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Structural setting, active tectonics and seafloor morphology of the northeastern Calabria accretionary prism (Ionian Sea, Italy)

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The Calabrian accretionary prism is the result of a complex interaction between subduction-related tectonics and sedimentation, active since the Eocene. The limited seismicity recorded in recent years in the area appears mostly associated to the subduction interface and could reflect either a weak subduction coupling or a slow subduction rate. Nevertheless, recent intense deformation and uplift of the seafloor has been observed within the accretionary prism.

The analysis of multichannel 2D and high-quality 3D seismic data, morphobathymetric data and instrumental seismicity, allows defining and characterizing both the deeper and shallower tectonic deformation affecting the northeastern sector of the Calabrian accretionary prism.

Besides the uppermost thrust fault of the Calabrian accretionary prism, that outlines the Crotona promontory, the shallow tectonic pattern of the prism is characterized by a belt of broad flat-topped anticlines, and a set of minor narrow structures, mainly NNW-SSE to N-S oriented, that present a variable relationship with the underlying main thrust faults. The uppermost sedimentary strata within the anticlines are affected by numerous small-scale extensional faults, not rooted at depth, likely due to outer-arc extension above uplifted depocenters. In places, the inversion of basin-bounding faults is also visible. More regularly spaced and cylindrical NW-SE anticlines are also observed in the Gulf of Taranto, in the outer sector of the accretionary prism, where a thrust/back-thrust tectonic style is present. The origin of the anticlines varies within the overall set and reflects the long-term tectonic evolution of the accretionary prism, with the oblique docking of the Calabrian accretionary prism onto the Apulian Escarpment as a key feature.