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PROSPECTS OF NEWLY DISCOVERED UGUR AREA IN THE NORTHWEST OF THE GEDABEY ORE DISTRICT (LESSER CAUCASUS, AZERBAIJAN)

(Представлено членом редакційної колегії д-ром геол. наук, проф. В.А. Михайловим)

The article describes Ugur exploration area located in Gedabey Ore District of the Lesser Caucasus in NW of Azerbaijan. Results of trenches and channels sampling on the surface, RC bore holes and summary of significant drill intercepts (>0.29 ppm Au) of Ugur Exploration area are presented. It has been established that The deposit is enlarged by highly gold-silver result of surface outcrop rock chip samples over an area of 2.5 kms North-South by 2 kms East-West, with the Reza gold deposit located in the central part. Out of metallic minerals crystalline hematite was observed. On surface intensive barite and barite-hematite vein and veinlets, also gossan zones were observed. The main mineralization zones have been sampled in three trenches at a distance up to 270 m by trenches #1, #2 and #3 and received positive results for gold and silver. Also there have taken approximately 550 samples from outcrop #1 and #2. On the main orebody at surface centre there occured secondary quartzites with vein-veinlets barite-hematite mineralization over which there remain accumulations of hydrous ferric oxides cementing breccias of quartz and quartzites. And in erosion parts "reddish mass" being oxidation product of stock and stockverk hematite ores were observed. Representing typical gossans, these accumulations by the data of trenches for thickness about 5-10 m contain gold 0.3-2.0 ppm and silver 1.0-15.0 ppm. Ten diamond drill holes, named UGDD 01-10 were drilled in the center part of the deposit. The drill holes were sampled mainly in 1 meter lengths from the top of the hole to the bottom. The core samples were marked and placed into standard boxes.

Significant intervals of weighted averages greater than 0.29 ppm over down hole intervals of 1 metres or greater (>0.29 ppm Au and >0.9 m) are summarized in table 3 below. In conclusion, the outcropping alteration at the deposit is typical of the upper steam-heated levels of high-sulfidation epithermal (HSE) deposits, which in most mineralized systems of this type, may cap higher-grade gold mineralization which is hosted by underlying vuggy and oxide zones.

Keywords: Ugur exploration area, prospects, mineralization zones, content of Au, Ag, Cu, Zn, Gedabey Ore District, Lesser Caucasus.

Formulation of the problem. In spite of the fact that the ore region is well studied, a number of issues, including the assessment of perceptions of offenses and deep horizons of the private Gedabak field, the study of modern geological and geochemical methods of other ore beds and manifestations in the region is carried out.

Ore district belongs to the Lok-Karabakh island of the Jurassic – Cretaceous age, formed by subduction of the Tetis Ocean to the Eurasian Caucasus in the Tetis metallogenic belt. The results of recent geological exploration and research activities in the Gedabak Ore region are high-sulfidation type (high sulfidation) of the Gedabey deposit, with high sulfidation, and the Au-Ag-Zn-Pb filtration of the Gadir and Ugur deposits near it. Low sulfidation bedrock hopes to discover new porphyry-epithermal ore deposits as part of a single epithermal system of the ore region. The location of gold-copper-porphyry ores on the Gedabey deposit by experts as a "Gedabey copper deposit" in the Lesser Caucasus can be a promising criterion for the unique, non-ferrous and rare metals in the ore region.

The purpose of the work is to identify the regularities of the bed and manifestations of the Gedabey ore region using modern complex geological research methods, and to develop predictive search criteria to identify new perspective areas.

During the implementation of the article, maps were drawn based on the data of a company (Samir Mursalaov), and results of chemical and geochemical analyzes were used. Macro and micronutrient analysis (over 500 micronutrients, including Au, Ag, Cu) was performed by X-ray fluorescence (XRF) laboratory at SGS Mineral Services UK LTD in Ontario.

The article considers new data on the contents of Au, Ag, Cu, Zn taken from trenches and wells in these deposits. This article describes Ugur exploration area – Reza gold deposit, and some mineralization areas (Gyzyldjadag, Shah Yatag, Yukhari Narzan and Dashbulag) which can be of interest from commercial point of view for future.

Geology. Gedabey ore district is located in the territory of Shamkir uplift of the Lok-Karabakh island arc volcanic structural-formation zone in the Lesser Caucasus Mega-anticlinorium. The ore region has a complex geological structure, and it has become complex with the intrusive masses and breaking structures of different ages and different composition. Lower Bajocian is essentially composed of an uneven succession of diabase and andesite covers, agglomerate tuffs, tuff-gravelites and siltstones. Tuff facies of the Lower Bajocian were exposed to strong metamorphism (skarn alteration and hornfelsing) as a result of the impact of Upper Bajocian volcanism and intrusives of Upper Jurassic age. Only subvolcanic facie of the Upper Bajocian in the Gedabey mine has been studied (rhyolite and rhyodacite, quartz-porphyry). Rocks related to the Bathonian stage have developed mainly in the northern and southern edges of Shamkir uplift.

Gedabey ore district and Shamkir uplift in general is complex in terms of its tectonic structure and its magmatism is complex too. Magmatic processes in this region have occurred intensely. There are 3 phases of magmatism in the ore area: 1-Bajocian phases, 2-Bathonian phases, 3-Upper Jurassic phases (*Abdullaev et al.,1988*) (Fig. 1).

