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How linear is the ENSO Teleconnection to the North Pacific? The Role of ENSO Atmospheric Feedbacks for Rainfall in California

Daniela I.V. Domeisen (1), Tobias Bayr (2), and Christian Wengel (2)

(1) Institute for Atmospheric and Climate Science, ETH Zürich, Switzerland, (2) GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel, Maritime Meteorologie, Kiel, Germany (tbayr@geomar.de)

El Niño/Southern Oscillation has global teleconnections. Precipitation on the US East Coast, and in particular Southern California, is strongly dependent on ENSO variability in the tropical Pacific: More rainfall is expected during El Niño episodes, and reduced rainfall during La Niña. While this teleconnection is highly dependent on the location, timing, and strength of the sea surface temperature (SST) signal in the tropical Pacific, the associated nonlinearities are often not well represented in current climate models. Moreover, the location and strength of convection over the equatorial Pacific has been shown to be linked to the strength of atmospheric feedbacks in the tropical Pacific, i.e. the wind-SST feedback and the heat flux-SST feedback. The strength of the local atmospheric feedbacks is here shown to not only affecting tropical Pacific ENSO dynamics, but also the teleconnection to California: A strengthening of the atmospheric feedback tends to initiate a stronger wave train to California, bringing significantly higher rainfall. In addition to feedback strength, this study compares coupled and atmosphere-only models with observations in terms of the ENSO teleconnection to California.