

Corals from the member C of Mobarak Formation in the Vali-Abad section (Central Alborz – North part of Iran)

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Abstract

The study is based on the corals of member C of the Mobarak Formation in Vali-Abad section (south of Marzan-Abad, Central Alborz). In the Vali- Abad section Mobarak Formation overlaying Girud Formation conformably, and it is covered with Dorud Formation (Early Permian) unconformably. The member C of Mobarak Formation reaches about thickness of 60 meters, and its lithology has composed of limestones with black shale intercalations. Up to 12 species of Rugosa and tabulate corals belonging to 9 genera have been identified. The following species are:

Kailingophyllum sp., Marzanophyllum chalusense, Marzanophyllum grassiseptum, Hapsiphyllum sp.1, Hapsiphyllum sp.2, Zaphrentoides sp.A, Zaphrentoides sp. B, Ufimia sp., Hapsiphyllidae indet, Zaphrentites parallela, Syringopora sp. and Favositidae indet.

The assemblage is composed of small undissepimented solitary rugosa corals belonging to Cyathaxonia fauna and it occurs at oolitic limestones. Corals of member C of Mobarak-Abad having endemic character and in base of fauna and stratigraphical position has been assigned to Upper Visean-Namurian in age.

According to study of microfacies of the member C, this part of the section belongs to the basin margin to the shelf lagoon, from the 3rd to 4th zone of Wilson model. Moreover a shallow carbonate Platform dominated in this area during the Carboniferous.

Keywords: Mobarak Formation, Vali-Abad section, corals, Upper Visean-Namurian, Microfacies

Introduction

The Mobarak Formation is developed in the NorthWest through the NorthEast of Iran. It comprises thick Lower Carboniferous succession (Tournaisian through the Namurian) in different parts of Central Alborz. Its lateral equivalents are developed in the Central Iran and East Iran Basins, and extended from northwest to northeast of Iran. The Mobarak Formation is represented by dark fossiliferous limestones with subordinate black shale intercalations in its lower part. In the type section, it rests disconformably on sandy-argillaceous beds of the Upper Devonian and is overlain by marly limestone with ironstone lenses Upper Permian fossils (possibly, the Nesen Formation).

The first systematic research on Iranian Carboniferous corals was made by Douglas (1948), who described Permo-Carboniferous corals from Iranian Baluchestan. Since then many scholars studied corals in various parts of the country. Rugose and tabulate genera were used for correlation of different sections. Rugose complex typically includes solitary genera; only in the Vali-Abad a patch reef built by colonial *Siphonodendron* is known. Tabulate corals are widely distributed in Carboniferous deposits of the Iranian Platform.

Some descriptive papers have been published on Lower Carboniferous corals from several localities in the Central Alborz (Flügel, 1963; Khaksar, 1994, 1996). The paper by Flügel (1963) is the most important for understanding of the Lower Carboniferous coral fauna of Iran. Carboniferous sequence of the Central Alborz is represented by more than 400 m of limestones yielding abundant rugose corals, brachiopods, foraminifers and other fossils. The Mobarak Formation developed in this area contains rich and diverse coral fauna (Assereto, 1963). Biostratigraphy of the Mobarak Formation is based on conodonts and brachiopods (Ahmadzadeh-Heravi, 1971), and also on corals (Flügel, 1993, Khaksar, 1994).

DISCUSSION

The lower boundary of Mobarak Formation in the ValiAbad section is Gairud Formation (Upper Devonian) conformably and it has covered by Dorud Formation (Early Permian) Unconformably. This section is located in Central Alborz Mountains- North of Iran, about 40 km south of Marzan-Abad. Geographic coordinates of the section are: 36° 14' 52.61" N and 51° 17' 38.36" E and the altitude is 1779.5 m.

The sedimentary succession can be divided into three members A, B and C; it reaches up to 200m thick. Member C was considered, because it exists only in this part of the Alborz region and it has never reported in other sections of the Mobarak Formation yet, particularly in the type section.

