

## ***Interactive comment on “The Rofental: a high Alpine research basin (1890 m – 3770 m a.s.l.) in the Ötztal Alps (Austria) with over 150 years of hydro-meteorological and glaciological observations” by Ulrich Strasser et al.***

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Review of the manuscript "The Rofental: a high Alpine research basin (1890 m – 3770 m a.s.l.) in the Ötztal Alps (Austria) with over 150 years of hydrometeorological and glaciological observations" by Strasser et al., 2017.

The manuscript by Strasser et al. introduces in detail a comprehensive (yet not fully available) meteo/snow/glacio/hydrological dataset from the Rofental area in the Ötztal Alps in Austria. Releasing in such a comprehensive and harmonized manner this in-

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formation to the scientific community is of critical importance to advance this scientific field in the context of climate change and the need to better apprehend its relationship with mountainous conditions. This manuscript belongs to a dedicated special issue coordinated in the framework of the GEWEX/INARCH initiative and must be applauded for this.

I would recommend, if possible, to include more illustrations especially for the older datasets (including drawings and man-made graphics), so as to better illustrate the long history of this site.

A few specific points may deserve to be improved prior to final publication, and are listed below.

Introduction :

Page 2, line 2: The Introduction starts immediately by introducing the institutions responsible for achieving this landmark contribution and then it focuses directly on the study area and the data. While such a data paper must of course contain such information and focus on the technical description of the dataset, I believe it would be useful for a less specialized audience that a small paragraph introduces the main challenges and scientific investigations that such a data set can help addressing (framing the context of water resources in mountain regions, climate change and snow/glaciers dynamics, relevant time and space scales etc.). This needs not be too long but would better, in my view, set the stage to better place in context the unique data set introduced.

Page 2, line 13: "The glacier mass balance time series [...] are among the longest uninterrupted series worldwide" : this statement deserves a reference.

Page 2, line 11: "more than 150 years ago" ; Page 2, line 14, "Today," : Please check throughout the manuscript and remove potentially ambiguous time marks ; indeed, this manuscript may be read several years ahead in the future, and "Today" will then have a different meaning. While the date of the paper makes it possible to address this

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indirectly, I think it would be preferable to explicitly refer to dates, e.g. replace "Today" by "As of 2017"(or alternative more appropriate phrasing if need be). This will enhance the perennity of the documents and make it better understandable in the future.

Page 3, line 20 and before : it is a bit unclear whether the last part of the Introduction is already a description of the Rofenthal catchment (descriptions of huts, entry points etc.). Maybe this would better fit in the Section 2 (Site description) and the Introduction could rather close on a brief and non-technical description of the type of data which are dealt with in the manuscript. More generally, I think the Introduction could also introduce the fact that the dissemination of the data is a work in progress, to be complemented in the future.

#### Section 2 "Site description"

Figure 2 is a useful and well designed map, although it could be beneficial for the manuscript to also exhibit a map with the position of the catchment within the European Alps and its glacier bodies, making it possible to better highlight the climatological/environmental setting of the Rofenthal catchment.

Page 4, line 3: "approximately 1/3 of its area still is ice-covered (Müller et al. 2009)". The term "still" gives the impression of a rapid change in time. It would then be preferable to give the date (year) when this fractional coverage was estimated, and perhaps an order of magnitude of the pace of its evolution before and since then.

Page 4, line 8: "The characteristic water discharges (in  $m^3 s^{-1}$ , 1971–2013) are  $NQ=0.09$ ,  $MQ=4.6$  and  $HQ=109$ " : The acronyms NQ, MQ and HQ should be defined explicitly.

Page 4, line 13: "The Vernagtbach catchment still is approximately 2/3 ice-covered." This statement deserves to be a bit more precise (data source, date of the estimate). Furthermore, it may be good to display the subcatchments on the Figure 2.

Page 5, line 2 and other occurrences : Please consider replacing "mm" by "kg m<sup>-2</sup>"

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as this is more accurately describing the physical quantity measured (quantity of total precipitation per unit surface area).

