Offshore Evidence for Contractional Tectonic Reactivation of the North Africa Margin, Western Mediterranean Sea, and Geodynamic Implications

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Since the closure of the Tethyan ocean and the collision of the Internal Zones with the African passive margin by 15 Ma, the slow convergence between Africa and Europe is accommodated in a different way, implying a tectonic reorganization of the plate limit. From a set of ~10 000 km of swath bathymetry and seismic lines aquired in 2003 and 2005, we reveal the development of young, active fault-related folds at the foot of the Algerian margin and describe its general pattern. The active faults identified depict similarities in length, tectonic style, position on the margin, and geometry (southdipping segments). This young tectonic system is well preserved in the sedimentary record and further supports the hypothesis of subduction inception, with a progressive transfer of stress at the boundary between continental and oceanic crust, i.e. near the foot of the margin. We show how the development and style of this system from West to East depend on structural inheritance and the Africa-Europe plate velocity field, and compare this evolution to the recent strain attern observed in the southern Alboran and Tyrrhenian Seas. We try to show how this new step of deformation is related to the Miocene collision of AlKaPeCA blocks, to slab detachment of the Tethyan ocean, and to shortening in the Tell and Atlas domains.