CHARACTER OF THE ALTERATION ACCOMPANYING Au – MINERALIZATION IN THE ANDĚLSKÁ HORA ORE DISTRICT

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Vein – veinlet low sulfide Au – quartz mineralization of the Andělská Hora ore district is hosted by carbonaceous slates, altered tuffs and metadolerites of the Devonian Vrbno Group (the Jeseníky Mts). The polyphasely folded, thrusted and metamorphosed carbonaceous chlorite – muscovite slates enriched in Fe–sulfides and Fe–Mg carbonates appear to have been the favourable screen for reducing of the ascending metamorphic–hydrothermal fluids. Carbonate–quartz veins and veinlets are located in different planes of foliation, cleavage and joints produced by superposed fold deformation (D_1–D_4) and polyphase metamorphism of greenschist facies (M_1–M_4) (Cháb et al. 1990).

Gold–bearing mineralization is accompanied by metasomatic alteration and wall rock hydrothermal changes. Regional character of the metasomatic alteration, which developed partly in the pre– and later in the ore periods, was supposed. The extensive berezite–listvaenite metasomatic alteration of rocks was caused by a massive influx of the H_2O–CO_2 fluids derived from the devolatilization of the metamorphic pile within the M_2 event. The flow of the fluids was driven by existing PT–gradient and controlled by the Variscan tectonic processes. During this alteration the content of carbonates, muscovite, fewer sulfides (in late syntectonic veins also albite), increased both in rocks and veins. Chloritization and paragonitization of rocks were found in the northern part of the district. Metadolerites were altered and tectonically reworked into greenschists or carbonatemuscovite schists. The grade of alteration has been studied using the molar fractions CO_2/(Ca+Mg+Fe) and (3K + Na)/Al (Kishida – Kerrich 1987). The increased gold contents are preferentially bound to the more altered "graphitic" phyllites and are often accompanied by the primary geochemical haloes of Au, As, Mo, Sn, Ba and Ag. The mass balance estimation of the rock metasomatic changes showed the gains of CO_2, K_2O, CaO, in phyllites also MgO and P_2O_5, and prevailing loss of Na_2O, Al_2O_3, SiO_2, together with dehydration and increase of the FeO/Fe_2O_3 ratio. An influx of about 2,5 km^3 of H_2O–CO_2 fluids (109 t CO_2) was necessary to produce the ascertained carbonatization in the district (the volume of altered rocks is estimated at about 10 km^3). The regional anomaly of gravity can be interpreted as a manifestation of the centre of the most extensive metasomatic processes.

The alteration processes caused the decrease of the permeability of the host rock sequence. The growth of the syntectonic vein system developed then by a repeating hydraulic fracturing and crack–seal mechanisms. Gold precipitation within the altered pyritic and carbonaceous slates may be ascribed to the changing PT – conditions, decreasing pH and H_2S – activity at low f_{O_2}.

ND– AND SR–ISOTOPIC CONSTRAINTS ON THE EVOLUTION OF CONTINENTAL CRUST OF THE WESTERN PART OF THE MID–GERMAN CRYSTALLINE RISE

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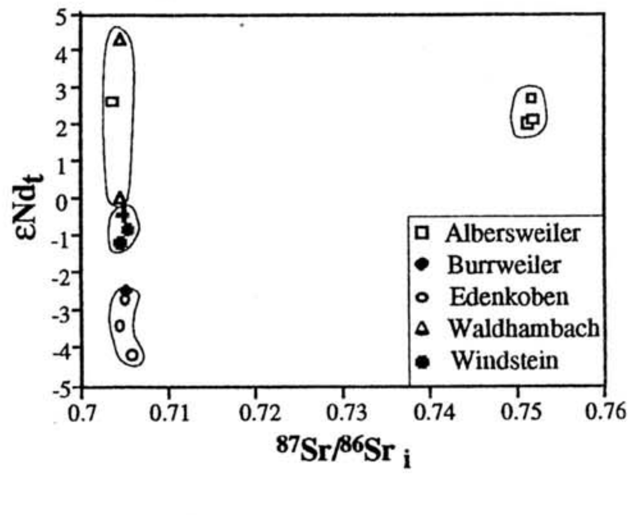

Several small outcrops along the western Oberrheingraben escarpment expose granitoid rocks which represent the western prolongation of the Mid–German Crystalline Rise (MGCR). The variable rock association includes an ortho–gneiss–amphibolite complex and a number of different syn– to post–orogenic granodioritic to granitic intrusives, which are crosscut by Late Lower Carboniferous undeformed lamprophyric dikes and uncomformable overlain by Permian sediments and volcanics. Rb–Sr and Sm–Nd–isotopic studies in combination with major– and trace–element geochemistry of these granitoids are used to evaluate the history of crustal growth in this part of the MGCR. Sr– and Nd–isotopic data show differences between the northern part (Burrweiler and Edenkoben), dominated by S–type–granites and the southern part (Albersweiler, Waldhambach and Windstein) with I–type–granites (see Fig). Calculated Nd–model ages range from 1.22 to 1.85 Ga in the north and 0.67 to 1.24 Ga in the south, which we explain by larger amounts of recycled crust in the northern parts of the studied area. New isotopic data from other outcrops of the MGCR to the east are in progress to characterize crustal segments within the Variscan belt of Middle Europe.

