The Sedimentological of Quaternary Sediments "Gargaresh Formation" NW Libya.

Ayub Sijok*

Abstract

The Gargaresh Formation represents the Quaternary age sediments, located next to the beach only. This study deals with observations and laboratory investigations of Calcarenite sediments from Mediterranean coast of NW Libya – Janzour area which consists of old limestone in the size of sand grains (1/16 - 2 mm) and called Calcarenite with fossils, quartz grains, it's conformable above Jeffara formation. The Sedimentary structure displayed cross bedding showed the physically deposition of formation due to weathering and erosion.

المستخلص

يمثل تكوين قرقارش رواسب العصر الرباعي ، التي تقع بجوار الشاطئ فقط . حيث تركز هذه الدراسة على المشاهدات والتحاليل المخبرية لرواسب الكالكرينيت من ساحل البحر المتوسط في شمال غرب ليبيا – منطقة جنزور والتي تتكون من الحجر الجيري القديم والذي أُعيد ترسيبه في حجم حبيبات الرمل (16/1 – 2 مم) ويسمى بالكالكرينيت والذي يحتوي على أحافير مع خليط من حبيبات الكوارتز، حيث يقع هذا التكوين فوق تكوين جفارة والذي يُظهر بنيات رسوبية واضحة كعلامات النيم والترقق . بالاضافة الى التطبق المتقاطع الذي اثبت ان التكوين ترسب فيزيائياً نتيجة للتجوية والتعرية.

Key wards: Gargaresh Formation, Calcarenite sediments

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* Lecturer Assistant at Earth science department, Faculty of science, Azzytuna University.

Introduction:

The Quaternary deposits cover the major part of the Jeffara Plain (Figure 1). The Pleistocene deposits were mainly divided into three rock units, from base to top: Qasr al Haj Formation, Jeffara Formation, and Gargaresh Formation (Figure 2).

A geomorphological feature and geological characteristic of north-west Libya is the Gargaresh formation which represents Calcarenite sediments. The term Gargaresh was introduced by Lipparini (1940). The formation often contains interlayers of cross bedding and well cemented Aeolian sands (Lipparini, 1940; Burollet, 1960; Hey, 1962; Goudarzi, 1970; El-Hinnawy and Cheshitev, 1975; Maan, 1975; Smetana, 1975; Mijalkovic, 1977).

The Calcarenite commonly contains shell fragments and occasionally silty, the Colour of the rock is yellowish to light grey. The stone has been mined from numerous quarries along the Mediterranean shore between Zuwarah and sirt and had been widely used in building construction as blocks for house walls and fences (Ilich and Kloss).

For current study of Sedimento-logical descriptions and petrographic investigations of Gargaresh Formation, we collected specimen of the Gargaresh rock from locality near Tripoli named Janzour, about 20 km west of Tripoli.

During field study, the section was divided into 6 units based on different lithology based on field observations ((show columnar section figure 3)).

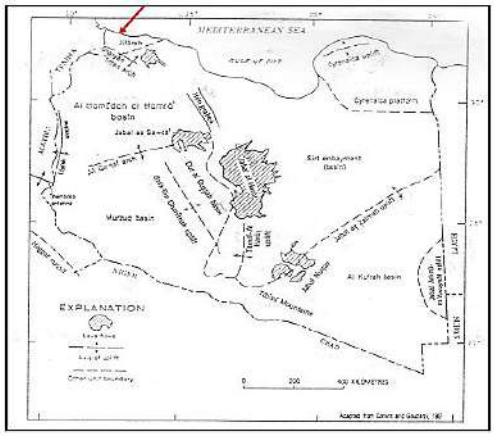

Figure 1. Map illustrating Area of Study (Jeffara Plain)

Sedimentology

The specimens from Unit 1 to 6 represented by a medium and rounded-grained semi hard Calcarenite, well sorted, yellowish to light brown in color (Table1 sample description). The formation characterized by much sedimentary structure such as lamination (Photo No.1), ripple marks, (Photo No.2) with cross bedding (Photo No.3). The skeletal grains contain (Table 2): The abundant are Foraminifera, Algae (Plate2), with rare fragments, echinoderms (Plate7), Intraclasts (Plate5), Bryozoa (Plate 6). The non-skeletal grains are quartz (Plate1).

