

SPECIAL PROJECT PROGRESS REPORT

Progress Reports should be 2 to 10 pages in length, depending on importance of the project. All the following mandatory information needs to be provided.

Reporting year 2012

Project Title: Analysis of the coupling between the ocean and atmosphere large scale circulation regimes from annual to decadal time scales.

Computer Project Account: SPDEIFMB

Principal Investigator(s): Univ.-Prof. Dr. Ulrich Cubasch
Dr. Ingo Kirchner

Affiliation: Freie Universität Berlin, Institut für Meteorologie

Name of ECMWF scientist(s) collaborating to the project (if applicable)

Start date of the project: January 2012

Expected end date: open

Computer resources allocated/used for the current year and the previous one (if applicable)

Please answer for all project resources

		Previous year		Current year	
		Allocated	Used	Allocated	Used
High Performance Computing Facility	(units)	200000	0.04	200000	
Data storage capacity	(Gbytes)	3000	200	4000	

Summary of project objectives

(10 lines max)

Global and regional models are used in many projects at FUB to study different aspects of these interactions, the coupling of stratosphere, troposphere and ocean, the interaction of Indian monsoon and extreme events in Europe, the evolution of Rossby waves and its interaction with planetary waves. The combination of our model data with reanalysis and observations (e.g. ERA40, ERA-INTERIM), which are available at the ECMWF archive system, will help to analyse the processes behind the climate variability over Europe. The aim is to include observation based data sets into a framework for the standardised evaluation of the used model system. This will enable a direct and comprehensive evaluation of simulations. The integrated application of the evaluation system within the model system will guarantee the efficient use of computer resources. Furthermore, the use of standardised evaluation methods will support the development process and optimisation of the used model system.

Related ongoing scientific projects

- MiKlip (Medium range climate prediction) funded by BMBF

Summary of problems encountered (if any)

(20 lines max)

In the previous project period no relevant resources at ECMWF were used.

Summary of results of the current year (from July of previous year to June of current year)

This section should comprise 1 to 8 pages and can be replaced by a short summary plus an existing scientific report on the project

Hydrological forecast with statistical methods (Gerd Bürger)

We used the XDS method to downscale 5-day atmospheric forecasts of the IFS ensemble prediction system. The corresponding ensembles of local temperature and precipitation forecasts were used to drive a hydrologic model for a 50km² catchment in Germany, to test the ability for an early warning flood forecasting system. The main result (see Figure attached) is that for lead times larger than 24h the full ensemble forecast is superior to all single-valued forecasts.

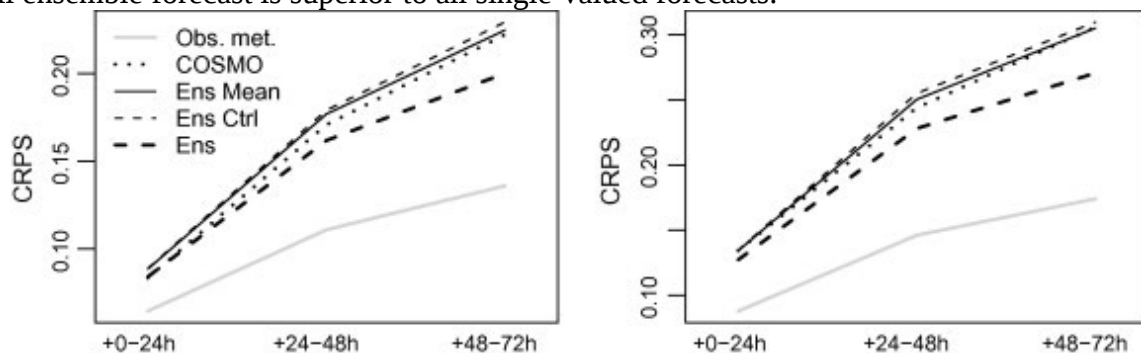


Fig. 1: CRPS of hydrological forecasts (m³ s⁻¹) for day 1–3. Left: forecasts of daily average stream flow. Right: forecasts of the daily maximum (see Eqs. (3) and (4)). The single-value forecast are labeled as in Fig. 13. The CRPS of the full ensemble (Ens) is represented by the thick dotted line. Data: 1250 forecasts of the period 07/2005 – 12/2008.

Furthermore, reanalysis data from ERA40 and ERA-interim were used to calibrate XDS for the downscaling of climateprojections.

List of publications/reports from the project with complete references

Simulating future precipitation extremes in a complex Alpine catchment

C Dobler, G Bürger, J Stötter - Nat. Hazards Earth Syst. Sci, 2013

Downscaling extremes-an intercomparison of multiple methods for future climate

G Bürger, TQ Murdock, AT Werner, SR Sobie... - Journal of Climate, 2013

Assessment of climate change impacts on flood hazard potential in an Alpine watershed

C Dobler, G Bürger, J Stötter - Journal of Hydrology, 2012

Downscaling extremes-an intercomparison of multiple statistical methods for present climate

G Bürger, TQ Murdock, AT Werner, SR Sobie... - Journal of Climate, 2012

Evaluation of medium-range runoff forecasts for a 50km² watershed

D Kneis, G Bürger, A Bronstert - Journal of Hydrology, 2012

Summary of plans for the continuation of the project

(10 lines max)