THE EAST-CHOVDAR ORE CLUSTER – PROSPECTIVE METALLOGENIC UNIT OF THE LESSER CAUCASUS SOMKHIT-GARABAKH ZONE

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According to the geological explorations' results the East Chovdar ore cluster including a number of prospective areas has been determined as one of the most prospective areas for searching moderately gold-sulfide low-medium temperature deposits in Chovdar ore-magmatic system. The conducted investigations have revealed the deposits being different in the internal structure of the natural and downthrown blocks.

The prospects of the Chovdar ore-magmatic system on gold-sulfide mineralization including its eastern part being defined by us as the East Chovdar ore cluster are emphasized by most researchers (Baba-Zadeh et al., 2013; Baba-Zadeh, Abdullayeva, 2009; Baba-zadeh, Abdullayeva, 2012). The ore-bearing volcanic-dome structures of the Upper Bajocian are quite widely distributed in this area . It is possible to define three major blocks bounded by the large faults along the strike and downdip here.

Shadakh-Chovdar-Chaykend downthrown block. The upper part of the section is composed of Bathonian andesites, andesite-basalts and their tuffs (400-700 m thickness) then they are changed by rhyolites, rhyolite-dacitic porphyries of Bajocian. Mineralization has been represented by barite mineralization. Barite veins with commercial parameters have been confined to Bathonian deposits. The faults enclosing these veins crossing Bajocian rhyolite-dacitic porphyries are lost mineralization or they are represented by small parameters of vein schizolites that is clearly observed in the wintering area of Dashalty, in the 9^{th} and 10^{th} zones with quartz-polymetallic ore with full displacement of the barite. The secondary quartzites formed due to andesites and andesite-dacites of Bathonian are of predominantly linear character of the development or they represent semiannular configurations of the vent facies of Bathonian volcanoes (Baba-zadeh et al., 2015).

Danaerichay-Eagle mountain-Pirinyal upstanding block of Bajocian volcanogenes except for small downthrown areas in the north-east of the Eagle mountain and in the elevation area. Pirinyal hasn't barite mineralization with the exception of thin and unextended veinlets. At the same time veinlet-disseminated gold-contained sulfide ores are observed in the feathering fractures.

The basis for organizing works in this area was extensively developed aureoles and flows of molybdenum and lead dissemination in the Eagle Mountain region in the volcanic domes and covering lava-pyroclastic strata of the andesite-dacite, rhyolite-porphyry structure especially in the paleovolcanoes vents breaking the stratum of Mesozoic volcanic rocks. Later the area of 60 km^2 was covered searching scale of 1: 10,000 that revealed the concentration of the majority anomalies within two large submeridional zones of the high tectonic stress level: Western-Shadakh-Chaykend and East - "Albanian Church" - Narchala - Pirinyal. The most interesting geochemical anomalies have been revealed in East-Chovdar ore cluster. Its internal structure is characterized by complex combination of many faults - submeridional ($5\text{-}20^0$), northeast ($40\text{-}70^0$), sublatitudinal and northwestern ($300\text{-}330^0$), mainly near-meridionally located steep ruptures ($60\text{-}80^0$). It is the faults with displacement amplitudes up to 100 m.

Kyzylja-Laish block is continuation of the second block in the north-east. The block rocks is less dislocated, the disturbances are mostly northwestern orientation. The block has been insufficiently studied although there have been revealed numerous quartz-polymetallic veins and linear zones of metasomatites with gold content up to 1,5 g/t, copper and polymetals - tenths of one percent. It is interesting that beginning from Agekhush village through Laish and Fadylly villages up to v. Achagaya, through Kheyrachay river up to its confluence with Koshkarchay river the commercial accumulations of the free gravitational gold have been found in channel alluvial proluvial deposits. It has allowed to determine the resources of the placer gold in quantity up to 43 kg. The same situation is observed on r. Danayerichay between Danayeri and Kyzylja villages in connection with which we think that it is

necessary to estimate the prospects of Danaerichay-Eagle mountain-Pirinyal and its northeastern continuation of blocks (Kyzylja-Laish) for the detection of gold-ore and gold-containing sulfide ores particularly with regard to three prospects areas revealed here in recent years.

