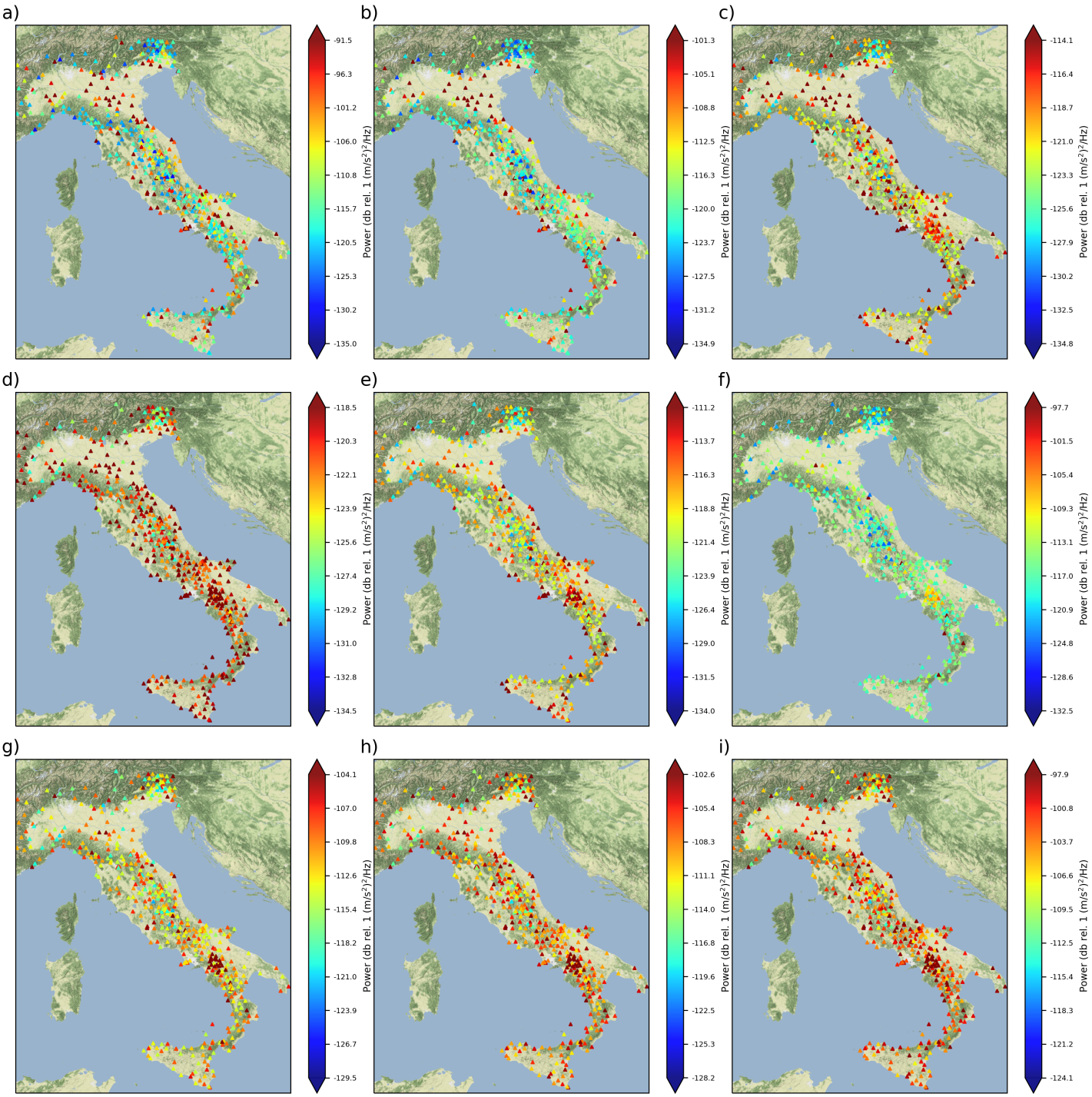
This study is about the computation of the variations in ambient noise levels of the big Italian Strong Motion Network to evaluate the performance of the stations. The study is definitely important and useful for future studies. I appreciate the authors used a large dataset to establish the study by considering different periods and taking the advantage of COVID-19 lockdown period. The methods they used is a well-known and suited to the paper. The manuscript is written in good English. Although I like the idea of the paper which provides an excellent opportunity to exploit this large dataset for different time periods, I believe the paper still needs some significant revision. Please see my comments below.

