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Discovers of Geochemical and mineralogy of Gold in the HamzehQarinin area and exploring industrial areas

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Abstract: *In this study, the Hamzeh Gharnin area, one of the provinces functions, was studied. The area is 35 km from the city of Saqez, which is considered to be a major part of country divisions in the province of Kurdistan and a part of the north in the province West Azarbaijan. For geochemical surveys, the sampling network was designed considering the extend of the expansion of the waterway network, lithology, alteration, mineralization zones, and tectonics. Their dispersal varied from four to five geochemistry samples per square kilometers and covers an area of over 10 square kilometers. The colonies were analyzed using an I CP_ MS method and flame method for analyzing the gold element. In this study, considering the potential of the region, it is clear how the formation of these veins in this area and the potential mineralization associated with it. Finally, the separation of abnormal amounts of land and the preparation of algebraic and geochemical abnormal maps and field studies, an area of 3 sq.km, as the most important gold mineralization zone, is introduced as a promising area.*

Keywords: *Geochemical discoveries, Gold, HamzehGharnian, Alteration.*

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I. Introduction

Geochemical sampling in a regional comparison is considered as an underground exploration operation in any purpose is to identify areas with mineral potential. In the world, less territory like Iran can be found in its area of such diversification and diverse natural resources. One of the steps to take advantage of these resources is the scientific discovers of mineral deposits, which among the exploratory methods used, undoubtedly, geochemical exploration is one of the most appropriate and widely used methods. Experience has shown that geochemical explorations using effective sediment in semi-exploratory exploration are effective. The reason that sediments were the result of erosion and transportation material. Therefore, it is a good indication of outcrops in the direction of water movement. Another benefit of this method is that the environmental conditions oxidize the irritation of the ore deposits and, consequently in the extend of their hole. Of course, the impact of factors such as principle design, optimal sampling, analyzes with appropriated detection limits and high accuracy and processing of information should not be left out of view. In order to detect the actual and clean abnormalities of various types of mineral deposits from other types, in each area, it is necessary to test some of the sediment (1).

II. Method

The methodology and principles used in geochemical explorations include sampling design, standard sampling, field operations, sampling, sample preparation, sample analysis, sample analysis error analysis, processing data, drawing of abnormal maps, anomalous control and prioritization of multiple abnormal areas for the continuity of exploratory work and, finally, determination of industrial areas.The current project has been designed and implemented in three stages. The first step involves collecting information (preparation and study of documents such as: 1- 1:100000 map of geology Sanandaj, Sanandaj Mapping organization, geological survey of Iran. 2 - Topography Map 1:250000 Sanandaj – Country Mapping Organization 3- 1:100000 topography of Saqez city, Geographical organization of the Armed Forces in this area).The second step involves the steps of sampling the sediments up to drawing geochemical abnormalities maps and identifying areas of potential. The third stage involves controlling these abnormalities. The desired are analyzed and, the data were analyzed using Excel and SPSS software. After that the analysis of processed data is carried out. Finally, an abnormal range is evaluated one by one, and then promising areas will be introduced for continuation of the studies.

III. Geographic location, morphology and access to the study area

HamzaQarenin area in Kurdistan province with an approximate area of 10km2 and geographic coordinates of 46˚03' 35"- 46˚2' 16" East and 36 5 11 - 36˚04' 24" North latitudes. Access to the study area is possible through the main road of Saqez to Baneh. In order to reach the study area, it should take about 35 km from Saqez road to Baneh. Then, through the road to the left of the maim road , after about 3km to the HamzehGharin village and after 2km later, reach the studied area(figure 1-1). There are other ways to reach this range, which are all around the surrounding villages such as: Kilah Shin, Koroian,Qalqaleh . Apart from the first track of the rest of the paths, the road is dirt and the motorcycle is hard to do.

The study area is part of the 100000th city of Saqez city, which is largely located in the province of Kurdistan and a small part of the north of West Azarbaijan province. The target area is located in the southwest of the region. This area has a rural texture and the occupation of the region is mainly agricultural, animal husbandry and beekeeping. The people of region are mainly Muslim (shafl'i religion). Most of the waterways in the area flow to the Hamza River and then to the main river Cham. From the highlands of the area you can mention the mountain of PirBodagh, Shahid, PirKhedr (2). The area of HamzehQorinan is located in alteration zone, Sanandsj-Sirjan. The zone consists of a complex transformation of various intensities and numerous intrusions that accompany these transformations. This range is important due to the presence of Gold mineralization conditions and its proximity to several other reasons. In fig 1-5, the position of the range and several known gold deposits are specified on the Sanandaj-Sirjan zone. Among these deposits can be mentioned: Muteh, Zarrstad, Khorian, Qalqalah and Barika. Subsequent studies have been carried out in these deposits, and have identified mineralogy related to orogeny and shear zones. There are different ideas about how to form and place gold. Some of the origin of gold is related to the intrusive masses adjacent to mineralization, and others are caused by the washing of metamorphic rocks. However, public opinion is about the role of masses and intruders in providing heat to flow fluids (5).

