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Monday, October 8
Oral Session 2
14:00–16:00

14:00–14:20

ENHANCEMENT OF OPTICAL ABSORPTION AND SCATTERING AND CHANGES IN PARTICLE SIZE DISTRIBUTION IN THE SEA-SURFACE MICROLAYER COMPARED TO UNDERLYING BULK SEAWATER

The sea-surface microlayer (SML) is a thin (< 1 mm) surface layer of the ocean forming the interfacial boundary between the oceanic waters and the atmosphere. Typically, the SML has physical, chemical, and biological properties that are distinctly different from the underlying bulk seawater. Few studies have reported on the measurements of optical properties of SML, and were limited to absorption in the UV and visible spectral regions. To our knowledge, light-scattering properties of SML and particle size distributions have not been previously measured. In this study we compare the measurements of light absorption, scattering, and particle size distribution (PSD) in the SML and underlying bulk waters in contrasting Pacific Ocean environments. The spectral absorption coefficients of dissolved and particulate matter were measured with high spectral resolution either within the visible spectral range (400-700 nm) or broader spectral range (300-850 nm). The volume scattering function was measured at 532 nm within forward scattering angles (up to ~14°) or within a broader angular range (up to ~150°). The characteristics of near-surface bulk water varied greatly among the investigated sites, for example the chlorophyll-a concentration ranged from about 0.06 mg m^{-3} in ocean waters off Hawaii Islands to 1 mg m^{-3} in the Santa Barbara Channel. Our observations also included prominent slick conditions associated with a bloom of Trichodesmium species. Significant enhancement of the optical properties and particle number concentration, including significant changes in the shape of PSD, were observed in the SML compared to underlying seawater at all investigated sites.

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