



Simulation of climatology and Interannual Variability of Spring Persistent Rains by Meteorological Research Institute Model: Impacts of different horizontal resolutions

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The authors evaluated the performance of Meteorological Research Institute (MRI) AGCM3.2 models in the simulations of climatology and interannual variability of the Spring Persistent Rains (SPR) over southeastern China. The possible impacts of different horizontal resolutions were also investigated based on the experiments with three different horizontal resolutions (i.e. 120, 60, and 20km). The model could reasonably reproduce the main rainfall center over southeastern China in boreal spring under the three different resolutions. In comparison with 120 simulation, it revealed that 60km and 20km simulations show the superiority in simulating rainfall centers anchored by the Nanling-Wuyi Mountains, but overestimate rainfall intensity. Water vapor budget diagnosis showed that, the 60km and 20km simulations tended to overestimate the water vapor convergence over southeastern China, which leads to wet biases. In the aspect of interannual variability of SPR, the model could reasonably reproduce the anomalous lower-tropospheric anticyclone in the western North Pacific (WNPAC) and positive precipitation anomalies over southeastern China in El Niño decaying spring. Compared with the 120km resolution, the large positive biases are substantially reduced in the mid and high resolution models which evidently improve the simulation of horizontal moisture advection in El Niño decaying spring. We highlight the importance of developing high resolution climate model as it could potentially improve the climatology and interannual variability of SPR.