



Sensitivity of RegCM4.3 two convection schemes on Indian summer monsoon for the South Asia CORDEX domain

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Regional climate models can be used to examine the impact of global warming at the regional level for the possible emission scenarios. According to IPCC AR4, a number of studies noticed large inter model differences leading to large uncertainties in the projected future changes in different aspects of monsoon rainfall. The aim of this study to understand the different response of similarly forced model RegCM4.3 with different convection scheme over the Ocean.

In this study, RegCM4.3 is used to generate the climate scenarios for South Asia CORDEX domain using boundary forcing of global coupled climate models GFDL-ESM2M and MPI-ESM-MR in control runs and two emission scenarios RCP4.5 and RCP8.5 obtained from CMIP5 archive. Emanuel convective parameterization scheme has been used over the land in all the experiments. Over the Ocean, experiments are designed using both Emanuel and Grell convection schemes. Rest of the model configuration is based on the different sensitivity experiments conducted to reduce the model temperature and precipitation biases. The model has been integrated at 50km resolution starting from the initial condition of 1st Jan 1970 and the climate simulation continued till 1st Jan 2100.

Results indicate that all India JJAS mean temperature change is consistent with clear projection of warming, whereas the projected JJAS precipitation change shows large spread and uncertainty in trends. Even the similar forcing experiments with difference only in the convective scheme over ocean show large difference in their projected precipitation. Climatology of JJAS precipitation over Indian land and low level westerlies for the historical period (1979-2005) is well represented. However, there are differences in the precipitation distribution at regional level within the experiments mainly over the Northwest and southern part of Peninsular India. In case of Emanuel over ocean, enhanced convection over Indian land is mainly associated with the weak westerlies over the Bay of Bengal. The positive anomalies of westerly jet are captured over the Arabian Sea in both the cases where Grell convection over ocean is used in RegCM4.3. Grell scheme over ocean has significantly improved the pattern of westerly flow in RegCM4.3 simulations forced with the considered GCMs.