



## **Performance of CORDEX-Evaluation Simulations for Indian Summer Monsoon under Non-Stationary Climate**

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Regional models are first tested with reanalysis datasets as boundary conditions to understand their capability to simulate regional climate. In Co-ordinated Downscaling Experiment (CORDEX) simulations they are known as evaluation runs. They should be first tested before using them in climate projections with the boundary conditions from General Circulation Models (GCMs). In CORDEX simulations ERA-Interim reanalysis data is used for the same. Here we test the quality of evaluation runs by a CORDEX RCM: RCA4 (Rossby Centre regional atmospheric model version 4) by Rossby Centre, Swedish Meteorological and Hydrological Institute (SMHI), for Indian summer monsoon (ISM) characteristics. We compare the simulated precipitation with that of observations from India Meteorological Department (IMD). The results are further compared with respect to original ERA-Interim reanalysis data to understand added value. The regional simulations are tested under the non-stationary environment considering: A) hot and cold years based on Sea Surface Temperature (SST) of Indian Ocean, Pacific Ocean and surface temperature of Indian Landmass and B) chronology of years (first half as cold years and second half as hot years). We do not find any added value in the simulations by the RCM, in terms of performance under non-stationary climate. We further couple statistical and dynamical downscaling to ensure if such an approach improves the simulations; however, such an approach also fails to show improvement. This attributes to failure of evaluation runs itself in capturing the characteristics of Indian summer monsoon which is further reflected in climate projections by CORDEX RCMs.