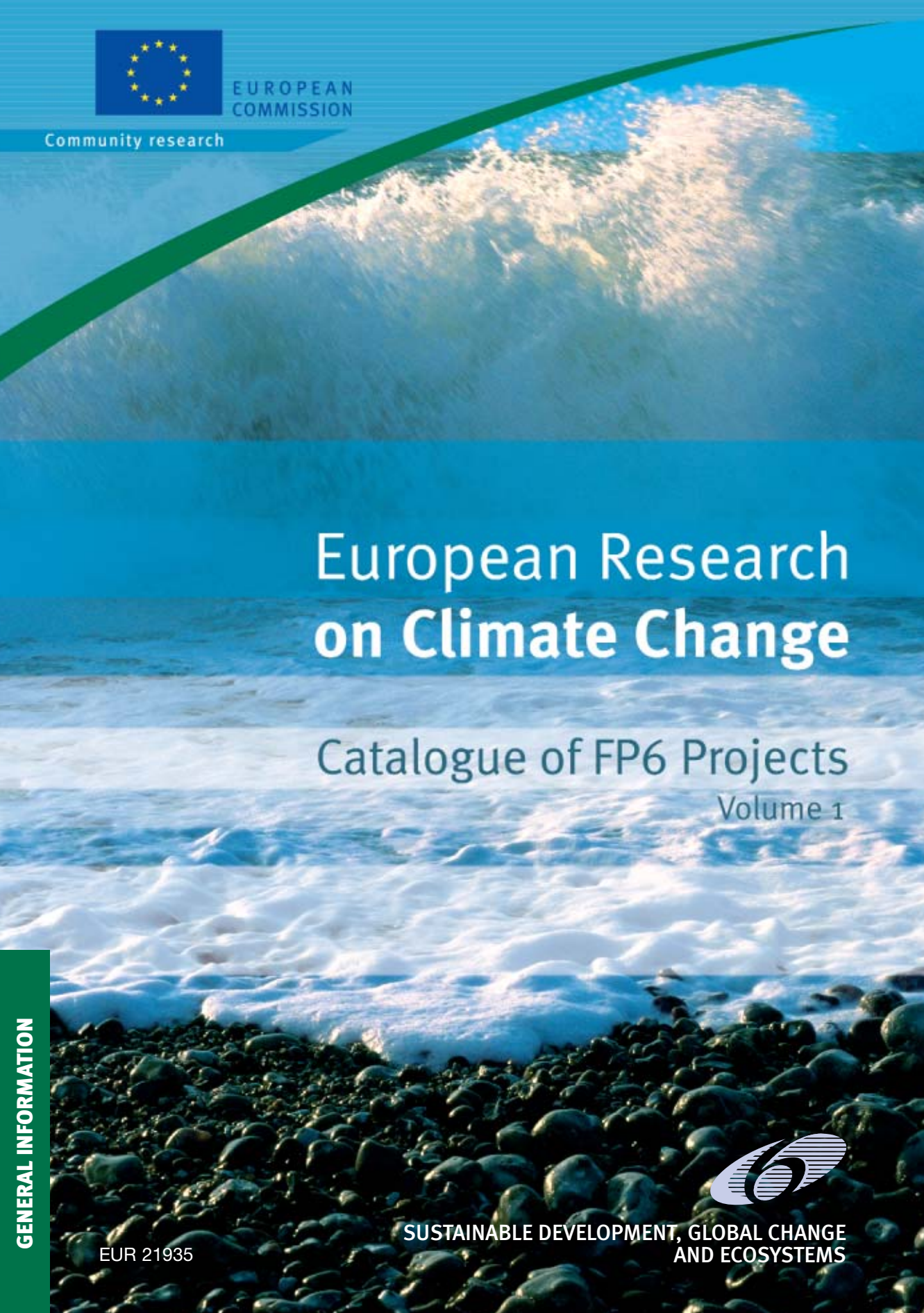
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Volume 1
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INTRODUCTION

Under the European Union's Sixth Framework Programme and the priority 6.3 Global Change and Ecosystems, several projects were financed with the objective to detect and describe global change processes associated with greenhouse gas emissions and atmospheric pollutants from all sources, to improve prediction of climate change and its impacts and to evaluate adaptation and mitigation options and strategies.

With these objectives research is focussing on studies and modelling of the terrestrial and marine carbon and nitrogen budgets, on the chemistry of atmospheric pollutants and greenhouse gases, the formation of aerosols and ozone, their impact on air quality and climate, on future stratospheric ozone levels and on systematic observations of climate parameters. It also focuses on the impacts of climate change, including sea-level rise, changes in precipitation and storminess, and severity and frequency of floods and droughts. Models for predicting future climate change and its impacts need to be further developed as well as the uncertainties associated with these predictions to be further studied. This catalogue provides information on projects with the above objectives financed under the three fist calls for proposals of the priority Global Change and Ecosystems.

The goal of this publication is to contribute, with projects financed by the European Commission, to the overall picture of research on climate change undertaken in Europe. We believe that these projects will help answer key scientific and policy questions related to the present and future climate, its impacts and the possible mitigation and adaptation options.

Elisabeth Lipiatou
Head of Environment and Climate System Unit
DG Research

Acknowledgements
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1. Carbon and Nitrogen Cycles: Sources and Sinks

CARBOEUROPE - Assessment of the European Terrestrial Carbon Balance 505572

http://www.carboeurope.org/

Instrument:	Integrated Project (IP)	Contract starting date: 01/01/2004
Total project cost:	25.115.542 €	Duration: 60 months
EC Contribution:	16.310.000 €	
Organisation:	Max Planck Gesellschaft zur Förderung der Wissenschaften E.V.	Jena - Germany
Co-ordinator:	Ernst-Detlef Schulze (dschulze@bgc-jena.mpg.de)	
EC Officer:	Giovanni Angeletti (giovanni.angeletti@cec.eu.int)	

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 (1) executing a strategically focussed set of surface based ecological measurements of carbon pools and CO_2 exchange, (2) further enhancement of an atmospheric high precision observation system for CO_2 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 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.

Partners

N°	Organisation	Country
1	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.	Germany
2	UNIVERSITA DEGLI STUDI DELLA TUSCIA	Italy
3	VRIJE UNIVERSITEIT AMSTERDAM	Netherlands
4	COMMISSARIAT A L'ENERGIE ATOMIQUE	France
5	UNIVERSITY OF EDINBURGH	UK
6	UNIVERSITY OF ABERDEEN	UK
7	INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE	France
8	FACULTE UNIVERSITAIRE DES SCIENCES AGRONOMIQUES DE GEMBLOUX	Belgium
9	METEO FRANCE	France
10	CONSIGLIO NAZIONALE DELLE RICERCHE	Italy
11	ENERGIEONDERZOEK CENTRUM NEDERLAND	Netherlands

12	RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG	Germany
13	ALTERRA B.V.	Netherlands
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16	MET OFFICE	UK
17	POTSDAM INSTITUT FUER 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 TECNOLOLOGIC FORESTAL DE CATALUNYA	Spain
24	EIDGENOESSISCHE FORSCHUNGSANSTALT FUER AGRAROEKOLOGIE 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
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34	SECONDA UNIVERSITA DEGLI STUDI DI NAPOLI	Italy
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42	SZENT ISTVAN EGYETEM	Hungary
43	HELSINGIN YLIOPISTO	Finland
44	INSTITUTO SUPERIOR DE AGRONOMIA	Portugal
45	AUGUST CIESZKOWSKI AGRICULTURAL UNIVERSITY OF POZNAN	Poland
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47	WAGENINGEN UNIVERSITEIT	Netherlands
48	MARTIN-LUTHER-UNIVERSITAET HALLE-WITTENBERG	Germany
50	UNIVERSITE DE LIEGE	Belgium
52	CESI - CENTRO ELETTROTECNICO SPERIMENTALE ITALIANO 'GIACINTO MOTTA' SPA	Italy
53	RIJKS-UNIVERSITEIT GRONINGEN	Netherlands
54	LORAND EOETVOES UNIVERSITY	Hungary
55	ENTE PER LE NUOVE TECNOLOGIE, L' ENERGIA E L'AMBIENTE	Italy
56	STOCKHOLMS UNIVERSITET	Sweden

57	UNIVERSITAT DE BARCELONA	Spain
58	UNIVESITAET BERN	Switzerland
59	AKADEMIA GORNICZO-HUTNICZA	Poland
61	UNIVERSITAET STUTTGART	Germany
62	EUROPEAN FOREST INSTITUTE	Finland
63	DANMARKS MILJOEUNDERSOEGELSER	Denmark
64	TUERINGER LANDESANSTALT FUER WALD, JAGD UND FISCHEREI	Germany
65	PHILIPPE SAUGIER INTERNATIONAL EDUCATIONAL PROJECTS	France
66	KOBENHAVNS UNIVERSITET	Denmark
67	UNIVERSIDADE DE AVEIRO	Portugal

Detailed Information

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 CO_2 exchange, (2) further enhancement of an atmospheric high precision observation system for CO_2 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 CO_2 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 objective

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 CO_2 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”

1. To determine the time-varying distribution of atmospheric concentrations of CO_2 and other Carbon Cycle related tracers by taking high precision measurements as input to top-down inverse modelling techniques (MO1).
2. 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).
3. 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”

4. 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).
5. To quantify the effects of management on net ecosystem carbon exchange based on data synthesis (MO5).
6. To develop, evaluate and optimise ecosystem process models (MO6).

