

Persistence and the change of Baiu precipitation anomalies

Tsuyoshi Yamaura^{1*}, Tomohiko Tomita²

¹RIKEN Advanced Institute for Computational Science, ²Graduate School of Science and Technology, Kumamoto University

This work examines the persistence and the change of interannual Baiu precipitation anomalies during the Baiu season from late May to middle July around Japan. Atmospheric circulations affecting the Baiu precipitation are abruptly changed around late June. In the former period, the sea surface temperature anomalies (SSTAs) in the western North Pacific (WNP) associated with the El Nino/Southern Oscillation (ENSO) mainly controls the Baiu precipitation anomalies through the Pacific-East Asia teleconnection. The atmospheric circulations are characterized by specific surface pressure anomalies induced by the Rossby wave response of the SSTAs, which persist for the former period. On the other hand, the covariability of the SSTAs in the WNP and in the tropical Indian Ocean (TIO) through the ENSO is crucial for the Baiu precipitation anomalies in the later period. Anomalous atmospheric circulations are established through the Kelvin wave response from the TIO to the WNP. This response controls the Baiu precipitation anomalies in the only later period because this response needs a peculiar timing with the seasonal northward migration of the North Pacific subtropical high. Thus, the interannual variations of the Baiu precipitation in these two periods have insignificantly spatiotemporal correlations. These results suggest that detailed monitoring of SSTAs in both the WNP and the TIO can improve the predictability of the Baiu precipitation in the entire Baiu season.

Keywords: Baiu front, ENSO, Indian Ocean, Western North Pacific, air-sea interaction