

Spatial pattern of inter-decadal variation of summer precipitation in Eastern China: Comparison of observation with CESM control simulation

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Using observed summer precipitation data from 403 sites during 1960 to 2014, and a 1100-year simulation of the Community Earth System Model (CESM) with fixed pre-industrial external forcing, the dominant patterns of inter-decadal variation of summer (June-August) precipitation over eastern China were analyzed with the EOF and Power Spectrum. The EOF analysis on observed and simulated data both shows that the dominant patterns of inter-decadal variation of summer precipitation over eastern China are a dipole pattern with the Huaihe River as divide and a pattern of multi-zonal rain bands. Comparison between observation and simulation demonstrate that the CESM with the fixed external forcing reproduced well the spatial patterns, the temporal alternations of phases, and the changing of circulation background of inter-decadal variation of summer precipitation over eastern China during 1960 to 2014. This finding provides an important basis for identifying the main causes of regional inter-decadal precipitation anomalies and analyzing the influences of external forcing and internal variations on inter-decadal variation of precipitation in China.

Key words: Eastern China, Summer precipitation, Inter-decadal Variability, Spatial Pattern, Simulation