”Detection of Kyoto”

7. To provide an observation system of atmospheric measurements and a modelling framework to detect changes in atmospheric CO_2 concentrations during the time frame of a Kyoto commitment period (MO7).
8. 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” (Figure 1) 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.

All these Components interact and require additional cross-cutting information. The joint aim is to estimate the European carbon balance in the recent past and present.

CARBOOCEAN - Marine carbon sources and sinks assessment
511176

http://www.carboocean.org

Instrument:	Integrated Project (IP)	Contract starting date: 01/01/2005
Total project cost:	19.271.618 €	Duration: 60 months
EC Contribution:	14.499.600 €	
Organisation:	Universitetet i Bergen	Bergen - Norway
Co-ordinator:	Christoph Heinze (heinze@gfi.uib.no)	
EC Officer:	Giovanni Angeletti (giovanni.angeletti@cec.eu.int)	

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 CO_2 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 CO_2 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 CO_2 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.

Partners

N°	Organisation	Country
1	UNIVERSITETET I BERGEN	Norway
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3	ALFRED-WEGENER-INSTITUT FUER POLAR- UND	Germany
4	LEIBNIZ-INSTITUT FUER MEERESWISSENSCHAFTEN	Germany
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16	UNIVERSITAET BREMEN	Germany
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22	UNIVERSITE DE PERPIGNAN	France
23	HAFRANNSOKNASTOFNUNIN	Iceland
24	INSTITUT NATIONAL DE RECHERCHE HALIEUTIQUE	Morocco
25	RIJKSUNIVERSITEIT GRONINGEN	Netherlands
26	KONINKLIJKE NEDERLANDSE AKADEMIE VAN WETENSCHAPPEN	Netherlands
28	STIFTELSEN NANSEN SENTER FOR FJERNMAALING	Norway
29	NORSK INSTITUTT FOR LUFTFORSKNING	Norway
31	INSTYTUT OCANOLOGII - POLSKIEJ AKADEMII NAUK	Poland
32	GOETEBORGS UNIVERSITET	Sweden
33	MET OFFICE	UK
34	NATURAL ENVIRONMENT RESEARCH COUNCIL	UK
35	UNIVERSITY OF ESSEX	UK
36	FASTOPT GbR	Germany
37	INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION OF UNESCO	France
38	NILU POLSKA Ltd.	Poland
39	PHILIPPE SAUGIER INTERNATIONAL EDUCATIONAL PROJECTS	France
44	PRINCETON UNIVERSITY	United States

Detailed Information

Overall goal and mission:

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 (CO_2), the most important manageable driving agent for climate change. The ocean has the most significant overall potential as a sink for anthropogenic CO_2. 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 CO_2 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.

Relevance to the objectives of the Programme:

CARBOOCEAN perfectly matches the research issue I.1.b in both the scientific questions concerning the marine sources and sinks, as well as the geographical area, i.e. the Atlantic and Southern Ocean, the areas of major uncertainties. The proposal also includes cooperation with 7 PI's from the US which strengthen the links between the scientific communities.

Potential impact:

The main goal of this ambitious IP (reducing the uncertainties in the quantification of net annual air-sea CO_2 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.

INSEA - Integrated Sink Enhancement Assessment
503614

Instrument:	Specific Targeted Research Project (STREP)	Contract starting date: 01/01/2004
Total project cost:	2.553.530 €	Duration: 30 months
EC Contribution:	1.488.750 €	
Organisation:	International Institute for Applied Systems Analysis	Laxenburg, Austria
Co-ordinator:	Michael Obersteiner (oberstei@iiasa.ac.at)	
EC Officer:	Daniel Deybe (daniel.deybe@cec.eu.int)	

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 COOPERATION INTERNATIONALE EN RECHERCHE AGRONOMIQUE POUR LE DEVELOPPEMENT	France
11	EUROPEAN FOREST INSTITUTE	Finland

NEU-CO_2-III - Continuation of the "International Network Non-energy use and CO2 emissions (NEU-CO_2)", Phase III

505345

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

Instrument:	Specific Support Action (SSA)	Contract starting date: 01/09/2004
Total project cost:	289.656 €	Duration: 24 months
EC Contribution:	289.656 €	
Organisation:	Universiteit Utrecht	Utrecht - Netherlands
Co-ordinator:	Martin Patel (m.patel@chem.uu.nl)	
EC Officer:	Giovanni Angeletti (giovanni.angeletti@cec.eu.int)	

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. CO_2 emissions from non-energy use continue to be a major source of uncertainty in national greenhouse gas (GHG) emission accounting. The NEU-CO_2 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-CO_2 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	Netherlands
3	ENTE PER LE NUOVE TECNOLOGIE, L' ENERGIA E L'AMBIENTE	Italy
4	AVONLOG LTD	UK
5	INSTITUT FUER INDUSTRIELLE OEKOLOGIE	Austria
6	RISOE NATIONAL LABORATORY	Denmark
7	CENTRE INTERPROFESSIONNEL TECHNIQUE D' ETUDES DE LA POLLUTION ATMOSPHERIQUE	France
8	VLAAMSE INSTELLING VOOR TECHNOLOGISCH ONDERZOEK	Belgium
9	CENTER FOR ENERGY EFFICIENCY	Russia

10	ECOFYS POLSKA SP Z.O.O.	Poland
11	THE ENERGY AND RESOURCES INSTITUTE	India
13	INHA UNIVERSITY	Korea Rep.
14	ICF CONSULTING, LTD.	UK
15	UNIVERSITY OF CAPE TOWN.	South Africa
16	ENERGIEONDERZOEK CENTRUM NEDERLAND	Netherlands
17	INTERNATIONAL ENERGY AGENCY	France

NITROEUROPE – The nitrogen cycle and its influence on the European greenhouse gas balance

017841-2

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

Instrument:	Integrated Project (IP)	Contract under negotiation
Total project cost:	28.310.000 €	Duration: 60 months
EC Contribution:	16.600.000 €	
Organisation:	Natural Environment Research Council	Swindon, UK
Co-ordinator:	Mark Sutton (ms@ceh.ac.uk)	
EC Officer:	Giovanni Angeletti (giovanni.angeletti@cec.eu.int)	

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 N_2O and CH4 inventories and refinement of IPCC approaches.

These objectives are met by a programme that integrates: 1) an observing system for N fluxes and pools, 2) a network of manipulation experiments, 3) plot-scale C-N modelling, 4) landscape analysis, 5) European up-scaling and 6) 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.

Partners

N°	Organisation	Country
1	NATURAL ENVIRONMENT RESEARCH COUNCIL	UK
2	STICHTING ENERGIEONDERZOEK CENTRUM NEDERLAND	Netherlands
3	FORSCHUNGSZENTRUM KARLSRUHE, INSTITUTE	Germany

