



## **Seasonal variation of photochemical ammonium release in the northeastern North Sea**

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We present the results of a seasonal study of photochemical nitrogen release from dissolved organic matter (DOM) conducted at the Dove Marine Time Series site located ~5.5 nautical miles off Northeast England in the North Sea (55° 07'N, 01° 20'W). We collected 10 water samples for irradiation experiments at the time series site from February 2007 to May 2008, and an additional 3 inshore water samples on transects extending from Blyth Harbour, NE England, offshore. All samples showed significant ammonium photoproduction (82 nM/h; n=11), with highest rates in inshore waters (194 nM/h; n=8) and lower rates offshore (48 nM/h; n=3). At the time series site ammonium release rates were highest in winter and following the spring phytoplankton bloom, possibly reflecting seasonal changes in DOM levels and source. Samples were also analysed for DOC, DON, inorganic nutrients, chlorophyll a, and ancillary parameters (salinity, temperature and turbidity). Furthermore, spectral dissolved organic matter absorbance and fluorescence excitation-emission matrices were used to characterise the DOM source. We used a multidimensional decomposition technique (PARAFAC) to decompose excitation-emission matrices into independent spectral components, in order to study the effects of allochthonous (terrestrial) versus autochthonous (marine-derived) sources on the seasonal variations in ammonium photoproduction. We will discuss relationships between ammonium photoproduction, PARAFAC fluorescence components, spectral DOM absorbance and bulk DOM composition in the context of changes in freshwater inputs and coastal hydrography in the study region.