Solid Earth
Discussions

Open Access

EGU

Interactive comment on "Characterizing the global ocean ambient noise as recorded by the dense seismo-acoustic Kazakh network" *by* Alexandr Smirnov et al.

Anonymous Referee #1

Received and published: 20 May 2020

General Comments

In this manuscript authors study the global ocean ambient noise by means of a dense seismo-acoustic network in a multi-year time interval. They present three year of detected microbarom and microseism signals, in order to track and study the temporal variability of ambient noise originating from the two hemispheres. They carried out data analyses and modelling by applying methods and techniques already known in literature and explained and cited them well. Authors modelled microbarom source model and compared the simulated directions and amplitudes with the observed ones. They obtained a good correlation as regarding azimuths, and some discrepancies in

amplitudes, which they discuss into the text. They were able to locate sources of low-frequency signals, and individuated the further studies needed to improve this kind of research. Overall, I think that the manuscript yields a good contribution to the literature in the topic of global ambient noise inasmuch they use coupled seismic and infrasound data, recorded during a three-year long period. I have a few specific comments, but I think that they can be solved by the authors. Results and interpretations are structured in a well way, beside the introduction section, which is, in my opinion, a little bit too long, with respect to the other sections.

Specific Comments

In data processing, when you work on amplitude and phase of the signal, the frequency response of both seismic and infrasonic sensors is a crucial point. This is especially true in this work, where frequency range of signals that you are analysing, is at the bound of the linear frequency response of some of the used sensors. As you show in Figures 3 and 6, you hold the frequency response curve of Microbarometers MB2000, and GS-21 and CMG-3V seismic sensors, I was wondering, did you correct the signal for the frequency response?

I order to make the overall structure of the paper clearer, I believe that few paragraphs of the introduction section could be moved into the method section (for example lines 34-36 and lines 69-76), or in the discussion section (e.g. lines 36-40). I think this would also help to streamline the introduction section.

Also, I think that you could better highlight: i) the contribution of this paper to the literature and ii) the goal of your study and how you try to reach it. You mention that you analysed a long-time interval with simultaneous seismic and infrasonic recording, but it is not so clear if this kind of study, using dense network and lots of data, has been already done in literature.

I suggest that you try to use Rose Diagrams, they could help you representing better the results (both azimuth and frequency of each class) of Figures 13 and 14.

Technical corrections

I suggest an English revision, in order to make the manuscript reading more fluent. The bibliography is not cited uniformly throughout the manuscript

Figure 3: x labels are wrong

Figure 7, 8 and 9: Can you put the legend out of the plot? They overwrite the results.

Insert in all the different plot of figures 13 and 14 the letters (e.g. a, b etc).

Line 49-50: Specify which kind of algorithm do you refer to.

Line 53: were

Line 58: measured instead of "measuring"

Line 64-65: "These agreements have been improved using more accurate wind profiles obtained from high resolution LIDAR middle atmospheric sounding". It is not clear that this work has been done by Hupe et al 2018.

Line 66-67: "In this paper, we further extend the approach developed by Hupe at al. (2018) using microbarom recorded by the dense Kazakhstani network". Specify in which sense you extended the work, only in terms of number of station/network?

Line 70: rephrase "For microseisms, the bathymetry strongly affects the source intensity" in "The bathymetry strongly affects the source intensity in microseism modelling"

Line 72: "angles lower than 40°" instead of "angles lower the 40°"

Line 74: typing error

Line 83: "as it contains a five seismic and three infrasound arrays". In the abstract and later on into the text and figure 1 you say four seismic arrays.

Line 89: "MKIAR (9 elements), and in Makanchi village" is not clear, MKIAR is in Makanchi village?

C3

Line 92: cut Figure 3

Line 101: cut Figure 5

Line 120-121: Add references

Line 132-134: Understanding this point is difficult in this part of the text, maybe you could move it into the results or discussion section, where you can refer to the figures. Or add here that it would be clarified later into the text.

Line 147-151: Specify that you are describing Fig. 7

Line 155: "amplitude increases from 0.001 to 0.03 Pa" are those average values?

Line 156: I suspect that "repeatable" means replicable.

Line 171: "a decrease in amplitude is observed early January 2017 at all stations." It is difficult to see this decreasing trend.

Line 182-183: "As the used source model was developed for microseisms (Ardhuin et al., 2011), an empirical scaling factor (F = 1:10000) must be applied for comparing the observed to the predicted amplitudes". Could you give further details?

Line 187-190. Could you explain better the reason of the discrepancy? And comment the quantitative estimations of the prediction quality?

Line 192-194: I think it is important here to highlight the further data you analyse in your work, both in terms of time interval and number of stations.

Line 200: Do you mean the comparison between observations and simulations?

Line 200-202: I suggest that you explain better this point.

Line 208: "Simulating microbaroms predicts signals" maybe Simulated microbaroms predict signals.

Line 208-210: Refer to the figures

C4

Line 222: Could you specify here the expanded form of SSW (beside the abstract)?

Line 222-227: As you write here, this topic seems to be one of the findings of the paper.

Line 243-244: This is not reported elsewhere in the text, maybe you could highlight this aspect even in other section, if you believe that it is an important point of your work.