

## The use of probabilistic tsunami hazard assessment in early warning system design

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Estimating the occurrence probability of natural disasters is critical for setting construction standards and, more generally, prioritizing risk mitigation efforts. Tsunami hazard in the Mediterranean region has traditionally been estimated by considering so-called “most credible” scenarios of tsunami impact for limited geographical regions, but little attention has been paid to the probability of any given scenario. We present here the first probabilistic estimate of earthquake generated tsunami hazard for the entire Mediterranean Sea. We estimate the annual probability of exceeding a given tsunami amplitude at any coastal location in the region by applying a Monte Carlo based technique. Earthquake activity rates are estimated from the observed seismicity, and tsunami impact is derived from deterministic tsunami wave propagation scenarios. The highest hazard is in the Eastern Mediterranean owing to earthquakes along the Hellenic Arc, but most of the Mediterranean coastline is prone to tsunami impact. Our method allows us to identify the main sources of tsunami hazard at any given location, and to investigate the potential for issuing timely tsunami warnings. We find that the probability of a tsunami wave exceeding 1 m somewhere in the Mediterranean in the next 30 years is greater than 95 percent. This underlines the urgent need for a tsunami warning system in the region.

