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Ophiolite belts in the sw-iberian variscan suture

[Antonio Ribeiro](#), *Fundacao da FCUL/Centro de Geologia (Portugal)*

Jorge Pedro, *Universidade de Evora/Centro de Geologia (Portugal)*

Colombo Tassinari, *Universidade de S. Paulo (Brazil)*

Jose Munha, *Universidade de Lisboa/Centro de Geologia (Portugal)*

Alexandre Araujo, *Universidade de Evora/Centro de Geologia (Portugal)*

Paulo Fonseca, *Universidade de Lisboa/Centro de Geologia (Portugal)*

Antonio Mateus, *Universidade de Lisboa/Centro de Geologia (Portugal)*

Pedro Gil, *Universidade de Lisboa/Centro de Geologia (Portugal)*

The SW-Iberia Variscan suture is the boundary between the Iberian (IT) and the South-Portuguese (SPT) Terranes, materializing the closure of Rheic and related oceans by northeast ward subduction of the SPT under the IT. The western segment of this suture displays imbrications of various units belonging to: (1) Neoproterozoic - Lower Palaeozoic Ossa Morena Zone (OMZ) relative autochthonous (locally covered by Lower-Middle Devonian limestones and shales); and (2) allochthonous complexes. The latter include disrupted slivers of (1), eclogite (370 Ma) klippen and slices of an internal OMZ ophiolite sequence (IOMZOS), a basal tectonic melange (Moura Phyllonitic Complex - MPC) and an external ophiolite (Beja-Acebuches Complex - BAOC). A large layered gabbroic sequence (Beja LGS) intruded (350-340 Ma) the southwestern suture domains. The BAOC is located between OMZ and STP and forms a continuous thin band of metamorphosed mafic/ultramafic rocks, preserving internal ophiolite features that display evidence of early obduction to the N; BAOC mafic rocks have Nd model ages of 380-440 Ma and their geochemical characteristics are consistent with generation in a back-arc basin which should be older than the (Upper Devonian) ophiolitic melange of NW Huelva. In contrast to the BAOC, IOMZOS form dismembered/highly incomplete, small scale, ophiolitic slices in MPC including mafic/ultramafic rocks with geochemical affinities identical to those of mid ocean ridge basalts (T-MORB); preliminary geochronological data indicate that the IOMZOS oceanic crust was contemporaneous with the (480-500 Ma) peralkaline magmatism in the northern OMZ continental autochthonous. These data suggest the existence of two ophiolite complexes with distinct ages and geodynamic significance. The IOMZOS should represent a wide ocean (Rheic) that opened near the Cambrian-Ordovician transition by a "rift-jump" from intra-cratonic setting (inside IT) to intra-oceanic rifting between IT and SPT. IOMZOS were emplaced by antithetic cold obduction in two stages (both with sense of shear to N-NE). The first stage (370 Ma) exhumates HP-rocks and creates a foreland bulge towards the OMZ SW flank; this mechanism controls the development of a Lower-Middle Devonian carbonate platform that deepens into the contemporaneous (NE) Terena flysch trough. The second stage corresponds to BAOC hot obduction carrying the IOMZOS klippen in piggy-back style and affecting the southern margin of Beja LGS at 340 Ma. It is suggested that the BAOC was a short-lived back-arc basin (Lower-Middle Devonian?), healing the narrow suture between IT and SPT. Therefore, it is concluded that a wide Rheic ocean existed during Lower Palaeozoic times, separating Iberia from (a promontory of) Gondwana and Avalonia, now represented by SPT.

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