Geophysical Research Abstracts
Vol. 21, EGU2019-15015, 2019
EGU General Assembly 2019

Acoustic Backscatter, Improved Spatial Analysis and Quantification of Scotland's Marine Sedimentary Carbon Resources

Corallie Hunt (1), William Austin (1), Craig Smeaton (1), Rhys Cooper (2), Ian Davies (3), and John Baxter (4)

(1) University of St Andrews, Geography and Sustainable Development, St Andrews, United Kingdom (cah24@st-andrews.ac.uk), (2) British Geological Survey, The Lyell Centre, Edinburgh, United Kingdom, (3) Marine Scotland Science, Scottish Government, Marine Laboratory, Aberdeen, United Kingdom, (4) University of St Andrews, School of Biology, St Andrews, United Kingdom

The marine sedimentary environment is a long-term repository of sinking particulate matter, effectively burying carbon (C). In addition to marine-sourced C, coastal environments, including estuaries, wetlands, fjords and the continental shelf, receive large inputs of C from the terrestrial environment via surface run-off and riverine discharge. Scotland's fjords are natural sinks of terrestrial C due to their proximity to land and geomorphology, trapping settling sediments in over-deepened glacial basins before currents can transport them to the neighbouring shelf. We will use Loch Creran as a case-study to improve our spatial understanding of where this C is stored in the surficial sediments. A detailed sedimentary C-stock estimate showed that Loch Creran stores 4.8±0.7 Mt C, from combined marine and terrestrial sources (Smeaton et al., 2017). However, a recently completed multi-beam bathymetric (including backscatter) survey of Loch Creran suggests that the surficial sedimentary store is heterogeneous, implying a highly variable depositional environment and therefore C storage potential. Acoustic backscatter data can be used for seabed sediment mapping, while sediment type can influence the preservation of organic carbon. Using a new integrated approach, we attempt to combine acoustic backscatter, photographic and ground-truthing data to understand relationships between organic carbon and sediment to improve spatial mapping and quantify the variability of C storage in Loch Creran's sedimentary store. Over the next 50 years, the significance and value of sedimentary marine C as an important component of Scotland's natural capital is likely to be realised in terms of new management strategies for its protection and, potentially, in helping to meet Scotland's climate change mitigation targets.

Smeaton, C. et al. (2017) 'Scotland's forgotten carbon: a national assessment of mid-latitude fjord sedimentary carbon stocks', Biogeosciences, 14(24), pp. 5663–5674. doi: 10.5194/bg-14-5663-2017