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Research without borders

Session 7

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Environment and Climate Change Research – the European Perspective

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Environment and Climate research - the European Perspective

Introduction

- Research highlights 5th and 6th Framework Programmes
- Examples of Australian-European research cooperation
- Research priorities in the 7th Framework Programme
  - * Climate Change, Pollution and Risks
  - * Sustainable Management of resources
  - * Environmental Technologies
  - * Earth Observation and Assessment Tools

Environment and Climate research - the European Perspective

Some pertinent results from FP5 Projects:

EPICA (European Project on Ice Coring in Antarctica):

- Ice coring reached a depth of 3100 m. Climate history record of past 900000 years

DEMETER (Development of a European Multi-Model Ensemble System for Seasonal to Interannual Prediction):

- Capability demonstrated to predict seasonal/interannual climate variations - implications for energy, agriculture, tourism and health

PRUDENCE (Prediction of Regional Scenarios and Uncertainties forDefining EuropeaN Climate change Risks and Effects)

- extreme European summer 2003: average in 2050 and cool summer by 2070

Environment and Climate research - the European Perspective

Some pertinent results from FP5/FP6 Projects:

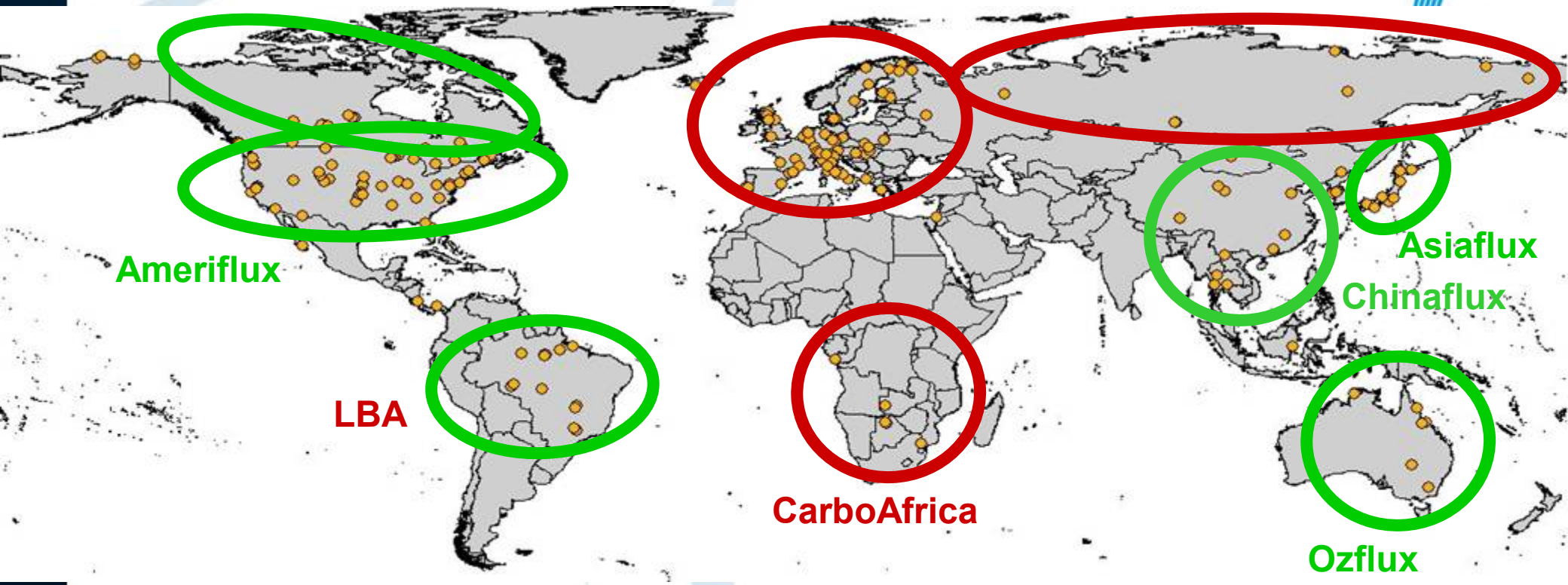
CARBOEUROPE (Carbon Balance in Europe):

Coordinator: Detlef Schulze, Max-Planck Institut Jena, DE

64 Partners, budget 18 Mill €, 5 years duration, 1 January 2004

- Carbon Absorption Capacity of Europe's terrestrial biosphere reported to be about 7-12% of the annual anthropogenic CO_2 emissions;
- European agriculture identified as major carbon sources;
- European ecosystems turn into a carbon source under hot and dry conditions (summer 2003)

