Geophysical Research Abstracts
Vol. 20, EGU2018-8842, 2018
EGU General Assembly 2018

Hinterland-verging thrusting in the northern Sicily continental margin: a late collisional stage of the Sicilian Fold and Thrust Belt?

Attilio Sulli, Maurizio Gasparo Morticelli, Mauro Agate, and Elisabetta Zizzo
Department of Earth and Marine Science, University of Palermo, Italy

Backthrusting, nappe refolding, and normal faulting frequently characterize late collisional stage of an orogen. Shortening driven by backthrusting is widely reported in the Alpine orogen, and it has been proposed to be responsible for the increase of subsidence (Roure et al., 1990). Moreover delamination and backthrusting has been considered as related to subcritical condition of a Coulomb-type accretional wedge (Torres Carbonell et al., 2011). The Sicilian Fold and Thrust Belt (SFTB) was characterized by a three-stage evolution during the last 15 My: two main shortening events generated and developed at different structural levels (shallow- and deep-seated thrusts in thin-skinned thrust-model) and at different time intervals, involving mainly the Meso-Cenozoic carbonate units of the ancient African passive continental margin, followed by a more recent thick-skinned thrust-model involving the Plio-Pleistiocene deposits in the frontal area as well as the crystalline basement in the internal sector of the chain.

We investigated the northern Sicily continental margin by using differently-penetrative seismic reflection data, calibrated with field surveys and borehole data. The tectonic edifice appears to be interested, both offshore and onshore, by a structural style typical of a triangle zone bounded, on the southern side by N-dipping high-angle transpressional faults, mainly Early Pliocene to Early Pleistocene in age, and on its northern side, by high-angle S-dipping thrusts, deeply connected with a low-angle décollement layer. In the outer sector of the SFTB, double-verging structures (with NW and SE-tectonic transport) have been described for the Plio-Pleistocene evolution of the Gela Thrust System. The southern Tyrrhenian region is also interested by normal faulting and subsidence, delamination processes, and widespread deep seismicity.

A late Miocene-Quaternary northern migration of the plate margin producing opposite-verging structures is reported in the northern Africa plate boundary (e.g. NW Algeria Neogene margin; Yelles et al., 2009; Mauffret, 2007). A plate boundary reorganization during the latest 0.8–0.5 My with the development of backthrusts have been documented in the Mediterranean region (Goes et al., 2004).

Our hypothesis is that the most recent tectonic processes in the study region are representative of a late collisional stage in the northern Sicily mountain building and at a larger scale could be a precursor of a change in the subduction polarity in the central belt of Mediterranean, as a consequence of the ongoing collision of the African promontory with the thinned continental to oceanic sectors (Algerian and Tyrrhenian basins) of the European plate.

References

Goes S., Giardini D., Jenny S., Hollenstein C., Kahle H.-G. & Geiger A. 2004. Earth Planet. Sc. Lett., 226, 335-345.

Yelles K., Domzig A., Deverchere J., Bracene R., Mercier De Lepinay B., Strzerzynski P. , Bertrand G., Boudiaf A., Winter T., Kherroubi A., Le Roy P. & Djellit H. 2009. Tectonophysics, 475, 98-116.

Mauffret A. 2007. Tectonophysics, 429, 21-44.

Roure F., Howell D.G., Muller C. & Moretti I. (1990). Journal of Structural Geology, 12, 259-266

Torres Carbonell, P.J., Dimitri, L.V. & Olivero, E.B. 2011. Geological Society, London, Special Publications 2011, v. 349, 123-147.