



Orographic control of Cold Pool precipitation during Indian Summer Monsoon Season

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Rainfall during June-September, termed as Indian Summer Monsoon (ISM) season, contributes to more than 80% of the annual precipitation over the country. Although there exists a spatial variability in the intensity of seasonal mean rainfall over India and its surroundings, most of the domain experience rainfall with intensity higher than 6 mm/day. However, a region on south Bay of Bengal along east coast of Indian peninsula (termed as Cold Pool, or CP, in this study) experience very low rain intensity during summer. The atmospheric conditions over the region are favorable for convection and sea surface temperature (SST) is maintained well above the threshold value for convection (28 degree Celsius). The mean vorticity above boundary layer is positive with magnitude comparable to that over the monsoon trough. However, even after having all favorable conditions for convection to occur, the region receives very less rainfall throughout the monsoon season. We investigate the reason of this paradox using an atmospheric general circulation model (AGCM) with perturbed simulations. We carry out simulations with varying height of western Ghat mountains (from 0 to 2 times the height of the present height) in the model and investigate its influence on the CP precipitation. We find that there is a linear relationship between the height of WG and precipitation over CP. Decrease in WG height reduces the inhibition of convection that prevails over CP. This was on account of increase in the moisture convergence in the boundary layer and reducing descend related to mountain lee wave over the region.