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

Ali Esmailvand¹, mohammad Reza Hezareh², Seyed vahid Shahrokhi ³, Mohsen Hasanvand⁴

¹,4:MS.C.Student,Islamic Azad University ,Khorramabad Branch.
²:Geological survey of Iran
³:Academic staff,Islamic Azad University ,Khorramabad Branch.

Abstract
In this study with the dim of exploration, tried to systematic sampling from stream sediments will be carried out with study of siyeh 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 Azarbeyjan Gharbi and Mako city that is located in north of mako1:250000 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 geologicaly and structurally 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, Felysh sediments type, Upper cretaccius plagic cal carious and Paleocene calcarius related to upper parts of ophiolote complex of north–west of Zagros with blocks of ultrabasic rocks with tectonization 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 ceretacious). emphasied 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 meted and other elements measured by ICP method. For controlling of accuracy analysis is used of Thompson controlling diagrams and relative error. for elision of trac 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 drewed 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 subject, 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 designed.

**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 keeped out.

In cases which in the field couldn’t sieving of sediments about 3-6 kg after drying 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 calculated 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 heterogenesis cause deviation in interpretation of data. First of all, should be selected 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 reached to homogenesis commmunity based on amount of
background , threshold and anomalies.
Total communities discussion in this sheet divided to sub community as follow:
A-s'ub community monolithic system, 80 samples in 5 type rocks.
B-sub community dilithic system, 73 samples in 7 different type rocks.
C-s'ub 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 Extention as Arcview packet is desined.
That is semiautomatically and with revenue of topographic maps and satellite pictures
in the least time and the best manner desined basins and correction basins of
watershed possibility. for this aim Extention including of one option that couldbe
calculated the mentioned factors.
Hence in here by this Extension once estimated primary data cramdata and enrichment
index estimated again . dramed 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 satges accomplished as is follow:
1-in put of data and formation of data bank from different layers
2- Interpretation of information layers.
3-combination of different layers with together.
Conclusion and introduce of anomal 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 Baronville.
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 Haramlooo avllage.
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 mélangé. This area shows anomaly for As, Co, Cr, Ni, Cd, and Ay elements.

Suggestion:
1-preparation of economic geology map in the 1:25000 scale in three anomalous area.
2-Preparation of geochemical stream sediments map in the 1:25000 scale in three anomalous 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 (lithogeochemistry, geolog 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 detrial 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:

\[
Ei = \frac{Gj}{\text{cmed}}
\]

Ei: enrichment index
Cj: amount abundance of element J in specified sample.
And j(cm)=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.

References
1- Hassany pak, Ali asghar (1376), best design exploration project, publication of yazd university.
2- Hassany pak, Ali asghar (1370), The principal of geochemical exploration, publication of Tehran University.
3- Hassany pak, Ali asghar and Sharafeeddin, Mohammad (1384), analysis of exploration data, publication of Tehran University.
4- Hassany pak, Ali asghar (1380), mining sampling, publication of Tehran University.
5- Hassany pak, Ali asghar (1377), Zamin statistic, publication of Tehran university.
6- Moghaddam, Mohammad, Mehri, Abolghasem, Aghaei, Mostafa (1373), Familiarity with several variable method, written by menly, B,F,G.