



Validation of Atmospheric Dynamics (VADY) – results of teleconnectivity analyses within MiKlip

Benjamin Lang, Jucundus Jacobeit, Christoph Beck, and Andreas Philipp
Institute of Geography, University of Augsburg, Germany

The climate research program “Medium-range Climate Predictions” (MiKlip), funded by the Federal Ministry of Education and Research in Germany (BMBF), has the aim to develop a climate model system (MPI-ESM) that can provide reliable decadal predictions of climate, including extreme weather events.

A substantial part of this development is a comprehensive model validation. Within MiKlip, it includes comparisons of model simulations and observations in order to allow statements about the performance of the model and to give particular recommendations for the further development of the model. The research project “Validation of Atmospheric Dynamics” (VADY), conducted by the cooperation partners “Institute of Geography at the University of Augsburg” (IGUA) and the “German Aerospace Centre” (DLR), contributes to model validation within MiKlip with a special focus on atmospheric waves and circulation dynamics.

To analyse circulation dynamics, well-known teleconnection indices such as the North Atlantic Oscillation (NAO), the Pacific/North American Pattern (PNA) or the Southern Oscillation Index (SOI) are used. The earth system model of the Max Planck Institute for Meteorology (MPI-ESM) is applied in successive model generations (historical, baseline0, baseline1, prototype).

Validation results show that for the teleconnection indices improvements can be identified in the prediction skill. Basically they appear only in the first year after the initialization of the model, i.e. in the first lead year. The improvements can especially be observed for the initialized second (baseline1) and third model generation (prototype) of the decadal prediction model MPI-ESM, but not for the uninitialized model runs (historical) and the first model generation (baseline0). However, the different teleconnection indices show big differences: On the one hand, during spring (MAM) of the first lead year, i.e. for the third, fourth and fifth months after the initialization of the model, correlation coefficients near 0 occur for particular teleconnection indices (e.g. NAO). On the other hand, values greater than $r=0,7$ can be observed for other indices (e.g. SOI). Other skill scores (such as MSSS or RPSS) confirm the correlation results.