Dissolved Organic Matter Cycling at the West Antarctic Peninsula

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The Southern Ocean is critical for carbon and nutrient cycling, however, little is known about the processes controlling dissolved organic matter (DOM) cycling in this region. Marine DOM is an important carbon reservoir and sink for atmospheric CO_2, since it is similar in size to the atmospheric reservoir and can react on equivalent timescales. In the Southern Ocean, DOM is mostly introduced autochthonously by primary production in surface waters which is limited to a short period of time due to its high latitude. While it is known that DOM concentrations and microbial activity are comparatively low in the Southern Ocean, reasons behind this remain unclear. This makes it difficult to model Southern Ocean biogeochemical responses to ongoing changes in atmospheric CO_2 and climate. The West Antarctic Peninsula (WAP) is a biogeochemically important region of the Southern Ocean with a productive ecosystem. Since the 1950s, the WAP has been undergoing rapid climate change with increasing atmospheric and oceanic temperatures, widespread glacial retreat, and large reductions in sea-ice cover and duration. This study aims to characterise DOM cycling processes under these physical and the resultant biological changes.

Seawater samples from Rothera Research Station (UK) and the Palmer Antarctic LTER (US) annual research cruise are analysed for bulk C and N concentrations and N-isotopic composition of DOM to investigate seasonal and spatial variability. In combination with other ecological data available from both field campaigns (e.g. primary and microbial production, nutrients and physical parameters), processes driving DOM cycling are reconstructed. Initial results showing distinct variations in the C and N composition of DOM seasonally and spatially are presented and discussed in this poster.