Influence of extra-tropical sea-level pressure variations on the longitudinal location of ENSO events.

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Previous research has shown that boreal winter El Niño/Southern Oscillation (ENSO) events are preceded by sea-level pressure (SLP) and wind-stress variations in the central tropical/extra-tropical North Pacific approximately twelve months earlier. The pattern of preceding SLPs is characteristic of the North Pacific Oscillation (NPO), such that negative (positive) boreal-winter SLP anomalies in the southern lobe of the NPO (NPO-S) can be significant predictors of El Niño (La Niña) events at lead times of around one year. Here we report evidence from observationally-constrained ocean data for the influence of these same preceding SLP anomalies upon the longitudinal location of the subsequent ENSO events. Using the Center of Heat Index (CHI) to determine the longitudinal position of both warm and cold events, we find that warm (cold) events which are preceded by significant negative (positive) boreal-winter NPO-S anomalies tend to be shifted approximately 10-degrees to the east (west) of their climatological position. For warm and cold events which are not preceded by significant boreal-winter NPO-S anomalies, the CHI is nearly identical and is centered at about 140°W. To confirm these results, we analyze 1000 years of pre-industrial control data from the latest version of the Community Climate System Model (CCSM4) and find that systematic differences in the median longitudinal location of warm and cold events is only apparent for those events that are preceded by significant boreal-winter NPO-S anomalies. In the presentation we will diagnose possible mechanisms for the longitudinal shift in ENSO events arising from the preceding boreal winter sea-level pressure and wind-stress variations, as well as how these same variations affect our ability to predict the "flavor" of the resulting ENSO events themselves.