Page 5, line 17 Please consider replacing "black sea" by "Black Sea".

#### Section 3 "The data"

Page 5, lines 19 to Page 6, line 3 : This concise description of the data dealt with in the paper could be replicated almost as such at the end of the Introduction (see comment above).

Page 6, lines 5 to 13 : It is very valuable and very honest to describe the fact that the current article introduces only a fraction of the total potentially available data. I would recommend, however, that the status of the update of the data set can be monitored online using a dedicated website. Maybe the PANGAEA website/portal can be used for this, but this remains to be verified and clarified. It would be more perennial than pointing the interested reader to contact the authors, whose scientific career will inevitably cover a shorter time span than the upcoming fate of the catchment.

Page 6, line 13 : Perhaps better to avoid terms such as "enormous" which have a limited quantitative added value. Same holds for line 5 "giant" on the same page.

Page 6, line 24. "permanently registering pluviometer." Would it be possible to provide more information here ? Also, "pluviometer" could possibly be replaced by "precipitation gauge".

Page 6, line 24: "In addition to the automatic recordings, 2014 to 2016 several AWSs" needs rephrasing : AWS also operate automatically. Maybe adding "at the fixed meteorological station" after "recordings" would improve the clarity of the sentence.

Page 6, line 28 to Page 7, line 2: First of all, in the Introduction it is mentioned that the automatic lidar system has been installed in 2016 and not 2017 (this seems to be the date of the installation of the tower). Also, I would recommend to focus on existing instrumentation and not future plans (which may or may not materialize for a diversity

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of reasons) in the description of the data, which by definition is only generated by existing instrumentation. I would thus recommend removing this paragraph, unless the equipment is now in place.

Table 1: Please replace "M" by "m" for the unit of wind speed. Also, do I understand correct that the data is actually available only for years 2010, 2011 and 2012 ? If so, this must be explicitly stated.

Page 7, line 16: "Fueß precipitation gauge in 1970" As this is not a standard instrument, would it be possible to provide more info on this measurement device (principle, catching surface area etc.)

Page 8, line 12 – 19: please clarify the functioning of the totalizing gauges. How can they be measuring 2-monthly accumulated precipitation quantities while being visited only once per year ?

Page 9, line 10 : please provide the geographical distance between the old and new position.

Page 10, line 19-21 : "During summer 2017, the station will undergo a general technical overhaul, and the pictures of an automatic camera which has the station in its view field will be available via internet (later in 2017)". Please consider updating this sentence according to operations which actually took place during the summer 2017.

As a general comment on the presentation of the meteorological/snow data, I would recommend that pictures of the corresponding meteorological stations are provided in the paper, so as to better understand the environmental setting of each station the distance/arrangement of the sensors.

Page 15, line 10: "Annual recorded streamflow amounted to 1848 mm (1957/58) and 1770 mm (1958/59)". Does this correspond to the time integration of the stream flow (mass or volume) divided by the catchment surface area ? Please explicitly define what is this "annual streamflow" and the unit used. Similar question arises later on

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regarding monthly or daily stream flow, expressed with the same unit, while actual stream flow data expressed in  $\text{m}^3 \text{s}^{-1}$  are also provided, without explicit reference on how to compare the two types of reporting.

Page 16, Figure 6 : unit should be displayed on the legend of the graph, and not only in the caption.

Page 20, line 2 : please check the consistency of the installation date for the permanent TLS (see comments above)

Page 20, line 14 : please replace "Currently," by a more time-invariant time stamp.

Page 22, line 10, please consider replacing "Virtual Observatory of the Alps" with "Virtual Alpine Observatory".

Page 22, line 25 : please consider adding "AWI PANGAEA" besides "Bremerhaven" (or any appropriate refined description) so as to better illustrate the contribution of PANGAEA staff itself to the dissemination of the dataset.

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Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2017-85>, 2017.

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