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The influence of sea ice melt on phytoplankton spring bloom dynamics in Fram Strait. CONNER LESTER, UNCW — Springtime in Fram Strait is marked by intensive large-scale phytoplankton blooms that are crucially seeded and sustained by sea ice melt. While the close connection between sea ice melt and plankton blooms is well established, important open questions remain regarding the mechanistic relationships linking the release of meltwater and physical and chemical upper ocean variability to the growth, community composition, and carbon uptake of lower trophic levels. In this study, we examine satellite-derived sea ice and surface chl-a data, in concert with in situ measurements collected during an oceanographic cruise in May 2019, to quantify relationships between spatial and temporal characteristics of spring blooms and the sea ice cover. Satellite observations document a strong ice-edge bloom in May 2019, with maximum chl-a concentrations reaching near 10 mg m-3. High resolution ocean color and SST imagery from Landsat exhibit strong submesoscale activity at the ice edge, with eddies and fronts leading to strong gradients in surface properties. Sea ice edge conditions are marked by high variability, ranging from a packed, clearly defined ice edge, to diffusely spread ice floes and filament-like bands of sea ice. Comparison of satellite-derived chl-a concentrations with output from an idealized phytoplankton growth model forced by observed sea ice concentrations yields further insight into the relationships linking physical processes to biological response. Due to the hierarchical importance of phytoplankton blooms for a thriving ecosystem in Fram Strait, it is crucial to understand how their dynamics vary with the current and imminent variations in Arctic sea ice conditions.

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