

Earth Syst. Sci. Data Discuss., referee comment RC1
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Comment on **essd-2021-68**

Anonymous Referee #1

Referee comment on "Operational and experimental snow observation systems in the upper Rofental: data from 2017–2020" by Michael Warscher et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-68-RC1>, 2021

Review

The current manuscript draft on « Operational and experimental snow observation systems in the upper Rofental: data from 2017 - 2020” describes new weather and snow sensors installed and corresponding data collected in the Rofental catchment.

General comments:

Unfortunately, with the exception of the snow drift sensor, the authors miss the opportunity to introduce the new sensors in detail and to describe the applied data curation. Moreover, the available data are sometimes carelessly interpreted without any critical plausibility assessment or references to other studies. The possibility of wrong measurements, especially regarding SPA and SGG, was not considered. If really no manual control measurements were performed during the three years, it should at least be mentioned and explained. Nevertheless, the new measurement infrastructure and the corresponding data are worth to be published as soon as the following points have been addressed:

- An overview is missing about what has already been documented in Paper I and what is now newly documented in this paper. Has anything been abandoned?
- There is no information about any quality assurance or quality control procedures applied to the data. There is no information about the frequency data are downloaded and screened, if at all?
- The snow drift sensor is explained and referenced in detail. In contrast, e.g. information and literature about the SPA and its measured quantities is missing entirely. For example, the difference in data series S1 and S2 listed in the data set is not explained at all.

- Several times snow fall or snow accumulation is mentioned (e.g. L198-199) without including information of the concurrent precip data. For example, the case mentioned in L198-199 is contradicting the precip signal! Additionally, the case in L228-229 can't be true because the clearly negative temperatures demonstrate that the reason for the SWE increase can't be rain! Finally, what was the precip for the case explained in L316-317?
- There are several situations where the pressure measured SWE is wrong. For example, see the described case in the paragraph above or the SWE increase and concurrent stable snow depth during the second half of March in Fig. 8. Please elaborate. I suggest to also check the plausibility of the calculated density as provided in 9b. The reason of the difference described in L246-247 is probably also a such wrong SWE measurement and not the difference in measurement location.

Specific comments:

L34: Matiu et al. 2021

L55: Since the paper will not be published before summer 2021 I'd recommend to also include the winter season 2020/21.

L63: (same special issue)?

L67: The Rofenache river

Fig. 1: Very bad map. Not even valleys or ridges are easy recognizable. Many geographical locations described in the text are missing in the map.

L95: "...the existing weather stations..." how many?

L96: "...at several locations.." What do you want to say?

L113: 1.5 m does not make sense for high alpine AWS? What is the reason. Add the exact height above ground for each sensor Table 1-3. This is important for many applications. Moreover, it is in contradiction to the min/max height of 2 m written e.g. here:

<https://doi.pangaea.de/10.1594/PANGAEA.918096>

L123: 10 min mean values?

L124; I suggest to use HS instead of SD, because it is the official abbreviation.

L126: ...by two European Avalanche...

L134: Why do you mention Sommer SSG-2 and not also accordingly the same for the snow depth and snow temperature sensors?

L136: The new instruments complement...

L142: .. installed at the main station

Fig2: The red arrow marks the main "exposed" AWSS. The blue...

L155: Why Sommer is mentioned for the SIR sensor, but not the SCA and the SPA-2 sensors? Be consistent!

L163: time resolution, raw data , quality controlled?

L164: I'd recommend to provide PDFs about the instruments used instead of manufacturer URLs, which can change any time.

L171: time zone?

L180: How do you manage to have enough power for heating?

L190: In 4.2.1, there is only snow depth described despite the SWE mentioned in the title.

Fig 7: Please provide the same figure for SWE.

L323: the technical details of the instruments are not all described!

L324: It's hard to believe that no manual measurements were performed during the three years to check the plausibility and representativity of the automatic snow measurements?

L335: Can you tell anything about funding?

Table 1: EE08 instead of E08.

Is the air temperature ventilated?

Is the radiation sensor ventilated? What is the source of the given accuracy? It should rather be given in percentage.

Table4: The calculated snow drift values are wrong!