

# Organic carbon storage and benthic consumption in sediments of northern fjords (60–80°N)

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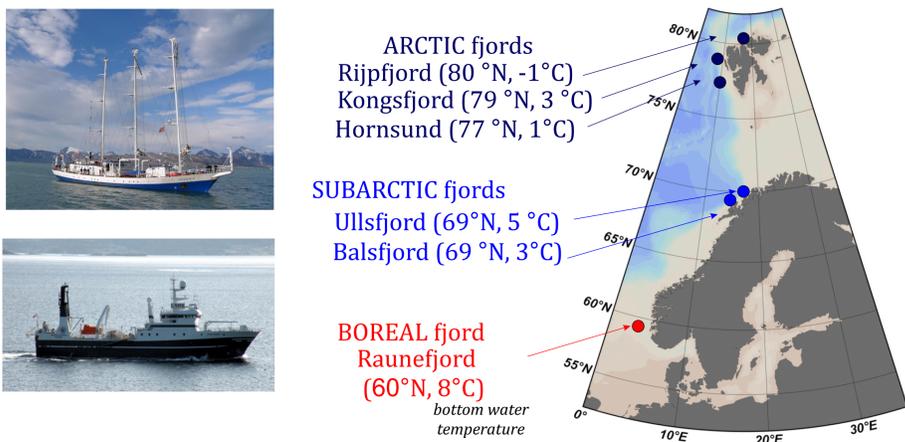
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## Introduction

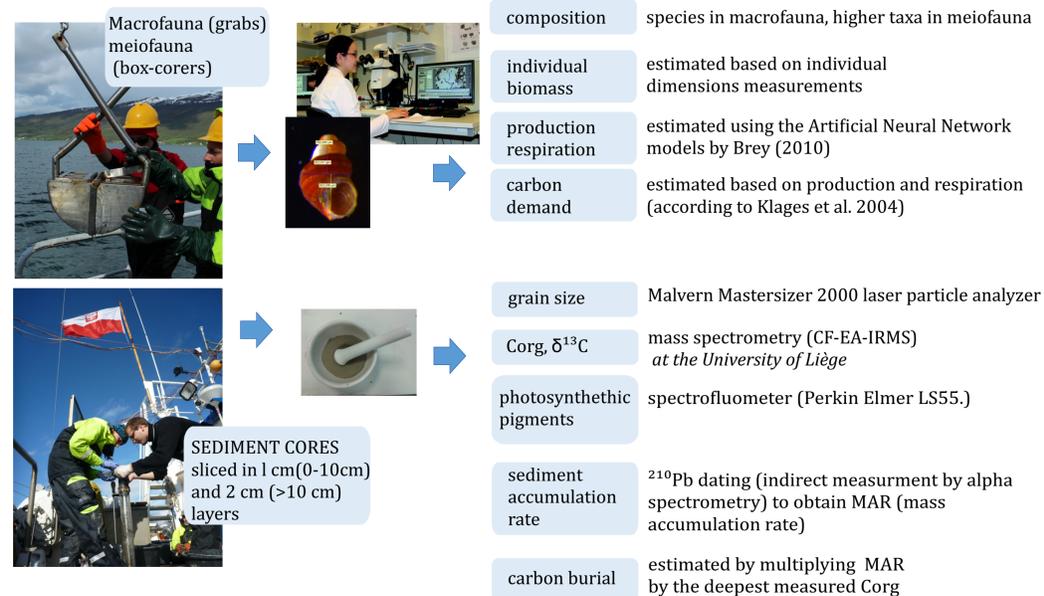
Fjords have been recently recognized as hotspots of organic carbon burial, with organic carbon burial rates one hundred times larger than the global ocean average, accounting for 11% of annual marine carbon burial globally [Smith RW et al. (2015) Nature Geoscience]. The organic carbon production and processing in coastal waters and sediments are controlled by environmental settings that are likely to be reshaped in the course of the global warming. The fastest and strongest changes are to occur in polar regions. In the present study we compare organic carbon stocks, accumulation and burial in six North Atlantic fjords located along the latitudinal thermal gradients from the southern Norway (60°N) to North of Svalbard (80°N).

