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A LARGE SUBMARINE COLLAPSE ALONG THE GELA BASIN MARGIN (STRAIT OF SICILY) AND ITS CONSEQUENCES ON THE COASTS OF SICILY AND MALTA

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The Gela Basin Margin (GBM), located in the Strait of Sicily (Central Mediterranean) between Sicily and Malta, is characterized by a steep slope, which breaks the wide shelf, known also as Malta Plateau, from about 200 m water depth down to over 700 m. The slope has been repeatedly affected by mass wasting processes during the Quaternary, as testified by several scars along the northern shelf edge and by the numerous deposits at its base (Minisini et al., 2007). The sequence and mechanisms of failure are rather complex and difficult to reconstruct exactly, due to the overlapping of different episodes that are hard to discriminate.

Although some events have been well described and characterized (Minisini and Trincardi, 2009), one large landslide located in the southern portion of the margin, about 30 km north of the coasts of Malta, has received so far little attention. The seafloor morphological characteristics include a large amphitheater, approximately 7 km wide starting just from the margin at less than 200 m sea depth, and a depositional area with a 15-km-long run out from the slope base. The reconstruction of the slide scenario, hereafter called Southern Gela Basin Slide (SGBS), entails a volume ranging between 3 and 4 km3.

The genesis of the slide might be due to local seismicity that is characterized by medium-size earthquakes with sources off South Sicily. The focus here is on the tsunamigenic potential of such event that is evaluated through in-house numerical codes (see for example Zaniboni et al., 2016). The slide dynamics is computed by means of the numerical code UBO-BLOCK1, implementing a block-model approach, providing the complete time history of the mass motion along the sea bottom. From this, the perturbation on the sea surface is evaluated with an intermediate code (UBO-TSUIMP) that accounts for the attenuation of the slide impulse due to the sea depth, filtering higher space frequencies. Note that the tsunamigenic trigger from landslides is not instantaneous as in the case of earthquake-tsunamis, but extends in time. The propagation of the wave is computed on a regular grid via the finite-difference code UBO-TSUFD (Tinti and Tonini, 2013), which allows us to compute the impact of the generated tsunami on the coasts of Sicily and Malta.

Considering the possible seismic genesis of this landslide, it is worth stressing that tsunamis induced by landslides, in turn triggered by even small earthquakes, can exceed the direct effects of the shake itself. In the present case, the tsunami is shown to affect the coasts of south-east Sicily and of the Malta archipelago.

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