

## Role of benthic fauna functional traits in iron cycling in two Icelandic Fjords

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Iron availability limits marine primary productivity in large parts of the ocean and CO<sub>2</sub> uptake in large parts of the ocean, including the North Atlantic. Lithogenic iron is an important iron source for the ocean and can be delivered via dust deposition or transitional systems such as estuaries, rivers and fjords. The activity of benthic fauna ("bioturbation") is known to promote benthic iron recycling in marine sediments and can be further divided into the up and downward transport of particles ("biomixing") and solutes ("bioirrigation"). The balance of these two processes controls the release of iron from the sediment and is ultimately determined by the faunal community present and their functional traits. The specific link of all these components however remains largely unquantified, preventing a reliable assessment of the role of benthic faunal communities in benthic iron cycling, the release of iron from the sediment and ultimately, the iron availability for marine primary productivity.

To address this we investigated the benthic iron cycle and faunal activity in two fjord systems from Iceland. Pore-water distributions of dissolved iron (Fe<sup>2+</sup>) and benthic iron mineralogy (FeS, FeS<sub>2</sub>, Fe-oxides) along a transect of each fjord were complemented by a quantitative assessment of the present faunal community and their functional traits. Despite their close geographical relation, both fjords differed distinctively in their present benthic faunal communities and sediment iron geochemistry. Preliminary results suggest more efficient iron cycling and less burial as Fe-sulfides in the fjord dominated by equally upward and downward conveying fauna, confirming the important role of bioturbators in benthic cycling.

### Keywords

Benthic Iron Cycling; Benthic Fauna; Bioturbation; Icelandic Fjords