QUATERNARY	Gargarash Formation
	Jeffara Formation
	Qasr al Haj Formation
MIOCENE	Al - khums Formation
UPPER CREATESOUS	Nalut Formation
	Sedi Alsed Formation (yefren Member)
LOWER CREATESOUS	Sedi Alsed Formation (Ain topi Member)
TRIASSIC	Abushyba formation

Figure2. Stratigraphic succession of Jeffara Plain (Area of Study)

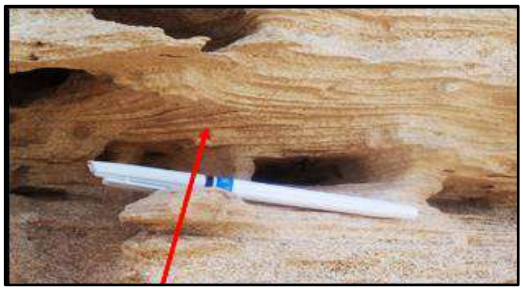

Photo No. 1 shows lamination

Photo No. 2 shows ripple marks

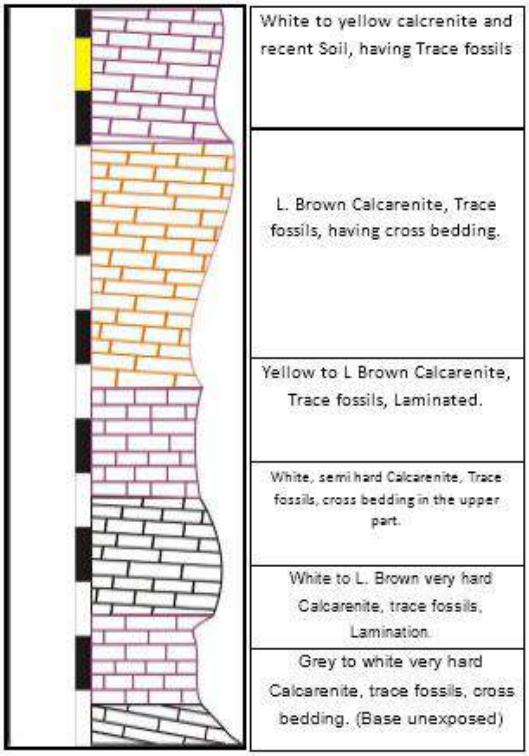

Figure 3: shows columnar section of Gargaresh Formation along Janzour Coast line ((Area of study)).

Table1. Samples description

■ Rock type: CALCARENITE
■ Color: yellowish to light brown
■ Texture:
■ Grain size: ranging between μ 350 الى μ 1000
■ Roundness: sub rounded to Rounded
■ Sorting: sorted to well sorted
■ Fossils & accessories
Fossils: Trace fossils
Accessories: (Pyrite)
■ Porosity & oil shows
Porosity: Pores
■ Oil shows: No
■ Sedimentary Structure
Cross bedding, Ripple marks, and lamination.

Photo No. 3 shows Cross bedding and boring activities of ichono-fossils

Petrographic thin section description

The main objective from the petrographic study is to determine the mineral composition of the Gargaresh formation. Six samples have been selected from the columnar section of Gargaresh Formation based on different lithological elements. These samples are shown below in Table (2).

(Table2): Petrographic thin section description

Formation: Gargaresh **Lithology**: Calcrenite

Grains	**60%**	**Cement**	**5%**	**Matrix**	**2%**
Skeletal grains					
Rock fragment	5				
Algae	29				
Intraclasts	5				
Echinoderm	1				
Foraminifera	40				
Bryozoa	10				
Non skeletal	-				
Quartz	10				

Porosity (Primary) 53%	**%**	**Porosity (Secondary) 47%**	**%**	**Digenetic minerals**	**%**
Intraparticles	3				
Interparticles	50	Vuggy	47		

