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## Source to Sea: Transport of organic carbon and iron from forested environments to coastal waters and sediments

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There is strong evidence that the source of terrestrial carbon and iron geochemistry play an important role in organic carbon transport and preservation in coastal and marine sediments<sup>1,2,3</sup>. There is a global drive to increase forestry and Scotland is undergoing a period of afforestation<sup>4</sup>. A portion of this is being planted in sea loch (fjord) catchments; however the effect of this increase in forestry on coastal carbon transport and storage is poorly understood. Fjord systems have recently been identified as significant terrestrial carbon stores<sup>5</sup> therefore understanding how afforestation of these catchments changes the carbon dynamics from source to sea, is key.

In this study Mossbauer spectroscopy, XRD and XRF are used to examine how iron concentration and speciation differs within Scottish fjord sediments. This preliminary data provides insight of the variation in iron speciation in fjord systems, processes controlling iron transport and speciation and potential mineral binding mechanisms in coastal sediments. This enables us to start addressing key knowledge gaps in the transport of organic carbon and iron from land (forested source areas) to sea (fjords). Thus, contributing to our overarching aim of tracing the movement and interactions of organic carbon across the terrestrial - aquatic interface.

Through this project, further analytical techniques such as biomarker analysis, isotopic analysis and SEM, will be used to improve our understanding of source to sea processes in fjord systems throughout the northern hemisphere. This will hopefully enable improved understanding and quantification of local and national carbon stocks. Further insights into carbon and iron burial mechanisms may allow us to tailor land use and management around fjord environments to maximise natural carbon storage.