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Licosa submarine slide, Eastern Tyrrhenian margin: characterization of a possible weak layer

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Licosa slide (Eastern Tyrrhenina Margin) is about 30 km^2 in extent and occupies a restricted portion of a broader mobilization area affected by in-situ deformation. The deposit that failed offshore Cape Licosa is a shelf-margin low-stand progradational wedge where the main mobilization surface coincides with its basal downlap surface (Trincardi and Field, 1991; 1992). Recently acquired high-frequency multibeam bathymetric data allow definition of areas where evacuation of the failed material was complete and areas where slide blocks remained in situ or underwent minimal downslope translation. In general, the difference between these two slide areas reflects the slope of the basal mobilization surface and, possibly, local variations in the mechanical characters of sediments near the basal surface. Full evacuation of the failed material took place where the basal surface is dipping seaward 2^o or more. The head scar is a composite morphological feature where multiple sub-vertical offsets define blocks and sole out on the basal slide surface. The toe region consists of a narrow EW-trending slope basin filled by slide blocks and loose material conferring a transparent acoustic facies to the resulting deposit and showing local evidence of up-dip deposition against the slope ridge.

Sediment cores indicate that the downlap surface at the base of the failed sediment section coincides with the last major seaward and downward shift in shelf margin progradation driven by glacial sea-level fall leading to the last glacial maximum. Failure occurred after low-stand progradation had ceased as indicated by the evidence that the slide scar is not filled by younger progradational deposits. Micro-paleontological determinations and AMS ^{14}C dates from the mud drape veneering slide scar and slide

deposits indicate that failure occurred during the late-Quaternary sea-level rise (Trincardi et al., 2003). Interestingly, in all cores the lower portion of GI1 (Greenland Interstadial I, Bijork et al., 1998) is reduced or missing at the base of the post-slide drape; this stratigraphic incompleteness extends to the C2 tephra (Neapolitan Yellow Tuff, ca. 14.3 cal. kyr BP), even though the study area is not far from the source of this widely reported Mediterranean tephra.

Licosa failure formed in response to a combination of predisposing factors and triggers including: 1) rapid deposition on the upper slope, during the LGM, resulting in the formation of a potentially unstable sediment section resting on a well defined basal surface; 2) the basal weak layer coincides with a shelly deposit with a dominant fine sand fraction prone to liquefaction; 3) the rapid drowning of unconsolidated sediment resulted in an increased hydrostatic load and enhanced pore pressure within the recently-deposited sediments; 4) failure occurred in response to this increase of hydrostatic load and/or in response to cyclic loading imparted by earthquakes, which are common and large on the tectonically-active eastern Tyrrhenian margin.