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Earth System Science Data Discussions

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 #5

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I had the opportunity to review the manuscript entitled "A new dataset of soil carbon and nitrogen stocks and profiles from an instrumented Greenlandic fen designed to evaluate land-surface models" by More and collaborators. This study presents a dataset on soil carbon and nitrogen stocks on two transects in a monitored site for CO2 and CH4 fluxes in a Greenlandic fen. Thus, the authors suggest that the presented dataset could be include in models for C fluxes. I agree with the authors that this dataset will help to this end, but also could be relevant for other research objectives. I have some comments that might help to improve the manuscript. Main comments The authors

conducted two transects in Nuuk Research Station. However, it is not clear how these two transects were selected (based on previous information; topographically?) and with which objective (some plots are selected to close to the automatic chambers, but the others?). In P10, L31-32 only profiles from T1-0 to T1-20 are considered to be useful to be include in the models, why to sample other plots? This is not well justified. In line 24-25, the authors referred to GEM open access repository where data of the site is available. I would like to read a small description on what are the soil-related variables available in this database (e.g. soil temperature, chemistry?) and in which period/frequency. Because one of the main goals of the paper is to use the dataset for modelling purposes, this will help to spread the use of the dataset presented. Some statements need references (e.g. P2; L1; P2, L18; P2, L22; P2, L30; P4; L9, P4, L24 etc.). If the formatting of the journal allows, I suggest to merge results and discussion in only one section. This will make the text easy to follow. As it is now, both sections are mixed (e.g. references included in the results section). Also, the first section of the results P7 L1-L18 mostly belongs to Material and Methods section, please consider to move it there (or almost part of it). In the results section, there a lot of tables and figures but some data is not presented (e.g. water content and nitrogen stocks). It is only referred to the figure content e.g. P7, L6-7. Main results should be described in the text. I am particularly interested to see the description on nitrogen stocks since this was announced on the title of the paper. The manuscript presents some style issues: - use of capital letters is inconsistent through the text e.g. arctic (P1,L10)/Arctic (P,L25)- I prefer the second option; Nitrogen (title)/nitrogen-better the second option... ; Nuuk Research Station (P3, L18) vs Nuuk research station (P3,L25); Greenlandic (L4) should be capitalized - references should be cited at the end of the sentences (e.g. P3, L32) - abbreviations are not consistent along the text; e.g. carbon is referred as C (P1, L18) but hereafter appears as "C" or "carbon" - the use of one sentence as a paragraph is not usually advised (e.g. P7, L28-29; P8, L2-3; etc.), please check that through the manuscript

Minor comments - P1,L8 briefly provide a description of the transects - P1,L9 better

provide range of values for carbon density. - P2, 14-17 long sentence and difficult to understand. Please, rephrase - P2, L27 provide the name of acronyms for HWSD and NCSCD. - P3, L9 how does affect soil sampling to emissions measurement? Maybe provide more info on the methods and material section. - P3, L11 I am not sure how this paper validates the presented database, please rephrase. - P4, L1 particular - P5, L18 thanks for noting the potential shortcomings of the methods applied. - P5, L24 please provide a short summary of the method used (not only refer to the citation). - P7, L15 heterogeneity - P7,L15-L18 provide reference for "normalized distance from OMI". Also to help to understand this metric add something like "values greater than 100 represents depths below OMI" - P7, L30, tend to show - P8, L3, clarifyy what the proportions referred in Yu (2012) refer to (northern peatlands) - P8, L15-16 the authors exclusively attributed the high value to bad sampling. If so, I suggest to remove the value from the dataset. If not, provide alternative explanation. If not important, leave the value and not mention it - P8, L28-30 this corresponds to method section - P9; section 4.5 please refer figures and tables that the text refer to. - P10, L14; r2 refers to what type of relationship? (lineal?) - P10, 31-32 this sentence could easily be moved to the material and methods. I do not thing that is appropriate for a final sentence in the discussion since there is no justification of that, so I guess authors suggest that only because of the location of the plots...is that right? - P10 L17; "same order of magnitude"- "right" is a tricky work to be used in science - Consider to include appendix A in the material and methods - Figure 1. Please include the location of automatic chambers and other equipment of interested such as temperature probes. Also, the location of the fen on a Greenlandic map would help to geographically contextualize the study site. Also, consider to highlight the plots that might be useful to combine with C fluxes dataset (T1-0 to T1-20; according to P10 L32). - Table 1. An extra column stating if data is freely available. - Table 2: lowest decile; highest decile; C/N ratio (molar/weight ratio?) - Figure 5: C/N ratio (molar/weight ratio?) - Figure 8 red shaded area represents...

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