	FOR METEOROLOGY AND CLIMATE RESEARCH	
4	FORSKNINGSCENTER RISOE, RISOE NATIONAL LABORATORY	Denmark
5	ALTERRA GREEN WORLD RESEARCH	Netherlands
6	INSTITUT NATIONAL DE LA RECHERCHE AGRONOMIQUE	France
7	SECONDA UNIVERSITA 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 FOERDERUNG DER WISSENSCHAFTEN E.V.	Germany
12	CONSIGLIO NAZIONALE DELLE RICERCHE (INSTITUTO SISTEMI AGRICOLI E FORESTALI MEDITERRANEI AND ISTITUTO DI BIOMETEOROLOGIA	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	Netherlands
20	THE AUGUST CIESZKOWSKI AGRICULTURAL UNIVERSITY OF POZNAN, AGROMETEOROLOGY DEPARTMENT	Poland
21	ILMATIETEEN LAITOS, FINNISH METEOROLOGICAL INSTITUTE	Finland
22	FOREST RESEARCH INSTITUTE	Hungary
23	DRZAVNI HIDROMETEOROLOSKI ZAVOD, METEOROLOGICAL & HYDROLOG. SERVICE OF CROATIA	Croatia
24	NORSK INSTITUTT FOR LUFTFORSKNING	Norway
25	SLOVENSKÝ HYDROMETEOROLOGICKÝ ÚSTAV,	Slovakia
26	TRINITY COLLEGE DUBLIN	Ireland
27	NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH	Netherlands
28	THE UNIVERSITY OF MANCHESTER	UK
29	UNIVERSITY OF CORK, NATIONAL UNIVERSITY OF IRELAND	Ireland
30	THE UNIVERSITY OF EDINBURGH	UK
31	UNIVERSITA DEGLI STUDI DELLA TUSCIA,	Italy
32	ODESSA NATIONAL UNIVERSITY	Ukraine
33	GOETEBORGS UNIVERSITET, GÖTEBORG UNIVERSITY	Sweden
34	DEN KONGELIGE VETERINAER- OG LANDBOHOEJSKOLE	Denmark
35	SZENT ISTVAN EGYETEM, ST STEPHENS UNIVERSITY, GODOLLO	Hungary
36	UNIVERSITEIT GENT	Belgium
37	UNIVERSITY OF ZIMBABWE	Zimbabwe
38	LEIBNIZ-ZENTRUM FÜR AGRARLANDSCHAFTS-UND LANDNUTZUNGSFORSCHUNG E.V., MÜNCHEBERG,	Germany

39	KUNGLIGA TEKNISKA HÖGSKOLAN	Sweden
40	INST. ATMOS. PHYSICS - CHINESE ACADEMY OF SCIENCES	China
41	INDIAN AGRICULTURAL RESEARCH INSTITUTE	India
42	INSTITUTE OF PHYSICOCHEMISTRY & BIOLOGICAL PROBLEMS IN SOIL SCIENCE, RUSSIAN ACADEMY OF SCIENCES	Russia
43	RESEARCH CENTRE FOR AGRICULTURAL AND FOREST ENVIRONMENT POLISH ACADEMY OF SCIENCE	Poland
44	JUSTUS-LIEBIG-UNIVERSITAET GIESSEN,	Germany
45	COMMISSARIAT A L'ENERGIE ATOMIQUE, LABORATORY FOR CLIMATE SCIENCES & ENVIRONMENT	France
46	RIJKSINSTITUUT VOOR VOLKSGEZONDHEID EN MILIEU	Netherlands
47	METEOROLOGISK INSTITUTT, NORWEGIAN	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	A.N.SEVERTSOV INSTITUTE OF ECOLOGY AND EVOLUTION RUSSIAN ACADEMY OF SCIENCES	Russia
54	EOTVOS LORAND TUDOMANYEGYETEM	Hungary
55	TARTU UELIKOOL	Estonia
56	CENTRE DE RECERCA ECOLÒGICA I APLICACIONS FORESTALS	Spain
57	INSTITUTO SUPERIOR DE AGRONOMIA, UNIVERSIDADE TÉCNICA DE LISBOA	Portugal
58	IVL SWEDISH ENVIRONMENTAL RESEARCH INSTITUTE	Sweden
59	UNIVERSITEIT VAN AMSTERDAM	Netherlands
60	LUNDS UNIVERSITET	Sweden
61	UNIVERSIDAD POLITÉCNICA DE MADRID	Spain
62	EIDGENOESSISCHE FORSCHUNGSANSTALT	Switzerland
63	ROSKILDE UNIVERSITETSCENTER	Denmark
64	SUOMEN YMPÄRISTÖKESKUS	Finland
65	SZEGEDI TUDOMANYEGYETEM	Hungary

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

505335

http://www.geog.ox.ac.uk/research/projects/panamazonia/index.html

Instrument:	Specific Support Action (SSA)	Contract starting date: 01/01/2004
Total project cost:	400.000 €	Duration: 36 months
EC Contribution:	400.000 €	
Organisation:	University of Edinburgh	Edinburgh - UK
Co-ordinator:	Yadvinder Malhi (yadvinder.malhi@ouce.ox.ac.uk)	
EC Officer:	Giovanni Angeletti (giovanni.angeletti@cec.eu.int)	

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 EDINBURGH	UK
2	UNIVERSITY OF LEEDS	UK
3	VRIJE UNIVERSITEIT AMSTERDAM	Netherlands
4	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	France
5	ALTERRA B.V.	Netherlands
6	UNIVERSITEIT UTRECHT	Netherlands
7	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG	Germany

	DER WISSENSCHAFTEN E.V.	
8	INSTITUTO NACIONAL DE PESQUISAS DA AMAZONIA	Brazil
9	MUSEU PARAENSE EMILIO GOELDI	Brazil
10	MUSEO DE HISTORIA NATURAL NOEL KEMPFF MERCADO	Bolivia

2. Atmospheric Pollutants and their Regional Impacts

ACCENT – Atmospheric Composition Change: an European Network
505337

http://www.accent-network.org

Instrument:	Network of Excellence (NoE)	Contract starting date: 01/03/2004
Total project cost:	13.220.000 €	Duration: 60 months
EC Contribution:	11.220.000 €	
Organisation:	Consiglio Nazionale delle Ricerche	Roma - Italy
Co-ordinator:	Sandro Fuzzi (s.fuzzi@isac.cnr.it)	
EC Officer:	Ib Troen (ib.troen@cec.eu.int)	

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.'

Partners

N°	Organisation	Country
1	CONSIGLIO NAZIONALE DELLE RICERCHE	Italy
2	COMMISSION OF THE EUROPEAN COMMUNITIES - DIRECTORATE GENERAL JOINT RESEARCH CENTRE	Belgium
3	INTERNATIONAL INSTITUTE FOR APPLIED SYSTEM ANALYSIS	Austria
4	UNIVERSITAET FUER 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	METEO-FRANCE	France
11	FORSCHUNGSZENTRUM JUELICH GMBH	Germany
12	LEIBNIZ INSTITUT FUER TROPOSPHAERENFORSCHUNG e.V.-	Germany
13	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.	Germany
15	UNIVERSITAET BREMEN	Germany
16	RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG.	Germany
17	UNIVERSITY OF CRETE	Greece
18	ARISTOTELEIO PANEPISTIMIO THESSALONIKIS	Greece
19	VESZPREMI EGYETEM	Hungary
20	NATIONAL UNIVERSITY OF IRELAND, GALWAY	Ireland
21	LATVIJAS UNIVERSITATE	Latvia
22	INSTITUTE OF PHYSICS	Lithuania
23	NORSK INSTITUTT FOR LUFTFORSKNING	Norway
24	UNIVERSITETET I OSLO	Norway
25	INSTITUTE OF ENVIRONMENTAL PROTECTION	Poland
26	UNIVERSIDADE DE AVEIRO	Portugal
27	FUNDACION CENTRO DE ESTUDIOS AMBIENTALES DEL MEDITERRANEO	Spain
28	STOCKHOLMS UNIVERSITET.	Sweden
29	INSTITUT UNIVERSITAIRE KURT BOESCH	Switzerland
30	PAUL SCHERRER INSTITUT	Switzerland
31	KONINKLIJK NEDERLANDS METEOROLOGISCH INSTITUUT	Netherlands
32	NATURAL ENVIRONMENT RESEARCH COUNCIL	UK
33	UNIVERSITA DEGLI STUDI DI URBINO "CARLO BO"	Italy
34	UNIVERSITY OF KUOPIO	Finland
35	ILMATIETEEN LAITOS	Finland
36	DEUTSCHES ZENTRUM FUER LUFT UND. RAUMFAHRT E.V	Germany
37	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO	Netherlands
38	RIJKSINSTITUUT VOOR VOLKSGEZONDHEID EN MILIEU	Netherlands
39	ENERGIEONDERZOEK CENTRUM NEDERLAND	Netherlands
40	IMPERIAL COLLEGE OF SCIENCE, TECHNOLOGY AND MEDICINE	UK
41	UNIVERSITY OF CAMBRIDGE	UK
42	UNIVERSITY OF LEICESTER	UK
43	UNIVERSITY OF EAST ANGLIA	UK
44	UNIVERSITY OF MANCHESTER INSTITUTE OF SCIENCE AND TECHNOLOGY	UK

Detailed Information

Project objective(s)

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.

AIR4EU - Air Quality Assessment for Europe from Local to Continental 503596

http://www.air4eu.nl

Instrument:	Specific Targeted Research Project (STREP)	Contract starting date: 01/01/2004
Total project cost:	2.927.506 €	Duration: 36 months
EC Contribution:	1.958.181 €	
Organisation:	Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek - TNO	Delft, Netherlands
Co-ordinator:	Peter Builtjes (p.j.h.builtjes@mep.tno.nl)	
EC Officer:	Ib Troen (ib.troen@cec.eu.int)	

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 PM2.5), NO_2, CO, SO_2, 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.