IV. Geochemical Study Area

1. Field Operations

Each specimen contains at least 40 pieces of rock from 150 to 200garms, randomly (rocky outcrops) inside the cell, and the specimen has a minimum weight of 6 t 8 kilograms. Before each sample is taken out, the center of the cell first is determined according to the coordinates provided by the design phase with GPS with a precision of ½ m and marked with color.

All geochemical samples of this sheet were analyzed for 43 samples. These elements are:
Ag,Al,As,Au,B,Ba,Ba,Be,Bi,Ca,Cd,Ce,Co,Cr,Cs,Cu,Fe,Hg,K,La,Li,Mg,Mn,Mo,Na,Nb,Ni,P,Pb,Rb,S,Sb,Sc,Sn, Sr,Te,Th,Tl,U,V,W,Y,Zn,Zr.
All of these elements are measured by ensuring a lower sensitivity limit than the field value.

2. Calculation of chemical analysis error

In this method in a logarithmic coordinate system, the mean horizontal axis was measured twice and is shown on the vertical axis of the measured difference. In this diagram, you can see mile lines that can have a precision level of %10.The method of work is to be distributed by the two previously described quantities of each pair of repetitive samples on a coordinate sheet, if 90% of them are below the lower line (line 10% error) and 99% of them below the upper line (line 1%), Then the total error of this repeating sample s evaluated for that particular element of 10%,which is an acceptable and permissible error in exploratory affairs. So, for each element, you have to draw a separate diagram. In the case of some elements, because of the average and the difference of the two measured values, all samples were not included in in the diagrams; the values of these elements were also scaled with the diagrams, respectively (3).

Measured values of the Bi ,Hi element in the number 100 and the values of the Ag, Be, Cd, Cs, Mo, Sn, Te , Ti , U and W values in the number 100 and the measured values of Co , Li , Nb , Ni, S, Sb, Th and Y are multiplied by 10. The values for the elements Al, Ca, Fe, K, Na and Ti on the number 100, the measured values of the Mg element in the number of the 50, the measured values of the elements P on the number 10, and the values of the element Mn are divided into number 2. The cause of B is omitted due to sensor sensitivity.

3. Processing sensor values

Given the presence of sensor values (values below the measurement limit) in measurements and the problems that these values may have caused in data analysis and processing, should be replaced by a specific method. In this project, the sensor values were replaced according to the measurement limits reported by the laboratory and with the ¾ method. In table (1), the number of sensor samples of each variable and the measured limits reported by the laboratory for all variables are given. It needs to be explained that element B has been excluded from this list of samples due to the presence of sensor values for all samples (3). Table (1): The number and the amount of sensor values for each variable in the HamzaQarnian region.

Table 1: Number and limits of the sensors for each variable in the HamzaQarnian area

Variale	Detection Limits	Count Censord	Percent	Variale	Detection Limits	Count Censord	Percent
Ag	0.01	2	0.1	Mo	0.1	5	0.25
Al	10	0	0	Na	10	1	0.05
As	0.5	4	0.2	Nb	0.5	0	0
Au	1	275	13.25	Ni	2	21	1.05
B	0.5	870	18.5	P	5	0	0
Ba	0.2	0	0	Pb	0.2	0	0
Be	0.2	15	0.75	Rb	0.1	0	0
Bi	0.1	348	17.4	S	0.001	8	0.4
Ca	10	8	0.4	Sb	50	107	5.35
Cd	0.1	177	8.85	Sc	0.1	2	0.1
Ce	0.5	0	0	Sn	1	1	0.05
Co	0.2	0	0	Sr	0.2	2	0.1
Cr	2	28	1.4	Te	0.1	2	0.1
Cs	0.1	4	0.2	Th	0.2	654	32.7
Cu	0.2	0	0	Ti	0.02	0	0
Fe	100	0	0	Tl	10	0	0
Hg	0.05	598	29.9	U	0.1	92	4.6
K	10	2	0.1	V	0.02	0	0
La	10	120	6	W	2	0	0
Li	0.5	6	0.3	Y	0.1	3	0.15
Mg	10	0	0	Zn	0.05	0	0
Mn	2	0	0	Zr	0.22	0	0

V. Calculate and process variables

1. Raw Data Factor Analysis

The results of the factor analysis are based on normalized value (according to the distribution function of each variable, in the absence of normalization, the logarithm method is used to normalize the values, the variables in this region are listed in table (2-4). In this able, all 43 variables are included with the total values and their role in justifying the variability m two ways (one-to-one and cumulative) as well as load factors related to the eight factors before and after the rotation.

