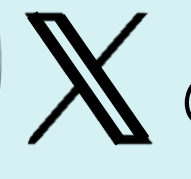


A multi-proxy approach to study productivity and carbon burial at the North Sea-Atlantic gateway

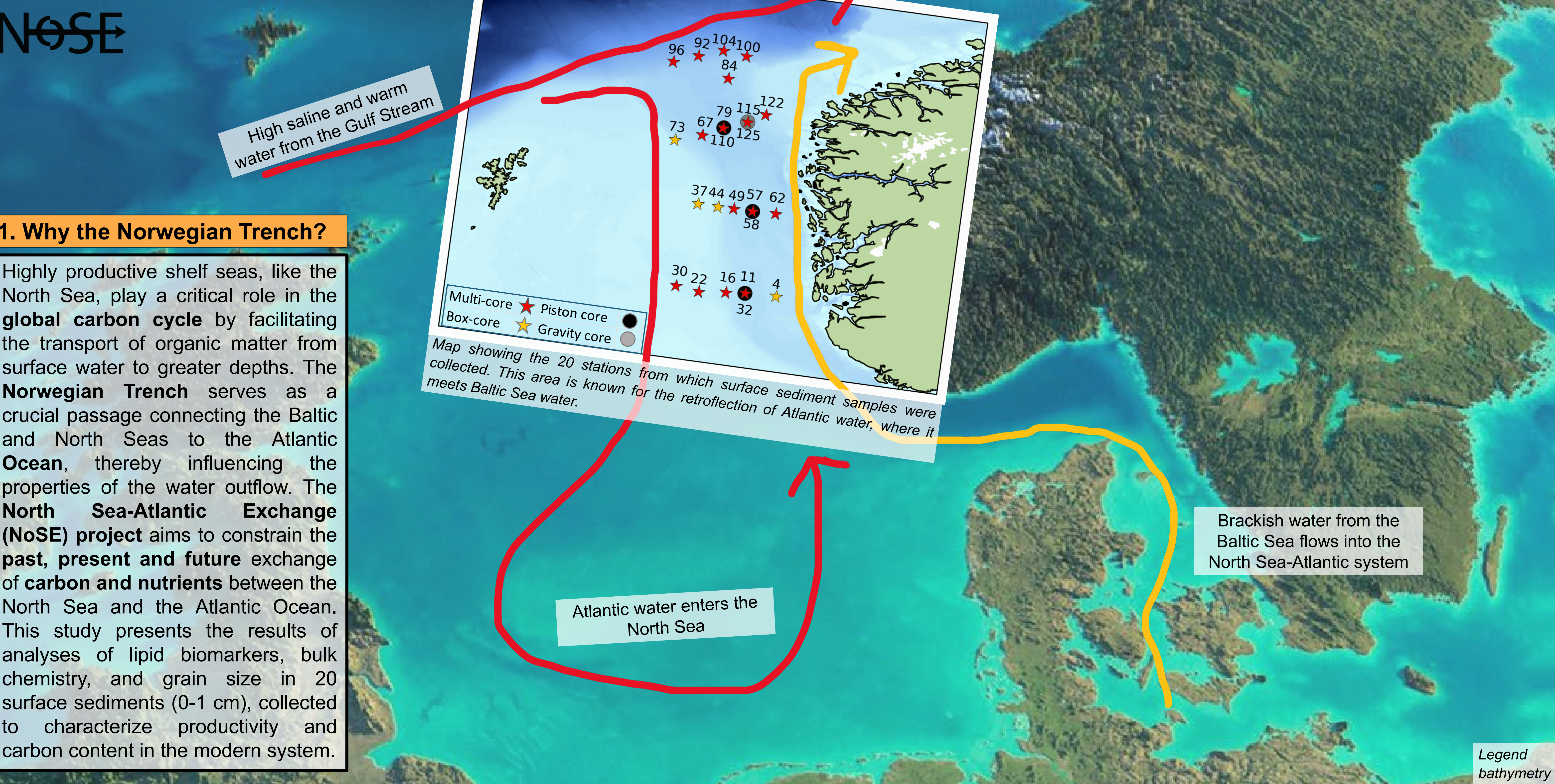
Cecile Hilgen¹, Rick Hennekam², Marcel van der Meer³, Gert-Jan Reichart^{1,2}, and Francesca Sangiorgi¹

¹Department of Earth Sciences, Utrecht University, 3584 CB Utrecht, the Netherlands
²Department of Ocean Systems, NIOZ Royal Netherlands Institute for Sea Research
³Department of Marine Microbiology & Biogeochemistry, NIOZ Royal Netherlands Institute for Sea Research



