

Introduction Investigation of Geochemistry and Introduction Promising Area in 1:100000 Noor Sheet

Ghaderi,Shahrbanoo^{a*},Dr.Rasa,Iraj^b,Dr.Hezareh,Mohamadreza^c,

^a*Islamic,Azad University Research and science compose of Tehran, Shahbanoo.ghaderi@yahoo.com*

^b*Beheshti Universit , Tehran*

^c*Geological Survey of Iran*

Abstract

Longitudes and 52°00' 00" to 52°30' 00" Studied area (1/100000 sheet of Noor)is between Latitudes 36°30' 00" to 37°00' 00". To explorate the area geochemically,was used drainage sediments method and consequently accomplished drainage sampling. 44 element analysis for all samples was accomplished by AMDEL laboratory in Australia. The analyses were measured by two methods of Thampson control diagram and taking proportional error and data process was performed by statistical and diagram softwares after assurance about acceptable data. So,at first statistical parameters involved to raw data was accounted and then lithologic homogeneous sets separated and every set was normalized in regard to mean scale of the set. After checking of this zones, collection samples of heavy minerals and mineralize and integrating data layers, according to the most overlap data layers 1 area defined for continues of exploration semi- details studies.

Key word: *heavy minerals -Factor Analysis- cluster analysis- Paragenesis –Anomalus*

Introduction

Longitudes and 52°00' 00" to 52°30' 00" Studied area (1/100000 sheet of Noor)is between Latitudes 36°30' 00" to 37°00' 00". To explorate the area geochemically,was used drainage sediments method and consequently accomplished drainage sampling. From morphology point of view, this region is a flat land. It is located in the littoral plain region of Mazandaran province. Moreover, it is wholly made of river alluvial and sediments, besides, there is not considerable highlands in this plate. Only in south part of the plate, Alborz highlands prevent the Caspian sea clouds from going through central parts of Iran, therefore it improves the area climate.

From geological point of view the area under study is very young because the area is covered by quaternary sediments. Furthermore, the study area is located in Alborz territory, Gorgan and central Alborz sub territory and Rasht which is basically covered by quaternary sediments (swamp, coastline, riverside and marine sediments) besides, these sedimentary units belong to west Paratetis catchment.

Because there is a dense plant cover in the region, none of the satellite and air images show an obvious lineation. Even in field investigations, no evidence of faulting in any of drilled trench has been shown. Therefore, geophysical and geomorphology-tectonic data is used for structural (faulting) investigation.

Discussion

After designing the sampling net and taking those samples, they were tested chemically for these elements: La, Zn, Cr, Mn, Ba, Au, Na, S, Zr, Hg, Ag, B, As, Co, Cu Cd, Te, U, Mg, Be, K, V, P, Li, Ca, Sc, Al, Fe, Ti, Sr, Tl, Cs, Ce, Bi, Y, Th, Sn, Rb, Pb, Nb, Mo, Sb, W, Ni. Au was measured by Fire Assay method, while other elements were measured by ICP(MS,AES) method. after calculating the errors, accuracy of analysis was verified.

One of the main assumptions for correct analysis of variables in geochemical societies is their uniformity. Any deviation from this assumption could have more or less impact on the results of data analysis. Consequently it results in incorrect outcome. one of surface environmental variables that could cause non uniformity in geochemical media is type of base rock which has outcrop. While this base rock is the source of erosion sediments.

Since, each stream sediment is coming from its upper rocks. access to the uniformity standard through which we could determine the base, critical and anomaly values is impossible without normalizing the element amount according to upstream litho logy in the catchment .classifying these standards has been done according to type of outcrop base rock which is available in upstream of each samples.

Statistical evaluation

According to table, Pierson correlation coefficient between variable pairs is around 99% which is satisfactory.greatest correlation relation is between Co,Ni (0.970).these coefficients show the Para genesis relation between elements.

We used raw data to calculate Spierman correlation coefficient. As it can be seen, some times, these coefficients have different behavior respect to Pierson coefficient. This difference is severe when there are lots of data which are not in the main range. With precise comparison between them, it can be seen that the difference between these two correlation coefficients is not much. It shows that data which are not in the main range doesn't have great effect on others. Greatest correlation relation is between elements CO,Ni (0.948).correlation coefficient between pairs with Pierson and Spierman shows that there is a small difference between correlation coefficient of equivalent elements. It indicates that there is a fairly normal distribution of elements and another point is that faraway samples (data) haven't considerable

effect on the main ones.

Another way to study the relation of elements' changes with each other is to plot ScatterPlot. If scattering of points in the chart is high, bonding between variables would be weaker.

Because each group of elements shows more or less the same sensitivity to the environmental conditions, knowing the genetic relation and interaction between different elements can be implemented to understand more accurately the changes in the geochemical environments

Cluster analysis is a multi variable statistical method which categorizes the elements of similarity based on the similarity of change. For many reasons cluster analysis is valuable, including cluster analysis that can help to find all real groups and will also reduce data density. According to calculated Dendogram four main groups can be isolated, indicating that the relationship between the variables is Para genesis.

The first Group: consists of: Ca, Mg, As, Bi, Mn, Au.

The second group: consist of: Ag, Tl, Sn, U, Mo.

The third group: consist of: Sb, Y, V, Sc, Li, Zn, Nk, Al, Be, Pb, Ca, Rb, Cs, W, Th, Zr, Cd, S.

