3.6.P18

Silicified calcalkaline volcanic rocks indicator of gold occurrences: Western Anatolia – Turkey

A. BAYRAM AND Y. K. KADIOGLU

Ankara University Department of Geological Engineering, 06100, Tandogan, Ankara

Complex chemical reactions between wall rocks and hydrothermal fluids charged with minerals form the precious mineral deposits in the form of veins, stockworks, disseminations and replacements.

Western Anatolia has a wide exposure of silicified calcalkaline volcanic rocks in the composition of andesite and dacite cropping out mainly around Izmir, Manisa and Balikesir. Mega feldspar crystals have gained these rocks a porphyritic texture. Biotite, and amphibole are the main mafic products of these units. Silicification is a product of hydrothermal alterations occupying along the fault and crack zones within these rocks in the elongation of NE-SW and E-W. They have heterogeneous in color composition ranging from gray, green, gray brown and to reddish brown due to the hydrothermal alteration. Brecciate and blocky brecciate are the most characteristic structural features of these units. Brecciate are the products of hydrothermal alteration and mostly have a fine-grained matrix of volcano sedimentary deposits. Arsenopyrite, chalcopyrite, bornite, native gold, sulfosalts, electrum, galena and sphalerite are main precious minerals of the silicified calcalkaline volcanic rocks. Mafic young dykes are intruding the calcalkaline volcanic rocks along the fault and fracture planes with no precious minerals.

Hydrothermal alteration veins are well defined by sharp geological boundary coincident with a rapid decrease in precious minerals from silicified vein toward the calcalkaline volcanic rocks. Silicification, advanced argillisation, montmorillonite formation and propylitisation are the main alteration types of these veins. The precious minerals in these veins are proportional to the silicified (quartz) products. Colloform banding, comb, bladed carbonate replacement, brecciation and vuggy crustiform are the main textures of hydrothermal alteration veins. Higher precious minerals are concentrated in colloform-crustiform banded silicified zone. Lower grade of precious minerals are present in massive quartz and quartz brecciated zone.

Silicified calcalkaline volcanic rocks have a concentration of Au, Ag, Cu, Pb, Zn, Mo, As, Sb and Hg. As, Sb, Hg, and Zn may use as Au indicator within these silicified rocks. Silicification is classically zoned due to the different effects caused by cooling and loss of pressure as the fluids rise to the surface and may use as fingerprint to exploring the gold deposit with in the region.

3.6.P19

Proper silver deposits in siberia

A.L. KOVALEVSKII AND O.M. KOVALEVSKAYA

Geological Institute, Siberian Branch of Russian Academy of Sciences, Ulan-Ude, Russia (koval@gin.bsc.buryatia.ru)

Deposits of polymetals and copper were mainsources of silver in Russia and the USSR within 300 years. The mistaken judgement prevailed proper Ag deposits were not essential sources. Therefore they were not objects under special exploration. Experience of Mexico, USA, Canada and other countries producing more than 1000 t of Ag per year refutes this judgement. More than half Ag is mined from its proper deposits there. They usually occur inside and on flanks of extensive ore fields of Pb, Zn, Cu, Au, Mo, U and other metals. In these ore fields numerous veined Ag ore bodies 0,2-2 m thick of several types are found.

Our complex lithobiogeochemical researches of Ag were conducted in the Gil'bera Zone of Deep Faults (GZDF) with known fluorite, gold, polymetal, lead-silver, asbestos and mica mineralization. Lower Paleozoic alkaline granitoids prevail in the GZDF. The discovering of new types of platinum group elements mineralization in the Ag-bearing GZDF was unexpected.

The first 6 supposed ore biogeochemical anomalies (SOBA) Ag with concentrations 70-3000 ppm on background 0,7 ppm in ash of plants were revealed in 1984 when checking a single anomaly with 10 ppm Ag in a soil. More than 250 SOBA Ag were revealed when contouring them in 1985-2001. Most of SOBA Ag form stockworklike thickenings from 100x150 to 250x400 m. The first 6 contoured thickenings include 51, 35, 23, 17, 12, 9 SOBA Ag. We have divided them into three main geochemical types as related to concentration Pb:Ag: 1) leaden – Pb:Ag=3-30, 10 on the average; 2) low-leaden – Pb:Ag=0,3-3, 1,0 on the average; 3) leadless – Pb:Ag=0,01-0,3. When checking SOBA Ag by ditches it was established that they correspond to three geochemical types of Veined Silver Ore Bodies (VSOB): 1) Quartzless massive galenite veins – "bleischweif", 0,2-2 m thick. 2) Quartz-galenite veined zones from 0,5 up to 15 m thick. 3) Quartzless and sulphideless VSOB in zones of crushing 0,5-12 m thick with visible gold of size up to 0,2-0,5 mm. The relation of concentrations Ag:Au in VSOB of the first two types is changed from 500 up to 5000 and on the average is close to 2000. In the third type of VSOB Ag:Au on the average is close to 20000. It allows to consider all three geochemical types of VSOB as proper Ag ores.

The opening of 27 VSOB under 29 SOBA by has allowed to standardize the Ag lithobiogeochemical field. Plant-ore coefficients (POC) for poor (10-100 ppm), common (100-1000 ppm) and rich (1000-10000 ppm) ores of Ag were determined. Preliminary evaluation suggests geological Ag resources in GZDF as much as the known Ducat Ag-ore region in the north-east of Russia.