

Title: Potential inundation of Lisbon downtown by a 1755-like tsunami

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Abstract: In this study, we present 10 m resolution tsunami flooding maps for Lisbon downtown and the Tagus estuary. To compute these maps we use the present bathymetry and topographic maps and a reasonable estimate for the maximum credible tsunami scenario. Tsunami modeling was made with a non-linear shallow water model using four levels of nested grids. The tsunami flood is discussed in terms of flow depth, run-up height and maximum inundation area. The results show that, even today, in spite of the significant morphologic changes in the city river front after the 1755 earthquake, a similar event would cause tsunami flow depths larger than one meter in a large area along the Tagus estuary and Lisbon downtown. Other areas along the estuary with a high population density would also be strongly affected. The impact of the tide on the extent of tsunami inundation is discussed, due to the large amplitude range of the tide in Lisbon, and compared with the historical descriptions of the 1755 event. The results presented here can be used to identify the potential tsunami inundation areas in Lisbon; this identification comprises a key element of the Portuguese tsunami emergency management system.

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