



Construction of high resolution model consistent pseudo-observations of precipitation and their use for bias correction

Peter Berg, Thomas Bosshard, and Wei Yang

SMHI, Hydrological Research Unit, Norrköping, Sweden (peter.berg@smhi.se)

There is often a lack of suitable observational data at high time and space resolution for evaluation and bias correction of regional climate model (RCM) simulations. This is clearly the case for regions of very poor data records of e.g. only monthly resolution, but also occurs when going to very high space and time resolutions. Here, we present a method to construct pseudo-observational precipitation data by merging a large scale constrained (here through spectral nudging) RCM reanalysis downscaling simulation with coarse time and space resolution observations. The spectral nudging synchronizes the inner domain solution to the driving reanalysis model, such that the simulated weather is similar to observations on a monthly time scale, for which corrections are made to a monthly data set using a simple scaling factor. In order to retain the fine scale information of the RCM, a low-pass filter is applied to the correction factors. The method is evaluated for a 12.5 km RCM simulation over Sweden and shown to produce a reasonable alternative to available data sets for this rather well observed region. In a second step, the pseudo-observations are used as reference data for a quantile mapping bias correction of the same RCM, but driven by a GCM. The use of the pseudo-observations retains the fine scale features, which are otherwise destroyed or changed depending on the reference data set. The proposed method provides a high resolution forcing data set for impact models and also allows bias correction of high resolution model simulations without changing the fine scale spatial features, i.e. retaining the very information required by many impact models.