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Teleconnections of Seasonal Monsoon Variability over South and East Asia: CMIP5 Simulations and Projections

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The Asian summer monsoon system incorporates two large regional subsystems: the South Asian (Indian) monsoon and the East Asian monsoon. Both the South Asian and East Asian summer monsoon rainfall exhibits variability on a variety of time scales. Summer monsoons over South and East Asian regions are interrelated, but they also exhibit independent behaviour at times. The variability of South Asian summer monsoon is also associated with circulation features over East Asian region and a see-saw between the Indian and East Asian monsoon, associated with the variability in the sea surface temperatures (SST) over western Pacific, have been reported. Further, the rainfall variations over central India, northern parts of China, Southeast Asia (Indonesia) are in phase, however an out of phase relationship has been observed with rainfall variations from northeast India up to southern parts of China-South Korea, southern parts of Japan. These relationship exhibits secular variations and an estimation of how the monsoon relationships are represented in the climate models and an understanding of how the relationship will vary in the warming environment is required. This is being carried out using Coupled Model Intercomparison Project (CMIP5) datasets, which provides opportunity to understand the present climate as well as an estimate of the future climate change. The present study is therefore focused on evaluating the model performance in simulating the observed teleconnections of South and East Asian monsoon. Further, the future projections of monsoon variability and teleconnections are estimated using the models reproducing the observed features of monsoon. CMIP5 experiments of the coupled ocean-atmosphere models for the historical period (1850-2005) is used to evaluate the model performance against present climate and the future climate projections are estimated using the experiments based on RCP4.5 forcing (Representative Concentration Pathways: Radiative forcing stabilizes at $\sim$4.5 Wm-2 after 2100) for the period 2006-2100.