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Volcanism at the edge of a subduction plate: geophysical and morphological data revel a new set of volcanic structures in the Southern Tyrrhenian Sea

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Southern Tyrrhenian Sea represents a natural laboratory where the subduction and back-arc extension are responsible for an intense magmatism including island-arc, back-arc, and slab tear volcanoes. Major submerged seamounts as Vavilov and Marsili represent surficial expression of an upraising of deep rising asthenospheric melts as consequence of a stretching and rupture of the Europen plate during the east-retreating roll back of Apennine subduction system.
In the last decades, studies on the geology and major volcanic features of the submerged portions of the Tyrrhenian area become increasingly consolidated thank to the advancement in geophysical prospecting surveys, which allow us to unveils details of the seafloor. A constrained interpretative model of the volcanism associated to subduction environments was provided by integration of geophysical methods (seismic, potential field) and multibeam soundings for the physiographic reconstruction of the seafloor (Cocchi et al., 2017).
Volcanism at the edge of the subduction is enigmatic because lacks of comprehensive geological and geophysical data. Until today, an estimation on the real budget that tear faults counts in the global volcanism is unknown. Here, we present new data from Palinuro volcanic chain and surrounding volcanoes overlapping the E-W striking tear of the roll backing Ionian Slab in Southern Tyrrhenian Sea. In particular, we show new potential field data and modelling of an unknown volcanic structure located offshore the Cilento coast, north-westward of the Palinuro tear fault. New multibeam and magnetic data highlight a spreading-like volcanic complex with a local lows of magnetization close its centre probably related to an uprising of the isotherms or due to juxtaposing of separate volcanic edifices intruding a thick sedimentary sequence.
Volcanic and geophysical features indicate that this volcanic complex emplaces on the continental scarp. The geophysical modelling suggests a prevailing lateral growth of the volcano, similar to volcanic features observed east of Palinuro, which can point out the same or a similar volcanic/geodynamic process. This suggests that deformation related to crustal-lithosphere slab tear faults overlaps a larger area than that previously assumed (i.e the E-W elongated Palinuro-Glabro volcanic chain), underlining the relevance of tear faults in the evolution of a subduction system.