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Scenario Based Approach for Multiple Source Tsunami Hazard Assessment for Sines, Portugal

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In this paper, we present a scenario-based approach for tsunami hazard assessment for the city and harbour of Sines, Portugal one the test-sites of project ASTARTE.
Sines holds one of the most important deep-water ports which contains oil-bearing, petrochemical, liquid bulk, coal and container terminals. The port and its industrial infrastructures are facing the ocean to the southwest facing the main seismogenic sources.
This work considers two different seismic zones: the Southwest Iberian Margin and the Gloria Fault. Within these two regions, a total of five scenarios were selected to assess tsunami impact at the test site. These scenarios correspond to the worst-case credible scenario approach based upon the largest events of the historical and paleo tsunami catalogues.
The tsunami simulations from the source area towards the coast is carried out using NSWING a Non-linear Shallow Water Model With Nested Grids. The code solves the non-linear shallow water equations using the discretization and explicit leap-frog finite difference scheme, in a Cartesian or Spherical frame. The initial sea surface displacement is assumed to be equal to the sea bottom deformation that is computed by Okada equations. Both uniform and non-uniform slip conditions are used. The presented results correspond to the models using non-uniform slip conditions.
In this study, the static effect of tides is analysed for three different tidal stages MLLW (mean lower low water) MSL (mean sea level) and MHHW (mean higher high water).
For each scenario, inundation is described by maximum values of wave height, flow depth, drawdown, run-up and inundation distance. Synthetic waveforms are computed at virtual tide gages at specific locations outside and inside the harbour.
The final results consist of Aggregate Scenario Maps presented for the different inundation parameters.
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