

Interactive comment on “Glaciohydraulic seismic tremors on an Alpine glacier” by Fabian Lindner et al.

Alex Brisbourne (Referee)

aleisb@bas.ac.uk

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General comments

Lindner et al. present a careful and thorough analysis of what looks to be a hard-won data set from a Swiss alpine glacier. The paper presents the application of a number of established techniques to investigate the relationship between glacial hydrology and seismicity / seismic tremor. The authors present some of the most convincing arguments to date supporting the applicability of cryo-seismology, with sufficient and appropriate data, to help further our understanding of glacial hydrology.

The paper is well structured and well written. It is clear that the authors have put a lot of work into a thorough analysis of the available data sets. The figures contain a wealth

C1

of information that is, in general, presented clearly and succinctly. As such, I only have minor comments.

Specific comments

There is no discussion of the uncertainties associated with Bartlett and MVDR locations. Given the methodology and the tight array aperture, these could be significant. However, there is a reasonable degree of clustering and results are comparable and as such appear reliable. There certainly appears to be a statistical significance to the results. It does not appear that the authors have over-interpreted the results by ignoring uncertainties. However, for reference, and certainly for workers building on this study, it would be useful to quantify these uncertainties and discuss in context.

When measuring seismicity rates with an STA/LTA, is it necessary to account for variation in background noise? Could the masking of events during periods of high background noise lead to a reduced measured seismicity rate and vice versa?

I recall that Lennartz LE3D are flat from 1-80Hz but may be wrong (P3L26)

Technical corrections

The manuscript would benefit from a careful reading to identify a number of grammatical errors and referencing format issues. I highlight a number of minor issues below.

P2L37 - why e.g.?

P3L9 – what does “latter” refer to?

P4L7 (and elsewhere) – Simme River (capitalise river, valley etc)

P4L18 – blue curve in Fig. 2a and 2b (the latter is actually more instructive)

P4L20 – Is it possible to highlight the elevation of the moulin inlet on Fig. 2b?

P5L24 + P7L12 - “the the”

P6L22 – reword “allows to measure”

C2

P8L24 – even not event

P9L4 - 7c not 7b

P9L9-10 – this sentence does not make sense.

P9L20 – remove “with”

P10L20 onwards – be sparing and consistent with parentheses around figure numbers (Fig, 8, left column)

P11L3 – “shown upstream area” – what does this mean?

P12L32 – “in the case where”

P13L22 – reformat Gimbert reference.

P13L27 – reword “more targeted as without”

P15L14 – reformat reference

P15L20 – “In the following” seems strange here.

P15L26 – (less than 100 m)

P15L30 – remove “also”

Figures

Fig. 2 – Is the stripe down the middle of 2e a data gap? If so, make white. There is no caption of e or f.

Fig. 11b it is hard to see the trend in the black dots. Can these be plotted on top?

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