

ABSTRACT

JULY TEMPERATURE AND RAINFALL REGIMES OVER BHUTAN

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The climate of Bhutan during its peak monsoon month of July is investigated using analysis of the long-term wind, temperature and pressure fields derived from the NCEP/NCAR reanalysis data. The differences in the meteorological fields for two Julys (2001 and 2002, wet and dry respectively) were studied and compared with the long-term mean fields. In July 2001, the synoptic conditions were near to the normal conditions. For the two months mentioned, the Regional Climate model (RegCM3) was used to simulate the meteorological fields on a domain centered at Bhutan. The simulations were done with 20 km horizontal resolution and varied the closure schemes of Grell cumulus parameterization with Arakawa and Schubert (AS) and Fritsch and Chappell (FC) closures. AS simulated patchy rainfall pattern whereas FC simulated heavier rainfall. The model under-predicted temperature with both AS and FC but AS simulated relatively higher values compared to FC. The model wind, temperature and rainfall outputs were compared with reanalyses, TRMM and station-observed data. The model was able to capture the general surface wind pattern and spatial distributions of rainfall and temperature. The model also reasonably captured the rainfall and temperature maxima and minima areas with higher values in the south and decreasing in values towards the northern regions. Particularly, over the study area the model performed better in the southern foothills compared to its counterparts in northern mountains. Overall the temperature results showed that the model was cold biased towards the lower half of the domain. The model performed better when Grell with AS closure was used. However, the study recommends model runs to be performed at higher horizontal resolution for the model to capture the influence of complex topography of Bhutan.