Bias-correction of CORDEX-MENA projections using the Distribution Based Scaling method

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Within the Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region (RICCAR) lead by UN ESCWA, CORDEX RCM projections for the Middle East Northern Africa (MENA) domain are used to drive hydrological impacts models. Bias-correction of newly available CORDEX-MENA projections is a central part of this project. In this study, the distribution based scaling (DBS) method has been applied to 6 regional climate model projections driven by 2 RCP emission scenarios. The DBS method uses a quantile mapping approach and features a conditional temperature correction dependent on the wet/dry state in the climate model data. The CORDEX-MENA domain is particularly challenging for bias-correction as it spans very diverse climates showing pronounced dry and wet seasons. Results show that the regional climate models simulate too low temperatures and often have a displaced rainfall band compared to WATCH ERA-Interim forcing data in the reference period 1979-2008. DBS is able to correct the temperature biases as well as some aspects of the precipitation biases. Special focus is given to the analysis of the influence of the dry-frequency bias (i.e. climate models simulating too few rain days) on the bias-corrected projections and on the modification of the climate change signal by the DBS method.