Project no. GOCE-CT-2003-505539

Project acronym: ENSEMBLES

Project title: ENSEMBLE-based Predictions of Climate Changes and their Impacts

Instrument: Integrated Project

Thematic Priority: Global Change and Ecosystems

Milestone 6.12: Work Package 6.2 meeting to report progress in applying probabilistic information to impact models and to agree on common approaches and reporting of results

Due date of deliverable: month 32
Date of meeting: month 32
Submission date of meeting report: month 39

Start date of project: 1 September 2004   Duration: 60 Months

Lead Partners: SYKE and FMI
Contributing Partners: WP6.2 Partners plus other ENSEMBLES representatives

	Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)	
	Dissemination Level	
PU	Public	
PP	Restricted to other programme participants (including the Commission Services)	x
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the Consortium (including the Commission Services)	

ENSEMBLES WORK PACKAGE 6.2 MEETING, HELSINKI, 26-27 APRIL 2007

Brief meeting report, agenda and rapporteur's notes[*]

In April 2007, the Finnish Environment Institute (SYKE) and Finnish Meteorological Institute (FMI) jointly hosted a WP 6.2 Workshop in Helsinki, Finland. The meeting provided an opportunity for Partners to:

- report recent impacts research in WP 6.2 based on "surrogate" climate information,
- compare progress to date against milestones and deliverables,
- discuss methodological issues regarding the provision and application of climate data in impact studies,
- liaise with RT 1 regarding preliminary GCM-based data,
- liaise with RT 2B regarding overall delivery of data and scenarios,
- consider WP 6.2 in the broader ENSEMBLES context, and
- allocate Partner responsibilities and agree on a workplan for achieving milestones and deliverables.

Representatives from RT 0 (Integration and Project Management – Chris Hewitt), RT 1 (Ensembles Prediction System – Glen Harris) and RT 2B (Prediction of regional climate scenarios for impact assessments – Clare Goodess) also attended. In addition, one of the ENSEMBLES external project evaluators, Dr Jouni Räisänen, Helsinki University, presented some related research on probabilistic descriptions of Finnish climate, and the Head of the IPCC Working Group II (WG II) Technical Support Unit (Impacts, Adaptation and Vulnerability), Prof. Jean Palutikof, delivered an evening presentation on the IPCC WG II AR4.

ENSEMBLES WP 6.2 Meeting, Finnish Environment Institute (SYKE) & Finnish Meteorological Institute (FMI), Helsinki, 26-27 April 2007
Back row: Jouni Räisänen, Chris Hewitt, Tom Holt, Tim Carter, Lars Bärring, Sara-Sofia Hellström, Jørgen Olesen, Gregor Leckebusch, Phil Graham, Fredrik Wetterhall
Front row: Maria Vuorinen, Markus Donat, Glen Harris, Marco Bindi, Christos Giannakopoulos, Stefan Fronzek (kneeling), Tove Heidmann, Clare Goodess, Kirsti Jylhä, Martina Weiß

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[*] The agenda and presentations from this meeting can be found on the internal website of ENSEMBLES under WP 6.2. The pages were prepared by Dr Tom Holt of UEA.

ENSEMBLES WORK PACKAGE 6.2 MEETING, HELSINKI, 26-27 APRIL 2007

Programme Thursday 26 April (SYKE)

