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Biogeosciences Discussions

Interactive comment on "Vegetation structure and fire weather influence variation in burn severity and fuel consumption during peatland wildfires" *by* G. M. Davies et al.

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RESPONSE TO GENERAL COMMENTS

The authors are grateful to the referee for their positive and constructive review of our paper. We're glad they feel it makes a useful contribution and are particularly pleased they approved of our statistical analysis - that was something we put a lot of effort into getting right. The reviewer makes a general comment that they'd like to see us "do more" with the GLMM but we're not really sure what they mean here. The objective of the analysis was to partition variance across the spatial scales of our experiment rather than to model consumption - we do that (see equations 1 and 2) using a more

complete data set that includes information from a wider variety of burning conditions. We feel we do draw attention to the importance of within fire variation and discuss that at some length already.

RESPONSE TO SPECIFIC COMMENTS

In our response below we provide both the page and line numbering in the published BGD manuscript and that quoted by the reviewer (latter in brackets)

Page 15739, line 25 (Page 1, Line 25) "ancient carbon" - We have changed this to "stored carbon" in our revised version

Page 15745, line 26 (Page 7, line 26) Correlation analysis - We used Pearson's product-moment correlation. Most of the variables are approximately normally distributed except for the DMC but this is hard to judge properly given the small sample size and the fact that each fire has the same DC and DMC. We could use Spearman or Kendall rank-based correlations but the trade-off here is that exact P-values can't be calculated due to the tied ranks. In either case the overall conclusion is the same - there are statistically significant positive correlations between DMC/DC and pCBI. We have clarified we used Pearson's correlation.

Page 15746, line 5-6 (Page 8, line 5-6) GLMM analysis - The referee's comment that our analysis was conservative may stem from a misunderstanding of its objectives. Our aim was to partition variance in fuel consumption across the spatial scales of our experiment and to estimate the uncertainty associated with fuel consumption estimates. We have clarified this in our revised manuscript by redrafting the section to clearly state the analysis' objective at the outset.

The reviewer makes reference to us discussing "the impacts of Calluna and Sphagnum" and states that these aren't linked back to the GLMM. The relevant section of the discussion (page 15750, lines 6-28) was focused on the results of the GLMM and in particular on understanding the relevant importance of the different random factors in

our model. We have clarified on line 6 that the results relate to the GLMM. We do not explicitly test for an effect of vegetation type but do suggest this as a hypothesis to explain the variation in consumption we observe.

RESPONSE TO TECHNICAL COMMENTS

Page 15739, line 26 (Page 1, line 26) - Sentence already reads "equivalent to 25 % of global soil organic carbon stocks (Mitra et al. 2005) and 75 % of all atmospheric carbon". We think writing "equivalent to" a second time would be clumsy and that the meaning is already clear.

Page 15740, line 8(Page 2, line 8) "...far from being undisturbed..." - We have changed this to read "Temperate peatlands are also an important carbon store and habitat type but have a long history of disturbance and management"

Page 15742, line 19 (Page 4 line 19) - Well 45% of people recently voted for Scotland to leave the UK in our independence referendum, but maybe that's the answer to a different question! We describe the vegetation of sites in England and Scotland separately in the text. Both England and Scotland are part of the UK (for now). Table 1 describes which sites are in England and which in Scotland. We modified the paragraph to explain that all sites were in Britain and have removed reference to the UK (not the same thing) to avoid confusion

(Page 5 line 3) - We're not sure if there's a convention around the formatting of cited R package names either but have always used quote marks in the past

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Interactive comment on Biogeosciences Discuss., 12, 15737, 2015.