FLUXNET network 2004



Environment and Climate research
- the European Perspective

FP6 Project, Australian research cooperation :

ENSEMBLES: (IP) (ENSELMBLE-based prediction of Climate Change and their impacts) – Bureau of Meteorology Research Centre

Coordinator: David Griggs, British Met. Office, UK

80 Partners, budget 15 Mill €, 5 years duration, 1 September 2004

Core Objectives:

- **Production of probalistic seasonal to decadal climate predictions**
- **Integration of additional process towards earth system modelling**
- **Development of high resolution climate models**
- **Reduction of uncertainties in climate predictions**
- **Increase application of climate prediction for divers user community**

Environment and Climate research
- the European Perspective

FP6 Project, Australian research cooperation:

IP SCOUT-O3 (Stratosphere-Climate links with emphasis on the UTLS)

Coordinator: John Pyle, University of Cambridge, UK

59 Partners, budget 15 Mill €, 5 years duration, 1 May 2004

Core Objectives:

- **Ozone variability (mid-latitudes)**
- **Inter-annual variability in polar processes**
- **Tropical UTLS and transport processes**
  (major field campaign in Darwin, Australia Nov. 2005)
- **Stratospheric trends**
- **Stratosphere/Troposphere coupling – past and future**
- **Past UV changes, variability and trends**

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

SCOUT field campaign in Darwin, Australia Nov. 2005

on exchange process between the Troposphere and the Stratosphere

In cooperation with the International Experiments:

TWP- ICE (Tropical Warm Pool – Ice Clod Experiment)
research priority on Monsoon
ACTIVE
priority on aerosol and chemical transport in tropical convection

Joint international aircraft campaign with Australian, US and European Scientists
Falcon 20 of DLR, Russian Geopysica, Australian Egrett
Australian research institution involved:

- Australian Buerau of Meterology TWP-ICE led by Peter May and Christian Jacob

Research priorities in FP6
Programme Global Change and Ecosystems
(2003-2006, budget ~ €800 **Million**)

1. Impact and mechanisms of Greenhouse gas emissions and atmospheric pollutants on climate, ozone depletion and carbon sinks
2. Water cycle including soil related aspects
3. Biodiversity and ecosystems
4. Mechanism of desertification and Natural Hazards
5. Strategies for sustainable land management
6. Operational forecasting and modelling including global climate change observation systems

7th Framework Programme Cooperation budget Council agreement July 2006

- ***Indicative FP7* 2007- 2013**
- **Cooperation 32.365**
- Health 6.050
- Food, Agriculture and Biotechnology 1.935
- Information and Communication Technologies 9.110
- Nanosciences, Nanotechnologies, Materials and new Production Technologies 3.500
- Energy 2.300
- **Environment (including Climate Change) 1.900**
- Transport (including Aeronautics) 4.180
- Socio-economic Sciences and the Humanities 610
- Space 1.430
- Security 1.350

Environment (incl. Climate Change)

Climate Change, pollution and risks	- Pressures on environment and climate - Environment and health - Natural Hazards
Sustainable management of resources	-Conservation and sustainable management of natural and man-made resources - Evolution of marine environments
Environmental Technologies	- Technologies for observation, prevention, mitigation,…, of the natural and man-made environment -protection, conservation and enhancement of cultural heritage, including human habitat - Technology assessment, verification, testing
Earth observation and assessment tools	- Earth observation - Forecasting methods and assessment tools

Environment (incl. Climate Change)

6.1 Climate Change, pollution and risks

6.1.1 Pressures on Environment and Climate

Integrated research on the functioning of climate and the earth system, including the polar regions, is needed in order to observe and analyse how these systems evolve and predict their future evolution. This will enable the development of effective adaptation and mitigation measures to climate change and its current and future impacts. Pressures on environment and climate from anthropogenic and natural emissions will be investigated as well as related interactions. Advanced climate change models from the global to sub-regional scales will be developed and applied to assess changes, potential natural and socio-economic impacts and critical thresholds. Climate induced changes to atmospheric composition, greenhouse gases and to the water cycle will be studied. Emphasis will also be given to feedback mechanisms and abrupt changes. Novel responses to climate changes will also be studied.

