Variation in colloidal chromophoric dissolved organic matter in the Damariscotta Estuary, Maine

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ABSTRACT: The relationship between chromophoric dissolved organic matter (CDOM), colloidal DOM (.1 kDa), and phytoplankton biomass in marine waters of the Damariscotta estuary, Maine, was studied using flow field-flow fractionation (flow FFF). The goal was to determine whether temporal variability in CDOM in this region is due in part to rapid cycling of marine colloids. CDOM absorption of filtered (0.2 μm) seawater correlated positively with colloidal absorbance (r^2 = 0.772, p = 0.021). We observed changes in colloidal size spectra and CDOM optical properties associated with phytoplankton biomass. In particular, a significant positive correlation was found between the < 18 kDa colloidal fraction and chlorophyll *a* (Chl *a*) (r^2 = 0.819, p = 0.013). While we did not find significant relationships between Chl *a* and either CDOM absorption or the spectral slope of filtered seawater (r^2 and p values of 0.079, 0.590 and 0.111, 0.519, respectively), we did observe patterns of higher CDOM absorption and spectral slopes following periods of increased phytoplankton biomass. The spectral slope of colloidal material often was significantly lower than that of filtered seawater and normally varied significantly with colloidal size. These findings show that colloidal processes can contribute to CDOM optical signatures in coastal waters.