The data in this table implies that: The first element can justify about 28% of the total variability. This amount falls to the second one and reaches the figure of about 13%.In the third case, this drop has dropped sharply to about 10%. Therefore, the first three motifs in total compensate for 50% variation. From the fourth to the eighth stage, which consists of 5 pieces of music, about 22% add to the justification of the plot, minor changes were made. This is a form of justification of variability in which 4 variables are sufficient to justify about 3\4 of variability. It means that, in principle, the generative relationship between elements in this region is not very strong in each other. (Solidarity matrix numbers also indicate this) after turning axes, the whole conclusion does not change, and the results can be considered true.

The table (2) shows the rotated matrix of factor analysis. The following elements are important in each of the 8 points given.The first elements of the element, (Ni, Sc), (Mg, Mn), (Fe, Ti), (V, p), (Co, Cr) are. These rocks are related to the alkaline stones of the region and are not important in terms of mineralization activities.In the second step, there are elements of (Al, Ba) and (Nb, Sr) that can in some way represent the plastic alteration in the region.In the third stage, there are elements of (Al, Ba), (Nb, Sr), which can be related to the activity of Felsic type rocking in the region and is not important in terms of mineralization activities.In the fourth stage, the elements (Be, Ce) and La are present. These elements are related to Felsic type rock placement activities in the region. Therefore, this factor will not have much significance in mineralization activities.In the fifth step, elements (Ag, Cd), (Pb, Cu) and Bi are present. The elements are important in relation to the introduction of high potential areas in terms of mineralization of lead and copper bridge.In the sixth elements, (Su, U) are present. These elements are related to the activity of felsic type rocking in the region and are not important in term of mineralization activities.

In the seventh element of the element, Mo, S, A, with a high factor load, these elements in one factor can indicate the high temperature (Mesothermal) mineralization of the mineral in this region.In the eighth component, Hg, W, Te elements are present with high factor load. The presence of these elements as an epithelial deposit detector can be important in introducing areas with the mineralization ye mentioned above.

Table (2): Results of factor analysis based on normalized raw data values in HamzaQarinin region. Table (4-4):

Rotational matrix of factor analysis based on normalized raw data values in HamzaQarenin.According to the above analyzes on the components of the analysis of factor analysis, the following results can be obtained.

Table(2): The results of factor analysis are based on the normalized raw data values in Hamzeh Qarenin

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	12.03	27.99	27.99	12.03	27.99	27.99	10.11	23.52	23.52
2	5.38	12.51	40.49	5.38	12.51	40.49	4.70	10.93	34.45
3	4.22	9.82	50.31	4.22	9.82	50.31	3.27	7.61	42.05
4	3.39	7.89	58.21	3.39	7.89	58.21	3.22	7.50	49.55
5	2.11	4.90	63.11	2.11	4.90	63.11	3.15	7.32	56.88
6	1.53	3.57	66.67	1.53	3.57	66.67	2.38	5.54	62.42
7	1.29	3.00	69.67	1.29	3.00	69.67	2.26	5.26	67.68
8	1.05	2.43	72.11	1.05	2.43	72.11	1.90	4.43	72.11
9	1.00	2.32	74.42						
10	0.92	2.14	76.57						
11	0.80	1.86	78.42						
12	0.74	1.72	80.14						
13	0.71	1.65	81.79						
14	0.65	1.51	83.30						
15	0.59	1.38	84.67						
16	0.56	1.29	85.97						
17	0.53	1.24	87.20						
18	0.49	1.15	88.36						
19	0.45	1.05	89.41						
20	0.43	1.00	90.41						
21	0.40	0.92	91.33						
22	0.38	0.89	92.22						
23	0.34	0.79	93.00						
24	0.31	0.73	93.73						
25	0.30	0.71	94.44						
26	0.27	0.62	95.06						
27	0.26	0.60	95.65						
28	0.23	0.54	96.19						
29	0.19	0.44	96.63						
30	0.19	0.43	97.06						
31	0.18	0.41	97.47						
32	0.16	0.38	97.85						
33	0.14	0.32	98.17						
34	0.12	0.28	98.45						
35	0.11	0.26	98.71						
36	0.10	0.24	98.94						
37	0.09	0.22	99.16						
38	0.08	0.19	99.36						
39	0.07	0.17	99.53						
40	0.06	0.14	99.67						
41	0.06	0.13	99.80						
42	0.05	0.12	99.92						
43	0.04	0.08	100.00						

Extraction Method: Principal Component Analysis.