Partners

N°	Organisation	Country
1	NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO	Netherlands
2	NORSK INSTITUTT FOR LUFTFORSKNING	Norway
3	ARISTOTELEIO PANEPISTIMIO THESSALONIKIS	Greece
4	UNIVERSITAET 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 HLAVNIHO MESTA PRAHY	Czech Rep.
11	ENVECO S.A. ENVIRONMENTAL PROTECTION MANAGEMENT AND ECONOMICS	Greece
12	GEMEENTEWERKEN ROTTERDAM	Netherlands
13	DCMR MILIEUDIENST RIJNMOND	Netherlands
14	OSLO KOMMUNE HELSEVERNETATEN	Norway

Detailed Information

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 pollutant components in Europe: PM10 (and PM2.5), NO_2, CO, SO_2, O3 and benzene. AIR4EU is designed to meet the research objectives of Topic 1.5, Task 2 of SSP priority 8.1.

In respect to AQ assessment, AIR4EU strengthens the links between research and policy, which has been recognised as a priority within the "Clean Air for Europe" (CAFE) programme. There are a wide variety of assessment methods to provide reliable and accurate AQ data, but the methods depend on the spatial and temporal scales, and are often not or only partially compatible. Monitoring and modelling methods are usually used separately and consequently yield results that are not mutually consistent. There is an obvious demand for scientific sound and practical recommendations on how to integrate measuring and modelling techniques into internally consistent, comprehensive and cost-effective assessment methods.

The aim of AIR4EU is to provide recommendations on integrated AQ assessment for different temporal and spatial scales: ranging from hourly to annual and from "hotspot"/street to continental scale. This will directly benefit EU stakeholders including policy makers and city, national and regional users. Research objectives in AIR4EU are directed to review the benefits and drawbacks of existing modelling and monitoring methods for different spatial and temporal scales. Criteria for the review are parameters such as accuracy, costs, input requirements and representativeness of the data. These parameters are evaluated against the requirements for different policy purposes. This will result in recommended methods for AQ assessment with emphasis on the combined use of monitoring and modelling. AIR4EU will also prepare AQ maps at different scales in Europe based upon available data sets (monitoring, meteorology and emissions) and the recommended methods.

AIR4EU will bring together European top-scientists with complementary skills in the field of AQ assessment together with relevant stakeholders. The cooperation of researchers from six member states representing four universities and two research institutes, as well as eight user partners will support the establishment of the European Research Area. Authorities, practitioners and policy makers at urban, regional, national and European level will be consulted, as well as a high level Expert group. A vital aspect of Air4EU are 'case studies' to test and further develop the recommendations. Case studies, which will address the "hotspot", urban and national scales, will be implemented in Paris, Rome, Prague, London, Athens, Rotterdam and Oslo in close cooperation with user partners and other interested parties.

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 also 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.

MAP- Secondary Marine Aerosol Production from Natural Sources 018332

Instrument:	Specific Targeted Research Project (STREP)	Contract starting date: 15/09/2005
Total project cost:	3.943.700 €	Duration: 36 months
EC Contribution:	2.600.000 €	
Organisation:	National University of Ireland	Galway, Ireland
Co-ordinator:	Colin O'Dowd (colin.odowd@cmas.demon.co.uk)	
EC Officer:	Ib Troen (ib.troen@cec.eu.int)	

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.

Partners

N°	Organisation	Country
1	NATIONAL UNIVERSITY OF IRELAND, GALWAY	Ireland
2	NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH	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

Detailed Information

Objectives:

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

A full schedule of the activities leading to achieving these objectives is outlined in section 7. 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 (0 '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.

NATAIR - Improving and Applying Methods for the Calculation of Natural and Biogenic Emissions and Assessment of Impacts on Air Quality 513699

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

Instrument:	Specific Targeted Research Project (STREP)	Contract starting date: 01/01/2005
Total project cost:	956.586 €	Duration: 27 months
EC Contribution:	600.000 €	
Organisation:	Universitaet Stuttgart	Stuttgart - Germany
Co-ordinator:	Rainer Friedrich (Rainer.Friedrich@ier.uni-stuttgart.de)	
EC Officer:	Ib Troen (ib.troen@cec.eu.int)	

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 und 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 {NOX, SOX, NH3, PM, NMVOC; CH4, 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 SOX, NOX, NH3 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.

Partners

N°	Organisation	Country
1	UNIVERSITAET 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 - DIRECTORATE GENERAL JOINT RESEARCH CENTRE	Belgium

Detailed Information

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 und 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 (NOx, SOx, NH3, PM, NMVOC; CH4, 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 SOx, NOx, NH3 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.

OOMPH - Organics over the Ocean Modifying Particles in both Hemispheres
018419
http://www.atmosphere.mpg.de/enid/oomph

Instrument:	Specific Targeted Research Project (STREP)	Contract starting date: 01/09/2005
Total project cost:	2.488.648 €	Duration: 36 months
EC Contribution:	1.931.648 €	
Organisation:	Max-Planck-Institut für Chemie	Mainz, Germany
Co-ordinator	Jonathan Williams (williams@mpch-mainz.mpg.de)	
EC Officer:	Ib Troen (ib.troen@cec.eu.int)	

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.

Partners

N°	Organisation	Country
1	MAX-PLANCK-INSTITUT FUER 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

Detailed Information

Objectives:

1. To determine which organic species are emitted by ocean biology into seawater and air.

2. To determine fluxes for key organic species between sea and air.
3. To determine main driving factors for organic species emission in the marine boundary layer.
4. To determine which oxygenated products are formed by the oxidation of primary emissions in seawater and in air.
5. To determine which organic chemical species are found on marine aerosols
6. To determine the role of organic species in the physical properties of marine aerosols
7. To construct an air/sea/aerosol box model of organic species in the marine boundary layer.
8. To use proven box model chemistry in a global model.

3. Stratospheric Ozone and Climate Interactions

THE MAIN AIM QOS2004 – Quadrennial Ozone Symposium 2004

505404

http://www.qos2004.gr

Instrument:	Specific Support Action (SSA)	Contract starting date: 01/10/2003
Total project cost:	232.000 €	Duration: 12 months
EC Contribution:	63.000 €	
Organisation:	National and Kapodistrian University of Athens	Athens - Greece
Co-ordinator:	Christos Zerefos (zerefos@geol.uoa.gr)	
EC Officer:	Claus Brüning (claus.bruning@cec.eu.int)	

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. Therefore, the Symposium falls within the objectives and the Work Programme of the 6th Framework, sub-priority 1.1.6.3 under the activity code SUSTDEV-3.1.5 (Stratospheric ozone - climate interactions).

Partners

N°	Organisation	Country
1	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS	Greece

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

3893

http://www.pa.op.dlr.de/quantify/

Instrument:	Integrated Project (IP)	Contract starting date: 01/03/2005
Total project cost:	12.000.000 €	Duration: 60 months
EC Contribution:	8.000.000 €	
Organisation:	Deutsches Zentrum für Luft- und Raumfahrt e.v. Köln - Germany	
Co-ordinator:	Robert Sausen (robert.sausen@dlr.de)	
EC Officer:	Claus Brüning (claus.bruning@cec.eu.int)	

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 CO_2 and N_2O, 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.

Partners

N°	Organisation	Country
1	DEUTSCHES ZENTRUM FUER LUFT UND RAUMFAHRT E.V.	Germany
2	AIRBUS FRANCE	France
3	COMMISSARIAT A L'ENERGIE ATOMIQUE	France
4	CAMBRIDGE ENVIRONMENTAL RESEARCH CONSULTANTS LTD	UK
5	CENTRE EUROPEEN DE RECHERCHE ET DE FORMATION AVANCEE EN CALCUL SCIENTIFIQUE	France
6	CICERO SENTER FOR KLIMAFORSKNING	Norway
7	METEO-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
14	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE	Switzerland
15	HEAVENS-ABOVE GmbH	Germany
16	ADMINISTRATIA NATIONALA DE METEOROLOGIE	Romania
17	UNIVERSITAET BREMEN	Germany
18	IVL SVENSKA MILJOEINSTITUTET AB	Sweden
19	KONINKLIJK NEDERLANDS METEOROLOGISCH INSTITUUT	Netherlands
20	KOEZLEKEDESTUDOMANYI INTEZET KOEZHASZNU TARSASAG	Hungary
21	THE MANCHESTER METROPOLITAN UNIVERSITY	UK
22	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.	Germany
24	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS	Greece
26	NATIONAL INSTITUTE OF METEOROLOGY AND HYDROLOGY OF THE BULGARIAN ACADEMY OF SCIENCES	Bulgaria
27	OFFICE NATIONAL D'ETUDES ET DE RECHERCHES AEROSPATIALES	France
28	PAUL SCHERRER INSTITUT	Switzerland
30	UNIVERSITY OF SZEGED	Hungary
31	TRANSPORT & MOBILITY LEUVEN	Belgium
32	UNIVERSITY OF CAMBRIDGE	UK
33	THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	United States
34	UNIVERSITETET I OSLO	Norway
35	THE REGENTS OF THE UNIVERSITY OF MICHIGAN	United States
36	UNIVERSITAET HAMBURG	Germany
37	UNIVERSITY OF OXFORD	UK
38	THE UNIVERSITY OF READING	UK
39	UNIWERSYTET WARSZAWSKI	Poland
40	UNIVERSITY OF YORK	UK

