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## Comment on esurf-2022-7

Roger Kuhnle

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Community comment on "Toward a general calibration of the Swiss plate geophone system for fractional bedload transport" by Tobias Nicollier et al., Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2022-7-CC1>, 2022

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Review of "Toward a general calibration of the Swiss plate geophone system for fractional bedload transport", by T. Nicollier, G. Antoniazza, L. Ammann, D. Rickenmann, J. W. Kirchner

The manuscript reports on a new method to calibrate the Swiss plate geophone (SPG) which uses a combination of data collected in a laboratory flume and at four different field sites. The SPG has been shown in previous studies to be an excellent indirect method to measure the rate and size of bed load transport in gravel bedded streams and rivers. This study further develops the science of turning impact data into quantitative data of the transport of bedload. The study of bed load transport using impact plates at several field sites has indicated that a general calibration of the SPG has been difficult to develop for a variety of reasons. This study uses a combination of amplitude and frequency to calibrate the SPG in the quest for a general calibration relation to turn impact data into quantitative values of mass and grain size for gravel bed load transport. This manuscript contains much valuable information and should be published, however, suggestions for improvement of the presentation are given below.

### Specific comments:

- Lines 246-251: In these lines it is related how all packets were filtered using equation (3) and packets which do not meet this criterion are ignored in further analysis. It is clear to me how and why this was done, however, in Figure 7 there appears to be substantial overlap between real (blue) and apparent (red) peaks measured in the flume experiments. How many real peaks were rejected using this criterion in the flume experiment data? Also, could the authors estimate how many real peaks were rejected from the 4 field data sets considered in the study? I believe text should be added to the manuscript discussing this issue.
- Lines 239-240, and 257-260: In these sentences the lower and upper thresholds for the amplitude-frequency method are described. Is it correct that the lower threshold ( $V$ ) was based on the minimum grain size of the size fraction and the upper threshold ( $V$  Hz) was based on the maximum grain size of the size fraction being considered? The clarity of the text should be improved to make it easier for the reader to interpret

the details of how this technique was implemented.

- Figure 9: This Figure is too small and has too much information contained in it. This renders this Figure very difficult to interpret other than for a general impression of the data trends. Consider simplifying this Figure or possibly presenting this information on two Figures.
- Lines 394-400, Table 5: The comparison of the two methods for arriving at quantitative rates and sizes of bed load is interesting. Was the criterion in eq (3) applied to the data before the amplitude histogram (AH) method was implemented? It is clear that the criterion in eq (3) was used as part of the technique for the amplitude-frequency (AF) method. Some text should be added to make it clear as to whether eq (3) was applied in relation to the data before applying the AH method.

Lines 571-598: It is clear that the AF method performed better than the AH method in some cases such as the Erlenbach, however, it is also clear that for the other 3 field sites the AH method yielded results for bed load that were quite close to that obtained from the physical samples. It is also not clear whether the general calibration calculated in this study would give