Table(3): Rotational matrix of factor analysis based on normalized raw data values in Hamzeh Qarinin

Rotated Component Matrix(a)								
Variable	Component							
	1	2	3	4	5	6	7	8
Ag	0.08	0.12	-0.06	-0.04	0.65	-0.02	0.15	0.12
Al	0.40	0.09	0.59	0.37	0.03	-0.04	-0.35	-0.01
As	0.49	0.23	0.01	-0.08	0.35	-0.21	0.32	0.18
Au	0.10	-0.18	-0.18	0.25	0.03	-0.40	0.42	0.32
Ba	0.16	0.10	0.68	0.16	-0.24	-0.11	0.19	0.18
Be	-0.21	0.35	-0.09	0.69	0.01	0.11	-0.06	0.09
Bi	-0.09	0.25	-0.17	-0.12	0.70	0.05	0.16	0.10
Ca	0.63	-0.31	0.29	-0.27	0.06	0.21	-0.20	-0.22
Cd	0.16	0.07	0.31	-0.17	0.69	-0.09	0.03	0.17
Ce	0.12	-0.07	0.22	0.84	-0.17	0.21	0.17	0.05
Co	0.89	-0.21	0.09	0.05	-0.01	-0.13	0.18	0.03
Cr	0.90	-0.07	-0.10	-0.09	0.02	-0.01	-0.03	0.04
Cs	0.00	0.77	0.24	0.14	0.14	-0.11	0.12	0.02
Cu	0.34	0.16	0.04	-0.20	0.58	0.07	0.33	-0.03
Fe	0.80	-0.13	0.31	0.07	0.06	-0.15	0.31	-0.02
Hg	0.06	0.05	0.08	-0.01	0.12	0.04	-0.02	0.75
K	-0.27	0.77	0.20	0.09	0.02	0.03	-0.06	0.02
La	0.12	-0.11	0.25	0.81	-0.10	0.15	0.13	0.11
Li	0.76	0.24	0.06	0.11	0.19	0.00	-0.10	0.14
Mg	0.90	-0.20	0.13	-0.11	-0.01	0.06	-0.08	-0.04
Mn	0.77	-0.15	0.43	-0.02	0.10	-0.16	0.07	-0.08
Mo	-0.05	0.03	0.06	0.15	0.17	-0.02	0.77	0.16
Na	-0.07	-0.63	0.47	0.37	-0.18	-0.04	-0.10	0.01
Nb	0.28	-0.08	0.54	0.48	0.04	-0.08	0.21	-0.15
Ni	0.89	-0.04	-0.14	-0.01	0.06	-0.04	-0.07	0.00
P	0.65	0.08	0.51	0.05	-0.01	-0.05	0.27	0.05
Pb	-0.06	-0.05	-0.13	0.09	0.70	-0.02	-0.09	0.04
Rb	-0.18	0.84	-0.13	-0.02	0.10	0.25	-0.17	0.03
S	0.12	-0.26	0.12	0.04	0.17	-0.20	0.53	0.04
Sb	0.38	0.37	0.04	-0.05	0.31	-0.13	0.28	-0.02
Sc	0.82	-0.15	-0.02	0.12	-0.05	0.13	-0.06	-0.02
Sn	-0.26	0.40	-0.17	0.26	0.03	0.61	0.00	0.14
Sr	0.48	-0.49	0.50	-0.05	0.01	0.00	-0.25	-0.13
Te	0.03	-0.15	-0.13	0.06	0.13	-0.20	0.08	0.54
Th	-0.44	0.24	-0.27	0.52	-0.12	0.41	-0.12	0.08
Ti	0.82	-0.12	0.42	0.08	-0.04	-0.03	0.15	-0.04
Tl	-0.17	0.81	-0.13	-0.08	0.19	0.31	-0.20	0.01
U	-0.14	0.39	-0.26	0.23	0.07	0.70	-0.13	0.04
V	0.94	-0.10	0.04	0.02	-0.02	0.00	0.06	0.07
W	-0.05	0.23	0.09	0.18	0.14	0.10	0.17	0.67
Y	0.22	-0.14	0.04	0.22	-0.14	0.76	-0.09	-0.11
Zn	0.64	0.03	0.39	-0.02	0.45	-0.15	0.07	0.07
Zr	0.02	0.40	-0.20	0.18	0.33	-0.15	-0.24	-0.38

