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# Identifying the activation of an inland fault for the first time in Malta

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A key prerequisite to efficiently monitor seismic activity is the appropriate planning and deployment of seismic stations of a local network. The effectiveness of a recently extended local network in the Maltese Islands and applications of various methodologies on its data, are presented and further discussed. Using the data of the enhanced network, it was possible for the first time to identify the activation of an inland fault. Such accomplishment is important not only because it sheds light to the local tectonics but also contributes to an accurate seismic hazard assessment of the Maltese islands.

Since 1995 and until 2014 only one broadband station was installed on the island. The detection of several local events, using a single station location algorithm, indicated the need to improve earthquake locations and detectability. The Malta Seismic Network (ML) in the recent years was extended and currently comprises six broadband stations. Between June 2017 and September 2018, and in collaboration with Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS) in the frame of the project FASTMIT, 6 short period new stations were installed in key positions across the islands. This temporary network improved the overall network capability and served also to test new sites for permanent station locations.

The developments on the network have improved the detectability threshold and allowed the identification of activity that would have been misclassified or overlooked. In order to improve the detection of the events PyMPA software is adopted. Cross-correlation of continuous data using templates of the best recorded events, is performed and the new events are manually re-picked.

High precision event relocation in combination with Full Moment Tensor Inversion following the CAP method, is applied to identify and better determine the inland fault activation of a fault for the first time.

Such studies emphasize the importance of identifying local and regional fault zones activation, and their impact on the seismic hazard of the Maltese islands. Moreover, they lead to an understanding of the local and regional geodynamics, shedding light on the mechanisms that contribute to both the crustal deformation and the tectonics of the central Mediterranean.