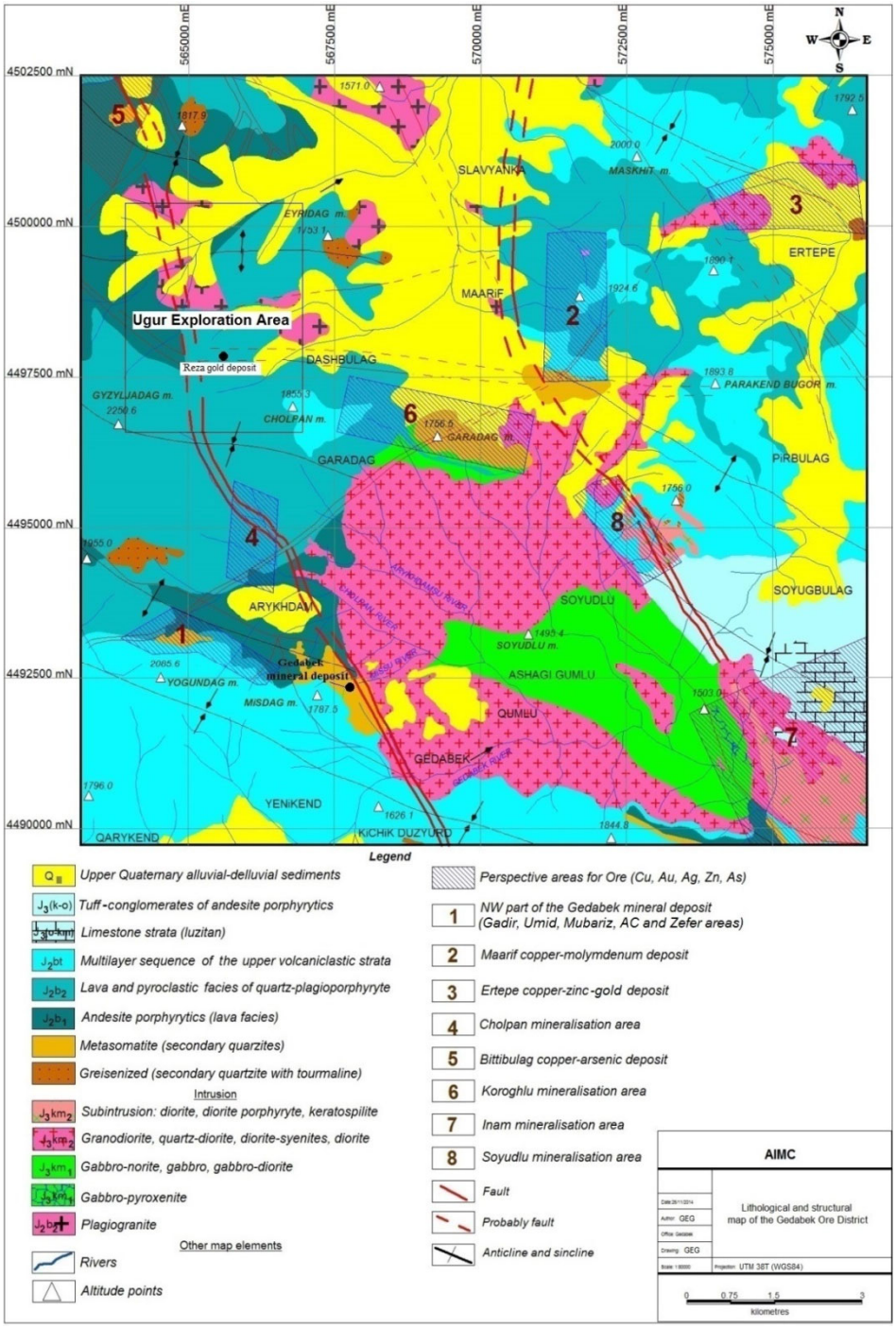

Fig. 1. Lithological-structural map of the Gedabey Ore District (perspective areas for Cu, Au, Ag, Zn & As)

The Bajocian phase is divided into two autonomous sub-stages:

Lower Bajocian age rocks – intermediate and basic composition pyroclastic volcanic and volcanic disturbed rocks – occupy the central portion of Shamkir uplift, and have become complex with intrusive and subvolcanic complexes and breaking structures of different ages, morphology.

Acid composition products of the Upper Bajocian magmatism are represented very broadly by all facies within Gedabey ore district. It can be considered that the magmatic center of the Upper Bajocian period is located in the Shamkir uplift.

Andesite, partially andesite-basalt composition products of the Bathonian phase of magmatism, as well as various composition pyroclastic materials and lava flows Upper Jurassic phase are spread mainly in the sidelines of Shamkir uplift. Along the breaking structures and in the areas between them, rocks along micro cracks have become strongly quartizated, kaolinized, sericitized and in most cases changed to secondary quartzite. Breaking structures have not caused Lower Bajocian rocks to become too complex. The main complexity were generated by subvolcanic masses of rhyolite, rhyodacite and quartz–porphyry composition of Upper Bajocian age which occurred along the Gedabey-Bittibulag depth fault and which began to cool down in the area close to the surface (*Baba-zadeh, Abdullayeva, 2012*).

Rhyolites and rhyodacites changed to various types of quartzite, and the surrounding rocks changed into quartzite, skarn rocks and hornstones depending upon petrographic, mineralogical and lithological compositions. However, the processes mentioned above did not occur all through the

subvolcanic masses and contact rocks. These processes occurred in such areas where there was a constant contact (open channel or open contact zone) between the subvolcano and magmatic source. One of such areas was the Misdag area in which Gedabey mineral deposit (mine) is located.

The NW part of Gedabey ore district is located along Gedabey-Bittibulag deeper fault, from the Yogundag Mountain area to Bittibulag copper-arsenic deposit. This area with respect to tectonics and metallogenic is confined to volcano-plutonic structure of Shamkir uplift of Lok-Karabakh structure-formation, Lesser Caucasus metallogenic zone (*Adamia et al., 2011*). The ore perspective areas (porphyry, high and low sulfidation epithermal deposit types) are embedded in cone-shaped Mountain Yogundag at elevation 2085 m and Gyzyldjadag at altitude 2250.6 m.

The study of the Gedabey ore district was carried out by many geologists. They examined mainly the geology and magmatism of the region (*Abdullaev et al., 1988; Abdullaev, 2018; Baba-zadeh, 2005; Baba-zadeh, Abdullaeva, 2012; Baba-zadeh et al., 2015, 2017; Guseynov et al, 2014; Moritz et al., 2016; Ramazanov et al., 2012; Suleymanov, Aliev, 1977; Hemon et al., 2012, 2013*). However, there is little information about the new discovered deposits of the region, with the direct participation of the co-authors of this article (Gedabey Exploration Group – Anar Veliyev, Samir Mursalov).

The NW part in southern of Gedabey ore district has been explored for porphyry-epithermal ore perspective areas due to its favorable geological setting for Gedabey and Gadir type of deposit. In the result of exploration activities there were discovered several new local epithermal mineralization areas, one of which has underground mining, named Gadir deposit (low sulfidation type) (*Baba-zadeh et al., 2015; Valiyev et al., 2016, 2018; Novruzov et al., 2019*) and named Ugur exploration area – Reza gold deposit (by AIMC Gedabey Exploration Group, 2014). Other ore perspective areas are in advanced stages of exploration, such as Umid, AC, Zefer and Bittibulag (*Baba-zadeh et al., 2019*).

Identification of exploration targets by mineral prospecting often includes reviews of available information, interpretation of remote sensing data, geological mapping and soil geochemical surveys.

This article describes Ugur exploration area – Reza gold deposit, and some mineralization areas (Gyzyldjadag, Shah Yatag, Yukhari Narzan and Dashbulag) which can be of interest from the commercial point of view in future (fig. 2).

Available information on property description and location, which is common to all the exploration projects, may be found above in the report section with that name. The following information comes largely from Gedabey Exploration Group.

A personal inspection of the Ugur Exploration Area was made by Vice President Farhang Hedjazi and Director of Geology Dr. Stephen Westhead. It was concluded that, for present purposes, Gedabey NW Project is an advanced exploration project. A substantial amount of historical and more recent exploratory work has been carried out by previous and current owners and exploration activity is ongoing.