General Comments:

1. The paper sometimes is lacking in quantification for the validation of the results appropriately, especially in the result section. For instance, I am a bit surprised there is no quantitative comparison with the results from the other networks around the world to evaluate the performance of the Italian Network in the Discussion part. I would definitely add one paragraph to the Introduction part, showing the previous studies and their ambient noise level with numbers, and compare&discuss them in the Discussion section.
   We have added numerical results related to the background noise levels of the network. Network-wise comparison would can be done but background noise information is highly dependent on the local conditions, especially in short periods. However, we use the High- and Low-Noise Model developed by Cauzzi and Clinton (2013) and use it as a baseline. There are other studies that provided background noise models for broadband seismic networks such as Peterson (1993) and D' Alessandro et al. (2021). However, broadband seismic stations have different sensibilities in different periods. Results in Figure 3-5,13, and 15 and Table 3. We realized that there is a problem in Figure 4 and replace it with another figure. You can see it below:



Median vertical component noise maps in one-third octave bands around a-g) 0.1 s, 0.25 s, 0.5 s, 1 s, 2 s, 5 s, 16 s, 32 s, and 80.6 s. Upper and lower limits of the color bar are defined by the model developed by Cauzzi and Clinton 2013. Vertical components are presented in the following figures and Electronic Supplement. Background noise levels of all calculated periods can be found in Figure S1.

2. The paper also needs additions and extra explanations because some details are missing (e.g., in the Method section).
   We improved the Method section of the paper

3. The organization of the paper is not well structured. The aim of the study is not given clearly. The sections sometimes don't show their actual points. While the Results section is very smooth, the Discussion part contains mostly the results of the study. Furthermore, the text sometimes contains repetitive sentences specifically in the Result, Discussion, and Conclusion parts. This does not make the article fully comprehensible.
   We added the aim of the study to Introduction section. We agree with the reviewer about the relatively weak Result section. To improve it, we quantify some of our results and presented them in Results section. We also reduce the repetitive parts as much as possible.

4. For the figures, the figure axis fonts are quite small and not readable. On the other hand, the authors can do zoom-in maps based on different coordinates instead of showing the whole land of Italy which makes the figures more catchy.

We increase the font sizes in several figures to increase the readability. In the early stages of the paper we had various selected stations to explain some features of the noise levels in specific periods. However, it increased the length of the paper and we believe that the information retrieved from those site-specific features do not increase the quality of paper. We also tried to zoom in the before-mentioned parts in figures but it makes the figures even more complicated. We believe providing the overall picture of the network is a better approach on visualizing the noise levels of the Italian territory.

Minor comments:

