

ENSO and PDO effects on sea level changes in the current systems of North Pacific Ocean from satellite altimetry

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The most significant effects of climate variability on the North Pacific Ocean (NPO) are the interannual variability (El Niño –Southern Oscillation, ENSO) and Pacific Decadal Oscillation (PDO) phenomena. Both oscillations are related to ocean temperatures. In this study, the influences of thermal expansion/shrinking by both oscillations on the sea level changes in the different current systems in the North Pacific Ocean are investigated and discussed. Sea level anomaly data derived from satellite altimetry from 1993 to 2014 are used to analyze the variations of sea level change. The results show that 1) sea level rises in the regions of Kuroshio Extension, Oyashio Current, Alaska Current, and California Current during the El Niño and negative PDO phase, 2) sea level rises are not significant or even descend in all current systems during the La Niña and positive PDO phase, and 3) ENSO affects more significantly on sea level changes than PDO does in the North Pacific. These phenomena imply that the thermal expansion is a key factor to cause the sea level changes in these current systems.

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