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Predictability of heat waves over West Africa in subseasonal and seasonal reforecasts with CNRM-CM

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Climate projections indicate that West Africa is prone to experience more frequent and intense heat waves in the upcoming decades. The Sahelian region is particularly vulnerable to spring heat waves, during which maximum temperatures can reach over 40°C for several days, with dire impacts on population health. The French National Research Agency (ANR) project ACASIS, funded from 2014 to 2017, focuses on the characterization of these heat waves and their impact on health, in collaboration with Senegal and Burkina Faso national weather services, demographers and epidemiologists.

In this framework, the predictability of heat waves at subseasonal and seasonal time scales with the CNRM-CM global coupled model is assessed. Predictability of springtime surface temperature over the region is strongly related to ENSO, thus providing the grounds for some ability of the model to correctly represent inter-annual variability at a seasonal time scale. For this study, we rely on definitions of heat waves according to a threshold of consecutive days of daily minimum or maximum temperatures reaching over the 90th percentile, and evaluate the ability of CNRM-CM to represent the inter-annual variability of heat wave duration indices and number of heat waves per period. Despite strong surface temperature biases and issues in representing the persistence of heat spells over the region, the Meteo-France hindcasts for the EUROSIP multi-model and the WWRP/WCRP S2S project exhibit some skill for these heat wave indices, as evaluated over a 22-year hindcast period.

An assessment of the spring 2016 operational forecasts in the light of these results will also be shown, to discuss the potential role of dynamical sub-seasonal and seasonal forecasts in a pre-operational warning system over the region.