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Biogeosciences Discussions

Interactive comment on "Peat decomposition records in three pristine ombrotrophic bogs in southern Patagonia" *by* T. Broder et al.

Anonymous Referee #1

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Peat decomposition records in three pristine ombrotrophic bogs in southern Patagonia
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general comments This manuscript presents data on peat decomposition in three pristine ombrotrophic bogs in Patagonia. It is generally interesting and new material from the region that has not been so far very disturbed by human. Therefore, palaeoclimatic and autogenic explanation of the development of peatlands might be a good point but it is not explored in the text. The manuscript looks like a very technical study with sort of geochemical methods applied to estimate peat decomposition, with an uncertain approach to reconstruct climate on the basis of the analysed cores. This is important contribution that should be published, however some statements connected with palaeoclimatic reconstruction should be better balanced. The option is to make radio-

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carbon dating on the cores to make inferences more reliable or concentrate only on the mechanistic aspect of peat decomposition.

specific comments I find palaeoclimatic approach as very controversial here because of lack of dating. Therefore I find some interpretations too speculative. We also do not have plant macrofossils description therefore it is not sure if decomposition is connected with different plant potential of decomposition or environmental change. I think that aspect might be a very important topic of the study. There are some trivial statements connected with potential causes of the decomposition (Page 10555 line 17-18), that show uncertainty of authors on the data presented. Also, statements about climate are very speculative (Page 10555 lines 23-24). Did the authors considered also autogenic development of the peatland? I mean processes within the dynamics of the plant communities connected with the different vegetation patterns. It is also not clear how sea sprays influence decomposition – is this through the different vegetation that is adapted to this input?

It is rather obvious that in cannot be corrected here, but I would like to stress that such data (decomposition, geochemistry) should be always supported by the other proxies like pollen and plant macros to draw reliable palaeo conclusions. The title of the manuscript suggests that only decomposition is going to be explored but authors are trying to draw palaeoenvironmental conclusions without time axis. Consequently, all attempts of palaeoenvironmental inferences are based on the depth axis.

The stable isotopes results discussed in section “Decomposition and isotopic signatures of solid peat” might be biased as they were measured on the bulk peat where modern roots of vascular plant were also milled and measured. There are examples from the modern literature that it is better to used separated e.g. Sphagnum stems of know species to use this data to a potential quantitative reconstructions. This problem should be discussed in this and further parts of the manuscript.

Please, explain what you mean “genesis of the bog” (Page 10557 lines 19-20). The part

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Conclusions consists of several statements that are not based on the available data. Is there a sense to state that peat decomposition in Boreal peatlands was higher than in Patagonian peatlands? We would need a really detailed spatial data to make such a general conclusion! Furthermore, lack of a time scale does not give an opportunity to write that a process too place over time.

Interactive comment on Biogeosciences Discuss., 8, 10543, 2011.