Triggering factors and stratigraphic reconstruction of multi-stage failures in the southeastern slope of the Gela Basin in the Strait of Sicily (Central Mediterranean Sea)

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A dozen of submarine landslide deposits, rather small in size (ca.40 km^2), have been observed in the south-eastern slope of the Gela Basin in the Strait of Sicily, Mediterranean Sea. Their close proximity to several offshore oil and gas exploitation plants and other marine infrastructures might represent a menace if similar events prove to be recurrent. The Gela Basin is located in the Plio-Quaternary foredeep of the Maghrebian fold-and-thrust belt, and is restrained between the accretionary wedge of the Gela Nappe to the north and the grabens, opened during the Pliocene-Pleistocene rifting phase, to the south. The high sedimentation rate (110 cm / kyrs) contributes to form thick muddy deposits, in principle prone to mass gravitational processes in face of the existing topographic gradients. Although of lower intensity if compared to adjacent Mediterranean areas, the local seismicity may well represent a legitimate trigger mechanism for slope instability.

This study used multibeam bathymetry data and high resolution seismic data which revealed the presence of a 67-km^2 'nameless slide' with a clear seafloor expression, to the north of it an older 30-km major head-scar is visible, and seems to be cannibalized by 6 minor scars with a retrogressive style. To the south of the 'nameless slide' there are other two head scars, one of which 4-km-long and characterized by the close proximity to a 9-km-long and 400-m-wide moat, which might be considered as one of the contributing factors to slide generation. Moreover, 2 long piston cores (ca 10-m-long) recovered on the lower and upper slope, have been compared to the MeBo well cores recovered in the 'Twin Slides' area located 50 km away from the our study area in the north-eastern slope of the Gela Basin (Kuhlmann et al, 2014). The first piston core was collected at the toe of the 'nameless slide' and penetrated through a 4-m-thick recent mudflow, which seems to spread out over most of the study area, reaching an undisturbed sequence of sediments. In CHIRP profiles this sequence appears to be 20-m thick overlying another major older slide characterized by a chaotic facies (30-m at its pinch outs). This older

slide seems to be related to the major head scar visible at the shelf edge. The second piston core was collected in the upper southernmost tip of the slope, just below the moat. Biostratigraphic correlations with the MeBo well cores give the opportunity to constrain better the stratigraphic framework and the age of the multi-stage failures. This contribution belongs to one of the research projects of the European Training Network ‘SLATE – Submarine landslides and Their impact on European continental margins’ funded by the European Commission in the frame of the H2020 Marie-Skłodowska-Curie program.