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Altitude or slope position - gaseous carbon cycling on UK blanket peat bogs

Simon Dixon (1), James Rowson (2), and Fred Worrall (1)

(1) Durham University, Earth Sciences, Durham, United Kingdom (s.d.dixon@durham.ac.uk), (2) Manchester Metropolitan University, Environmental and Geographical Sciences, Manchester, United Kingdom

Blanket peat accounts for 87% of Britain's total peatlands and represents one of the UK's largest terrestrial carbon stores. For peatlands to accumulate carbon the net ecosystem exchange of CO_2 (NEE) must be negative with respect to the atmosphere. Unlike many other peatlands, upland blanket peat bogs in the UK are draped across hillsides and so it could be that both altitude and slope position are significant controls upon the magnitude and direction of NEE.

The role that altitude and slope position play on NEE in upland blanket peat is poorly constrained on a local scale. Thus a hillslope transect was set up to measure how the gaseous exchange of CO_2 varies across altitude and with slope position. The slope-transect consisted of 4 sites, in the English Peak District, with three replicates per site. The transect spanned the entire margin of peat occurrence on the hillside, from the summit (447m ASL) to the lowest occurrence of peat at (378m ASL). The sites were positioned to sample each of the distinct points of the variation in slope from the flat top, to the point of slope steepening, to the point of slope leveling to the final flattening out of the slope. Each site was located in *Calluna vulgaris* of similar age and in the same growth phase (degenerate). Data were gathered for a year in order to sample a complete seasonal cycle.

The results of analysis by ANOVA showed that altitudinal effects were either not present or so small as to be masked by other effects. However both NER and GPP seemed to be linked to slope position. ANOVA and post hoc Tukey testing showed that only the site on the point of slope steepening was significantly different to the other sites with NER being 47% higher and GPP being 63% greater than the average of the other sites. But the elevated rates of GPP and NER cancelled each other out resulting in a non-significant 3% greater rate of overall NEE from the point of slope steepening. Another slope position effect observed was that of hill foot shading. This created markedly less variable readings than on the hill top sites, with the coefficients of variation being 70%, 40% and 36% greater on the hill top sites than hill foot sites for NEE, NER and GPP respectively. This suggests shading provides a more stable environment leading to more a spatially uniform gaseous carbon cycle within a single vegetation type.