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Predictability of heat waves over West African main cities

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Heatwaves are one of the most dangerous climatic hazards affecting the health of humans and ecosystems around the world. Accurate forecasts of these dramatic events can be relevant for policy makers, climate services and the local population. In this perspective, the present study addresses the predictability of heatwaves in sub-seasonal to seasonal forecasts in the West Africa region over the recent period from 2001 up to 2020. Two models from the S2S Prediction project namely ECMWF and UKMO have been analyzed. Heatwaves have been detected using minimum/maximum values of 2-m temperature as indicators over a period of at least 3 consecutive days. The validation of the model outputs is processed using ERA5 as reference. The global skill of the models in reproducing 2-m temperature is done by calculating the Continuous Rank Probability Score (CRPS). ECMWF model shows more skill in the Guinean region for minimum and maximum values of 2-meter temperatures. The predictability of heatwaves in the models is estimated by the computation of some probabilistic metrics such as : hit-rate and false alarm ratio (FAR). Models show predictive skill of heatwave days greater than the climatology up to 3 weeks lead time in the 3 regions. The FAR values are high and increasing with the lead time. This suggests that the models used to predict heat wave days which are not observed in the reanalysis (ERA5) more than real events. ECMWF shows more predictive skill at weekly time scale with high hit_rate values up to 3 weeks lead time. The accurate representation of the heatwaves intensity in the models remains very challenging at any lead time.