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Impacts on El Niño Flavors on Northern Hemisphere Wintertime Atmospheric Blocking in Reanalysis and Models

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Abstract

Atmospheric blocking is a synoptic-scale weather pattern often indicated as a positive geopotential height anomaly that blocks or diverts the eddy-driven jet stream from its climatological path. Blocking events are persistent, making them influential to extreme weather events, such as summertime heat waves or heavy precipitation and flooding. Prior studies of blocking response to interannual climate variability have found a mixed bag of responses to the warm phase of the El Niño–Southern Oscillation, El Niño, but none have considered the spatial diversity of El Niño. We first investigate the effects of Central Pacific (CP) and Eastern Pacific (EP) flavors of El Niño on the characteristics of wintertime (December-February) atmospheric blocking in 42 years (1979-2020) of the ERA5 reanalysis dataset. Blocks are identified from the geopotential height field at 500 hPa using a two-dimensional index. In the North Pacific, blocking frequency is almost completely reduced in EP years compared with the seasonal climatology, and blocks that do occur are significantly smaller and weaker in intensity. By contrast, the preferred region of blocking occurrence is shifted northeastward in CP years, while overall blocking frequency and characteristics in the Pacific sector are not significantly red

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