — Institute for International and European Environmental Policy Germany
- 4 The Royal Veterinary and Agricultural University Denmark
5. Szkoła Główna Gospodarstwa Wiejskiego Poland
6. Nikola Poushkarov Institute of Soil Science Bulgaria
7. Università degli Studi di Firenze Italy
8. Universidad Politécnica de Madrid Spain
9. Danish Institute of Agricultural Sciences Denmark
10. Københavns Universitet Denmark
11. Aarhus Universitet Denmark

SAFEWIND — Forecast with emphasis to extreme weather situations for a secure large-scale wind power integration

CT — 213740

<http://www.safewind.eu/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/09/2008
Duration:	48 months
Total project cost:	5.581.859 €
EC Contribution:	3.992.400 €
Coordinating organisation:	Association pour la Recherche et le Développement des Méthodes et Processus Industriels Paris — France
Co-ordinator:	Valentine Vierne (vierne@armines.ensmp.fr)
EC Office:	Energy Directorate

Abstract

The integration of wind generation into power systems is affected by uncertainties in the forecasting of expected power output. Misestimating of meteorological conditions or large forecasting errors (phase errors, near cut-off speeds etc), are very costly for infrastructures (i.e. unexpected loads on turbines) and reduce the value of wind energy for end-users.

The state of the art in wind power forecasting focused so far on the “usual” operating conditions rather than on extreme events. Thus, the current wind forecasting technology presents several strong bottlenecks. End-users urge for dedicated approaches to reduce large prediction errors or predict extremes at local scale (gusts, shears) up to a European scale as extremes and forecast errors may propagate. Similar concerns arise from the fields of external conditions and resource assessment, where the aim is to minimize project failure.

The aim of this project is to substantially improve wind power predictability in challenging or extreme situations and at different temporal and spatial scales. Going beyond this, wind predictability is considered as a system design parameter linked to the resource assessment phase, where the aim is to take optimal decisions for the installation of a new wind farm. The project concentrates on: using new measuring devices for a more detailed knowledge of the wind speed and energy available at local level; develop strong synergy with research in meteorology; develop new operational methods for the very-short-term for warning/alerting that use coherently collected meteorological and wind power data distributed over Europe to early detect and forecast extreme events; develop models to improve medium term wind predictability; develop a European vision of wind forecasting taking advantage of existing operational forecasting installations at various European end-users. Finally, the new models will be implemented into pilot operational tools for evaluation by the end-users in the project.

Partners

N°	Organisation	Country
1.	Association pour la Recherche et le Développement des Méthodes et Processus Industriels	France
2.	Fundacion CENER- CIEMAT	Spain
3.	Danmarks Tekniske Universitet (Technical University of Denmark)	Denmark
4.	Carl von Ossietzky Universität Oldenburg Germany	
5.	Energy & meteo systems GmbH	Germany
6.	Overspeed GmbH & Co. KG	Germany
7.	Energinet. Dk	Denmark
8.	European Centre for Medium-Range Weather Forecasts	UK
9.	Electricité de France	France
10.	EirGrid	Ireland
11.	The Chancellor, Masters and Scholars of the University of Oxford	UK
12.	Universidad Complutense de Madrid	Spain
13.	Universidad Carlos III de Madrid	Spain
14.	Public Power Corporation SA	EL
15.	Meteo-France Direction de la Production	France
16.	The Energy and Resources Institute	India
17.	Acciona Eolica CESA, S.L	Spain
18.	System Operator for Northern Ireland	UK
19.	RTE EDF Transport SA	France
20.	Institute of Communication and Computer Systems of the National Technical University of Athens	Greece

GILDED — Governance, Infrastructure, Lifestyle Dynamics and Energy Demand: European Post-Carbon Communities

CT — 225383

<http://www.gildedeu.org/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/12/2008
Duration:	36 months
Total project cost:	1.882.788 €
EC Contribution:	1.426.647 €
Coordinating organisation:	Macaulay Land Use Research Institute Integrated Land Use Systems UK — Aberdeen
Co-ordinator:	Nick GOTTIS (n.gottis@macaulay.ac.uk)
EC Office:	Science, Economy and Society Directorate

Abstract

In Europe, about 35% of all primary energy use and 40% of all greenhouse gas emissions come from private households. While technological innovation can make low-carbon energy sources economically and environmentally viable, their impact in reducing carbon-intensive energy use will depend critically on broad public and political commitment to such a reduction.

GILDED will target socio-economic, cultural and political influences on individual and household energy consumption through five regional case studies. Each case study focuses on a medium-sized city along with nearby rural areas. Investigating individuals' lifestyle choices and their understanding of energy issues will provide insights into patterns of energy-related behaviours characterising emergent lifestyle types, and the particular drivers impacting on consumption decisions.

The social, cultural and political contexts in which these behaviours are embedded will be addressed through analysis of the structural factors and actors (from local to EU level), including governance networks, physical environments, and materialized and institutionalized transport and provisioning networks.

This combined 'top down' and 'bottom-up' perspective on household consumption will be utilised to inform the analysis of an energy-reduction initiative or experiment in each case study region, in which stakeholder advisory groups guide the selection of an intervention of particular local relevance.

Principles derived from the lifestyle, structural and initiative studies will be utilised to structure agent-based models of policy implementation and change response. Resultant policy recommendations will describe the necessary changes at systemic level that need to be initiated in order to develop an environmentally-friendly European model of energy policies that respond to the expectations and needs of European cities and rural communities.

