Interactive comment on "Snow depth estimation by time-lapse photography: Finnish and Italian case studies" *by* Marco Bongio et al.

Anonymous Referee #1

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The authors describe in the manuscript an automatic procedure aimed to estimate the snow depth from stake positioned in front of a camera. They considered three different sites and two different approaches in order to estimate the efficiency of their tool. Results are promising but I suggest to fix some issues in order to improve the readability of the paper.

1) too long introduction - authors are focusing the attention on snow depth and they should refer strictly on SD and secondly on the relative impact on other parameters - authors describe methods for estimating SD using about 40 lines but the considered methods required less 10 lines. Are satellite and airborne approaches useful in this manuscript? You considered only ultrasonic tools and visual inspection of camera pictures...

2) case studies - You should highlight better that in Sodankyla you considered camera detection (automatic and manned) versus ultrasonic estimations and that the snow pit observations confirm or not the ultrasonic "ground-thruth". - What is the distance between camera and the 3 stakes? - What is the Camera height? - What is the distance between the ultrasonic device and the camera? - How many picture you have acquired and how many can be used? - How many ultrasonic values you have in the same period?

- Gressoney photo – manual inspection - What is the distance between camera and stake? - What is the Camera height? - How many picture you have acquired and how many can be used?

- Careser dam photo – manual inspection - What is the distance between camera and stake? - What is the Camera height? - How many picture you have acquired and how many can be used?

- Authors should discuss how many valid observations they have obtained compared an ultrasonic device before extrapolating time-series.

You showed for Sodankyla time-series in Fig.7 and 8 without showing correlation plots between ultrasonic, manned and automatic estimations. I see several strong understimations while the snow depth is very high. How many? Why?

You showed for Gressoney time-series in Fig.9 showing the correlation plots between manned and automatic estimations. What do you mean with "simulated"? You defined two different correction factors, are they site-specific or operator-specific?

You showed for Careser dam time-series in Fig.14 without showing the correlation plots between manned and automatic estimations.

- How much the distance between the camera and the stack affects the determination? - They are discussing about an optimal geometry (4.5): could you give distances or heights? Can you suggest a final setup and discuss much effort require this kind of

facility compared to an ultrasonic device?

Minor issues: - Numbers...10*10ˆ-2m or 0.01m - several font bugs