

LATE REQUEST FOR A SPECIAL PROJECT 2011–2013

MEMBER STATE: Germany

Principal Investigator¹: Prof. Dr. Karsten Schulz

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Other researchers: Dr. Mathias Bernhardt.....

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Project Title: Statistical Downscaling of ERAinterim data using spatial distributed land surface characteristics and novel tools from machine learning and pattern recognition for hydrological applications

Would you accept support for 1 year only, if necessary?	YES X	NO <input type="checkbox"/>
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Computer resources required for 2011-2013: <small>(The project duration is limited to a maximum of 3 years, agreed at the beginning of the project. For late requests the project will start in the current year.)</small>	2011	2012	2013
High Performance Computing Facility (units)	30000	30000	30000
Data storage capacity (total archive volume) (gigabytes)	500	500	500

*An electronic copy of this form **must be sent** via e-mail to: special_projects@ecmwf.int*

Electronic copy of the form sent on (please specify date):
.....01.06.2011.....

Continue overleaf

¹ The Principal Investigator will act as contact person for this Special Project and, in particular, will be asked to register the project, provide an annual progress report of the project's activities, etc.

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Extended abstract

It is expected that Special Projects requesting large amounts of computing resources (500,000 SBU or more) should provide a more detailed abstract/project description (3-5 pages) including a scientific plan, a justification of the computer resources requested and the technical characteristics of the code to be used. The Scientific Advisory Committee and the Technical Advisory Committee review the scientific and technical aspects of each Special Project application. The review process takes into account the resources available, the quality of the scientific and technical proposals, the use of ECMWF software and data infrastructure, and their relevance to ECMWF's objectives. - Descriptions of all accepted projects will be published on the ECMWF website.

This project is part of a German –Luxembourg research initiative aimed at investigating the impact of pattern dynamics of rainfall, other meteorological conditions, land surface characteristics and subsurface soil hydraulic properties on water, energy and solute transport processes at the mesoscale level. As well, effective modelling strategies will be developed to provide prediction tools at the operational level.

In particular – relevant to this proposal – we aim to evaluate the possibility of using down-scaled ERAinterim data to generate historic patterns of rainfall- and evapotranspiration-related hydro-meteorological data and their dynamics. For the statistical downscaling, we will make use of novel techniques from machine learning (such as support vector machine/regression, random trees or modified nearest neighbour techniques) as well as of subgrid variable, local, site specific information of topography, land surface characteristics and general eco-climatological information.

For the more recent parts of the time series, these downscaling methods and derived patterns can be compared and validated against different interpolated data sets of a dense meteorological network in the Luxembourg Alzette catchment. Especially for rainfall, a combination of radar measurements, local measurements and WRF modelling, as well as data-assimilation will provide very precise information on the spatial distribution of precipitation. This will serve as a benchmark for the scale dependent statistical down-scaling techniques, thus allowing to define uncertainties as well as a minimum possible spatial scale that can be achieved using the ERAinterim data.