08:30 – 09:00	**Arrival at the Finnish Environment Institute (SYKE) and coffee**
09:00 – 09:30	Chair: Tim Carter Tim Carter, Finnish Environment Institute, Helsinki (SYKE) *Welcome, tour de table, agenda and objectives of meeting*
09:30 – 10:00	Tom Holt, Climatic Research Unit, University of East Anglia, UK (UEA) *Relating changes in extremes to impacts over the Mediterranean: developments since the AGM and application to D6.8*
10:00 – 10:30	Christos Giannakopoulos, National Observatory of Athens, Greece (NOA) *Meteorological and pollution factors affecting hospital admissions in Athens, Greece*
10:30 – 11:00	**Refreshments**
11:00 – 11:30	Chair: Christos Giannakopoulos Anna Maria Jönsson[†]/Lars Bärring, University of Lund, Sweden (ULUND) *Forest damage in a changing climate*
11:30 – 12:00	Gregor Leckebusch/Markus Donat, Institut für Meteorologie, Freie Universität Berlin, Germany (FUB) *European property damage potentials: development and application of a simple storm regression model to global and regional simulations*
12:00 – 12:30	Ari Venäläinen/Kirsti Jylhä/Simo Järvenoja, Finnish Meteorological Institute, Helsinki (FMI) *Aspects of climate extremes in Finland*
12:30 – 13:30	**Lunch**
13:30 – 14:00	Chair: Tom Holt Glen Harris, Hadley Centre for Climate Change Research, UK (METO-HC) *Joint Frequency Distributions of Future European Climate Change*
14:00 – 14:30	Tove Heidmann/Jørgen Olesen, Faculty of Agricultural Sciences, University of Aarhus, Denmark (DJF) *Climate change impact on winter wheat yield and nitrogen leaching. Preliminary analysis*
14:30 – 15:00	Stefan Fronzek/Timothy Carter, Finnish Environment Institute, Helsinki (SYKE) *Probabilistic assessment of climate change impacts on subarctic palsa mires and yield of winter wheat in Europe*
15:00 – 15:30	**Refreshments**
15:30 – 16:00	Chair: Lars Bärring Martina Weiß, University of Kassel, Germany (UNIK) *Title to be finalised*
16:00 – 16:30	Phil Graham/Sara-Sofia Hellström/Fredrik Wetterhall, Rossby Centre, Swedish Meteorological and Hydrological Institute, Norrköping (SMHI) *Hydrological response surfaces in the Nordic Region for use in probabilistic assessment of climate change*
16:30 – 17:00	Marco Bindi, Dept. of Agronomy and Land Management, University of Florence, Italy (DISAT) *Development of a methodology for probabilistic assessments of climate change impacts on a typical Mediterranean agricultural crop: durum wheat*
17:00	**Close**
17:15 – 18:00	Sibelius monument (optional 45 minute coastal stroll)
18:00 – 19:30	Sauna (optional – women and men separate; towels provided)
19:30 – 22:00	Reception and buffet
~ 21:00	Guest speaker I: Jean Palutikof, Hadley Centre for Climate Change Research, UK and Head, IPCC Working Group II Technical Support Unit *Reflections on the IPCC Working Group II Fourth Assessment Report – Climate Change 2007: Impacts, Adaptation and Vulnerability*
22:00 +	**Leave for hotel**

[†] Unable to attend

Programme Friday 27 April (FMI)

08:00	**Assemble in the lobby of Hotel Helka for transport to FMI**
08:30 – 08:50	**Arrival at the Finnish Meteorological Institute (FMI) and coffee**
08:50 – 09:00	Chair: Kirsti Jylhä Heikki Järvinen, Finnish Meteorological Institute, Helsinki (FMI) *Welcome to FMI*
09:00 – 09:30	Chris Hewitt, Hadley Centre for Climate Change Research, UK (METO-HC) *Progress report and new developments in ENSEMBLES*
09:30 – 10:00	Clare Goodess, Climatic Research Unit, University of East Anglia, UK (UEA) *RT 2B: making climate model projections usable for impact assessment*
10:00 – 10:30	Discussion of types of climate data and timetable for delivery
10:30 – 11:00	**Refreshments**
11:00 – 11:30	Chair: Tim Carter Guest speaker II: Jouni Räisänen, Department of Physical Sciences, Division of Atmospheric Sciences, University of Helsinki *Climate in the near future - results from a simple probabilistic method*
11:30 – 12:00	Discussion of probabilistic projections and impact assessment
12:00 – 12:30	Publications, WP 6.2 Deliverables and Timetabling
12:30 – 13:30	**Lunch**
13:30 – 14:00	Wrap up
14:00	**Close**
14:00 – 14:30	Tour of the FMI building (optional)

Fredrik Wetterhall, SMHI

Notes from the presentations and following discussions:

Day 1. Presentations and discussions at SYKE

Tom Holt, CRU: Wants to have feedback/contributions regarding the web site on climate change – figures, material, opinions www.cru.uea.ac.uk/~tomh/ensemblespublic

On Deliverable 6.8: Climate change probabilistic time series – a simple plug-in model where probabilities of exceeding thresholds could be evaluated – Multi-model approach Seasonal-specific thresholds.

