Understanding the paleogeographic evolution of the North Axial Channel, Southern North Sea

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During the last 500 000 years, ice sheets occupied parts of the North Sea during three major glaciations (Graham *et al.*, 2011). The existence of these ice sheets was accompanied by a large fall in sea level, causing the Southern North Sea to emerge and become isolated from the Atlantic Ocean (Böse *et al.*, 2012; Graham *et al.*, 2011). In this area a complex drainage system was created by river water of the West- European rivers (e.g., Thames, Rhine, Meuse and Scheldt) and glacial meltwater during periods of low sea level (Gibbard 1995, Hijma *et al.*, 2012). Furthermore, most offshore studies support the idea of the formation of large proglacial lakes in front of these ice sheets, which may have caused high-magnitude outburst floods at the end of each glacial period (Gibbard and Cohen, 2015). The existence of such a proglacial lake is used in the argument that glacial outburst floods during the Elsterian (500-450 ka) created erosional features still preserved nowadays in the Dover Strait (Collier *et al.*, 2015; Gupta et el., 2007). A remnant of this large, complex fluvial and glacial drainage system is the (North) Axial Channel, a prominent geomorphological feature seen on the present-day sea floor of the Southern North Sea. Its formation and evolution are still uncertain (e.g. Garcia-Moreno, 2017; Hijma *et al.*, 2012; Liu *et al.*, 1992). Currently, only a relative chronology of potential erosional events has been established, which are subject to large uncertainties (Garcia-Moreno, 2017). Understanding the paleogeographic changes that affected the region also increases the knowledge on how early humans may have settled in and/or migrated through the region (Gaffney *et al.*, 2007).

In the framework of the WALDO project ("**W**here are **A**ll the (proglacial) **L**ake se**D**iments in the N**O**rth Sea Basin?"), a survey has been conducted in October 2023 during which high-resolution geophysical data (multibeam bathymetry and backscatter, acoustic and seismic data) combined with ground-truth data (vibrocores) have been acquired. One of the reflection-seismic grids was conducted ~40 km east of the East of England coast, over the western edge of the North Axial Channel, where also four sediment cores were taken. Here, we present the first interpretation of these new data, which allow us to evaluate, update and improve the relative chronology of the formation of the (North) Axial Channel.

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Keywords
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