Detailed Information

Project 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:

1. 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.
2. To generate transport (direct) emission inventories for scenarios of future development, which are consistent with the IPCC SRES scenarios.
3. 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.
4. 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).
5. To consistently calculate the global chemical impact of the different modes of transport, for present day conditions and several future scenarios.
6. 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.
7. 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.
8. To test the hypothesis that anthropogenic aerosol causes the formation of additional cirrus clouds.
9. 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.
10. To determine the spatial and temporal patterns of transport-induced climate change and to search for specific fingerprints.
11. To develop and evaluate policy relevant metrics that comprise all important impacts on climate and that take the particular characteristics of transport into account.
12. To estimate the impact of potential transport related mitigation options on atmospheric composition and climate. The main objectives listed above break down into individual objectives of the Work Packages. These objectives are listed in Chapter 6. Additionally, the associated milestones and the planned achievement times1 are given in this Chapter.

SCOUT-O3 - Stratosphere-Climate Links with Emphasis on the UTLS
505390

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

Instrument:	Integrated Project (IP)	Contract starting date: 01/05/2004
Total project cost:	23.315.623 €	Duration: 60 months
EC Contribution:	15.000.000 €	
Organisation:	University of Cambridge	Cambridge, UK
Co-ordinator:	John Adrian Pyle (john.pyle@atm.ch.cam.ac.uk)	
EC Officer:	Claus Brüning (claus.bruning@cec.eu.int)	

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; extratropical 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.

Partners

N°	Organisation	Country
1	UNIVERSITY OF CAMBRIDGE	UK
2	STIFTUNG ALFRED-WEGENER-INSTITUT FUER 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
10	CESKY HYDROMETEOROLOGICKY USTAV	Czech Rep.

11	DANMARKS METEOROLOGISKE INSTITUT	Denmark
12	PSYSIKALISCH-METEOROLOGISCHES OBSERVATORIUM DAVOS UND WELSTRAHLUNGSZENTRUM	Switzerland
13	DEMOCRITUS UNIVERSITY OF THRACE - RESEARCH COMMITTEE	Greece
14	DEUTSCHES ZENTRUM FUER LUFT UND RAUMFAHRT E.V.	Germany
15	DEUTSCHER WETTERDIENST	Germany
16	ENTE PER LE NUOVE TECNOLOGIE, L' ENERGIA E L'AMBIENTE	Italy
17	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE	Switzerland
18	ILMATIETEEN LAITOS	Finland
19	FREIE UNIVERSITAET BERLIN.	Germany
20	FORSCHUNGSZENTRUM JUELICH GMBH	Germany
21	FORSCHUNGSZENTRUM KARLSRUHE GMBH	Germany
22	IMPERIAL COLLEGE OF SCIENCE, TECHNOLOGY AND MEDICINE.	UK
23	INSTITUTO NACIONAL DE TECNICA AEROESPACIAL	Spain
24	ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA	Italy
25	ISTITUTO NAZIONALE DI OTTICA APPLICATA	Italy
26	JOHANNES GUTENBERG UNIVERSITAET MAINZ	Germany
27	UNIVERSITAET GRAZ	Austria
30	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG DER WISSENSCHAFTEN E.V.	Germany
33	METEO-FRANCE	France
34	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS.	Greece
35	NORSK INSTITUTT FOR LUFTFORSKNING	Norway
36	OBSERVATOIRE CANTONAL DE NEUCHATEL	Switzerland
37	PAUL SCHERRER INSTITUT	Switzerland
38	RIJKSINSTITUUT VOOR VOLKSGEZONDHEID EN MILIEU	Netherlands
39	KONINKLIJK NEDERLANDS METEOROLOGISCH INSTITUUT	Netherlands
40	SVERIGES METEOROLOGISKA OCH HYDROLOGISKA INSTITUT	Sweden
41	STRATOSPHERE - M, LTD	Russia
42	UNIVERSITAET BERN	Switzerland
43	UNIVERSITAET BREMEN	Germany
44	UNIVERSIDAD DE BUENOS AIRES	Argentina
45	UNIVERSITY OF CRETE	Greece
46	JOHANN WOLFGANG GOETHE UNIVERSITAET FRANKFURT AM MAIN	Germany
47	GOETEBORGS UNIVERSITET.	Sweden
48	UNIVERSITAET HANNOVER.	Germany
49	RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG.	Germany
50	MEDIZIN UNIVERSITAET INNSBRUCK	Austria
51	UNIVERSITAET KARLSRUHE (TECHNISCHE HOCHSCHULE)	Germany
52	LANCASTER UNIVERSITY	UK
53	UNIVERSITA DEGLI STUDI DE L'AQUILA	Italy
54	UNIVERSITY OF LEEDS.	UK
55	UNIVERSITY OF LEICESTER	UK
56	UNIVERSITY OF MANCHESTER INSTITUTE OF	UK

	SCIENCE AND TECHNOLOGY	
57	UNIVERSITETET I OSLO	Norway
58	ARISTOTELEIO PANEPISTIMIO THESSALONIKIS	Greece
59	UNIVERSITY OF WYOMING	United States
60	THE REGENTS OF THE UNIVERSITY OF CALIFORNIA - UC DAVIS	United States
61	MET OFFICE	UK
62	UNIVERSITY OF EAST ANGLIA	UK
63	UNIVERSITAET FUER BODENKULTUR	Austria
64	WEATHER INFORMATICS LTD	UK

Detailed Information

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 extratropical 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-03 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.

4. Climate Dynamics and Variability

DYNAMITE - Understanding the Dynamics of the Coupled Climate System 3903

http://dynamite.nersc.no/

Instrument:	Specific Targeted Research Project (STREP)	Contract starting date: 01/03/2005
Total project cost:	3.122.214 €	Duration: 36 months
EC Contribution:	1.999.998 €	
Organisation:	Nansen Environmental and Remote Sensing Center	Bergen, Norway
Co-ordinator:	Helge Drange (helge.drange@nersc.no)	
EC Officer:	Georgios Amanatidis (georgios.amanatidis@cec.eu.int)	

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.

Partners

N°	Organisation	Country
1	STIFTELSEN NANSEN SENTER FOR FJERNMAALING	Norway
2	UNIVERSITY OF READING	UK
3	CENTRE EUROPEEN DE RECHERCHE ET DE FORMATION AVANCEE 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 FUER 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

Detailed Information

Project objectives

The strategic objectives addressed in DYNAMITE are, in order of importance:
1. To assess the natural variability of NAO/AO and ENSO
2. To examine the representation of NAO/AO and ENSO in state-of-the-art climate models
3. To identify the likelihood of changes in NAO and ENSO caused by climate change
4. To quantify the role of ocean biology in the coupled climate system

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:

Objective 1: To quantify strongly and weakly coupled processes underlying the natural variability of ENSO and NAO/AO

Objective 2: 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

Objective 3: To identify the response of ENSO and NAO/AO to climate change

Objective 4: To quantify the role of ocean biology in the variability of the tropical coupled climate system, including ENSO

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

3868

Instrument:	Specific Targeted Research Project (STREP)	Contract starting date: 01/12/2004
Total project cost:	5.470.257 €	Duration: 36 months
EC Contribution:	2.500.000 €	
Organisation:	Centre National de la Recherche Scientifique	Grenoble, France
Co-ordinator:	Dominique Raynaud (raynaud@lgge.obs.ujf-grenoble.fr)	
EC Officer:	Riccardo Casale (riccardo.casale@cec.eu.int)	

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 CO_2 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.

