

## 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, thrust 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 orthogneiss–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 unconformably overlain by Permian sediments and volcanics. Rb–Sr and Sm–Nd isotopic studies in combination with major– and