6.1.1 Pressures on environment and climate

Indicative budget: 39 M€

area 1: *The Earth System and Climate: Functioning and abrupt changes*

- **Stability of the ThermoHaline Circulation (LP)**

area 2: *Emissions and Pressures: natural and anthropogenic*

- **Megacities, regional hot spots, air quality and climate (SMPs)**

area 3: *The Global Carbon cycle - GreenHouse Gas budget*

- **Ocean acidification and its consequences (LP)**

area 4: *Future Climate*

- ...

6.1.1 Pressures on environment and climate

Indicative budget: 39 M€

area 5: *Climate Change Natural and Socio-economic Impacts*

- **Climate change impacts and adaptation strategies in water policies (SA/CA)**
- **Climate change impacts on vulnerable mountain regions (LP)**
- **Past and future climate change impacts in the Parana-Plata river basin of South America (SMP)**

area 6. *Response strategies: Adaptation, Mitigation and Policies*

- **Full costs of climate change (SMPs)**
- **Effectiveness of adaptation and mitigation measures related to changes of the hydrological cycle and its extremes (SMP)**
- **Impacts and feed-backs of climate policies on land use and ecosystems in Europe (SMP)**
- **Exploitation and dissemination of climate change research results and public perception (SA)**

Environment (incl. Climate Change)

6.1 Climate Change, pollution and risks

6.1.2 Environment and Health

Multidisciplinary research on interactions of environmental risk factors and human health is needed to support the Environment and Health action plan and the integration of public health concerns and disease characterisation related to emerging environmental risks. Research will focus on multiple exposures via different exposure routes, identification of pollution sources and new or emerging environmental stressors and their potential health effects, as well as on the quantification and cost-benefit analysis of environmental health risks and indicators for prevention strategies

6.1.2 Environment and Health

Indicative budget: 21 M€

area 1: *Health effects of exposure to environmental stressors*

- **Indoor air pollution in Europe: an emerging environmental health issue (SMP/NoE)**
- **Environmental factors and their impact on reproduction and development (SMP)**

area 2: *Integrated approaches for environment and health risk assessment*

- **European network on human biomonitoring (NoE/SMP)**
- **European cohort on air pollution (LP)**
- **Health impacts of drought and desertification including related socio-economic aspects (SMP)**

area 3: *Delivery of methods and decision support tools for risk analysis and policy development*

- **ERA-NET for environment and health (CA)**

Environment (incl. Climate Change)

6.1 Climate Change, pollution and risks

6.1.3 Natural Hazards

Managing natural disasters related, inter-alia, to climate and geological hazards requires improved knowledge, methods and an integrated framework for the assessment of hazards, vulnerability and risks. Furthermore a multi-risk approach combined with spatial planning, mapping and modelling are needed for the development of prevention and mitigation strategies. Multidisciplinary research aiming to better understand the underlying processes should be performed to improve detection, prediction and forecasting methods. Societal resilience and repercussions of major natural hazards will be quantified.

6.1.3 Natural hazards

Indicative budget: 14 M€

area 1: *Hazard assessment, triggering factors and forecasting*

- **European storm risk (SMP)**

area 2: *Vulnerability assessment and societal impacts*

- **Frame for better vulnerability assessment (SMPs)**

area 3: *Risk assessment and management*

- **Assessing and managing volcanic threat (SMP)**
- **Harmonising avalanche forecasting, risk mapping and warning (SMP)**
- **Investigating Europe's risk from droughts (SA/CA)**

area 4: *Multi-risk evaluation and mitigation strategies*

- **European (multi) hazard database analysis (SA/CA)**

Environment (incl. Climate Change)

6.2 SUSTAINABLE MANAGEMENT OF RESOURCES

6.2.1 Conservation and sustainable management of natural and man-made resources and biodiversity

Research will improve the knowledge basis and develop advanced models and tools needed for the sustainable management of resources and the creation of sustainable consumption patterns. This will enable the prediction of the behaviour of ecosystems and their restoration, and the mitigation of degradation and loss of important structural and functional elements of ecosystems (for biodiversity, water, soil and marine resources). Research will also address sustainable management of forests and the urban environment including planning, and waste management.

