GONDWANA 15
North meets South

ABSTRACTS BOOK

14-18 July 2014, Madrid
(Spain)

The Ibero-Armorican arc: indentation *versus* self-subduction

R. Dias[1,2,3,*], A. Ribeiro[4], C. Coke[1], N. Moreira[1,3] and J. Romão[5]

[1]*Earth Sciences Institute (ICT)/*
[2] *Geosciences Department, Sciences and Technology School, Évora University (ECTUE), Largo dos Colegiais, 2-Apartado 94, 7002-554 Évora, Portugal; *rdias@uevora.pt*
[3]*Industrial and ornamental rock research laboratory of University of Évora (LIRIO), Convento das Maltezas, 7100-513 Estremoz, Portugal*
[4]*Centro de Geologia da Universidade de Lisboa (UL), Geology Department, Sciences Faculty of Lisbon University (UL), Museu Nacional de História Natural e da Ciência (UL), Edificio C6, Piso 4, Campo Grande, 1749-016 Lisboa, Portugal*
[5]*UGHGC, Laboratório Nacional de Energia e Geologia, Estrada da Portela; Universidade Europeia*

In the Iberian Variscides it is possible to distinguish major arcuate structures; although highly studied, their characterization and genesis are still a matter of controversy. The main Ibero-Armorican Arc (IAA) is essentially defined by a NW–SE trend in the Iberian branch and an E–W trend in the Brittany branch; however, in northern Spain it is rotated 180º, sometimes known as the Cantabrian Arc (CA). The relationship between these arcs is debatable, being considered either as a single arc generated in one tectonic event, or the result of polyphase bending process. According to the last assumption, there is a later arcuate structure (CA), overlapping a previous major one (IAA). Whatever the proposed models, they must explain the presence of a sinistral transpression regime in Iberia and a dextral one in Armorican branch, and the temporal deformation range of Devonian to Upper Carboniferous (Dias and Ribeiro, 1995).

Another arcuate structure in continuity with the IAA, the Central Iberian Arc (CIA) was recently proposed (e.g., Martínez Catalán et al., 2014; Shaw et al., 2014) mainly based on magnetic anomalies, the geometry of major folds and Ordovician paleocurrents. However, this definition didn't take into account the described deformation events in the southern sectors of the Portuguese Central Iberian zone.

Considering the models proposed for the genesis of Iberian Variscan arcs, they could be ascribed to two major processes: oceanic lithosphere self-subduction and the indentation of a Gondwana promontory. The first argues that self-subduction of Paleotethys oceanic lithosphere induces whole-lithosphere buckling around vertical axes and thus the major Variscan arcuate pattern – according to this model, a previous linear chain was bent in a late and very fast stage (about 10 Ma). Although this model could be applicable to the CA, its extrapolation to the IAA does not explain either the transpressive deformation regimes that prevail in large sectors (dextral in Armorica and sinistral in Iberia), or the Devonian age of part of the Variscan deformation.

If a polyphase indentation model is considered it becomes possible to explain the observed situations: mainly the presence of important transcurrent kinematics in both branches of the IAA, and the progressive deformation from Devonian to Carboniferous times (with an earlier IAA genesis and a latter arcuate structure that is represented by the CA). We do not consider that the CA could be supported by the described Variscan structures.

Dias, R., Ribeiro, A., 1995. The Ibero-Armorican arc: a collisional effect against an irregular continent? Tectonophysics 246, 113-128.

Martínez Catalán, J., et. al. 2014. The late Variscan HT_LP metamorphic event in NW and Central Iberia: relationships to crustal thickening, extension, orocline development and crustal evolution. Schulmann, K., Martínez Catalán, J., Lardeaux, J., Janousek, V. & Oggiano, G. (Eds). The Variscan Orogeny. Geological Society, London, Special Publications, 405.

Shaw, J., et. al., 2014. Provenance variability along the Early Ordovician north Gondwana margin: Paleogeographic and tectonic implications of U-Pb detrital zircon ages from the Armorican Quartzite of the Iberian Variscan belt. Geol. Soc. Am. Bull.