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Carbon stocks and carbon fluxes from a 10 year prescribed burning chronosequence on a UK blanket peat.

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Prescribed burning is a common land management technique in many areas of the UK uplands. However, concern has been expressed at the impact of this management practice on carbon stocks and fluxes found in the carbon rich peat soils that underlie many of these areas. Existing data shows a range of results at differing spatial and temporal scales for a range of carbon pathways e.g. dissolved organic carbon (DOC), yet there are limited studies that monitor a suite of parameters under burning management.

This study measured both carbon stocks and carbon fluxes from a chronosequence of prescribed burn sites in northern England. A range of carbon parameters were measured including: above-ground biomass and carbon stocks; net ecosystem exchange (NEE); ecosystem respiration (Reco); photosynthesis (Pg); and particulate organic carbon (POC). CO_2 data was analysed using ANOVA to investigate any significant differences between burn years. Carbon budgets were also calculated using measured and modelled data.

Analysis of the CO_2 data showed that burning was a significant factor in measured CO_2 readings but that other factors such as month of sampling explained a greater proportion of the variation in the data. Carbon budget results show that whilst all the sites were net sources of carbon, the most recent burns were smaller sources of carbon compared to the older burns (Burn year 2009: 85 $\pm$ 29 gC/m2/yr; Burn year 1999: 152 $\pm$ 12 gC/m2/yr). Additionally, the most recent burns were net sinks of gaseous CO_2.