U-Pb age constraints on the source, cooling and exhumation of a Variscan middle crust migmatite complex from the Central Iberian Zone: insights into the Variscan metamorphic evolution and Ediacaran paleogeographic implications

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Supplementary Material 2: Lithological description

The low-grade metamorphic units (chlorite to biotite metamorphic zones) are represented by phyllites (Fig.3a) and quartzphyllites (Fig.3b) that, generally, show schistosity nearly E-W (N90-100º; subvertical). These metasediments are deformed close to the Huebra shear zone. These phyllites are composed of quartz, muscovite, biotite, and minor plagioclase and chlorite; and accessory minerals, such as titanite, zircon, apatite and opaque minerals.

The granites are essentially of two-mica type (Fig.3c), with biotite and muscovite appearing in different proportions giving origin to the different facies. The grain size of these granites is also diverse. Some granitic outcrops reveal deformation which matches the movement of the JPCSZ (Fig.3d; further details in Pereira et al., 2017). Granites are mainly composed of quartz, plagioclase, K-feldspar, biotite, muscovite and minor fibrolitic sillimanite with an accessory mineral assemblage that includes zircon, apatite, rutile needles and opaque minerals.

The metatexites exhibit stromatic textures where the banded orientation is inherited/coincident with the phyllites' schistosity (E-W; subvertical). Centimetric or millimetric bands of peritectic sillimanite associated to muscovite are occasionally found in metatexite (Fig.3e). In some outcrops leucosomatic pockets and leucosome veins are found associated (Fig.3f). At times, the leucosomes of centimetric dimension occur as E-W boudins (Fig.3g). The majority of leucosomatic veins are parallel to the pre-migmatization structures (schistosity) in their host, but some are cross-cutting. The metatexite paleosome exhibits, predominantly, biotite and muscovite. The leucosome in the metatexites has a dominant quartz-feldspar composition. Fibrolite occurs included in the retrograde secondary muscovite.

The diatexites show structures such as restitic nodules (Fig.3h), schlieren structures, and, occasionally, ptygmatic folds. Near the shear zones, the diatexitic outcrops reveal shear deformation planes (ductile deformation) nearly oriented E-W, subvertical (Fig.3i). Pegmatitic and leucosomatic veins forming vein-structured diatexites are also observed. Nebulitic textures are also occasionally present. The mineral assemblage of the diatexites comprises quartz, plagioclase, K-feldspar, biotite, secondary muscovite and minor fibrolitic sillimanite. Based on whole-rock geochemical data, the diatexites were divided in two groups (Ferreira et al., 2020): diatexites type-1 and diatexites type-2. Diatexites type-1 have high Rb composition and fractionated HREE (heavy rare earth elements) are geochemically more akin with the S-type granites. Conversely, the diatexites type-2 are Rb-poor and have unfractionated HREE, and they are more SiO_2 enriched than the diatexites type-1 and granites. Ferreira et al. (2020) inferred that type-1 diatexites and granites were produced by dehydration-melting of muscovite and the type-2 diatexites required influx of externally derived fluids during melting, representing a more evolved melt composition than the outcropping granites.

References

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