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Can two-way nesting improve a regional climate model simulation?

P. Lorenz and D. Jacob

Max Planck Institute for Meteorology, Hamburg, Germany (philip.lorenz@zmaw.de)

Large scale atmospheric processes are influencing smaller scale atmospheric processes, which in turn affect the evolution of the regional climate: this paradigm is the basis for one-way nested simulations with regional climate models (RCMs) driven by data from general circulation models (GCMs).

In recent years a two-way nested GCM-RCM model system, allowing feed-back from the RCM to the GCM, has been developed and applied. The model system consists of two Max Planck Institute (MPI-M) climate models, the GCM ECHAM4 and the RCM REMO, both using the same set of physical parameterisations. Several integrations using observed sea surface temperature data (AMIP; 1980-1989) have been carried out for different regions.

An important motivation for performing two-way in contrast to one-way nested RCM simulations is a higher degree of compatibility between the RCM's internal dynamics and the lateral boundary conditions. The GCM adapts to the large scale state of the RCM by the two-way nesting technique feedback, and is providing therefore more consistent boundary data.

The analysis of the differences in the results of a one-way nested against a two-way nested RCM (REMO) climate integration will be the main focus of this presentation.