Felsitic Magmatism and Th-Bi Mineralization in the Greater Caucaus Kakheti Region, Georgia

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The Greater Caucasus represents a Phanerozoic collisional orogen which is formed along the Euro-Asian North continental margin between the Black and Caspian Seas, and is accreted to the south margin of the Euroasian continent. The Kakheti region is located on the eastern part of the southern slope of the Greater Caucasus and is mainly formed of strongly folded Lower Jurassic clay-shales and mafic volcanic-sedimentary formations. Ore mineralization is related to hydrothermally altered zones, which are significantly enriched in rare metals – thorium and bismuth, and also in gold, zinc, lead and cobalt.

The studied area is underlain with highly deformed Lower-Middle Jurassic sediments and volcaniclastic rocks, associated with numeorus intrusive bodies. The rocks contain variety of mineralization types and hydrothermal alteration. The largest outcrop of felsic hypo-abyssal dykes is Speroza massif, which has a lenticular shape with a length of 14 km. It represnets the area of mesothermal hypo-abyssal magma intrusion. In the section of the Stori River is exposed upper part of the hypo-abyssal quartz-feldspar felsic magmatic rocks, which cause intense alteration of host rocks. Stori north-south section is limited by thick gabbroic intrusions. However, small bodies of similar generation are marked within the above section, intrusion of which have preceded felsitic magmatism. The section is characterized by intense sulfide mineralization, which often forms quartz-pyrite-pyrrhotitic veins in shear zones. Geochemical anlyses of hydrothermally altered rocks showed abnormally high concentrations of Th and Bi in the hydrothermally altered rocks. Quartz-pyrite-pyrrhotite ore zones are also observed here. Th content varies 40-120g/t, and Bi – 200-800g/t, but the grades are even higher in sulfide veins. Th is mainly represented by thorite, which fills the voids of crushed quartz, and bismuth – by bismuthinite. Thus, contents of Th and Bi are very high in the studied area. As Th is considered as the main energy source of the third millenium of our civilization [1,2, 3], it's necessary to carry out comprehensive exploration works in the region.

[1]Windham (2007) [2] Gosen et al. (2009) [3] Martin (2009)