Partners

N°	Organisation	Country
1.	Ustav Systemove Biologie A Ekologie Av Cr Verejna Vyzkumna Instituce — Usbe	Czech Republic
2.	Magyar Tudomanyos Akademia Politikai Tudomanyok Intezete	Hungary
3.	Potsdam Institut für Klimafolgenforschung	Germany
4.	Rijksuniversiteit Groningen	The Netherlands

PACT — Pathways for Carbon Transitions

CT — 225503

<http://www.pact-carbon-transition.org/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/10/2008
Duration:	36 months
Total project cost:	1.787.117 €
EC Contribution:	1.374.466 €
Coordinating organisation:	ENERDATA SA Gieres — France
Co-ordinator:	Bertrand CHATEAU (bertrand.chateau@enerdata.fr)
EC Office:	Science, Economy and Society Directorate

Abstract

Most “business-as-usual scenarios” built up till now have shown that hydrocarbon resources scarcity and the growing release of greenhouse gases will bring the world far away from sustainability over the next decades. Then, deep changes in behaviours away from ‘Business as usual’ are unavoidable long before the turn of the century in a move towards a post-carbon society.

Urbanisation and mobility are probably the domains where these changes might be the most important and they will be necessarily driven and limited by socio-economic and cultural forces that will dominate the century. They will induce further deep changes in behaviours of consumers and producers and are likely to deeply impact the use and production of bulk materials, large energy consumers and greenhouse gas emitters.

To address these challenges, key milestones were defined by the EU: a 20% reduction (minimum) of CO₂ emissions by 2020 (compared to 1990) in Europe; and a reduction of the greenhouse emissions by 2050 and after, so as to limit the increase of the temperature due to climatic change within 2°C.

In this framework, the PACT project objective is to provide strategic decision-support information to decision-makers to achieve these milestones. It will focus on 3 themes:

- what shape the energy demand, and how this should evolve towards post-carbon concept, from the infrastructures viewpoint, in relation to urbanisation and land-use schemes, and that of the lifestyles and behaviours, in relation to the available technologies;
- the question of urbanisation and land-use from the renewable energy perspective, including that of the systems;
- the role of social forces, actors, stakeholders in the transition process.

PACT will address these issues in two phases: first, by developing the necessary analytical and conceptual framework, second in attempting to quantify scenarios of post-carbon societies at EU and world level by 2050 and beyond, using enhanced versions of the VLEEM and POLES models.

Partners

N°	Organisation	Country
1.	Universita Degli Studi Di Padova	Italy
2.	Mefos- Metallurgical Research Institute Ab	Sweden
3.	Université Pierre Mendes France	France
4.	Istituto Di Studi Per L'integrazione Dei Sistemi (Isis)	Italy
5.	Arcelormittal Maizières Research Sa	France
6.	Budapesti Corvinus Egyetem	Hungary
7.	Energeticka Agentura Vysociny Sdruzeni	Czech Republic
8.	Max Planck Gesellschaft Zur Förderung Der Wissenschaften E.V.	Germany
9.	Laboratorio Di Scienze Della Cittadinanza — Lsc	Italy
10.	Turun Kaupparkeakoulu	Finland
11.	Fraunhofer-Gesellschaft Zur Förderung Der Angewandten Forschung E.V	Germany

PLANETS — Probabilistic Long-Term Assessment of New Technology Scenarios

CT- 211859

<http://www.feem-project.net/planets/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/01/2008
Duration:	30 Months
Project total cost:	1.927.050 €
EC contribution:	1.541.674 €
Coordinating organisation:	Fondazione Eni Enrico Mattei (F.E.E.M.) Milano — ITALY
Co-ordinator:	Massimo TAVONI (massimo.tavoni@feem.it)
EC Office:	Energy Directorate

Abstract

The goal of PLANETS is to devise robust scenarios for the evolution of energy technologies in the next 50 years. This is achieved by means of an ensemble of quantitative and analytical tools that are designed to foresee the best technological hedging policy in response to future environmental and energy policies. Focused technological assessments will provide the necessary guidance for technology availability and competitiveness. Given the long term nature of the analysis, not to mention the many uncertainties surrounding the natural, technological and socio-economic determinants, the scenarios development will be accompanied by probabilistic and stochastic modelling analysis to quantify the most determinant sensitivities. To this purpose, a suite of state-of-the-art energy-economy-climate models will be brought together. The model portfolio spans varieties of regional coverage, technological detail and economic interrelations. Dedicated integrated assessments will explore the technological options that are most likely to play a role over the time horizon under investigation, and the critical issues that are needed for their competitive deployment. PLANETS will research the future of energy systems by examining environmental and energy policies at the European and global level in their capacity to influence the deployment of new technologies with respect to a mutually agreed Business-As-Usual scenario. This project will also analyse the linkage between European and world perspectives of energy technology futures and forecasts, in particular in terms of issues like economic competitiveness and the capacity to export clean technology adoption. Finally, PLANETS will aim to broadly disseminate EU energy technology futures, by setting up an informative scenarios website and acquainting a large number of stakeholders — from science, industry, government and so forth — with peer-reviewed publications and a final general-audience conference.

Objectives

The objective of PLANETS is to contribute to the energy FP7 goal to adapt the current energy system into a more sustainable, competitive and secure one. To this purpose, the project will focus on how a series of currently foreseen and future energy and environmental policies will shape the outlook for energy technology development.

This research objective is particularly relevant for the European Union for a successful compliance to its policies. Among such policies there are the EU commitment under the Kyoto Protocol and the future agreement that will emerge from post-Kyoto negotiations, and –equally importantly- the recent proposal by the European Council to adopt binding targets for carbon emission reductions and clean technology development.

