

Interactive comment on “Are researchers following best storage practices for measuring soil biochemical properties?” by Jennifer M. Rhymes et al.

Anonymous Referee #1

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In this short communication the authors address the lack of evidence-based recommendations for storage of soil samples and extracts prior to analysis of organic and inorganic carbon (C) and nitrogen (N) and microbial biomass C and N. Based on literature and an online survey, the authors demonstrate that samples and extracts are stored in a multitude of ways. They further provide a case study in which they demonstrate the effects of sample and extract storage on measurements of organic, inorganic and microbial C and N, further stressing the need for standardisation of protocols. The manuscript offers recommendations for sample and extract storage for the investigated methods, a flow-chart to guide researchers deciding on the most appropriate storage approach for their experiments and recommendations for reporting of the methods

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adopted for scientific publications. The results of the case study are a welcome reference for future research. In particular, the case study demonstrate that storage methods do not affect samples of different soil types (top vs subsoil) equally. This finding goes against the common assumption that storage affect all sample types similarly.

This short communication is relevant for the international science community, and fits well in the scope of SOIL. The introduction outlines the motivation of the objectives clearly, and the necessary details of the case study methodology and results are given in the supplementary material. The text is well written and pleasant to read. I have a few suggestions for corrections. Tables and figure are mostly supportive (particularly table 2). I have some suggestions to further clarify the text in tables 1 and 3. Also, I wonder whether the message the authors want to convey in section 4 with Table 4 isn't better served by integrating its information into the text. Lastly, I would ask the authors to consider including Fig S6 into the main text. I outline my general and minor comments in more detail below.

General comments The authors conducted an online survey and reflect on the outcome in L65 and further. Adding few lines about the nature of the survey and how representative the responses are would increase the value of its outcome in the authors argumentation. Also, inclusion of Figure S6 into the introduction would aid the reader follow the narrative, or at least place it first in the Supplementary materials. For Figure S6, I recommend the authors to clarify the meaning of the colours, explain the abbreviation of RT, and consider scaling the size of the arrows to the % of cases.

I miss the mentioning of other storage methods than those considered by the authors in their case study. L73 states the authors considered widely used storage methods, but it does not become clear to me how the selected methods compare to alternatives, for example drying. I recognize that a full evaluation is beyond the scope of this short communication, yet adding a few examples could bring the proposed manuscript into a broader perspective. For example, storage and the achievability of soil samples are important considerations when choosing indicators for mon-

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itoring efforts (Ritz K, Black HJ, Campbell CD, et al (2009) *Ecol Indic* 9:1212–1221. <https://doi.org/10.1016/j.ecolind.2009.02.009>).

While sections 2 and 3 give helpful directions to soil scientists, I find section 4 less strong. Table 4 presents best reporting practices, yet the section does not mention why the listed requirements are important, nor gives a motivation for providing these recommendations. Also, I would recommend the authors to remove table 4, and instead list the four reporting recommendations in the text in section 4. To convey the best reporting practice, I don't think it is necessary to provide examples of poor reporting, and giving examples of good reporting are easier to read when listed in the text.

Minor issues: L43: "that have considered these have taken into account few..." makes it easier to read

Table 1: Column 6 "storage methods explores", remove the word 'only' in the listed examples. Yolo loam: what soil type reference was used, e.g. WRB soil types? H2O – Rolson and Liss: at what temperatures were the soils stored frozen? Plant available N – Soil Type: what is the difference between not applicable and not provided? Plant available N – Jones & Willett 2006: can the text on soil type be shortened? F.e. "Unclear. All samples taken in temperate, oceanic locations"; Same row, last column: unclear what is meant with broad recommendation. What makes that a limitation?

L129: "suppress"

Table 3: Recommendation listed for Storage Methods is not formulated as a recommendation but reads like an observation. Replicates-Heterogeneity: authors recommend 5 replicates, but it is unclear on which this is based. Statistically, number of required replicates depends on the variation within the group/treatment.

L155: "in the literature are"

Supplementary material: Table S2 is strangely outlined in the text and stands sepa-

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rately from its caption.

Statistical analyses: how were normality and homogeneity assumptions checked?

L99: unclear which variables were log transformed before analysis. Is this natural logarithm or Log10?

Fig S6: see in general comments

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