Ugur Exploration Area is identified in the following list (Fig. 2):

- *Reza gold deposit (Au-Ag); high sulfidation type;*
- *Gyzydjadag sulphur mineralization area (Au-Ag-S); high sulfidation type;*
- *Dashbulag mineralization area (Au-Ag-Cu); high sulfidation type;*
- *SHAH Yatag mineralization area (Au-Ag-Cu); high sulfidation type;*
- *Yukhari Narzan mineralization area (Au-Ag), high sulfidation type.*

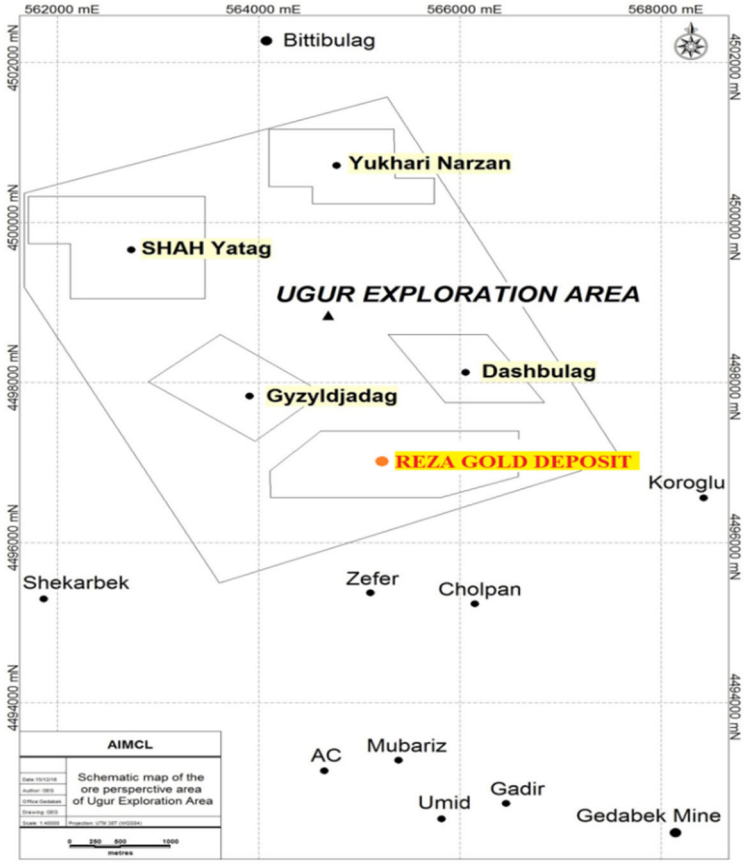

Fig. 2. Schematic map of the ore perspective area of Ugur Exploration Area

Regional geological-structural setting. Ugur Exploration Area is located at 4 km to the southwest Gedabey high sulfidation epithermal deposit, on Mountain Gyzyldjadag (Fig. 3).

The Reza gold deposit, Shah Yataq, Gyzydjadag, Dashbulag and Yukhari Narzan mineralization areas are all located within on the Gedabey-Bittibulag regional deeper fault system. The major elongated structural zones within the system form the framework for the region.

Middle Jurassic to Upper Jurassic sedimentary, magmatic and metamorphic rocks forms the basement of the region. These are intruded by Upper Bajocian to Kimmeridgian age plagiogranites, gabbros, diorites, granodiorites and granites. In a geological structure of mineralization area includes Upper Bajocian rhyolite-dacites and their agglomerated tuffs and secondary quartzites of compound genesis. There are also widely developed contact hydrothermalites along with fumarole-solfatara type due to acid volcanism of Upper Bajocian Age. Contact hydrothermalites get their origin in plagiogranite intrusion exposures having wide expansion in a large field of hydrothermalites spread in the head river Djeyirchay. And a broad net of discontinued dislocations is developed on the given area where the dominant role among them belongs to Gedabey-Bittibulag deeper fault.

Within the mineralization area bounds there also observed Gyzyldjadag fault of latitudinal strike in which zone at a thickness 15 m the rock are brecciated, silicificated and limonitized. The area is confined to an intersection knot of above-listed faults however the dominant role in mineralization localization belongs to Gedabey-Bittibulag deeper fault (Fig. 3).

Rocks within the mineralization areas bounds, enclosed between tectonic structures, are strongly kaolinized and impregnated by phenocrysts of pyrite and rarely chalcopyrite at which leaching formed a gossan composed of strongly limonitized, ocherous rocks.

Copper minerals as rare phenocrysts of chalcopyrite and hypergene formations as malachite are observed on an intersection area of Gedabey-Bittibulag fault with Gyzyldjadag fault.

Deposit was discovered in 2016 by GEG and called Reza in ***honour of Reza Vaziri*** who is the president of Azerbaijan International Mining Company, Anglo Asian Mining PLC.

The Reza gold deposit is located in Gedabey Ore District of the Lesser Caucasus in NW of Azerbaijan, 358 kms East of the capital city Baku, 48 kms East of the city of Ganja and Ganja airport, 4.7 kms NW of Gedabey open-pit gold copper mine. The deposit is the well within the Ugur exploration area, NW Area polygon of Gedabey Contract Area.

Fig. 3. Location of Ugur Exploration Area on Gedabey-Bittibulag regional deeper fault system (*www.googleearth.com*)

The exploration centre of the project is the partially backfilled outcrop, independently located on Google Earth at Latitude 40°37'13.10"N and Longitude 45°46'15.34"E. The known gold mineralization has an estimated north-south strike length of 400 m and a total area of approximately 20 hectares or 0.2 km². The deposit is enlarged by highly gold-silver surface outcrop rock chip samples over an area of 2.5 kms North-South by 2 kms East-West, with the Reza gold deposit located on the central part.

In a geological structure of section there participated secondary quartzites being formed under the influence of Atabek-Slavyanka plagiogranite intrusion exposures observed to the north from the gold mineralization area. The area in tectonic attitude is confined to Gyzyldjadag fault of Northeastern sub-latitudinal strike 80° with a vertical dip. The mineralization zone thickness within the area bounds is up to 80–120 m.

Rocks in the alteration zone area crumpled, argillic alterated, brecciated, strongly limonitized and hematitized. Out of metallic minerals crystalline hematite was observed. On surface intensive barite and barite-hematite vein and veinlets, also gossan zones were observed. The main mineralization zones have been sampled in three trenches at a distance up to 270m by trenches #1, #2 and #3 and received positive results for gold and silver. Also there have taken approximately 550 samples from outcrop #1 and #2.

On the main orebody at surface centre there occured secondary quartzites with vein-veinlets barite-hematite mineralization over which accumulations of hydrous ferric oxides cementing breccias of quartz and quartzites remain. And in erosion parts "reddish mass" being oxidation product of stock and stockverk hematite ores are observed. Representing typical gossans, these accumulations by the data of trenches for thickness about 5-10 m contain gold 0.3-2.0 ppm and silver 1.0–15.0 ppm.

