



EGUsphere, referee comment RC2
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Comment on egusphere-2022-306

Anonymous Referee #2

Referee comment on "Forest liming in the face of climate change: the implications of restorative liming for soil organic carbon in mature German forests" by Oliver van Straaten et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-306-RC2>, 2022

The article deals with the effect on liming across different forest types in Germany. Liming was generally performed to reduce the acidity and increase forest productivity. Given the contrasting results present in the scientific literature about this topic, the authors try to clarify the effect of this operation using both space-for-time substitution and chronosequence approaches. The topic is worth to be investigated and suitable for this journal.

The material and method section is very clear and the methods applied both for the sampling (litter layer and mineral soil) are sounds. My only concern is about the sampling of the organic horizon that was collected on a very small area since the root auger used for sampling has a diameter of 8 cm only. In the section where the flux measurements are described, some more info are required. For instance, it is no clear to me why the measurements were performed only in the limed sites (prior and after the liming). Why for the baseline it was not used the same approach as for the soil sampling, namely a control site and a limed site? From line 472 it seems that you measured the soil flux in both control and limed plots, isn't it? So, probably some clarification in the text are needed.

The results section clearly report the outputs of the study.

The Discussion section is well developed and each of the three different subsections clearly address the impact of liming on forest floor and mineral soil carbon stocks. Scientific literature is updated. Figures and tables are easy to understand.

Conclusions are sounds and in line with the hypothesis done at the end of the introduction section.

In general, I found the article very easy to follow and well organized.

Specific comments:

Table 1: Why the soil features in this tables are reported only for the 0-5 cm depth? Are these measures coming from the previous study or are from some historical data? Similarly, why the texture is reported for the 30-60 cm layer?

line 190 – 2044: some more info about the 13 C measurements such as the standards and type of instruments used for measurements would be welcome. Similarly, the samples where these measurements were performed should also be indicated (e.g. sites and number of samples).

Line 254: it would be nice to know how long back in time the historical data are referring. 10 yr? 20 yr? more? From figure 2 it seems that the historical data are referring to the previous 20 yr, isn't it? I appreciate table A1 at the end where all the dates of the previous sampling are indicated

459-464: the possible impact of earthworms could be partly evaluated looking at the C concentrations. Since earthworms move vertically more homogeneous C distribution between the different depths should be present in sites where earthworms' activity is higher compared to control plots where liming was not applied.