Exploring the Growing Role of Terrestrial Carbon Across North Atlantic Fjords

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Fjords are recognized as globally significant hotspots for the burial (Smith et al., 2015) and long-term storage (Smeaton et al., 2017) of marine and terrestrially derived organic carbon (OC). By trapping and locking away OC over geological timescales, fjord sediments provide a potentially important yet largely overlooked climate regulation service. The proximity of fjords to the terrestrial environment in combination with their geomorphology and hydrography results in the fjordic sediments being subsidized with organic carbon (OC) from the terrestrial environment. This terrestrial OC (OC\textsubscript{terr}) transferred to the marine environment has traditionally be considered lost to the atmosphere in the form of CO\textsubscript{2} in most carbon (C) accounting schemes yet globally it is estimated that 55\% of OC trapped in fjord sediments is derived from terrestrial sources (Cui et al., 2016). So is this terrestrial OC truly lost? Here, we estimate the quantity of OC\textsubscript{terr} held within North Atlantic fjords with the aim of better understanding the recent and long-term role of the terrestrial environment in the evolution of these globally significant sedimentary OC stores. By understanding this subsidy of OC from the terrestrial to the marine environment we can take the first steps in quantifying the terrestrial OC stored in fjords and the wider coastal marine environment.