These regulations require a substantial deviation from what would happen in a Business as Usual scenario; besides demand side management and energy efficiency measures, large scale deployment of innovative technologies that are clean but currently not enough competitive will be key to achieving these sustainable targets. As such, a comprehensive indication of the energy technology penetration potential will provide valuable support to specific policies, by for example indicating the implications in terms of energy investments, R&D budget and test programmes.

In addition to this, the project will focus on the bearing of a sustainable energy development on the competitiveness of EU economy and the ability to become an energy technology leader. The EU is currently well positioned with respect to other developed countries, with a large renewables share, the first ongoing CCS projects and a proven experience with nuclear energy. Nonetheless, it will need to move ahead to ensure a position as an energy technological forerunner. For example, Europe land constraints and restrained coal availability pose an upper bound to the development of new technologies such as renewables, bio-energy and CCS. The capacity to export such technologies in other parts of the world, especially to the fast growing developing countries, would ensure adequate economic returns to the significant up-front investments needed to make advanced technologies competitive. This will provide the EU with highly qualified jobs and a competitive economy, as originally envisaged by the Lisbon Summit in 2000.

PLANETS research objective is to design the evolution of energy technologies in Europe and at the world level for the next 50/60 years. It envisages the construction of a number of scenarios to assess the potential technological deployment in response to different energy and environmental policies, at various levels of geographical, technological and economic detail.

A pool of various numerical models and targeted technology assessments is used to build results on a solid quantitative and qualitative methodology. The key features of the proposed research activity are:

- Definition of Business as Usual scenarios, as produced by the various models once a set of driving assumptions is agreed upon. This is a crucial step in that it ultimately entails the effort of achieving given energy and environmental targets, and its achievement is envisioned in the second milestone of the project.
- Specific assessments of the main technologies needed for a sustainable energy development, such as Renewables, Carbon Capture and Storage, New Nuclear, Syn-Biofuels. The assessments will both evaluate technical aspects as well as the impact on sustainability and competitiveness.
- Policy scenarios: for a specified set of energy and environmental policies at the EU and global level, the resulting energy technologies development are derived, accounting for both capacity and research and development investments needs. The economic policy implications, in terms of costs, carbon prices, sectoral readjustments of the economy, are evaluated.
- Probabilistic analysis, to assess the impact of the many uncertain dimensions at stake and the critical input assumptions of models. This will be done accounting for technical and economic uncertainties, with state of the art techniques such as Monte Carlo simulations and stochastic programming.

- Policy recommendations and EU competitiveness: given the relevance of the issues analysed in this project outside the EU borders, the project will analyse the potential outcome of EU policies on the European industry capability to spread clean technology adoption and thus reinforce EU economic competitiveness.

Partners

N°	Organisation	Country
1.	Fondazione Eni Enrico Mattei	Italy
2.	Energy Research Center of the Netherlands	The Netherlands
3.	Universität Stuttgart	Germany
4.	SARL KANLO Consultants	France
5.	Operations Research Decisions and Systems Consultants	Switzerland
6.	Chalmers Tekniska Högskola	Sweden
7.	Lithuanian Energy Institute	Lithuania
8.	University of Manchester	UK

POEM — Policy Options to engage Emerging Asian economies in a post-Kyoto regime

CT — 226282

(¹)

Funding instrument:	Coordination-Support Action (CSA)
Contract starting date:	under negotiation
Duration:	30 months
Total project cost:	1.089.576 €
EC Contribution:	971.518 €
Coordinating organisation:	Chalmers Tekniska Högskola AB Goeteborg — Sweden
Co-ordinator:	Anjana Das (anjana@chalmers.se)
EC Office:	Environment Directorate

Abstract

Developing countries are reluctant to make any binding commitment as their per capita emissions are low and climate abatement measures conflict with their main priorities on socio-economic development. The question is if there is a way to simultaneously provide sufficient energy (which is also the main source of GHG emissions), to support poverty alleviation and economic growth and achieve sufficient emission reductions. Finding an answer is the main aim of this project. It may be possible with a combination of policies and measures encompassing from international level to national level supported by committed international cooperation to achieve both the goals together. The main focus of the study is on India and China. The primary objective is to develop a portfolio of policy options including both international and national policies as well as institutional frameworks for international cooperation for these two emerging economies to engage them in climate protection measures under a post-2012 regime. By applying an integrated modelling framework, the study will explore possible multiple pathways which may exist for these countries to contribute into international climate initiatives without compromising their national development priorities.

Specific objectives are:

- Developing country-specific integrated modelling framework to analyse policies and identify multiple pathways to achieve socio-economic and climate targets.
- Identifying/designing international climate policies in post-Kyoto regime for future commitments and participations of emerging economies (India and China).
- Designing national policies (in socio-economic sectors, energy and environment) compatible with the global climate targets.
- Designing and quantifying as much as possible the international co-operations needed to make the participation in a post-2012 regime acceptable at least in economic terms.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Disseminating the results to potential users for use in future negotiations.

