Sensitivity Analysis of Different Convection Schemes and Domain Center for Numerical Simulation of Winter Precipitation Over Iran

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This paper qualifies the impact of different convection schemes and domain centers on the simulation of two dry and wet winter precipitations of 1997 and 2000 over Iran using RegCM3 numerical climate model. The model uses a compressible, finite difference with hydrostatic equilibrium in sigma coordinate and a semi-implicit algorithm for reduction of horizontal diffusion. In this study, sensitivity of the RegCM3 regional climate model has been analyzed using different convection schemes, including Grell-AS, Grell- FC, Emanuel and Kuo schemes and different domain center locations including Himalaya, Mediterranean sea, Iran and Indian ocean (near Pakistan southern boundaries). NNRP1 data with 5-degree resolution, GLCC and GTOPO dataset are used as initial and boundary conditions, land use and topography data, respectively. We found that the performance of the Model strongly depends on the location of the domain center, for example when the center of the domain is located over Himalaya then the results for the precipitation are reasonably better especially when a Siberian high pressure develops over Iran. With Kuo scheme the minimum of bias and MAE are -0.7mm and 0.6mm for dry year of 2000, but with Grell scheme the error is found to be a minimum compared to other configurations of the model both in dry and wet season. In all experiments the precipitation amounts are underestimated when compared to corresponding observations. The largest difference occurred in Himalaya experiment. Moreover, we found that there is an eastward shift in Caspian Sea precip-

itation pattern in all experiments. It is also found that CRU reanalysis data cannot be considered as a reference data for calibration of RegCM3 over Iran.