

EGU21-1285

<https://doi.org/10.5194/egusphere-egu21-1285>

EGU General Assembly 2021

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Discrimination of quarry blasts from earthquakes using artificial neural networks

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Seismic networks record vibrations that are captured by their stations. These vibrations can be coming from various sources, such as tectonic tremors, quarry blasts and anthropogenic sources. Separation of earthquakes from other sources may require human intervention and it can be a labor-intensive work. In case of lack of such a separation, seismic hazard may be miscalculated. Our goal is to discriminate earthquakes from quarry blasts by using artificial neural networks. To do that, we used two different databases for earthquake signals and quarry blasts. Neither of them have data from our study of interest, which is North-East of Italy. We used three channel signals from the stations as an input for the neural networks. Signals are used as both time series and their spectral characteristics and are fed to the neural networks with this information. We then separated earthquakes from quarry blasts in North-East Italy by using our algorithm. We conclude that our algorithm is able to discriminate earthquakes from quarry blasts with high accuracy and the database can be used in different regions with different earthquake and quarry blast sources in a large variety of distances.