



## **Tsunami Risk in the NE Atlantic: Pilot Study for Algarve Portugal and Applications for future TWS**

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Tsunami risk assessment is an essential component of any Tsunami Early Warning System due to its significant contribution to the disaster reduction by providing valuable information that serve as basis for mitigation preparedness and strategies. Generally, risk assessment combines the outputs of the hazard and the vulnerability assessment for considered exposed elements. In the NE Atlantic region, the tsunami hazard is relatively well established through compilation of tsunami historical events, evaluation of tsunamigenic sources and impact computations for site-specific coastal areas. While, tsunami vulnerability remains poorly investigated in spite of some few studies that focused on limited coastal areas of the Gulf of Cadiz region.

This work seeks to present a pilot study for tsunami risk assessment that covers about 170 km of coasts of Algarve region, south of Portugal. This area of high coastal occupation and touristic activities was strongly impacted by the 1755 tsunami event as reported in various historical documents. An approach based upon a combination of tsunami hazard and vulnerability is developed in order to take into account the dynamic aspect of tsunami risk in the region that depends on the variation of hazard and vulnerability of exposed elements from a coastal point to other. Hazard study is based upon the consideration of most credible earthquake scenarios and the derivation of hazard maps through hydrodynamic modeling of inundation and tsunami arrival time. The vulnerability assessment is performed by: i) the analysis of the occupation and the population density, ii) derivation of evacuation maps and safe shelters, and iii) the analysis of population response and evacuation times. Different risk levels ranging from “low” to “high” are assigned to the coasts of the studied area. Variation of human tsunami risk between the high and low touristic seasons is also considered in this study and aims to produce different tsunami risk-related scenarios.

Results are presented in terms of thematic maps and GIS layers highlighting information on inundation depths and limits, evacuation plans and safe shelters, tsunami vulnerability, evacuation times and tsunami risk levels. Results can be used for national and regional tsunami disaster management and planning.

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