

Importance of organic matter in mercury spatial distribution into Svalbard fjord sediments

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ABSTRACT

In the Arctic fjords of Svalbard, the increasing ablation and retreat of glaciers have accelerated sediment discharge of mineral, as well as fresh and ancient organic matter from land to fjord sediments. Consequently, the latter may contain significant concentrations of organic matter bound mercury (Hg). The present study revealed that the average of total mercury (THg; $52 \pm 15 \text{ ng g}^{-1}$) and total organic carbon (TOC; $17 \pm 5.5 \text{ mg g}^{-1}$) contents observed in the Hornsund surface sediments, where the rate of glaciers retreat and the length of calving fronts are the largest among Svalbard fjords, are significantly higher compared to surface sediments in Wijdefjorden ($30 \pm 15 \text{ ng g}^{-1}$ for THg and $12 \pm 5.4 \text{ mg g}^{-1}$ for TOC) and Dicksonfjorden ($18 \pm 7 \text{ ng g}^{-1}$ for THg and $6.4 \pm 3.4 \text{ mg g}^{-1}$ for TOC). In addition, a strong positive relationship between

THg and TOC concentrations indicates that Hg bound to organic matter is responsible for the spatial distribution of THg concentrations in the Svalbard fjord surface sediments. The transfer of mineral and organic matter to fjord sediments caused by the melting of glaciers is expected to accelerate the releases and transport of THg into the Arctic fjord ecosystems in the future.

Key words: Organic matter, Total mercury, Marine sediments, Glaciers, Fjords, Svalbard