

# Investigating the relationship between western North Pacific subtropical high and tropical cyclone activity

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Tropical cyclones (TCs) are natural hazards that impact ecosystems and human society especially in the western North Pacific (WNP), which is the most active region. TC activity in the WNP shows strong interannual variation and is affected by both atmospheric and oceanic environmental factors. This study focuses on the western North Pacific subtropical high (WNPSH) and investigates its effects on TC activity. The TC data is from the Joint Typhoon Warning Center (JTWC) best track data set, which provides 6-hourly TC locations. NCEP-DOE AMIP-II Reanalysis data is used to describe the WNPSH within the region  $0^{\circ} - 40^{\circ}$  N and  $90^{\circ} - 180^{\circ}$  E at a monthly time scale. The time period selected is from 1979 to 2020, corresponding to the earliest available data in the reanalysis and the latest available TC data from JTWC, respectively. Three indices are constructed: north-south (NS), west-east (WE), and total area (A). They describe the meridional and zonal extent of the WNPSH relative to the climatological mean. Monthly (JJASON) and seasonal (summer and autumn) analysis is done in the comparison of individual indices with mean cyclogenesis latitude and cyclone counts. A seasonal pattern is observed where both mean cyclogenesis latitude and cyclone counts increase during summer and decrease during autumn. Significant correlation between the A index and cyclone counts is observed at a monthly scale from June to September, and at a seasonal scale during summer. Significant correlation between the indices and mean cyclogenesis latitude is observed only during July and August. The results suggest that a larger extent of the WNPSH contributes to reduction of TC activity.

**Keywords:** tropical cyclone, cyclogenesis, subtropical high, index, western north pacific