Partners

N°	Organisation	Country
1.	Chalmers tekniska hoegskola AB	Sweden
2.	The Netherlands Environmental Assessment Agency	The Netherlands
3.	Indian Institute of Management, Ahmedabad	India
4.	Tsinghua University	China
5.	The Kiel Institute for the World Economy	Germany
6.	The Center for Energy and Environmental Policy Research(CEEP), Institute of Policy and Management(IPM), Chinese Academy of Sciences(CAS)	China
7.	Institute of Economic Growth, Delhi	India

TETRIS — Technology Transfer and Investment Risk in International Emissions Trading

CT — 006624

<http://www.zew.de/en/kooperationen/umw/tetris/index.php>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	1/06/2005
Duration:	18 months
Total project cost:	1.010.475 €
EC Contribution:	699.976 €
Coordinating organisation:	Zentrum für Europäische Wirtschaftsforschung GmbH Mannheim — Germany
Co-ordinator:	Christoph Böhringer (boehringer@zew.de)
EC Office:	Environment Directorate

Abstract

The TETRIS project aims to explore the economic and industrial impacts as well as the prospects for achieving technology transfer associated with the implementation of the Kyoto flexible mechanisms. Comprehensive risk indicators measuring the risks of investing in climate change mitigation in foreign countries will be developed. These indicators will be incorporated into an economic model of international emissions trading. Using quantitative methods and actual market experience from early transactions involving a broad range of technologies, we will assess the technology transfer and cost savings that can be realized through the Clean Development Mechanism (CDM) and Joint Implementation (JI). Another goal of our project is to examine to what extent GHG emissions trading schemes outside the European Union are compatible with each other and the proposed European emissions trading scheme. Our results will provide valuable insights about technology transfer and risk management in carbon markets for policy makers and the business community.

Objectives

1. The first objective of the TETRIS project is to explore the technology transfer related to the implementation of the Kyoto mechanisms in developing and EU accession countries. Behind most transactions in emissions trading markets, there is a technology transfer or implementation that allows the reduction of GHG emissions. We will analyze how the Kyoto flexible mechanisms can initiate or facilitate technology transfer (TT) to developing or transition countries. Key determinants of TT will be identified from the literature on technology transfer by commercial companies, government agencies, and multinational organizations. Case studies of real projects undertaken under early greenhouse gas trading initiatives (AIJ program, World Bank Prototype Carbon Fund, Senter) will describe the types of technology that have been transferred and the host country benefits. Critical factors such as the crediting period will be explored and illustrated using real data from the case studies. We will analyse the potential for TT in several other large potential CDM host countries such as Brazil and China.

2. The second objective is the incorporation of investment risk into the analysis of ET markets. As mentioned above, the risks of investment in climate change mitigation are substantial, but often ignored in analyses of climate policy and emissions trading. To account for these risks, we will develop indicators of the investment climate for GHG abatement projects for the main seller countries. These indicators shall describe the costs and risks of investments in climate change mitigation in a comprehensive manner, taking into account macroeconomic stability, the institutional environment for JI and CDM, and political risk. These indicators will be integrated into the quantitative analysis at a later stage.
3. The third objective of the project is to examine to what extent other GHG emissions trading schemes are compatible with the proposed European emissions trading scheme, and identify potential problems of integrating them. The analysis will consist of two parts: Analysis of trading systems in European countries which are not members of the EU (Switzerland, Norway), and of countries outside Europe which are crucial for the implementation of the Kyoto Protocol (Japan, Canada). A key problem is the fundamental differences between the design of national climate policies and ET systems. Climate policy in Switzerland, for example, is a combination of carbon taxes, voluntary agreements, and emissions trading. Whether this complicated system can be linked to the EU ETS, and whether the Swiss allowances can be considered equivalent to EU allowances, remains to be seen.
4. The fourth objective is the quantification of the economic and industrial impacts of international emissions trading using an established large-scale multi-region multi-sector computable general equilibrium model of international trade and energy use (see Böhringer 2000, Böhringer 2002b). This model represents the analytical backbone of our project and will be extended in several steps to accommodate adequate quantitative analysis of the above mentioned policy issues. In a first step, the European market for tradable CO₂ allowances as envisaged under the EU Directive will be modelled in detail. The impact analysis of the EU trading scheme will serve as a benchmark for the investigation of JI and CDM. In a second step, the model will be extended to represent a world-wide ET system (including JI and CDM mechanisms) encompassing transition and developing countries under realistic conditions (including investment risks and transaction costs). The comprehensive ET system will then be compared to the benchmark case. Integrating JI and the CDM is expected to further enhance the cost effectiveness of emissions trading. Besides this, we are interested in the industrial impacts (by sectors), allowance prices, and, particularly, the impact of investment risk on the magnitude and regional distribution of emissions trading.

The work we propose to carry out is novel in several respects:

- Technology transfer is often mentioned as an important part of the Kyoto mechanisms. However, it has hardly been analysed thoroughly in this context. Our project shall examine both the theoretical potential for technology transfer and the experiences made in pilot trading schemes until today;
- Only few studies of the global market for tradable GHG permits have incorporated investment risks. Where this has been done, rather simple risk indicators were used. In contrast, the work described in the present proposal aims to develop indicators which reflect investment risks in a comprehensive way;
- Emissions trading schemes are being planned or implemented in many countries now, perhaps inspired by the successful trading system for sulphur dioxide in the United States. However, it is often overlooked that cost savings can only be achieved if trading partners and abatement options are numerous. Small, isolated markets are unlikely to yield substantial

cost savings. Hence, it is important to learn how emissions trading schemes around the world could be linked or integrated to form an efficient common market;

- Emissions trading at the global level has been the subject of a great number of scientific analyses. In contrast to most existing studies, we plan to model the global emissions trading market starting from a detailed representation of the EU-wide market for CO₂, which will be extended to include other countries via JI and the CDM.

The TETRIS project shall provide insights which enable policy makers to fully exploit the economic and environmental benefits of emissions trading. The project delivers valuable results regarding the emerging market for tradable GHG permits and its impact on industry and technology transfer.

