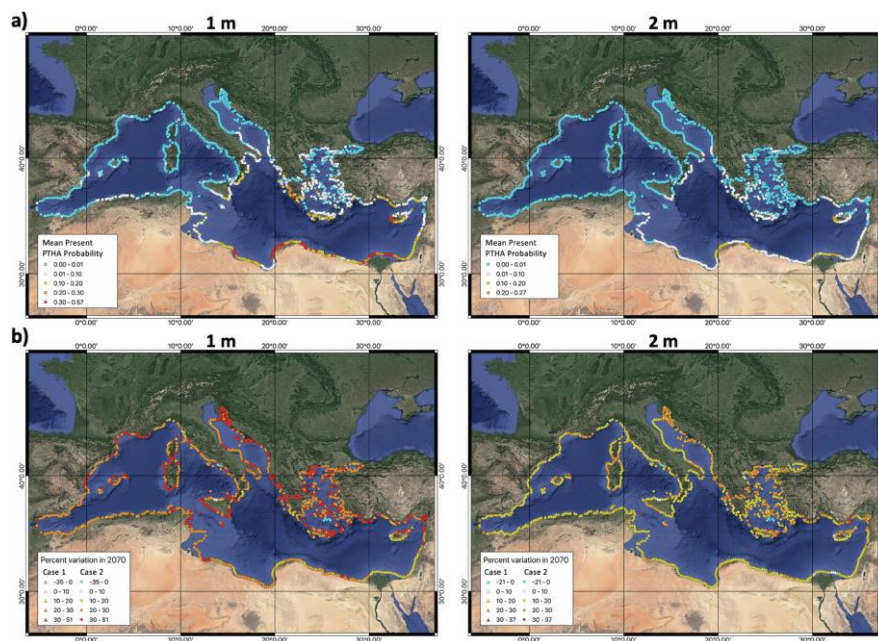


Including sea-level rise and vertical land movements in probabilistic tsunami hazard assessment for the Mediterranean Sea

Summary

Probabilistic tsunami hazard analysis (PTHA) introduces potential biases in tsunami risk assessment if it assumes static coastlines. Global warming, in addition to geological and local factors, may affect sea-level rise in the next few decades. Here, we provide a method that integrates the expected sealevel rise into existing PTHA, updating regional models without further tsunami simulations. We perform the tsunami hazard analysis at the densely populated Mediterranean coasts, which are highly exposed to tsunami inundations, as reported by historical and instrumental evidence. PTHA and related epistemic uncertainties significantly change when we include the time-dependent components, such as: (1) vertical land movements along the coasts, and (2) future sea-level changes based on the expected climate scenarios described by the IPCC AR6 Report. Probability maps show that the mean probability of exceeding the 1 m and 2 m maximum inundation heights in 2070 has a general increase differentiating locally, with percent variations mainly in the range 10–30% of the updated time-dependent PTHA compared with the current PTHA.



Probability maps with sea level projections. (a) Maps of probability of exceeding the 1 m and 2 m MIH (fraction of unit) in 50 years at the current coastline and (b) relative percent variations with respect to the updated time-dependent PTHA computed in the POIs relative to Case 1 and Case 2.

How to cite and download publication:

Grezio, A., Anzidei, M., Baglione, E., Brizuela, B., Di Manna, P., Selva, J., ... & Vecchio, A. (2024). Including sea-level rise and vertical land movements in probabilistic tsunami hazard assessment for the Mediterranean Sea. *Scientific Reports*, 14(1), 28873.

DOI: <https://doi.org/10.1038/s41598-024-79770-9>