



EGUsphere, referee comment RC2
<https://doi.org/10.5194/egusphere-2022-823-RC2>, 2022
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Comment on egusphere-2022-823

Anonymous Referee #2

Referee comment on "Ocean bottom seismometer (OBS) noise reduction from horizontal and vertical components using harmonic–percussive separation algorithms" by Zahra Zali et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-823-RC2>, 2022

This paper describes an interesting method for separating harmonic and "percussive" signals on ocean-bottom seismometer (OBS) data. OBS data have strong harmonic noise and this method could be of great use in identifying and analyzing percussive signals such as earthquakes.

The authors present the parameters used in their algorithm in a haphazard manner and often before they have explained why these parameters are needed. For example, on line 214 they indicate that they divide the frequency content of the signal into two ranges and they give the values of the ranges, but they don't explain why this division is needed and how they choose the ranges until lines 271-272 and 301-303.

The authors should reorganize the text so that the need for parameters and the criteria used to select these parameters is explained from the beginning. This will allow others to more easily understand and profit from their algorithm. I also recommend that the authors make a table of these parameters.

The figure captions often contain expository text that should be in the main text and lack specific information about the figures themselves (see below).

There are some language issues that do not prevent understanding but slow down reading, including extraneous or missing "the"s and overuse of "in order to". Below is an incomplete list of more complicated examples, with suggested corrections:

- L313: "part of that is still remained" -> "part of it remains"
- L314: "The signals ... that don't ... in the spectrogram are difficult to be captured by our HPS algorithm so part..."
- > ""Signals ... , which don't ... in the spectrogram, are difficult to capture using our HPS

algorithm, so part...""

SPECIFIC CORRECTIONS/COMMENTS

MAIN TEXT

L53-59: The details of microseism noise aren't relevant to the performed analysis/results.

L82: The IG wave signal used by Crawford and Webb was not recorded by a hydrophone, but by a differential pressure gauge. Differential pressure gauges, nano-precision bottom pressure recorders or broadband hydrophones can be used to measure the IG wave signal, though I'm not sure if broadband hydrophones are sensitive enough below their corner frequency.

L136-141: These details of the LOBSTER OBSs development aren't relevant to the method or the data presented.

L175-176: Repeats previous lines.

L180-192: In this description of the MED algorithm, it is not clear which bits are information about median filters and which are intrinsic to the specified algorithm.

L210-212: The statement that most OBS noises are narrow-band is false for tilt, microseism and compliance noise.

L301-303: This should be explained in the algorithm section

L298-300: This should be written more clearly

L 214-215: Why 0.1 to 1 Hz? Why two ranges? This is only explained ~60 lines later.

L 235: Why 2%? Is this a parameter you set? Or an observation of some separation in S-values?

L306: "will be separated in the": is this another step? or the output of this step?

L320: Does the phase component have a name? (since the amplitude is name "V")

Eq 7: Use the same emphasis in the equation as in the text (N and N' are bold in the text, but italicized in the equation)

L337: the window length and overlap should be in the parameter table and the chosen values explained.

L339: is the frequency resolution relevant?

L341: Should your choice of a kernel size of 80 (parameter table!) be used by other users, or should they run their own tests?

L354: 11.5 km deep oceanic crust: Are there 11.5 km of sediments over this crust? 5 km water + 6.5 km sediments? or do you mean that the bottom of the oceanic crust is 11.5 km beneath sea level? Or something else?

L361: "Here only those events were used": Is this a subset of the 46 events you name

above, or was this part of the selection criteria that led to 46 events being chosen. If the former, how many events were used finally?

L380: "improvements of the method" -> "improvements obtained using the method", I think.

L388: Does a high correlation coefficient really demonstrate that there is no waveform distortion? What is the threshold correlation coefficient for which this is true?

394-396: Unclear.

403-4: Repeats what you already wrote.

L406-7: Isn't 4D just an overlapping plot of the lines in Figure 4C? If so, you don't need to describe it in such detail.

L438: The sentence starting with "Group velocity curves..." seems out of sequence

L440: "noise situations N1-N3": Be consistent in your naming, you refer to N1-N3 as "situations" here and in the figure captions, "scenarios" on line 357 and "type" on line 519

L445: "in the range of the signal frequencies" repeats, remove it.

"0.05 to 0.2 Hz": you give a frequency range here but the figure only shows periods.

L446: You state that longer signal periods can not be recovered, but it appears in the figure that they can for N1 and N3, as you state for N3 on lines 447-8

L488-9: "became a broader peak..." Compared to SO? or to $P_{410}S$?

L508-511: These sentences are not specific enough, they read more like a summary than a conclusion.

L514-515: Unless, I'm mistaken, this is the first time you mention extracting microseism signal. If so, this should be mentioned in the discussion, not the conclusion.

L519-537: Much more specific and detailed than in the discussion, should be put in the discussion and simply referred to here.

L539-540: "and has especially application in noise reduction of OBS signals": seems to just repeat the first half of the sentence.

REFERENCES:

Has some non-standard journal references:

- "Journal of largescale research facilities" -> "J. ... large-scale ..."
- "J. Geophys. Res - Sol Ea" -> "... Solid Earth" (?)
- Essing et al. and Negi et al.: "Seismological Society of America" -> "Seism. Res. Lett."

Missing DOIs for some articles, including:

- Beyreuther et al, 2010
- Duennebier & Sutton, 1995
- Friedrich et al., 1998
- Langston, 1979
- Romanowicz et al., 1998
- Silver and Chan, 1991

FIGURES

Figure 2b: put units on axes of spectrogram plots

Figure 3:

- Remove ("SNR is defined as..."), already stated in article text
- Remove (or place in article text) sentences starting by "The spectrograms clearly show..." and "The whole amplitude and the phase information..."

Figure 4:

- Remove (or place in article text) the three sentences starting with:
- "We see significant improvements..."
- "The HPS signal has significantly lower..."
- "A high noise reduction is seen..."