

Seasonal Prediction of Western Pacific Typhoon Landfall Frequency using Tibetan Plateau Snow Cover

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There is a large negative correlation between the Tibetan Plateau snow cover (TPSC) from January to March (JFM) and the West North Pacific (WNP) typhoon landfall frequency (TLF) on China's east coast over the following June to December period. The effect of JFM TP-SC on WNP-TLF can be explained by the response of the West Pacific subtropical high pressure system (WPSH) to the land surface thermodynamic changes over the Tibetan Plateau. An increase in TP-SC is followed by a weak WPSH that is shifted to the southwest in July and to the northeast in August. As a result, during years of above normal TP-SC, WNP typhoons are confined mostly to the south of Taiwan, China, in July due to the more southern location of the WPSH, while mainly curving offshore in August due to the more easterly location of the WPSH. In contrast, in years of less TP-SC, a stronger WPSH develops which tends to steer more typhoons toward the coast of Mainland China. The observed seasonal lag correlation between the TP-SC and the WNP-TLF suggests that climatic signals communicate between seasons on interannual bases. It also provides forecasters with an opportunity for the seasonal prediction of WNP-TLF for Mainland China using the preceding JFM TP-SC.