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### Scotland's forgotten carbon:

Smeaton, Craig; Austin, William EN; Davies, Althea; Howe, John; Baltzer, Agnes

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## **Sedimentary Carbon Stocks: A National Assessment of Scotland's Fjords.**

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Coastal sediments have been shown to be globally significant repositories for carbon (C) with an estimated 126.2 Tg of C being buried annually (Duarte et al. 2005). Though it is clear these areas are important for the long-term storage of C the actual quantity of C held within coastal sediment remains largely unaccounted for. The first step to understanding the role the coastal ocean plays in the global C cycle is to quantify the C held within these coastal sediments.

Of the different coastal environment fjords have been shown to be hotspots for C burial with approximately 11 % of the annual global marine carbon sequestration occurring within fjordic environments (Smith et al. 2015). Through the development of a joint geophysical and geochemical methodology we estimated that the sediment in a mid-latitude fjord holds  $26.9 \pm 0.5$  Mt of C (Smeaton et al., 2016), with these results suggesting that Scottish mid-latitude fjords could be a significant unaccounted store of C equivalent to their terrestrial counterparts (i.e. peatlands).

Through the application of the joint geophysical and geochemical methodology developed by Smeaton et al (2016) to a number of other mid-latitude fjords, we will create detailed estimations of the sedimentary C stored at these individual sites. Using these detailed C stock estimations in conjunction with upscaling techniques we will establish the first national estimation of fjordic sedimentary C stocks. The data produced will allow for the sedimentary C stocks to be compared to other national C stocks, such as the Scottish peatlands (Chapman et al. 2009) and forestry (Forestry Commission, 2016).

Alongside quantifying this large unaccounted for store of C in the coastal ocean this work also lays foundations for future work to understand the role of the coastal ocean in the global C cycle.

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