Partners

N°	Organisation	Country
1.	Zentrum für Europäische Wirtschaftsforschung GmbH	Germany
2.	Ecoplan Economie Research and Policy Consultancy	Switzerland
3.	Energieonderzoek Centrum Nederland	The Netherlands
4.	Natsource Europe Ltd	UK
5.	Agentura Pro Ciste Prostredi (Center for Clean Air Policy)	Czech Rep.

TOCSIN — Technology-Oriented Cooperation and Strategies in India and China: Reinforcing the EU dialogue with Developing Countries on Climate Change Mitigation

CT — 044287

<http://reme.epfl.ch>

Funding instrument:	Specific Targeted Research Project (STREP)
Contract starting date:	01/01/2007
Duration:	34 months
Total project cost:	1.382.000 €
EC Contribution:	1.069.000 €
Coordinating organisation:	Ecole Polytechnique Fédérale de Lausanne Lausanne — Switzerland
Co-ordinator:	Philippe Thalmann (Philippe.Thalmann@epfl.ch)
EC Office:	Environment Directorate

Abstract

This research will evaluate climate change mitigation options in China and India and the conditions for a strategic cooperation on RD&D and technology transfer with EU. This project will identify and assess technology options that might significantly reduce greenhouse gases (GHG) emissions in China and India in key sectors (i.e. power generation, transport, agriculture, and heavy industry). It will also define the necessary institutional and organizational architecture that would stimulate technology cooperation. The research will emphasize the strategic dimension of RD&D cooperation, and the key role of creating incentives for the participation of developing countries (DCs) in post-2012 GHG emissions reduction strategies and technological cooperation. Finally it will evaluate how the Clean Development Mechanism (CDM) and international emission trading (IET) might improve the attractiveness of new energy technology options for DCs, and thus contribute to stimulate RD&D cooperation and technology transfers toward China and India.

The research will be structured around the use of an ensemble of models that will be coupled together via advanced large scale mathematical programming techniques:

- World and regional (i.e. China and India) MARKAL/TIMES bottom-up techno-economic models permitting a global assessment of technology options in different regions of the world;
- a CGE multi-country and multi-region model of the world economy (GEMINI-E3) that includes a representation of developing countries' economies (i.e. China and India) permitting an assessment of welfare, terms of trade and emissions trading effects;
- a multi-region integrated model (WITCH) representing the effect on economic growth of technology competition in a global climate change mitigation context;
- a game theoretic framework that will be implemented to analyze self-enforcing agreements regarding abatement commitment and technological cooperation.

Objectives

The main objective of this research is to assess the benefits and costs of possible self-enforcing technology-based international agreements involving the EU, China and India with the aim of stabilizing the long term atmospheric concentrations of GHGs. The specific objectives of the project are:

- To provide a detailed description of the available energy/technology options that might significantly reduce GHG emissions in China and India and their relative costs in comparison with EU and other OECD members (the possibility of endogenous technological learning (ETL) and the competition for innovation, expected in a world adapting to a new technology environment, being also analyzed);
- To define the possible self-enforcing international agreements on GHG emission abatement, taking into account their economic impacts, including terms of trade changes, as well as the possible gains of multilateral and bilateral collaborations, Clean Development Mechanisms (CDM) and international emission trading (IET) in order to stimulate RD&D cooperation and technology transfers toward China and India;
- To promote capacity building for modelling activities in China and India. Researchers from China and India who joined this project will benefit from high level scientific cooperation with leading European researchers and will develop databases and models for China and India that will be fully compatible with the most recent developments in EU and America concerning BU (bottom-up) and TD (top-down) modelling for energy-environment policy analysis. This ensemble of compatible models will be of great help for the development of a consistent dialogue between the parties in post-Kyoto negotiations.

Partners

N°	Organisation	Country
1.	Ecole Polytechnique Fédérale de Lausanne	Switzerland
2.	Fondazione Eni Enrico Mattei	Italy
3.	The Chancellor, Masters and Scholars of the University Of Cambridge	UK
4.	Tsinghua University	China
5.	Hong Kong Baptist University	Hong Kong
6.	Sarl Kanlo Consultants S.A.R.L.	France
7.	Ordecys S.A.R.L.	Switzerland
8.	Indian Institute of Management	India

ENCI-LowCarb — European Network engaging Civil Society in Low Carbon

CT — 213106

(¹)

Funding instrument:	Coordination and Support Action (CSA)
Contract starting date:	01/01/2009
Duration:	30 months
Total project cost:	791.184 €
EC Contribution:	717.980 €
Coordinating organisation:	Reseau Action Climat Montreuil — France
Co-ordinator:	Olivier Louchard (olivier@rac-f.org)
EC Office:	Environment Directorate

Abstract

The overall aim of ENCI-LowCarb is to engage civil society in research on low carbon scenarios. This will be achieved by:

- Creating a European network related to the factor 4 composed by Civil Society Organisations and research institutes
- Elaborating two national studies (France and Germany) based on the confrontation between climate policies of low carbon scenarios and civil society organisations (social acceptability)
- Disseminating the results to a larger public

This project has direct relevance to the last developments of climate change European policies. The Spring Council of 8-9 march 2007 recognized that in order to stabilize the climate and to reach the 2°C objective, industrialized countries need to cut their greenhouse gases emissions by 30% by 2020 and by 60 to 80% by 2050 compared to 1990. In this context, the European Council endorsed an EU objective of a 30% reduction in greenhouse gas emissions by 2020 compared to 1990 as its contribution to a global and comprehensive agreement for the period beyond 2012. Policies able to reach these objectives still have to be conceived, and as there is not one single emission reduction objective common to each member state, there is no unique way to reach it.