Surface sampling. GEG AIMCL is pleased to announce that rock chip and channel sampling has identified multiple high-grade gold mineralizations at Ugur exploration are. Following the previously reported discovery of potentially significant outcropping hematite-barite vein and breccia

mineralization (*Exploration Report, 2013-2015*) at Gedabey NW Project has undertaken systematic geological mapping and rock chip and channel sampling. This sampling has delivered exceptional gold results including 4.96 ppm Au (UGA-01), 3.07 ppm Au (UGA-43) and 3.43 ppm Au (UGA-200) confirming the existence of outcropping high-grade gold mineralization. The mineralization occurs within in NW subparallel structural zones within 200 m in the deposit and partly in the East part.

The majority of the new results are from sampling surface outcrops that occur in the centre of known high sulfidation epithermal mineralization at Reza area, and the style of mineralization indicates a potential link between known gold-rich barite-hematite vein mineralization. A total of 48 rock chips samples were collected from out cropping and sub cropping areas across three main outcrops. The majority of samples returned highly values (30% of samples graded more than Au 0.3 ppm; see table 1 and Fig. 4). Significantly a total of 177 samples returned grades higher than Au 0.3 ppm and 31 samples returned more than Au 0.99 ppm (up to 4.96 ppm Au).

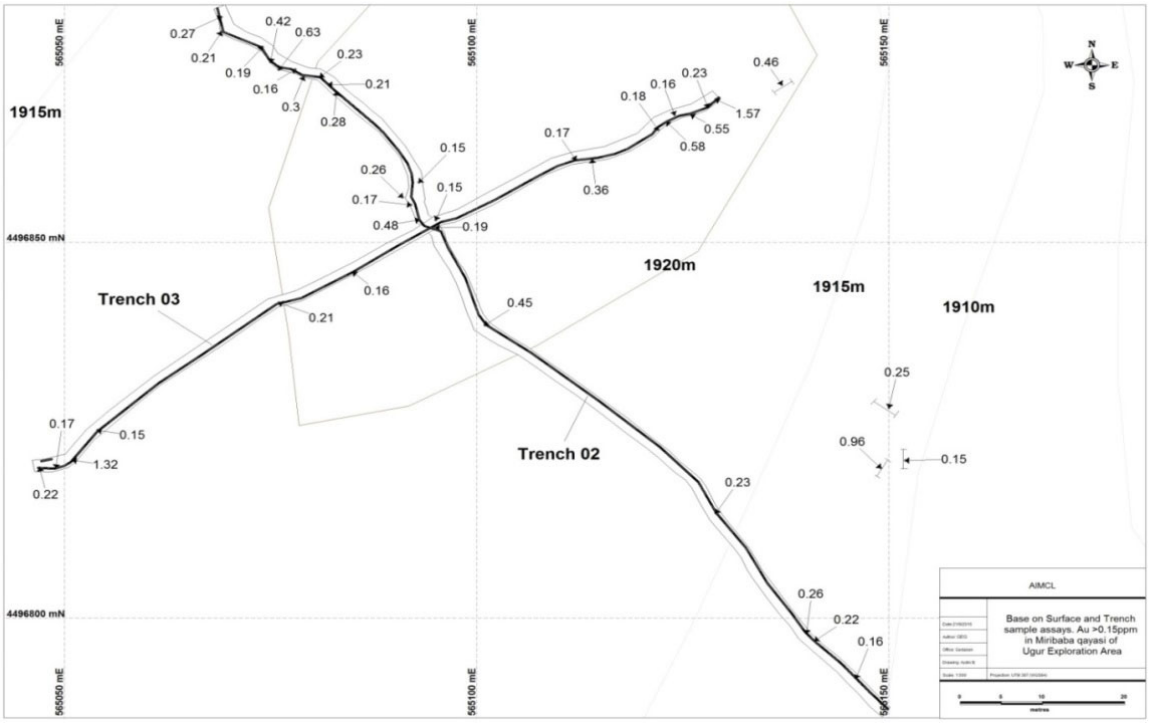

Fig. 4. Base on surface and trenches (T-2 and T-3) samples assays, Au>0.15 ppm in the Reza gold deposit of Ugur Exploration Area

Table 1

Assay results of trenches and channels sampling on the surface of Ugur Exploration area

Sample_id	Au, ppm	Ag, ppm	Cu, %	Zn, %	Easting	Northing	Altitude
UGA-01	4.96	1.5	0.073	0.1069	565888	4497351	1691
UGA-30	0.35	1.3	0.044	0.0600	565813	4497325	1717
UGA-39	4.49	1.3	0.064	0.0874	565886	4497351	1688
UGA-42	0.67	1.5	0.034	0.1006	565958	4497418	1685
UGA-43	3.07	9.9	0.125	0.1375	565961	4497420	1685
UGA-44	2.48	3.5	0.079	0.0903	565963	4497421	1684
UGA-46	0.33	1.7	0.096	0.0993	565965	4497423	1682
UGA-63	0.56	1.5	0.116	0.1844	566148	4497480	1662
UGA-64	0.59	1.5	0.131	0.1387	566147	4497481	1662
UGA-65	0.97	2.1	0.070	0.1561	566118	4497459	1667
UGA-69	0.96	2.4	0.046	0.0223	565684	4497294	1667
UGA-72	1.37	2.3	0.037	0.0576	565658	4497273	1667
UGA-74	0.64	2.9	0.041	0.0374	565622	4497260	1667
UGA-75	1.33	6.6	0.050	0.0375	565595	4497262	1667
UGA-76	0.71	2.2	0.055	0.0724	565569	4497251	1667
UGA-88	0.29	7.7	0.053	0.1536	565310	4496898	1869
UGA-91	0.36	2.8	0.047	0.1277	565310	4496897	1869
UGA-92	0.71	22.1	0.066	0.2127	565309	4496897	1869
UGA-93	0.44	2.9	0.075	0.0990	565308	4496896	1869
UGA-94	0.34	5.1	0.055	0.2089	565308	4496895	1869
UGA-98	0.36	8.2	0.033	0.1403	565310	4496893	1875
UGA-99	0.63	6.3	0.059	0.1967	565311	4496892	1875
UGA-100	0.50	6.0	0.059	0.1458	565314	4496902	1873
UGA-101	0.44	7.6	0.060	0.1487	565311	4496903	1871
UGA-106	0.57	7.0	0.038	0.1107	565321	4496907	1867
UGA-107	0.93	3.9	0.078	0.1457	565323	4496908	1867
UGA-108	0.84	2.9	0.069	0.1489	565323	4496911	1866

Ending table 1

Sample_id	Au, ppm	Ag, ppm	Cu, %	Zn, %	Easting	Northing	Altitude
UGA-112	0.60	3.8	0.127	0.1713	565329	4496908	1863
UGA-113	0.32	4.1	0.160	0.2472	565330	4496920	1859
UGA-114	0.88	6.0	0.136	0.1357	565328	4496921	1858
UGA-115	1.36	10.3	0.150	0.2102	565329	4496928	1857
UGA-116	0.45	9.0	0.151	0.2487	565325	4496920	1860
UGA-118	0.99	2.9	0.086	0.1769	565334	4496925	1856
UGA-120	0.44	6.7	0.067	0.1425	565330	4496948	1850
UGA-124	0.31	0.9	0.002	0.0100	565263	4497029	1872
UGA-125	0.42	1.6	0.012	0.0082	565264	4497027	1873
UGA-126	0.65	1.0	0.016	0.0398	565264	4497025	1873
UGA-127	0.58	1.7	0.020	0.0256	565263	4497023	1873
UGA-128	0.76	1.0	0.020	0.0230	565262	4497022	1873
UGA-129	0.46	1.1	0.021	0.0344	565262	4497020	1873
UGA-131	0.71	1.1	0.016	0.0168	565261	4497016	1874

Trenching. Reza gold deposit trenches were dug with the objective of discovering mineral bodies under the unconsolidated cover, sampling and ascertaining the orientation. Two main phases of trenching occurred, with the initial trenching taking place on surface of the deposit, with validation and infill trenching completed by GEG (Fig. 5).

