



Introducing CAT (Centro di Allerta Tsunami), the Italian candidate Tsunami Watch Provider (It-cTWP) for the Mediterranean

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The recently established CAT (Centro di Allerta Tsunami) at Istituto Nazionale di Geofisica e Vulcanologia (INGV) will be part of the Italian National Tsunami Warning Center (It-NTWC) and it is a candidate Tsunami Watch Provider (cTWP) for the Mediterranean Sea in the framework of the Tsunami Early Warning and Mitigation System in the North-eastern Atlantic, the Mediterranean and connected seas (NEAMTWS). It-NTWC is a partnership of three Italian institutions: INGV, the Italian Department of Civil Protection (Dipartimento di Protezione Civile, DPC) and the Institute for Environmental Protection and Research (Istituto Superiore per la Protezione e la Ricerca Ambientale, ISPRA) which provides the sea-level data of the Italian mareographic network (Rete Mareografica Nazionale, RMN) in quasi-real-time. CAT is the operational part of the It-NTWC based at the INGV 24/7 seismic monitoring centre in Rome. CAT will be committed to deliver tsunami warning messages to DPC and, when it will enter its operational cTWP phase, to any IOC/UNESCO member state that will subscribe for the service. The current implementation of CAT is based on the NEAMTWS Decision Matrix (DM). Earthquake parameters are determined automatically by the Early-Est (EE) software, and used as an input to DM and tsunami travel times calculation to provide warning messages, including earthquake parameters, plus level of alert and estimated tsunami arrival time at pre-defined forecast points along threatened coasts. Basing on updated automatic EE solutions, seismologist's revision, and sea-level readings subsequent messages can be delivered until warning status ends. The use of the DM allows a rapid implementation of a tsunami warning system, but it does not consider some important features to better characterize a tsunami forecast, such as the earthquake's focal mechanism, the directivity of tsunami propagation and the morphology of the coast. More sophisticated procedures are currently under development: a database of pre-calculated, or calculated on the fly on GPU cards, tsunami scenarios, and rapid moment tensor calculation. The deployment of deep-sea tsunami (pressure) sensors is envisaged as well subject to budgetary constraints. A Decision Support System (DSS) is under development in order to integrate the different sources of information (earthquake parameters estimates and prior knowledge of the tectonic setting, numerical tsunami forecast, sea-level readings), and assist decision making during the first minutes after an event. CAT participated successfully in several NEAM communication tests within its function of National Tsunami Warning Focal Point (NTWFP) and the delivery of messages to DPC, ISPRA, and local authorities has also been tested. Preliminary CAT procedures have been tested internally, that is without delivering messages, also for two recent Mediterranean earthquakes: the M=6.6 occurred the 12th October 2013 offshore Crete and the M=5.9 occurred the 28th December 2013 offshore between Turkey and Cyprus. Here, we will present the current CAT implementation and describe its future developments.