Public Abstract

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Title:The Horizontal Redistribution of Anomalous Vertical Heat Fluxes at Tropical Latitudes

A study was conducted to improve quantitative understanding of how anomalous vertical heat fluxes associated with the El Niño-Southern Oscillation (ENSO) are transported poleward to maintain climate equilibrium. State-of-the-art atmospheric reanalysis output was used to quantify anomalous horizontal, tropospheric mean fluxes of sensible and latent heat monthly over a global domain during all ENSO events that occurred between January 1979 and June 2016. Results showed coherent spatial patterns ($p < 0.05$) of horizontal fluxes of latent heat connecting ENSO and Pacific North American (PNA) pattern regions implying potential to quantify the interrelationship between ENSO and PNA patterns. Spatial patterns of anomalous sensible heat fluxes showed anomalous circulation dipoles consistent with PNA and North Atlantic Oscillation (NAO) patterns. Results indicated a linear relationship between ENSO, PNA, and NAO patterns that was most apparent for the PNA (NAO) pattern during January (November). Strong ENSO forcing produced a more temporally consistent linear relationship between ENSO, PNA, and NAO patterns, but was shown to transition to a non-linear relationship during January of weak ENSO forcing. Results suggested the most substantial climate impacts occurred across North America during strong El Niño and weak La Niña events when the anomalous circulations were closest to the west coast of North America. Finally, the methods presented in this work provide a mechanism for monitoring ENSO related climate impacts for North America and Western Europe in near real-time.