



## **A Case of active Slab-Transfer Edge-Propagator Fault along the eastern Sicily Slope (central Mediterranean)**

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The nature of the subducted African plate changes across the eastern Sicily slope, where the Ionian oceanic lithosphere passes to the west to the Hyblean-Pelagian continental lithosphere. The Malta Escarpment (ME) represents the dominant morphological feature offshore eastern Sicily and appears as a steep, eastward-sloping surface partly onlapped by the flat laying sediments of the adjacent Ionian basin. South of Siracusa the ME is not affected by recent faulting and the escarpment appears as an original slope, likely inherited from Mesozoic (or earlier) time, linking the deep Ionian basin to the east with the Hyblean carbonate platform to the west. The segment of the ME extending north of Siracusa, on the other hand, is characterised by the presence of a system of NNW-SSE, east-dipping extensional faults located along the morphological escarpment and a few km east of it. This fault system appears to have been active throughout the Quaternary and presents some seismicity (Amato et al., 1995; Giardini et al., 1995).

It has been recently suggested, mainly on the basis of GPS results, that a recent change in plate boundary configuration occurred in the region encompassing Sicily and southern Calabria (Goes et al., 2004; D'Agostino and Selvaggi, 2004). In particular, it has been inferred that a NNW-SSE-trending transform fault is currently connecting the NW-dipping Ionian subduction with a newly developed S-dipping subduction in the southern Tyrrhenian Sea. According to this scheme, such a transform fault should be characterised by a dextral motion and should increase its length with time (Wilson, 1965). However, the dominant extensional tectonics observed along the eastern Sicily slope cannot be easily fit into this interpretation. The neotectonics of the eastern Sicily

slope is related to the final stage of the southern Tyrrhenian backarc opening, driven by the rollback of the Ionian subduction, and reflects the complex interaction between the lateral ramp of the Calabrian Arc accretionary wedge, in the upper plate, and the passive sinking of the Ionian lower plate, which may be torn apart from the buoyant Hyblean-Pelagian lithosphere (e.g. Gvirtzman and Nur, 1999; Argnani, 2000). In this framework, the neotectonic extension affecting the eastern Sicily slope can be interpreted as a surficial expression of an ongoing lithospheric tear or slab-transfer edge-propagator fault (STEP fault sensu Wortel and Govers, 2004); as this tear likely occurs with scissor-like motion (e.g. Wortel and Spakman, 2000), large vertical throws are expected and can account for the observed extensional faults.

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