Simulating evaluation and projection of the climate zones over China by CMIP5 models

Wenping He (1) and Shiquan Wan (2)

(1) National Climate Center, Climate Service Division, Beijing, China (wenping_he@163.com), (2) Yangzhou Meteorological Bureau of Jiangsu Province (wan_sq@163.com)

The number of days of the daily average temperature $\geq 10\,℃$ (DT10) is one of the most widely used indicators of climate regionalization in China. On the basis of climate zones classified by DT10 over China, the performance of the 9 CMIP5 climate models is investigated in this paper. The results indicate that the 9 models can reproduce the spatial pattern and decadal variations of climate zones in China to some extents. Root-Mean-Square-Error (RMSE) of the number of days of DT10 simulated by MPI-ESM-MR, HadGEM2-AO, IPSL-CM5A-MR, and CMCC-CMS are relatively less than those simulated by the other 5 models in the east of 110°E. The trends of DT10 simulated by GFDL-ESM2G, CMCC-CMS, IPSL-CM5A-MR, and MPI-ESM-MR are relatively closer to that of the observations than the other 5 models. As far as the decadal change of the climate zones was concerned, the performance of CMCC-CMS and MPI-ESM-MR are closer to the observations than other 7 models. In general, taking into account of the three factors, including the RMSE, the trends, and the decadal change of the DT10, the CMCC-CMS and MPI-ESM-MR perform better than others 7 models in simulating climate zones over China. The simulation results for FGOALS-G2 and INM-CM4 both worse than other 7 models. Meanwhile, the performance of multi-model ensemble in simulating climate zones over China is obviously better than the simulated result of any single model. So, it is a good way to simulate climate zones by multi-model ensemble to reduce some uncertainty of climate models. However, it is crucial to select suitable ensemble members.