

## **Figueira de Castelo Rodrigo-Lumbrales anatectic complex (Central Iberian Zone): new geothermobarometric data**

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In the Central Iberian Zone (Iberian Massif) there is a significant change in the Variscan D<sub>1</sub> trend from the dominant NW–SE to E–W (Marofa and Ahigal de los Aceiteros synclines). This change is due to the 65 to 100 km sinistral movement of the Juzbado–Penalva do Castelo shear zone (JPCSZ), a composite structure where several shear bands formed as a result of progressive deformation (Pereira et al., 2013). Despite some uncertainties, the JPCSZ has been considered to have been active during the Variscan D<sub>3</sub>, syn- to-post regional metamorphic peak (Villar *et al.*, 2000). The JPCSZ was responsible for the exhumation of the Figueira de Castelo Rodrigo–Lumbrales anatectic complex, resulting in its juxtaposition to low-grade (350–450 °C) metasediments. The complex is essentially composed of metatexites, diatexites and two-mica anatectic granites. We present new geothermobarometric data in order to better constrain the regional metamorphic climax, as well as the evolution of this first-order Variscan tectonic feature.

Mineral analyses were conducted on a JEOL JXA-8200 electron microprobe and P-T estimates were obtained using THERMOCALC software (Holland and Powell, 1998), version 3.33. Due to lack of garnet in the migmatites, peak metamorphism calculations were made using interlayered calc-silicate rocks with a mineral assemblage of plagioclase + biotite + amphibole + clinopyroxene + garnet ± titanite ± apatite ± zircon ± oxides. These minerals are chemically unzoned, displaying flat rim-core-rim chemical profiles. The garnet is grossular-rich ( $X_{\text{Alm}} = 0.51$ ;  $X_{\text{Py}} = 0.05$ ;  $X_{\text{Gr}} = 0.31$ ;  $X_{\text{Spss}} = 0.13$ ), whereas clinopyroxene is essentially hedenbergitic ( $X_{\text{En}} = 0.25$ ;  $X_{\text{Fs}} = 0.28$ ;  $X_{\text{Wo}} = 0.47$ ). Peak paragenesis is also composed of plagioclase ( $X_{\text{An}} = 0.95$ ) and ferrohornblende. P-T estimates using garnet-pyroxene-amphibole-plagioclase equilibrium reactions establish the metamorphic peak at  $725 \pm 50$  °C and  $5.4 \pm 1$  kbar.

These new results are compatible with a geothermal gradient of  $36$  °C km<sup>-1</sup>, slightly higher than that prevailing in typical Barrovian-type conditions, implying relatively shallow depths for crustal anatexis during Variscan orogenic events. These new results provide an explanation for the absence of garnet in the anatectic pelites, whereas the absence of mineral zoning in the peak parageneses suggests fast exhumation of the Figueira de Castelo Rodrigo–Lumbrakes complex induced by the JPCSZ. If the low-grade rocks were formed under the same geothermal gradient, the vertical exhumation of migmatitic rocks from their level of generation to the final juxtaposition with greenschist facies rocks is estimated to be over 12 km.

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