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# Detection of seismic signals from background noise in the area of Campi Flegrei: limits of the present seismic monitoring

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We study the seismic noise level at 26 temporary digital, high dynamical range, 3-D broad band seismic stations which operated in the area of Campi Flegrei during a three-month survey, with the main aim to find the detection threshold of seimic events in this area. The zone under study is volcanically active and exposed to a strong risk, being densely populated (one of the most known volcanoes "in town") and characterized by intense sporadic seismic swarms associated with ground uplift. We calculate the spatially interpolated 80-th percentile noise power spectrum for the area, starting from the spectral estimates at the single seismic stations. We then generate the equivalent power spectral density for a theoretical seismic source as a function of Magnitude (seismic Moment) distance and stress-drop, and finally plot in the same graph both theoretical source and interpolated noise spectra. These plots can be obtained for any source coordinates and recording site, giving a clear and easy view of the detection threshold in any location point of the area. Example results show that in the frequencies below 1 Hz the signal is detected starting from magnitude around 1.5. Magnitude about zero is instead the detection threshold for frequencies greater than 2 Hz. This detection threshold is a useful information for any future developments of the permanent monitoring seismic network, which urge to be improved with surface small aperture seismic arrays and borehole seismic stations in order to lower the noise level.