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# The palaeoceanographic history of the Celtic Sea since the last deglaciation and its potential for carbon storage

**Jacob Noble**[1], Alix Cage[1], Olivia Beavers[2], Bradley Sparks[1], Mark Furze[3], and James Scourse[4]
[1]Keele University, Whitby, United Kingdom of Great Britain – England, Scotland, Wales (x3v04@students.keele.ac.uk)
[2]The Potteries Museum & Art Gallery, Stoke-on-Trent, United Kingdom
[3]University Centre in Svalbard, Longyearbyen, Norway
[4]University of Exeter, Exeter, United Kingdom

Shelf seas account for around 10-30% of ocean productivity, 30-50% of inorganic carbon burial and up to 80% of organic carbon storage (Sharples et al., 2019); as such, shelf-sea sediments are a potential store of carbon and could play an important role in the 'blue' carbon cycle, and thus global climate. UK shelf-sea hydrography is dominated by seasonal stratification which drives productivity; however, stratification evolved with sea-level and tidal dynamic changes over the Holocene epoch on the UK shelf, and thus carbon stores will have changed over time. These shallow marine environments are typically seen as erosional environments and have therefore been somewhat overlooked in terms of palaeoenvironments with only a few studies from the UK continental shelf (e.g. Austin and Scourse, 1997). Here we use a core collected from the Celtic Deep, on the UK shelf, to explore environmental change, and the evolution of stratification in this setting and the potential role it plays in the global carbon cycle.

JC106-052PC, a 7.5m long marine sediment core, was recovered in 2018 at a water-depth of 116 m from the Celtic Deep (a relatively deep trough in the Celtic Sea between Britain and Ireland) as part of the BRITICE project. A radiocarbon date of 10,435 ±127 years cal BP at 4.1m suggests the core covers the Holocene epoch and preceding deglacial period. Preliminary multiproxy data from this expanded archive (ITRAX XRF, organic content, benthic foraminifera assemblages) points to changing environmental conditions and productivity potentially reflecting the evolution of seasonal stratification in the Celtic Sea over the Holocene. Work currently focuses on increasing the resolution of the benthic foraminifera record of JC106-052PC, extending the record into the deglacial period, and applying a benthic foraminifera transfer function approach to estimate sea-surface temperature of the Celtic Sea during the Holocene and deglacial period.

This study aims to increase our understanding of the shelf-sea dynamics and productivity of the Celtic Sea over the last deglacial to Holocene period. By elucidating the response of the Celtic Sea to changing sea level and oceanographic conditions, and its capacity to act as a carbon store, we can better understand the role of other shelf environments, potentially benefiting global studies of palaeoclimate and future climate change.