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Comment on egusphere-2022-1091

Anonymous Referee #1

Referee comment on "Differential temperature sensitivity of intracellular metabolic processes and extracellular soil enzyme activities" by Adetunji Alex Adekanmbi et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-1091-RC1, 2023

The article of Adekanmbi and coauthors is aiming to set up an interesting comparison between extracellular and intracellular enzymes and evaluate their temperature sensitivity after being exposed to distinct temperatures for 60 days. However, the authors need to better justify the use of glucose-induced respiration as a proxy for intracellular enzymes. Because the glucose-induced respiration will be the result of various processes and also ultimately depends on the microbial community growth efficiency. While the beta-glucosidase and chitinase activities are capturing only the activity of these enzymes. So, making the comparison between extracellular and "intracellular" enzymes becomes difficult in my understanding. Moreover, it is important to remember that the production of extracellular enzymes will also result in CO2 production. I am concerned that authors' experimental design might not allow to separate between intracellular and extracellular enzymes. Instead of referring to intracellular enzymes authors could refer to "intracellular activity" or "intracellular processes" related to SOM decomposition. This should help to avoid confusion. If authors think that the design allow to make the comparison between extracellular and "intracellular" enzymes they should add an explanation and references to justify their choice.

Nevertheless, I think that the data collected by the authors is valuable and is a good contribution to the field of soil ecology and to the EGU community. It could be interesting to evaluate if the respiration temperature sensitivity and extracellular enzyme temperature sensitivity are coupled or not (are they correlated?). It is also interesting to observe how distinct the two extracellular enzymes responded to the increase in temperatures. I think the authors did a good job in their discussion section.

It is not very clear why authors used a distinct range of temperatures to evaluate the enzyme activation energy for the respiration and extracellular enzymes. Authors could clarify this choice.

Overall, the paper is very well written and is citing the relevant literature in this topic.