



1 Evidence of widespread slope failures on the Southwestern Adriatic Margin. What goes next?

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The Southwestern Adriatic Margin, southern Italy, shows evidence of widespread slope instability extending from the shelf break to the base of slope, along a margin stretch of more than 150 km and over 2000 km². Evidence of slope instability includes numerous mass wasting features having highly variable run outs and thicknesses, thus suggesting a differentiated sediment rheology.

The SAM, during the last half million years, was affected by syn-sedimentary deformation which generated areas of local folding and faulting, affecting the deposition of younger sedimentary structures and offsetting the seafloor, locally.

The upper slope displays multiple and steep headscarps, secondary scarps and transverse cracks in consolidated sedimentary units. These units belong to the youngest of a set of Pleistocene regressive sequences with a basinward-dipping basal downlap surface acting as a possible weak layer. Mass wasting of these units generated a variety of morphologies and internal geometries indicating that failure occurred in repeated phases and followed markedly different deformation styles. Deformation styles range from movements of coherent slab-like masses to plastic flows and turbidity currents, reaching a total run out of 55 km into the basin floor.

The lower slope, dominated by late glacial and Holocene bottom current deposits (including sediment drifts and sediment waves), shows clear evidence of in situ, or limited-displacement, sediment deformation and diffused evidence of failure with

well-defined headscarps but negligible run out. In places, the absence of depletion zones comparable in size with the volumes that failed suggests that deformations affected semi-consolidated sediments with a highly effective remoulding of the seafloor sediment, possibly accompanied by sediment liquefaction.

Establishing the age of some of the failure deposits is difficult because the South-western Adriatic Margin is impacted by powerful bottom currents: the Levantine Intermediate Waters (LIW) and the North Adriatic Deep Waters (NAdDW). Both these water masses flow southward and seem to reinforce each other in the 400-600 m depth range, possibly resulting in substantial reworking of failure deposits and continuous winnowing of any potential post-slide drape.

Besides these deposits, very recent mass wasting features also occur on the South-western Adriatic Margin. Furthermore, the margin presents deposits that appear prone to failure as indicated by the presence of broad areas affected by creep processes and shallow vertical offsets upslope of the main scarps, which may indicate incipient retrogressive failure.

Predisposing factors conducive to sediment instability along the whole margin include oversteepening of the slope, seaward-dipping downlap surfaces at the base of regressive sequences and neotectonic activity, leading to the growth of localized folds and faults, while the intense seismicity of the area provides the most likely trigger for sediment failure.