

Interactive comment on “Climate-related changes in peatland carbon accumulation during the last millennium” by D. J. Charman et al.

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A well-written and informative article. Paper describes an important aspect of carbon cycling in peatlands, viz. the interaction with climate, and comes up with the important conclusion that future climate may actually lead to greater, rather than lesser, carbon sequestration within existing peatlands. This is critical to the way in which we approach the management of peatlands as well as impacting upon models of future soil-climate interactions.

Specific comments

P14333 L25 (Fig 1) It could be argued that the detailed (high resolution) dataset is

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low on values from the drier/cooler areas while the less detailed (low resolution) set is over-represented by a large collection of Western Siberia data points. Any comment on likely impact of these biases?

RESPONSE: The distribution of sites included in our analyses is constrained by the current availability of peatland studies. The larger spatial gradient represented by the low resolution data was necessary to be able to establish the relationships shown in Figure 5 and it may well be that the large number of Siberian data points drive much of this relationship. This would be a good target for testing in future studies to check if the relationship observed in Siberia is also shown over other strong climate gradients. Our data support this, but a large dataset from other individual peatland regions is needed to test this idea more thoroughly. The bias in the high resolution work is perhaps less important because the sampling is over time rather than in space. We do not have a large enough dataset to determine whether there are spatial patterns in the MCA-LIA response but it is possible that these exist. Again, this would make a suitable testable hypothesis in further studies.

P14377 L5 It is difficult to be 100% clear on the exact procedure taken here; it really has to be taken on trust that this is appropriate.

RESPONSE: The different number of age models between sites arises because the amount of iterations to reach stable runs differed between sites. We resampled these with an equal number to avoid this biasing the compilation towards a few sites with a high number of MCMC iterations.

P14377 L27 Unclear as to what "step 4" is.

RESPONSE: Edited to clarify this is the same procedure as for the untransformed values

P14338 L27 Perhaps being fussy but better to say that Total C still relates to GDD0, rather than the other way round.

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RESPONSE: Text has now been changed

P14359 L17 Siberian (capitalised?)

RESPONSE: We have changed the capitalisation (in fact on page 14350).

P14359 L20 Germany

RESPONSE: Changed

P14353 L10 Canada

RESPONSE: Changed

P14356 Walton Moss appears to be in the North Sea according to the Long/Lat!
(Haven't checked all these locations)

RESPONSE: Thank you for this. We have corrected this location. We have also checked all of the other locations, and corrected one other minor error caused conversion to decimal degrees.

Figures: Some text is difficult (Figure 2) or impossible (Figure 4) to read. RESPONSE: We have redrawn figures with larger fonts for the revised version of the ms.

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