



Plate boundary evolution in the western-central Mediterranean: From the past to the present.

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The evolution of the Calabrian and Gibraltar arcs and that of the margins of northern Africa and Sicily are part of the final phase of opening of the western Mediterranean basins. Jointly, they are the central topic of the TopoMed project concerning the plate boundary reorganization of the western-central Mediterranean, one of the projects of the TOPO-EUROPE programme (EUROCORES/ESF). The structure and evolution of the Gibraltar arc region are discussed in a separate presentation.

This final stage of opening shows intriguing lateral variations from the Calabrian Arc, via the northern margin of Sicily to the North-African (Algerian) margin. In concert, they provide an excellent opportunity to study the evolution of an expanding oceanic realm that may be at the verge of entering a new phase of closure.

Our studies encompass detailed analyses of deep penetration seismic data, multibeam bathymetry and field observations, and numerical model experiments addressing lithospheric scale process-oriented aspects. Special attention is given to the aspect that the region is embedded in a context of ongoing Africa-Eurasia plate convergence and to the role of structures, inherited from earlier stages of basin opening, in controlling the recent and ongoing evolution.

For the Calabrian accretionary wedge the focus is on assessing the present state of deformation, including seismic activity, and other accompanying processes. We show that the Calabrian wedge is segmented (in direction along the arc) in two different lobes, the western and eastern lobe corresponding with detached and still continuous parts of the subducting slab, respectively.

For the Northern Sicily margin we propose that its earlier history involving STEP faulting has preconditioned the lithosphere structure to the extent that it promotes initiation of a new southward-dipping subduction zone. The northern African margin is in a very special transitional situation in which the retreating northward subduction has come to an end, and new southward-dipping subduction may possibly be initiated.

The study area is a regional scale natural laboratory in which the principal features of a Wilson cycle and their effect on surface tectonics, can be identified and investigated.