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Satellite altimeter data of the past two decades are used to investigate the large-scale sea level and circulation changes in the North Pacific Ocean on decadal timescales. The variability has three centers of action: one in the tropical western Pacific of 2N~18N, the 2nd in the central subtropical gyre along the Subtropical Countercurrent (STCC; 18~30N), and the 3rd in the Kuroshio Extension (KE) region of 30~40N. While all changes in the three regions are induced by the PDO wind forcing, the ways the sea level and circulation respond in these three regions are dynamically different. In the tropical western Pacific, large regional sea level rise and the southward migration of the tropical-subtropical gyre boundary are caused by enhanced trade winds through the low-latitude manifestation of the PDO forcing. Along the STCC band, the PDO-related Ekman flux forcing alters the baroclinic vertical shear of the STCC, resulting in a clear decadal modulation in the regional eddy kinetic energy field. Decadal fluctuations in the KE system, on the other, are caused by the remote PDO forcing in the eastern North Pacific Ocean. Affected circulation changes include the path location, the surface jet intensity and stability, and the recirculation gyre.
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