The most northern "Narchala" area is located on the right bank of Heyrachay river in 1,2 km towards SW from Narchala spring, in 500 m from the elevation point 1576,1 m. Its area is 0,7 km^2. Rhyolite porphyries and their tuffs changed hydrothermally up to secondly quartzitic metasomatites of the areal type of development. They are gold-bearing and sulfide-bearing. Hydrothermalites have changed in limonitized quartz-clay mass with frequent discharges of green spinel and andalusite in the ruptured zones. Tectonic sutures quite often contain unextended veins and veinlets of barite, dissemination of the oxide pyrite and malachite. It was determined the high concentrations of Mo (0,002-0,015%), Pb (0,010-0,06%), As (0,01-0,08%) and especially the precious metal. Geochemical sampling over dispersion trains and network of 50x5 m in the area of 0.4 km^2 showed anomalous fields of lead, copper and molybdenum. The high gold contents in some cases reaching 2,435; 2,537; 2.756, 4.41, even 6,02 g/t have been defined by the pit sampling of the secondary quartzites in all selected 30 samples.

In the southwestern edge of Narchala area 208 and 11 wells (150 m and 226 m depth) drilled on the weak lead anomaly penetrated monoquartz, quartz-sericite, quartz-kaolinite metasomatites with ubiquitous distribution of pyrite and with frequent intervals (5-15 m), with visible vein-disseminated mineralization of bornite, chalcopyrite, galenite and sphalerite.

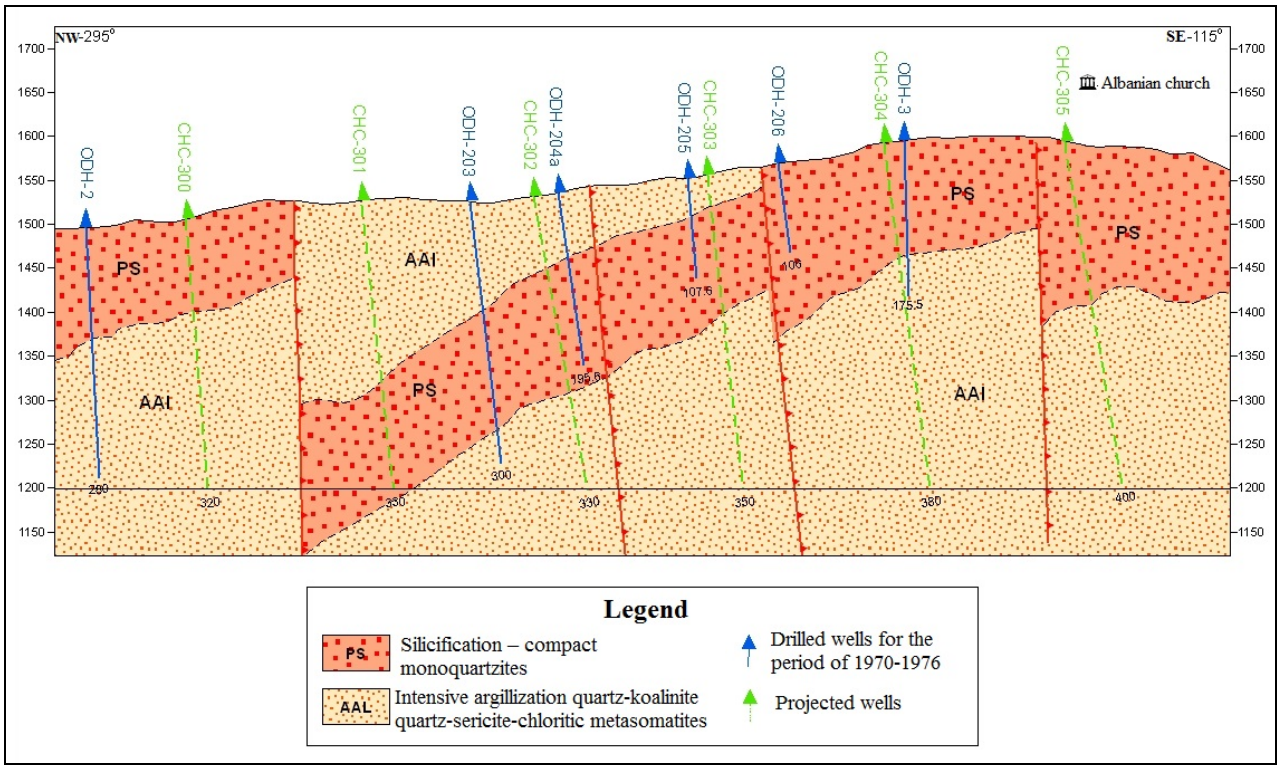
The second prospective area "Eagle Mountain" with area of 0,15 km^2 is located in 1,5 km southward of the "Narchaly" and covers the submeridional ruptures' system intersecting volcanogenic and volcanogenic-sedimentary formations of Bajocian and Bathonian. The argillization, carbonatization, chloritization are developed in zones of disturbances. The veinlets of calcite, siderite, pink barite, malachite dissemination, azurite, pyrite are distinguished among hydrothermalites. Three zones of anomalous radioactivity, high contents of molybdenum, lead (0,003-0,01% and 0.01-0.04%, respectively) have been determined by surface mine workings. The drilled 207 well (with 230 m depth) has intensively undercut argillized, the quartzous in the lower part of the section and often crushed rocks with abundant dissemination of the coarse-crystalline pyrite but dissemination of galenite and sphalerite – in the range of 10-60 m.

