Geochemistry and U-Pb age of Early Ordovician ash-fall tuff beds from Moncorvo, Northern Portugal

E. URBANO[12], M. GOMES[12], C. MEIRELES[3], R. TEIXEIRA[12], A. SÁ[14] AND F. CORFU[5]

[1]Dep. Geology, University of Trás-os-Montes e Alto Douro;
[2]CEMUC, University of Coimbra, Portugal
[3]Laboratório Nacional de Energia e Geologia, Portugal
[4]Geosciences Center, University of Coimbra, Portugal
[5]Dep. Geosciences, University of Oslo, Norway

The Moncorvo sinforme is located in the Central Iberian Zone (CIZ) of the Iberian Variscan Belt, a segment of the northen Gondwana margin. Felsic tuff beds have been identified in the Marão Formation, which is equivalent to the Armorican Formation and represent an acid volcanic event during the Lower Ordovician. These ash-fall tuff beds occurs as uniform layers, not thiker than 40 cm, interbeded with a sequence of iron rich quartzites and micro-conglomerates. The contact with the host rocks is sharp and concordant with the sedimentary sequence. The tuffs are fine-grained and contain variable amount of recrystallised muscovite and sheared quartz. The ground mass is strongly devitrified and recristalized due to regional deformation, therefore shows a penetrative metamorphic foliation. Microprobe analyses confirmed the presence of sky-blue lazulite and tourmaline, where the first is interpreted as being of sedimentary origen with metamorphic recristalization and the sencond as a hydrothermal overprint.

The felsic rocks are peraluminous (A/CNK>2.5) and have rhyolitic to rhyodacite composition. Their trace element patterns are characterized by a significant enrichment in incompatible elements (Y, Zr, Nb, Rb, Ba, Sr), where as their REE show moderate fractionation (Ce_N/Yb_N: 3.5-7.0), with a high LREE and a low HREE fractionations and a discrete negative Eu- anomaly.

Despite the Marão Formation has been dated as Floian age, one of the zircon prisms, however, yields an ID-TIMS U-Pb age of 484.5 ± 3.0 Ma, which can be, in a preliminary stage, interpreted to date a magmatic event of Tremadocian age. The other oldest grains correspond to inherited zircons which are dominated by Neoproterozoic (546.9-685.4 Ma) components. The U-Pb age obtained in monazite crystal (317.3 Ma) is clearly younger and appear to date the Variscan metamorphic overprint, responsible for monazite resetting.