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Planning for Tsunami Early Warning System in the Marmara Sea

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Potential impact of natural disasters, such as earthquakes and tsunamis, on urban societies can be reduced by timely and correct action immediately following the disastrous event. Modern technology permits measurements of strong ground shaking in near real-time for urban areas exposed to earthquake risk. An Earthquake Early Warning System (EWS) forewarns an urban area (or facility) of the forthcoming strong shaking, normally within a few seconds to a few tens of seconds before the arrival of the destructive part of the strong ground motion. The existing Istanbul Earthquake Early Warning System (IEEWS) has 10 strong ground motion stations (24 bit resolution) located as close as possible to the Great Marmara Fault in on-line mode. Continuous telemetry of data between these stations and the main data center (KOERI) is realized with digital spread spectrum radio modem system involving repeater stations selected in the region.

Recently, KOERI has been nominated as one of the possible centers to be associated with the “Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS)” of the UNESCO Intergovernmental Oceanographic Commission. As a component of this center we plan to extend the existing IEEWS to function as a Tsunami Early Warning System in the Marmara Region. Two potential sources in the Marmara Sea region are identified for tsunami generation: Seismic sources and non-seismic sources (i.e. earthquake triggered submarine landslides). The IEEWS essentially serves only Istanbul area with stations located on the southern shoreline of Istanbul and as close as possible to the main Marmara fault line. Additional stations are proposed around Marmara Sea to cover the early warning system all around the Marmara Sea region. The system will also be integrated with the five OBS units currently being installed and individual stations consisting of three-component seismometers that provide almost real-time information on magnitude, location and depth of the earthquake immediately after the arrival of P-wave.