EFFECTS OF CHANGING REDOX CONDITIONS ON THE PHENOLIC DISTRIBUTIONS AND CARBON CYCLING FROM BUTTERBURN FLOW BOG, UK.

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Introduction

Changes in water table regimes and vegetation inputs will impact on oxygen availability as well as the distributions and amounts of *Sphagnum*– and vascular plant–derived phenols. (Clymo, 1984; Abbott *et al*., 2013). This will in turn significantly influence the carbon storage capacity of peatlands (Freeman *et al.,* 2012). This study presents an exploration of the effects of water table fluctuations on redox conditions as well as the accumulation and degradation of phenols along a bog-fen gradient from Butterburn Flow, Cumbria UK.

Results

Water table fluctuations were monitored continuously at 4 sites along a bog-fen gradient over 12 months which allowed the identification of the unsaturated (oxygen rich), seasonally saturated and permanently saturated (oxygen depleted) layers within the peat. Both the dominant plant species as well as 4 x 1 m peat profiles were collected from Butterburn Flow. Samples from the cores were collected at 2 cm intervals, and both plants and peats were then solvent extracted. The insoluble peat residues were analysed using unlabelled and ^{13}C-labelled tetramethylammonium hydroxide (TMAH) thermochemolysis. This technique allows the identification of lignin, microbially altered lignin and non-lignin phenols. Peat core analysis showed significant increases in C_{org} content with increasing burial depth (Figure 1). Plant analysis confirmed the presence of *Sphagnum* biomarkers as well as abundant lignin phenols from the vascular plants. A further investigation into the chemical composition of the peat (Figure 1) was conducted to establish the extent of accumulation/degradation of these phenolics and the resulting effects upon the C_{org} content of the peat.

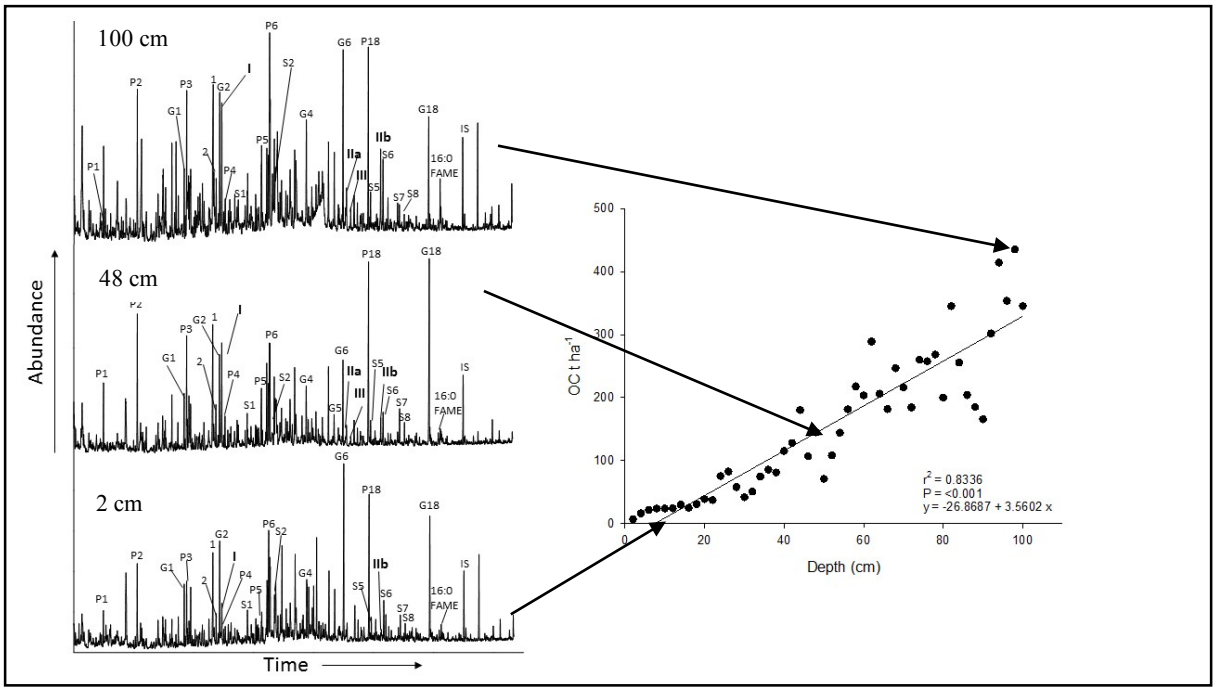

***Figure 1**. Three total ion chromatograms (left) exploring the chemical composition of the peat at different depths. Full core analysis shows significant increases in C_{org} content with increasing burial (right).*

References

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