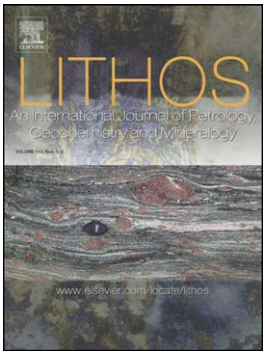

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Variscan metagranitoids in the central Tauern Window (Eastern Alps, Austria) and their role in the formation of the Felbertal scheelite deposit

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Abstract. The W mineralised Early Carboniferous orthogneisses (K1-K3 orthogneiss) in the Felbertal scheelite deposit represent a chemically evolved metagranitoid series. Some of its characteristics are high concentrations of F (<4438 ppm), Nb (<86 ppm), Ta (<13 ppm), and U (<74 ppm) and REE patterns with distinct negative Eu-anomalies (Eu/Eu* = 0.24-0.48) and increasing HREE concentrations (Lu_N/Ho_N = 1.93-2.81). The systematic chemical trends documented for a multitude of elements (e.g., SiO_2, TiO_2, P_2O_5, Ba, Nb, Ta) and their respective ratios (e.g., $1/TiO_2$, Nb/Ta, Zr/Hf) indicate that crystal-melt fractionation controlled the evolution of the granitic melts. The higher differentiated, peraluminous light-coloured K1-K3 variety (ASI = 0.99-1.08, Nb/Ta = 5-7, Zr/Hf = 13-18) evolved from the less differentiated, metaluminous dark-coloured variety (ASI = 0.93-1.03; Nb/Ta = 6-10, Zr/Hf = 18-24). Peraluminous holo-leucocratic aplite gneiss represents the most evolved member of the series (ASI = 1.11-1.12, Nb/Ta = 4, Zr/Hf = 9-10). Modelling of magmatic differentiation assuming Rayleigh fractionation shows that c. 70-90 % of the residual granitic magma had crystallised at the time of the emplacement of the aplites. When compared to barren metagranitoids in the central Tauern Window ("Zentralgneis"), the metaluminous dark-coloured K1-K3 orthogneiss shows some geochemical similarities with the peraluminous Felbertauern augengneiss, one of the regional orthogneisses exposed near the W deposit. Elevated concentrations of Nb (<36 ppm), Ta (<5.3 ppm) and U (<30 ppm) distinguish it from other regional Zentralgneis types and illustrate its genetic relation with the K1-K3 orthogneiss.