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# Interplay of volcanotectonic, sedimentary, and regional tectonic processes at Mount Etna's submerged south-eastern flank

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Collapses of coastal and ocean island volcanoes can cause damaging tsunamis and thus pose ocean-wide hazards. To assess the collapse hazard of an unstable flank, a profound understanding of its structural setting and active deformation is essential. This knowledge is, however, often missing, especially for the remote and submerged offshore part of the edifice. Long before satellite-based techniques were available, observations of extensional structures in the summit region and transpressive to compressional structures farther downslope helped to constrain flank instability onshore at many volcanoes globally. Similar deformation structures are also expected offshore where they might be even better preserved due to the absence of anthropogenic influence, limited weathering and erosion. However, in the offshore realm structures related to flank instability are masked by and interact with other processes that act on underwater slopes, such as bottom currents, downslope sediment transport, and regional tectonics. Furthermore, the remote location of offshore flanks complicates geophysical, geomorphological, and geological investigations. Using (micro-) bathymetric and high-resolution seismic data we analyse the seascape forming processes at the Eastern Sicily continental slope at the foot of Mount Etna's unstable south-eastern flank. We untangle seafloor structures related to volcanotectonic, sedimentary, and regional tectonic processes. This allows singling out patterns and structures related to volcano flank instability, such as the lateral and outward boundaries of the unstable flank. We identify a strike-slip fault that changes its morphological appearance from a sharp linear feature atop a pressure ridge north of Catania Canyon to an almost smooth seafloor further downslope, where gravitational sediment transport outbeats volcanotectonic activity. Sediment transport from the continent to the abyss occurs along several canyons and channels that partly align with fault systems. Furthermore, uplift at the distant toe of Etna's south-eastern flank may indicate compression from the downwards moving flank, while at the same time provoking erosional responses, e.g. landslides. This new information provides important constraints for kinematic models that seek to explain the drivers of flank instability. It also forms the base for future studies that will infer the styles and rates of offshore flank deformation from the geological record.