



Challenges and requirements for near-field Tsunami Warning in the Aegean Sea and Eastern Mediterranean

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The 20 July 2017 Bodrum–Kos (Turkey–Greece) earthquake (Mw 6.6) and the subsequent tsunami provided an opportunity to assess the progress and remaining challenges of an efficient tsunami warning system in the Aegean Sea and Eastern Mediterranean. Although the Bodrum–Kos tsunami was moderate with little damage to properties, it was the first noticeable tsunami in the Mediterranean Basin since the 21 May 2003 western Mediterranean tsunami and was a noticeable wake-up call from the mother nature. North East Atlantic, Mediterranean and Connected Seas Tsunami Warning System (NEAMTWS) Tsunami Service Providers (TSP) issued tsunami warnings to their subscribers and Civil Protection Authorities (CPA) at 10 min (CAT-INGV), 18 min (NOA/HL-NTWC) and 19 min (KOERI-RETMC) after the earthquake origin time. Even if a warning time of ~ 10 min would have been achieved by all TSPs, it might not have been sufficient for addressing near-field tsunami hazard with very short tsunami arrival times due to the fact that there is currently no efficient public alerting system in the region. Despite considerable progress and achievements made within the upstream components of NEAMTWS, while helping to identify improvements in the TSP operations and procedures, the experience from this moderate tsunami highlighted its limitations as a result of the use of decision matrix, which depends on earthquake magnitude determination and associated time requirements. More importantly, this event demonstrated the need for further efforts in the downstream components of NEAMTWS, such as further integration of Civil Protection Authorities (CPAs) and promoting education and preparedness programs for the people at risk, as a strategic priority for the NEAMTWS. As an example, local capacity building programs in coordination with municipalities, CPAs, TSPs, Ministries of Education, and other relevant stakeholders targeting development of inundation and evacuation maps, CPAs Standard Operating Procedures, local monitoring and Tsunami Early Warning Systems, local education programs and multi-hazard (earthquakes and tsunamis) exercises, should be promoted. This study reveals the limitations of NEAMTWS, lessons learnt from Bodrum-Kos tsunami and proposes possible remedies and improvements in order to increase the coping capacity of the system in various aspects.