Abstract View

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Midlatitude Sea Surface Temperature Anomalies: A Numerical Hindcast

Robert L. Haney

Department of Meteorology, Naval Postgraduate School, Monterey, CA 93943

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ABSTRACT

A multilevel primitive equation, ocean circulation model with surface layer physics is used to study the interannual variability of sea surface temperatures (SST) in the central midlatitude North Pacific Ocean. Results from a 10-year model simulation (hindcast) driven by observed winds are analyzed and compared with observations.

The hindcast SSTs exhibit a significant amount of nonseasonal variability despite being damped toward a regular annual cycle by the thermal boundary condition at the surface. This variability is due to the horizontal and vertical redistribution of heat by currants and by parameterized turbulence processes caused by the winds. The resulting hindcast SST anomalies are correlated with observed SST anomalies at a statistically significant level over a large part of the central midlatitude North Pacific Ocean. This suggests that wind forcing by itself, through the mechanisms noted before, makes an important contribution to the development of SST anomalies in this area. The hindcast and observed SST anomalies do not compare well in the northwest and in the southeast part of the midlatitude North Pacific, suggesting that local wind forcing by itself is relatively unimportant for SST anomaly generation in these locations.

Throughout the midlatitude North Pacific, however, the hindcast SST anomalies are only about one-third as intense as the observed anomalies. It is suggested that this discrepancy is due to the absence of forcing by anomalous surface heat fluxes in the model hindcast.