

Interactive comment on “Seismic monitoring of urban activity in Barcelona during COVID-19 lockdown” by Jordi Diaz et al.

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The paper “Seismic monitoring of urban activity in Barcelona during COVID-19 lockdown” by Jordi Diaz and co-authors deals with the seismic signature of the lockdown measures as observed by a very dense local seismic network, installed in Barcelona and composed of a fairly wide variety of instruments: broad-band sensors, short-period sensors, accelerometers and Raspberry shake seismometers. The paper is in a very good shape and scientifically sound, it shows very interesting results regarding how the amount of seismic noise reduction, due to the lockdown measures, is strongly site-dependant even in a so dense network and reflects the local human activity variations. In my opinion, the manuscript deserves to be published in Solid-Earth after minor revision.

MAJOR POINTS

- Section 3.1: it is not clear how you identified the frequency band of interest, that is, the band where the seismic signature of lockdown measures is most evident. It is hard to identify it just by looking at the spectrograms. In addition, each spectrogram shows peculiar features, different from the others.
- Line 175: how did you calculate such mean value, as well as the power values shown in Table 1? By taking into account the whole time series, or by focusing on week-days/daytime?
- The “Discussion and conclusions” section does not discuss all the findings of the manuscript, but it mainly focuses on the comparison between seismic data and mobility information. I suggest to rename the section, and write another section, truly discussing all the findings of the paper.

MINOR POINTS

- Line 59: What does “CA” indicate?
- Lines 58-72: the sampling rate information is missing for all the instruments.
- Line 78-79: please provide further information about the spectral analysis. For instance, did you divide the 30-min-long windows into smaller windows? If so, how long do the smaller windows last?
- Line 80: What do you mean when you talk about “spectra dynamic”. Sorry, I do not know this term.
- Line 95: “(i.e., (Díaz, 2016a))”: please remove the double brackets.
- Line 108: is “official time” the local time?
- Lines 108-109: “the period of high energy period begins earlier”: sounds a bit strange...

- Line 126: “Location of the seismic network”: actually, the location is not indicated in the table, but rather site descriptions and power amplitude information.
- Line 184: “characteristics. (Figures 7e-f)” → “characteristics (Figures 7e-h)”?
- Line 234-240: the power level at this station is very very low compared to what is recorded by the other sensors (it is hard to clearly read it, but it seems to be lower than -300 dB). Is it reasonable? Or is there a problem in the instrument?
- Line 258-262: this finding is very interesting. However, it is not highlighted in the abstract, neither in the Discussion and conclusions section.

FIGURES

- Figure 1: it would be useful to add in the legend information about the symbols used for the seismic stations. In addition, I suggest to use different symbols (or colors) for short-period and Raspberry Shake sensors (as far as I understand they are both indicated by red dots). The font size of the legend is very small, I suggest to make it bigger.
- Figure 2: it would be useful to indicate the different phase names in the figure (similar to what has been done in Figures 4 and 5).
- Figure 3: I suggest to increase the font size. In addition, please correct the caption “Data is expressed as dB as dB relative. . .” → “Data is expressed as dB relative. . .”
- Figure 4: it is really hard to identify the names of the stations associated with each time series. I suggest to increase the font size of the legend, and to sort the names in the legend into descending noise power order.
- Figure 6: I suggest to increase the font size of the labels surrounding each plot.
- Figure 7: I suggest to increase the font size and to indicate the different phase names in the figure (similar to what has been done in Figures 4 and 5).

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- Figure 8: I suggest to increase the font size of the labels surrounding each plot. In addition, to make the comparison between seismic noise power and geology easier, I suggest to add another subplot with a schematic map showing the main material distribution, such as Paleozoic, Holocene and Pleistocene materials (a sort of simplified version of Figure 1), as well as the location of the places you cite in the text, as the city center, the industrial factory affecting the station R4B31, Montjuic.

- Figure 9: “Eastern 2019” → “Easter 2019”.

- Figure 10: I suggest to increase the font size and to indicate the different phase names in the figure (similar to what has been done in Figures 4 and 5).

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