6.2.1 Conservation and sustainable management of natural and manmade resources and biodiversity

Indicative budget: 28 M€

area 1: *Integrated Resource Management*

- ...

area 2: *Water resources*

- **Assessing the Ecological Status of Water Bodies (LP)**
- **River basin twinning initiatives as a tool to implement EU water initiatives (SMP)**
- **Temporary water bodies management (SMP)**
- **Integrated resource management in international co-operation partner countries (SA/CA)**

area 3: *Soil research and desertification*

- **Geographical transect approach to desertification (LP)**

6.2.1 Conservation and sustainable management of natural and manmade resources and biodiversity

Indicative budget: 28 M€

area 4: *Biodiversity*

- **Contribution of biodiversity to ecosystem services (SMP)**
- **Use of natural resources: the impact on biodiversity, ecosystem, goods and services (SMP)**
- **Biodiversity values, sustainable use and livelihoods (SMP)**

area 5: *Urban development*

- **Urban metabolism and resource optimisation in the urban fabric (SMP)**

area 6. *Integrated forest research*

- *...*

Environment (incl. Climate Change)

6.2 SUSTAINABLE MANAGEMENT OF RESOURCES

6.2.2 Management of marine environments

Specific research is also required to improve our understanding of the impacts of human activities on the ocean and seas and on the resources of the marine environment, including the pollution and eutrophication of regional seas and coastal areas. Research activities in aquatic environments, deep sea ecosystems and seabed will be carried out in order to observe, monitor and predict the behaviour of this environment and enhance understanding of the sea and the sustainable use of ocean resources and will facilitate the achievement of the good environmental status of marine waters by 2021 consistent with the Strategy for the Marine Environment.

6.2.2 Management of marine environments

Indicative budget: 23 M€

area 1: *Marine resources*

- **Development of advanced ecosystem models and methodologies for the management and the sustainable use of resources (LP)**
- **Ecology of important marine species (SMP)**
- **Habitat-marine species interactions in view of ecosystem based management in the deep-sea (LP)**
- **Dynamic of marine ecosystem in a changing environment (LP)**
- **Deep Ocean geophysical and biological processes (SA/CA)**
- **Investigating Life in Extreme Environment (SA/CA)**
- **Promoting access to information across marine themes (SA/CA)**
- **Fostering improved co-operation between marine science and the private sector (SA/CA)**
- **Access to and recovery of marine data from previous FP projects (SA/CA)**

Environment (incl. Climate Change)

6.3 ENVIRONMENTAL TECHNOLOGIES

6.3.1 Environmental technologies for observation, simulation, prevention, mitigation, adaptation, remediation and restoration of the natural and man-made environment

New or improved environmental technologies are needed to reduce the environmental impact of human activities, protect the environment and manage resources more efficiently and to develop new products, processes and services more beneficial for the environment than existing alternatives. Research will target in particular: technologies preventing or reducing environmental risks, mitigating hazards and disasters, mitigating climate change and the loss of biodiversity; technologies promoting sustainable production and consumption; technologies for managing resources or treating pollution more efficiently; technologies for the sustainable management of the human environment including the built environment, urban areas, landscape, …

6.3 Environmental Technologies

6.3.1 Environmental technologies for…

Indicative budget: 41 M€

area 1: *Water*

- **Innovative technologies and services for sustainable water use in industries (LP)**
- **Technologies for measuring and monitoring networks (SMP)**

area 2: *Soil*

- **Development and improvement of technologies for data collection in (digital) soil mapping (SMPs)**
- **Development of technologies and tools for soil contamination assessment and site characterization, towards sustainable remediation (SMPs)**

area 3: *Waste*

- **Development of integrated waste management technologies for maximising material and energy recovery/recycling of the organic (humid) fraction of municipal solid waste (LP)**
- **New technologies for waste sorting (SMPs)**
- **Networking and preparatory action in view of developing cost-effective, environmentally-safe waste treatment technologies and services adapted to the needs of developing countries, within a targeted life cycle approach (SA/CA)**

6.3 Environmental Technologies

6.3.1 Environmental technologies for… Indicative budget: 41 M€

area 4: *Clean Technologies*

- **Networking and preparatory action in view of control of mercury in industria processes and products (SA/CA)**

area 5: *Built environment*

- **Low resource consumption buildings and infrastructure (SA/CA)**
- **Performance indicators for health, comfort and safety of the indoor built environment (SA/CA)**

Environment (incl. Climate Change)

6.3 ENVIRONMENTAL TECHNOLOGIES

6.3.2 Protection, conservation and enhancement of cultural heritage, including human habitat

…technologies for the sustainable management of the human environment including the built environment, urban areas, landscape, as well as for the conservation and restoration of cultural heritage

6.3.2 Protection, conservation and enhancement of cultural heritage, including human habitat

Indicative budget: 7 M€

area 1: *Assessment and conservation in cultural heritage*

- **Damage assessment, diagnosis and monitoring for the preventive conservation and maintenance of the cultural heritage (SMP)**

area 2: *Networking, knowledge transfer and optimisation of results in cultural heritage*

- **ERA-NET for the preservation of the tangible cultural heritage (SA/CA)**
- **Consolidation and dissemination of results related to cultural heritage (SA/CA)**

area 3: *Environment technologies for archaeology and landscapes*

- ...

area 4: *Fostering the integration of cultural heritage in urban and rural settings*

- ...