Discussions on this subject will take into account different national circumstances and potentials: French and German situations in particular will be analysed. But two main elements are decisive in implementing climate policies: of course their economic assessment, but also their social acceptability. The long term impact of the ENCI-LowCarb project will be to enhance the adoption by citizens and decision makers of the new behaviours which are required to reach the Factor 4 objective.

(¹) The website for this project can be found by searching on the following site:
http://cordis.europa.eu/fp7/projects_en.html

Partners

N°	Organisation	Country
1.	Potsdam Institut für Klimafolgenforschung	Germany
2.	International Network For Sustainable Energy-Europe	Denmark
3.	Germanwatch Nord-Süd-Initiative E.V.	Germany
4.	Centre National De La Recherche Scientifique (CNRS)	France

IMPLICC — Implications and risks of engineering solar radiation to limit climate change

CT — 226567

<http://imPLICC.zmaw.de/>

Funding instrument:	Collaborative Project (CP)
Contract starting date:	01/07/2009
Duration:	36 months
Total project cost:	1.320.837 €
EC Contribution:	999.152 €
Coordinating organisation:	Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V. München — Germany
Co-ordinator:	Claudia Piltz (claudia.piltz@zmaw.de)
EC Office:	Environment Directorate

Abstract

The overall goal of this project is to significantly increase the level of knowledge about the feasibility and implications of novel options (or “geoengineering concepts”), proposed recently to limit climate change. Among these possibilities, a deliberate manipulation of the radiative budget of the Earth may allow a counterbalancing of the effects of continued greenhouse gas emissions on global temperature, but may also result in undesirable side effects for crucial parts of the Earth system and humankind. Three complex climate models will be used to quantify the effectiveness and side effects of such geoengineering concepts aiming at a reduction of the incoming solar radiation. Simulations of a climate modified through geoengineering will be performed based on IPCC type future emission scenarios. Economic modelling will be used to link benefits and side effects of the studied geoengineering concepts. The results of the study will be discussed with the scientific community, policy- and law-related communities and interested non-governmental organizations (NGOs).

Partners

N°	Organisation	Country
1.	Max Planck Gesellschaft zur Förderung der Wissenschaften e.V.	Germany
2.	Commissariat A L'Énergie Atomique	France
3.	Universitetet i Oslo	Norway
4.	Cicero Senter Klimaforskning	Norway

INDEX BY ACRONYM

ACCENT — Atmospheric Composition Change: A European Network	137
ACQWA — Assessment of Climatic change and impacts on the Quantity and quality of Water	200
ADAGIO — Adaptation of agriculture in the European regions at Environmental risk under climate change	301
ADAM — Adaptation and Mitigation Strategies: Supporting European Climate Policy	290
AIR4EU — Air Quality Assessment for Europe from Local to Continental	163
ALOMAR eARI — Arctic Lidar Observatory for Middle Atmosphere Research, enhanced Access to Research	75
AMMA — African Monsoon Multidisciplinary Analysis.	28
AMMA TTC — African Monsoon Multidisciplinary Analysis — Extension	32
ARCFAC V — The European Centre for Arctic Environmental Research	77
ArcRisk — Arctic Health Risks: Impacts on health in the Arctic and Europe owing to climate-induced changes in contaminant cycling	244
ATMNUCLE — Atmospheric Nucleation: from Molecular to Global Scale	146
ATP — Arctic Tipping Points	37
ATTICA — European assessment of the Transport Impacts on Climate Change and Ozone Depletion	132
BASIN — Basin-scale Analysis, Synthesis, and Integration: Resolving the impact of climatic processes on ecosystems of the North Atlantic Basin and shelf seas.	240
CapHaz-Net — Social capacity building for natural hazards: Toward more resilient societies.	271
CARBOAFRICA — Quantification, understanding and prediction of carbon cycle, and other GHG gases, in Sub-Saharan Africa	94
CARBOEUROPE — Assessment of the European Terrestrial Carbon Balance	84
CARBO-Extreme — The terrestrial Carbon cycle under Climate Variability and Extremes A Pan-European synthesis	89
CARBO-NORTH — Quantifying the Carbon Budget in Northern Russia: Past, Present and Future.	91
CARBO-OCEAN — Marine Carbon Sources and Sinks Assessment	99
CCTAME — Climate Change — Terrestrial Adaption and Mitigation in Europe	294
CECILIA — Central and Eastern European Climate Change Impact and Vulnerability Assessment	219
CENSOR — Climate variability and el niño southern oscillation: implications for natural coastal resources and management	238

