

Interactive  
Comment

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

### **Anonymous Referee #3**

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The ms presents an interesting dataset of changes in carbon accumulation rate in peatbogs over the last millennium. The present research fits the topic of BG. However in the text and the figures I have noted some points that need to be clarified before publication in BG.

Figure 1 – I don't understand the caption for panel b. Could you explain it better?

Figure 2 – The example is from the Misten Bog in Belgium. As several cores have been retrieved in this site (De Vleeschouwer et al., 2012; Allan et al., STOTEN, in press), you should precise the core number. Moreover the age model here is different than the published age model (see Figure 2, De Vleeschouwer et al., 2012). The difference is especially marked at ~40 cm with different curvatures in the two age-models. As the selected age-model has an impact on the estimated PAR, this point must be clarified.

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Section 2.4 – You should better explain why you define *1850 AD* as the limit to exclude the carbon accumulation rate in the uppermost peat.

Section 3.1 – In the text you precise that the strongest relationship between the carbon accumulation rate and climate is observed for the parameter PAR, with a  $R^2$  of 0.33 (Figure 5a).  $R^2$  is higher than for GDDO (0.19) but is this really significant? In the text you describe a weaker overall relationship between C accumulation rate and GDD. Indeed in the figure 5b the data may be clustered in two groups, the first one with rapid increase of C accumulation rate for GDD below 2 and the second one with limited increase of C accumulation rate but variable GDD between 1 and 4. Why do you not discuss those two trends that seem to be characterised by higher  $R^2$  than the whole dataset?

Section 3.2 – In the text you observe “an overall downward trend in the composite C accumulation rates from AD1000 to 1850”. This trend is not obvious at figure 6a. The values remain quite stable between AD1000 and 1650 and then start to decrease in the younger section (AD1650-1850). You could plot the C accumulate rate versus the modelled  $T^{\circ}$  to better evidence the data-climate relationship.

Section 3.4 – The estimated decline of C sink during LIA is very low (1 ppm) in regard with the error (2.41 ppm). You should insist on this in your conclusion.

References – All references listed are cited in the paper.

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Interactive comment on Biogeosciences Discuss., 9, 14327, 2012.

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