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The WASCAL high-resolution climate projection ensemble for West Africa

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With climate change being one of the most severe challenges to rural Africa in the 21st century, West Africa is facing an urgent need to develop effective adaptation and mitigation measures to protect its constantly growing population.
We perform ensemble-based regional climate simulations at a high resolution of 12km for West Africa to allow a scientifically sound derivation of climate change adaptation measures. Based on the RCP4.5 scenario, our ensemble consist of three simulation experiments with the Weather Research & Forecasting Tool (WRF) and one additional experiment with the Consortium for Small-scale Modelling Model COSMO in Climate Mode (COSMO-CLM). We discuss the model performance over the validation period 1980-2010, including a novel, station-based precipitation database for West Africa obtained within the WASCAL (West African Science Service Centre for Climate Change and Adapted Land Use) program. Particular attention is paid to the representation of the dynamics of the West African Summer Monsoon and to the added value of our high-resolution models over existing data sets.
We further present results on the climate change signal obtained for the two future periods 2020-2050 and 2070-2100 and compare them to current state-of-the-art projections from the CORDEX-Africa project. While the temperature change signal is similar to that obtained within CORDEX-Africa, our simulations predict a wetter future for the Coast of Guinea and the southern Soudano area and a slight drying in the northernmost part of the Sahel.