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

M1.8 Completion of the seasonal-to-decadal stream 2 hindcasts (joint milestone with MM2A.3)

Due date of deliverable: Aug 2008
Actual submission date: Sept 2008

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

Organisation name of lead contractor for this deliverable: ECMWF

Version: INTERIM

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
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)	

The stream 2 seasonal-to-decadal (s2d) simulations include sets of re-forecasts on the seasonal (up to 7 months), annual (up to 14 months) and decadal time scales (up to 10 years). The experimental design of the minimum set of runs is as follows:

Seasonal and annual ensemble integrations

- 4 start dates per year: 1st of February, May, August and November
- 7-month long hindcasts for every start date, except 14 for those starting in November
- hindcast production period: 1960-2005
- 9-member ensembles

Decadal ensemble integrations

- one hindcast every 5 years
- 10-year long runs starting on 1st of November 1960, with the next one starting in November 1965 and so on
- hindcast production period: 1960-2005; this results in 8 real *hind*casts in the sense of predicting the past as if now information about that past were available, and 2 hybrid hindcast/forecast runs for the 2000 and 2005 start dates
- 3-member ensembles

Unlike stream 1, uncertainty due to model error in stream 2 is represented by two approaches: a multi-model ensemble and an ensemble of perturbed physical parameters. Here, the multi-model approach can be seen as a pragmatic way of combining individual climate model initial-condition ensemble forecasts from 5 (for the seasonal and annual runs) or 6 (for the decadal runs) different forecasting systems into a multi-model ensemble. By contrast, the perturbed physical parameter approach is currently based on perturbations of physical parameters to one specific climate model, the DePreSys system (HadCM3) run by the Met Office.

All model simulations by the different s2d partners have been carried out on the ECMWF high performance supercomputers and a set of common atmospheric and oceanic variables from these simulations has been archived. Atmospheric data are archived in ECMWF's main repository of meteorological data, the Meteorological Archival and Retrieval System (MARS) system in GRIB format. Oceanic data are archived in ECMWF's archive/retrieval system for user files, the ECMWF File Storage system (ECFS) in netCDF format. Detailed information on the generation and archiving of the s2d data can be found at http://www.ecmwf.int/research/EU_projects/ENSEMBLES/index.html.

The following table summarises the status of the stream2 s2d simulations and their archival as of end of August 2008.

Forecast system	Hindcasts		Archiving			Comments
	Seasonal/Annual	Decadal	Atmosphere	Ocean hindcasts	Ocean analyses	
IFS/HOPE (ECMWF)	done	done	done	in progress (seasonal/annual completed; e.c*.: in 2 months)	done	
ARPEGE/OPA (Météo-France)	done	n.a.	done	in progress (e.c.: in 1 month)	n.a.	
ECHAM5/OM1 (IfM Kiel)	done	in progress (1995 to be done; e.c.: in 1 month)	not done (e.c.: in 1 month)	in progress (e.c.: in 1 month)	In progress (e.c.: in 1 month)	difficulties with manpower caused delays
ARPEGE/OPA (CERFACS)	n.a.	done	not done (e.c.: in 1 month)	done	done	
HadGEM (Met Office)	done (consistent from 1981 onwards)	in progress (e.c.: in 5 months [1)])	in progress (seasonal/annual complete; e.c.: in 5 months [1)])	in progress (e.c.: in 6 months [1)])	in progress (e.c.: in 5 months [1)])	computing resources problem to complete the decadal and re-run the inconsistent seasonal integrations; [1)] subject to computing resources
DePreSys (Met Office)	in progress (Feb and May start dates complete; e.c.: in 3 months)	done	in progress (decadal complete; e.c.: in 3 months)	in progress (e.c.: in 6 months)	not done (e.c.: in 6 months)	
ECHAM4/OPA (INGV)	done	n.a.	done	in progress (1960-1980 complete; e.c.: in 1 month)	in progress (e.c.: in 1 month)	

* e.c.: expected completion