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Scenario based tsunami wave height estimation towards hazard evaluation for the Hellenic coastline and examples of extreme inundation zones in South Aegean

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A scenario based methodology for tsunami hazard assessment is used, by incorporating earthquake sources with the potential to produce extreme tsunamis (measured through their capacity to cause maximum wave height and inundation extent).
In the present study we follow a two phase approach. In the first phase, existing earthquake hazard zoning in the greater Aegean region is used to derive representative maximum expected earthquake magnitude events, with realistic seismotectonic source characteristics, and of greatest tsunamigenic potential within each zone. By stacking the scenario produced maximum wave heights a global maximum map is constructed for the entire Hellenic coastline, corresponding to all expected extreme offshore earthquake sources. Further evaluation of the produced coastline categories based on the maximum expected wave heights emphasizes the tsunami hazard in selected coastal zones with important functions (i.e. touristic crowded zones, industrial zones, airports, power plants etc). Owing to its proximity to the Hellenic Arc, many urban centres and being a popular tourist destination, Crete Island and the South Aegean region are given a top priority to define extreme inundation zoning.
In the second phase, a set of four large coastal cities (Kalamata, Chania, Heraklion and Rethymno), important for tsunami hazard, due i.e. to the crowded beaches during the summer season or industrial facilities, are explored towards preparedness and resilience for tsunami hazard in Greece.
To simulate tsunamis in the Aegean region (generation, propagation and runup) the MOST – ComMIT NOAA code was used. High resolution DEMs for bathymetry and topography were joined via an interface, specifically developed for the inundation maps in this study and with similar products in mind. For the examples explored in the present study, we used 5m resolution for the topography and 30m resolution for the bathymetry, respectively.
Although this study can be considered as preliminary, it can also form the basis to further develop a scenario based inundation model database that can be used as an operational tool, for fast assessing tsunami prone zones during a real tsunami crisis.