

Morphological changes due to tsunami impact: Numerical modelling of sediments transport and deposit at Tangier – Morocco

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Coastal areas in the North of Morocco are at risk of tsunami inundation. Overland tsunami propagation leads to widespread and dramatic changes in coastal morphology due to sediments erosion, transport and deposition processes. Tsunami sediments transport and morphological changes must take into consideration bed-load and suspended load transport of non-cohesive sediments and suspended load of cohesive sediments. Numerical calculation of suspended sediment transport/deposition is performed by solving the advection-diffusion equations for the suspended sediment, where the velocities are obtained from the hydrodynamic modelling. In this study, we assess the morphological changes under tsunami impact at the Bay of Tangier-Morocco. We use a coupled hydrodynamic and morpho-dynamic numerical code, based on two open sources codes: COMCOT and Xbeach, to simulate the tsunami impact and the associated sediments transport and deposition. COMCOT solves the shallow water equations to calculate the inundation characteristics (flow depth and velocity), while Xbeach allows solving the advection-diffusion equations to determine the amount of sediments eroded, transported and deposited. The results of this study are presented in terms of maps displaying the amount of sediments eroded, transported and deposited at the bay of Tangier following a tsunami similar to the 1755 Lisbon event. We find that the bay of Tangier is vulnerable to morphological changes under tsunami threat coming from SW Iberia margin.

This work is supported by the EU project ASTARTE – Assessment, Strategy And Risk Reduction for Tsunamis in Europe, Grant 603839, 7th FP (ENV.2013,6.4-3).