

EGU21-8510

<https://doi.org/10.5194/egusphere-egu21-8510>

EGU General Assembly 2021

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



The national seismic network for the Maltese islands: Update 2021

Pauline Galea, Matthew Agius, George Bozionelos, Sebastiano D'Amico, and Daniela Farrugia

Department of Geosciences, University of Malta, Msida, Malta (pauline.galea@um.edu.mt)

The Maltese islands are a small country 15 km wide by 30 km long located about 100 km south of Sicily, Italy. Since 2015 Malta has set up a national seismic network. The primary aim of this network is to monitor in real-time and to locate more accurately the seismicity close to the islands and the seismicity in the Sicily Channel, offshore between Sicily, Tunisia and Libya. This Channel presents a range of interesting and complex tectonic processes that have developed in response to various regional stress fields mainly as a result of the collision between the African plate with Europe. The Maltese islands are known to have been affected by a number of earthquakes originating in the Channel, with some of these events estimated to be very close to the islands.

The seismotectonic characteristics of the Sicily channel, particularly south of the Maltese islands, is not well understood. This situation is being partially addressed through an increase in the number of seismic stations on the Maltese archipelago. The Malta Seismic Network (FDSN code ML), managed by the Seismic Monitoring and Research Group, within the Department of Geosciences, University of Malta, currently comprises 8 broadband, 3-component stations over an area slightly exceeding 300 km². We present a technical description of the MSN including quality control tests such as spectral analysis (Power Spectral Density and HVSR), station orientations and timings as well as examples of local and regional earthquakes recorded on the network. We describe the upgrades to real-time data transmission and archiving, and automated epicentre location for continuous seismic monitoring using the local network amalgamated with a virtual seismic network to monitor the seismicity in the extended Mediterranean region. Such a dense national network, besides improving epicentral location in the Sicily Channel, is providing valuable information on microearthquake activity known to occur in close proximity to the islands, which has been very difficult to study in the past. It also provides an important tool for analysing site response and site amplification related to underlying geology, which constitutes a major component of seismic hazard analysis on the islands. Furthermore, the increase in seismic stations to the seismic monitoring system provides more robust earthquake estimates for the tsunami monitoring/simulation system.

Funding for stations was provided by Interreg Italia-Malta projects (SIMIT and SIMIT-THARSY, Codes B1-2.19/11 and C1-3.2-57) and by Transport Malta.