Marine sediment cores and sub-bottom profiles to constrain glacial erosion rates

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BACKGROUND

- **Sediments** produced by erosion play a fundamental role in Earth systems through their **influence on the global carbon cycle and marine and freshwater ecosystems**.
- This is **particularly pronounced in Arctic regions.**

RESEARCH QUESTIONS & GOALS

- **How will sediment delivery of the Greenland Ice Sheet change in the future due to climate change?**
- **What are the spatio-temporal patterns of sub- and periglacial sediment delivery in West-Greenland?**
  - → Quantify the link with controlling variables for glacial erosion and sediment transport
  - → Generate time series of sediment export volumes

SUCCESS STORY

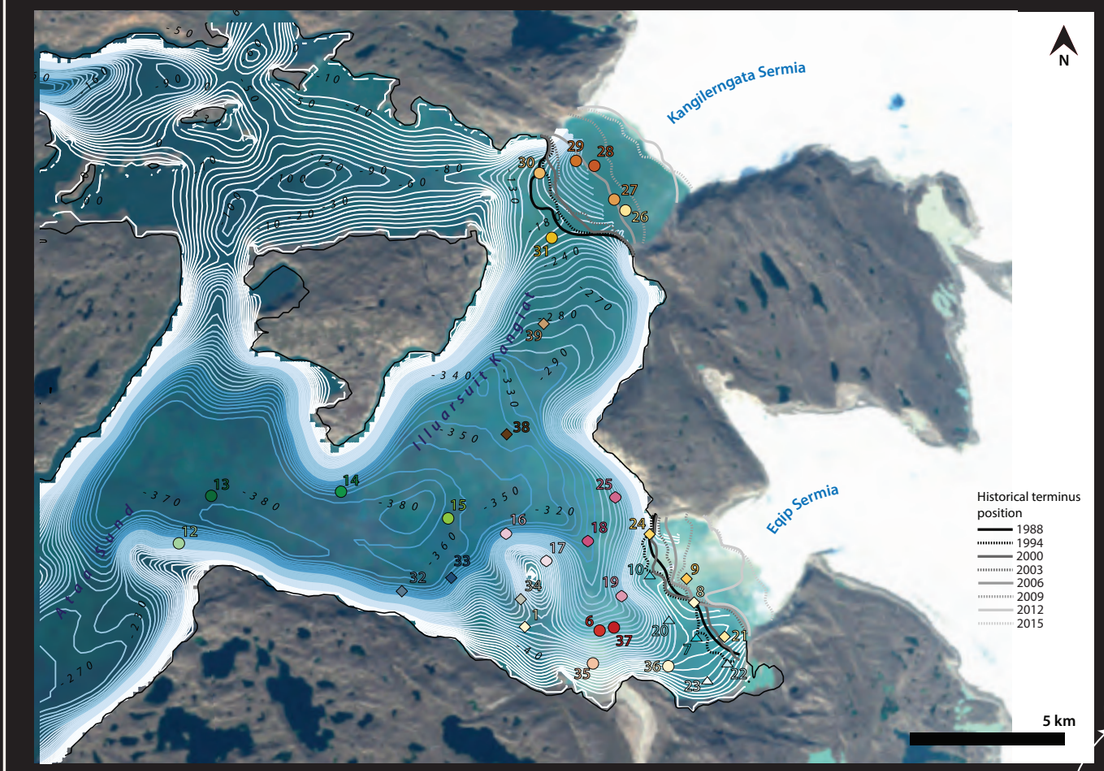

Figure 1: Locations of cores. Colourgroups and symbols indicate different geomorphic domains. Darker colours represent cores taken at deeper seafloor levels.

Although we faced multiple challenges (COVID-19 restrictions and linked with this, last minute decisions in gear acquisition, difficulties finding a boat and organizing a field trip with a fairly unexperienced team), **we successfully collected 39 sediment cores** in the bay that will be analyzed once lab access is again permitted.
Unfortunately, our sub-bottom profile data are not of high quality. Therefore a new field trip should be envisioned once possible.
First results show no turbidity events, but very different sediment delivery patterns for the two glaciers.

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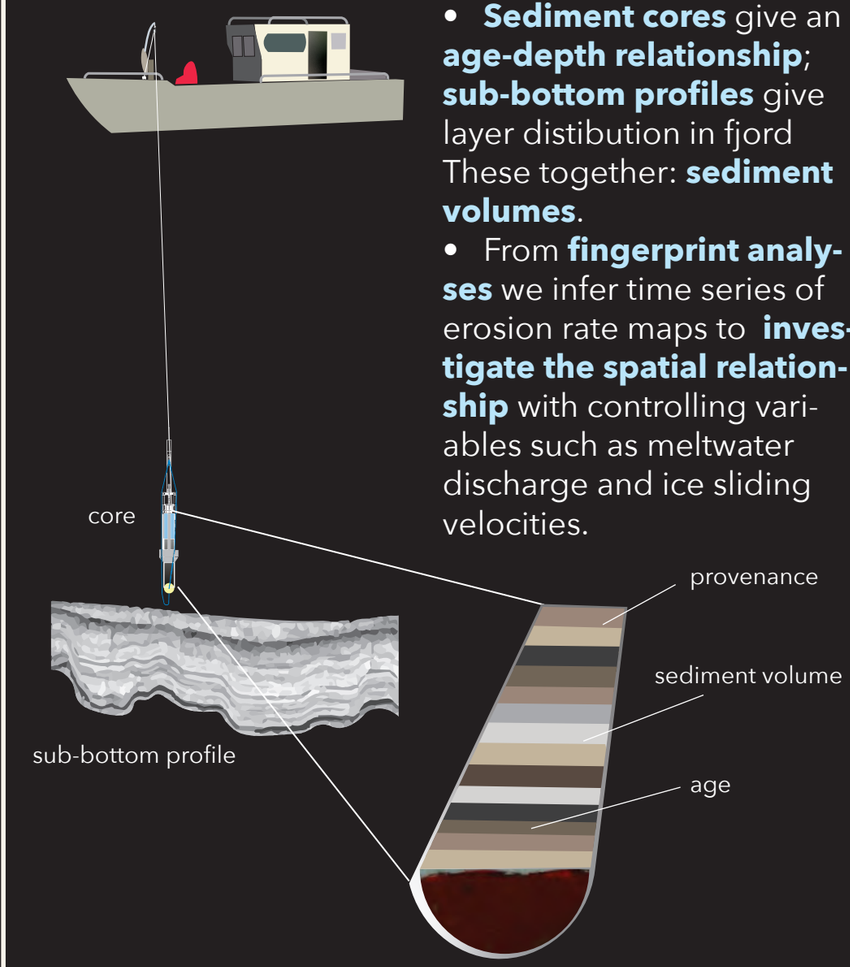
METHODS



- **Sediment cores** give an **age-depth relationship**; **sub-bottom profiles** give layer distibution in fjord These together: **sediment volumes**.
- From **fingerprint analyses** we infer time series of erosion rate maps to **investigate the spatial relationship** with controlling variables such as meltwater discharge and ice sliding velocities.

ARTISTIC PROJECT

For our artistic project with writer **Gianna Molinari** and visual artist **Christoph Oeschger**, centered around the **changing image of the Arctic**, we collected words and analogue material.
The **words** form the base of our **illustrated lexicon** in which we interpret important terms from our respective fields. The **collected material** is brought together in our **Research Catalogue** that serves as a common ground and source of inspiration for all the members.