Environment (incl. Climate Change)

6.3 ENVIRONMENTAL TECHNOLOGIES

6.3.3 Technology assessment, verification and testing

Research will also focus on the risk and performance assessment of technologies, including processes and products, and the further development of related methods such as the life cycle analysis. Research will support the development of the European Environmental Technologies Verification and Testing system.

6.3.3 Technology assessment, verification and testing –

Indicative budget: 5 M€

area 1: *Risk assessment of chemicals and alternative strategies for testing*

- **In-silico techniques for hazard-, safety-, and environmental risk-assessment (SMP)**
- **Defining a long-term research strategy for the full replacement of animal tests for repeat dose systemic toxicity (SA/CA)**

area 2: *Technology Assessment*

- …

area 3: *Environmental Technologies Verification and Testing*

- …

6.4.1 Earth and ocean observation systems and monitoring methods for the environment and sustainable development

Indicative budget: 22 M€

area 1: *Integration of European activities within GEO*

- Monitoring of the carbon cycle at global level (SA/CA)
- Contribution to a global biodiversity observation system (SMP)

area 2: *Cross-cutting research activities relevant to GEO*

- Coordination of national earth observation programmes in view of their long-term integration and sustainability (SA/CA)
- Contributing to the development of a worldwide network of in-situ observatories for seismogenic hazards (SMP)

6.4.1 Earth and ocean observation systems and monitoring methods for the environment and sustainable development

Indicative budget: 22 M€

area 3: *Earth Observation activities in emerging areas*

- Application of Earth Observations to environmental and health issues (SA/CA)
- Monitoring the ocean interior, seafloor, and subseafloor (SMP)
- Development of a Global Soil Observing System (SMP)

area 4: *Developing capacity building activities in the domain of earth observation in developing countries*

- Georesource information system for Africa (SA/CA)
- Improving observing systems for water resource management (SMP)
- GEOnetcast applications for developing countries (SA/CA)

area 5: *Support to the functioning of the GEO Secretariat*

- Support to the 2007 activities of the GEO Secretariat (special grant)

6.4.2 Forecasting methods and assessment tools for sustainable development taking into account differing scales of observation

Indicative budget: 12 M€

area 1: *Tools for impact assessment*

- Methodologies for scaling down the analysis of policy impacts on multifunctional land uses, from economic-wide to the regional and local level (SMP)
- Improved tools to analyse the sustainable development implications of the EU financial perspective revision (2008-2009) (SA/CA)
- Tools for impact assessment of sustainable development policies in international collaboration partner countries (SMP)

area 2: *Sustainable development indicators*

- …

area 3: *Interplay between social, economic and ecological systems*

- Strategies to transform the environment challenge into an economic development opportunity (SMP)
- Policies to promote sustainable consumption patterns (SMP)
- Engaging civil society in research on sustainable development (SA/CA)

6.5.1 Dissemination and horizontal activities

Indicative budget: 6 M€

area 1: *Dissemination and horizontal activities*

- Dissemination and broadcasting of scientific data and information (SA/CA)

- Transnational co-operation among NCPs (SA/CA)

- Development of methodology and evaluation of the impacts of Framework Programmes projects in the field of Environment (SA/CA)

- Enhancing connectivity between Member States activities in the field of environmental research (SA/CA)

Call Name **Environment**
Budget **213 Million Euro**
Publication **End of December 2006**
Closure Date **27 March 2007**
Submission Procedure **1 Stage**
Evaluation Procedure **1 Stage**
Intended Period for Remote Evaluation **16 April - 30 April 2007**
Intended Period for On-site Evaluation **7 May - 20 May 2007**

Information

- EU research:
  http://ec.europa.eu/research
- Seventh Framework Programme:
  http://ec.europa.eu/research/fp7
- European Research Council:
  http://ec.europa.eu/erc/index_en.cfm
- Info on programmes and projects:
  http://www.cordis.lu/
- RTD *info* magazine: http://ec.europa.eu/research/rtdinfo/
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