

Interactive comment on “A zero power warming chamber for investigating plant responses to rising temperature” by Keith F. Lewin et al.

Anonymous Referee #1

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This is a well prepared and easy to read summary of a new method for partial control of a passive solar warming chamber. The ability to modulate (to a degree) the warming from solar-induced heating of the chambers provide some control over the nature of the warming treatments. Limited and quantified artifacts related to relative humidity, vapor pressure deficit and atmospheric CO₂ concentrations are openly discussed for the reader. I think the paper will be well received by the experimental warming community. This new approach will provide another tool for researchers to consider as they plan manipulative warming efforts in remote areas.

The following issues should be addressed by the authors prior to final publication.

Page 1 Line 20: Rather than quoting the daily mean temperature I recommend that the abstract quote both the daytime and nighttime mean temperature differentials. They

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are not the same, and that reality should be stated up front. The discussion of diurnal temperature ranges on Page 7 provides the necessary text. It may also be useful to include a statement on the impact on soil warming in the abstract as well. Although it is stated in the text the abstract is not clear that these data are for the growing or thaw season. That may not be obvious to non-arctic readers of the paper.

Page 2 Line 37: Please consider removing the word “control” from the phrase “modulated temperature control”. Warming in the ZPW chambers is driven by solar inputs, and the venting process doesn’t really control warming levels in the ZPW chambers. I like the authors’ term modulation and how it is used throughout the manuscript. A reader who takes a quick look at the paper and its conclusions, should not think that the ZPW system specifically controls the internal temperature in the sense of a fully active warming system. The wording on page 6 lines 32 and 33 captures the ZPW process in acceptable terms.

Page 8 Line 1: I would use “influence” in place of impact.

Figures:

It would be helpful if the use of colors for various variables and chambers were the same in all plots. For example, red lines in Figures 3 and 4 represent different things.

Figure 8 lower box would benefit from a legend for the various lines. They are defined in the text, but a legend would be helpful.

Figure 10 doesn’t work for me. I would replace it with a stacked set of frequency distributions of the temperatures for the ambient, control and ZPW chambers so that details of any skewness with respect to temperature can be directly observed without being obscured by the data printed on the top.