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Effects of mesoscale processes on phytoplankton chlorophyll off Baja California

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[1] Using satellite sea surface height (SSH) and chlorophyll (CHL), the year 2000 is analyzed to characterize the effects of mesoscale circulation patterns on phytoplankton spatial variability in the California Current (CC) off Baja California. Satellite data are combined with and compared to in situ field measurements (chlorophyll-*a* and hydrographic variables) along vertical alongshore sections located ~130 km offshore between ~24.5° –33°N. Monthly average maps of SSH and surface geostrophic velocities depict the characteristics of mesoscale meanders and eddies, which correspond well with the subsurface hydrographic and velocity fields. Satellite-derived pigment (CHL) represent in situ fields in the upper 0–20 m (overall $r = 0.53$; $p < 0.05$), but their representation of peak values in Deep Chlorophyll Maxima (DCM) at ~50 m depth are inaccurate. DCM are traced in all three seasons (January–July), descending from near the surface (north of 31°N) to 50 m over a large extent of the transect to the south, approximately following the 24.7–25.1 isopycnals as they and the isotherms deepen to the south. In January, phytoplankton chlorophyll concentrations in the DCM are relatively uniform, originating during upwelling events that occur farther north, then following the equatorward flow of the CC. During April and July, the discrete maxima in the DCM occur at the centers of cyclonic meanders and the chlorophyll concentrations inside these maxima are enhanced as a result of local coastal upwelling off Baja California. Phytoplankton blooms created by coastal upwelling spread offshore and subduct along the 24.7–25.1 isopycnals, creating the DCM along the inner part of the meandering jet.

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