Geophysical Research Abstracts
Vol. 14, EGU2012-337, 2012
EGU General Assembly 2012

Oxidative ratio (OR) of UK peats

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The oxidative ratio (OR) is the amount of CO_2 sequestered in the terrestrial biosphere for each mol of O_2 produced. The OR governs the effectiveness of a terrestrial biome to mitigate the impact of anthropogenic CO_2 emissions and it has been used to calculate the balance of terrestrial and oceanic carbon sinks across the globe. However, few studies have investigated the controls of the variability in OR. What factors affect OR – climate? Soil type? Vegetation type? N deposition? Land use? Land use change? Small shifts in OR could have important implications in the global partitioning of CO_2 between the atmosphere, biosphere, and oceans.

This study looks at peat soils (Histosols) from a series of sites representing a climatic transect across the UK. Duplicate peat cores were taken, along with samples of above-ground vegetation and litter, from sites in northern Scotland (Forsinard), southern Scotland (Auchencorth), northern England (Moor House; Thorne Moor) through the Welsh borders (Whixhall Moss) and Somerset levels (Westhay Moor) to Dartmoor and Bodmin Moor in the south west of England. Sub-samples of the cores were analysed for their CHNO concentrations using a Costech ECS 4010 Elemental combustion system. Using the method of Masiello et al. (2008), OR values could be calculated from these elemental concentrations.

Initial results show that OR values of UK peats varied between 0.94 and 1.1 with a median value of 1.05 which similar to the median value of World soils but the range is at the more reduced end. There was significant variation between peat cores, even between peat cores on the same site and the peat showed significant reduction in OR with depth in the core.