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The SIMIT-THARSY project: Upgrading the real-time monitoring system and risk assessment for earthquakes and tsunami on the Maltese islands

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Within the SIMIT-THARSY project, the Maltese islands are upgrading their infrastructure for real-time earthquake and tsunami monitoring. The addition, through the project, of further broadband seismic stations to the Malta Seismic Network (MSN), managed by the Seismic Monitoring and Research Group (SMRG) of the University of Malta, has greatly improved the coverage for earthquake observations. The MSN now consists of eight broadband stations which will all feature online transmission, while a further three stations are planned. This upgrading means that smaller magnitude earthquakes occurring in all areas around the Maltese islands can be better detected and located. Such seismicity and microseismicity, although not generally presenting a threat to the islands, is helping to understand the nature and configuration of active faults on- and offshore the Maltese islands, which could potentially generate larger- magnitude events. Real-time earthquake monitoring, archiving and routine processing is carried out through SeisComP3 software, which is also used to create a virtual Mediterranean network for the monitoring of seismic activity in the Mediterranean basin and beyond. Also through the SIMIT-THARSY project, the SMRG has installed the tsunami monitoring package TOAST ((Tsunami Observation And Simulation Terminal) which integrates with SeisComP3 to detect tsunamigenic earthquakes, rapidly generate wave propagation simulations and predict arrival times and wave parameters at a pre-determined set of points of interest. This system, which is now operative, will contribute information to an eventual tsunami alert and preparedness programme that will be adopted by the national Civil Protection Department. A sea-level monitoring gauge will also be installed in the study area of Marsaxlokk Bay, southeast of Malta, which will contribute to the IOC online sea-level network that is integrated into the TOAST software for tsunami verification and modelling purposes.

Within the SIMIT-THARSY programme we are also implementing a seismic and tsunami-vulnerability index survey of buildings in the study area, together with geophysical investigations, which will be used to elaborate earthquake shaking and tsunami scenarios and form part of a Web-GIS database for preparedness and emergency management. In particular, single-station ambient noise measurements and seismic array analysis have been carried out in the test sites and earthquake scenarios will be computed combining both low and high frequency simulation methods. The results will be used to integrate the decision system mechanism in support of emergency planning.

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