## Sampling

Sampling in summer 2004 and 2015 from board r/v „Oceania” and r/v „Helmer Hansen” at 3-5 stations (depths 150-300 m) in 6 fjords - Arctic (Spitsbergen), subArctic (northern Norway), boreal (southern Norway).

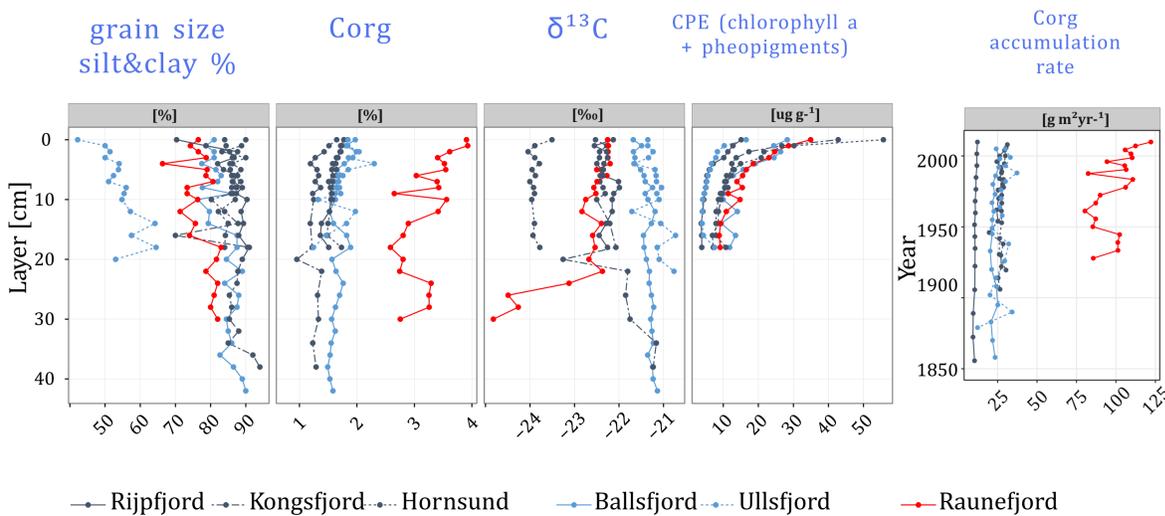


## Analyses



## Results

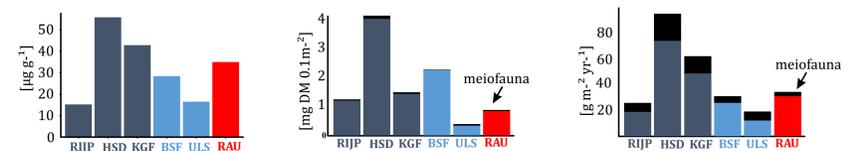
### SEDIMENTS



### CPE in 0-1 cm

### benthic biomass

### carbon demand



fjord	MAR [g m <sup>-2</sup> yr <sup>-1</sup> ]	average Corg (0-20cm) [%]	Corg benthic demand [g m <sup>-2</sup> yr <sup>-1</sup> ]	Corg burial rate [g m <sup>-2</sup> yr <sup>-1</sup> ]
Rijpfjord	689	1.6	26	10
Hornsund	1752	1.6	96	28
Kongsfjord	2059	1.3	63	26
Ullsfjord	1623	1.7	20	29
Ballsfjord	1330	1.7	29	17
<b>Raunefjord</b>	<b>3110</b>	<b>3.3</b>	<b>37</b>	<b>85</b>

No clear latitudinal patterns in carbon burial were documented. The highest organic carbon burial rates were noted in the southernmost fjord - Raunefjord. Organic carbon content in sediments and MAR in this fjord much exceeded that of all the other localities. The benthic metazoan (meiofauna and macrofauna) carbon consumption was correlated to food quality (photosynthetic pigments- indicators of fresh/labile organic matter) rather than to quantity (POC). The high organic carbon bulk and accumulation rates in Raunefjord were not compensated by the comparably large benthic carbon consumption that further supported very large levels of carbon burial in this fjord.