Partners

N°	Organisation	Country
1	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	France
2	ALFRED-WEGENER-INSTITUT FÜR POLAR- UND MEERESFORSCHUNG	Germany
4	CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LE SCIENZE DEL MARE	Italy
5	UNIVERSITE LIBRE DE BRUXELLES	Belgium
6	KOEBENHAVNS UNIVERSITET	Denmark
7	INSTITUT POLAIRE FRANÇAIS - PAUL EMILE VICTOR	France
8	UTRECHT UNIVERSITY	Netherlands
9	STOCKHOLMS UNIVERSITET	Sweden
10	NORWEGIAN POLAR INSTITUTE	Norway

11	UNIVERSITY OF BERN	Switzerland
12	NATURAL ENVIRONMENT RESEARCH COUNCIL	UK
13	UNIVERSITY OF CAMBRIDGE	UK
14	COMMISSARIAT À L'ENERGIE ATOMIQUE'	France
15	CONSORZIO PER L'ATTUAZIONE DEL PROGRAMMA NAZIONALE DI RICERCHE IN ANTARTIDE	Italy

Detailed Information

Project objective(s)

1. State of knowledge

The polar ice sheets are the only archive preserving information about changes both in past climate and in the atmosphere's composition. This is in particular due to the capacity of the ice during formation to enclose a small sample of atmospheric air in the form of air bubbles, and thus to record in a unique manner past changes of the most important greenhouse gases beyond water vapour: CO2, CH4 and N2O. The Vostok ice record going back to 420,000 years before present (420 kyr BP) has shown that greenhouse gases and climate have been closely related [Petit et al., 1999]. At the same time studies of ice core, from both Greenland and Antarctica, revealed important information about changes in atmospheric circulation and transport, temperature and precipitation at high latitudes, aerosols and moisture sources, ice volume at different time scales ranging from glacial interglacial cycles to the decadal scale. Another big revelation arising from the ice archive is certainly the discovery that our atmosphere experienced abrupt and huge climatic events quite often and in a quasi- cyclic manner during extended periods of the past.

At the same time, a similar type of variability in the sea surface temperature (SST) and oceanic circulation has also been observed in the marine sediment record, and much knowledge has been assembled to reconstruct Pleistocene climate variability from marine sediment archives based on the study of geochemical, isotopic and microfossil assemblage studies. We are now in the possession of proxies that permit the estimation of the ocean physical environment, such as changes in circulation, water mass distribution, SST, and sea ice, as well as components of the biogeochemical cycle that are governed by biological productivity in the ocean surface waters.

All these marine and ice core reconstructions, together with the progress made in reconstructing the continental conditions, and in particular the vegetation changes, have been extremely useful for validating a hierarchy of climate models.

Nevertheless the ice core record needs to be extended, at least to a few more climatic cycles to reach periods showing different climatic conditions. Furthermore we lack certain crucial indicators as proxies for sea ice extent or local insolation to investigate how the climatic changes are phased with the orbital parameters. This has to be remedied. New markers have also to be investigated in order to get an optimal synchronization.

On the other hand, there are still uncertainties how to reconcile the signals obtained from various geochemical, isotopic and paleobiological proxies concerning especially past productivity and organic carbon transport to the deep ocean. While much work has been done to develop proxies relying on biogenic carbonate, less is known how to exploit the biosiliceous components for paleoceanographic reconstruction, especially concerning stable isotope measurements on biogenic silica. However, the latter represents the major sediment compound in coastal and equatorial upwelling regions as well as the Southern Ocean (SO) and the north Pacific regions that are crucial for the understanding of global ocean circulation and biological productivity.

2. Completion of the EPICA drillings

The initial overall objective of the European Project for Ice Coring in Antarctica (EPICA) was to reconstruct a continuous, highly resolved history of global climate and environmental changes extending from centuries to several hundred thousand years from two ice cores drilled in East Antarctica, one in its central part at Dome Concordia (75°00'S, 123°24'E), the other in its Atlantic sector at Kohnen Station in Dronning Maud Land (75°00'S, 0°04').

The large European effort made with the combined support of EU and the nations taking part in the project has enabled the community to recover (at the beginning of 2003) ice cores to 3,200m depth at Dome C (named the EDC core, at Concordia Station) and 1,564 m at Kohnen Station (named the EDML core).

The Dome C core provides today the longest climatic record ever through an ice sheet. According to current estimates of the age of the core we may have a record covering approximately the last 800,000 years, i.e. about twice as long as the longest previous record measured at the Vostok site in Antarctica.

The EDML core provides now a new Antarctic record covering the last 50,000 years, with an improved resolution for studying decadal changes at that age in the paleoclimatic record. The potential of these two cores for new discoveries concerning the climatic system is high and will improve the understanding of the climate system. Such understanding is essential to improve model simulation addressing future climate changes and potential surprises.

The present success of EPICA is the result of the excellence of the technology developed at the European level both in terms of drilling and logistics. It is also an excellent example of how European collaboration can tackle large scale and long-term research projects for the benefit of society.

Our first objective in the frame of the present proposal is to complete the two drilling operations in the next years.

3. Extending the ice record

The different scientific partners of EPICA are now starting the investigation of the recently recovered EDC and EDML cores with the objective to obtain first a smooth record of the different properties measured along the two cores. This analysis focuses on ice isotopes, a proxy for Antarctic temperatures, greenhouse gases, dust, chemistry and physical properties (crystal size, fabrics).

In the frame of this proposal we will:

- extend back in the past the EDML and EDC records and produce for the first time an atmospheric record covering nearly the last million years;
- provide new high-resolution sets of ice core data for resolving specific scientific questions arising from the paleo-record (stage 11, sequence of climatic forcings, North-South climatic interactions, carbon cycle and paleo productivity,…);
- develop and test novel proxies for paleoclimatic reconstruction.

The extension of the EDML core should produce a highly appropriate record for investigating the inter-hemispheric climate dynamics in the Atlantic sector during the last climatic cycle, by comparison with the marine and Greenland records. By extending the EDC drilling we except to complete the already unprecedented atmospheric paleo-record for periods older than 420,000 years.

The research to be undertaken based on this new paleoreconstruction effort is described in part B.6 (Workplan) and focuses on:

- synchronizing the different records (WP3),
- investigating MIS 11 and comparing it with other interglacials with special reference to the Holocene (WP4),
- reconstructing Antarctic temperatures and moisture sources (WP5),
- investigating the sequence of climatic forcings and the North-South climatic connection (bipolar

seesaw) (WP6);
- understanding and modelling the ice-sheet dynamics and its relationship with global sea level (WP7);
- investigating the paleo-carbon cycle and paleo-productivity (WP8)

4. Developing novel proxies for paleoclimatic reconstruction

In order to optimise our ice and marine reconstructions we will develop and test novel or recently proposed ice proxies for paleoclimatic reconstruction. Aside the fact that we will look at novel approaches for correlating the cores by using tephra horizons or magnetic excursions, the following methods will be developed:

- One of the crucial problems when looking at the phase relationship between the different climatic forcings from the ice paleorecord is the lack of a direct signature of the insolation forcing in the ice.
- Paleoreconstructions currently lack a reliable and continuous proxy of changes in southern sea ice extent. Sea ice is a critical boundary condition for models: it has a major influence on planetary albedo, air-sea heat exchange, and Antarctic bottom water formation and thermohaline circulation [Knorr and Lohmann, 2003]; it may also play a role in modulating glacial-interglacial CO2 changes [Stephens and Keeling, 2000].
- Declining rates of iron and other bioactive trace elements prior to the glacial terminations may be critical in driving the initial deglacial rise in CO2.
- For the credibility of the CO2 data, investigations of any possible artefacts have to be carried out. Dissolved organic carbon (DOC) in the ice will show the regions of ice where organic material could potentially contribute to altered CO2 concentrations.
- Stables isotopes in biogenic silica (δ13C, δ15N, δ18O) are promising new proxies for the reconstruction of past biological productivity, nutrient utilization, ocean/atmosphere CO2 exchange and water mass physical properties.
- Greenhouse gas isotopes or mass-independent sulfur and oxygen isotope fractionation in ice are new and very promising tools for to differentiate the role of different sources and sinks in the budget of greenhouse trace gases and aerosols in the past.

5. Paleoreconstruction and integrated climate analysis through marine and ice core studies

One of the major scientific objectives of our proposal is to use a multiproxy approach combining ice and ocean to achieve a dynamic paleoreconstruction providing a platform for future improved modelling. While polar ice cores contain paleoclimatic records that are unique in terms of significance (e.g. records of greenhouse gases) and temporal detail, and in many other respects, it is impossible to describe the whole climate system without other records. Marine sediment cores offer a much broader geographical cover and contain information on past climate that is inaccessible to ice cores. Considerable progress has been made through the EC-funded POP ("Polar-Ocean-Polar") project to link marine and ice core records on a common time scale so that all sources of data can be brought to focus on the important questions such as causes and effects of rapid climate change. The newly available EPICA Dome C ice, that probably almost doubles the length of time represented in the Vostok ice record, combined with the very high resolution records from DML, and a large body of information from already collected deep-sea sediments, will be integrated within the framework of the EPICA-MIS project using the strategies developed in the POP project. The combination of both ice and marine records offers also a unique opportunity to investigate in detail the situation which led to the long and very special interglacial having occurred 420 kyr BP and known as marine isotopic stage 11 (MIS 11). In doing so we hope to provide new insights into the mechanisms which would drive the future Holocene climate in the absence of anthropogenic perturbation. This is a prerequisite for simulating our future climate.

