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Simulation of different phases of Indian summer monsoon using Regional Climate Model

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Asian summer monsoon is one of the anticipated climate phenomena over the Indian subcontinent, which is marked as the termination of hot summer and beginning of rainy season. During the monsoon season (June-September), India receives 70% of its annual rainfall, which intensely influence the agriculture, irrigation and power industry as well as the whole economy of the country. On sub-seasonal time scale, rainfall of Indian summer monsoon (ISM) is associated in different phases and undergoes through the periods of appearance, enhance and reduce rainfall activity, refer as onset, active and break phase of monsoon. During the active phase, monsoon trough is placed towards south than normal, strong low-level jet (LLJ) running over peninsula India and raises of cyclonic vorticities in lower level along with enhancement of rainfall activity over monsoon core region, are the feature of active phase of monsoon (Muraleedharan et al. 2013). Along the side, opposite feature is observed in break phase of monsoon during the peak monsoon months of July and August. The genesis of this variability and intensification are controlled by the sea surface along with the interaction between sea surface and atmosphere (Paul et al. 1992). On the aspect of this, an attempt has made to evaluate the different parameterization convective scheme (PCS) for simulation of onset, active and break phases of the monsoon. Six PCS namely Kuo, Mix98 (Emanuel over land and Grell over ocean), Mix99 (Grell over land and Emanuel over ocean), Tiedteke, Emanuel, and Grell of Regional Climate Model Version 4.3 (RegCM 4.3) developed by International center Theoretical Physics (ICTP) are considered for simulation of different phase over South Asia Coordinated Regional Climate Downscaling Experiment (CORDEX) region at 50 K.M resolution. This is observed that RegCM response well for the simulation of large-scale atmospheric circulation (Raju et al. 2015) with a suitable high-resolution resolving complex topography, deals with land-sea contrast. To find out prognostic efficiency for different time epoch of onset, active and break, pentad composite analysis of rainfall, mean sea level pressure (MSLP), outgoing long-wave radiation (OLR) and wind at 850 and 925 hPa level are carried out. Throughout the study, the PCS evaluated with the help of good agreement of IMD observation, some modulation is found in the OLR field ($\leq$ 200 Wm-2) over the region 5–10^0N and 70-75^0E. Yearly analysis is conducted for finding best fitted PCS which shows the strength of wind at 925hPa over the region 5-10^0N and 70-80^0E on pentad composite onset and provide the precursor for simulating the Onset, Active and Break phases.

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