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Simulated precipitation in an ensemble of 10 RCMs over Africa

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We analyse an ensemble of 10 regional climate simulations, driven by the ERA-Interim over the period 1989-2008 to document their ability to simulate various aspects of the observed precipitation climate over Africa. Precipitation statistics are evaluated at a range of time scales, including: seasonal means, annual and diurnal cycles, as well as synoptic variability such as that associated with African Easterly Waves (AEWs). All RCMs represent the seasonal mean and annual cycle quite accurately, although individual models can exhibit significant biases in some regions and seasons. The multi-model average generally outperforms most of individual simulations, showing biases of similar magnitude to differences across a number of well-established observational data sets. Moreover, many of RCMs significantly improve the precipitation climate compared to their boundary condition data- ERA-Interim. With respect to AEW rainfall variability, agreement between models is reduced, although a number do capture this variability quite well. Finally, the majority of the RCMs fail to simulate the diurnal cycle of precipitation over Africa, with rainfall generally triggered too early during the day, although a subset of the models do have a reasonable representation of the phase of the diurnal cycle. The systematic bias in the diurnal cycle is not improved when the ensemble mean is considered.