Geochemical and isotopic studies in the Tabuaço prospect (tungsten mineralizations in northern Portugal)

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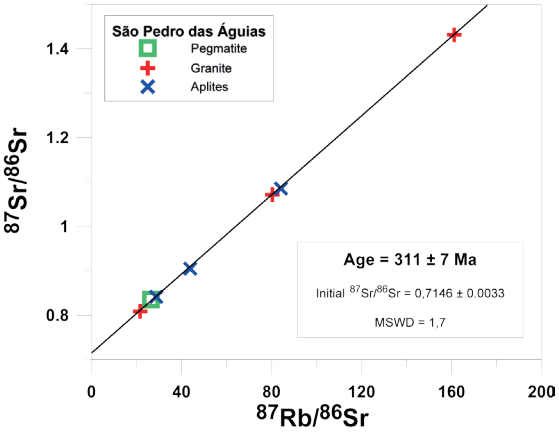
This work took place in the Tabuaço prospect, which corresponds to an area of 45 km^2 where exploration for W-skarn deposits is being carried out by Colt Resources. The study now presented results from collaboration among that company, the University of Aveiro, the Geobiotec research unit and the team of the Petrochron project (PTDC/CTE-GIX/112561/2009) and it was focussed on the lithologies recognized, both in outcrops and in drill cores, in the area of Quinta de São Pedro das Águias: "normal" phyllites, black phyllites, marbles, calcsilicate (s.s.) rocks and skarns, belonging to the Bateiras Formation, of the Douro Group of the "Complexo Xisto-Grauváquico" (CXG); Paredes da Beira-Tabuaço granite; several aplitic and pegmatitic bodies. Rb-Sr isotope analyses provided a 311 ± 7 Ma age for the granitoids, which dates their emplacement during a late stage of the Variscan orogeny. The isotope geochemical signatures, at 311 Ma, of the granite and of the studied metapelites overlap each other, suggesting that the parental magma was generated by anatexis of Grupo do Douro metasediments. According to their petrographic, geochemical and isotopic features, aplites and pegmatites are viewed as extreme differentiates from the granite. São Pedro das Águias metapelites show REE normalized patterns very similar to those displayed by the most widely accepted upper crustal reference compositions; isotopically, especially due to their lower εNd_{311}, the studied metapelites are clearly distinct from the Grupo das Beiras metasediments (the other major division of the CXG), and, instead, they resemble other metasedimentary units of the Iberian Massif. Several lines of evidence suggest that calcsilicate (s.l.) rocks owe their composition not only to metasomatism that accompanied the granite intrusion, but also to an inheritance from their protoliths, which should have resulted from mixed sedimentation, both chemical and terrigenous.



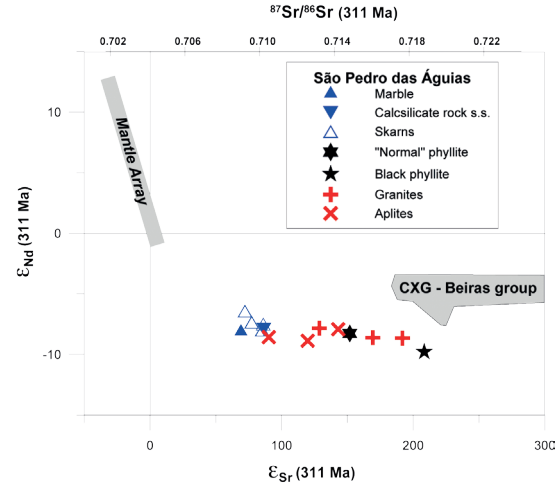


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FIGURE 1
Whole-rock Rb-Sr isochron for the granitoids from São Pedro das Águias area. The 311 ± 7 Ma date is interpreted as the age of granitoids emplacement (and correlative metallogenic processes).

FIGURE 2
$\varepsilon_{Nd(311Ma)}$ vs. $\varepsilon_{Sr(311Ma)}$, or $\varepsilon_{Nd(311Ma)}$ vs. $^{87}Sr/^{86}Sr_{(311Ma)}$, plot of the compositions of granitoid and metasedimentary rocks sampled at São Pedro das Águias area.