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Principal modes and related frequencies of sea surface temperature variability in the Pacific coast of North America

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We examined monthly time-series (1950 to 1999) of sea surface temperature (SST) anomalies in 47 quadrants (2° 2°) along the Pacific coast of North America. Correlation, clustering and principal components analyses were applied to identify the spatial structure in coastal SST. The resulting modes and the individual series were investigated using spectral analysis to identify the most significant time-scales of variability, and the propagation of the main signals was explored by computing the wavenumber-frequency spectrum of each spatial mode. Results showed that coastal SST variability in the northeast Pacific conformed to three main geographical modes. A tropical mode extends from the equator to about the entrance to the Gulf of California. This mode appears related to two low frequency components of the El Niño-Southern Oscillation of about 3 and 5 years. The SST anomaly related to these signals propagates poleward, seemingly at low speeds (~ 0.08 m s^{-1}). A temperate (or transitional) mode, which includes the coastal areas along the California Current System, also shows the 5-year signal plus a decadal-scale component (periods between 10-17 years). Finally, a subarctic mode includes the coastal areas along the Gulf of Alaska and is dominated by the interdecadal variability that is characterized by the Pacific Decadal Oscillation.

Palabras clave: Eastern Pacific, transitional zone, Quasi-biennial Oscillation, El Niño-Southern Oscillation, Pacific Decadal Oscillation, decadal-scale variability

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