

Potential finding of metallic elements and economic geology investigations in district 1/50000 sheet of Bandan south of southern khorasan.

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Abstract

In this study with the aim of exploration, tried to introduce areas with potential mineralization in Bandan sheet. Systematic sampling of stream sediments will be carried out with study area. Analytical results show Mohammad Hossein mountain western areas and also around the Musa Arbabi mountains show some unknown areas in Bandan sheet. In this sheet, some area such as show high anomaly of Cr, Ni, as after analysing sediments of secondary halo. More over, study of heavy mineral samples, also show the presence of mineral and paragenesis such as Corundum, Pentlandite and etc. These associations are also supported our interpretations.

Key word: Factor analysis, principle component analysis map, inverse of probability production.

Introduction

Bandan 1:50000 sheet is included about 625 km² that is located in SE and between Bandan 1:100000 Sheet.

The area is limited to geographical latitudes of 31°30' N and Longitudes of 60°30' to 60°45' In east of this strip Sistan Block and in west of that lot Block are located.

The important view is ophiolitic complex of Bandan with NW trend in all of area.

In this There is same fault with NW trend that the biggest of faults is sinistral. ophiolitic strip there are two main ophiolitic melange. First of all CM: serpentinite kuge, disordered topography of western central area show folds and faults. M^{SA}: different block in shistosity matrix which including of glaucophanitic Amphibole, Albite and Magnetite. The highest height of area belong to western trend with 1450 meters of sea level and the average of height is 1000 meters. Central population is Bandan (Fig1-1) and date of trees that there is in around of Bandan will irrigation by several Qanat System.

The age of tectonic block in ophiolite mélange of Bandan is late Cretaceous (Cenomanian) (Fig 1-2).

Method of study

For doing systematic geochemical exploration, firstly based on former data, area under study has been investigated.

Then sampling has been done. In next step calculation of analysis error has been done for assemblage rocks in the area.

Based on this information, process of data has been done.

Sampling of heavy mineral and drawing of maps and study of rock samples were the other studies.

Designing of Sampling network

For distinguishing of really geochemical anomalies and separated types related to mining deposition from other types in each area, it is needed that a constant part of flood channel sediments (for example 80 mesh) and or heavy mineral (for example 200 mesh) is selected for experiment.

Diameter of this firm part is dependant of weather condition, topography and distance of origin of mineralization.

Density of sampling from flood channel is dependant of channel density in water shed. Hence for area under study that belong to dried and salt desert area (ophiolite mélange) there is one sample for one or some kilometers. In Bandan 1:50000 sheet with attention to size of outcrops, 196 samples selected for that each one sample is only for 2.5 km².

Tried distribution of samples in mountain area was based on water sheds gravity that will be controlled by stratigraphy, lithology, tectonic, intrusive and subvolcanic bodies.

Sampling activity

Attention to extent area under study, geochemical exploration in scale of 1:50000 should be done in secondary environments. These information is based on distribution of elements in secondary halos especially river sediments and soils.

Each sample of geochemical is about 100-200 grams of 80 mesh flood channel sediments. After sieving the dried sediments in a bag put in the safe packet with numbered.

Sending samples of geochemical to laboratory

The whole of samples have been sent to Amdel in Australia. Till after providing of samples, samples selected for analysis of 22 elements. Method of analysis was ICP.(AES,MS).

Limit of sensitivity for samples have been accepted that is as follows (quantity is based on g per ton)

Ag=0.01	Au=0.001	Cu=0.2	Zn=0.2	Pb=0.2	Ti=10	Fe=100	Ba=0.2	Sn=0.2
Be=0.2	Bi=0.1	B=0.5	Hg=0.05	Mo=0.01	Sb=0.2	W=0.1	As=0.5	Sr=0.1
Cr=2	Mn=0.5	Ni=2	Co=0.2					

Processing of data

In this sheet for each sample 22 elements are calculated and then have been processed. In this step for a portion of data sensor and replacement amounts calculated and have been replacement.

Replacement of sensor amounts by most kohen correctly method

most of important statistics methods need total set of non sensor data. for estimate of amount of sensor there is some methods. In here is used of other method and that is kohen correctly method.

This method included of average society of normal log with use of most corrections below table show the sensor estimate by kohen's method correction.

Table(1-1)

X_0 = Limit sensitive of devise.

X_R = Replacement amounts for sensor data.

