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# Age of the basement beneath the Mesozoic Lusitanian Basin revealed by granitic xenoliths from the Papôa volcanic breccia (West Iberia)

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## | A B S T R A C T |

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The dyke of the Papôa volcanic breccia cross-cutting the Lower Jurassic sequence of the Lusitanian Basin (West Iberia) contains granitic xenoliths. In this study, for the first time, U-Th-Pb zircon analysis of two xenoliths yielded c. 298Ma for the biotite granite and of c. 305-291Ma for the two-mica granite, indicating that the pre-Mesozoic basement of the Lusitanian Basin includes Permian intrusions. These ages are close within the margin of error to the age of the Late Carboniferous granites of the Berlengas isles that with the Late Devonian high-grade metamorphic rocks of the Farilhões isles, located northwest of the study area, form the pre-Mesozoic basement of the Lusitanian Basin. These new geochronological findings enable us to establish that Permo-Carboniferous magmatism lasted at least 14Ma in this region, as in other regions of the Appalachian-Variscan belt. Furthermore, a comparison with available data from Paleozoic tectonic units of the Appalachian-Variscan belt located in and outside the Iberian Massif suggests that the Lusitanian Basin (Peniche) most probably rests on the South Portuguese Zone, which may correlates with the Rhenohercynian Zone present in southwest England, and the Meguma terrane of Nova Scotia.

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**KEYWORDS** | Pyroclastic breccia. Xenoliths. Granitic rocks. U-Pb zircon dating.

## INTRODUCTION

The study of xenoliths in volcanic pipes can enable the characterization of the magmatic and metamorphic rocks that constitute the crust at depth. This approach is particularly relevant where such rocks that have formed at deeper crustal levels are not exposed in a given basin or occur hundreds of kilometres away from the basin with no apparent relationship with it. The ascent of magma to its level of extrusion may involve the incorporation

of fragments of solid rock material from the host rocks through which it has passed (e.g. [Dostal et al., 2005](#); [Puelles et al., 2019](#)). Therefore, a volcanic pipe that cuts a sedimentary basin, whose basement rocks are unknown, may provide evidence of the deeper crustal rocks preserved as xenoliths, of which granites are a good example. This paper describes the field occurrence of two granitic xenoliths from the Papôa intrusive volcanic breccia in the Jurassic strata of the Lusitanian Basin (western Iberia).