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalizaton

Table(4):The results of factor analysis based on the normalized values of the enrichment index in HamzaQarginan region

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	11.18	26.00	26.00	11.18	26.00	26.00	9.28	21.58	21.58
2	5.32	12.38	38.38	5.32	12.38	38.38	4.05	9.43	31.01
3	4.48	10.42	48.80	4.48	10.42	48.80	4.01	9.33	40.34
4	3.21	7.46	56.26	3.21	7.46	56.26	3.97	9.24	49.58
5	2.16	5.03	61.29	2.16	5.03	61.29	3.10	7.21	56.79
6	1.51	3.52	64.81	1.51	3.52	64.81	2.34	5.44	62.23
7	1.35	3.13	67.94	1.35	3.13	67.94	1.76	4.10	66.33
8	1.11	2.57	70.51	1.11	2.57	70.51	1.49	3.47	69.80
9	1.04	2.43	72.94	1.04	2.43	72.94	1.35	3.15	72.94
10	0.96	2.23	75.17						
11	0.84	1.95	77.13						
12	0.77	1.80	78.93						
13	0.70	1.63	80.55						
14	0.65	1.52	82.07						
15	0.61	1.41	83.48						
16	0.60	1.39	84.87						
17	0.55	1.29	86.16						
18	0.51	1.19	87.35						
19	0.48	1.11	88.46						
20	0.47	1.09	89.55						
21	0.43	1.00	90.55						
22	0.40	0.94	91.48						
23	0.38	0.89	92.37						
24	0.34	0.80	93.17						
25	0.31	0.71	93.89						
26	0.29	0.66	94.55						
27	0.27	0.62	95.17						
28	0.25	0.59	95.76						
29	0.23	0.53	96.29						
30	0.22	0.51	96.80						
31	0.19	0.44	97.24						
32	0.18	0.41	97.65						
33	0.14	0.32	97.98						
34	0.13	0.30	98.28						
35	0.12	0.28	98.55						
36	0.12	0.27	98.82						
37	0.10	0.23	99.05						
38	0.09	0.22	99.27						
39	0.08	0.19	99.47						
40	0.07	0.16	99.62						
41	0.06	0.15	99.77						
42	0.05	0.13	99.90						
43	0.04	0.10	100.00						

Extraction Method: Principal Component Analysis.

Table(5): Rotational matrix of factor analysis based on normalized values of the enrichment index in HamzaQarenin

