Characterizing Dissolved Organic Matter in Penobscot Bay, ME, in Relation to Weather Events

Dissolved Organic Matter (DOM) is fundamental to marine ecosystems, as it forms the foundation of marine ecosystems. Due to DOM's vital role in ecosystem health and function, small changes in the DOM pool can result in much larger changes to overall ecosystem dynamics. With storm intensity and frequency expected to increase with progressing climate change, it is pertinent to understand how DOM is reacting to current weather events in order to make predictions about its behavior under future conditions. This study identified DOM components present in a tidal estuary system in Penobscot Bay, ME, through water sample collection along a three station salinity transect over a 5-week study period. Samples were analyzed through EEM-PARAFAC analysis, which determined three unique components present in the system: two fulvic acid like components, and one aromatic protein. The relative abundance of each of these components were then analyzed in relation to precipitation (mm), river discharge (m^3 s^{-1}) rates of the adjacent Penobscot River, and physical parameters that were collected at each station (temperature, salinity, dissolved oxygen, etc.). DOM component 2 (C2) was identified as a terrestrially sourced fulvic-acid and shown to increase in abundance following a major precipitation event. Components 1 and 3 (C1 and C3) were identified as a general fulvic acid and tryptophan like component, respectively, and require more investigation to understand the drivers of their distribution and abundance within this system. This study concluded that C2 of the DOM pool in Penobscot Bay, ME, is increasing in response to precipitation events, while the abundance of other components are controlled by other factors.

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