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Interactive comment on "Glaciohydraulic seismic tremors on an Alpine glacier" *by* Fabian Lindner et al.

Anonymous Referee #1

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This is a very well written report on the analysis of a significant field effort to further develop cryo-seismological methods for the purpose of understanding glacier hydrology and processes related to hydrology. The data are unique and of high quality, and the analysis techniques are cutting edge. What speaks strongest for the positive regard of this manuscript is the creative way in which seismological methods and unusual seismic signals (as many are in this day and age, because cryoseismology is just starting as a field) are used to develop fundamental understanding about the glaciohydraulic system.

I did not find many problems or issues to comment on, as it was clear that the authors have done a very careful job of preparing their manuscript in advance of submitting it. My relatively minor comments are provided below.

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Discussion paper

page 2 line 10: rewrite this sentence to read something like "... these approaches have drawbacks, including: being expensive and laborious, providing subsurface images at only a few instances in time, and being isolated in location.

page 2 line 19, I would "call out" (i) and (ii) as two indented short sentences in a list, then put the sentences that discuss them, e.g., "This configuration is expected..." which begins on on line 20 in the rest of the paragraph that follows, and start the discussion sentences with "In the case of (i), this configuration is expected... In the case of (ii), These scaling relations..." etc. The way it reads now, the reader might not see the list of two end members in a simple way, because there is discussion involved in the definition of the list.

page 3 around line 24 - can a description of how the lake levels were monitored and how draining was detected be added? Was this done using instrumentation (e.g., depth or pressure sensors in the water) or was it done via remote sensing? How accurately or frequently are water depth measurements made? Also, since power outages are referred to, at the end of the page, the type of power source (photovoltaic?) should be mentioned. On the next page in the paragraph starting on line 5, it might be worth mentioning the sample rate of the GPS units and also the sample rates of the various data sets associated with Lenk and Geopravent...

page 5 around line 20 - out of curiosity, do the Rayleigh wave polarizations conform roughly with direction of radiation and source location? Would polarizations be capable, in the absence of other analysis, of determining source location or at least source azimuth? How consistent would location and azimuth be if just Rayleigh wave polarization were used to determine phase velocity vectors?

equation 4: is it necessary to have two sets of absolute value or "norm" (|.|) signs, one on the denominator and one on the whole fraction of the right hand side?

page 9 line 27. I seem to have forgotten what a "Bartlett processor" refers to. Was this defined above? Maybe make a citation to equation 3 instead of just referring to the

Bartlett processor. . .... Ditto with the term MVDR-Rayleigh results (a simple parenthetical with a equation number reference would be enough).

page 10 line 7 - Can “spurious body wave contributions” be defined more precisely? Are they whole-ice-thickness modes of P or S where the wave vector is horizontal?

page 10 line 19 - has the term MVDR-grids been defined?

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