The fourth group of B1: consists of :Na, Sr, Nb, Ba, Ce, La, Fe, P, Ti, Cr, Ni, Co.

Also on the raw data and the rich index of other statistical parameters like factorial analysis, differentiation analysis, Pn and. . . Was performed, and finally was ready for estimating network

Network estimation of data

In the network estimation method, firstly, the considered map is covered by a network of cells with the same dimensions in which the network dimensions depends on sample taking scale and required accuracy. Generally in 1:100000 sheets, 250*250 networks have been used before, but in this project in order to increase accuracy of map the 30*30 networks have been used, which dramatically increase the accuracy of these maps. Finally three types of weights (consist of distance, area and ratio of occupied area of estimated cell to sum of occupied areas) are calculated for each cell, and with regards to these weights, amount of a variable in each net cell would be estimated.

To hit the target, an extention is designed with Arcview program, which is semi automatic. It uses topography maps and satellite images to draw the catchment with best quality and minimum time. Besides, it corrects the catchment as far as possible.

Control phase of geochemical anomalies

In geochemical exploration with regional scale, which is done to discover the second halos of probable cancers, usually a wide area is investigated for exploration purpose. This process results in exploration of available apparent anomaly in secondary environments.

Composing the data

After preparing and composing the geological, air geophysics and geochemistry data in GIS system, three anomaly regions is distinguished.

Anomaly #1

In east part of Mahmoodabad ,which shows an abnormal behavior in respect to these elements , Pb, Mn, Ni, Sb, W, Ba ,Cu, Be, As ,Co, Au, Fe.

Anomaly #2

In east part of Anomaly#1, which shows an abnormal behavior in respect to these elements, Zn, Be, Au, Cd, Mn, W, Pb, Cu, Co, Ag, Fe.

Anomaly #3

In east part of Noor County, which shows an abnormal behavior in respect to these elements, Zn, Be, Cd, W, Pb, Cu, Co, Ag, Mo, Sb, Cr, Bi, As, Ba.

Because of not having high elevation difference in the region and various contaminations in area, not enough heavy mineral samples were obtained from anomaly regions. According to all investigations in the region; there is no evidence for faulting. Therefore, geophysical and geomorphology-tectonic data is used for structural (faulting) investigation.

Conclusion

Due to lack of rock outcrops in the region (the entire studied region is covered by the sea

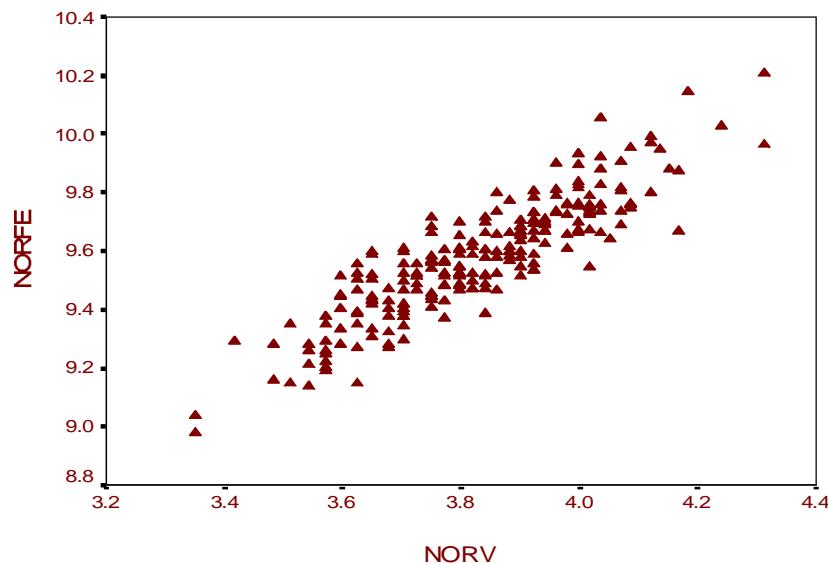
water and sediments of Quaternary, and there is not any noticeable height at the region.) And different contaminations found in the environment, particularly agricultural contaminations from anomaly region, no heavy mineral sample was found. According to all investigations performed on the region no evidence of faulting has been found and therefore the geophysical and Tectonic - tectonic data are used for the structural (faulting) investigation. Finally, the geochemical anomalies and the elements' distribution map, it seems that within the Eastern region Mamourich village, South of Dryasr, North of Abdullah Abad village and around Moallem Kala village it seems that in terms of Environmental pollution the these regions have the highest potential for the elements V, Mn, Te , Sb, AsW, Sn, Be, Ag, Cu, Pb, Zn, Co, Ni, Cr, which should see what is the origin of this pollution.

Pierson correlation coefficient table

Co-Ni	Be-Al	Cs-Rb	La-Ce	Be-K	Ba-Nb	Al-K	Cr-Ni
0.970	0.941	0.939	0.933	0.929	0.924	0.920	0.919

Spierman correlation coefficient table

Co-Ni	Cs-Rb	Al-Li	Sr-Na	Ba-Na	Sc-V	La-Ce	Cs - Cu
0.948	0.939	0.896	0.895	0.887	0.871	0.868	0.863



Following ScatterPlot shows the greatest correlation between pairs of CO,Ni.

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