



Evidence of crust-doming in the Mesozoic rifting of the north-western Iberian Chain (Spain)

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The Triassic-Liassic transition in the NW margin of the Iberian Chain (Spain) was characterised by a strong extensional regime. Such tectonic regime was responsible for the reactivation of the NW-SE trending Celtiberian Rift, originally developed at the Permo-Triassic boundary. This rift was linked to the opening of the Neotethys Ocean, and enabled the ascent of the asthenospheric mantle and the emplacement of magmatic bodies in the NW margin of the Iberian Chain.

Regional tectonics were characterised by the development of semi-grabens, which determined the formation of NW-SE trending sedimentary basins. This extensional context enabled the rising and emplacement of the aforementioned magmas, which were basaltic and alkaline in composition. They were emplaced as multi-layered hypovolcanic bodies (mainly sills), intruding the Keuper plastic facies (Norian); the sills are always stratigraphically situated below the Imon formation (Rhaetian).

3 rock-types can be recognized throughout the vertical of the studied sills: 1) chilled margins to both sides (Ol+Ti-Aug+Pl+Ti-Mag), b) a central facies (major Ti-Aug+Pl, minor Ol and accessory Ti-Mag+Ttn+Ap) and 3) a cm-sized differentiated pegmatoid facies (Pl+Ilm+Ttn+Ap).

We have constructed 24 stratigraphic columns covering different outcrops of the studied sills and their host rocks, from the NW (Sierra de Cameros) to the SE (Sierra del Moncayo and its eastern prolongation) of the NW margin of the Iberian Chain; the stratigraphic columns cover the whole Triassic-Liassic rifting episode. Stratigraphic data indicate that: a) the thickness of the sills decreases from the NW (100-30 m) to the SE (50-5 m) and they are probably related to different emission centres; b) there is a conglomerate level in the SE area (Sierra del Moncayo), stratigraphically situated over the sills and below the Imon formation, which includes basaltic and limestone fragments. This conglomerate level reaches its maximum thickness (12 m) in the neighbourhood of the Beratón village; its thickness decreases further to the SE, where it is reduced to a few dm near Arándiga and Morata villages, indicating a decrease of the tectonic subsidence in the same direction.

The lack of mantle-xenoliths in the studied sills contrasts with the presence of this type of xenoliths in the cogenetic and coetaneous sills located closer to the Neotethys margin, further to the east (Tarragona and Mallorca areas). This fact can be related to the reactivation of the Celtiberian Rift (originally developed at the Permo-Triassic boundary) in the studied area, which allowed a quick ascent and emplacement of the basaltic magma in the different sedimentary basins. Indeed, a crust-doming related to an ascent of the asthenospheric mantle could have taken place in the NW margin of that Celtiberian Rift (Sierra de Cameros), in agreement with the higher thickness of the sills in that area and with their progressive differentiation towards the SE (Sierra del Moncayo).