

Multidecadal Variability of Tropical Cyclone Translation Speed over the Western North Pacific

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ABSTRACT

Tropical cyclone (TC) translation speed (TCS) over the western North Pacific (WNP) has experienced a long-term decreasing trend. To date, however, little is known about the multidecadal variability of TCS and its possible influence on this trend. This study investigated the multidecadal variability of the WNP TCS and the underlying physical mechanisms. Results show that the WNP TCS presents robust multidecadal variability during the past seven decades, which is dominated by the TCS over the extratropics. Further analysis shows that the Atlantic multidecadal oscillation (AMO) is responsible for the TCS multidecadal variability. AMO positive (negative) phases lead to favorable (unfavorable) large-scale environmental conditions for maintaining TCs over the extratropics, which results in longer (shorter) residence time for TCs having been accelerated by the midlatitude westerlies, thus, leading to higher (lower) TCS. The TCS phase shift strongly offsets its slowdown trend, leading to the inconsistent trends during past decades. This inconsistency may also relate to the influence of extratropical transitioned cyclones without being totally excluded. These cyclones may be inhomogeneously recorded due to the absence of satellite observation before the 1980s. Our results indicate that internal variation such as AMO may dominate TCS low-frequency variations over the past several decades. Previous studies have attributed the inconsistent trends of TCS during different subperiods to data inhomogeneity. This study shows that AMO can modulate the TCS trends in different subperiods with phase shift, thus providing new evidence for the recent controversial TCS slowdown.