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

010292

Instrument:	Specific Support Action (SSA)	Contract starting date: 01/07/2005
Total project cost:	409.000 €	Duration: 18 months
EC Contribution:	395.000 €	
Organisation:	Nansen Environmental and Remote Sensing Center	Bergen, Norway
Co-ordinator:	Ola M. Johannessen (ola.johannessen@nersc.no)	
EC Officer:	Riccardo Casale (riccardo.casale@cec.eu.int)	

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 rise 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.

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 GEOSIENCES	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), DEPARMENT OF CHEMESTRY	Sweden
10	SCOTTISH ASSOSIATION 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	
15	FOUNDATION FOR RESEARCH AND TECHNOLOGY	Greece
16	NATIONAL METEOROLOGICAL ADMINISTRATION	Romania
17	INSTITUTE DE CIENCIA I TECNOLOGIA AMBIENTALS	
18	INSTITUTE OF OCEANOLOGY, POLISH ACEADEMY OF SCIENCES	Poland
19	INTERNATIONAL POLAR FOUNDATION	Belgium

MILLENNIUM - European climate of the last millennium
017008-2

Instrument:	Integrated Project (IP)	Contract under negotiation
Total project cost:	16.025.487 €	Duration: 48 months
EC Contribution:	12.600.000 €	
Organization:	University of Wales Swansea	Swansea, UK
Co-ordinator:	Danny McCarroll (D.McCarroll@swansea.ac.uk)	
EC Officer:	Riccardo Casale (riccardo.casale@cec.eu.int)	

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.

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	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	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

5. Prediction of Climatic Change and its Impacts

AMMA - African Monsoon Multidisciplinary Analysis
4089

http://www.amma-eu.org

Instrument:	Integrated Project (IP)	Contract starting date: 01/01/2005
Total project cost:	34.962.795 €	Duration: 60 months
EC Contribution:	11.700.000 €	
Organisation:	Centre National de la Recherche Scientifique (CNRS) Paris - France	
Co-ordinator:	Jan Polcher (jan.polcher@lmd.jussieu.fr)	
EC Officer:	Georgios Amanatidis (georgios.amanatidis@cec.eu.int)	

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 : i) To improve our ability to predict the WAM and its impacts on intra-seasonal to decadal timescales, ii) 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 : i) a long term monitoring, ii) an enhanced observing period of two years and iii) 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.

Partners

N°	Organisation	Country
1	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	France
2	INSTITUT DE RECHERCHE POUR LE DEVELOPPEMENT	France
3	UNIVERSITAET ZU KOELN	Germany
4	DEUTSCHES ZENTRUM FUR 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 METEOROLOGIQUES METEO FRANCE	France
9	MEDIAS FRANCE	France

10	UNIVERSITE DE BOURGOGNE: DIJON	France
11	UNIVERSITE PARIS XII - VAL DE MARNE	France
12	UNIVERSITE PAUL SABATIER - TOULOUSE III	France
13	CENTRE DE COOPERATION INTERNATIONALE EN RECHERCHE AGRONOMIQUE POUR LE DEVELOPPEMENT	France
14	UNIVERSITAET BREMEN	Germany
15	FORSCHUNGSZENTRUM KARLSRUHE GMBH	Germany
16	LEIBNIZ INSTITUT FUR MEERESWISSENSCHAFTEN	Germany
17	LUDWIG-MAXIMILIANS-UNIVERSITAET MUENCHEN	Germany
18	RHEINISCHE FRIEDRICH-WILHELMS - UNIVERSITAET 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
28	UNIVERSITA DEGLI STUDI DI PERUGIA	Italy
29	UNIVERSIDAD DE CASTILLA - LA MANCHA	Spain
30	UNIVERSIDAD COMPLUTENSE DE MADRID	Spain
31	UNIVERSIDAD POLITECNICA DE CARTAGENA	Spain
32	UNIVERSITE CATHOLIQUE DE LOUVAIN	Belgium
33	EUROPEAN CENTRE FOR MEDIUM - RANGE WEATHER FORECASTS	UK
34	CENTRE REGIONAL DE FORMATION ET D'APLICATION EN AGROMETEOROLOGIE ET HYDROLOGIE OPERATIONNELLE	Niger
35	CENTRE DE RECHERCHE MEDICALE ET SANITAIRE	Niger
36	ECOLE INTER-ETATS D'INGENIEURS DE L' EQUIPEMENT RURAL	Burkina Faso
37	AFRICAN CENTRE FOR METEOROLOGICAL APPLICATION FOR DEVELOPMENT	Niger
38	VAISALA OYJ	Finland
39	OCEAN SCIENTIFIC INTERNATIONAL	UK
40	KONINKLIJK NEDERLANDS METEOROLOGISCH INSTITUUT (KNMI)	Netherlands
41	AGENCE POUR LA SECURITE DE LA NAVIGATION AERIENNE EN AFRIQUE ET A MADAGASCAR	Senegal
42	UNIVERSITAET KARLSRUHE (TECHNISCHE HOCHSCHULE)	Germany

Detailed Information

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 tropic 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.

CLARIS -A Europe-South America Network for Climate Change Assessment and Impact Studies

1454

http://www.claris-eu.org

Instrument:	Specific Support Action (SSA)	Contract starting date: 01/07/2004
Total project cost:	1.118.479 €	Duration: 36 months
EC Contribution:	499.998 €	
Organisation:	Centre National de la Recherche Scientifique	Paris, France
Co-ordinator:	Jean-Philippe Boulanger (jpb@lodyc.jussieu.fr)	
EC Officer:	Georgios Amanatidis (georgios.amanatidis@cec.eu.int)	

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 CIENTIFICAS 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.	Netherlands
12	UNIVERSIDAD DE CHILE	Chile
13	INSTITUT DE RECHERCHE POUR LE DÉVELOPPEMENT	France
14	MAX PLANCK SOCIETY FOR THE ADVANCEMENT OF SCIENCE	Germany

ENSEMBLES - ENSEMBLE based Predictions of Climate Changes and their Impacts
505539

http://www.ensembles-eu.org

Instrument:	Integrated Project (IP)	Contract starting date: 01/09/2004
Project total cost:	22,561,908 €	Duration: 60 months
EC contribution:	15.000.000 €	
Organisation:	Met Office	Exeter, UK
Co-ordinator:	David Griggs (dave.griggs@metoffice.gov.uk)	
EC Officer:	Georgios Amanatidis (georgios.amanatidis@cec.eu.int)	

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.

Partners

N°	Organisation	Country
1	MET OFFICE	UK
2	METEO FRANCE, CENTRE NATIONAL DE RECHERCHES METEOROLOGIQUES	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	Netherlands
9	UNIVERSITY OF BRISTOL	UK

10	MAX PLANCK GESELLSCHAFT ZUR FOERDERUNG 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	UNIVERSITE 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 EUROPEAN POUR LE RECHERCHE ET LA FORMATION AVANCEE EN CALCUL	France
21	CESKY HYDROMETEOROLOGICKY USTAV	Czech Rep.
22	CICERO SENTER FOR KLIMAFORSKNING	Norway
23	CLIMPACT	France
24	CONSIGLIO NAZIONALE DELLE RICERCHE	Italy
25	UNIVERZITA KARLOVA V PRAZE	Czech Rep.
26	DANMARKS JORDBRUGSFORSKNING	Denmark
27	UNIVERSITA DEGLI STUDI DI FIRENZE	Italy
29	DEUTSCHER WETTERDIENST	Germany
30	ELECTRICITE DE FRANCE	France
31	ECOLE NORMALE SUPERIEURE	France
32	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE ZUERICH	Switzerland
34	FONDAZIONE ENI ENRICO MATTEI	Italy
35	FUNDACIÓN PARA LA INVESTIGACIÓN DEL CLIMA	Spain
36	ILMATIETEEN LAITOS	Finland
37	FACHHOCHSCHULE FUER TECHNIK STUTTGART	Germany
38	FREIE UNIVERSITAET BERLIN	Germany
40	GKSS FORSCHUNGSZENTRUM GEESTHACHT GMBH	Germany
41	USTAV FYZIKY ATMOSFERY AV CR	Czech Rep.
42	THE ABDUS SALAM INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS	Italy
43	INSTITUT FUER MEERESKUNDE AN DER UNIVERSITAET	Germany
44	INSTITUTO NACIONAL DE METEOROLOGIA	Spain
45	THE TRUSTEES OF COLUMBIA UNIVERSITY IN NEW YORK CITY	United States
46	INSTITUT UNIVERSITAIRE KURT BOESCH	Switzerland
47	UNIVERSITÄT STUTTGART	Germany
48	COMMISSION OF THE EUROPEAN COMMUNITIES - DIRECTORATE GENERAL JOINT RESEARCH CENTRE	Belgium
49	LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE	UK
50	LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE	UK
51	METEOROLOGISK INSTITUTT	Norway

