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On the relationships between tectonics and volcanism in the offshore Capo Vaticano, SE Tyrrhenian Sea, during the Plio-Pleistocene

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High-resolution bathymetry and a grid of single-channel reflection seismic profiles (Sparker and Chirp) were recently recorded in a sector of the upper slope of Capo Vaticano (CV) promontory (Tyrrhenian coast, W Calabria) where forward and inverse modeling of previously acquired aeromagnetic data highlight the presence of a WNW©\ESE elongated, 20 km long and 3¨C5 km wide, magnetized body extending from sea floor to about 3 km below sea level. Magnetic properties of this body are consistent with those of the medium to highly evolved volcanic rocks of the Aeolian Arc (De Ritis et al., 2010).
Forthwith offshore promontory, the bathymetry highlights a complex-shape seamount that develops along a WNW direction, orthogonally interrupted by NE-trending ridges (Loreto et al., 2013), the largest of which shows major- and minor-axes of ca. 11 and 2 km, respectively. Summit elevation is ca. 70 m. Several vented fluids points were imaged on top of the seamount by chirp profiles. The largest of which rises from seafloor up to 6/7 m within water column, assuming the acoustic water velocity of 1500 m/s.
Two faults systems associated with extensional faults are mainly observed on seismic profiles. High-angle NW-trending normal faults, SW-dipping, formed along the continental slope connecting the south-west continental shelf of the CV promontory to the Gioia Tauro basin (Pepe et al., 2013). These faults generally have small displacements, up to 40 m, and are sealed by Pleistocene deposits. A NE-trending normal fault, SE-dipping, is also observed on both chirp and sparker profiles. Its length is estimate to be more than 30 km, partially borders the NE-trending ridge intersecting the NW-trending fault. Landward, another NE-trending normal fault affects Pliocene and lower Pleistocene, and is sealed by upper Pleistocene.
The described new geophysical data lead to a re-examination of the magnetic anomaly field interpretation. In fact, the revealed NE-trending ridge encounters the CV NW-SE ridge just where the peak value of the Reduced-to-the-Pole magnetic anomaly lies. Therefore, the inherent source body is emplaced where the maximum fracturing occurs. This suggests highly magnetized material crystallized in a vertical conduit that fed a volcanic system, likely fault-controlled, surrounded by the almost not magnetized rocks of the Gioia and the Paola sedimentary basins and of the Arco Calabro Peloritano units.

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