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Interdecadal Change of Typhoon Occurrence and Genesis Location over the Western North Pacific

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The number of typhoon (category 1-3) occurrence has decreased and its genesis location has moved northwestward during the peak typhoon season (July-November) in the western North Pacific (WNP) [0°-50°N, 100°-180°E] since the mid-1990s. The interdecadal change of the typhoon activity and its linkage with environmental conditions in the WNP are investigated during the period from 1979 to 2011. To show convincing evidence of the result in the present study considering the discrepancy of the best track datasets in the WNP, all of the available observed best track datasets in the WNP and the detection-produced best track dataset by using the MERRA reanalysis data were used. The detected dataset was reclassified, taking its underestimation into consideration. The number of typhoon which passes through the East China Sea and Japan has been increased due to the westward expansion of the western North Pacific subtropical high (WNPSH), enhancement of the southerly in the lower latitude, and increase of the relative humidity in the mid-level atmosphere. Although the underlying oceanic condition has been provided a favorable condition for the typhoon formation over the southeastern part of the WNP, the number of the typhoon occurrence has been decreased over that region since the mid-1990s. It is noted that the strong vertical wind shear over the southeastern part of the WNP has a dominant role in decreasing the typhoon occurrence based on the EOF analysis. The JTWC and IBTrACS are closely consistent in the number of the typhoon category 1, whereas they are relatively more inconsistent in the category 2 and 3. The variability of the typhoon category 1 occurrence approximately corresponds to that of the typhoon category 1-3 because the Typhoon categories 2 and 3 are negatively correlated with each other. Furthermore, the increase of the typhoon category 1 formation in August in the vicinity of Taiwan can be supported by the weakening vertical wind shear. Consequently, the vertical wind shear has had a significant role in the interdecadal change of typhoon occurrence and genesis location over the WNP since the mid-1990s.