The well №9 with depth of 260 m was drilled in 300 m to the southwest (210^0) from Eagle Mountain (1599,9 m). The well was drilled through tuffobreccias, tuffolavas and rhyolites' ignimbrites and rhyolite-dacites transformed into monoquartz, quartz-kaolin metasomatites. The well has penetrated the phenocrysts of galenite, sphalerite and chalcopyrite from 36 m depth that can be traced up to 260 m depth. The rich mineralization is observed in the intervals of 36-43,5 m; 52,5-89,0 m; 100,6-102,1 m; 138,4-260,0 m. The total shaft length of rocks with rich ore is 167,5 m.

Generally only this working from more than ten drilled wells (K. Aliyev and others) has undercut the most powerful ore-bearing zone of copper and polymetals that is undoubtedly connected with the presence of the large near-meridianal faults being probably ore-controlling in this area.

In the seventies of the last century 11 wells were drilled by Koltsov expedition in the basin of Danaerichay river wherein chalcopyrite-pyrite-galenite-sphalerite ores were exposed. The gold-copper-polymetallic mineralization with shaft length of 62,5 m containing Cu – 0,1%, Zn – 1,9%, Pb – 0,25%, was intersected by one of the wells (204a) but with shaft length of 19,5 m Au content is from 0,6 to 6,0 g/t, Ag – 30-40 g/t. Taking this into consideration three samples showing besides the non-ferrous metals and also high gold contents – 0,8; 2,2 and 3,8 g/t were selected eastward of the mentioned well in the area of elevation point – 1503,9 m 150 m in 2000.

Finally the third prospective area – *"Sulfide"* is located in 800 meters to the south-west of "Eagle Mountain" region, to the north-west of the "Albanian Church". There has been conducted the geochemical sampling according to the dispersion trains and network of 100x10m and the anomalous aureoles of lead – 0,002-0,01% in sizes from 200 x 500 to 700 x 1500 have been defined in the area of 2,0 km^2. The forms of the anomalies are lenticular and they are extended northeastward. The anomalies of the copper (content – 0,001-0,05%) and molybdenum (0,0005-0,0025%) with sizes of 150 x 700 m are superposed in anomaly contours. It should be noted that a number of wells (№ 2, 203, 204a, 205, 206, 3) have been drilled within the abnormal area "Sulfide". They have been undercut mineralization of copper and polymetals. The generalized section along the lines of the mentioned workings is presented in the profile (Fig.).



