Open-slope, translational submarine landslide in a tectonically active volcanic continental margin (Licosa submarine landslide, southern Tyrrhenian Sea)

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Abstract: The southern Tyrrhenian continental margin is the product of Pliocene–Recent back-arc extension. An area of approximately 30 km2 of gentle (about 1.5°) lower slope of the last glacial outer shelf sedimentary wedge in water depths of between 200 and 300 m failed between 14 and 11 ka BP. We approached the landslide by multibeam and sub-bottom profiler surveying, high-resolution multichannel seismics, and coring for stratigraphic and geotechnical purposes. With regard to a slope-stability analysis, we carried out an assessment of the stratigraphic and structural setting of the area of the Licosa landslide. This analysis revealed that the landslide detached along a marker bed that was composed of the tephra layer Y-5 (c. 39 ka). Several previously unknown geological characteristics of the area are likely to have affected the slope stability. These are the basal erosion of the slope in the Licosa Channel, a high sedimentation rate in the sedimentary wedge, earthquake shaking, the volcanic ash nature of the detachment surface, subsurface gas/fluid migration, and lateral porewater flow from the depocentre of wedge to the base of the slope along the high-permeability ash layers. A newly discovered prominent structural discontinuity is identified as the fault whose activity may have triggered the landslide.