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Performance of various post-processing bias correction methods for climate change impact studies

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There is still ongoing debate in the scientific community about the usage of bias correction methodologies in climate impact studies. Relatively few attempts have been undertaken to quantify the impacts of different bias correction methods on climate variables, which are subsequently applied in impact models.
In this study, we evaluate a number of state-of-the-art post-processing bias correction methods such as quantile matching, power law transform and local intensity scaling for precipitation, temperature, radiation, humidity, and wind speed to be used as input in hydrological and agricultural impact models. For this reason, a suitable subset of 12 regional climate model (RCM) simulations from the CORDEX Africa initiative are bias corrected and validated against observation data, which are collected and gridded in the framework of the West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL) program. It turned out that the raw Africa-CORDEX simulations cannot be used without further adjustment for any climate impact studies. Moreover, a procedure is presented to check the RCM ensemble members for plausibility and to reduce the CORDEX Africa ensemble. This may help to reduce computational efforts in climate impact assessments and facilitate decision making in the end.