Comments on the paper entitled “Potentials and pitfalls of permafrost active layer monitoring using the HVSR method: A case study in Svalbard.”, submitted for publication to Earth Surf. Dynam. Discuss. (#esurf-2018-52).

This manuscript is well-written, clear and it shows very convincing results on the correlation of the HVSR and external or internal factors (air temperature, wind, frozen soil layer etc...). The quality of the data, their processing and some relevant interpretation regarding the correlation (for example with ellipticity) provide evidences on the physical origins of HVSR variation.

I recommend this manuscript for publication. However, some critical lacks on the HVSR methods (a very classical methods used for very long time and benefiting from a huge experience and examples in scientific literature, references a little bit missing in this manuscript) and the irrelevant conclusions must be modified before publication.

1. On the HVSR - many recommendations related to the interpretation of the HVSR amplitude or the operative process for recording and processing HVSR, to the physical interpretation related to this method, in particular with ellipticity of Rayleigh waves, to the effect of the frozen uppermost layer on HVSR have been published for long time. I suggest the authors to browse these references and add them to their manuscript.

Ellipticity and HVSR - Lachet, C., & Bard, P. Y. (1994). Numerical and theoretical investigations on the possibilities and limitations of Nakamura's technique. *Journal of Physics of the Earth*, *42*(5), 377-397.
Method and processing - Chatelain, J. L., Guillier, B., Cara, F., Duval, A. M., Atakan, K., & Bard, P. Y. (2008). Evaluation of the influence of experimental conditions on H/V results from ambient noise recordings. *Bulletin of Earthquake Engineering*, *6*(1), 33-74.
Temperature and HVSR - Guéguen, P., Langlais, M., Garambois, S., Voisin, C., & Douste-Bacqué, I. (2017). How sensitive are site effects and building response to extreme cold temperature? The case of the Grenoble’s (France) City Hall building. *Bulletin of earthquake engineering*, *15*(3), 889-906.
and more and more...

2. This lack reflects a lack of knowledge about this literature and may help authors to improve their manuscript. For example, the interpretation of the amplitude HVSR, the use of SPAC or FK methods for interpretation, the experimental condition recommendation, and other conclusion could be removed (very well known for very long time - see reference Chatelain et al. ) and it is not necessary to repeat them, just refer to already published papers.

I recommend the author to follow this recommendation before finalizing their manuscript.

Some additional remarks:
R1 As explain in these references, HVSR amplitude is poorly physically explained. In your manuscript, you focus more on the amplitude rather than on the value of the

frequency. Moreover, amplitude at high frequency is certainly controlled by local effects and for that reason, the amplitude may change quickly with local condition. What is happen at low frequency, i.e. between 1 and 10 Hz, that correspond approximately to the the uppermost layers of the soil? For using HVSR for environmental seismology, these frequency band must be considered in priority.

R2 Figure 7: do you think that the slight variation of ellipticity curves between winter and summer can be observed using HVSR? Please, provide uncertainties related to peaks.

R3. Figures 2 et 3 - Results are shown until months 8.5 and it is really a pity about the fact that we cannot see what's happen after. No more data?

R4: Model Tab. 1. How these parameters have been selected? Some other studies (in depth) about Vs and Vp in frozen regions have been published - Browse the very interesting journal on frozen region (Cox B, Wood C, Hazirbaba K (2012) Frozen and unfrozen shear wave velocity seismic site classification of Fairbanks, Alaska. J Cold Reg Eng 26(3):118–145. - Xu G, Yang ZJ, Dutta U, Tang L, Marx E (2011) Seasonally frozen soil effects on the seismic site response. J Cold Reg Eng 25(2):53–70.
and more and more...