The Cryosphere Discussions

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Comment on tc-2021-87

Anonymous Referee #1

Referee comment on "The role of sublimation as a driver of climate signals in the water isotope content of surface snow: laboratory and field experimental results" by Abigail G. Hughes et al., The Cryosphere Discuss., https://doi.org/10.5194/tc-2021-87-RC1, 2021

Review of manuscript “The role of sublimation as a driver of climate signals in the water isotope content of surface snow: Laboratory and field experimental results” by Abigail Hughes and others.

This work is devoted to the investigation of the post-depositional changes of the snow isotopic composition due to the mass- and isotopic exchange between snow cover and the overlying atmospheric water vapor. The authors use the results of laboratory experiments, as well as of two types of filed experiments, to show that the isotopic composition of the uppermost few cm of snow may change at hourly time-scale due to these processes. The obtained results are quite interesting and important as another step towards a comprehensive transfer function between isotopic content of precipitation and that of an ice core.

I have a few minor comments and questions as listed below:

Figure 1 - photo of the experimental set-up would be relevant.

Lines 111-112: “Three Pico Technologies PT-104 Data Logger temperature sensors were placed in the box to record continuously; one 10 cm above the snow surface” – based on the figure 1, the upper sensor is placed about 20 cm above the snow surface.

Line 134: “wind speeds below 10-12 knots” – meters per second is a preferable dimension in meteorology.

Lines 136-137: “Sampling boxes were partially buried in the snow surface, and protected from direct overhead sunlight using a cloth covering” – why did not you bury the boxes completely in the snow (so that the level of snow in and around the box is the same), and why did not you use a white (a sunlight-reflecting) material for the box?

Line 139: “which would have otherwise led to melt of the snow not otherwise occurring” – this sounds a bit awkward to me, please consider rephrasing.