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Seasonal changes, spatial variability and origin of suspended organic matter in Hornsund, Spitsbergen

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Carbon stable isotope composition (δ13C) of suspended organic matter (SOM) was investigated to recognize temporal and spatial variability, as well as sources of particulate carbon delivered to the sediments of Hornsund fjord, Spitsbergen. Sampling was carried out between May 2015, when most of the investigated area was covered with sea-ice, and late August 2015. Samples were taken from a number of sites in central part of Hornsund, Burgerbukta, Samarinvegen and Brepolen bay in the innermost part of the fjord. One litre water volume, sampled from a range of depths between the water surface and 100 m, was filtered using GFF filters. δ13C values of the SOM were measured after acid treatment of the filters to remove carbonates. δ13C values of SOM varied both temporarily and spatially reflecting the variable sources of organic carbon, namely the marine production in situ, fresh marine organic carbon brought from the shelf with currents and "old" carbon delivered from land. The samples were most 13C-enriched (-22.4‰ in June, at the time of an intensive primary productivity within the fjord. Later, during the warm season, with the more intensive glaciers melting and thus supply of the suspended sediment load containing the old terrigenous carbon, δ13C values of SOM decreased in all the localities studied towards the carbon isotope values of the local terrestrial end-member, i.e. δ13C values of the old organic carbon in the bedrock. Change in δ13C values of SOM was also observed with increasing distance from glaciers, e.g. in front of the Samarinbreen and reflect changes in the intensity of primary production and supply of the old carbon.
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