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**GEOCHEMISTRY OF CRUSTAL FLUIDS:
Characterisation of Reactive Transport in Natural Systems**

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Contamination of soils and waters related to cassiterite-wolframite and baryte-galena-sphalerite mineralizations from Segura, Portugal

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An Hercynian granite intruded the Pre-Ordovician schist-metagraywacke complex (metapelites intercalated with metagraywackes). The granite produced a contact metamorphic aureole up to 500 m, with hornfels up to 20 m. There are Sn-bearing granitic aplites and pegmatites cutting the granite and country rock and subhorizontal stanniferous quartz veins progressively enriched in wolframite further from the granite, but all cutting the schist-metagraywacke complex. Later quartz-baryte-galena-sphalerite veins cut the schist-metagraywacke complex, but a few of them cut the granite. Arsenopyrite, pyrite, sphalerite and chalcopyrite are associated with the Sn-W mineralizations. These sulfides, except arsenopyrite, were found in the quartz-baryte-galena-sphalerite veins. The area was exploited for Sn, W, Ba and Pb.

In soils, anomalies of Sn (>75 ppm), W (>45 ppm), B (>300 ppm), As (>375 ppm) are related to the quartz veins with cassiterite and wolframite, while anomalies of Ba (>1500 ppm), Pb (>120 ppm) and Zn (>290 ppm) are associated with the quartz-baryte-galena-sphalerite veins. The anomaly of Cu (>100 ppm) is related to all of these veins, but preferentially to those containing cassiterite and wolframite.

There is a decrease in As content of water from springs (up to 1.90 mg/l), wells (up to 0.122 mg/l) and streams (up to 0.047 mg/l). The highest Zn content (0.15 mg/l) of water was found in wells. As and Zn contents of the analysed waters are related to the As and Zn anomalies respectively in soils derived from those ore deposits.

Fe, Mn, HCO_3^- , SO_4^{2-} , Cl^- , NO_3^- , PO_4^{2-} and NO_2^- contents of waters are not related to the mineralizations. Sn, Ba, Pb and Cu were not detected in waters.

The water in a small lagoon in direct contact with a quartz-baryte-galena-sphalerite vein has the lowest pH, conductivity, dry residue and concentrations of most ions.

The Sn-W mineralizations and associated sulphides only produced As contamination in waters, while the baryte-galena-sphalerite mineralizations caused a Zn contamination in waters.