**ABSTRACT**

Evaluating the projection capability of climate models is an important task in climate model development and climate change studies. The projection capability of the Beijing Climate Center (BCC) Climate System Model BCC\_CSM1.0 is analyzed in this study. We focus on evaluating the projected annual mean air temperature and precipitation during the 21st century under three emission scenarios (Special Report on Emission Scenarios (SRES) B1, A1B, and A2) of the BCC\_CSM1.0 model, along with comparisons with 22 CMIP3 (Coupled Model Intercomparison Project Phase 3) climate models. Air temperature averaged both globally and within China is projected to increase continuously throughout the 21st century, while precipitation increases intermittently in each of the three emission scenarios, with some specific temporal and spatial characteristics. The changes in globally-averaged and China-averaged air temperature and precipitation simulated by the BCC\_CSM1.0 model are within the range of CMIP3 model results. The changes in precipitation and temperature are more pronounced over China than in the global average, also in agreement with the CMIP3 models. The projection capability of the BCC\_CSM1.0 model is comparable to that of other climate system models. Furthermore, the results reveal that the climate change response to greenhouse gas emissions is stronger over China than in the global mean, which implies that China may be particularly sensitive to climate change in the 21st century.

**Keywords:** BCC\_CSM1.0, air temperature, precipitation, projection