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Objective weather types as a tool to quantify the proportion of RCM precipitation bias due to GCM circulation bias

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In the German research programme KLIWAS (www.kliwas.de), funded by the Federal Ministry of Transport, Building and Urban Development, the likely impacts of climate change on waterways and navigation are evaluated and possible options to adapt will be proposed. As part of the German Strategy for Adaptation to Climate Change, KLIWAS aims at providing a sound basis for adaptation strategies. KLIWAS uses information derived from a wide variety of climate model runs (multi model approach).

Within KLIWAS, the task of Deutscher Wetterdienst is to process and evaluate reference data and climate model simulations and prepare them for use in impact models. For waterways, weather situations related to hydrological events such as drought and floods are of particular interest. To assess the ability of global and regional climate models to simulate weather elements realistically, an objective weather type classification is used (Bissolli & Dittmann 2001).

In a first step, the occurrence of circulation patterns in the control runs (time period 1961 to 2000) of IPCC Global Climate Models GCM (BCCR-BCM2.0, CNRM-CM3, ECHAM5-MPI, ECHAM5-DMI, EGMAM) is compared to reanalysis data (ERA40, ERAInterim and NCEP/NCAR reanalysis). Results from this comparison will be presented.

In a second step, precipitation statistics from Regional Climate Models control runs, dependent on the GCM circulation pattern, are investigated. For that, results from the ENSEMBLES project (van der Linden and Mitchell 2009) are used. Precipitation from RCMs (control run) is compared to regionalised daily precipitation data based on surface measurements (HYRAS data set), dependent on circulation pattern.

BISSOLLI & DITTMANN (2001): The objective weather types classification of the German Weather Service and its possibilities of application to environmental and meteorological investigations. Meteorologische Zeitschrift, 11, No.4, 253-260

VAN DER LINDEN & MITCHELL (2009): ENSEMBLES: Climate Change and its impacts: Summary of research and results from the ENSEMBLES project. Met Office Hadley Center, Exeter, 160 pp.