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Late Cenozoic Geodynamic Evolution of The Western Mediterranean

The Western Mediterranean consists of three paired back-arc basins and arcuate folded belts: 1) Gibraltar arc and Alboran basin, 2) Maghrebides and Algerian basin and 3) Apennines-Calabrian arc and Tyrrhenian basin. The origin of these basins and belts are associated to roll-back of different oceanic slabs. During Early Oligocene times a NE-SW striking active continental margin involving Iberian continent and Tethys ocean have been inferred for many authors. We propose that the Western Mediterranean opened at that time owing to Africa-Europe NE-SW convergence as a mega-continental tension gash. This feature developing in the continental margin resulted asymmetric because his oceanic free face side evolved to an arcuate shape. Thrusts developed in front of the arc-shaped, bowed-out continental units and extensional basins opened between separating units. The opening of these basins implies uplift and intrusion of asthenospheric material under the basins. With increasing convergence, this asthenospheric material was expelled laterally to the free face, helping to slab roll-back. Atlantic and Tethyan oceans played the role of free faces and thus controlled slab roll-back and arc facing direction. Atlantic slab roll-back has been to the west and Gibraltar arc face to the west. Tethyan slab separated in two pieces. Kabylian one was completely subducted and the growing belt collided with continental Africa. Apennine one is still active beneath the facing to SE Calabrian arc owing to the availability of oceanic lithosphere for subduction in the Ionian Ocean.