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Estimation of marine, sea ice and terrestrial contributions to the Western Arctic carbon cycle using Bayesian mixing models and GC-IRMS

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The Western Arctic Ocean is a unique part of the world's oceans, and is an area undergoing significant climate changes. The effects and possible climate feedbacks of these changes are not yet fully understood. Decreased sea ice cover could lead to increased productivity in the water column, or a reduction in total productivity through the loss of sea ice algal contributions. Climate change could also alter the patterns of terrestrial inputs from rivers and coastal erosion.
In order to better understand the balance of organic material inputs in the Western Arctic Ocean, elemental and isotopic compositions from 19 surface sediment samples and 7 cores from 4 shelf to basin transects in the Western Arctic Ocean will be presented as evidence of the sources of organic carbon buried in the sediments of the Chukchi and Alaskan Beaufort Seas.
Bulk δ13C and δ15N isotopic data will be combined with a Bayesian multi-source mixing model analysis to estimate proportional contributions of sea ice algae, water column phytoplankton and terrestrial organic matter. Results from the mixing model will then be corroborated through compound specific analysis of n-alkane biomarkers, enabling a more accurate picture of organic carbon supply to the Western Arctic Ocean to be constructed.