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## Assessment on the wind hazard of tropical cyclones over the Northwest Pacific basin with parametric wind field model

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Strong winds over the sea surface induced by tropical cyclones (TCs) of Northwest Pacific (NWP) basin have been posing great threats to maritime activities, and quantitative assessment on its hazard intensity is of great importance. In the past, most studies focused on the modeling of winds over the land and areas of major island areas numerically or statistically. However, there is no systematic assessment of TC wind hazard over the NWP basin with long-term wind time series based on windfield modeling of historical TC events. In this study, the footprints of historical TC events during 1949~2019 were modeled based on the parametric models developed in previous studies, which simulate the winds of both gradient layer and planetary boundary layer. The historical TC track data were obtained from the China Meteorological Administration, and the wind records from the Global Telecommunication System (GTS) data were used for the calibration and validation of the models. The spatial resolution of the modeling output is 1km for winds over the sea surface. In order to reflect wind speed heterogeneity over the land of small islands, the wind speeds were modeled with 90-meter resolution by considering local terrain effects and roughness heights of islands, derived from 90m SRTM DEM data and 30m land-used data. Based on the simulated wind footprints of the 2384 TC events during 1949~2019, the relationships between wind intensity and frequency of each modeling pixel were analyzed and fitted with General Extreme Value (GEV) distribution. A series of wind hazard maps, including wind speeds for return periods of 5a, 10a, 20a, 50a and 100a, and the exceedance probabilities of wind scales from 10 to 17, etc were produced. These wind hazard maps are useful to the management of TC disaster risks in the NWP basin.