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Biogeosciences Discussions

Interactive comment on "Is the content and potential preservation of soil organic carbon reflected by cation exchange capacity? A case study in Swiss forest soils" *by* Emily F. Solly et al.

Anonymous Referee #2

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This MS is succinct and well written and uses a robust data set to test their central question. There appears to be a critical flaw in this analysis – organic matter is likely contributing the majority of CEC in a large number of the samples.

CEC at low pH is dominated by permanent charge on clay minerals but as pH rises variable charge on clay and organic matter take over as the dominant control on CEC. I think the results presented in Fig 1 and 3 are a nice demonstration of this phenomena. Given the large range in OM in these samples, it is highly probable that variable charge of OM is driving the correlations seen in this analysis.

Unless there is a way of removing the confounding influence of OM on CEC espe-

cially at more neutral to basic pH levels, I do not see how this study is publishable. Alternatively, the authors can provide a very convincing argument as to why the biogeochemistry community should accept the findings. Perhaps I'm just dense and don't get it, but, if that is the case, then the authors need to spend some time in the introduction laying out the logic behind how CECeff is not confounded by OM content in the context of this analysis.

A few other comments: L40 Does correlation with a physiochemical property mean more potential for preservation?

L113-119 Measurement of Al and Fe forms is equally laborious as calculating CEC (both involve similar extraction protocols then quantification on an ICP or AAS or similar), so this argument is a bit of a red herring

L160 Exchangeable cations measured from an unbuffered solution will overestimate Ca in calcareous soils and overestimate Na in sodic soils (probably aren't any in Swiss forests), therefore CEC calculated by summing cations instead of by further displacement of the NH4 is not reliable for these soil types.

L238 Is mmolc/kg an acceptable unit? I thought ccmolc/kg was the standard

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