Rotated Component Matrix(a)									
variable	Component								
	1	2	3	4	5	6	7	8	9
Ag	0.03	0.02	-0.11	0.06	0.57	0.16	0.21	0.08	0.26
Al	0.33	0.10	0.72	0.19	0.03	-0.34	0.02	0.05	0.09
As	0.45	-0.11	-0.08	0.21	0.39	0.29	0.16	-0.26	0.00
Au	0.06	0.00	0.04	-0.26	0.03	0.42	0.28	-0.48	0.00
Ba	0.08	-0.14	0.64	0.24	-0.17	0.16	0.10	0.02	-0.34
Be	-0.15	0.63	0.26	0.27	-0.05	0.04	0.03	-0.25	0.15
Bi	-0.11	0.09	-0.27	0.17	0.65	0.15	0.15	0.01	0.20
Ca	0.60	-0.28	0.13	-0.22	0.06	-0.23	-0.09	0.49	0.06
Cd	0.12	-0.17	0.11	0.11	0.76	-0.01	0.08	0.01	-0.12
Ce	0.13	0.58	0.65	-0.11	-0.18	0.23	0.02	-0.08	0.03
Co	0.88	-0.12	0.12	-0.22	-0.01	0.17	0.02	-0.04	-0.01
Cr	0.89	-0.04	-0.12	-0.09	0.05	-0.07	0.01	-0.04	-0.02
Cs	-0.07	0.10	0.18	0.76	0.10	0.14	0.06	-0.05	0.22
Cu	0.29	-0.05	-0.17	0.13	0.60	0.29	0.00	0.15	0.08
Fe	0.77	-0.22	0.30	-0.09	0.05	0.34	0.00	0.08	0.05
Hg	0.06	0.03	0.02	0.08	0.10	0.00	0.78	0.02	-0.11
K	-0.24	0.14	0.19	0.79	0.05	-0.08	-0.01	-0.03	-0.05
La	0.12	0.53	0.66	-0.14	-0.11	0.19	0.08	-0.11	0.02
Li	0.74	0.13	0.13	0.22	0.24	-0.13	0.06	-0.16	-0.04
Mg	0.88	-0.12	0.05	-0.20	0.00	-0.14	-0.03	0.20	0.00
Mn	0.74	-0.33	0.36	-0.06	0.14	0.06	-0.08	0.12	-0.03
Mo	-0.06	0.08	0.06	0.03	0.18	0.75	0.14	-0.08	-0.14
Na	0.06	-0.05	0.62	-0.46	-0.07	-0.23	0.04	-0.04	-0.27
Nb	0.24	0.03	0.68	-0.01	-0.04	0.32	-0.06	0.16	0.21
Ni	0.88	0.02	-0.10	-0.10	0.07	-0.10	-0.03	-0.10	0.05
P	0.62	-0.13	0.40	0.17	0.03	0.26	-0.01	0.19	-0.19
Pb	0.00	0.09	-0.03	-0.05	0.74	-0.05	-0.06	-0.21	-0.04
Rb	-0.15	0.34	-0.19	0.79	0.12	-0.20	0.01	-0.01	0.06
S	0.06	-0.17	0.13	-0.27	0.16	0.49	0.12	-0.05	0.03
Sb	0.32	-0.10	-0.05	0.36	0.25	0.29	0.10	-0.03	0.29
Sc	0.82	0.06	0.11	-0.15	-0.07	-0.01	0.04	0.09	0.11
Sn	-0.21	0.73	-0.11	0.31	0.04	0.00	0.10	0.21	-0.06
Sr	0.43	-0.34	0.46	-0.36	0.04	-0.29	-0.06	0.27	-0.05
Te	0.00	-0.07	-0.03	-0.17	0.04	0.13	0.66	-0.11	0.13
Th	-0.26	0.86	0.08	0.14	-0.08	-0.09	0.05	-0.08	0.00
Ti	0.79	-0.19	0.40	-0.02	-0.04	0.18	-0.01	0.21	-0.02
Tl	-0.13	0.30	-0.22	0.77	0.20	-0.23	0.00	0.09	0.09
U	-0.09	0.77	-0.14	0.29	0.09	-0.16	0.02	0.23	0.00
V	0.94	-0.02	0.05	-0.10	0.01	0.03	0.03	-0.02	-0.07
W	-0.07	0.29	0.09	0.18	0.12	0.15	0.66	-0.02	-0.09
Y	0.30	0.46	0.19	-0.10	-0.14	-0.02	-0.02	0.61	0.01
Zn	0.61	-0.20	0.29	0.09	0.52	0.06	0.04	0.05	0.00
Zr	-0.01	0.04	-0.03	0.28	0.13	-0.14	-0.08	0.01	0.83

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

1-Factories 1, 2, 3, 4, 5, 6 are more related to the grinding component.
2-Factor 5 is related to hydrothermal activity and mineralization of copper and lead in the region
3-Factor 7 can be important in relation to the Mesothermal type of mineralization in the region
4-Factor 8 is important in relation to the identification of high – potential areas of epithelial mineralization.

V. The Factor Analysis Of The Values Of The Enrichment Index

The results of factor analysis are based on normalized values (according to the distribution function of each variable, in the absence of normalization, the logarithm method is used to normalize the values) the variables related to the enrichment index data are presented in this table (4). In this table, each of the 24 components, the total values of the total and their role in justifying the value of the variability in two ways (one-to-one and aggregate), as well as the load factors associated with the first 10 factors before the rotation is presented.

Table data implies that:The first component is capable of justifying about 26% of the total variability. This amount falls to the second component and reaches the figure of about 12%. In the third component, this amount dropped sharply and dropped to about 10%.Therefore, the first three components justify a total variation of 49%. From the fourth to ninth component, which consists of 6 components. Only 24%add to the justification of the variability and hence the changes will be small.

The table (4-4) shows the rotational matrix of the factor analysis. In each of the 9 components given, the following elements are important:

In the first component, the elements (Ni, Sc), (Mg, Mn), (Fe, Ti), (V, P), (Co, Cr) are. This factor is related to basic rocks in the region and they are not important in terms of mineralization.