Stratigraphy

The thickness of member C reaches about 60 meter of the upper part of Mobarak Formation and its lithology has composed of:

Median to thin beds of Limestone containing oolitic grainstones and wackestone – bioclastic packstones with some dolomitic sparry cement and black marlyshale intercalations.

Based on the corals assemblage and the present microfossils and the stratigraphical position, the age of this part of the formation is determined Upper Visean – Namurian.

The diameter of marlyshale intercalations piecemeal increases upward in this section. Absence of Lower carboniferous corals after the early Namurian, relates to sea-level and an off lap sequence of erosional Alborzian phase. Indeed the off lap sequence has occurred later as compared to the Eastern part of Alborz in this period.

The recovered corals in this member of the Formation belong to two Suborders of Rugosa and Tabulata, up to 12 species of 9 genera have been identified and they are as follows:

Kailingophyllum sp., *Marzanophyllum chalusense*, *Marzanophyllum grassiseptum*, *Hapsiphyllum* sp.1, *Hapsiphyllum* sp.2, *Zaphrentoides* sp.A, *Zaphrentoides* sp. B, *Ufimia* sp., Hapsiphyllidae indet., *Zaphrentites parallela*, *Syringopora* sp. and Favositidae indet.

The small undissepimented solitary Rugosa corals belonging to Cyathaxonia fauna, and the attendant fauna is containing Brachiopods, Bryozoans, Dasyclad Algae, Foraminifera and Gastropods.

These evidences of microfacies and the existent biota confirm totally that they have occurred in the back reef zone, the cyathaxonia and tabulata corals available in this area can tolerate this condition. The cyathaxonia adaptive morphology enables them to exist in lagoon condition to 4000m depth. A relative abundance of these corals is in two habitats of the

subnatural terms of marine for purposes of salinity, temperature, amount of Oxygen and nutrient currents.

Some of the recorded micro fauna and flora in this facies are:

Archeodiscus planus, BOZORGNIA, 1973 from Foraminifera and *Windsporella tulayae* (CHANTON-GUVENC, 1972) VACHARD, 1980 from Algae, they estimate upper Viséan to Namurian age for this part of the section.

Also the identified microfacies among the vertical and horizontal subsequences suggests that a shallow carbonate Ramp has dominated in this region during the Lower Carboniferous epoch and as for the Iran location in the SouthWest of the old Tethys, presence biota belong to warm condition, indicate the current rotation of warm water from the higher latitude flowed around the Alborz zone.

Results

- 1-up to 12 species belong to 9 genera of corals has been recognized in this part of the section.
- 2- There are a new genus and 2 new species of corals among them.
- 3- The corals assemblage is representative of a subnormal marine environment which these corals can tolerate this condition.
- 3- Based on the biostratigraphical and lithostratigraphical characteristics the Mobarak Formation in this section have been determined Upper Viséan-Namurian in age.
- 4- According to these studies represent there was a retrogressive sea which had extended from open sea to lagoon.
- 5-The Carboniferous sea regressed in Southern and Eastern parts of Alborz in the Middle Viséan whereas it has continued to Namurian in the studied area.

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Tab1: Various species of corals are found in the member C of the Mobarak Formation in the Vali-Abad section

Species	Age	
	Early Carboniferous	
	Upper Visean	Namurian
Hapsiphyllidae indet	=====	
<i>Hapsiphyllum</i> sp.1	=====	
<i>Hapsiphyllum</i> sp.2	=====	
<i>Kailingophyllum</i> sp.	=====	
<i>Marzanophyllum chalusens</i>		=====
<i>Marzanophyllum grasiseptum</i>		=====
<i>Zaphrentites parallela</i>		=====
<i>Zaphrentoides</i> sp.A		=====
<i>Zaphrentoides</i> sp. B		=====
<i>Ufimia</i> sp.		=====
<i>Favosites</i> indet.	=====	
<i>Syringopora</i> sp.	=====	

