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# Improvement of Genesis Potential Index for Western North Pacific Tropical Cyclones

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The genesis potential (GP) indexes suggested by Emanuel and Nolan (2004) and Murakami and Wang (2010) are widely used, which simulate well the climate distribution of tropical cyclone (TC) genesis, but with a poor simulation of interannual variation of TC genesis. The previous GP indexes show an upward trend, which is different with the interdecadal variation of observation TC frequency. The reason is that previous studies focused on the construction of globally unified index. However, the conditions for the TC formation in the western North Pacific (WNP) are different from those in other regions, e.g. Atlantic Ocean. The TC genesis in the WNP is greatly affected by dynamic factors such as monsoon trough, but TC genesis in north Atlantic is greatly affected by sea surface temperature (SST) variation. Our study attempts to improve the GPI in the WNP by considering the important impact of relative vorticity on interannual variation of TC genesis. Based on the Best-track from Joint Typhoon Warning Center and NCEP/NCAR reanalysis data from 1979 to 2011, we substitute the absolute vorticity in previous GPI with a modified relative vorticity. The Coriolis factor is still remained. The difference of TC formation between the South China Sea (SCS) and the WNP is also taken into account and develop the GPI for the SCS (5˚-25˚N, 100˚-120˚E) and the WNP (5˚-40˚N, 120˚-180˚E) respectively. The modified GPI improve the simulation of the climate distribution of TC genesis. Moreover, the modified GPI much improve the simulation of the interannual variation of TC genesis, especially for the genesis of intense tropical cyclone, compared with the previous GPI.