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ENSEMBLE-based Predictions of Climate Changes and their Impacts

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- A five year project under EC Framework Programme VI
- Funding from EC of 15 million Euros
- 72 partners from EU, candidate countries, Switzerland, Australia, US
- Ten Research Themes

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Strategic Objectives

- Develop an ensemble prediction system based on the principal state-of-the-art high resolution, global and regional Earth System models, validated against quality controlled, high resolution gridded datasets for Europe, to produce for the first time, an objective probabalistic estimate of uncertainty in future climate at the seasonal, decadal and longer timescales
- Quantify and reduce uncertainty in the representation of physical, chemical, biological and human-related feedbacks in the Earth System
- Maximise the exploitation of the results by linking the outputs to a range of applications, including agriculture, health, food security, energy, water resources, insurance and risk management

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Scientific Objectives 1

- Build an integrated European capability to predict climate changes, and consequent socio-economic impacts, on seasonal, decadal and longer timescales, using a probabalistic multi-model approach to climate scenario construction.
- Assemble Earth System models including the various components and the interactions between them.
- Develop high resolution regional climate models for Europe along with quality controlled gridded climate datasets for Europe
- Advance understanding of the key processes and feedbacks that govern changes in climate, and related consequences, with particular attention to extreme events and the possibility of abrupt climate change.

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Scientific Objectives 2

- Develop a comprehensive approach to the validation of climate change ensembles and the impact assessments, which includes the exploitation of seasonal to decadal predictability studies, thereby providing for the first time a sound, quantitative measure of the confidence in future scenarios
- Estimate quantitatively the predictability of climate changes and variations, especially those associated with flood and drought, on timescales of seasons, decades and beyond, and to provide better estimates of the likelihood of abrupt, catastrophic climate change in the coming century.
- Provide detailed probabalistic assessments of the impacts of climate change at high resolution over Europe.
- Disseminate the knowledge gained during the project to policy makers, scientists, and the public.

ENSEMBLES Research Themes

RT	Name	Co-ordinators
0	Project integration, management and promotion	Dave Griggs
1	Development of the Ensemble Prediction System	James Murphy, Tim Palmer
2A	Production of seasonal to decadal hindcasts and climate change scenarios (Model Engine Part 1)	Guy Brasseur, Jean-François Royer
2B	Production of Regional Climate Scenarios for Impact Assessments (Model Engine Part 2)	Clare Goodess, Daniela Jacob
3	Formulation of very high resolution Regional Climate Model Ensembles for Europe	Jens Christensen, Markku Rummukainen
4	Understanding the processes governing climate variability and change, climate predictability and the probability of extreme events	Julia Slingo, Herve le Treut
5	Independent comprehensive evaluation of the ENSEMBLES simulation-prediction system against observations/analyses	Antonio Navarra, Albert Klein Tank
6	Assessments of impacts of climate change	Jean Palutikof, Andy Morse
7	Scenarios and Policy Implications	Richard Tol, Roberto Roson
8	Dissemination, Education, and Training	Martin Beniston, Christos Giannakopolous

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Integrates world-leading European research

- Participation by main European modelling centres to provide earth system model (ESM) and regional model components
- Exploits PRISM infrastructure to explore uncertainty using multi-model approach
- Strengthened collaboration between physical climate modellers and experts in the carbon cycle and atmospheric chemistry
- Participation by applications modellers to deliver climate impacts predictions of societal relevance
- Uses techniques and knowledge gained at seasonal timescales and applies them to decadal and longer timescales

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Quantifies and reduces uncertainty in representation of Earth system

- Carbon cycle, atmospheric chemistry, and climate to be considered together in a rigorous and interactive way
- Combination of global and regional models enables resolution of adequate geographic detail, capturing both regional effects/impacts but including global teleconnections
- Economic and social dimensions of uncertainty to be considered
- Multi-model ensemble-based probability approach will quantify uncertainty, lead to increased understanding, and influence the development of the next generation of models, thereby leading to uncertainty reduction in the future

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- Currently at contract negotiation stage
- Project will be managed by a Management Board under the terms of a Consortium Agreement
- Expected start date 1 April 2004?
- First activities will include a kick-off meeting