

Review comments on tc-2022-7 manuscript, entitled, " Comparison of in-situ snow depth measurements and impacts on validation of unpiloted aerial system lidar over a mixed-use temperate forest landscape".

General comments:

The tc-2022-7 manuscript, entitled, " Comparison of in-situ snow depth measurements and impacts on validation of unpiloted aerial system lidar over a mixed-use temperate forest landscape" presents validation of snow depth maps from an unpiloted aerial system (UAS) with an integrated Light 16 Detection and Ranging (lidar) sensor using snow depth 14 measurements from a magnaprobe automatic snow depth probe and a Federal snow tube.

The objectives of the presented work are

- to investigate effects of an ephemeral snow environment, land cover type and forest leaf litter on snow depth measurements using a magnaprobe and a Federal tube are significantly different in an ephemeral snow environment,
- to investigate impacts of validation UAS lidar with magnaprobe and a Federal tube snow measurements.

As general comment, the manuscript is designed and written well. It consists of all results and conclusions and objectives of the work planned.

The point I miss is how those results on the objectives would differ in case of deeper snowpack. It seems that the snowpack is very shallow like 10-15 cm. What happens if it varies up to 100 cm. The conclusions should be confined under limited snow depth conditions like up to 15 cm.

Because if snow depth is deeper then they may be some other challenges and errors can occur on the snow measurements by magnaprobe and snow tube. Please have a look at

López-Moreno, J. I., Leppänen, L., Luks, B., Holko, L., Picard, G., Sanmiguel-Valladolid, A., Alonso-González, E., Finger, D. C., Arslan, A. N., Gillemot, K., Sensoy, A., Sorman, A., Ertaş, M. C., Fassnacht, S. R., Fierz, C., and Marty, C.: Intercomparison of measurements of bulk snow density and water equivalent of snow cover with snow core samplers: Instrumental bias and variability induced by observers, *Hydrol. Process.*, 34, 3120–3133, <https://doi.org/10.1002/hyp.13785>, 2020.

There is also a recent work published on retrieval of snow depth using webcam images in Cryosphere. It would be good to have look at it as well:

Bongio, M.; Arslan, A.N.; Tanis, C.M.; De Michele, C. Snow depth time series retrieval by time-lapse photography: Finnish and Italian case studies. *Cryosphere* 2021, 15, 369–387.