In the second component, the elements of (Be, Ce), (Th, U) are. These elements are important in relation to Felsic type grinding activities .Therefore, this factor will not be of much importance to mineralization activities. In the third component, there are elements (Al, Ba), (Ce, La), (Nb, Na) that can be related to the type of stone activity in the region and it is not important in terms of mineralization activities. In fourth component (K, Rb) and (Ti, Cs) are, which can be a maker for potassium alteration in the region. In the fifth component, there are elements (Ag, Cd), (Pb, Cu) and Bi are. These components can also be important in terms of introducing of mineralization of lead and nitrogen types. In the sixth component, elements are Au, S; Mo with high factor load is.The presence of these elements in one factor can be the introduction of high temperature (mesotrimed) mineralization in the region. In the seventh component, there are elements Te, with high factor .The presence of these elements as an epithelial canvas detector with the mineralization. In the eighth component, there is an element Y that can be related to the type of Felsic rocking, and it is not important for mineralization activities.

In the ninth element, there is an element Zr that can be associated with Felsic type rock placement activities in the region, and it is not important for mineralization activities. Regarding the analysis of the decomposition on the components of the analysis of factor analysis, the following result can be obtained:

1. The factors of 1, 2, 3, 4, 8, and 9 are related to the liming component.
2. Factor 5 is related to the hydrothermal activity and mineralization of Polymetal silver, copper and lead in the region.
3. Factor 6 can be important in relation to the introduction of the areas of mineralization of the mesothermal type of gold in the region.

Table (4): the results of factor analysis based on normalized values of the enrichment index in HamzaQarinin.

Table (5): Rotational matrix the factor analysis based on the normalized values of the enrichment index in HamzaQarinin.

4. Factor 7 is important in relation to the introduction of epithelial type mineralization potential.

VI. Modeling of alteration indicators

In order to draw up an alteration map based on the method of alteration indices ,in this method the oxide values of major elements of the rock mass including: Feo, MgO, CaO, Na2O, k2O, Al2O3, SiO2 are calculated based on the values of the 43 variables of the enrichment index , and using the obtained values of the reciprocity indexes ,including : Chrysiste, Chlorite, Spitz, Darling, Alkali, Hashmo, Hashi, Pearson alkaline depletion , the relative variables of the two variables ,of the two variables ,are calculated for calculated alkali and calcite.(Principles of Geochemical Exploration, Dr.Ahsani Pak, Tehran university press).

The map of distribution of raw data and the enrichment index for all 44 variables investigated using the Kriging method is drawn. The mapping of all maps is done based on the following.

The yellow color is about 95% of the maximum estimated value.
The pink color is about 95%-84% of estimated value.
The yellow color is about 84%-50%of estimated value.
The blue color is about 50%of the minimum estimated value.

The gold distribution map (HG-R4) indicates that the maximum value of gold variables in the northwest is located in the southern part of HamzaQarinin and south of the area. This is also confirmed by the distribution map of the enrichment index (HG-E1).The distribution map of silver (HG-R4) there are regions with maximum silver in the southwestern part of the HamzaQarinin and a southern region. According to the distribution map of the enrichment index of this (HG-E12), the anomalous areas obtained from the map of distribution of crude to about many emphasized that map has increased. According to the explanation map of Arsenic (HG-R3), there are anomalous of areas of whole region. These ranges include: Northwest, Northeast, East and south. In the distribution map of the enrichment index (HC-E2), it can be noted that the aforementioned anomalies are confirmed by this map, except that the magnitude and severity of the eastern anomalies have decreased in this map. In the map of the distribution of Antimony, we can mention the presence of areas with the maximum excitation of the element in your west and south .Taking into account the distribution map of the enrichment index (HG-R7), it can be seen that the anomalies mentioned in this map are also determined. extend and severity of western anomalies has diminished in this map.

The distribution map of the Bismuth element (HG-R7) of the anomaly zones and south and southwest of the village and north of the region. The distribution pattern of the enrichment index values of this element (HG-E4) also confirms the parts of the anomaly map of the distribution of crude amounts.

The Tellurium distribution Map (HG-R34) implies a small anomaly in the southern part of region.

The Sulfur distribution map (HG-R29) implies the existence of regions with maximum sulfur content in the south of the village and north, northwest, east and south of the study area. For all areas of the normal, the map of the raw amount of this element by the distribution map of the enrichment index (HG-E11) (also confirmed).The distribution of the lead element (HG-R27) implies the presence of anomaly regions of this element in several areas in the north, west center, east, and south of the region. This content is confirmed by the map of distribution of the index of the enrichment index (HG-E10).

