Geophysical Research Abstracts
Vol. 13, EGU2011-2974, 2011
EGU General Assembly 2011

Carbon fluxes from a UK peatland disturbed by fire – results from a 10 year chronosequence

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The prescribed burning of vegetation on a regular cycle is a commonly used management technique in rural upland areas of the UK to enhance the productivity of the vegetation for livestock grazing and for the production of grouse of field sports. Many of the areas that are regularly burnt are underlain by carbon rich peats and organic rich soils. Therefore, there is great interest in how management by prescribed burning affects the important carbon stock found in the UK uplands.

There is already an expanding literature on prescribed burning's affects on carbon cycling in the UK peatlands. However, when investigating the complete carbon budget, existing research has either concentrated on measuring one aspect of the carbon budget or is limited in temporal range. By utilising a chronosequence of prescribed burn sites in Northumberland it is possible to carry out a time-space swop and allow a range of ages up to 10 years since burning to be investigated. Major carbon flux pathways (CO2, DOC, POC) along with water table and other water quality parameters were monitored on a monthly basis over a 15 month period.

Results of the 15-month monitoring programme suggest whilst some aspects of carbon cycling may change systematically over time (e.g. primary productivity is greater on recently burnt sites, and lower on older stands of vegetation) it appears that the greatest variation in carbon fluxes may lie between the individual burns. This could suggest that it is the nature of the fire and its intensity with which it burns on the day of the fire that affects the immediate burn severity and long-term ecosystem response, and consequently the carbon response.