

Interactive comment on “Seismic monitoring of the Auckland Volcanic Field during New Zealand’s COVID-19 lock-down” by Kasper van Wijk et al.

Kasper van Wijk et al.

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In general, the manuscript reads well and the order of ideas and figures is well presented.

We thank reviewer 3 for this comment.

I would like the authors to edit or re-write to sentence starting in line 29. I would Line 44-45: The authors use the frequency band: 0.1 – 50 Hz assuming the cover the range of interest for volcano monitoring and seismic tomography, however, whiting this range, what frequency band is the most affected? It would be interesting to observe the results

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presented here using and plotting several frequency bands (5 or 6?) to understand better where the noise amplitudes show the maximum reduction and how they are related to different anthropogenic activities or sources (diffuse, harmonic, transient, etc) or/and natural processes (volcanic, wind, ocean, etc.).

We have rewritten this part in the revised manuscript, and added PSD plots to distinguish noise/signal in different frequency bands. What sets this study apart from previous studies on COVID-19 noise reductions is the presence of local seismicity and an active volcanic field. These require data to be used across a broad band of frequencies, where the frequencies of noise overlap with those for the signals of interest.

Line 73: instead of multiplying by a factor of 25, why didn't the authors normalized the time series presented in figure 7? If i understand it correctly, the main idea of the figure is to compare the relative differences between the observed amplitudes at 3 different stations with the wind speed and more importantly evaluate their temporal correlations.

Not only relative amplitudes matter and are informative; we are very much interested in the absolute value of the noise, so we can compare performance across the whole network. If we were to normalise the data in this figure, the reader loses perspective with the data from the stations not in Figure 7. Either way, the reader can appreciate how valuable it is to bury a station even by 10s of meters.

The fact that authors found 35 more earthquakes (a very low number of events) than Geonet during the lockdown, it doesn't mean they appear because of a reduction in anthropogenic noise, rather, they are found because of the use of a template matching algorithm, that is, systematically more efficient in

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finding earthquakes when compared with traditional human-based methods. Probably you also could find the same amount of events even without lock down measures. authors can add a sentence like this after line 105.

We completely agree, and this was meant to be the message of this section: we find more earthquakes in general, because template matching is more sensitive than STA/LTA. We did *not* find more EQs during the lockdown than before or after the lockdown with this technique. For example, this is stated in the conclusions:

“However, the detection rate was not higher during the lockdown period than in the periods before or after the lockdown.”

We hope the revised manuscript is more clear in this regard.

Interactive comment on Solid Earth Discuss., <https://doi.org/10.5194/se-2020-152>, 2020.

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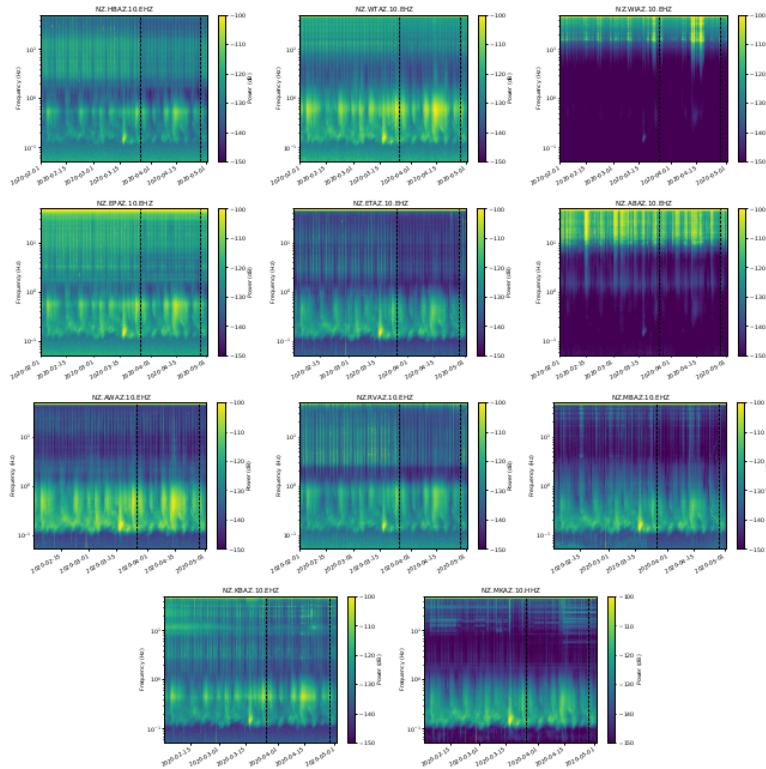


Figure A1. Spectrograms for the seismic data of the Auckland Volcanic Seismic Network. The vertical dashed lines indicate the start and end date of the COVID-19 lockdown in New Zealand.

Fig. 1.

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