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Investigating carbon fluxes in a UK peatland

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The important role of northern peatlands in global carbon cycling is now widely acknowledged due to their large carbon stocks and the potential for the processes controlling these stores to be affected by environmental change. However uncertainties remain both with respect to the magnitude of the various flux pathways and their responses to key controlling environmental variables. We used a combination of eddy covariance and novel chamber techniques to intensively quantify and investigate components of the carbon cycle in a northern peatland in the UK. Eddy covariance has been used to quantify the net CO_2 flux at the landscape scale and techniques used to partition the flux into the two main components. To further understand the processes behind this net flux, we have also used chamber methods to measure the soil CO_2 flux at the plot scale within different vegetation patches. A soil collar depth experiment identified a close link between collar insertion depth, the amount of cut roots and lost soil CO_2 flux and questions the validity of some past measurements of fluxes in these ecosystems. We suggest that collar insertion excluded a large proportion of the autotrophic component of soil respiration, affecting both our understanding of the magnitude of the fluxes and their responses to environmental variables. We present soil CO_2 data collected using a novel multiplexed chamber system with high temporal resolution and use this to investigate relationships with temperature, soil moisture and photosynthetically active radiation. These data will contribute to a more complete understanding of the carbon budget of this upland peat catchment, where other fluvial carbon fluxes have already been quantified.