Discussion:
How to deal with uncertainties. Not much can be done without the model runs.

Clare Goodess said that observed data will be available from RT5 in September. 1958-today, 25 km spatial resolutions, same grid as the RCM.

Should physiological thresholds or percentiles be used?

Christos Giannakopoulos, NOA: Analysis of the effects of weather variables on hospital admissions. Real climate data as well as heat indexes were used. Cold climate – more hospital admissions. Mediterranean countries have higher temperature thresholds for coronary stress than countries in Northern Europe.

Discussion:
Tim Carter suggested that an idea would be to look at anomalies instead of real values.

Lars Bärring, LU: Nordic spruce, should it be replaced with other species due to increased temperature and wind speed?

Discussion:
Could seasonal forecasts be used to warn forest owners?

Lars: Not used today, but sensitivity analysis is used to take measures and inform forest owners. There is a difference between large and small owners when it comes to ability to tackle the problem. An increase in storms (hard wind) together with more warming would cause great damage. Increase in storm frequency not yet observed in data. Multimodel data will be used in later stage.

Gregor Leckebusch, FUB: Climate model ECHAM5 shows an increase in 98% max wind speed. Westerly-northwesterly winds increase. Data problems – delay in deliveries of data from other parts of ENSEMBLES.

Discussion:
Tom Holt pointed out that storm frequencies and wind speed cannot be seen due to too coarse resolution. Cyclone systems cannot be seen. The systematic error is the same for the control period and the scenarios.

Ari Venäläinen, FMI: Showed climate extremes in Finland. Return periods for 2006-7 temperatures are larger than 500 years. Will be 50-100 year events in future climate. Example: 2003 should not even happen, but it did.

Comments:

Tim Carter talked about the problem of stationarity, or rather non-statoinarity. One should be careful as to what statistics to use.

Clare Goodess mentioned that methods are developing to work with non-stationarity GEV statistics.

Glen Harris, MetOffice: Talked about an emulator to produce ensembles (Murphy et al, 2004, Nature, Harris et al, 2006). Discrepancy and distance, disrupts (flattens) posterior distributions. Transient runs more costly. Can provide data from the perturbed physics runs with the HadCM3. Regional downscaling will be available later on demand. Could be provided if we ask before July.

Comments: How do we combine grid cells when many drainage basins cover more than one grid cell?

Tove Heidmann, AGRSCI: Winter wheat yield and nitrogen leaching. Thresholds 20% and 10% decrease in yield. Used differential seasonal predictions. Changed precipitation patterns give different leaching patterns.

Stefan Fronzek, SYKE: Same monthly distribution for future climate. Response surfaces are sensitivity studies of your impact model. Used a multimodel approach with perturbations in the parameterization.

Martina Weiss, UNIK: Talked about the WaterGAP model and coupling between annual and seasonal changes. Used Q90 and Q10 as thresholds. Scaling is a problem when a drainage basin is affected by many grid cells.

Discussion:
Clare Goodess reminded that probabilistic scenarios further into the project will be an ensemble of model projections. RT2 will have to think on how to present the results to the rest of the groups.

Phil Graham, SMHI: Showed sensitivity surfaces for the HBV model applied in drainage areas in Sweden and for the whole Baltic Sea. Used very specific thresholds for two of the areas. He pointed out that seasonality may not be important for annual runoff, but very important for thresholds.
 Questions raised:
- Which thresholds should be used?
- How to cope with difference in seasonality
- What data will we get?
- What scenarios will be available?

Marco Bindi, DISAT: Presented a crop yield method, threshold 20% yield

Questions raised: How to apply probabilistic climate projections?
What will be the format and delivery of climate information?

Day 2. Presentations and discussions at FMI

Chris Hewitt, MetOffice: Talked about the overall progress within ENSEMBLES

ERA 40 Hindcasts 1961-2000 will be ready in June 2007
RCM output, 1 or 2 ready in August, the rest in December

Discussion:
GCM archive – FUB asked for daily data from MPI-M but it was not available. Should have been stored, Gregor Leckebusch will look it up.

From the discussoin about data availability, following was discussed:
— The GCM archive was supposed to be available, the list of variables are on the RT2A web page.
— There should also be a status report from the archiving institute on where to find data.
— Delivery table (status report could be a solution)

The reason why the GCM archive was not available could be either:
1. Might be that the archive institute have not put in the data
2. The responsible institutes have not delivered

Availability in archive or by request is not a good idea, not easy to get hold of. Better to have data available online.

