



Influence of Disturbance on Sedimentary Carbon Stocks in a Temperate Seabed

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Shelf sea sediments are natural, long-term carbon sinks that may be managed for Blue Carbon (BC) storage to offset greenhouse gas emissions and contribute to nations 'Net Zero' ambitions. The Isle of Man in the Irish Sea has territorial waters equivalent to approximately 85% of its total jurisdiction, and significant potential for BC offsetting through seabed management. The Island's Government is developing a comprehensive BC management plan to maximise carbon sequestration and restore seabed biodiversity and wider ecosystem services. We determined the effects of disturbance on sedimentary carbon stocks and accumulation rates in the western territorial sea, a region of mud-dominated sediment with elevated disturbance from *Nephrops norvegicus* bioturbation and bottom-contact fishing activities. Sediment cores were collected from approximately 5 to 12 nautical miles off the west coast of the Isle of Man, at depths from 60 m to 120 m. The cores were sectioned and analysed using: elemental analysis and isotope ratio mass spectrometry to quantify organic and inorganic carbon stocks; and gamma-ray spectrometry and alpha spectrometry to identify and quantify radionuclides of Cs-137, Pb-210, Am-241 and Po-210 to determine sedimentation rates. Complete sediment cores were scanned using X-ray to generate radiographs and laminographs, to determine internal core structure and identify *N. norvegicus* burrows. The results show that organic/inorganic carbon and sedimentation rates in offshore sediments vary over time and space. Analysis is ongoing to ascertain if these variations are related to disturbance of the sedimentary system, using indicators of fishing intensities and *N. norvegicus* bioturbation. Results of this analysis will be presented to elucidate the effects of disturbance on sedimentary carbon stocks and accumulation.