



Effects of bias correction on the climate change signal of extreme indices of precipitation

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The output of Regional Climate Models (RCMs) is known to be biased, which often poses a problem when it is to be used in impact models such as crop models or hydrological models. To mitigate the effects of the RCM bias, the RCM output is in many cases post-processed to adjust for the known systematic bias in the best possible way. One of the bias correction techniques which is used is a quantile-quantile mapping of the central atmospheric variables including temperature and precipitation; this approach is for example used in the EU FP7 projects IMPACT2C and MODEXTREME. In this method, it is only possible to bias correct the variables for which there are appropriate observations, i.e. the observations must be of good quality and a sufficiently long time-series without gaps must be available. The variables are bias corrected individually, which may affect their internal consistency.

In MODEXTREME, we bias corrected daily precipitation values of ten EURO-CORDEX EUR-11 models using quantile-quantile mapping. The observation data set against which the bias correction is made is E-OBS v10. The bias correction is done for the period 1991-2060, where 1991-2010 is used as the calibration period. The bias correction is done in each grid point separately; to do this the RCM output is first regridded onto the E-OBS 25° regular grid.

Here we show how the bias correction affects the climate change signal of a series of seven indices of extreme precipitation over South-western Europe and consider the reasons for these effects. The climate change signal is calculated as the difference in the mean index value from 1991-2020 to 2041-2060. The extreme precipitation indices include annual values of the maximum daily precipitation, maximum of five days accumulated precipitation, number of consecutive dry days, number of consecutive wet days, number of days with precipitation above 10mm, number of days with precipitation above 20mm, and the Simple Daily Intensity Index (SDII).