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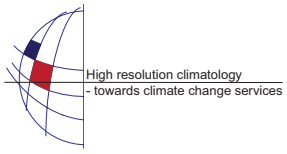

Developing an Ensemble Prediction System based on COSMO-DE

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The numerical weather prediction model COSMO-DE is a configuration of the COSMO model with a horizontal grid size of 2.8 km. It has been running operationally at DWD since 2007, it covers the area of Germany and produces forecasts with a lead time of 0-21 hours. The model COSMO-DE is convection-permitting, which means that it does without a parametrisation of deep convection and simulates deep convection explicitly. One aim is an improved forecast of convective heavy rain events.
Convection-permitting models are in operational use at several weather services, but currently not in ensemble mode. It is expected that an ensemble system could reveal the advantages of a convection-permitting model even better. The probabilistic approach is necessary, because the explicit simulation of convective processes for more than a few hours cannot be viewed as a deterministic forecast anymore. This is due to the chaotic behaviour and short life cycle of the processes which are simulated explicitly now.
In the framework of the project COSMO-DE-EPS, DWD is developing and implementing an ensemble prediction system (EPS) for the model COSMO-DE. The project COSMO-DE-EPS comprises the generation of ensemble members, as well as the verification and visualization of the ensemble forecasts and also statistical postprocessing. A pre-operational mode of the EPS with 20 ensemble members is foreseen to start in 2010. Operational use is envisaged to start in 2012, after an upgrade to 40 members and inclusion of statistical postprocessing.
The presentation introduces the project COSMO-DE-EPS and describes the design of the ensemble as it is planned for the pre-operational mode. In particular, the currently implemented method for the generation of ensemble members will be explained and discussed. The method includes variations of initial conditions, lateral boundary conditions, and model physics. At present, pragmatic methods are applied which resemble the basic ideas of a multi-model approach. For the variation of initial conditions and lateral boundary conditions, forecasts of different global models are used, and for the variation of model physics, different configurations of the COSMO-DE are used. Verification and investigation of the ensemble forecasts give an estimate about the current quality characteristics of the ensemble and how the variations affect the forecasts. The main focus is precipitation. For statistical postprocessing, a logistic regression for probabilities of precipitation is under development.