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Landslide-generated tsunamis in the Ischia island (Italy)

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Tsunami hazard in the Gulf of Naples (South Italy) has never been clearly evaluated, though potential for tsunami generation exists both in view of the historical cases that are known to have occurred and in view of the potential sources that can be identified or suggested. This work, as part of the INGV-DPC project V3 on volcanic hazard and risk assessment associated to the Ischia volcanic complex, north-west of the Gulf, concentrates on the study of tsunamis generated by possible landslides from Ischia slopes.

The island has been characterized in the past by a strong volcanic activity, that deeply modified the morphology of the island, with residual processes still ongoing, like the Mt. Epomeo block resurgence. The catastrophic collapse that formed the big scar in the southern flank (known as Ischia Debris Avalanche, IDA, 2-3 km^3 volume, between 4 and 10 ky BP) can be taken as the upper limit case for tsunamigenic failures in the Ischia island, but the repetition of such an event in the near future is very improbable. On the other hand, smaller episodes of mass failures have to be taken into account. Ischia subaerial slopes are known to be prone to failures: though usually subaerial landslides do not reach the sea, the case of a tsunamigenic subaerial failure cannot be certainly ruled out. Further, a series of bathymetric surveys pointed out the existence of a lot of scars along the submarine flanks of the volcanic edifice, evidencing several past events and scenarios of possible future landslides. In this work we consider submarine and subaerial bodies, quite smaller than the one involved in the Mt Epomeo collapse, that were probably detached from slopes of the island. Our purpose is to evaluate the propagation and the impact of tsunamis in Ischia as well as in the nearby islands and

in the Gulf of Naples.

The simulation of the sliding motion is performed by means of the codes UBO-BLOCK (1D and 2D), developed at the University of Bologna, implementing a Lagrangian block model that considers the moving mass as divided in different interacting blocks. The tsunami generation and propagation is simulated through a finite-element model, UBO-TSUFE, that solves the Navier-Stokes equation with shallow water approximation on a triangular mesh and that is interfaced to the Lagrangian model through the codes UBO-TSUIMP (1D and 2D).