



## **Fjordic Environments of Scotland: A National Inventory of Sedimentary Blue Carbon.**

Craig Smeaton (1), William Austin (1,2), Althea Davies (1), Agnes Baltzer (3), and John Howe (2)

(1) University of St-Andrews, Department of Geography & Sustainable Development, St-Andrews, United Kingdom (cs244@st-andrews.ac.uk), (2) Scottish Association for Marine Science, Scottish Marine Institute, Dunbeg, Oban, PA37 1QA, (3) Geolittomer, IGARUN, Université de Nantes, Campus du Tertre, BP 81227, 44312 Nantes, France

Coastal sediments potentially hold a significant store of carbon; yet there has been no comprehensive attempt to quantitatively determine the quantity of carbon in these stores. Using Scottish sea lochs (fjords) we have established a Holocene record of the quantity and type of carbon held within the sediment store of a typical Scottish sea loch.

Through the use of both seismic geophysics and geochemical measurements we have developed a methodology to make first-order estimations of the carbon held with the sediment of sea lochs. This methodology was applied to four sea lochs with differing geographical locations, catchments, freshwater inputs to produce the first sedimentary Blue Carbon estimates. The resulting carbon inventories show clearly that these sea lochs hold a significant store of sedimentary carbon; for example, Loch Sunart in Argyll stores an estimated  $26.88 \pm 0.52$  Mt C. A direct comparison of the organic carbon content per unit area suggest sea lochs have a greater OC storage potential between than Scottish peatlands on long, Holocene timescales (Loch Sunart =  $0.234$  Mt OC km<sup>-2</sup>; Peatland =  $0.093$  Mt OC km<sup>-2</sup> (Chapman et al. 2009).

The carbon values calculated for these sea lochs have been used to estimate the total carbon held within Scotland's 110 sea lochs and these up-scaled estimations are for the first time, reviewed in the context of Scotland's known terrestrial stores.

Chapman, S. J., Bell, J., Donnelly, D. and Lilly, A.: Carbon stocks in Scottish peatlands, *Soil Use Manag.*, 25(2), 105–112, doi:10.1111/j.1475-2743.2009.00219.x, 2009.