



Impact of air-sea interaction on simulation of East Asian summer monsoon in CMIP5 models

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In the western North Pacific (WNP), it is well known that there is a negative correlation between sea surface temperature (SST) and precipitation indicating that the atmosphere may force the ocean. If global climate models (GCMs) cannot capture the air-sea interaction over the WNP, it leads to the failure in simulating regional climate over East Asia. The East Asian summer monsoon (EASM) is an intrinsic atmospheric phenomenon in East Asia, which significantly affect the surrounding countries. In this study, therefore, we investigate the impact of the air-sea interaction on simulating the EASM in multi-GCMs.

The GCMs from the Coupled Model Intercomparison Project 3 (CMIP3) have large errors in cross correlation between SST and precipitation over the WNP, which means that the models could not capture the negative correlation realistically. On the contrary, the GCMs participating in CMIP5 improve the air-sea interaction compared to CMIP3 models. They have smaller errors in cross correlation between SST and precipitation. Among CMIP5 models, the models which have the smaller errors in cross correlation showed realistic simulation of the EASM in terms of its evolution and associated principal mode. However, GCMs with larger errors tend to simulate the EASM unreasonably. This indicates that the realistic air-sea interaction over the WNP is required to improve the EASM simulation.

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