Review: "Attenuation of Sound in Glacier Ice from 2 kHz to 35 kHz" by Meyer et al.

General comments

The paper investigates the attenuation coefficient of sound waves in ice conducted on a glacier. Overall, the paper presents a very careful description and analysis of an acoustic wave propagation experiment carried out on the Langenferner glacier. I am not an expert in seismic measurements, so I cannot entirely judge the claimed improvement of these experiments over previous work. But the measurement protocol appears to be sound and the study is without a doubt a very careful piece of work so I recommend publication after some revisions have been made.

As a main weakness of the work, no additional, constraining data (texture, porosity, temperature etc) from the ice at the measurement locations was collected which renders the interpretation of the results a bit difficult. Accordingly, the discussion in view of existing work and potential mechanisms remains a bit fuzzy to me and requires a polish. The respective questions are included in the list of specific comments below.

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Specific comments

(p.1 l.6): here presented results → results presented here

(p.2 l.9): polycrystaline → polycrystalline

(p4. l.21): maybe I missed it but *when* was the field campaign carried out?

(p.10 l.19): N → N

(p.11 l.27): what does sup stand for?

(Fig 6/7): should be combined to a single figure

(p.15 l.4): a reference should be given for the used method

(p.20 l.11): the wave lengths ($\approx 9 - 60$ cm) as estimated from frequencies and measured speed of sound should be stated somewhere explicitly (not necessarily here, but the occurrence of "wave length" reminds me of that) I think its helpful for the discussion later.

(p.20 l.22): The statement about the comparison to Westphal in the frequency dependence is not clear. From which part of Fig 15 does this follow?

(p.20 l.24): I cannot follow why the present data is not consistent with Rayleigh scattering. Here it seems necessary to recall the prediction of Rayleigh scattering on the frequency dependence and maybe include an inset in Fig 15 to show how this compares to the collected data. In addition, the discussion and comparison to other work should be a bit more comprehensive in view of the similarities in view of of temperature, depth, ice porosity, etc. Given the range of wave lengths, the origin of attenuation by dissipative or scattering mechanisms may be quite different.

(p.20 l.29): Again, the conclusion about the frequency dependence is appears to be an overstatement if numbers (or figures) are not shown.

(p.20 l.32): accounts → account

(p.20 l.32): which differences?

(p.21 l.2): Isn't it possible to discuss/include at least the prediction of the attenuation coefficient/length (maybe derived from the "quality factor" as often used in the geo context) for homogeneous, polycrystalline ice in Fig 15?

(p.21 l.17): Acoustic scattering in heterogeneous materials is reasonably well understood, but it needs additional measurements to characterize the heterogeneities and the state of the material to infer potential origins.