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PRIN Project 2010-11 “Active and recent geodynamics of Calabrian Arc and accretionary complex in the Ionian Sea”: new constraints from geological, geodetic and seismological data

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This contribution illustrates the preliminary results of our Research Unit in the PRIN Project 2010-11, which focuses on active and recent geodynamics of Calabrian Arc. The integration of the new geological, geodetic and seismological data supports the inferred recent plate boundary reorganization in the central-southern Mediterranean, where the regional GNNS velocity fields point to a deceleration or cessation of Calabrian Arc migration, and to extension along the axis of the Calabrian Arc, accommodated by normal faulting (e.g. Capo Vaticano and Messina Straits (Aloisi et al., 2012; Pepe et al., 2014; Spampinato et al., 2014). The study of the lateral borders of the Arc revealed that oblique strike-slip displacement has occurred during its southeastwards migration. Active dextral transtension is occurring along the NNW-striking Aeolian-Tindari Letojanni fault system, forming the southern boundary of the Arc. It joins to the north other two boundaries characterized by different tectonic regimes, a contractional belt in the southern Tyrrhenian sea, where a tectonic inversion has occurred since the middle Pleistocene, and the extensional one in northeastern Sicily and western Calabria (Palano et al., 2012; Barreca et al., 2014a). Along the northern boundary of the Arc, the so-called Pollino line (onshore) and Sibari Line (offshore), active deformation has been documented on folds growing above blind oblique thrust ramps extending offshore, controlling the present morphobathymetric pattern (Santoro et al., 2013). Although external to the Calabrian Arc, we also devoted attention to the front of the Maghrebian thrust belt in western Sicily where we presented the first evidence of historical co-seismic deformation on a thrust array running from the Belice area to the Sicily Channel (Barreca et al., 2014b). Morphotectonic analysis and fault numeric modeling of uplifted Pleistocene marine terraces and Holocene paleo-shorelines has documented that most of the uplift along the Calabrian Arc is related to regional processes and the residual to co-seismic displacement on major faults, both transpressional and transtensional, at the borders, and extensional along the chain axis.

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