Index enrichment

According to definition, Index enrichment of an element in a special sample is ratio of viscosity that element to average viscosity that element in each society which sample belong to it. Hence efficient factors in Index enrichment of a special element in a sample is dependant of amount of that element in sample and the same element in society too.

Index enrichment can separate geochemical data from lithological variation (syngentic phenomena) in the origin of area. For calculation of Index enrichment we can use from following formula:

$$E_i = \frac{G_j}{(C_{med})^j}$$

In this formula E_i is index enrichment, G_j is amount of abundance of element in a specific element and $J(C_{med})$ is amount of groundmass of the same element from society that belong to them.

Calculation of probability of occurrence each of Index enrichment :

The geochemical map of flood channel sediments from point of two view is included of evaluation of potential mining of Lithological units and structural units and finally providing of metallogeny map of these units in the way of distribution abundantly map of elements and evaluation of anomalies that will be useful for comparative exploration activity. In this study, for doing two views, except of distribution geochemical elements map in the field scale, effort to calculation probability of occurrence of each amount of anomalies in the same region, more over calculation of statistic parameters of each society, after normalization, occurrence probability of amount of each element in any sample is calculated too.

According to this, expectation area for elements such as Cr, Hf, Co, Mg, Li, K, Zr, Ni, W, V, Rb, Te, and Mn show first degree anomalies.

Evaluation of studies and expectation areas

Bandan 1:50000 sheet is located in east of mountain ranges of Iran and is a portion of big Felish and ophiolitic melang strip in east of Iran with N-S trend.

This strip show a pool or oceanic basin after early certacous. In this strip there are two main ophiolitic mélangé. first CM: widespread .

Serpentinite , irregular topography show central west portion are included of several faults and folds, systems .

M^{SA}: different blocks in schstosity matrix including of glokofan amphibole, albite and magnetite . in this zone there is more epidotization ,choloritizotion ,hematitization and limonitization in faulted section (Fig 1-3).

In flood channel samples there is anomalies from Hf,W,Co,Li,Mg,Zr,Rb,Li and Cr elements.

In central, rocks belong to oceanic crust as vertiql and large scale.

Distingushed 12 anomalies that are following:

anomaly of western part of kuh-e- chah mohammad Hossein, around kuh-e-Mosa and kuh-e-Arbabi, anomaly of Nw of 1:50000 sheet.

Conclusion and suggestion

From index anomalies have known in this area ,one of them is Cr which there is two mine chromite in area under study . one is active and the other in unactive and have revenue befor .Among these regions.

Bandan anomaly is very important from point of bearing chromite rocks. Using other sources suggestion a primary exploration by hammer method so that can use from other exist potential in area.

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Table(1-1)

Variable	Au	Hg	Mo	Pb	Be	Bi	B	Sb	Sn	As
Xo	1	0.05	0.1	0.2	0.2	0.1	0.5	0.1	0.2	0.05
Xr	0.6316	0.00513	0.073	0.176	0.1475	0.06282071	-	0.6295	0.134	0.3504
	PPb	PPm								

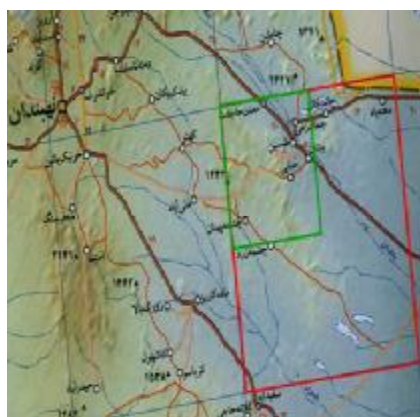


Fig1-1:the roads to the area under study Fig1-2:satellite picture of area under study

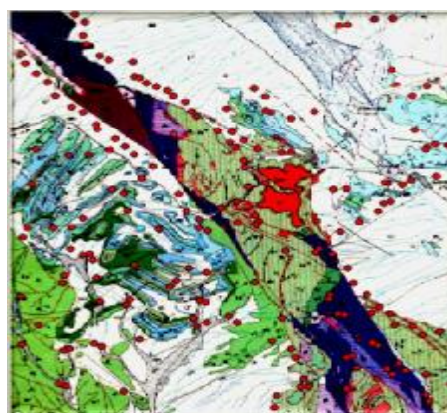


Fig:1-3 distribution of point on the geological map of area under study