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ASSESSMENT OF EVAPORATIVE RESIDUAL IN RESIDUARY ENVIRONMENTS SARDARREH AREA, GARMSAR

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A B S T R A C T

Garmsar block is located in Central Iran Basin, and the geological prospecting in this area is in the early stage. Late research reveals this area is potential oil-bearing and some reservoirs have been found in adjacent areas in Central Iran Basin. Qom Formation is proven that has the potentiality of self-generation and self-accumulation. The depositional setting and sedimentary-tectonic setting in this block are different with Zagros area which is famous for oil-gas enrichment and well studied in terms of geological setting. This investigation studies the Eocene – Oligocene facieses and sedimentary environments have in Sardarreh, Garmsar. Field studies were conducted to achieve this goal. So, 95samples were taken from the studied section. Because of the similarity of the samples, 49samples were selected for the preparation of thin sections. For facies interpretation and providing sedimentary model (Carruzi, 1989، ((Flugel, 2011) and naming of carbonate rocks (Dunham, 1962)، (Folk, 1962)and(Chen, 2011) were used. Due to interpretation of these facieses and their environments, the ancient geographical situation of this area is characterized. This is a carbonate platform which is a kind of carbonate Rimmed shelf.

INTRODUCTION

Foreword

The studied area is located 80km further from the southeast of Tehran, in the west, north and northwest parts of Garmsar province in the geographical limits of 1, 9 and 52 to 2, 10 and 52 of the eastern length and 3, 16 and 35 to 3, 17 and 35 of the eastern width. The studied area is placed in the southern parts of Alborz mountains and 15km away from the northeast of Garmsar. Sampling operation is held in selected sections through measuring the apparent specifications of rock units and consequently, the layering slope, topographical slope, real thickness of each unit are calculated and the studied surface stratum columns is depicted, however, the thickness of some of the units which were ideal directly measured. The specifications of each unit are first introduced and then the sections are illustrated. The findings of Carruzi(1989) and Flugel(2010) are applied to interpret the facieses and present a sedimentary model and Dunham(1962), Folk(1980) and Cohen(2011) are applied to name carbonate rocks. The current essay studies the characteristics of rocks, sedimentary facieses, the conditions forming such sediments and Curtase rocks in the studied area.

Stratigraphy

The cut taken mainly contains Maroon, Shill, Gypse, Indrite, lime, Maroon and Plaster, the path underneath is covered with Conglomera and impaired multi-Micro-Conglomera. Studies conducted on the sequence of evaporation in the intended area clearly demonstrate that a small evaporating basin is made in the area. Next, a compressive tectonic condition is dominated in Alborz and then a tensile basin is formed in the southern parts of Central Alborz for the sake of changes in the direction of eastern Alborz in comparison to western Alborz. In fact, a convenient environment is provided to form an evaporating sequence. In the studied area, small and floating particles of lime stones are dispersedly over barriers which are the same as Ghom structure from the characteristics of rock point of view. The only difference is that the above mentioned lime stone is completely tectonized and broken into particles due to some salt dome movements. According to the presence of lime stone of Ghom on salt barriers, the diaperic sedimentation of this region is older than the lime stone of Ghom(Dorri, 1991).

METHODOLOGY

In a field investigation, reconnaissance studies were carried out by identifying and measuring thickness of

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different units and litho logical variations. Consequently, for thin sections studies totally 144 samples were collected. After the studies are done and data are collected, field studies are conducted and the most convenient stratum surface is selected for measuring and sampling. Samples were collected by hammer, meter and compass in 1m intervals sampling is especially done in places where facieses and textural changes observed in less or more intervals. The sample chosen from the ground are analyzed by carbonate, destruction and evaporation facieses laboratorial studies and then the stratum columns are depicted in order to measure, interpret the sedimentary condition and also identify sedimentary facieses and carry out a sedimentary model related to these deposits in thin microscopic parts.

Microscopic Facieses

The microscopic characterization of thin sections revealed four kinds of facies which include nine sub-facies of carbonate and clastic ones. Comparisons of studied facies with those standard facies presented by Flugel (2004) and Wilson(1975) generally suggest a carbonate ramp is a depositional environment. In most of facies studied under thin sections, micrite texture, silication, vuggy, cellular and channel like porosities, compaction, dolomitization, cavity filling by sparcalcite are the most common diagenetic occurrences (Kayvani 2002). Field studies and researches on the thin sections made from sedimentary-territiary evaporating facieses display that these facieses are made up of various facieses. The already mentioned facieses are mainly the carbonate and evaporating ones. They are named after Dunham's categorizing(1962). Carbonate facieses include mudstone, wack stone, pack stone and grain stone which shall be defined in this part due to their sedimentary conditions. Considerably, 95samples were taken from the studied section. Because of the similarity of the samples, 49samples were selected for the preparation of thin sections. For facies interpretation and providing sedimentary model(Carruzi, 1989)، (Flugel, 2011) and naming of carbonate rocks and(Chen, 2011) were used. Holistically, such facieses form a carbonate rimmed shelf. This environment holds open marine, barrier environment, lagoon environment and the tidal one and every one of them has its own properties. Based on alukoms, orthokoms, sedimentary specifications embrace facieses that the very significant characteristics of theses facieses will be explained.

Open Marine Facieses group

There is not much energy in this environment and the sedimentary facieses are almost the same and are divided into semi-deep and deep areas and they hold bio-clast pack stone. The main constituents of these facieses hold bio- particles that some of them are tiny and unidentifiable. The sediments related to these facieses are observed on the ground in from of yellow thin layer of micritic limes. According to the above properties, it is considered that these facieses are formed in a low depth of an open marine.