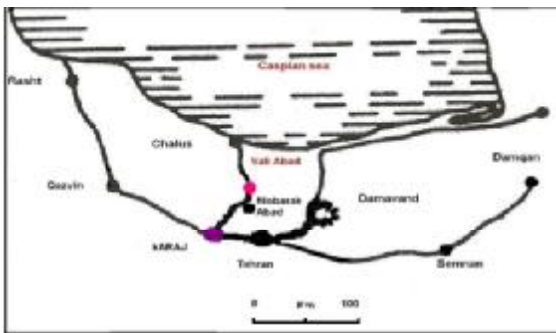


Fig 1. Geographical Location of Studied Area



Fig 2. Location of the studied section

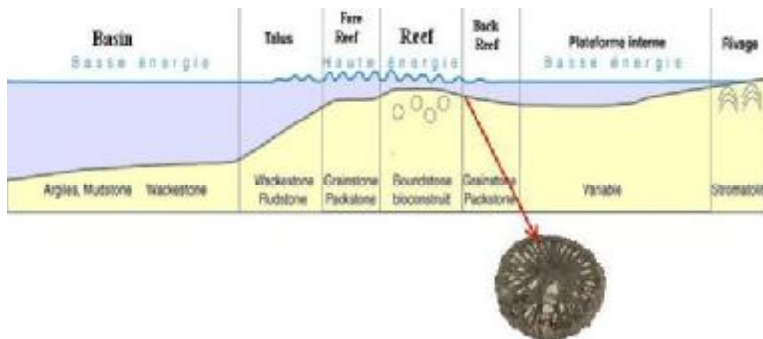


Fig3. Cyathaxonia fauna restricted in back reef zone

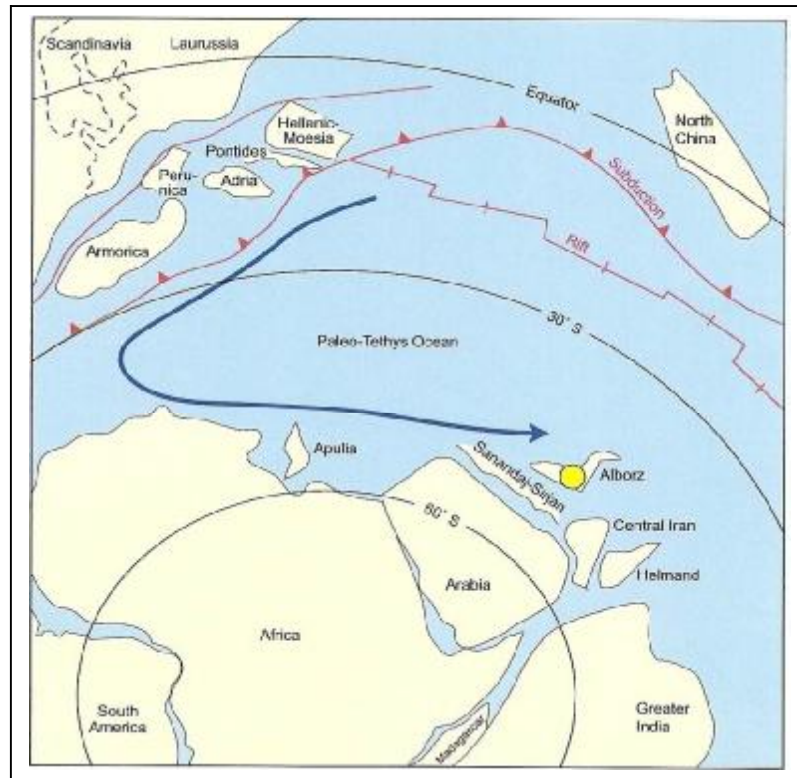


Fig4. Paleogeographic sketch suggestion the position of Alborz and the counterclockwise oceanic current around the Alborz region. Kiessling et al.1999



Fig5. Grainstone & micro fossils of Foraminifera & Algae

Plate1



1



2



3



4a



4b

1- *Marzanophyllum chalusens*, transversal section x1.4

2- *Hapsiphyllum* sp., transversal section x1.4

3- *Kailingophyllum* sp., transversal section x2

4- a, b- *Favositidae* indet.

4a- Longitudinal section x1.5 4b- Transversal section x2.4