In the aim to identify the gold presence in oxidized secondary quartzite zone on the surface 5 trenches were provided. Trenches were dug by excavator in length between 50 to 170 m the depth of 1.5 m. The trenches were mapped and sampled manually by taking one-to two meter long channel samples. The samples weights ranged between 2–5 kilograms.

The main mineralization targets have been sampled in three trenches at a distance up to 270m by trenches #1, #2 and #3 (Fig. 4) and given good results for gold and silver. Also approximately 350 samples from outcrop #1 and #2 have been taken.

Rc drilling. In the Reza gold deposit, 55 bore holes were drilled on a 50x50 m grid (Fig. 6) (the results of the analyzes are given in table 2).

RC holes were drilled at an angle of -90 degrees at a diameter 146 mm. The air-flush RC holes were intended to test the extension of the oxidized gold mineralization at depth. Slurry recovery was in the range 80-100%. However, although drilling below the level of ground water is technically feasible, the slurry material is lost and enriched with heavy residues.

Fifty-five RC holes were drilled for a total of 1482 m to test oxide gold mineralization in the central part of the deposit, also in flanks.

Fig. 5. Controlling of exploration surface sampling of trenches Reza gold deposit of Ugur Exploration Area

Fig. 6. Location of UGDD 01 & 02 bore holes at the Reza gold deposit

Table 2

Assay results of RC bore holes of Reza gold deposit, Ugur exploration area (>0.29ppm Au)

hole_id	sample_id	from, m	to, m	length, m	Au, ppm	Ag, ppm	Cu, %	Zn, %
UGRC02	UGRC02-14	13	14	1	0.61	0.83	0.0037	0.0337
UGRC02	UGRC02-15	14	15	1	0.50	1.05	0.0025	0.0296
UGRC02	UGRC02-16	15	16	1	0.38	0.75	0.0036	0.0269
UGRC02	UGRC02-17	16	17	1	0.32	0.76	0.0032	0.0234
UGRC02	UGRC02-20	18	19	1	0.30	0.75	0.0034	0.0290
UGRC03	UGRC03-15	13	14	1	0.44	2.39	0.0323	0.2893
UGRC03	UGRC03-16	14	15	1	0.46	2.96	0.0497	0.3735
UGRC03	UGRC03-17	15	16	1	1.42	3.35	0.0535	0.3302
UGRC03	UGRC03-18	16	17	1	0.89	11.91	0.0481	0.3271
UGRC03	UGRC03-19	17	18	1	1.90	60.18	0.0356	0.3624
UGRC03	UGRC03-20	18	19	1	1.36	55.77	0.0120	0.2446
UGRC03	UGRC03-22	19	20	1	1.11	13.18	0.0170	0.2566
UGRC03	UGRC03-23	20	21	1	0.98	23.36	0.0080	0.2487
UGRC03	UGRC03-24	21	22	1	0.60	8.33	0.0223	0.3277
UGRC03	UGRC03-25	22	23	1	0.43	9.25	0.0253	0.3225
UGRC03	UGRC03-27	24	25	1	0.67	7.23	0.0356	0.2741
UGRC03	UGRC03-28	25	26	1	0.36	10.59	0.0253	0.3404
UGRC04	UGRC04-3	5	6	1	1.01	5.56	0.0038	0.1304
UGRC04	UGRC04-4	6	7	1	0.78	3.63	0.0049	0.1067
UGRC04	UGRC04-15	16	17	1	1.89	9.14	0.0190	0.0835
UGRC04	UGRC04-16	17	18	1	1.90	10.03	0.0246	0.0477
UGRC04	UGRC04-17	18	19	1	2.17	6.76	0.0248	0.1258
UGRC04	UGRC04-18	19	20	1	1.60	14.01	0.0122	0.1175
UGRC04	UGRC04-19	24	25	1	1.93	7.78	0.0119	0.0601
UGRC04	UGRC04-21	25	26	1	1.89	10.15	0.0292	0.0885
UGRC04	UGRC04-22	26	27	1	2.11	20.78	0.0202	0.1019
UGRC05	UGRC05-11	9	10	1	1.75	27.78	0.0344	0.0875
UGRC05	UGRC05-12	10	11	1	1.62	71.70	0.0266	0.0718
UGRC05	UGRC05-13	11	12	1	2.04	36.75	0.0228	0.0735
UGRC05	UGRC05-14	12	13	1	2.10	33.08	0.0209	0.0673
UGRC14	UGRC14-23	20	21	1	10.27	74.53	0.0113	0.0182
UGRC14	UGRC14-25	21	22	1	16.08	46.21	0.0055	0.0019
UGRC14	UGRC14-26	22	23	1	11.08	56.52	0.0070	0.0030
UGRC14	UGRC14-27	23	24	1	2.15	39.04	0.0038	0.0080
UGRC14	UGRC14-28	24	25	1	1.29	22.08	0.0109	0.0062
UGRC14	UGRC14-29	25	26	1	2.10	18.08	0.0130	0.0386
UGRC14	UGRC14-30	26	27	1	3.28	14.90	0.0144	0.0071
UGRC14	UGRC14-31	27	28	1	7.33	28.82	0.0150	0.0281

Diamond drill holes. Ten diamond drill holes, named UGDD 01-10 were drilled in the central part of the deposit. The drill holes were sampled mainly in 1 meter lengths from the top of the hole to the bottom.

The exploratory core holes were drilled at an angle of –90 degrees at a diameter 122.6 mm (PQ) for the first 40–72.5 m. Thereafter, the bore hole diameter was 86 mm, producing 80 or 84 mm diameter cores. The core samples were marked and placed into standard boxes.

