The Baiu frontal activity clearly shows spatiotemporal differences in its interannual variability. This work examines the physical mechanisms behind these differences. On interannual time scales, the Baiu front can be divided into three sub-regions: (1) the western Baiu (WB), (2) the central Baiu (CB), and (3) the eastern Baiu (EB). Time-series analysis revealed that the dominant periods in these three sub-regions are long eastward periods of approximately 2 years in the WB, 4 years in the CB, and 6 years in the EB.

The biennial oscillation of the Asian monsoon controls the interannual variation in the WB through specific meridional circulation in the western North Pacific, whereas the El Niño/Southern Oscillation forces the interannual variation in the CB through the Pacific–East Asian teleconnection. The interannual variation in the EB is controlled by mid-latitude atmospheric circulations, not by effects from the tropics. The summertime North Atlantic Oscillation with a 6-year period excites the stationary Rossby waves, the energies of which reach Japan through the strong upper tropospheric westerlies over Eurasia. Geopotential height anomalies then appear around Japan with an equivalent barotropic structure that modifies the precipitation in the EB.