

Seismic Background Noise Levels in Italian Strong Motion Network
by Simone Francesco Fornasari, Deniz Ertuncay, and Giovanni Costa

Seismic data quality affects the earthquake monitoring capabilities of a seismic network significantly. More than that near-source strong motion records have great advantages for real-time estimation of earthquake magnitude by providing unsaturated recordings of moderate to large earthquakes to get fast and robust earthquake location and magnitude estimates. So, the quality of data from individual stations has to be estimated, evaluated and investigated constantly and regularly. In this framework, I found the submitted work of Fornasari et al. very valuable and precious. The results of the paper will be quite beneficial for the researchers who will use the data of the Italian Strong Motion Network. It is a necessity for each network to have similar studies investigating noise levels. So, I appreciate and encourage the submitted work and effort. I found this study, to have such an effort for Italian strong motion data, quite valuable. I would be in favour of the publication of this paper.

Line 1: "... with more than 700 stations." ITACA (https://itaca.mi.ingv.it/ItacaNet_32/#/station/search) refers to 836 stations for Italian Strong Motion Network, FDSN presents (<https://www.fdsn.org/networks/detail/IT/>) 523 stations. May you please provide a specific number, with a source?

Line 9: "... we focused on relatively short periods (≤ 5 s), interested **by** **in** anthropic noises."

Line 9: You refer "**anthropic**" noise/activities/sources in Line 9, Line 24, Line 98, Line 119, Line 186, Figure 11 caption.

You refer "**anthropogenic**" noises/sources in Line 5, Line 42, Line 75, Line 107, Line 165, Line 223

You refer "**cultural**" noise in Line 15, Line 140, Line 159.

If you are using these terms in the same meaning, please be more consistent in the usage. If you are referring to different meanings, please describe this.

Line 12: "... stations are located in densely populated areas such as **the** center of Naples, ...".

Line 14: "noise levels dropped to 6.5 decibels in **the** daytime and 12.5 decibels on weekdays. ...

Line 20: "On the other hand, noise can be used for the characterization of layers of the earth (Shapiro et al., 2005), **moon (Larose et al., 2005) or Mars (Schimmel et al., 2021).**"

Please refer also to those additional sources:

<https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2005GL023518>

<https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/2021EA001755>

Line 21-26: Please cite also (**Stutzmann et al., 2000**).

(<https://pubs.geoscienceworld.org/ssa/bssa/article/90/3/690/102808/GEOSCOPE-Station-Noise-Levels>)

Line 48: “ that ~~has~~ **have** been carried out for more than 25 years.”

Line 64-Line67: Please cite DOI’s, for these networks properly:

Italian Strong Motion Network - [10.7914/SN/IT](https://doi.org/10.7914/SN/IT) -

Friuli Venezia Giulia Accelerometric Network - [10.7914/SN/RF](https://doi.org/10.7914/SN/RF)

Irpinia Seismic Network - ?

Line 75: Regarding your comment about the change of the stations on Line 51-Line52; I may suggest you to perform 2022-year noise as a whole, in order to present a full understanding of the background noise for the mentioned networks. Then, to compare the results with the Covid-19 lockdown period provide more meaningful and stable results.

Line 112: “Numerous stations exceed the levels defined by Cauzzi and Clinton (2013).” May you please comment/discuss on the possible reasons of this situation.

Line 126: Diurnal and seasonal variations of seismic noise is well documented many years before **2021**. You should also check ([Stutzmann et al., 2000](#); McNamara and Buland, 2004), and please cite ([Stutzmann et al., 2000](#)), accordingly.

(<https://pubs.geoscienceworld.org/ssa/bssa/article/90/3/690/102808/GEOSCOPE-Station-Noise-Levels>)

Figure 1: Please mention what is “EM noise” and insert Cauzzi et al. (2014) to the References.

Figure 4: Does this caption refers to Supplement S1 or Table 4? Please, edit given period band in the caption accordingly. “ 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.**”