

EGU24-21415, updated on 20 May 2024

<https://doi.org/10.5194/egusphere-egu24-21415>

EGU General Assembly 2024

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How closely related are the Interdecadal Pacific Oscillation and El Niño-Southern Oscillation?

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Sea surface temperature (SST) patterns in the Pacific Ocean cause climate variability in many parts of the world. This is due to the El Niño-Southern Oscillation (ENSO) on interannual timescales and the Interdecadal Pacific Oscillation (IPO) acting on decadal to interdecadal timescales, modifying ENSO teleconnections. However, how both ENSO, ENSO diversity and the IPO interact with each other still requires further clarification. In this study, we use observations of Pacific Ocean SSTs from 1920 to 2022 to explore the statistical relationships between decadal ENSO variability and the IPO. More specifically, we show how ENSO event characteristics of both central and eastern Pacific El Niño, as well as all La Niña events varies between their occurrence in warm (positive), compared to cool (negative) phases of the IPO. We further show that up to 60% of the variability in the IPO Tripole Index can be reconstructed by using simple ENSO metrics such as the relative frequency of El Niño and La Niña events. While statistically a clear relationship between ENSO and the IPO exists, some of the IPO's key features, especially North Pacific SSTs, cannot be explained by decadal ENSO variability.