PALEOZOIC EVOLUTION WITHIN THE GURKTAL NAPPE COMPLEX, EASTERN ALPS

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The Stolzalpe Group within the Austroalpine nappe complex differs from other Austroalpine units because of its dominance of huge volcanic and clastic sequences. A section through the Stolzalpe Group within the central Gurktal nappe complex includes from bottom to the top: 1) the Nock Fm. (Ordovician) with predominant mafic tuffs and subordinate sills; 2) the Hochrindl Fm. with phyllite, slate, graywacke and quartz arenite; 3) the Kruckenspitz Porphyroid with thick acidic tuffs; and 4) the Eisenhut Fm. (Silurian) with much tuffs and subordinate lava flows and sills.

Volcanic sequences were formed within a siliciclastic sequence. Vesicular lava flows, the occurrence of conodonts within rare dolomite intercalations, and the presence of thick sandstone indicate a relatively shallow, marine depositional environment. Volcanic rocks of the Nock Fm. display a subalkaline mafic geochemical composition with La_{CN}/Lu_{CN} ratios of 5.53 to 6.67, those of the Eisenhut Fm. alkaline mafic rocks with La_{CN}/Lu_{CN} ratios of 7.87 to 20.29. The acidic Kruckenspitz Porphyroid shows a subalkaline character with a high enrichment of LREE and a high negative Eu anomaly, all features reflect remelting of continental crust.

Sandstones of the Hochrindl Fm. are variably altered by deformation and low grade metamorphism. Modal compositions range from quartz arenite to arkosic wackes with a high amount of primary and/or secondary matrix. Chemical compositions mostly plot within the graywacke field due to the high amount of sericite.

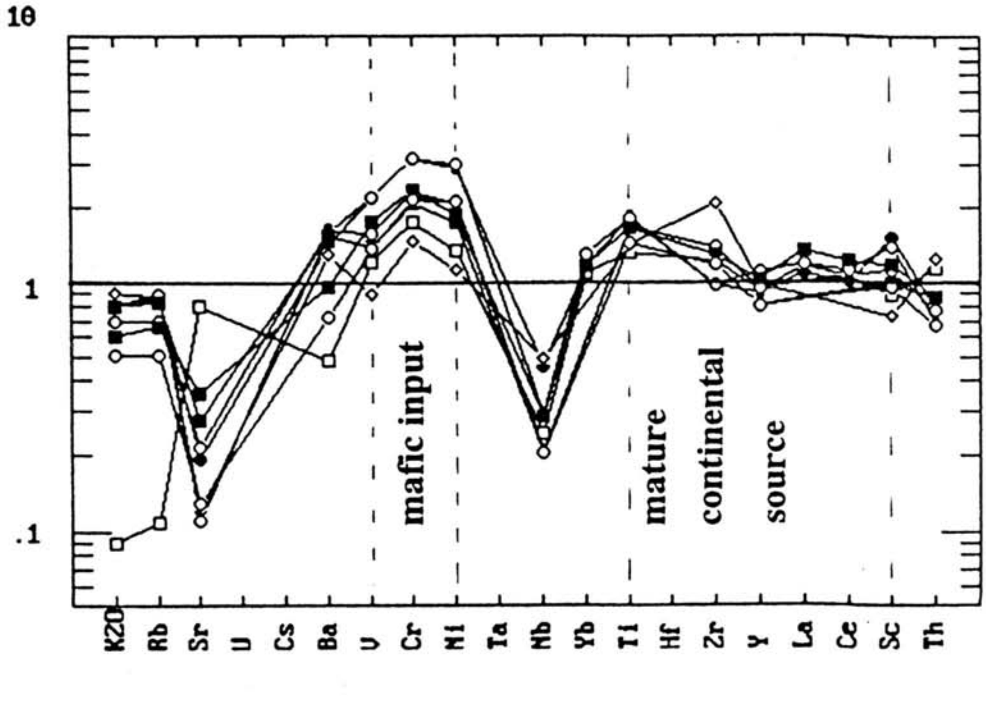

Fig.1. Spider diagram of sandstones from the Hochrindl Formation. Normalization values are those of upper continental crust according to Taylor and McLennan (1985).