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Carbon dioxide fluxes from an Irish saltmarsh

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Saltmarshes are important ecosystems for carbon capture and storage and play a vital role in carbon cycling processes. Despite their significance, the carbon fluxes within Irish saltmarshes remain poorly understood, with a notable absence of greenhouse gas flux data from coastal wetlands in the region. This study addresses this gap by employing the eddy covariance method to calculate carbon dioxide (CO_2) fluxes from Derrymore saltmarsh, County Kerry, a natural estuarine saltmarsh on the west coast of Ireland, from May 2023 to the present. The tower is equipped with an open path CO_2 and water vapour (H_2O) infrared gas analyser (LI-7500, LI-COR biosciences) and a sonic anemometer (CSAT3, Campbell Scientific) set 3.2m above the marsh surface. This method allows us to get continuous high frequency CO_2 and H_2O data with measurements being taken ten times per second.

Our findings reveal patterns in net ecosystem exchange (NEE), with higher values observed during autumn compared to summer months, attributed to reduced photosynthetic CO_2 uptake. These findings are comparable to saltmarshes in other regions. With a project duration of 12 months, our hypothesis suggests Derrymore saltmarsh will act as a modest CO_2 sink.

The use of the eddy covariance method allows us to get an overall picture as to the extent to which this saltmarsh acts as a carbon sink, giving us a better understanding of the carbon dynamics from this Kerry saltmarsh. This ongoing project contributes vital data to a broader initiative in Irish saltmarsh research, aiming to establish a scientific foundation for a comprehensive management framework. The framework will guide efforts in saltmarsh protection, restoration, and optimisation of carbon sequestration. Our research underscores the importance of understanding local variations in carbon dynamics, paving the way for informed environmental strategies in the context of climate change.