



Projection of climate change and its impact on the hydrological regimes of the Vistula and the Odra watersheds as the two major river basins in Poland.

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Water resources management and associated hydrological risks require a reliable characterisation of hydrological behaviour under historical and future climate conditions. Even under the historical climate conditions, it is difficult to estimate the natural variability of hydrological regimes.

We propose high-resolution simulations of natural daily streamflow for the period 1951-2013 in a dense network of river reaches of the transboundary Vistula and Odra basins occupying 313,000 km², using SWAT model. The SWAT model is calibrated on a gridded daily (minimum and maximum) temperature and precipitation dataset (5 km resolution) developed, for this purpose, for the entire study area based on kriging technique (DOI 10.4121/uuid:e939aec0-bdd1-440f-bd1e-c49ff10d0a07).

After validating the SWAT model in reproducing key observed hydrological features in a set of 80 relatively unimpaired sub-catchments, nine hydrological projections are produced where gridded meteorological variables as inputs in SWAT are replaced with meteorological variables from nine GCM-RCM runs projected to the year 2100 for RCP 4.5 provided within the EURO-CORDEX experiment.

We will first present a comparison of the performance of the hydrological SWAT model driven by GCM-RCM runs for the historical period using both bias-corrected and raw GCM-RCM output variables. A particular interest will be on how well reproduced are meteorological extremes. Then, we will present the ability of the combined simulation approach to reproduce reliable change of key hydrological variables and especially extreme floods at different spatial scales of the catchments. Finally, hydrological projections under future climate conditions and their impacts on the Odra and Vistula river basins are analysed and discussed.

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