52	METEOSCHWEIZ	Switzerland
54	NANSEN ENVIRONMENTAL AND REMOTE SENSING CENTER	Norway
55	INSTITUTUL NATIONAL DE HIDROLOGIE SI GOSPODARIRE A APELOR BUCURESTI	Romania
56	ADMINISTRATIA NATIONALA DE METEOROLOGIE	Romania
57	RESEARCH CENTRE FOR AGRICULTURAL AND, FOREST ENVIRONMENT POLISH ACADEMY OF SCIENCES	Poland
58	POTSDAM-INSTITUT FÜR KLIMAFOLGENFORSCHUNG E.V.	Germany
59	RIJKSINSTITUUT VOOR VOLKSGEZONDHEID EN MILIEU	Netherlands
60	SOCIETE DE MATHEMATIQUES APPLIQUEES ET DE SCIENCES HUMAINES	France
61	SUOMEN YMPARISTOKESKUS	Finland
62	UNIVERSIDAD DE CANTABRIA	Spain
63	UNIVERSITE CATHOLIQUE DE LOUVAIN	Belgium
64	UNIVERSIDAD DE CASTILLA LA MANCHA	Spain
65	UNIVERSITETET I OSLO	Norway
67	LUNDS UNIVERSITET	Sweden
68	UNIVERSITÄT KASSEL	Germany
69	UNIVERSITY OF LIVERPOOL	UK
70	UNIVERSITY OF OXFORD	UK
73	UNIVERSITE JOSEPH FOURIER GRENOBLE 1	France
74	C4I	Ireland

Detailed Information

Project 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. The project objectives and their associated

operational goals and measures of success are listed below.

Scientific and Technological Objectives

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.

State of the Art in Prediction of Climatic Changes and their Impacts

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,
- changes in extremes, and
- 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.

6. Adaptation and Mitigation Strategies

ADAM - Adaptation and Mitigation Strategies: Supporting European Climate Policy
018476-2

Instrument:	Integrated Project (IP)	Contract under negotiation
Total project cost:	18.197.000 €	Duration: 36 months
EC Contribution:	12.905.000 €	
Organisation:	University of East Anglia	Norwich, UK
Co-ordinator:	Michael Hulme (m.hulme@uea.ac.uk)	
EC Officer:	Ger Klaassen (gerardus.klaassen@cec.eu.int)	

Abstract

The core objectives of ADAM (ADaptation And Mitigation) are:

•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.

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.

Partners

N°	Organisation	Country
1	UNIVERSITY OF EAST ANGLIA	UK
2	POTSDAM-INSTITUT FUR KLIMAFOLGENFORSCHUNG E.V.	Germany
3	VRIJE UNIVERSITEIT AMSTERDAM	Netherlands
4	CENTER FOR INTERNATIONAL CLIMATE AND ENVIRONMENTAL RESEARCH	Norway
5	WAGENINGEN UNIVERSITY RESEARCH - ALTERRA	Netherlands

6	INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS	Austria
7	PAUL SCHERRER INSTITUT	Switzerland
8	LUND UNIVERSITY	Sweden
9	INTERNATIONAL CENTRE FOR INTEGRATED STUDIES, UNIVERSITY OF MAASTRICHT	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	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	Italy
16	UNIVERSITY OF FLORENCE	Italy
17	STOCKHOLM ENVIRONMENT INSTITUTE	Sweden
18	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE	France
19	HUNGARIAN ACADEMY OF SCIENCES	Hungary
20	ENERDATA SAS	France
21	DEUTSCHES INSTITUT FÜR WIRTSCHAFTSFORSCHUNG BERLIN E.V	Germany
22	EIDGENOESSISCHE TECHNISCHE HOCHSCHULE	Switzerland
23	ENVIRONMENTAL SYSTEMS ANALYSIS GROUP, WAGENINGEN UNIVERSITY	Netherlands
24	CENTRE FOR EUROPEAN POLICY STUDIES	Belgium
25	THE ENERGY AND RESOURCES INSTITUTE	India
26	START REGIONAL CENTER FOR TEMPERATE EAST ASIA KEY LABORATORY OF REGIONAL CLIMATE-ENVIRONMENT RESEARCH FOR TEMPLATE EAST ASIA, CHINESE ACADEMY OF SCIENCES	China

7. Observing and Forecasting Systems (Selected Projects)

DAMOCLES - Developing Arctic Modelling and Observing Capabilities for Long-term Environmental Studies
018509

Instrument:	Integrated Project (IP)	Contract under negotiation
Total project cost:	24.670.000 €	Duration: 48 months
EC Contribution:	16.100.000 €	
Organisation:	Université Pierre et Marie Curie	France
Co-ordinator:	Jean-Claude Gascard (gascard@lodyc.jussieu.fr)	
EC Officer:	Riccardo Casale (riccardo.casale@cec.eu.int)	

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: (1) identify and understand the changes occurring in the Sea-Ice, Atmosphere and Ocean of the Arctic and Sub arctic domain, (2) improve the realism by which these changes are simulated in models, thus extending the lead-time prior to the onset of extreme climate events, -3) 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.

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	UK

	RURAL AFFAIRS ACTING THROUGH THE CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE	
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
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43	AANDERAA INSTRUMENTS A:S	Norway
44	AQUATEC TELEMETRY LIMITED	UK
45	CERPOLEX	France
46	CAISSE DES DEPOTS ET CONSIGNATIONS	France

GAGOS - Assessing and forward planning of the Geodetic And Geohazard Observing Systems for GMES applications

10329

Instrument:	Specific Support Action (SSA)	Contract starting date: 01/02/2005
Total project cost:	229.620 €	Duration: 24 months
EC Contribution:	229.620 €	
Organisation:	GeoForschungsZentrum Potsdam	Potsdam - Germany
Co-ordinator:	Christoph Reigber (reigber@gfz-potsdam.de)	
EC Officer:	Riccardo Casale (riccardo.casale@cec.eu.int)	

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 (1) at assessing 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 and (2) will 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

SOGE-A - System for Observation of halogenated Greenhouse gases in Europe and

505419

Instrument:	Specific Support Action (SSA)	Contract starting date: 01/02/2004
Total project cost:	828.500 €	Duration: 36 months
EC Contribution:	380.000 €	
Organisation:	Norsk Institutt for Luftforskning	Kjeller - Norway
Co-ordinator:	Frode Stordal (Frode.Stordal@geo.uio.no)	
EC Officer:	Riccardo Casale (riccardo.casale@cec.eu.int)	

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 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. The coordinating institute has long time experience in project collaboration with China.

Partners

N°	Organisation	Country
1	NORSK INSTITUTT FOR LUFTFORSKNING	Norway
2	CHINESE ACADEMY OF METEROLOGICAL SCIENCES	China
3	UNIVERSITY OF BRISTOL	UK
4	EIDGENOESSISCHE MATERIALPRUEFUNGS- UND	Switzerland
5	UNIVERSITA DEGLI STUDI DI URBINO "CARLO BO"	Italy

STAR - Support for Tropical Atmospheric Research
506651

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

Instrument:	Specific Support Action (SSA)	Contract starting date: 01/03/2004
Total project cost:	448.216 €	Duration: 30 months
EC Contribution:	310.000 €	
Organisation:	Koninklijk Nederlands Meteorologisch Instituut	De Bilt - Netherlands
Co-ordinator:	Ge Verver (ge.verver@knmi.nl)	
EC Officer:	Riccardo Casale (riccardo.casale@cec.eu.int)	

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	Netherlands
2	METEOROLOGISCHE DIENST SURINAME	Suriname
3	BELGISCH INSTITUUT VOOR RUIMTE AERONOMIE	Belgium
4	RUPRECHT-KARLS-UNIVERSITAET HEIDELBERG	Germany
5	UNIVERSITAET BREMEN	Germany
6	TECHNISCHE UNIVERSITEIT EINDHOVEN	Netherlands
7	ANTON DE KOM UNIVERSITEIT VAN SURINAME	Suriname
8	STIFTUNG ALFRED-WEGENER-INSTITUT FUER POLAR- UND MEERESFORSCHUNG	Germany
9	HOKKAIDO UNIVERSITY	Japan

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