



Basement nappes on the NE boundary the Ossa-Morena Zone (SW Iberian Variscides)

Jose Manuel Romao (1), Antonio Ribeiro (2), Jose Munha (3), and Luisa Ribeiro (4)

(1) National Laboratory of Energy and Geology, Geology Department, Apartado 7586, 2721-866 Alfragide, Lisbon, Portugal, Phone: +351214705436, Fax: +351214719018, manuel.romao@ineti.pt, (2) Lisbon University, Faculty of Geosciences, CEGUL and Geology Department, Lisbon, Portugal, Phone: +351213921844, aribeiro@fc.ul.pt, (3) Lisbon University, Faculty of Geosciences, CEGUL and Geology Department, Lisbon, Portugal, jmunha@fc.ul.pt, (4) National Laboratory of Energy and Geology, Geology Department, Apartado 7586, 2721-866 Alfragide, Lisbon, Portugal, Phone: +351214705400, Fax: +351214719018, mluisa.ribeiro@ineti.pt

The studied area is located in the Abrantes (W-central Portugal) region of the Ossa Morena Zone, where the NW tip of the Tomar-Badajoz-Cordoba Shear Zone (TBCSZ) stops against the Porto-Tomar-Ferreira do Alentejo Shear Zone (PTFASZ). The TBCSZ is a WNW-ESE sinistral transpressive intra-plate Variscan flower structure, whereas the PTFASZ is N-S dextral paleotransform during the Variscan Wilson cycle in SW Iberia.

The NE branch of the TBCSZ, with top to NE sense of thrusting, is characterized by the following tectonic units, from top to bottom:

- Paleozoic cover: Bimodal volcanics, marbles and arkoses, metamorphosed under greenschist facies (and displaying a minor thrust at the base), inferred to be of Lower Paleozoic age by stratigraphic correlation with other sectors dated as Cambrian to Silurian in the Ossa Morena Zone.
- Cadomian intermediate crust: low/intermediate pressure ($\sim 4 - 7$ kb) retrograded granulites, including a mafic (meta-gabbroic) component that yielded metamorphic zircons dated at 539 ± 3 Ma (Henriques et al., 2009).
- Cadomian upper crust: granitic gneisses, yielding prismatic, oscillatory-zoned, igneous zircons dated at 570 Ma, and 540 ± 5 Ma metamorphic monazites (Henriques et al., 2009).
- Cadomian volcano-sedimentary sequences: Greenschist facies black phyllites and greywackes, intercalated with black chert beds and bimodal metavolcanics (“Série Negra”), which are correlated with the Neoproterozoic sequences of the Ibero-Armorican Massif.

All the tectonic units are separated by top to NE thrusts, operating under ductile conditions in the upper units and under a brittle regime in the lower units; thus, inverting the inherited Cadomian crust below the basal décollement of Palaeozoic cover.

The tectonic units belong to the Ossa-Morena Zone and were transported towards NE, on top of the (very low-grade) Central-Iberian Zone relative autochthon (Ediacarian/Cambrian to Lower Devonian). The amount of the NE thrust displacement in the granulite basement nappe is considerable, at least 5 to 10 km, considering the presence of mafic granulites included in intermediate granulites, both retrograded into the amphibolite facies, in the SW Bioucas and in the NE Olalhas klippe, resting on top of the lower-grade poly-metamorphic Cadomian assemblages.

Geological data summarized above confirm the presence of Cadomian basement nappes that were reactivated under a thick-skinned thrust regime during the Variscan cycle; therefore, implying a poly-orogenic evolution for the studied tectonic units. TBCSZ represents a Cadomian suture that was initially reactivated during Lower Paleozoic intercontinental rifting, later evolving to transpressive intra-plate flower structure during the Upper Paleozoic Variscan convergence phase.

It is concluded that thick-skinned tectonic regime by Variscan reactivation of Cadomian basement is a major element in the geodynamic evolution in the internal zones of SW European Variscides and of the Variscan Orogen in general terms.