Significant intervals of weighted averages greater than 0.29 gramme per tonne gold (ppm) over down hole intervals of 1 metres or greater (>0.29 ppm Au and >0.9 m) are summarized in table 3 below. Drill hole UGDD02 was the highest grade mineralized of the program, averaging 3.52 ppm Au over a 58.5 m length of the drill hole (Fig. 6). Drill hole UGDD10 was the widest mineralized of the program, averaging 1.23 ppm Au over a 106.5 m length of the drill hole. Other notably mineralized drill holes included UGDD01, UGDD03, UGDD04, UGDD06, UGDD07, UGDD08 and UGDD09. Drill hole UGDD05 was the least mineralized with a best intercept of 0.45 ppm Au for 11–16 m (5 m) and 0.40 ppm Au for 20–25 m (5 m).

Table 3

Summary of significant drill intercepts (>0.29 ppm Au) of Reza gold deposit

hole_id	sample_id	from, m	to, m	length, m	Au, ppm	Ag, ppm	Cu, %
UGDD01	UGDD01-17	19.00	20.00	1.00	0.85	23.58	0.0211
UGDD01	UGDD01-18	20.00	21.00	1.00	0.75	18.85	0.0203
UGDD01	UGDD01-19	21.00	22.00	1.00	1.45	25.25	0.0170
UGDD01	UGDD01-20	22.00	23.00	1.00	1.09	19.16	0.0165
UGDD01	UGDD01-21	23.00	24.00	1.00	1.34	10.66	0.0124
UGDD01	UGDD01-33	34.75	35.50	0.75	2.81	8.81	0.0161
UGDD01	UGDD01-34	35.50	36.50	1.00	5.05	4.69	0.0076
UGDD01	UGDD01-35	36.50	37.50	1.00	15.87	1.25	0.0044
UGDD01	UGDD01-36	37.50	38.35	0.85	5.14	0.97	0.0035
UGDD01	UGDD01-37	38.35	39.15	0.80	3.19	1.41	0.0043
UGDD01	UGDD01-38	39.15	40.00	0.85	2.51	1.01	0.0037
UGDD02	UGDD02-04	4.00	5.00	1.00	18.45	31.57	0.0075
UGDD02	UGDD02-05	5.00	6.00	1.00	13.96	28.83	0.0063
UGDD02	UGDD02-06	6.00	7.00	1.00	5.33	16.53	0.0042
UGDD08	UGDD08-42	41.00	42.00	1.00	17.38	64.74	0.0885
UGDD08	UGDD08-43	42.00	42.50	0.50	15.38	53.51	0.0388

Local geological-structural setting. The gold mineralization in the Reza deposit developed mainly during the Upper Bajocian tectonic-magmatic cycle (Fig. 7).

Tectonic zone is the main host structure for the West (central zone) and East zones of gold mineralization. During Upper Bajocian times, the central tectonic zone was a right-lateral strike-slip fault represented by a number of sub-parallel-trending faults (55º–85º) with a combined length of 1–1.5 kilometres. The fault dips are from 70º to 80° to the north-west. The faults of the central zone control the hydrothermal metasomatic alteration, gold mineralization, Upper Bajocian Atabek-Slavyanka plagiogranite massive intrusion, and in some cases are the borders of the elevated tectonic blocks formed by Lower Bajocian volcanic rocks.

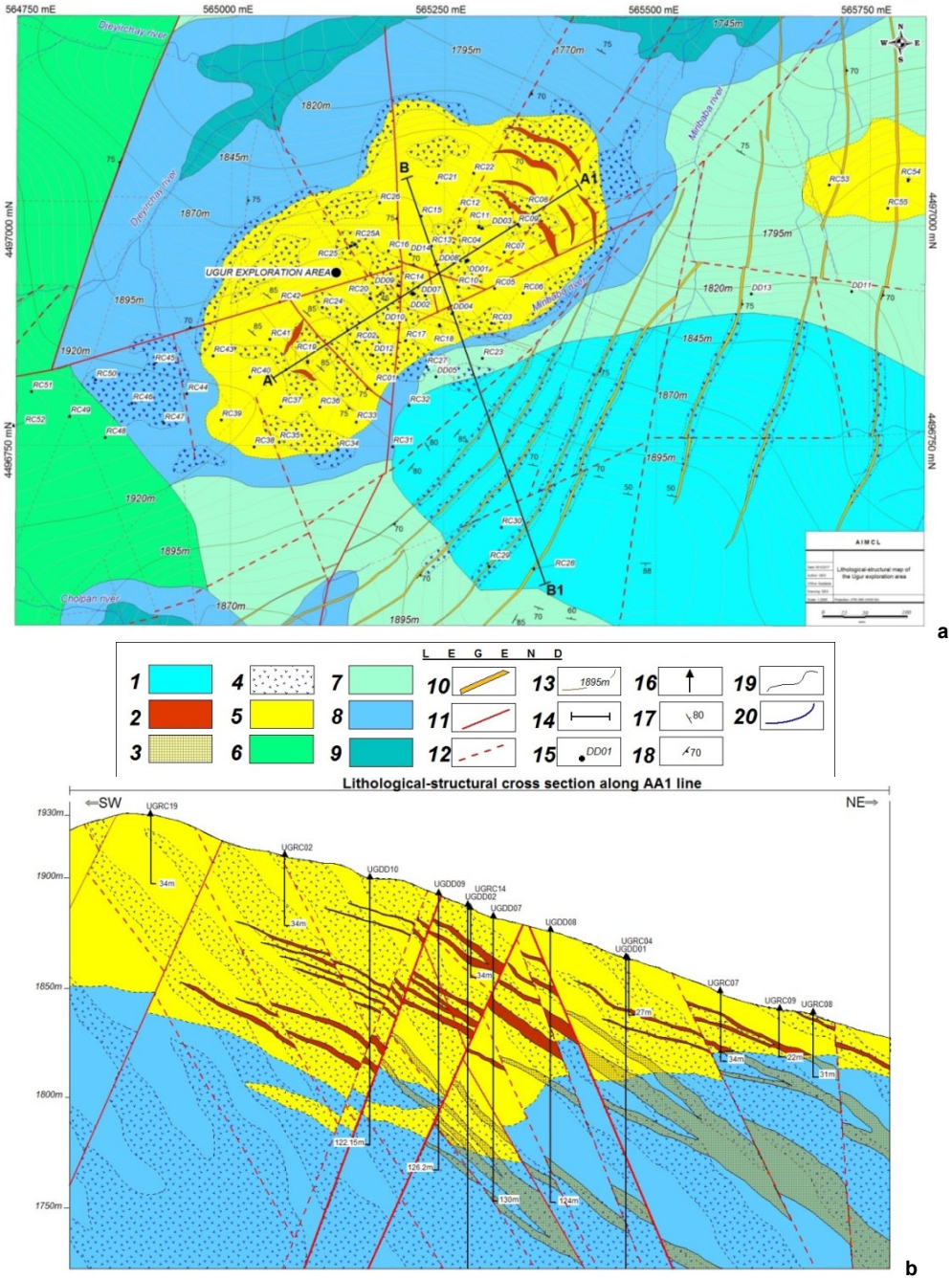

Fig. 7. Lithological-structural map (a) of the Reza gold deposit, Ugur exploration area (scale 1:2800, A3 format, Original scale 1:1 000 (by GEG, 2016)) and lithological-structural cross section along AA1 line (b).
Legend: 1 – andesite tuff agglomerates facie; 2 – gossan; 3 – pyrite stock and stockverk; 6 – breccia zone of silicified andesite porphyritic rocks; 5 – secondary quartzite; 6 – pyroclastic (from small clastic to lapilli) facie of rhyolite-dacite porphyry; 7 – lava facie of rhyolite-dacite porphyry; 8 – silicified andesite porphyritic rocks; 9 – andesite porphyritic rocks; 10 – quartz porphyry zone (weak hematitized, limonitezation); 11 – faults; 12 – probably faults; 13 – topographic contour line; 14 – cross section lines; 15 – bore holes points; 16 – bore holes ; 17 – deep angle of faults and dykes; 18 – structural elements of rocks; 19 – lithological contact; 20 – rivers

