Microbial responses to the release of DOC by sea ice and glacier melting in the East Greenland System

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Freshwater discharge around Greenland has more than doubled during the last decade. Understanding the associated physical and biogeochemical impacts in the ocean is of great importance for future predictions of ocean circulation, productivity and feedbacks within the Earth system. In summer 2019 we performed several cross-shore sections passing through the highly variable environments and physical regimes along the east Greenland coastline. Microbial communities showed distinct latitudinal and meridional distributions. Water mass characteristics played a major role in controlling the abundances of organisms with few groups appearing in significant numbers in coastal (colder and fresher) waters. Surface polar waters rich in dissolved organic carbon (DOC) flow south in the East Greenland Current maintaining a high DOC signal in inshore waters. Further optical analyses on the DOC fraction will determine what fractions of this material originate from long scale transport out of the Arctic. Of particular interest was an enhanced production of gel particles rich in carbon in an area extending across Denmark Strait, from close to Scoresby Sund to north of Iceland. Significant concentrations (e.g. 80 µg X.G. eq. L⁻¹) of these transparent exopolymer particles (TEP) were even found deeper than 100m, which is highly unusual. Given the role of TEP as a binding agent for sinking particles, enhancing the sinking of carbon in the water column, it is of interest to know why such a TEP hotspot arises. We hypothesize that it could be either related to circulation through the Strait or the timing of bloom dynamics in this region prior to our cruise. Our main conclusion from preliminary data analysis is that the east Greenland coastal system is highly dynamic with mixed properties reflecting various degrees of mixing between southward flowing Polar Water and warmer Atlantic water masses.