Grus origin in Karkonosze granite

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In the outcrop in Miłków occurs strongly altered Karkonosze type granites. The variety of secondary minerals indicates that whole granites in outcrop are hydrothermally changed. On the length of 100m there are three different types of hydrothermally altered granites: Ca-rich granite in the northen part of outcrop, and two low Ca granites types: with and without K-feldspars.

The granites of the middle part of the outcrop are completely grusified. Grus is considered as the effect of the weathering process. The process reasult is formation of the weathering mantle which contains below 10% of clay fraction.

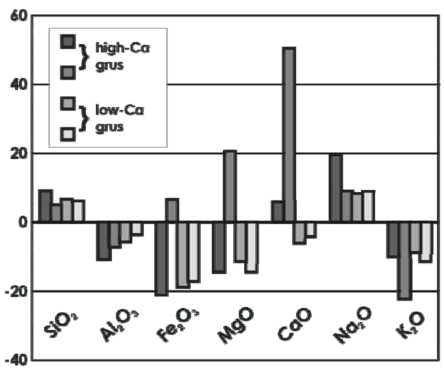

Figure 1: Mobility (in coparison to unaltered granite, wt.%) of main elements in grus from Straconka Hill.

The differences in chemical composition between the fresh granites and the grus are not significant (figure 1) e.g. the Chemical Index of Alteration is about 55 for grus and 50 for fresh granite, what is typical for them. The most altered minerals are phyllosilicates (e.g. biotite or chlorite). They are transformed into iron oxides, which colour the grus for ferruginous tint. The plagioclases are almost completely altered into clay minerals.

The differences in a level of grusification of granites may idicate various - weathering or hydrothermal origin of grus.

Contrast ecosystem between aerobic and anaerobic bacteria recorded in 3.0 Ga sedimentary rocks of the Atikokan-Lumby Lake area, Canada

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Relationship between geo-environments and activities of anaerobic and aerobic bacteria are poorly understood in particular for mid-Archean. Geological and geochemical studies were performed on 3.0 Ga sedimentary rocks at the Atikokan-Lumby Lake area in order to constrain the mid-Archean anaerobic and aerobic ecosystem. In the studied area, banded iron formation, stromatolite carbonate, black shale and sandstone are common and often intruded by mafic sills. It is found that kerogen in stromatolite contains primary iron- and manganese-oxides as minor inclusions. In addition hopane were extracted from kerogen-rich stromatolite. Oxygenic environments, i.e. activity of cyanobacteria, are suggested by these data in particular for photic zone of the 3.0 Ga shallow ocean. SEM observation of magnetite texture in banded iron formation indicates the potential presence of primary goethite, thus oxidation products in the photic zone. Pyrite is abundant in black shale, occurring as fine-grained layered type or nodular type. The fine-grained layered type was precipitated directly from deep euxinic water, suggesting ocean water was stratified in terms of redox conditions. Detailed petrography suggests that nodular type was formed during diagenesis by submarine hydrothermal activities. Pyrrhotite-pyrite assemblage and sphalerite compositions in nodular samples suggest that associated fluids were very reducing allowing production of hydrothermal hydrogen. This reducing system was not only responsible for euxinic conditions but also allowed activity of methanogens, indicated by C12-enriched carbon isotopes of kerogen: -45 to -40‰ (PDB). Geological survey indicates that activity of methanogens was strongly concealed with contemporary submarine hydrothermal activities and limited at the deep part of ocean water.