The East tectonic zone is complicated by the occurrence of numerous related faults such as antithetic and synthetic faults, down throw and thrust faults and intense folding due to faulting. The combination of these structures determines the general morphology of both the oxide and primary sulfide mineralization. Where zones of either fracture cleavage or quartz veinlets occur in drill core, these intervals are described as fault zones. In many cases the intervals of faulting are represented by tectonic breccias in which relics of the host volcanic-sedimentary rocks are cemented by dacitic rock. The tectonic breccias probably formed after emplacement of the sulfide mineralization, during the

formation of the sub-longitudinal faults. The intervals of tectonic breccia exhibit lower gold grades in comparison with zones of fracture cleavage and quartz veinlets.

The Reza gold deposit was emplaced in the intersection of NW, NE, N and E trending structural systems regionally controlled by a first order NW transcurrent structure.

Structure geometry and kinematics determined from surface mapping and drilling information suggest that the volcanic sequence hosted at central part might have been accumulated in a "pull-apart" basin controlled by NW structures. These structures were affected by two compressive deformation processes: the first as a result of the N to the NNE sub-horizontal contraction and the second being formed during a post mineral NW contraction.

Field geological exploration information, cross-cutting relationships between structures, veins and brecciation types and hydrothermal alterations styles suggest that the mineralization was controlled by NW brittle dextral shears, associated with E-W left lateral and N-S pure extensional structures, with all them related to the contraction event within a transpressional regimen.

Deposit type. The Gedabey NW project is a new local ore belt system discovered by GEG while following-up high priority alteration targets in a key mineralization area located in the Gedabey-Bittibulag ore belt of the Gedabey ore district in Azerbaijan. The ore belt contains a series of Jurassic-age porphyry, high-sulfidation and low-sulfidation epithermal gold deposits and mineralization occurrences. The remote sensing anomalous (in NW and SW) area is believed to remain open in all directions under shallow, post-mineral cover. Deposit alteration signature has characteristics which suggest the current outcrop level may be near the top of a mineralized, gold-bearing high sulfidation epithermal (HSE) system.

The gold mineralization at the deposit is interpreted as forming in shallow high sulfidation epithermal systems (*Sillitoe, Hedenquist, 2003; Simmons, 2005; Sillitoe, 2010*) . The mineralization has been noted to occur in two different styles:

- well-confined hydrothermal breccias;
- associated with pyrite stock-stockwork.

The majority of the deposit material and current estimates are formed within the barite-hematite-quartz-kaoline mineralization in the secondary quartzite rocks.

The main brecciation and stockwork are hosted within secondary quartzite, sometime massive silicified andesite porphyritic rocks.

Outcropping gold mineralization in the project is oxidized with no sulfides recognised at surface. Mineralization is hosted by brecciated, and intense advanced argillically-altered andesitic volcanics and possible domes, including large areas of "powdery" probably alunite-opal alteration (Fig. 8).

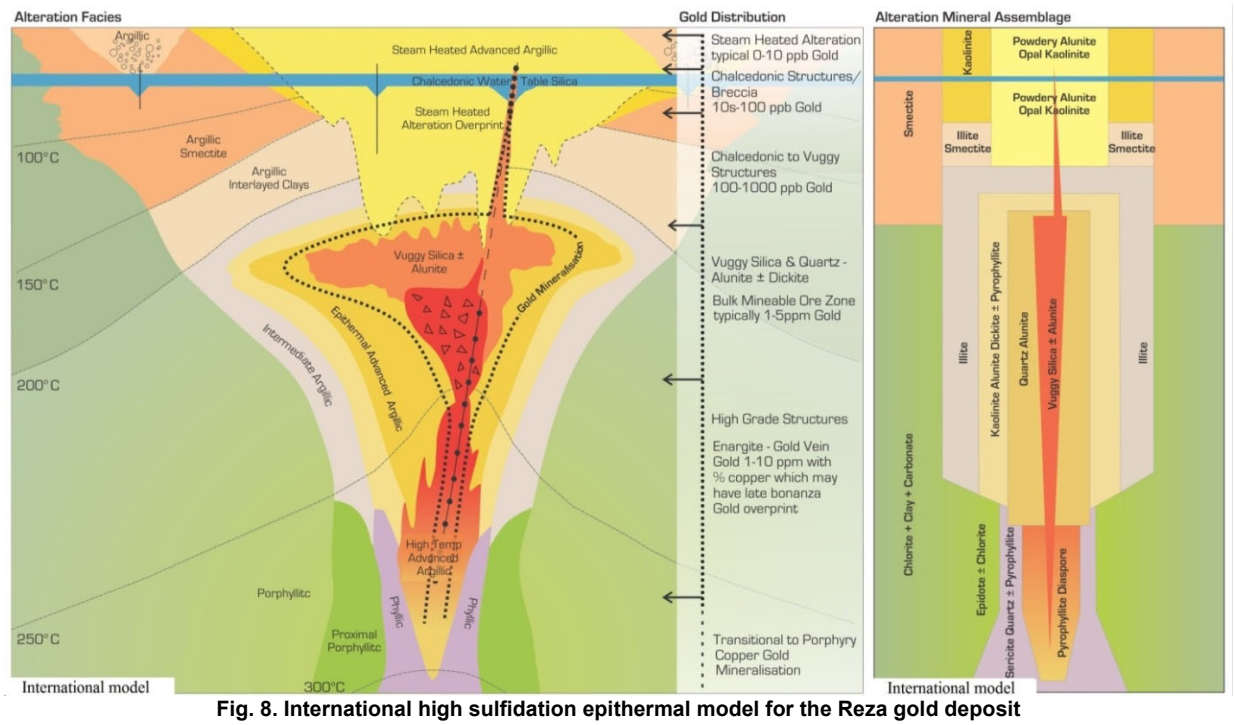

Fig. 8. International high sulfidation epithermal model for the Reza gold deposit

The outcropping alteration at the deposit is typical of the upper steam-heated levels of high-sulfidation epithermal (HSE) deposits, which in most mineralized systems of this type, may cap higher-grade gold mineralization which is hosted by underlying vuggy and oxide zones.

