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The effects of a local moderate tsunami in the Dover Strait on the French and English main harbors of the English Channel

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The Dover Strait is regularly shaken by small to moderate earthquakes which can be felt in the nearby cities Boulogne-Sur-Mer, Calais, Dover and Folkestone. Three destructive events have been documented during the Middle Ages including 1580 Dover Strait earthquake which has been largely felt in London. The isoseimal map of this main event shows a maximum MSK paleointensity of VIII in Calais and VII in Dover [Neilson et al 1984; Melville et al. 1996]. The Dover Strait has been studied using seismic-reflection method [Garcia-Moreno et al. 2014], seafloor sampling, boreholes and gravity anomaly [Everaerts and Mansy 2001], yet the actual tectonic context of the area stays hard to understand because of the lack of recent seafloor deformation and of large recent seismic events. Among other things the occurrence of a tsunamigenic earthquake is not totally impossible [Roger and Gunnell 2011].

We propose several numerical simulations of tsunamis where the seismic scenari are chosen according to the latest fault activity study of the area [Garcia-Moreno et al. 2014]. We used strike-slip and normal mechanisms for magnitudes ranging from 6.0 to 7.0. The propagation of the tsunamis from the source to the French an English coasts is made using a bathymetry with a grid step of 20m realized by the SHOM (Service Hydrographique et Océanographique de la Marine) within the TANDEM project. Using synthetic gauges, we measure the water elevation prediction at the entrance of the main harbours.

We push the investigation further for the case of Boulogne-Sur-Mer where the available topography-bathymetry map has a grid step of 10m. This fine bathymetry map enables to modelize the bassins and the embankments inside the harbor and thus to study the resonance of the site. Moreover Boulogne harbor is equipped with a maregraph that we use to compare the synthetic data with real water height registration. Using maregraph recording of rough sea or storm, we are able to evaluate the relevance of our resonance parameters. The method set up for studying the harbor resonance can be applied to the others site as soon as more detailed bathymetry will be available.

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