

Interactive comment on “Response of freeze-thaw processes to experimental warming in the permafrost regions of the central Qinghai-Tibet Plateau” by S. Chen et al.

Anonymous Referee #2

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This paper entitled “Response of freeze-thaw processes to experimental warming in the permafrost regions of the central Qinghai-Tibet Plateau,” by Shengyun Chen et al, reports the effects of an open top chamber warming experiment over three years. The authors measured air and soil temperature, soil moisture, and soil salinity with and without chambers. The study is basically methodologically sound and the manuscript is well written and readable. The figures are also very well done. However, the scientific justification for the study is very weak, and the performed work seems more like a methodological proof of concept or a component of a larger study than a full-fledged experiment. Given how long open top chambers have been used and the purely observational nature of this study, it is not clear what this paper contributes to a larger

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understanding of the effects of climate change on freeze-thaw dynamics or related hydrological and ecological processes.

A few specific suggestions for improving the manuscript:

1. This seems a little like a study in search of a response variable. Simply installing chambers and measuring if they effected soil temperature and moisture does not advance our understanding of how air temperature and soil temperature are related, nor does it provide novel insight into the ecological concerns raised by the authors in the introduction (links with vegetation, biogeochemical cycles, or permafrost degradation). Were there other parameters measured at these sites that could be leveraged to tell a more engaging story? 2. If the study is purely methodological (reworking old questions of artefacts and advantages of open top chambers), the authors should put their work in context. There are many papers that use ITEX methodology, many of which discuss in depth issues with passive warming chambers. It would be particularly relevant to discuss the effects of leaving the chambers throughout the winter when they can influence heat exchange via preferential snow accumulation. 3. The extensive use of uncommon acronyms makes the paper hard to read. What can be a shortcut for the authors becomes a stumbling block for readers. Most acronyms could and should be removed, except for a few key terms. 4. It would be helpful to develop a hypo-deductive framework around the research questions. Stating a clear hypothesis would go a long way towards justifying the study and preparing the readers to understand the implications of the results. It could also lead to a more focused analytical structure, rather than just observing differences.

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