WCRP CORDEX 17TH-20TH MAY 2016 STOCKHOLM, SWEDEN ICRC-CORDEX 2016

PARALLEL SESSION A : BENEFITS OF DOWNSCALING - A1: ADDED VALUE OF DOWNSCALLING

Multimodel CMIP5 and CORDEX simulations of Historical Summer Temperature and Precipitation Variabilities over West Africa

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In this paper, the mean climatology, the intermodel variability and the spatio-temporal patterns of temperature and precipitation over West Africa from CMIP5, CMIP5_SUBSET (ensemble of GCMs driving CORDEX) and CORDEX multimodel ensembles (MMEs) are evaluated and intercompared over West Africa for the monsoon season (June-September) during the historical period. We found that while CORDEX fails to outperform the simulated mean climatology of temperature by the CMIP5 ensembles, it substantially improves that of precipitation and provides more fine-scale features tied to local topography and landuse. The ensemble spread and descriptive statistics reveal that such an improvement is more a result of cancellation of errors in the Gulf Guinea but originates from a more consistent and realistic simulation of monsoon precipitation among the various Regional Climate Models (RCMs) in the Sahel. Analysis of the Rotated Empirical Orthogonal Function (REOF) indicates that all MMEs capture the spatio-temporal variability of both temperature and precipitation depicting the recent warming and the Sahel precipitation recovery that occur in recent decades over West Africa as identified in the first REOF mode. However, for the spatial patterns of the last two modes along with their associated time series, CORDEX mostly follows CMIP5_SUBSET. Our results thus points towards the strong influence of boundary forcing on the simulation of mean and spatio-temporal variability of temperature and precipitation over West Africa but also to the capability of CORDEX RCMs to pick regional contribution and improve upon the CMIP5 GCMs to some extent.

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