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Title: Relationship between Tropospheric Temperature and Indian Summer Monsoon Simulated by RegCM

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Abstract:

Characteristics of rainfall and Tropospheric Temperature (TT) have been examined over the Indian subcontinent during four seasons using Regional Climate Model Version 3.0 (RegCM3). The statistical connection between the Indian Summer Monsoon Rainfall (ISMR) and TT mainly over the Tibetan Plateau, Pakistan and Central India has been analyzed. The model has been integrated at 55 km horizontal resolution over India during the years 1980 to 2000 with prescribed lateral boundary forcing from European Centre for Medium-range Weather Forecast 40 years Re-Analysis (ERA40). This study shows that the RegCM3 is roughly able to capture the spatial distributions of rainfall in all the seasons as compared to the corresponding IMD0.5 gridded rainfall. The model has simulated warmer TT over the Himalayas region in all the seasons. However, it is well captured over the peninsular India and oceanic regions. Warming of about 0.5°C over the northwest and Central India in the summer monsoon months may lead to lower surface pressure there. As a consequence, the simulated monsoon circulation and rainfall are stronger than those observed. The two most important rainfall seasons, the winter and monsoon are reasonably well simulated with Correlation Coefficients (CC) of 0.59 and 0.60 respectively significant at 1% with the corresponding observed values of IMD. Further, the ISMR and TT during the contrasting monsoon years are also close to the respective observations. Temporal CC between the TT over Tibet, Pakistan and Central India during monsoon season with gridded ISMR reveals that the TT over Pakistan has better correlated with the ISMR than the TT over Tibet and Central India, which is well supported by the model.

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