

## Abstract title

ARGON-ARGON AGES IN MICAS FROM METAPELITES OF THE OVAR-ESPINHO AREA (NW PORTUGAL): DATATION OF METAMORPHISM RELATED TO THE VARISCAN D3

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## Abstract

The Ovar-Espinho area is geologically characterized by the presence of the northernmost outcrops of the Ossa-Morena Zone, easterly bounded by the Oporto-Tomar shear structure. The dominant lithologies are metapelites (phyllites, micaschists and migmatites) with some metabasic (greenschists and amphibolites) intercalations; the protoliths of these rocks are of probable Proterozoic age. Hercynian magmatism is represented by small intrusions of granites and aplites.

In the studied area, there is a continuous metamorphic zonality, with increasing grade from West to East, from the chloritoid zone to the sillimanite zone, passing through the staurolite zone. These three metamorphic zones can be divided into five subzones with the following parageneses in the metapelites: 1) Ms+Chl+Qtz±Cld±Gr±Ilm; 2) Ms+Chl+Qtz±Bt±Cld±Grt±St±Ilm; 3) Qtz+Ms+Bt+Grt±St±Ilm; 4) Ms+Qtz+Bt±Sil±Grt±St±Ilm±Pl±Tur; 5) Bt+Ms+Qtz±Sil±Ilm±Grt±Pl±Tur.

The most penetrative structure is Variscan D3 crenulation schistosity, superimposed on D1 flow schistosity. D3 schistosity is commonly affected by dextral shear planes related to the activity of the Oporto-Tomar fault still during the third Variscan phase. Blastesis-deformation relationships show that the metamorphic parageneses are essentially syn to tardi-D3.

Mica grains from two samples of metapelites collected in subzone 3 (staurolite zone) near the transition to subzone 4 (sillimanite zone), in two different places near the town of Espinho, were used for datation by Ar-Ar laser ablation. The studied samples are characterized by the presence of Grt and St poikiloblasts enclosed in a granolepidoblastic matrix, dominantly composed of Qtz, Bt and Ms. The D3 schistosity is defined mainly by the orientation of mica blasts. However, Ms is commonly a late product replacing Bt and, sometimes, the white mica constitutes crystals that cut the schistosity. Therefore, whilst Bt seems to have been formed essentially during the main deformation event of the third Variscan phase, blastesis of Ms was probably important after the climax of D3.

In biotite grains, an age of 309.5±1.4 Ma was obtained; on the other side, muscovite gave ages of 305.3±1.6 Ma and 302.2±2.0 Ma. The biotite age, according to the textural studies, can be interpreted as a datation of D3 in this area.

The results on muscovite probably mark a retrograde event after the peak of deformation and metamorphism.

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