

Bias adjustment for hydrological modelling – Comparing methods and reference data sets

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In the context of the HORIZON 2020 project BINGO (Bringing INnovation to onGOing water management), high-resolution meteorological driving data from the COSMO-CLM regional model are to be bias corrected to be used for various hydrological models. For many of the variables considered, the climate model simulations show a systematic deviation from observation. The expectation value of this error is referred to as bias. To achieve better statistical correspondence between model simulations and the corresponding observational data, it is common practice to adjust this bias prior to subsequent impact studies. A plethora of approaches for bias adjustment have been developed, ranging from simple scaling to more sophisticated approaches. In BINGO, two different approaches are currently used: i) one based on Generalized Linear Model using seasonal covariates and ii) Cumulative Distribution Function Transform (CDF-t). While the former aims at correcting the climatological seasonal cycle of simulations to match that of observations, the latter (CDF-t) is based on a cumulative distribution function (CDF) and thus ensures a correction of the full distribution. Focusing on precipitation, a comparison between these two approaches is carried out with two different reference data sets (WATCH and E-OBS). The comparison is mainly based on statistics such as the relative frequency of wet days, the monthly mean and variance. The Wupper catchment (Germany), which is one of the six research sites studied in BINGO, is used as a showcase.