Biogeosciences Discussions

Biogeosciences Discuss., referee comment RC2
https://doi.org/10.5194/bg-2022-90-RC2, 2022
© Author(s) 2022. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on bg-2022-90

Anonymous Referee #2

Referee comment on "Temperature sensitivity of dark CO_2 fixation in temperate forest soils" by Rachael Akinyede et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2022-90-RC2, 2022

The authors compared the temperature sensitivity of dark CO2 fixation and respiration in temperate forest soils of Germany. The fixed 13C was traced into microbial biomass and SOC, allowing the authors to comment on potential microbial biomass turnover rates under the contrasting temperature treatments. The study is interesting and the design is overall simple, but effective; there is limited information on the potential changes in dark CO2 fixation under climate change. However, several aspects of the analysis and the discussion could be further clarified. Some of the results pertaining to the microbial community response and gene abundance were not adequately addressed in the discussion.

Line 26: This speculation around the role of clay content may not be appropriate for the abstract. Since the role of texture was not directly studied it is best not to highlight this as a possible mechanism in the abstract. Many other aspects of the systems may be able to explain differences in microbial biomass turnover. Similar comment for the last sentence of the abstract – "…variations in site-specific parameters might affect microbial biomass…"

Line 41-42: Add "through" so that it reads "through so-called dark CO2 fixation…". Also, what is meant by "which also affects CO2 emissions from other soils"? This wording is unclear.

Line 66-67: What kind of ecosystems were included in this study by Nel and Cramer (2019)?

Line 71: I suggest changing "can warm" to "projected to warm"

Line 77-80: Please add a sentence or two to discuss the potential reasons why these processes would be expected to mirror each other.

In general, the introduction could have more discussion of the microbial community's role in dark fixation. Hypotheses appear to be implied in the writing, but could be explicitly outlined in this last paragraph of the introduction.

Line 96-98: It is not clear what this is saying.

The beech and spruce plots were not replicated, correct? I am not sure it is possible to comment on statistical differences between spruce and beech plots without further replication of the forest types.

Line 126: What is a "biological replicate"?

Line 183: Should 12C/13C be 13C/12C?

Line 279: What is the covariate in the ANCOVA?

Line 504-506: The turnover may be slower in the clay-rich soil, but there is a greater availability of mineral surfaces that could potentially interact with C.

In general, the authors should elaborate on the gene abundance results. There appears to be no comment on these results in the discussion.