

Are CMIP5 Models better than CMIP3 Models in Simulating Precipitation over East Asia?

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The performance of climate models participating in the phases 5 and 3 of the Coupled Model Intercomparison Project (CMIP5 and CMIP3, respectively) is evaluated and compared with respect to precipitation over East Asia (110 - 150° E, 20 - 50° N). The target period covers the 20 years from 1981 through 2000. The CMIP5 and CMIP3 models underestimate precipitation amounts over East Asia in the warmer season (May through September), while they overestimate precipitation amounts in the colder season (October through April). Both sets of models have some difficulty in simulating the seasonal march of the rainy season over China, Korea and Japan, and they also underestimate the precipitation intensity over East Asia. Nevertheless, the CMIP5 models show a higher reproducibility of precipitation over East Asia than the CMIP3 models with respect to the geographical distribution of precipitation throughout the year, seasonal march of the rainy season, and extreme precipitation events. Models with a higher reproducibility of annual precipitation tend to show a higher reproducibility of precipitation intensity for both the CMIP5 and CMIP3 models. Correlation analysis using all of the CMIP5 and CMIP3 models reveals that models with higher horizontal resolution tend to perform better than those with a lower resolution. The advantage of the CMIP5 models over the CMIP3 models in the simulation of the East Asian climate can be partly attributed to the improved representation of the West Pacific Subtropical High in the CMIP5 models, especially during the summer.

Key words: CMIP5 model, Precipitation, East Asia

References

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