



Submarine mass movements as tsunamigenic sources offshore Tyrrhenian Calabria, Italy

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Several large earthquakes have affected the Tyrrhenian Calabria (Italy), often accompanied by moderate to destructive tsunamis. The events occurred in 1184 (Mw 6.8), 1638 (Mw= 7.1), 1783 (a long sequence with three Mw>6.7 earthquakes in two months, Mw=7.1 being the largest), 1905 (Mw=6.9) and 1908 (Mw=7.1) are well-documented historical examples. Moderate-to-large landslides have also been mapped by offshore surveys (e.g., the late-Quaternary landslide offshore Cape Licosa and in the Paola basin) and identified as potential tsunamigenic sources.

This work outlines the first steps of a systematic assessment of landslide-induced tsunami hazard for the Tyrrhenian coast of Calabria. The idea is individuating the typical shape and volume of earthquake-triggered landslides and studying their tsunamigenic impact along the coast. First, a literature review is carried out about known offshore and coastal slopes and margins defined potentially unstable. Then, by using the Minimum Lithostatic Deviation method, we investigate the stability conditions of the continental edge offshore western Calabria, selecting the sections that could be destabilized by a characteristic local earthquake. For these, the dynamics of the potentially triggered mass movements are simulated by means of the Lagrangian UBO-BLOCK model, while the tsunami offshore propagation and the coastal impact are computed through the UBO-TSUFDF shallow-water code.

The hazard assessment carried out in this work helps identify the sectors of the Tyrrhenian coasts of Calabria most exposed to tsunami hazard, which will be subsequently the focus of specifically-oriented, high-resolution hazard mapping. Moreover, we discuss the relevance of the selected scenarios in terms not only of hazard assessment but also of early warning.