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Intraseasonal Variability of the Indian Summer Monsoon in the Regional Climate Model COSMO-CLM

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The regional climate model COSMO-CLM driven by ERA-Interim reanalysis data with a spatial resolution of 55km is used to simulate observed features of the intraseasonal variability of the Indian summer monsoon (ISM) during the period 1979 until 2011.
One of these features is the northward propagation of the monsoon intraseasonal oscillations. We find, that the temporal evolution of this oscillation between model and observation is in good agreement, but the strength is less well simulated.
Additionally, the models capability to simulate observed dry and wet events on a weekly time scale is investigated using the standardized precipitation index. In general, the model is capable to simulate these events with a similar magnitude at the same time, but we find a higher ability for dry compared to wet events. We hypothesize this is related to differences in the atmospheric circulation during dry and wet events. Analyses show, that dry events are characterized by a cyclonic vortex over India as well as an anti-cyclonic vortex over Pakistan region in 500hPa, whereas wet events are characterized by an anti-cyclonic vortex over India, only. It is found that COSMO-CLM has a higher ability to simulate the observed anomalous circulation over Pakistan region compared to observed anomalous circulation patterns over India.
Overall, this study shows that the current configuration of COSMO-CLM is able to simulate key features of the intraseasonal variability of the Indian summer monsoon. Thus, under consideration of its limitations, COSMO-CLM is suitable to investigate possible changes of the intraseasonal variability of ISM under changed climate conditions.