Palynofasies study of Aitamir formation in mozduran section

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Abstract
Kopeh Dagh construction sedimentary are is an intercontinental basin wich begins from khazar sea ,passes through Turkmenistan and Iran,then inter Afghanistan. Aitamir formation is one of the sedimentary unit of this basin that has been studied based on some fosils such as Amonit several times. In this research ,the mentioned formation ,for the first time is being studied based on Palinomorphs. The supored area is located in No. 110 Kilometers of Mashhad-Sarakhs road,with geographical features North latitude 36 6 13 and East longitude 40 60 14 , and its litology is mostly of Shale and Glakonit sand stone shale. 50 samples of Aitamir formation ,have been taken based on Palinomorph parameters and 200 palynologic slides have been make. with study of this slides and according to palynomaserals, SOM and Palinomorph of the slides and also use of Tyson triple diagram, the facies formation were defined. using of Tyson diagram showed that most of the samples are in marginal dysoxic-anoxic basin palinofasies and indicate marginal seashore and low oxygen environment.

Key words: Kopeh Dagh – Aitamir – mozduran - palynomaserals- palynomaserals- palinofasies

Introduction
Koph Dagh sedimentary basin is in the E.N of Iran and south of Turan plate. Aitamir formation is one of the stratigraphic unites of this basin. The age of this formation is Albian-Senomanian. The mentioned formation is expanded of eastnorthen Khope Dagh sedimentary basin to 70 Km of eastnorthen Gonbad Kavoos with different thickness which is thicken from East to West. The litology of the lower part of Aitamir formation is Glakonity sand stone and shale and the upper part is shale and thin beds of Glakonity sand stone. The lower boundray of the mentioned formation with Sanganeh formation is gradual and it’s upper boundary with Abderaz formation is erosive (fig1).
After initial studies, fielding observation, sampling environment is selected and after providing and studing the palynologycal slides with help of Tayson triple diagram, is defined palynofacies of section.

Discussion
Specify for determination palinofaciess of Aitamir formation sediments in Mozduran section, have been studied about 200 palynologycal slides of 50 sedimentary samples. Particles extant in palynological slides wich are used in environmental comments, palinofacies and palynoecoloogy, are in three groups:
Amorph material (SOM), palynomorphs (Dinoflagellata, Acritarchs, Tasmanitids, inner shell of foraminifers) and palynomaserals. (Tayson, 1993).

The components in palynological slides are divided into two parts as follow:
1. Allochthonous part
2. Autochthonous part, which this parts are controlled by ecological factors. (Vanderzwan, 1990).

The slides which are made from Aitamir formation, in all samples consist of different relations of three groups of palynomorph ingredients (palynomaserals, palynomorphs, unformed organic material) which they are indicative of open marine environment with medium to high energy condition.

Sandy bands of Aitamir formation don’t have any palynomorph elements.

For more positive evaluation, Tayson triple diagram is used as follow:
In each slide 300 palynological particle is numbered random and percent of palynomaserals, palynomorph and SOM in each sample which has an important role in identifying palynofacies, achieved with graphic statistic methods.
Then the percentage are transported to Tayson diagram and Aitamir formation palynofacies is modified in this section.

The studying slides are divided in three palynofacies based on Tayson diagram (fig2).

**Palynofacies I:**
In this palynofacies there is the low amount of SOM and between 15% - 30% which the predominant of SOM are light and are indicative of low oxygen environment. Palynomaserals are more than SOM. Palynomaserals are about 70% - 85%. The palynomacerals often are IV type.

The number of Dayniosists are very low and in some slides they reach to zero. The samples as: 1-3-10-12-14-20-23-25-29-30-35-36-38-44-45-48 are in this palynofacies and there is much focus of different palynomaserals which confirm the marginal and shallow environment near the sea-shore. Tayson diagram shows marginal dysoxic-anoxic basin for this palynofacies (fig 3).

**Palynofacies II:**
In this palynofacies the amount of SOM is between 40% - 50% and the amount of palynomorphs is between 5% - 10%. Tayson diagram shows proximal suboxic-anoxic shelf for this phacies. The samples of 7-11-15-18-22-28-34-50 are in this palynofacies.

In this palynofacies, high protected SOM is related to condition basin, presentation and excess of palynomacerals consequent turbidit flows or near source.

**Palynofacies III:**
In this palynofacies the number of SOM are increased related to for going palynofacies, and about 70% - 80% and palynomacerals about 20% - 25% and the amount of palynomorph is between 3% - 5%.

This palynofacies was viewed in samples 5-6-9-12-16-17-22-28-32-34-42-43.

Tayson diagram shows distal suboxic-anoxic-basin for this palynofacies. Dark and black SOM is possibly result of decomposition IV palynomaserals. This palynofacies shows the anaerobic condition dominate sedimentary basin.
Conclusions
1. Three palynophacies for Aitamir formation has been offered according to content of palynological slides.
2. Predominant palynophacies Aitamir formation in Mozduran section is marginal dysoxic-anoxic basin.
3. Sedimentary environment of Aitamir formation inferred marginal and shallow environment near the sea-shore with medium to high energy.
4. Marin and non-marin palynomorphs in Mozduran section are rare.

References:

Fig 1: stratigraphic column of Aitamir formation
Fig 2: Studied samples in triple Tayson diagram

$\text{Palynophacies I}$, $\text{Palynophacies II}$, $\text{Palynophacies III}$

Fig 3: Palynophacies I, II, III