

Tropical cyclone activity over the western North Pacific associated with Pacific–Japan teleconnection pattern and its impacts on extreme events over the Korean peninsula

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Abstract

The East Asia (EA) region including China, Taiwan, Japan, and Korea are especially vulnerable to hydrometeorological extremes during the boreal summer (June–September). This study, therefore, pursued an exploratory analysis to improve better understanding of the potential impacts of the two types of PJ patterns on WNP Tropical cyclone (TC) activities and TC-induced extreme moisture fluxes over Korea's five major river basins. This study shows that during positive PJ years, the large-scale atmospheric environments are more favorable for the TC activities than those in negative PJ years. During positive PJ year, it is found that there are weaker wind shear, stronger rising motion, as well as large relative humidity over the Korean peninsula (KP) compared to negative PJ years. As a result, TCs making landfall are more exhibited over the southeastern portions of South Korea. Despite the relatively modest sample size, we expect that insights and results presented here will be useful for developing a critical support system for the effective reduction and mitigation of TC-caused disasters, as well as for water supply management in coupled human and natural systems.

Keywords: Tropical cyclone, PJ index, summer precipitation, Korean peninsula

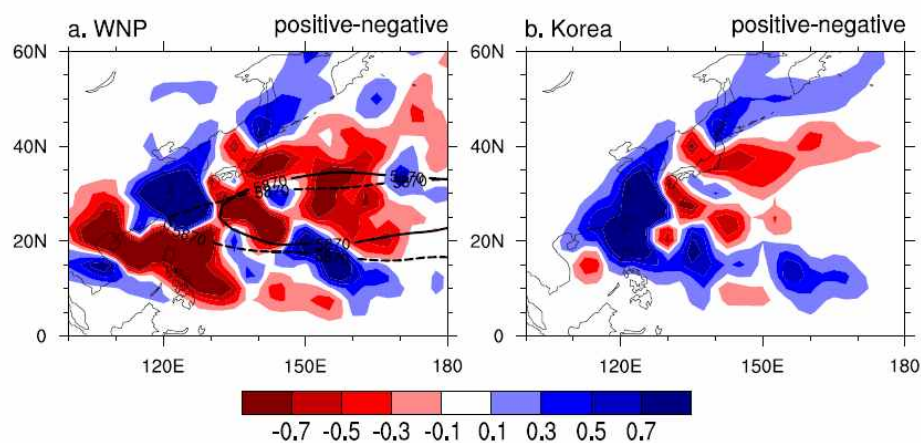


Figure. Difference of TC track between positive and negative PJ years for (a) TCs in the WNP and (b) TCs entering the Korean domain. TC track is calculated by counting the TC occurrence in each 2.5° by 2.5° grid.

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