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## Study of Northeast Monsoon over India using a coupled land-atmosphere model RegCM4-CLM4.5

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The major rainfall period over the southern peninsular part of the Indian Subcontinent generally occurs during the months of October-December (OND) through the northeast (NE) monsoon (also called winter monsoon or post-monsoon season). The present study focuses on the ability of regional climate model RegCM4 forced with MIROC5 Global Climate Model and three different land-surface parameterization schemes: Biosphere-Atmosphere Transfer Scheme (BATS, herewith referred as CONTROL), Community Land Model (CLM4.5), and Sub-grid BATS in capturing the mean features of NE monsoon for the present climate (1975-2005) over India region. Based on their ability to simulate the inter-annual and intra-seasonal variability, and seasonal mean during monsoon, the current GCM is selected for downscaling from the available literature. The model performance is evaluated against the gridded temperature and precipitation datasets from the Climate Research Unit (CRU) and India Meteorological Department (IMD) respectively. We have found that the MIROC5\_CLM4.5 is simulating the precipitation and surface temperature better than other experiments with relatively less bias over the study. MIROC5\_CLM4.5 experiment again performs well in capturing the precipitation and surface temperature during wet and dry years' composite. Overall, our results show a better representation of NE Monsoon mean features by MIROC5\_CLM4.5 compared to other sets. The RegCM4-CLM4.5 coupled simulation has shown promising performance in representing NE monsoon. Further, it is envisaged to test and customize this framework in order to generate reliable future projections in subsequent studies.

Keywords: RegCM4, CLM4.5, NE Monsoon, Downscaling.