Geophysical Research Abstracts
Vol. 20, EGU2018-7887, 2018
EGU General Assembly 2018

A large-scale submarine slide offshore Mt. Etna: Possible record of early deformation at the eastern flank of the volcano

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Key structural features have been identified offshore of Mount Etna using multichannel reflection seismics and multibeam bathymetry. The offshore slope is characterized by a bulge-shaped morphologic high, protruding eastward (e.g., Chiocci et al., 2011), with a thrust fault that outlines the boundary of the bulge. This morphologic high is composed by a northern part, where a thick package of sedimentary strata has been thrust and folded, and by a less deformed southern part, which is interpreted as the northern prolongation of the Hyblean Plateau (Argnani et al., 2013). The NW-SE-trending Pernicana fault played a relevant role in the last 15 kyr, during the main building stage of the present volcanic edifice (Branca et al., 2004, 2011), representing the northern boundary of the collapsing eastern flank of Mt. Etna. Geological evidence indicates that the onset of the thrusting that affected the offshore morphologic high preceded the activity of the Pernicana fault. The onset of Mount Etna magmatism, leading to the intrusion of the large magmatic body, started at about 120 ka (Branca et al., 2004, 2011), and we infer that the intrusion-related deformation could be responsible for the initiation of shortening at the bulge frontal thrust. In the northern part of the offshore bulge, the Riposto Ridge represents the morphological expression of folding and thrusting. It is inferred that this deformation promoted the gravitational instability that originated a large-scale submarine landslide that is some 100s meter thick and covers a surface of over 50 squared km (Etna landslide in Argnani et al., 2013). The extensional faults observed in the Riposto Ridge result from a combination of large-scale folding and downslope gravity sliding. This contribution addresses the geometric features of this large scale slide and presents inferences on possible age and causes of instability.

References

Argnani A. and Bonazzi C. 2005. Tectonics of Eastern Sicily offshore. Tectonics 24. http://dx.doi.org/10.1029/2004TC001656 TC4009.

Argnani A., Mazzarini F., Bonazzi C., Bisson M., and Isola I. 2013. The deformation offshore of Mount Etna as imaged by multichannel seismic reflection profiles. J. Volcanol. Geotherm. Res. 251, 50–64.

Branca S., Coltelli M. and Groppelli G. 2004. Geological evolution of Etna volcano. In: “Etna Volcano Laboratory”, Bonaccorso, Calvari, Coltelli, Del Negro, Falsaperla (Eds), AGU (Geophy - sical monograph series), 143, 49-63.

Branca S., Coltelli M. and Groppelli G., 2011. Geological evolution of a complex basaltic stratovolcano: Mount Etna, Italy. It. J. Geosciences 130, 306–317.

Chiocci F.L., Coltelli M., Bosman A. and Cavallaro D., 2011. Continental margin large-scale instability controlling the flank sliding of Etna volcano. Earth and Planetary Science Letters 305, 57–64.