Oceanography and Atmospheric Sci. ▪ Meteorology

Seasonal Variability in the California Current, a Diecast Model Study

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Abstract: The high resolution DIECAST ocean model, with improved physics, is used to simulate the annual cycle of mesoscale variability in the California coastal region. Model improvements include reduced numerical dispersion, an annual cycle of climatological wind stress forcing enhanced in magnitude near the coastal headlands, and barotropic and baroclinic boundary inflows and outflows. A six year simulation produced results in general agreement with recent observations of the annual cycle in the California Current although the gradients of sea surface temperature and dynamic height are generally stronger, and show more structure than observed. The stronger gradients indicate increased coastal upwelling and produced faster geostrophic currents than observed. A region of maximum Eddy Kinetic Energy (EKE), originally formed in the upper ocean over the continental slope in late spring, migrates westward on a seasonal timescale consistent in magnitude and phase with observations. At the same, the EKE spreads vertically into the deep ocean, decreasing the surface EKE west of about 126 deg W. This result clearly identifies a non-dissipative process that can account for the pronounced decrease of EKE west of 126 deg W recently documented in the literature. Deficiencies in the simulation include some artificial influences from the incompletely open western boundary, an exaggerated response of the surface circulation to the **Mendocino** escarpment and the absence of a significant poleward surface current along the coast in winter.

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