

Hydrol. Earth Syst. Sci. Discuss., author comment AC2
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Reply on RC2

Christian Voigt et al.

Author comment on "Technical note: Introduction of a superconducting gravimeter as novel hydrological sensor for the Alpine research catchment Zugspitze" by Christian Voigt et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-78-AC2>, 2021

Dear Anonymous Referee #2,

Thank you very much for your positive and constructive expert report. In particular, we would like to thank you for supporting our idea of presenting preliminary results from this novel high-alpine SG setup. In the following we will just briefly comment on your major concerns and recommendations, while we will provide a detailed point-by-point reply later within the revision of our manuscript.

- The second parallel absolute measurements have been carried out successfully from 29 March to 1 April 2021 and will be included in the revised manuscript for the SG's drift estimation.
- The question regarding the high correlation between SG residuals and SWE is justified. This was also a bit surprising for us at the beginning. However, the large SWE quantities of up to 2000 mm dominate the hydrological mass variations in this area by far. So the general good agreement between the SG residuals and the SWE from a single but quite representative hydro-meteorological station is initially positive. In addition, in Figure 9 and as stated in the paragraph from line 381, SG residuals and SWE show highly significant differences of 250 nm/s² range which leaves a lot of room for analysis on the variability of the snowpack but also on liquid contributors. Finally, the SG residuals show a lot more short-term variations than the SWE especially during and after snow events indicating plenty of more information included.
- The note on the relation of SWE-corrected SG residuals and spring discharge at the Partnach spring is fair and a figure would be desirable. Unfortunately, the massive snow masses (and corresponding discharge) at the end of winter 2018/2019 have damaged the sensors at the Partnach spring gauge station and this is why there is a lack of data for our relevant SG period. So this can only be part of upcoming analysis.
- The more detailed issues are also helpful and will be considered in the revision of the manuscript.

Best regards,

Christian Voigt on behalf of the team of authors