American Geophysical Union, Fall meeting 2011, San Francisco, Calif., 5-9 december, abstract #T53D-02

Recent Inversion, Seismic Potential, and Neogene Kinematics of the Algerian Margin (Western Mediterranean) from Offshore Studies *(Invited)*

Meeting 2011 Fall Meeting

Section Tectonophysics

Session Formation and Deformation of the Mediterranean Basins, Margins, and Arcs III

Identifier T53D-02

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Index Terms
Seafloor morphology, geology, and geophysics [3045]
Continental contractional orogenic belts and inversion tectonics [8102]
Continental neotectonics [8107]
Plate boundary: general [8150]

The reasons to study the Algerian margin (Western Mediterranean) are at least threefold: (1) the seismic hazard offshore is obviously present but unconstrained, (2) the way the opening of the Algerian basin occurred is highly debated, and (3) this margin represents one of the rare examples on Earth of an ongoing subduction inception. We present an overview of recent findings on the tectonic evolution of this margin, where most of the plate convergence between Africa and Europe is taken up today, mostly from cruises MARADJA and MARADJA2/SAMRA led by joint Algerian and French teams. Large, overlapping active thrust faults and folds apparently dominate the seismotectonic pattern from the Atlas domain on land to the foot of the margin offshore, with a clear segmentation. Strain is distributed across the whole area, with a significant part of the relative plate convergence taken up offshore. Fault activity offshore is tenuous and most often indirect (Plio-Quaternary growth strata, folds, uplifted basins, scars and slope breaks). Along the eastern margin, faults form stepwise, en-échelon systems on the slope and in the deep basin. Some thrusts identified turn to fault-propagation folds at the sub-surface. Thrusts interact with the sediment flux, Messinian salt and seafloor currents, forming complex structures at deep-sea fans and scarps or scars on the main slope breaks. The 2003 Mw 6.9 Boumerdes rupture is correlated segmented cumulative scarps on the slope and at the foot of the margin. Using various VHR seismic reflection and coring analyses, we show that the record of turbidite deposition since ca. 10.000 yrs can be identified and correlated over long distances within or across large segments of the margin affected by the 1954, 1980 and 2003 events. The consequences in term of earthquake size and recovery of their recurrences (identification of paleo-events) are explored and discussed. Although we cannot associate the triggering of large turbidity currents to a given fault, we find that the Algerian margin gathers favourable conditions to reconstruct times series of turbidites associated to significant earthquakes. Finally, we show that the structures inherited from the Algerian basin opening and from the Alpine belt building (AlKaPeCa blocks migration and collision) determine for a large part the size, style and location of this strain pattern. The overall geometry indicates the predominance of back thrusts, implying underthrusting of the young oceanic crust, although large dextral strike-slip structures may guide deformation at some places on land. The recent (probably less than 3 Ma) reactivation of the Algerian margin is strongly influenced by the subduction of the Tethyan Maghrebian ocean, implying not only an important roll-back of the slab, but also strong thermal, magmatic and isostatic effects of the slab evolution at depth.

Cite as: Author(s) (2011), Title, Abstract T53D-02 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec.