

Multiparametric warning systems: Near real-time capabilities in the South Aegean region

Melis N.S.⁽¹⁾, D. Paradissis⁽²⁾, G. Drakatos⁽¹⁾, A. Marinou⁽²⁾, D. Anastasiou⁽²⁾, S. Alatza⁽²⁾, V. Zacharis⁽²⁾, X. Papanikolaou⁽²⁾, I. Kalogeras⁽¹⁾, G. Chouliaras⁽¹⁾, C. Evangelidis⁽¹⁾ and K. Makropoulos⁽³⁾

⁽¹⁾ National Observatory of Athens, Institute of Geodynamics, ⁽²⁾ National Technical University of Athens

⁽³⁾ National and Kapodistrian University of Athens

Warning systems are key elements in disaster risk reduction. Today, early warning systems, based on rapid earthquake detection, facilitate towards taking urgent action to mitigate damages, prior to the arrival of strong ground motion and/or tsunami. However, even when this is not possible, considering the location of the earthquake source and the monitoring facilities, the rapid assessment still is valuable for decision makers to direct emergency response within minimal time to the affected area.

Monitoring networks, such as broad band and strong motion seismic networks, as well as, cGPS and tide gauge networks, can facilitate to detect and evaluate the earthquake event and then assess the effect (i.e. the extent of damage area or tsunami origination, etc.). Scientific information that can also be extracted rapidly, could include, apart from the location (hypocenter) and the earthquake magnitude, the following: moment tensor estimation (point to the corresponding fault zone with its characteristics); evaluation of PGA recorded values and probable resulted ShakeMap; produce model of tsunami propagation and evaluate maximum wave height close to the shore and time of expected arrival to the probable foreseen inundation zone that needs to be evacuated.

In Greece and in the South Aegean region in particular, several networks comprising of broad band and strong motion seismic stations exist and they are in continuous real time operation. GPS stations, mainly used for studying crustal deformation, but also in real time some of them with high rate (1Hz) operation, densely populate the region. Recently, an effort to deploy tide gauge stations of modern type and incorporate them with cGPS has been undertaken by the National Observatory of Athens, Institute of Geodynamics (NOA-IG). This existed in operation infrastructure can be explored under the coordination of NOA-IG in collaboration with other Institutions and Organizations in Greece and abroad and facilitate towards risk mitigation of earthquake and tsunami hazard.

Examples are presented to indicate the possible operational capabilities of this infrastructure, if it functions in a unified manner, under a collaborative real time operation and under a coordination that will assure also the support, maintenance and long lasting functionality.