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Recent Intensification of ENSO Impact on East Asian Climate in February

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ENSO has a key role in regulating the East Asian winter climate through its teleconnection, with the western North Pacific anomalous anticyclone (WNPAC). Here, we examine recent changes in the impact of ENSO-induced WNPAC on the East Asian climate using observations and present-climate based GFDL CM2.1 model. We find that the relationship between November–January (NDJ) ENSO and February East Asian climate has strengthened in recent decades for both precipitation and surface air temperature. Concurrently, the WNPAC has shifted and expanded northward, accompanied by poleward transports of moisture and moist static energy. During El Niño, both observations and the model indicate that the region of suppressed convection over the western Pacific shifts northward, consistent with a strengthened, poleward-extended WNPAC. We suggest that mean-state warming of the western North Pacific (WNP) has increased background convective sensitivity, facilitating stronger and more poleward ENSO-induced responses. These results imply that ENSO's wintertime impacts on East Asian climate may be amplified by WNP mean-state warming, with implications for seasonal predictability under the global warming.

Keywords: ENSO, Teleconnection, WNPAC, East Asia, Global warming