

Summary

Metabasites of contact aureole of Tanvald granite between Rádlo and Přichovice used for the manufacture of Neolithic stone tools

Study of the provenance of raw materials used by prehistoric people to manufacture tools for everyday use has a long tradition in the Czech lands. The origin of the raw material used in numerous Neolithic industries has been sought for practically 100 years. Eventually used resources of this interesting raw material were found on the southern edge of the Krkonoše-Jizera pluton (V. Šreina and A. Přichystal independently of each other in 2002). The discovery of Neolithic manufacturing sites was more interesting due to the fact that extensive remnants of prehistoric quarrying (some 7000 years old) have been preserved on Maršovice Hill.

In this work I have focused on the detailed mapping of metabasite outcrops, their mineralogical and geochemical characteristics and an assessment of the potential for the use of this site by prehistoric peoples. Metabasite bodies generally conform to the structure of the contact aureole of Tanvald granite. They sink at a slight angle (15 - 30°) predominantly to the south. Considering the surrounding sediments the bodies are laid concordantly. They occur at various structural levels and in parts of contact aureoles affected to differing degrees of intensity. The number of metabasite bodies and the thickness of them (which varies from mere centimetres to the first metres) fluctuate. The bodies are slightly crumpled and the protoliths of the original rocks have been recrystallised to varying degrees during the course of several metamorphic processes. The course and distribution of the bodies is markedly affected by the existence of fault disturbances in a NW-SE direction, which segment the course of the horizon with the metabasites, which was originally probably more coherent. This most likely concerns the position of tufa rocks or tuffites; with porphyric varieties it could be a bed vein.

Metabasites can be split into two main types – fine-grained and porphyric. Felt types of the amphiboles typical for metabasites also contain, to a limited extent, certain types of massive tuffite phylites. The main metabasite minerals are amphiboles, which are represented by line Mg, Fe hornblend, aktinolith, amfibole, aktinolith, cummingtonit). The original magmatic amphiboles were recrystallised during metamorphic processes into various forms of acicular, lock- and shrublet-like amphibole aggregates of the composition described above. The second most common component of the rock are plagioclases of bytownite, anortite and, in exceptional cases, oligoclase, albite. Besides these there are accessory occurrences of silica, ilmenite and epidot. In some samples chlorite and biotite also occur.

Metabasites have been subject to complex metamorphic development, which is reflected in the complex structural relations and compositions of the minerals they comprise. The original volcanoclastic or igneous rocks were fine-grained, sometimes with a porphyric structure, and contained outcrops of pyroxenes or amphiboles, which, however, were not preserved in the rocks. Of these, during the Variscan HP-LT metamorphism approx. 360 Ma (creating associations which contained barroisitic amphibole and, in very exceptional cases, lawsonite (Šreínová *et al.* 1997). The sporadic albites, chlorite and epidot could be a relict of this stage. After the subsidence of the HP stage the rocks were reequilibrated in facies of green slate, creating an association with albite II and actinolite, chlorite II. The metabasites were subsequently recrystallised as a result of the intrusion of Variscan granitoids of the Krkonoše-Jizera pluton (approx. 320 Ma – Marheine *et al.* 2002). The increasing temperature creates lock-like aggregates of Mg-hornblend and actinolite II, possibly also cummingtonitic amphibole, which intersperse with basic feldspar (bytownite to anortite).

Gradually 37 sites where metabasites occur have been identified. Archeological finds proving they were used have only been unearthed on some of these (at 10 localities, 27 %). The most important locality is doubtlessly Maršovice Hill, the site of the largest surface distribution of metabasites, a large quantity of chipped stone artifacts dated to the Neolithic period (around 7000 years ago) and several thousand relicts from quarrying holes. The second largest locality is Velké Hamry II.

At their time Pojizeří metabasites were of superregional importance. They were distributed to distances of up to 500 km and the quantity of rock quarried corresponds to several thousand tons during a period lasting around 500 years. These figures show the abilities of prehistoric man in a different light and change our view of the history surrounding the quarrying of raw materials.