



Lessons on past tsunamis impacting Lisbon area, and consequences for tsunami alert.

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In this study we review the impact of past tsunamis in the area of Lisbon to infer the expected response of the future TWS. The study area covers the Tagus estuary, includes the coastal segment, corresponding to the south entrance of the estuary (Caparica), the heavy populated areas located along the estuary and Lisbon downtown. The tsunami impact is deduced from instrumental data, covering only tsunami events after 1881, generated by magnitude 8 earthquakes with epicenter in the Atlantic Ocean, and numerical modeling of large historical events.

The tsunami worst case scenario is established using the information on the most important well identified thrust faults in the area. The source parameters are fixed in order to ensure the wave height observed by the eyewitness of the 1755 event at the entrance of the estuary. In order to compare the past and present impact of this event an “antique” 50 m resolution DTM model was re-constructed, using historical cartographic data of the estuary.

Inundation is discussed in terms of flow depth and current velocity in downtown Lisbon and in terms of maximum wave height for coastal areas south and along estuary. The main results of this study show that the present day flooded areas along estuary correspond to the eighteenth century flooded areas plus the recent landfill areas.

The maximum wave heights, current velocities and flow depths observed in the area are used to produce synthetic tsunami warnings. The paper will also discuss the requirements on the seismic and sea level signals identification and characterization in order to optimize the alerting time for the population. It is important to check which and when the sea level signals can be used to have the certainty 100% that a Tsunami was generated and thus evacuate the possibly affected area.

Tsunami early warning in the Portugal is part of the international effort to implement the North East Atlantic and Mediterranean tsunami Early Warning System (NEAMTWS).