

DETRITAL ZIRCON AGE CONSTRAINTS ON THE SEDIMENT PROVENANCE OF VARISCAN BASINS IN SW IBERIA: THE MISSING RHEIC OCEAN MAGMATIC ARCS?

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The mid-to late-Devonian Rheic suture between the Laurussia and Gondwana blocks that combined to form Pangea, can be traced along the Variscan orogenic belt across Western-Central Europe. In southwest Iberia, there are, however, no magmatic arc rocks that can be related to the closure, by subduction of its oceanic lithosphere, of the Rheic Ocean. The only magmatism recorded on both sides of the suture is of early Carboniferous age, when the Rheic Ocean is inferred to have already closed. If surface erosion removed the arc rocks, then sedimentary detritus should be preserved in basins peripheral to the suture (Beja-Acebuches Ophiolite). If subduction was intraoceanic, with an arc developed upon oceanic crust basement, then the resulting detrital zircon population should span the time when of subduction, whereas if subduction was beneath continental crust, then the resulting zircons should exhibit a component of inheritance from the basement upon it was built. In southwest Iberia, the Rheic Ocean suture separates the Ossa Morena Zone- OMZ of Gondwana to the north from the South Portuguese Zone-SPZ, thought to consist of a terrane that had previously accreted to Laurentia, to the south. Turbiditic strata from early Carboniferous synorogenic basins either side of the suture were sampled for provenance studies. U-Pb detrital zircon LA-ICP-MS geochronology reveals a large population of mid- and late Devonian (with main age clusters at ca. 391-387 Ma and 369 Ma) and early Carboniferous ages. Older zircons and inherited cores are largely absent in the detrital zircons separates. The mid-and late Devonian zircons are interpreted to have been derived from a source terrane of magmatic rocks with a simple geological history and which did not intrude into or through an older continental basement. Because the sediments characterized by the Devonian zircons were dispersed on both sides of the suture, we interpret the source terrane to have originally lain within the Rheic oceanic domain, and to have been completely removed by erosion. Our data are consistent with a model of Rheic Ocean closure by intra-oceanic subduction. The Tournaisian – Viséan sedimentary sequences overlying the SPZ and the OMZ provide the only record of the arc(s) that developed during closure of the Rheic Ocean and which were exhumed during collision and subsequently eroded.