Abstract

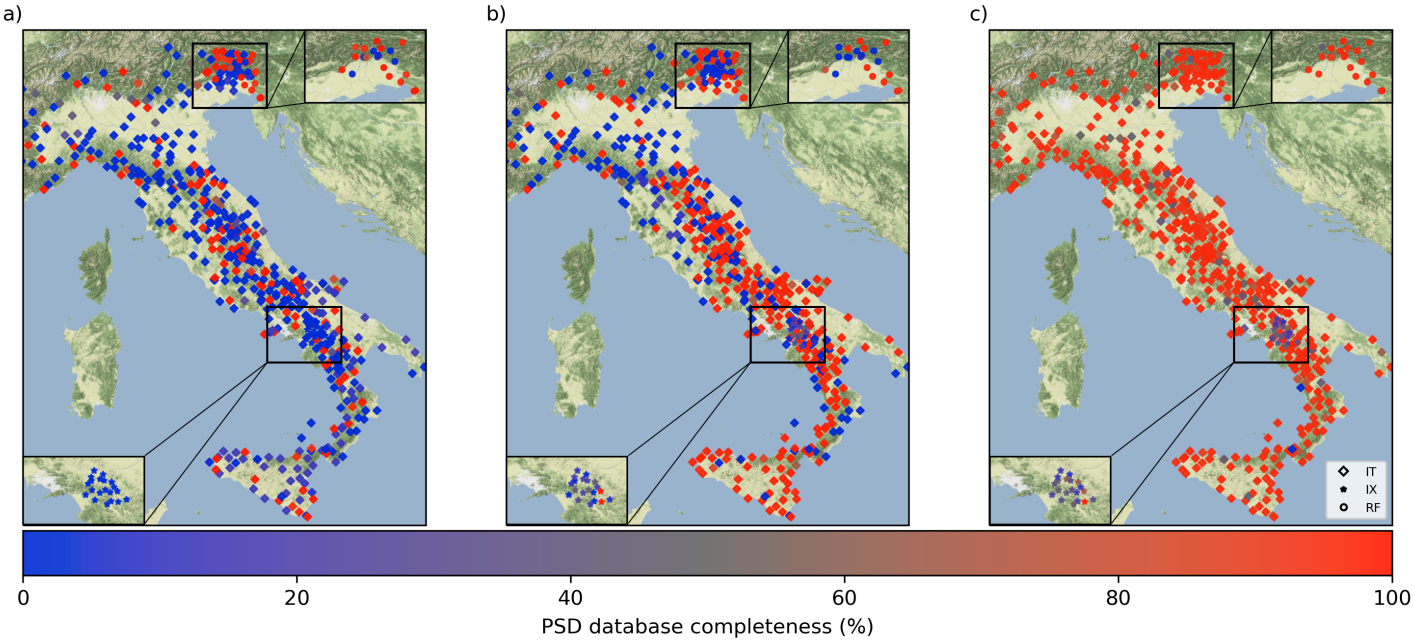
1. Line 5: ...anthropogenic ...Please be consistent to write this term in the same way throughout the text also figure captions. For example, it is written as “anthropic” in Line 98.
   We decided to use terms "anthropogenic" and "human activity" in general. In the updated version of the paper "anthropic" is used only in Figure 11 in which the term is used by the previous study.

Introduction

1. Line 49: ...RAN accelerometric network... Only “RAN” is enough here. Please be consistent with the abbreviations throughout the paper. ✓
2. Line 56: ...covid lockdown... Please be consistent (e.g. line 57: COVID-19) ✓
3. Line 62: ...more than 700 stations... How many exactly?
   We update the information related with the stations so that it is easier to understand the information related with stations. The RAN consists of more than 700 stations of which 532 provided continuous data in the time range that we are interested in. We have the exact current number of installed stations as we perform real-time monitoring using their data but since this number changes constantly due to the addition and removal of stations we prefer not to provide a specific number.
4. Can authors add also a paragraph from previous studies and their findings that use the same or different methods? Please also describe clearly the aim and purpose of your study which is missing in the text.
   We mention the previous studies in lines between 29-41. Model developed by Cauzzi and Clinton (2013) are used as a baseline and in many parts of the paper (eg. Figure 5, Table 3) comparisons can be found. In the discussion part some of our findings are compared with D’Alessandro et al. (2021)’s study since they both cover the same region.

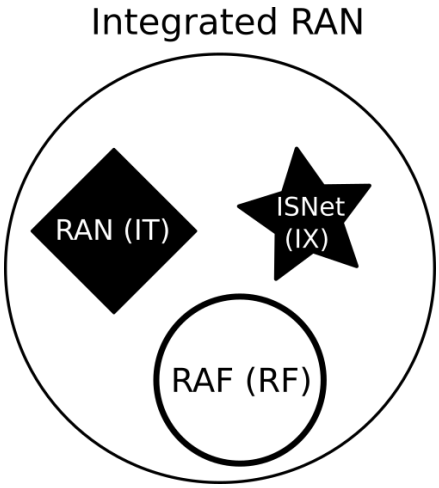
Data

1. Please add a diagram to clearly show the sub-networks that are involved in National Accelerometric Network (A supplementary figure is fine).
   The integrated RAN network is the combination of the following networks; i) the Friuli Venezia Giulia Accelerometric Network (RAF, Rete Accelerometrica Friuli Venezia Giulia in Italian, Costa et al. 2010) in the North-East Italy, owned and managed by the University of Trieste (UniTS) ii) Irpinia Seismic Network (ISNet, Weber et al. 2007) in the South of Italy, owned and managed by Analysis and Monitoring of Environmental Risk society (AMRA).
   We updated Figure 2 and it can be seen below. In the updated version diamonds, stars, and circles represent RAN (IT), ISNet (IX), and RAF (RF) networks, respectively. Colorbar presents the completeness of the data. diamonds represent the RAN network regardless of the completeness values. In the zoomed frames, ISNet and RAF networks are given different colours (star for IX and circle for RF) to explain where the stations are located.