This problem cannot be solved here, but can we can express what we want, and then the problem can be solved.

RCM data is better available than GCM output. If this is not resolved, it will have a huge impact on the impact society of ENSEMBLES. If we have problems with getting data, put it in writing and send an email to Chris/CC: Clare. The management needs to know the most important problems.
Clare Goodess, CRU: Talked about RT2B: Downscaling tool available on the web. GCM projections will be available, not yet there. SDS/DDS techniques will expand he matrix. 17 model outputs at present (D3.3.1). Tables and news on RT3 web site.

Discussion:
Most models run only 1950-2050, which means that a lot of uncertainty in future projections is lost. Uncertainty assessment will be biased when the runs stop at 2050. Some groups may run up until 2100. December 2007 officially the deadline for the scenario runs with the RCM.

There will be a weighting system from the RCM to create probability plots.

REA – Refinement of Reliability Ensemble Averaging will be used for the weighting of ENSEMBLE members.

Recommendations on weighting is in D2B.8. They should be:
— Robust
— Transparent
— Flexible
— Compare weighted/unweighted

There will be a broader discussion on weighting (credibility, reliability) on IAMAS in Perugia in July.

<u>Jouni Räisänen, Uni. Helsinki:</u> Presented a method to "resample" climate output from ensemble members to increase the variability. Used a variance correction (Tellus, 2007). Climate nowcasting. Observed constraints important for long-term climate projections. He also talked about the importance of public confidence in climate simulations

Discussion:
Clare Goodess talked about the CRANIUM methodology (CRU), Prudence output.

The discussion then moved to the data needs for the different groups:

Three types of data needed:

1. Time series of driving data (GCM, RCM, etc)
2. Monthly, seasonal and annual joint pdfs and cdfs
3. REA method on a regional scale

RCM sampling will provide probabilistic scenarios. The ensemble can be extended with weather generators.

Jouni Räisänen emphasized that the actual sample size is much smaller when the GCMs are running only until 2050
Tom Holt pointed out that extremes are unpredictable, and that it will be a caveat of pdfs created from only a few GCMs. Models are not so different up until 2050, beyond that it becomes more divergent.

Tim Carter said that ENSEMBLES can be seen as an exercise in methodology, or a real climate modelling exercise. Experiences from this project could give information on how to conduct similar modelling in future. Stabilization scenarios are important. There is a need to generate stabilizations scenario pdfs. High priority!

Tom Holt returned to the question of runs from 2050-2100. It could be possible to get estimates from other scenario runs until 2100.

A general question was formulated: Which is more important: More scenarios or longer time series? After some discussion this decision was left to the RCM people.

What data WP 6.2 is requesting:

Christos:	- RCM until 2100
	- SD
	- Resampling (daily data)
Martina:	- Probabilities
	- Broad area aggregates
	- Monthly basis
Phil	- Daily time series and pdfs
	- 2050/2100
Marco	- Joint probability density functions
	- Monthly seasonal levels

- Time series – stakeholders wants to have information for the next
  decade 2010-2020
- Daily data for a few points to make specific analysis

Ari:
- 50 years is enough
- Daily data, not 100 runs (a few tens)
- Stakeholders think 10-20 years ahead, but should think 100 years

Stefan:
- Joint pdf, frequency
- Monthly, seasonal, annual
- 1950-2050 OK

Tim then summarized the discussion. There should be a 2-track work. The proposed runs from 1950-2050 will be produced. In addition, those who can provide runs up until 2100 should do that. Glen Harris can provide GCM runs and Jouni can provide aid in expanding the ensemble numbers.

Important topics for further discussion:

- Uncertainties – how to deal with them in the response surfaces/multimodel runs
- Seasonality – how should this be represented in the response surfaces
- Non-stationarity – how to deal with that problem when calibrating models
- Scaling – problems when large basins cover many grid cells in GCM/RCM
- Thresholds – should they be:
    o Expressed as physical or in percentiles
    o One-time event or duration in time?
    o Seasonal-specific?
- Climate model output/Probabilistic scenarios – when do we get it and in what format?