According to the distribution map of (HG-R42), the anomaly ranges of this element can be found in many par in the east, nor, northeast, and small part in the south of region. Considering the distribution map of the enrichment index values of this element (HG-E14), it is possible to reduce the extent of the northern anomalies of the northeast and east. According to the copper map (HG-R140, it can be noted that there are areas with maximum copper the northeast, eastern and southeast parts of HamzaQarinin. these issues are also confirmed by the map of the distribution of the enrichment index (HG-E6). The difference is that this map of the anomaly oriental map. Molybdenum distribution map (HG-R22) implies the existence of areas rich in molybdenum in the north, southeast of HamzeaGharinin and south .This is also coned by the map of the distribution of the enrichment index (HG-E9). The element distribution map (H-R15) indicates that the anomaly regions of this element are visible in the northern, northeastern and eastern, regions of the study area. The distribution map of the enrichment (HG-E5) confirms this range. The iron element distribution map (HG-R15) implies that the maximum value of this variable varies in several parts in the northeast, north and south of the region. The map of the distribution of the enrichment index (HG-E8) indicates the maximum amount of this element amount of this element in the northeast, northwest, east and south of the HamzehGharinin village and the northwest, north east, and south parts of the region. Considering the mercury element (HG-R16), the anomaly areas can be found the northern and southern parts of the region and a north south trend. The distribution map of the enrichment index values of this element (HG-E8) confirms the anomalous areas introduced by the crude map.

VI. Conclusion

The area of HamzaQarinan is located in the Sanandaj-Sirjan zone and consists of a series of metamorphosed, intrusive and sedimentary rocks. The background of this complex is the metamorphosed, igneous and granodiorite (variety of coarse-grained igneous rock with characteristics of both granite and diorite) combinations, which are all undergoing transformation. Other sets of stones have become more or less moderated from weak to moderate, the tecno-technical situation , is the range affected by the general trend of Sanandaj-Sirjan zone and the main faults are formed with the process of NNW-SSE. In many cases, they have controlled the boundaries of intrusive units and play an important role in the placement of intrusive bodies. The activity of these faults has continued until now and has led to the flow of units and fluids (4).

Alteration of Quartz, Chlorite, Dickite, Albite, Pyrite (Limonite) has been developed in most units, especially the Mitonitemegatranodorite unit. The greatest degree of alteration has also been observed in the mininallymilonetary granite unit, and has been severely lethal and limonite. The mineralization from is affected by the tangential activity and has been bodied out. Mineralization consists of high-grade, low- impact bands with the same process. This mineral extends beyond the limits of the mineralization zone of the village of Qolqoleh, but in some places it is open, closed or removed. Similar ganglia have been seen in other parts of the range, which have a negligible extend, but have the same shape and trend (5).

Several evidence suggests that mineralization along with a mass of methane agglutination is associated with a certainty and may have occurred on the ceiling of this mass near the rock crystal plaque (Skarn). Mineralization has high temperature conditions and probably occurred at relatively deep depths in relation to the intrusive mass. More likely, the intrusive bodies, as the thermal engine, creating hydrothermal fluid droplet , and then the migration of the ore fluids the shear zones that simultaneously flowed has led to the concentration of gold, igneous fluids in the accelerated zones that flow at the same time, have led to the concentration of gold.

Evidence from excavations in the region and similar mineralization cases in the villages of Qolqoleh and Khoroyan represent.There is not much deep mineralization, so it cannot be caused by a deep fault z and the formation of a shear zone, since in this case the depth of mineralization and its shape will be different. Magnetite mineralization, Pyrite and Chalcopyrite have occurred in crystalline limestone, gold with pyrite has occurred in Dickite granite and mylonite granite. The alteration of the mineralization zone is weak and the boundary is several meters. The mineralization zone is also perpendicular to the Sanandaj-Sirjn trend, which is due to the creation of secondary and local shear zone associated with the placement of intrusive bodies, or in connection by rotating simultaneously with the slice and positioning the initial condition to the current trend.

An economic appraisal of the ore for limit of 0/2 grams per ton of gold indicates that there are plentiful zones with a width of more than 100 meters wide. Three medium-average ranges of about 0/93 g/a have been identified, bout 70 m for mineralization were estimated at about 7/53 tomes of gold. Due to the fact that there are also low –density in these sectors, the average grade is less than this, and there is probability of 20% error. For ranges greater than 0/5 grams per tonne of gold, 4 ranges of averae35/1 percent have been obtained, with an assumption of depth 70 meters for mineralization, about 3/5 tons of gold is predictable.

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