

Investigate of Economic geology and regional systematic geochemical exploration In siyah cheshmeh 1:50000 district (Azarbayejan Gharbi province.)

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Abstract

In this study with the aim of exploration, tried to systematic sampling from stream sediments will be carried out with study of siyah cheshmeh 1:50000 sheet. After geochemical and heavy mineral investigated. In area under study, 7 anomaly have been known. And finally 3 district are included north-west of Baronvillage, south-west of Nabikandi village and North – west of Haramloo village have been selected based on geochemistry, heavy mineral, Mineralization, remote sensing and geophysical data. These area introduce for later activity.

Keywords : Heavy mineral, Variety diagram, Systematic sampling.

Introduction

The area under study, is belong to siyah cheshmeh 1:100000 sheet of Azarbayejan Gharbi and Mako city that is located in north of mako 1:250000 map. This area north west of Iran is limited to geographical latitude of to in and longitude to E. The area is about 625km². The study area from geological and structural point of view mainly has oceanic crust features and is a portion of ophiolitic belt of North west of Zagros. Which mostly contained of submarine basaltic Lava, Felsic sediments type, Upper Cretaceous plagioclase and Paleocene calcareous related to upper parts of ophiolite complex of north-west of Zagros with blocks of ultrabasic rocks with tectonic contact in next to metamorphic rocks. By the way Intrusive bodies are included of basaltic andesites, quartz diorite and andesitic dacite.

Method of study

In this sheet is used of stream sediments method for geochemical exploration and network sampling is based on Lithology, fault and stratigraphy (Permian till Cretaceous). emphasized on gravity method. Finally 192 samples are selected. In this project 45 elements such as Sb, As, Au, Mn, Bi, Cr, Zn, Cd, Cu, Co, Ag, Mo, Ni, Pb, W, Se, Ca, Li, P, V, Mg, K, Na, S, Zr, Hg, B, Sn, Ni, U, Tc, Rb, Th, Y, Ce, Nb, Sr, Be, Ba, Ti, Fe, Al, La, Sc have been chemical analyzed.

Au element by fire Assay method and other elements measured by ICP method. For controlling of accuracy analysis is used of Thompson controlling diagrams and relative error. For elution of trace lithology from calculate of enrichment index with normalized of each element among same society are used.

Statistic processing monovariable and several argument for example calculating of correlation coefficient, cluster analysis, specific analysis, factor analysis and soon, the enrichment index and interpreted of obtained results.

In this way recognized paragenesis complexes, So mapped one argument and factor analysis with use of network estimate and enrichment index and introduced 7 anomaly using geochemical data and maps together.

Desin of network sampling

Have done based on corresponding with gravity method. for this drawed channels map of area with use of topographic map and help of aerial photos. by the way, with helping of GIS factors such as lithology, tectonic, contact of Intrusive and or extrusive rocks. With country rocks, area around of faults, alteration zones, doubtful zones to alteration using satellite photos have been recognized. These factors were very important for drawing of desin network, attention to this subjet, from near 625 km² area in this project, 192 geochemistry samples and 31 heavy mineral samples (at the same time with geochemistry sample) have been desined.

Sampling activities

In general, different stages of geochemical explorations such as desin sampling, sampling, sampling analysis, processing data, compilation and studying such as rings of chain related together. Sampling activities with helping G.P.S device have done. Each geochemistry sample is included of 300 grams of 80 mesh channel sediments which 100 grams of samples selected for laboratory and the rest kepted out.

In cases which in the field couldn't sieving of sediments about 3-6 kg after dring 80 mesh separated from them.

Geochemistry samples keep in firm plastic pachets and with attention to homogenesis of them, they divided to two section for analysis and archives.

Analysis of geochemical samples:

Total selected geochemical samples after providing and changed to 200 mesh, geochemical analysed for 45 elements.

Au element measured by Fire Assaying and other elements measuring by ICP(OES) method.

Analytical precision of geochemical samples:

After analysed and obtained results of laboratory investigated of data, for this aom 16 repeated sample have been separated and numbered and sent to laboratory with the main sample.

By Thompson controlling diagram calcaleted measuring precision.

So the amount of relative error (RE) calculated. Sn-Te-Au elements showed high relative error. average of relative error is in level of 95 percent equal of 11.306.

