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Abstract book

Architecture of a (deformed) rift-related basin: new insights about the Cambrian rifting process on the Ossa-Morena Zone

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The Ossa-Morena Zone (OMZ) is the outermost domain of the Iberian Massif hinterland and presents a stratigraphic succession which records the process of rifting that occurs in the northern Gondwana margin, leading to the opening of the Rheic Ocean during Cambrian-Ordovician times. Although this zone has witnessed a complex tectono-metamorphic evolution during Devonian-Carboniferous times, related to the rise up of the Variscan Orogenic Belt, their central-north domains preserve a significant Cambrian succession that allows the restoration of the architecture and evolution of the Cambrian intra-continental rifting.

The rifting process related with the Variscan Cycle began during Lower Cambrian (Terreneuvian; ~530 Ma), being marked by a basal conglomerate-arkose unit, sometimes with significant felsic calc-alkaline volcanism, which unconformably overlies the Ediacaran strata (Série Negra Group), previously deformed during the Cadomian Cycle.

The basal conglomerate unit is covered by an extensive (detrital-) carbonate succession, with significant lateral variation of thickness. This succession can reach 300-500 m of thickness, namely in the Elvas Carbonate Formation (Vila Boim tectonostratigraphic block) and in the Dolomite Formation (Estremoz Anticline). In both sections, the carbonate unit is dominantly composed of dolostones without fossiliferous content, although the $^{87}Sr/^{86}Sr$ isotope signature reveals similarities with those characterize the lower Cambrian seawater. In Alconera and Sierra de Cordoba sections, lateral equivalent units (Sierra Gorda Mb and Pedroche Fm, respectively) show Archaeochyaths and Trilobite faunas that allow to consider those units as Ovetian (Series 2, Stage 3). Locally, volcanic rocks are found, however they are mostly sills and dykes.

At Stage 3 of Series 2-Miaolingian, the intra-continental stretching remains active in the central-north domains of the OMZ, triggering the individualization of sub-basins with different depocenters and whose geometry and depth influenced the stratigraphic succession: in deeper sub-basins siliciclastic sedimentation becomes dominant while in the shallower ones carbonate deposition remains. This can explain the thickness of Vila Boim and La Lapa silliciclastics in Elvas-Cumbres Mayores and Zafra-Alanis domains respectively, and the carbonate nature of Santo Domingo Fm. (and the Estremoz VS Unit?) in the and Sierra de Cordoba (and Estremoz) section(s). In those units, tholeiitic basalts are described.

During the Miaolingian, a major episode of crustal stretching took place, enhancing the central- north basin subsidence. Siliciclastic sedimentation is now accompanied by noteworthy bimodal volcanism with alkaline signature (Umbria-Pipeta or the Terrugem Basalts). Volcanism becomes less abundant towards the top of this succession, probably because the main extensional depocenter migrates to the southernmost sectors (current coordinates), where the Rheic Ocean nucleates. The geochemical evolution of magmatism during Cambrian, from tholeiitic towards alkalinity, is in agreement with the progression of intra-continental rifting and lithosphere thinning.

The Furongian-Lower Ordovician transition is marked by an unconformity/paraconformity

throughout the OMZ, sometimes marked by conglomerate layers, probably representing the break-up unconformity related with the Rheic ocean opening.

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