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Selection of the appropriate variables for regionalization in mesoscale basins

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The regionalization of hydrological model parameters on the basis of catchment characteristics is plausible. However, model parameter estimation and subsequently fitting of regional transfer functions is often not appropriate due to non-uniqueness of the calibrated hydrological model parameters.

The multiscale parametrization technique (MPR) was proposed (Samaniego et al. 2010a) to address this problem, which requires only the estimation of a few transfer functions parameters. MPR not only takes into account the subgrid variability of the model parameters but also allows to make robust predictions at an interior location of a donor basin. Predictions in ungauged basin, however, may require the selection of suitable donor basins. This is commonly done with nearest neighbour approaches (Samaniego et al 2010b) or other statistical techniques called stepwise methods. Here, we used the recently proposed SAV algorithm by Bardossy and Singh (2010). This robust algorithm is based on the depth function approach which helps to finds predictors as a convex combination of catchment characteristics. i.e to restrict the regionalization to ungauged catchments whose relevant properties for the regionalization are in between the properties of the donor catchments in a geometrical sense.

To illustrate the application of these techniques, 34 southern German basins ranging from 70 to 4200 km^2 were selected. For each basin a number of catchment descriptors were quantified, e.g. mean slope, aspect, shape factor, mean elevation, and several climatic indices such as the antecedent precipitation index and mean monthly temperature. Daily stream flow time series correspond to the period from 1961 to 2000 along with a large set of parameters calibrated for the mHM model will be used for validation of results. Results indicate that SAV algorithm is very useful for finding adequate transfer parameters from donor basins for prediction in ungauged catchments. These parameters were found by identifying convex combination of catchment characteristics.

Samaniego, L., R. Kumar, and S. Attinger (2010), Multiscale parameter regionalization of a grid [U+2010] based hydrologic model at the mesoscale, Water Resour. Res., 46, W05523, doi:10.1029/2008WR007327.

Samaniego, L., A. Bárdossy, and R. Kumar (2010), Streamflow prediction in ungauged catchments using copula [U+2010] based dissimilarity measures, Water Resour. Res., 46, W02506, doi:10.1029/2008WR007695.

Bárdossy A. and Singh S. K. (2010), Regionalization of hydrological model parameters using data depth, Hydrology Research (in press).