From our current mapping and sampling, the gold mineralization at the deposit appears to form a crescent shape surrounding a "core" of barite-hematite mineralisation in advanced argillically & silicification – altered porphyritic andesite host rock.

Recommended. The objectives and recommended methodology of the next phase of work are outlined below.

✓Stage 1: Re-logging of core and re-interpretation to confirm geology model. Any mineralized exposures that are open, or were undiscovered, should be systematically sampled and documented.

✓Stage 2: Complete a thorough review and compilation of the database. This should include re-logging of core and standardizing nomenclature for log coding. Data can then be used to build new accurate cross sections for future drill hole planning. Field checks of geologic mapping to verify structural and lithologic interpretations should be completed as warranted. An intrusive suite of samples will be collected for detail petrographic-mineralogical and fluid inclusion studies.

✓Stage 3: All data will be compiled for detailed drill hole planning for initial confirmation drilling.

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ПЕРСПЕКТИВИ ОСВОЄННЯ НОВОГО РУДНОГО ВУЗЛА УГУР НА ПІВНІЧНОМУ ЗАХОДІ КЕДАБЕКСЬКОГО РУДНОГО РАЙОНУ (МАЛИЙ КАВКАЗ, АЗЕРБАЙДЖАН)

Описано рудний вузол Угур, розташований на північному заході Кедабекського рудного району Малого Кавказу в республіці Азербайджан. Наведено результати аналізу проб, відібраних з відкритих гірничих виробок (траншей, канав), зі свердловин, пробурених методом RC, а також зведені дані про рудні перетини із значущим вмістом золота (>0,29 ppm). Встановлено, що площа рудного вузла може бути збільшена за рахунок високих вмістів золота і срібла в бороздовій і штуфних пробах на 2,5 км у широтному і на 2 км у довготному напрямках; при цьому золоторудне родовище Реза приурочено до центральної частини рудного вузла. З рудних мінералів присутній кристалічний гематит. Ближче до земної поверхні спостерігаються інтенсивні баритові і барит-гематитові прожилки, а також зустрічається залізний капелюх сульфідних покладів. У ході розвідувального випробування головних зон мінералізації, розкритих траншеями № 1, 2, 3, які розташовані на відстані до 270 м одна від одної, у відібраних зразках було виявлено промислові вмісти золота і срібла. Також було відібрано близько 550 зразків з оголень № 1 і № 2. У місцях виходу основного рудного тіла на денну поверхню спостерігаються вторинні кварцити з барит-гематитовими прожилками, над якими збереглися скупчення гідроксидів заліза, що цементують брекчії кварцу і кварцитів. А на ділянках з інтенсивно виявленим вивітрюванням зустрічається "червона маса", що є продуктом окиснення гематитових штоків і штокверків. Являючи собою типові залізні капелюхи сульфідних покладів, ці, розкриті в канавах, рудні скупчення, мають потужність близько 5–10 м з вмістом золота 0,3–2,0 ppm і срібла 1,0–15,0 ppm. У центральній частині родовища було пробурено алмазним бурінням десять свердловин (UGDD 01–10). Свердловини випробовувалися цілком і безперервно, а довжини проб в основному становили 1 метр.

Значущі інтервали з довжинами проб 1 м і більше та із середньозваженими вмістами, що перевищують 0,29 ppm (>0,29 ppm і >0,9 м), узагальнено в таблиці. Зроблено висновок про те, що характер навколорудних гідротермально-метасоматичних змін вмісних порід, що зустрічається на даному родовищі, типовий для верхніх рівнів високосульфідних епітермальних родовищ, що зазнали оброку паром. Даний тип гідротермальних змін у більшості рудних систем може перекривати інтервали з кавернозними і оксидними зонами, що містять більш багату золоторудну мінералізацію.

Ключові слова: рудний вузол Угур; зони мінералізації; вміст золота, срібла, міді, цинку; Кедабекський рудний район; Малий Кавказ.

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ПЕРСПЕКТИВЫ ОСВОЕНИЯ НОВОГО РУДНОГО УЗЛА УГУР НА СЕВЕРО-ЗАПАДЕ КЕДАБЕКСКОГО РУДНОГО РАЙОНА (МАЛЫЙ КАВКАЗ, АЗЕРБАЙДЖАН)

Описан рудный узел Угур, расположенный на северо-западе Кедабекского рудного района Малого Кавказа в республике Азербайджан. Приведены результаты анализа проб, отобранных из открытых горных выработок (траншей, канав), из скважин, пробуренных методом RC, а также сводные данные о рудных пересечениях со значимыми содержаниями золота (>0,29 ppm). Установлено, что площадь рудного узла может быть увеличена за счет высоких содержаний золота и серебра в бороздовых и штуфных пробах на 2,5 км в широтном и на 2 км в долготном направлениях; при этом золоторудное месторождение Реза приурочено к центральной части рудного узла. Из рудных минералов присутствует кристаллический гематит. Ближе к земной поверхности наблюдаются интенсивные баритовые и барит-гематитовые прожилки, а также встречается железная шляпа сульфидных залежей. В ходе разведочного опробования главных зон минерализации, вскрытых траншеями № 1, 2, 3, находящихся на расстоянии до 270 м друг от друга, в отобранных образцах были выявлены промышленные содержания золота и серебра. Также было отобрано около 550 образцов из обнажений № 1 и № 2. В местах выхода основного рудного тела на дневную поверхность наблюдаются вторичные кварциты с барит-гематитовыми прожилками, над которыми сохранились скопления гидрооксидов железа, цементирующих брекчии кварца и кварцитов. А на участках с интенсивно проявленным выветриванием встречается "красноватая масса", являющаяся продуктом окисления гематитовых штоков и штокверков. Представляя собой типичные железные шляпы сульфидных залежей, эти, вскрытые в канавах, рудные скопления имеют мощность около 5–10 м с содержаниями золота 0,3–2,0 ppm и серебра 1,0–15,0 ppm. В центральной части месторождения были пробурены алмазным бурением десять буровых скважин (UGDD 01–10). Скважины опробовались целиком и непрерывно, а длины проб в основном составляли 1 метр.

Значимые интервалы с длинами проб в 1 м и более и со средневзвешенными содержаниям, превышающими 0,29 ppm (>0,29 ppm и >0,9 м), обобщены в таблице. Сделан вывод о том, что характер околорудных гидротермально-метасоматических изменений вмещающих пород, встречающийся на данном месторождении, типичен для подвергшихся обработке паром верхних уровней высокосульфидных эпитермальных месторождений. Данный тип гидротермальных изменений в большинстве рудных систем может перекрывать интервалы с кавернозными и оксидными зонами, содержащими более богатую золоторудную минерализацию.

Ключевые слова: рудный узел Угур; зоны минерализации; содержание золота, серебра, меди, цинка; Кедабекский рудный район; Малый Кавказ.