



Numerical Simulation on the Southern Flood and Northern Drought in summer 2014 over Eastern China

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Abstract In summer 2014, Eastern China suffered a typical “southern flood and northern drought” anomalous climate. Observational analyses indicated that the anomalous vertical motion, East Asian subtropical westerly jet stream, and the East Asian summer monsoon (EASM) played important roles in the formation of such precipitation anomaly. Furthermore, using the climate model (IAP-AGCM-4.1) perturbed by simultaneous observed sea surface temperature anomalies (SSTAs) in global scale and four different regions (North Pacific, Indian Ocean, North Atlantic, and Equatorial Pacific), this study investigated the potential contribution of ocean to such “southern flood and northern drought” over Eastern China in summer 2014. The simulations forced by global-scale SSTAs or North Pacific SSTAs displayed the most similarity to the observed “southern flood and northern drought” over Eastern China. It was revealed that the global-scale and North Pacific SSTAs influenced the rainfall over Eastern China via modulating the EASM. The related simulations successfully reproduced the associated atmospheric circulation anomalies. The experiment driven by Indian Ocean SSTAs could also reproduce the similar precipitation anomaly pattern, and suggested that the Indian Ocean exerted pronounced influence on the North Pacific Subtropical High. Additionally, the simulations forced by SSTAs in the North Atlantic and Equatorial Pacific successfully reproduced the northern drought but failed to capture southern flood. The simulations suggested that precipitation anomaly over Eastern China in summer 2014 was a comprehensive effect of global SSTAs and the dominant contribution to the “southern flood and northern drought” pattern came from the North Pacific and Indian Ocean.