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Improved bias correction for GCM precipitation data

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An improved bias correction method for daily GCM precipitation is presented. The method belongs to the widely used family of transfer function correction methods. The method utilizes multiple segments of the cumulative density function (CDF) to fit each a theoretical distribution, instead of the commonly used single transfer function on the entire spectrum of the CDF. The optimum number of segments that covers the CDF space is obtained resulting in a better fit between the bias corrected GCM and the observed precipitation data. The global precipitation data used was from the Institut Pierre-Simon Laplace Coupled Model (IPSL) for the period 1960-2100 and are bias corrected using the precipitation observations of Watch Forcing Data (WFD), a dataset of observed values created in the frame of the Water and Global Change EU project. The accuracy of the method was then assessed between the bias-corrected IPSL data and (WFD). Results show an improvement in the mean precipitation over the past period of 1960-2000 comparing to the newly available corrected IPSL global precipitation data of WATCH. Similarly the new method performs better for the representation of the precipitation extremes, defined as the mean precipitation exceeding the 99.9th percentile. The method is applied in the future precipitation for the periods 2010-2050 and 2060-2100. Results show increase in the mean global precipitation in both periods under A2 and B1 emission scenarios, confirming the intensification of the water cycle.