Climatological Relationships among the Tropical Cyclone Frequency, Duration, Intensity, and Activity Regions over the West Pacific

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Climatological relationships among the tropical cyclone (TC) frequency, duration, intensity and activity regions over the West Pacific are explored based on long-term best track data. It is found that highly frequent occurrence periods of TCs do not necessarily imply long TC duration in the same periods. Three types of relationships between the TC number and duration during 1945-2007 are identified in this study: low frequency and short duration during 1945-1955 (Period Ⅰ), high frequency but short duration in the 1960s (Period Ⅱ), high frequency and long duration in 1990s (Period Ⅲ). The TC activity regions are quite different among the above three periods. During Period Ⅰ, the main activity regions are over the ocean basin east to the Philippine Islands (120^0E-140^0E); During period Ⅱ, there are two prevailing storm tracks both extended west-northwestward between 110^0E-147^0E ; During period Ⅲ, TCs have relatively diverse activity regions extended from 110^0E-160^0E. Moreover, TC intensity is close related to the activity regions. Most of the strong TCs are developed over the ocean basin far away form the Philippine Islands with a northwestward track. The results also show that the relationships among the TC frequency, duration and their active regions are strong modulated by the broad-scale vertical motion, geopotential height and horizontal wind anomalies.