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Submarine landslides in the Southern Adriatic basin: good candidates for potential paleoseismic analysis.

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The Plio-Pleistocene sedimentary succession of the western continental margin that surround the Southern Adriatic basin mainly consists of contourite depositional systems. The architectural stacking pattern of the contourites-linked bodies is sometimes interrupted by the presence of large-scale mass-transport complexes (MTCs). MTCs are spatially diffused along the margin and are characterized by high variability in size, morphology and geometries. In the northern sector of the margin MTCs derive from the remobilisation of upper-slope contourite drifts, whereas in the southern sector of the margin sedimentary instability involves shelf-margin, progradational deposits. The most prominent MTC of the northern sector of the margin is the Gondola Slide (GS) a large, deep-seated MTC composed of at least three distinct MTDs involving up to 40km3 of sediments. The events that have generated these MTDs have been enclosed within a robust chronological framework using sedimentary shallow piston-cores collected along the continental slope. The reconstruction of the age of these MTDs indicates that failures have repeatedly occurred along the margin during at least the last 55,000 years. Therefore, the GS case indicates that sediment instability processes can span a large portion of a sea-level cycle, pointing to triggering mechanisms that are independent from variations in the relative sea level position. The repeated GS failure events are therefore interpreted to be mainly triggered by earthquake shocks. The Southern Adriatic basin represents a seismically active area and earthquakes are generally cluster along long-lived shear zones. One of these zones, the Gondola Zone, which run across the shelf and the slope, close to the GS-MTC, has been site of paleoseismology analysis, indicating recent (younger than 5.5 kyr) tectonic deformation through E-W strike-slip faulting .
Basin-scale MTDs characterize also the southern sector of the continental margin. MTDs are present both along the base of the slope, where they are generally exposed at the seafloor and consist of large, up to 30 m high blocks and across the deep basin plain, where MTDs are buried at shallow depths. Shallow-seismic Chirp profiles show that, in the basin plain, MTDs are vertically stacked, with thicknesses ranging from 3 to 20 m. Seismically they show a quasi-transparent to chaotic seismic facies. Due to the fact that in the southern margin MTDs lie at depths below the seafloor that unreachable by standard sampling systems, their ages, characteristics and lithological composition are unknown, making it virtually impossible to evaluating the recurrence of the failures.
As the Southern Adriatic basin represents one of the most seismic spots of the Mediterranean area, the need to understand the relative importance of earthquakes as triggers of landslides is therefore crucial. This could be obtained by a specific long-piston core sampling strategy, which aims to collect up to 30 m of basinal sedimentary sequences. This will allow to obtain a complete record of geotechnical, sedimentological and cronostratigraphic parameters of the sedimentary bodies involved in the failures. The next step will be to obtain a comprehensive characterization of the MTDs in terms of recurrence, provenance, hazard, risk and controlling factors for the different failures.