



Tsunami hazard induced by a newly discovered landslide in the Tagus delta off Lisbon (Portugal)

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Deltas are sedimentary bodies with high sedimentation rates that are very sensitive to changes in environmental conditions. The Tagus delta off Lisbon (Portugal) is characterized by the presence of high energy deposit and erosive structures with an estimated age of approximately 8 ky BP. In this work, we investigate, through numerical modelling, the tsunami hazard induced by a newly discovered underwater landslide at the Tagus delta. The Tagus delta landslide is more than 9 km of length (parallel to the delta front) and more than 3 km of width with a maximum thickness of ~20 m with a volume of approximately 0.27 km³.

To model the landslide downslope movement and its induced tsunami we employed a Bingham visco-plastic model coupled to non-linear shallow water equations. The numerical simulations are performed over a high-resolution paleo-bathymetry that allows evaluating the tsunami hazard at the time of the landslide failure. We constructed the paleo-bathymetric model of the Tagus delta taking into consideration the sedimentation rates, the age of the landslide, and the paleo mean sea level. Additionally, we evaluate the tsunami hazard resulting from the occurrence of a similar-size Tagus landslide at the present-day bathymetric and sea-level conditions.

Results show that landslides at the Tagus delta pose a significant tsunami hazard to the surrounding coasts, particularly in Lisbon. Therefore, more attention must be given to shallow water submarine landslides and their induced tsunamis in the marine Geo-hazards assessment of the region.

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