CIRCE — Climate Change and Impact Research: the Mediterranean Environment	226
CIRCLE — Climate Impact Research Co-ordination for a Larger Europe	232
CITYZEN — megaCITY — Zoom for the Environment	159
CLARIS — A Europe-South America Network for Climate Change Assessment and Impact Studies.	234
CLARIS — LPB — A Europe-South America network for climate change assessment and impact studies in La Plata Basin	236
CLAVIER — Climate Change and Variability: Impact on Central and Eastern Europe	223
CLEAR — Climate change, Environmental contaminants and Reproductive health	249
ClimateCost — Full Costs of Climate Change	296
CLIMATE FOR CULTURE — Damage Risk Assessment, macroeconomic Impact and Mitigation for Sustainable Preservation of Cultural Heritage in the Times of Climate Change	253
ClimateWater — Bridging the gap between adaptation strategies of climate change impacts and European water policies	308
COMBINE — Comprehensive Modelling of the Earth system for better climate prediction and projection	22
COPAL — Community heavy-payload long endurance instrumented aircraft for tropospheric research in environmental and geo-sciences	171
C8 — Consistent Computation of the Chemistry-Cloud Continuum and Climate Change in Cyprus.	147
DAMOCLES — Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies.	67
DAMOCLES-TTC — Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies — Extension	72
SEARCH for DAMOCLES — Study of Environmental Arctic Change — Developing Arctic Modelling and Observing Capability for Long-term Environment Studies	64
DYNAMITE — Understanding the Dynamics of the Coupled Climate System	14
EARLINET ASOS — European Aerosol Research Lidar Network: Advanced Sustainable Observation System	174
EDEN — Emerging diseases in a changing European environment.	246
EMIS — An Intense Summer Monsoon in a Cool World, Climate and East Asian Monsoon during Interglacials 500,000 years ago and before.	50
ENCI-LowCarb — European Network engaging Civil Society in Low Carbon	341
ENHANCE — Enhancing the European Participation in Living with Climate Variability and Change: Understanding the Uncertainties and Managing the Risks	47
ENSEMBLES — Ensemble based Predictions of Climate Changes and their Impacts.	17

ENSURE — Enhancing resilience of communities and territories facing natural and na-tech hazards	281
EPICA-MIS — New Paleoreconstructions from Antarctic Ice and Marine Records.	52
EPOCA — European Project on Ocean Acidification	197
ERICON-AB — The European Polar Research Icebreaker Consortium Aurora Borealis	79
ESCAPE — European Study of Cohorts for Air Pollution Effects	211
EUCAARI — European Integrated Project on Aerosol Cloud Climate and Air Quality Interactions	142
EUFAR — European Facility for Airborne Research Lidar Network: Adadvanced Sustainable Observation System.	177
EURO ARGO — Global Ocean Observing Infrastructure.	81
EUROCHAMP — Integration of European Simulation Chambers for Investigating Atmospheric Processes	180
EUROHYDROS — A European Network for Atmospheric Hydrogen Observation and Studies.	149
EURO-LIMPACS — Integrated Project to Evaluate the Impacts of Global Change on European Freshwater Ecosystems	202
EUROPOLAR — European Polar Consortium: Strategic Coordination and Networking of European Polar RTD Programmes	259
EUSAAR — European Supersites for Atmospheric Aerosol Research.	184
FUTURESOC — Forecasting Societies Adaptive Capacities to Climate Change	313
GAGOS — Assessing and Forward Planning of the Geodetic and Geohazard Observing Systems for GMES Applications	268
GAINS-ASIA — Greenhouse Gas and Air Pollution Interactions and Synergies	317
GENESIS — Groundwater and Dependent Ecosystems: New Scientific Basis on Climate Change and Land-Use Impacts for the Update of the EU Groundwater Directive.	205
GEOMON — Global Earth Observation and Monitoring.	168
GILDED — Governance, Infrastructure, Lifestyle Dynamics and Energy Demand: European Post-Carbon Communities	327
GRACE — Genetic Record of Atmospheric Carbon Dioxide.	103
HCFCWORKSHOPS — International Workshop on HCFC Alternatives and Intermediate Reduction Steps for Developing Countries	134
HERMIONE — Hotspot Ecosystem Research and Man's Impact on European seas	207
HighNoon — Adaptation to changing water resources availability in northern India with Himalayan glacier retreat and changing monsoon pattern.	311

HYDRATE — Hydrometeorological data resources and technologies for effective flash flood forecasting.	275
HYMN — Hydrogen, Methane and Nitrous oxide: Trend variability, Budgets and Interactions with the Biosphere.	152
IAGOS — Integration of Routine Aircraft Measurements into a Global Observing System . .	187
IAGOS-ERI — In-service Aircraft for a Global Observing System — European Research Infrastructure	189
ICEPROXY — Novel Lipid Biomarkers from Polar Ice: Climatic and Ecological Applications . .	58
ICEPURE — The impact of climatic and environmental factors on personal ultraviolet +radiation exposure and human health.	251
Ice2sea — Estimating the future contribution of continental ice to sea-level rise.	195
ICOS — Integrated Carbon Observation System.	104
IMECC — Infrastructure for Measurement of the European Carbon Cycle.	108
IMPLICC — Implications and risks of engineering solar radiation to limit climate change . .	343
IMPRINTS — Improving Preparedness and Risk maNagementT for flash floods and debris flow events	277
INCREASE — An integrated network on climate change research activities on shrubland ecosystems	209
INSEA — Integrated Sink Enhancement Assessment.	110
IPY-CARE — Climate of the Arctic and its Role for Europe (CARE) — A European component of the International Polar Year.	39
IRASMOS — Integral Risk Management of Extremely Rapid Mass Mouvements	285
IS-ENES — InfraStructure for the European Network for Earth System Modelling	25
LAPBIAT — Lapland Atmosphere-Biosphere Facility	191
LONG-TERM RISKS — Evaluation and Management of Collective Long-Term Risks	298
MACIS — Minimisation of and Adaptation to Climate change: Impacts on biodiversity. . .	310
MACROCLIMATE — Quantitative Dynamic Macroeconomic Analysis of Global Climate Change and Inequality	213
MAP — Secondary Marine Aerosol Production from Natural Sources	154
MATRICES — Modern Approaches to Temperature Reconstructions in Polar Ice Cores	56
MEECE — Marine Ecosystem Evolution in a Changing Environment	299
MEGAPOLI — Megacities: Emissions, urban, regional and Global Atmospheric POLLution and climate effects, and Integrated tools for assessment and mitigation . . .	161
MESMA — Monitoring and Evaluation of Spatially Managed Areas	263
MICORE — Morphological Impacts and Coastal Risks induced by Extreme storm events. . .	287

