




Tales from xenoliths: the link between the Papôa Volcanic Breccia and the Berlengas Archipelago (West Portugal)—geodynamic implications

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Received: 7 October 2022 / Accepted: 7 September 2023 / Published online: 22 November 2023
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Abstract

The Papôa Volcanic Breccia (Peniche, West Portugal) is a Mesozoic pyroclastic deposit that includes numerous igneous and metamorphic xenoliths belonging to the Variscan basement of the Lusitanian Basin, in which this unit outcrops. These rocks correspond mostly to syenogranites and diatexites affected by intense pyrometamorphism and, despite their strong secondary alteration by weathering, they still preserve several original petrographic features that are traceable to the lithologies that comprise the Berlengas Archipelago, located 15 km offshore the Peniche coast. New geochemical and mineral chemistry data now indicate a genetic relationship between these basement xenoliths and the Late Devonian migmatites outcropping in the Farilhões Anatectic Complex. Such evidence strongly suggests the physical continuity of these high-grade metamorphic terrains at least to the Peniche region, thus constraining the nature and composition of the crustal block beneath the sedimentary sequences of the Lusitanian Basin in the studied location. In addition, in situ LA–ICP–MS U–Pb dating of rutile formed during the pyrometamorphic event endured by the xenoliths provided an age of 92.3 ± 1.4 Ma for the Papôa volcanic eruption, placing this occurrence within the third magmatic cycle related to the opening and spreading of the North Atlantic Ocean in the West Iberian Margin.

Keywords Crustal xenoliths · Portuguese Mesozoic magmatism · Lusitanian basin · Variscan orogeny · Pyrometamorphism · U–Pb dating of rutile

Cuentos de xenolitos - El vínculo entre la Brecha Volcánica de Papôa y el Archipiélago de las Berlengas (Oeste de Portugal): implicaciones geodinámicas

Resumen

La Brecha Volcánica de Papôa (Peniche, Oeste de Portugal) es un depósito piroclástico de edad mesozoica que se encuentra en la Cuenca Lusitánica y que presenta numerosos xenolitos ígneos y metamórficos procedentes del basamento Varisco de esa cuenca. Estas rocas corresponden en su mayoría a sienogranitos y diatexitas que están afectadas por un intenso pirometamorfismo y que, a pesar de su fuerte alteración secundaria debida a meteorización, conservan características petrográficas originales que permiten asimilarlas a las litologías que componen el Archipiélago de Berlengas, ubicado a 15 km de la costa de Peniche. Nuevos datos geoquímicos y de química mineral indican una relación genética entre estos xenolitos del

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