Barrier Micro-Facies

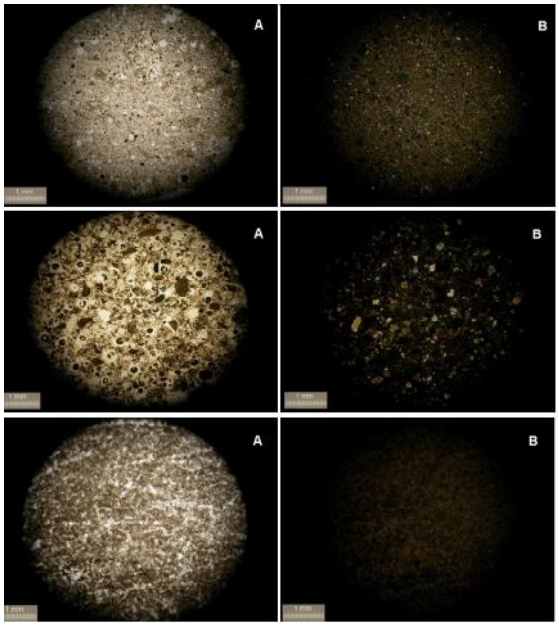
Barrier islands hold sand islands separating open marine environment from the lagoon one. Its shape is highly affected by wind, weather, the compression rate of sedimentation and the primary slope of the sedimentary basin. Barrier environments include grainstone/pelloid bio-clast.

Lagoon Facies Bolt

Lagoon are referred to the under tidal areas placed behind barriers which might be formed by riffs or shoals. Living things habiting in lagoon and sediments settling in pacific areas greatly rely on the relationship between the marine water and barrier stability. The lagoon environment includes facieses of gypsi-ferrous marl, calcareous sand stone.

Tidal Flat Facies Belt

Tidal flat facies are areas that are constantly covered withwater and are affected by the weak flows of waves. These areas are vastly expanded over epirick platforms. They are typically formed in the slope of coastal barriers around lagoons along the coastal strips of plateaus and ramps with low energy. In the studied area, D1, D2 and D3 facieses are observed as below. Micro-facies D1, The main components of this facies are mostly tiny and partial pelloid and sand grains. Since the texture of these components is grain like, the paste support is placed in the micritic field. As pelloid look irregular and reflect various sizes and there is intra- clast in adjacent facieses, it seems that these pelloid come from crumpled and eroded intra-clasts. As a result, their type is lithic pellet.Micro faciesD2,The main constituents of this facies are intra-clast grains and the partial components contain sand grains and some pelloid. These components hold a grain like texture and are placed in the micritic field with paste support. Intra- clast grains hold micrite or mudstone texture. In addition, they might be formed through turning half- tough supra tidal sediments affected by moving from water and getting dried. Micro-facies D3, This facies is seen in form of carbonate or a micrite with the lack of grain or alucom. Neo-forming phenomenon leaves a specific effect on this facies and it is changed into a micro-spar.



Micro facies D1, D2, D3polarized light(magnitude 40X)

Fenestral holes are very remarkable and they are sometimes attributed to the moulds left by evaporated minerals and in some cases made by holes of the gas rising from the spoiled organic deposits. On the other hand, tiny romboedric crystalsdolomite are dispersedly seen. The sediments of this facies are observed as olive or gray micrite lime stones. The above outcomes reveal that this facies is formed in supra tidal.

The arrangement of micro-facieses feature out an ideal vertical sequence. This sequence shows a relative reduction of depth starting from the facies of lower part of slope of open marine and ending to tidal facieses. Based on superposition, studying the relationship between micro-facies forming the units create an ideal shallow upward sequence and their environment. Following Walter's principles and scientific sources such as Carruzi(1989), Flugel(1982,2010), Reading(2001), Wilson(1975) and Chen and Wang(2011) quoted by Mohammadi(2013) and comparing it to the modern environment all directed into rebuilding to sedimentary facieses of Eocene – Oligocene in Sardarreh, Garmsar. This model holds an open marine and a surrounded one(lagoon) separated by a barrier from one another and each one of these facieses have their own specifications.

CONCLUSIONS

It is necessary to regard that in the studied samples, the facieses related to the deep area of the open marine haven't been observed (micro-facies number A1) and the deepest facies belongs to the shallow part of the open marine. Next, the depth is gradually reduced and moves toward the facieses related to environment with more energy till they get to a barrier belt exposed to waves and flows. Micro-facies number B1 is identified as the most energetic facies. Special facies with the limited rotation of water are seen at the banks. Remarking the redundancy of their components, they are placed in behind the barrier, lagoon bank and the area between the tide and finally the facies of carbonate mudstone is set in super tidal. The figure below illustrates the three dimensional situation of theses facieses (Shirin 2012).

No one has ever reported these facieses in this region. It is inferred that the paleontology of the geographical situation of the studied area at the time of Eocene-Oligocene sedimentation is carbonate rimmed shelf according to comprehensive analyses on stratum column, carbonate micro- facieses and their related environments. An apparent slope change is observed between the interior region of the continent plateau and the deeper water of the outside part in many of today's carbonate platforms. This slope change makes a specific area containing high energy where waves greatly affect it. A shallow rough and stormy environment is very appropriate for riff making creatures because they are away from muddy sediments. In case there are not any coral riffs, skeletal and oedie deposits create marine sand which they can make certain barriers. These rimmed platforms are half- continual or they hold a barrier parallel with rims. The section toward the dry part of the barrier is placed beside a low energy pool andit is further from open ocean and it might comprises a width of some hundred meters or tens of kilometres (BatmannGhlich, 2012).

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