



Validation of Atmospheric Dynamics (VADY) – representation of circulation types/dynamical modes in the decadal-prediction model system of MPI-ESM

Benjamin Lang, Jucundus Jacobeit, Christoph Beck, and Andreas Philipp

Augsburg, Institute of Geography, Augsburg, Germany (benjamin.lang@geo.uni-augsburg.de)

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 improve a climate model system (MPI-ESM) in such a way that it can provide reliable decadal predictions of climate, including extreme weather events.

A substantial part of the development process 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 (DLR) and circulation dynamics (IGUA).

Within the framework of VADY, DLR validates the representation of atmospheric waves on different levels and scales based on suitable activity indices (e.g. the so-called large-scale dynamical activity index (LDAI), which is a measure for the activity of planetary waves). The focus of IGUA is on the model validation with respect to the representation of atmospheric circulation types, dynamical modes and the teleconnectivity of the atmospheric circulation.

The present contribution provides results of the model validation concerning circulation types/dynamical modes. Results are shown for both the frequency of occurrence and internal characteristics (e. g. persistence or intensity), and for different classification methods (e. g. based on PCA or clustering techniques). The representation of circulation types/dynamical modes will be compared for different generations of the MPI-ESM decadal-prediction model (baseline0, baseline1, prototype) in order to clarify both advances and limitations in the development of the model. Furthermore, different validation techniques (skill scores like MSSS and RPSS) will be compared.