Comment on bg-2022-184
Aline Frossard (Referee)

This manuscript reports on an interesting study and experiment. The manuscript is well written and well structured, with clear questions and hypotheses. The experimental design and the analyses are sounded, and the results are well discussed. However, I would appreciate clarifications regarding the methods and the results (very brief). I have a few questions/comments which I think should be addressed by the authors:

- Line 130-135: how was the soil temperature recorded on the sites exactly? Table 3 reports on temperature recorder at different depth. How these different in depths (from 5 to 25 cm) were accounted in the analysis?

- Were other temperature predictor considered (such as temperature variation, number of days in minus temperature, etc.) which would be relevant for soil microbial communities. The choice of only 3 temperature predictors seems a bit limited.

- Line 160: what does it mean for 24 – 2 hours?

- Amplicons sequences were analyzed as ASVs but OTUs are reported in table 3.

- Line 200: The sentence “tested the relationship between Tmin and minimum soil temperature, Tmax and the maximum soil temperature...” is confusing. Also, Tmax/MaxT and Tmin/minT: these abbreviations are somewhat confusing to the reader through the manuscript as they designed two different things. Especially during the discussion, it is sometimes hard to follow (lines 283-310). Please clarify the parameters used (maybe in a form of a small table/list) and the related abbreviations.
- Lines 237-239: why MaxT, MinT were not part of the PERMANOVA analyses presented in Table 2? I think MaxT would especially be important to test its correlation to the total microbial community composition as this parameter revealed to be important for microbial growth. I also think that adding a figure showing the correlation of the predictors to the whole community structure would be meaningful (such as an ordination plot with significantly correlated variables).

- Lines 243-251: I find a bit reductive to work only with 12 selected ASVs to test the microbial adaptation on temperature. I wonder why these selection criteria (>0.001% in at least 4 soils) were chosen? Could it be possible to use less restrictive criteria to be able to test for the link between community composition and temperature more largely. Would the output of the regression tree and the random forest analyses be similar then?

- Lines 268-269: The significance of MaxT in the temperature-growth relationship is one of the main output of the study. However, I can't find

- Lines 327 – 331: This sentences should be part of the results section.