MICRODIS — Integrated health social & economic impacts of extreme events: evidence, methods & tools.	283
MILLENNIUM — European Climate of the Last Millennium	60
MOTIVE — Models for Adaptive Forest Management	303
MOVE — Methods for the improvement of Vulnerability Assessment in Europe	266
NATAIR — Improving and Applying Methods for the Calculation of Natural and Biogenic Emissions and Assessment of Impacts on Air Quality	154
NEU-CO₂-III — Continuation of the “International Network Non-energy use and CO ₂ emissions (NEU-CO ₂)”, Phase III.	112
NEWATER — New Approaches to Adaptive Water Management under Uncertainty.	305
NITROEUROPE — The Nitrogen Cycle and its Influence on the European Greenhouse Gas Balance	116
NOAHS ARK — Global Climate Change Impact on Built Heritage and Cultural Landscapes .	255
NOVAC — Network for Observation of Volcanic and Atmospheric Change.	269
OOMPH — Organics over the Ocean Modifying Particles in both Hemispheres.	157
PACEMAKER — Past Continental Climate Change: Temperatures from Marine and Lacustrine Archives	54
PACT — Pathways for Carbon Transitions	329
PAN-AMAZONIA — Project for the Advancement of Networked Science in Amazonia	114
PHYTOCHANGE — New Approaches to Assess the Responses of Phytoplankton to Global Change.	45
PICCMAT — Policy Incentives for Climate Change Mitigation Agricultural Techniques	323
PLANETS — Probabilistic Long-Term Assessment of New Technology Scenarios	331
POEM — Policy Options to engage Emerging Asian economies in a post-Kyoto regime . . .	334
QUANTIFY — Quantifying the Climate Impact of Global and European Transport Systems .	214
QUANTIFY-TTC — Quantifying the Climate Impact of Global and European Transport System — Extension.	217
QUASOM — Quantifying and Modelling Pathways of Soil Organic Matter as affected by abiotic Factors, Microbial dynamics and transport processes	97
RECLAIM — Resolving Climatic Impacts on fish stocks	242
RECONCILE — Reconciliation of essential process parameters for an enhanced predictability of arctic stratospheric ozone loss and its climate interactions. .	130
REDD-ALERT — Reducing Emissions from Deforestation and Degradation through Alternative Landuses in Rainforests of the Tropics	321
SafeLand — Living with landslide risk in Europe: Assessment, effects of global change and risk management strategies.	279

SAFEWIND — Forecast with emphasis to extreme weather situations for a secure large-scale wind power integration	325
SCOUT-O3 — Stratosphere-Climate Links with Emphasis on the UTLS	124
SERPEC-CC — Sectoral Emission Reduction Potentials and Economic Costs for Climate Change.	319
SHIVA — Stratospheric ozone: Halogen Impacts in a Varying Atmosphere.	128
SOGE-A — System for Observation of Halogenated Greenhouse Gases in Europe and Asia	120
STAR — Support for Tropical Atmospheric Research	192
TETRIS — Technology Transfer and Investment Risk in International Emissions Trading . . .	336
THE MAIN AIM QOS2004 — Quadrennial Ozone Symposium 2004	123
THOR — Thermohaline Overturning Circulation — at Risk	35
TOCSIN — Technology-Oriented Cooperation and Strategies in India and China: Reinforcing the EU dialogue with Developing Countries on Climate Change Mitigation	339
U4IA (Euphoria) — Emerging Urban Futures and Opportune Repertoires of Individual Adaptation	315
WATCH — Water and Global Change.	42
WRECKPROTECT — Strategies for the Protection of shipwrecks in the Baltic Sea against forthcoming attack by wood degrading marine borers. A synthesis and information project based on the effects of climatic changes. . . .	257
XEROCHORE — An Exercise to Assess Research Needs and Policy Choices in Areas of Drought	273

Information on EC-funded research projects referred to in this publication is available on the CORDIS web site:

For FP7 projects: http://cordis.europa.eu/fp7/projects_en.html

For FP6 projects: <http://cordis.europa.eu/fp6/projects.htm>

European Commission

**EUR 23609 — European Research Framework Programme - Research on Climate Change,
Prepared for the Third World Climate Conference (WCC-3) and the UNFCCC
Conference of the Parties (COP-15)**

Luxembourg: Office for Official Publications of the European Communities

2009 — 350 pp. — 17.6 x 25.0 cm

ISBN 978-92-79-10280-6

doi 10.2777/28294

Acknowledgements

Special thanks are due to Georgios Amanatidis, Irini Gavrielidou and Monica Caso González.

How to obtain EU publications

Publications for sale:

- via EU Bookshop (<http://bookshop.europa.eu>);
- from your bookseller by quoting the title, publisher and/or ISBN number;
- by contacting one of our sales agents directly. You can obtain their contact details on the Internet (<http://bookshop.europa.eu>) or by sending a fax to +352 2929-42758.

Free publications:

- via EU Bookshop (<http://bookshop.europa.eu>);
- at the European Commission's representations or delegations. You can obtain their contact details on the Internet (<http://ec.europa.eu>) or by sending a fax to +352 2929-42758.