Separating of rock communities:

One of the most factor of heterogenesis in geochemical samples community, is lithological variation factor in origin rocks of area. This heferogenesis cause deviation in interpretation of data. first of all, should be slected the superior rocks of sample and should be studied variety of these rocks. Because of each stream sediment derived only from superior rock's, without normalizing amount of element ratio to lithology

in watershed we can't reach to homogeneity community based on amount of background, threshold and anomalies.

Total communities discussion in this sheet divided to sub community as follow:

A-sub community monolithic system, 80 samples in 5 type rocks.

B-sub community dilithic system, 73 samples in 7 different type rocks.

C-sub community trilithic system, 36 samples in 5 different type rocks.

D-sub community fourlithic system, 3 samples in 5 different type rocks.

First factor: this factor will be more influenced of Fe, Ti, Mn, Cu, Zn, Tl elements.

Second factor: this factor is influenced of Ni, Cr, Mg, elements.

Third factor: this factor is influenced of Te, Sc, Hg elements.

Fourth factor: this factor is influenced of Sb, W, Cd, As, elements.

Fifth factor: this factor is influenced of Pb, Bi, elements.

Sixth factor: this factor is influenced of Sn elements.

Drawing of geochemical maps:

For this purpose one Extension as Arcview packet is designed.

That is semiautomatically and with revenue of topographic maps and satellite pictures in the least time and the best manner designed basins and correction basins of watershed possibility. for this aim Extension including of one option that could be calculated the mentioned factors.

Hence in here by this Extension once estimated primary data, data and enrichment index estimated again. drawed their map.

Phase control of geochemical anomalies:

There is some different methods for control of anomalies, that could canceled or confirmation of elements geochemical primary anomalies. here is used from:

1-heavy mineral sampling from anomalies limit.

2-Investigate of altered zones and probably mineralization zones.

3-sampling from filled joint or fissure systems by mine materials putting together of data.

Three fundamental stages accomplished as is follow:

1-input of data and formation of data bank from different layers

2- Interpretation of information layers.

3-combination of different layers with together.

Conclusion and introduction of anomaly points:

With putting together of all exploration data, finally three area is introduced for Hg, Au, Cr, as hope-giving exploration area.

Area No. 1: North – west of Baronvillage.

This anomaly is located in north of siyah cheshmeh 1:50000 sheet outcrop of this lithology including of limestone, ophiolitic mélange and conglomerate. This area shows anomaly for Hg, Sc, Zn, W, Sb, Sn, elements.

Area No. 2: south - west of nabikandi village.

This anomaly is located in south-west siyah cheshmeh and south - west siyah cheshmeh 1:50000 sheet.

Lithologically bearing outcrop show limestone and basalt.

This area shows anomaly for Au, Cu, Sb, Fe elements.

Area No. 3: North-west of Haramloo village.

This anomaly is located in North –west of siyah cheshmeh and North –west of siyah cheshmeh 1:50000 sheet . lithological's outcrop is included of basalt , andesite , dacite, trachy-andesite, ophiolitic mélange.

This area shows anomaly for As, Co, Cr, Ni, Cd, and Ag elements.

Suggestion:

1-preparation of economic geology map in the 1:25000 scale in three anomaly area.

2-Preparation of geochemical stream sediments map in the 1:25000 scale in three anomaly area so that taking sample 5-6 sediments and one heavy mineral per each km².

3-If activities are suitable in 1:25000 scale exploration will be entered 1:50000 Scale (litho-geochemistry, geology and digging of trench) Attention to amount of background of each elements mineralization of Au, Pb, As, Fe, Ag is related to rock units (calcareous rocks) in the area. elements of Cr, Mn, Ni, Fe, Co, V, is related to ultramafic rocks. element of Sb is related to chemical detrital rock community.

Processing data:

Processing data is based on primary data, stage of recognize, replacement of sensor data till mono variety statistic studies and multi variety studies. continuing is needed for later stages. Using statistic method's dependant normal distribution of variety in this study. Because of before using methods primary data have been normalized. In this section use some changing for normalizing of data.

Then calculated correlation coefficient between them.

For this mean, is used from pierson and spirman correlation coefficient.

Calculating of enrichment index and homogenesis of communities:

Based on definition enrichment index of one special element in a specified sample is ratio of viscosity of that element in that sample to average viscosity that element is community belong them.

Enrichment index is:

$$Ei = \frac{Gj}{(cmed)^j}$$

EI: enrichment index

CJ: amount abundance of element J in specified sample.

And j(cmed)=average amount of j element in community belong to that sample.

Total activities have done on primary data so done on enrichment index such as factoring and lysis so the results is as follow and there is relative paragenesis between varieties.

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