

## ***Interactive comment on “A new dataset of soil Carbon and Nitrogen stocks and profiles from an instrumented Greenlandic fen designed to evaluate land-surface models” by Xavier Morel et al.***

**Anonymous Referee #8**

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Comments on the paper by Morel et al. This is an interesting and overall well written manuscript about the C reservoir in the Nuuk peat area, Greenland. There are some linguistic problems that need to be corrected, as already noted by the other reviewers, so I will not go into detail here. The most critical point of this paper relates to the very limited database. Only two transects have been sampled (n=135), only on one particular fan, which is actually quite small (as far as I can see, the sample area is only half a hectare, and the total size  $\ll 0.1 \text{ km}^2$  ??), and no attempt has been made to extrapolate these data for the whole peatland. The authors say that the whole study

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area is  $32 \text{ km}^2$ , but is this all peatland? The satellite image does not look like that but rather point to the small studied hotspot only. The editors will have to decide whether this is sufficient for ESSD, but in any case the authors should give a more detailed justification for the uniqueness of this peatland and the associated data, and how they think we may improve the global C estimates by adding data only from this particular site. Another critical point concerns gas flow measurements. I agree with the authors that there is little documentation on the combined gas flow and C-stock analyses in such fens. However, the authors do not present these gas flow measurements. To show them in combinations would have been a more valuable contribution to ESSD. Unfortunately, this well-sold aim of the introductory part is not taken up again in the present form. More information about the landscape is needed (morphological peat soil descriptions, underlying geology of the parent material, pH values of the surrounding area (if available) and information concerning the history of the peatland. It is quite shallow ( $< 1 \text{ m}$  at most parts of the transect). Why? Why do we need to consider such small peatlands in our global C-flow assessments?

Minor comments: The small size and depth of the peatlands should be mentioned in the summary. The introduction should also mention N The diameter of the corer is quite small (4 cm). Can you provide references that quantify the errors of the corresponding bulk density evaluations, and could you add these uncertainty ranges to your data in a way? I appreciate the criticism (page 5/6) that has been expressed regarding the bulk density measurements. But how have these problems been solved, if you just list them, it doesn't help. Tables 3-4 could be combined, they should also show bulk density and C/N values, and they should contain geo-referenced coordinates. Overall, I like this work and the way it is presented, but I wonder how representative is such a small area for peatland C fluxes in the world. If accepted, certainly more effort should be made to convince the reader that such a small peatland is unique enough to be included in ESSD rather than as a data paper in a more disciplinary journal.

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