GEODYNAMIC EVOLUTION OF SW EUROPE VARISCIDES

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On the basis of existing data, some of which recently obtained, the following geodynamic evolution for the SW Europe Variscides is proposed.

The Rheic Ocean starts to open at 500 My by splitting Avalonia and Armorica plates at the Gondwana origin. Cadomian basement and Cambrian over are thinned by extension of lower crust, including high-pressure granulites and eclogites, belonging to a pre-existent Cadomian suture, and an upper crust of granitic composition. Rifting is expressed as a break-up unconformity of Sardic phase and along with bimodal magmatism and high heat flow that led to the resetting of the older Cadomian ages at 500 to 480My.

Subduction of the SE side of the wide Rheic Ocean induces the opening of a small back-arc basin, the Palaeoethydis, between 430 and 390 My, and splitting the Armorican plates from the Iberia plate. Both Armorican and Palaeoethydis are cut by the Peso-Tomara-Ferreira do Alentejo (PTF) dextral transtension shear zone and the continental segment of Armorican terminates against this transform.

Hot subduction of the Palaeoethydis oceanic lithosphere at 390 My is immediately followed by collision of Armorica and Iberia, leading to the emplacement of the NW Iberian Foreatholom, rooted in the South Armorican suture outlined by high pressure metamorphism at 390-370 My.

At the same time, to the west of PTF transform, anasthetic obduction of the Beja-Beceites Ophiolites Complex takes place from the back-arc of Rheic, which is a lateral equivalent of Palaeoethydis, but also obduction of the main Rheic ocean that leaves some klippen on the top of Ossa Morena Zone, the SW margin of Iberia plus. Below the obducted ophiolites, the development of high-pressure regional metamorphism is due to tectonic overpressure by a thick-dense wedge mechanism, confirmed by recent image data of the Iberian profile.

The tectonic setting of the Armorica-NW Iberia and of the SW Iberia transect differs in the fact that the intervening continental Armorican plate between the main ocean (Rheic) and a minor ocean (Palaeoethydis) is only present in the NW Iberia but not in the SW Iberia transect.

Convergence continues after 390 My by intracontinental deformation of Avalonica and Armorica-Iberia and progressive tightening of the Iberian Armorican Arc (IAA) by dextral transpression of the Catalan Iberian Indenter as a prominentor of Gondwana. This explains the increasing displacemen and shortening from Iberia to Armorica as we move clockwise along the IAA.