



Multiyear hindcast experiments of summer monsoon over Pakistan by using a nested regional climate model (BCC_RegCM1.0)

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A nested regional climate model of Beijing Climate Centre (BCC_RegCM1.0) has been experimentally used for the seasonal hindcast of summer monsoon over Pakistan through a series of sensitivity experiments with a special emphasis on the adequate choice of physical parameterization schemes suitable for the South Asia monsoon climate. The regional climate model is nested with the Global Climate Model of Beijing Climate Centre (BCC_CGCM1.0). A ten years hindcast of summer monsoon over Pakistan from 1991-2000 has been undertaken. The preliminary results have shown that BCC_RegCM is capable of predicting the summer monsoon and associated circulation over Pakistan. Thirty experiments are conducted by using three convective cumulus parameterization schemes namely, Kuo scheme (KS), Grell scheme (GS) and mass flux scheme (MFS) with the large scale implicit moisture scheme. Each time the model was initialized from 0000 UTC of May 01 and integrated up to the end of 31 September. The comparative experiments showed that the MFS is better in simulation of precipitation and maximum temperature, KS overestimated the precipitation but reasonably simulated the spatial pattern of maximum and minimum temperature, whereas GS failed to reproduce the observed spatial pattern of precipitation and minimum temperature in almost all cases. Further, MFS realistically simulated the inter-annual variability of summer monsoon over Pakistan with nine correct anomaly signs over Northern Pakistan (NP) and six over the Southern Pakistan (SP). In order to fur-

ther verify the performance of BCC RCM over Pakistan and adjoining areas of South Asia, we investigated in detailed the hindcast experiments of 1994, 1997 and 2000. The results are found very reasonable and encouraging when compared with the observations. The shortcomings of the RCM include the underestimation of the observed precipitation belt over the western Ghatts in India. The 10-years mean biases of simulated daily precipitation rate over NP by MFS, KS and GS are 0.9, 16.1 and -1.1 mm day⁻¹ respectively and over SP these biases are 1.8, 4.0 and -0.9 mm day⁻¹.