Data availability of the stations in a) 2019, b) lockdown period, and c) 2022. The close up boxes in lower left and upper right highlight ISNet (IX) and RAF (RF), respectively. Basemap data are retrieved from © Stamen Design.

We also created a Venn diagram for the networks. We believe in the updated Figure it is clear to see the relation between networks so we believe it is not necessary to put the diagram that we provide here to put also to the supplementary material.



Components of the integrated RAN network.

2. Could authors give more information about the stations (e.g., type of instruments, sensor, the cut-off frequency) used in their analysis? We added information related to instruments. The cut-off frequency is 80 % of Nyquist frequency of the station. To provide a snapshot of the status of the network for each of the three periods considered, we prepared the table below considering the first day of each period (the same table is added to supplementary material):

Table 1: Evolution of the sensors at integrated RAN stations.

Sensors[a]	2019[b]	2020[c]	2022[b]	Sampling rate [Hz]
Kinemetrics EpiSensor	177	274	370	200
Syscom ms2007	3	3	87	200
Kinemetrics FBA-23	23	27	35	200
Guralp CMG-5T	0	15	20	125
Reftek 147A	0	0	4	200
CFX US4H	1	1	2	200
Lunitek FB	1	1	1	250

[a] Equipped with 24bit recorders
[b] Status at January 1st
[c] Status at March 9th

Results

1. Line 105: ...0.1 s, 0.25 s, 0.5 s, 1 s, 2 s, and 5 s...Why did the authors choose these periods? Did they do any analysis to determine them? A spectrogram plot would be helpful for selected stations in order to understand dominant periods. Please explain it in more detail in the Data&Method section, not in the Result section.
   We believe that the anthropogenic sources are the main noise sources in our network. Hence we selected several periods in which anthropogenic sources are dominant (see Figure 1). 2 s and 5 s are chosen since there is information related to wind and sea can be found. Although the selection of the periods is arbitrary, we considered the choices made in previous studies combined with our interest to see the noise levels in our network. We would like to see if the strong motion stations are susceptible to these noise sources. We have not plotted any spectrogram but we provide multi-year noise level changes in various stations. As the reviewer mentioned, the data can be visualized in many ways. For the sake of simplicity, we use Figure 3 to show how in different periods noise levels are changing.

2. Line 125: ...The results show that winters are noisier than the summers...Can authors quantify how much (with numbers)?
   As told in the line 125, in winter longer periods are noisier than the summer time. In 5 s noise level differences are not really in an agreement with 87 noisier stations with respect to 49 quieter stations. In longer periods, 8 s, 16 s, and 32 s, number of stations that are noisier in winter with respect to summer are 117, 121, and 115. Median dB changes for those 4 periods are 0.56 dB, 0.99 dB, 1.55 dB, and 1.33 dB, respectively. We add this information to the paper.

3. Line 129 – 138. I don't see any indication of results in these two paragraphs. Can you specify the ambient noise levels for the different periods that you selected for the lockdown period? Authors should mention the result in the text as they plotted in the figures in this section. If the authors don't mention any results, the first paragraph rather seems related to the Introduction part while the second one is data and/or method related.
   We added provided overall results related to the lockdown period to Section 4.1.

Discussion

1. Please see my general comments above. ✓

2. Line 190-194. Did the authors compare their results with the studies mentioned in this paragraph during the lockdown period?
   We add more detailed information related to several previous studies about the topic. However, depending on the approach to the covid-19 effects, in the previous studies different approaches have been used to see the effects. Hence, it is not always possible to do a direct comparison.

Conclusions

1. Please avoid redundant sentences here and emphasize the main findings, contribution, and significance of your work. ✓

Figures

1. Figure 1: I am not sure if this figure should be included in the main text. It can go to the Supp. Material. Please see my general comments about the figures above.
   We believe that Figure 1 provides a nice characterization of the noise in seismic records. It may help readers to interpret the noise level that we present in this study. Hence, we believe that Figure 1 should be in the main text. Figure 1 has also been improved by adding the one-third-octave bands used in our analysis to show the expected contributions to the recorded noise.

Lastly, I believe the paper could be improved in many ways with some additions and restructuring as suggested above and published in the journal NHESS after applying the required revision.