Study on Dependency of Simulated Regional Climate on Models

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Present study uses three regional climate models (RCMs) namely fifthgeneration Pennsylvania State University–NCAR Mesoscale Model (MM5), Weather Research and Forecast (WRF) and NCAR Regional Climate Model (RegCM3) in the investigation of climatological features of surface air temperature at 2 meter height over East Asia. The model domain approximately encompasses the regions 23°N–51°N, 101°E–150°E with a grid point spacing of 27km using Lambert conformal projection. The terrain height and land use data are generated from a global data set produced by the United States Geographical Survey (USGS) at 10 minute resolution. All the simulations cover the period of 1st January to 31st December and we simulates the 10 years from 1991 to 2000. The initial and lateral boundary conditions necessary to run the RCMs were obtained from the NCEP/NCAR Global Reanalysis data, which is available at 6-h intervals with a resolution of $2.5° \times 2.5°$ and sea surface temperature (SST) for the simulation periods were obtained from a National Oceanic and Atmospheric Administration (NOAA) monthly data sets.

At present we will show the main results simulated with MM5 and RegCM only. The temperature features simulated by RCMs are compared with those of the NCEP/NCAR reanalysis. The most important results based on present study are (1) the area average monthly mean surface air temperature simulated with MM5 and RegCM3 show similar patterns (Figure. 1). (2) RCMs simulations also show warm biases over the southwest of China and cold biases over Japan regions. The 10 years annual mean surface air temperature over East Asia also depict similar pattern for MM5 and RegCM3 simulations. In future we are supposed to include next generation regional climate model, WRF, for future climate simulation.

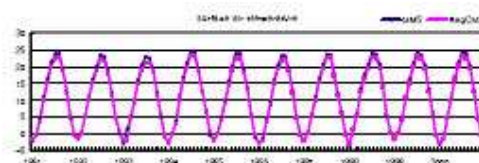Keywords: Surface air temperature, grid point spacing, terrain and Regional Climate Models (RCMs).

Figure 1: The area monthly mean surface air temperature (℃) of MM5 and RegCM3