Profile in the line of №2-3 wells along the "Sulfide" area (SE Chovdar village). Scale – 1:5000

The mineralized zones have been uncovered by surface workings and wells. The diabases' dikes contain mineralizations of galenite, sphalerite, gray ores, malachite and azurite. The content of Pb-6,78%, Cu-4,17%, Zn-2,20% at 0,5-1,0 m thickness in the channel samples. The mineralization has developed in tuffs of the rhyolite porphyries that have undergone intensive hydrothermal change; the rocks have been silicified, carbonated, gypsumed and albitized. The zoning can be noticed in nature of the hydrothermalites: distant from the mineralized zone the rocks have hydromicatized and kaolinized, they obtain grass-green color. All wells have dissected pyritization zone (up to 50-80 m depths). Pyrite is microcrystalline, cryptomerous and its coloform formations are revealed (possibly marcasite). The pyrite is 30-50% of the rock mass in the mineralized zone. The pyrite quantity is sharply decreased below in the zone of polymetallic mineralization development. According to this feature one can concede that some of the wells didn't uncover polymetallic ores because of insufficient depth as they are stopped in the pyritization zone. It is planned the vertical zoning of mineralization. The sphalerite, galenite in small quantity and chalcopyrite prevail in ores. The ores are mainly disseminated, breciated and veinlet. The ore minerals grains with size from fractions mm to 2-3 cm are relatively evenly distributed throughout the rock mass, there are observed the grains accumulation with ore nests formation of 10-15 cm in diameter. The veinlets of calcite and gypsum with thickness of 2-10 cm are frequent in the ore intervals.

The quantitative characterization of the ore at depth has been presented by the results of sampling №204a well ("Koltsov" anomaly). There are in the range of 93,5-116,5 m: 23,0 m - Au – 1,66 g/t, Ag – 1,65 g/t, Cu – 0,18 %, Zn – 3,34%, Pb – 0,42%. Moreover arithmetic mean content at 62,5 m is: Zn – 1,9, Pb – 0,25%, Cu – 0,1%; arithmetic mean content at 19,5 m is: Au – 2,0 g/t, Ag – 16.9 g/t, Cu – 0,18%, Cd –30 g/t. In 2010 CBH-950 well was drilled by AIMROC company nearby the mentioned working. It hasn't only confirmed our conclusions about the potential prospectiveness of the zone but also has revealed that the mineralization is distributed at great depth and it has the areal extent.

This well (CBH-950) is in the range of 29,65,5-45,6 m: 15,95 m – Au – 0,44 g/t; Ag – 4,65 g/t; in the range of 94,8-116,0 m: 21,2 m – Au – 0,32 g/t, Ag –18,35 g/t, Cu – 0,2%, Zn – 3,14 %, Pb – 0,36%; in the range of 70,5-117,0 m: 46,5 m – Au – 0,24 g/t, Ag –11,8 g/t, Cu – 0,13%, Zn – 1,81%, Pb – 0,21%. The second well (CBH-953) with 250 m

depth was drilled to the 160 m northwest of the mentioned well. It was undercut intensively changed, silicified rhyolitic tuffs at 208 m thickness (interval 147-175:28 m) – Zn – 0,29% 219-250:31 m – Zn – 0,43%) for which thin (1-5 m) intervals with the contents of Au – 0,1-1,2 g/t and Cu – 0,2-1,5% are considerably characteristic.

The above mentioned ones confirm the prospects of the East Chovdar ore cluster particularly within Danaerichay - Eagle Mountain - Pirinyal upstanding block and they are indicative of the high probability of revealing commercially valuable accumulations of gold, copper and polymetals in "Sulphide", "Orlinogorsk" and "Narchali" areas.

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