@CecileHilgen

c.s.hilgen@uu.nl



1. Why the Norwegian Trench?

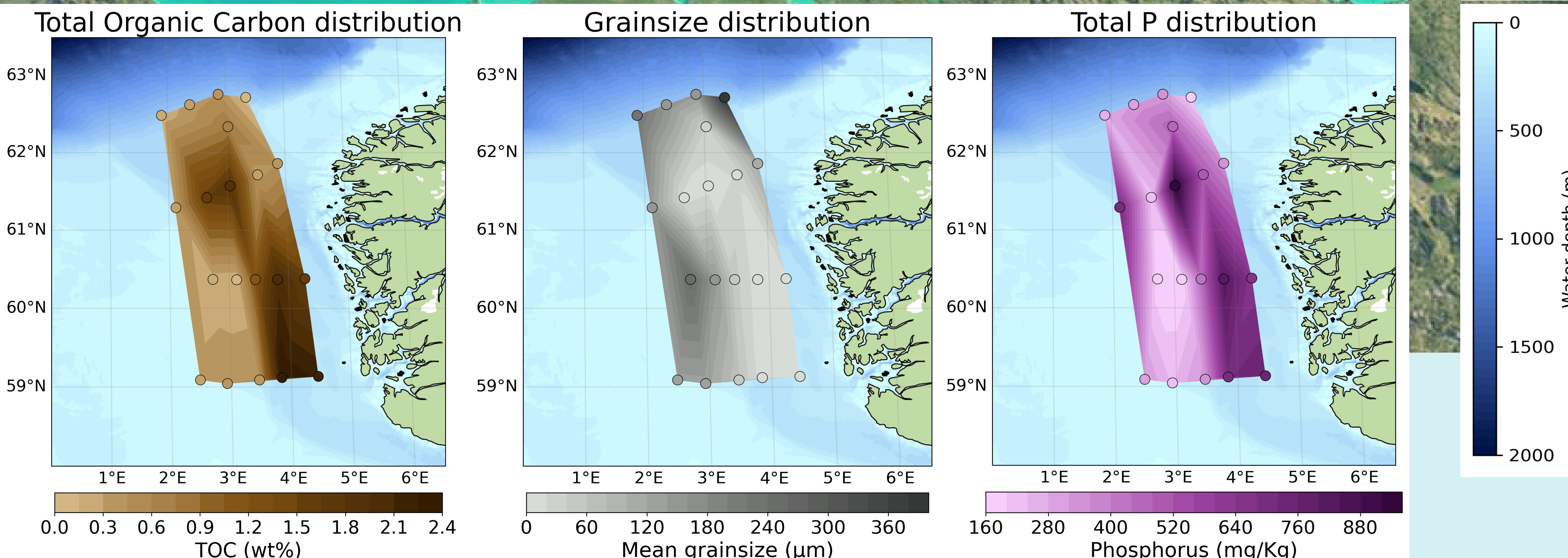
Highly productive shelf seas, like the North Sea, play a critical role in the **global carbon cycle** by facilitating the transport of organic matter from surface water to greater depths. The **Norwegian Trench** serves as a crucial passage connecting the Baltic and North Seas to the Atlantic Ocean, thereby influencing the properties of the water outflow. The **North Sea-Atlantic Exchange (NoSE)** project aims to constrain the **past, present and future exchange of carbon and nutrients** between the North Sea and the Atlantic Ocean. This study presents the results of analyses of lipid biomarkers, bulk chemistry, and grain size in 20 surface sediments (0-1 cm), collected to characterize productivity and carbon content in the modern system.

2. Multi-proxy approach

The surface sediments that preserve an **integrated (multi)annual and depth signal** over time show a strong marine carbon signature indicative of a full-marine setting.

The Norwegian Trench:

- Productivity, as indicated by four main marine primary producer groups, is higher in the middle of the trench and along the southernmost transect
- TOC (%) and Total P are higher
- The grain size with CaCO_3 & C_{org} removed is relatively small





This is the most dominant dinoflagellate cyst in all assemblages, comprising up to 50-70% *Operculodinium centrocarpum*.



20 µm

Take home message

Our findings show a dominance of marine organic matter with **minimal spatial variation** in the Norwegian Trench. The surface sediment provides a good representation of the modern water conditions, making it a **promising site for paleoclimate research**.



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3. Outlook

By applying this modern calibration dataset to down-core records, we will determine **the natural versus anthropogenic-mediated carbon burial over time**. We target the Holocene at centennial to millennial resolution and focus on the last 1000 year to establish baseline variations in **productivity, nutrient levels, and hydrological conditions**. This assessment will help understand the sensitivity of the North Sea-Atlantic system to recent global warming.

If you want to read more about my research or curious for footage of the NoSE 23 expedition? Please read the following article in the Trouw (Dutch) and/or go to my travel blog





Interview Bodemloven
In de bodem van de Noordzee ligt een schat aan klimaatkennis

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