Geophysical Research Abstracts
Vol. 16, EGU2014-1491, 2014
EGU General Assembly 2014

Impact of overestimated ENSO variability in the relationship between ENSO and East Asian summer rainfall

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El Niño–Southern Oscillation (ENSO) events in the preceding winter are an important predictor used to forecast the subsequent East Asian summer rainfall (EASR). This study investigates the relationship between the preceding winter ENSO and the EASR in coupled general circulation models, by analyzing the simulated results of 18 Coupled Model Intercomparison Project Phase 3 models. It is found that more than half of these models can approximately reproduce the ENSO's delayed impact on the EASR, and five models can capture the significant ENSO–EASR relationship. All of these five models overestimate the intensity of the ENSO variability, and they are almost the models that most seriously overestimate the ENSO variability, strongly suggesting that overestimated ENSO variability can help coupled models reproduce the relationship between the ENSO and EASR. Further analyses indicate that all of the five "best" models also overestimate the intensity of tropical Indian Ocean sea surface temperature (SST) variability, and they simulate the strongest intensity of Indian Ocean SST variability among the 18 models.

Citation: Fu, Y., R. Lu, H. Wang, and X. Yang (2013), Impact of overestimated ENSO variability in the relationship between ENSO and East Asian summer rainfall, J. Geophys. Res. Atmos., 118, 6200–6211, doi:10.1002/jgrd.50482.