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Title: Towed vehicle observations of thin layer structure and a low-salinity intrusion in Northern Monterey Bay, CA

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Abstract

Thin phytoplankton layers are common features in the coastal environment; however sampling these fine-scale optical features across broad horizontal scales remains a challenge. To investigate the horizontal spatial structure of thin phytoplankton layers, we performed an overnight survey in northern Monterey Bay, CA, USA using a SeaSciences Acrobat towed-vehicle. Physical and optical measurements were collected between the surface and near-bottom-depths along four parallel, across-shore transects. Three coherent chlorophyll features were observed: (1) a broad, sub-surface patch at the offshore end, (2) a near-surface patch at the nearshore end, and (3) a deep patch located between the nearshore and offshore patches. The offshore and nearshore patch were separated by a change in seafloor slope and a region of compressed, shoaling isopycnals. Both the offshore and nearshore features were located at the pycnocline, had similar optical properties, and were co-located with a low-salinity intrusion. The deep chlorophyll patch had associated physical and optical properties that were distinct from the patches at the pycnocline. The results from this study further underscore the heterogeneous horizontal spatial structure of thin layers and also add to the growing evidence suggesting that low-salinity intrusions may be strongly linked to the formation of thin phytoplankton layers over the northern shelf of Monterey Bay.

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