Depositional Texture	Depositional Environment
Grainstone	Shallow marine

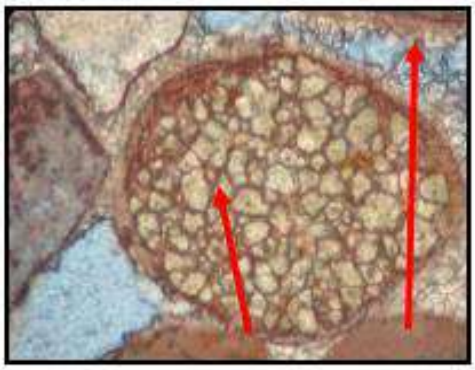

Plate 1. Showing: Quartz grains, secondary porosity

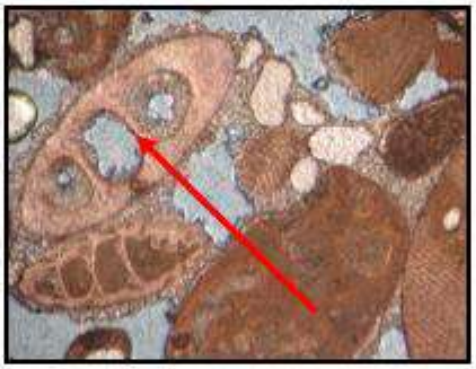

Plate4. Showing: Intragranular Porosity

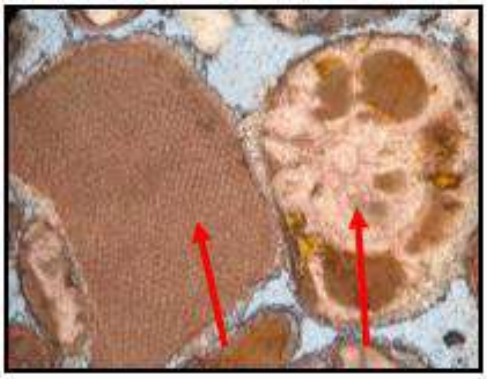

Plate2. Showing: Algae & Foraminifera

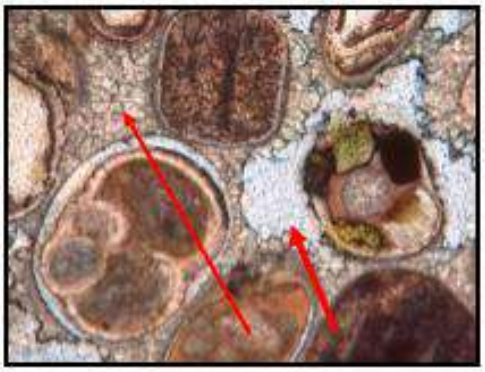

Plate5 . Showing Intraclasts, Vuggy porosity

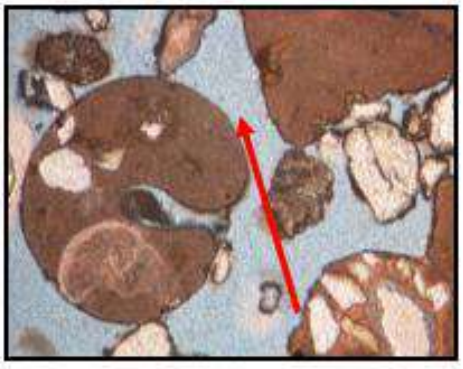

Plate3. Showing: Intergranular Porosity

Plate6. Showing Bryozoa

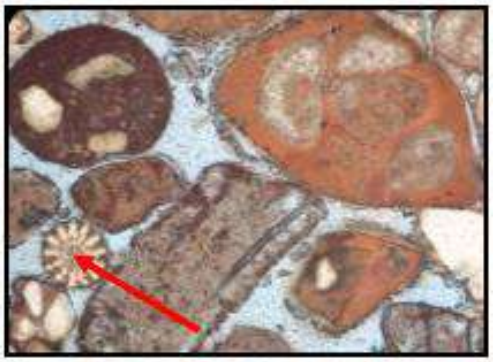

Plate7. Showing Echinoderm

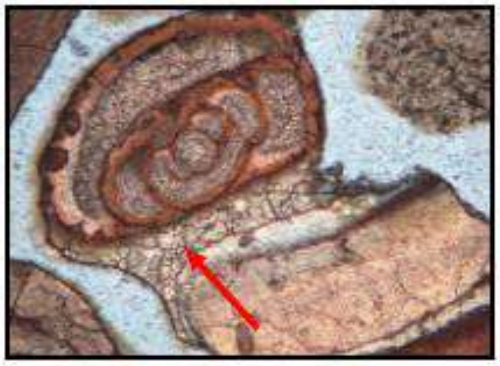

Plate8. Showing Cement

Result of Study:

Referring to the previous description and petrographic interpretations of the Gargaresh formation; the concluding of these interpretations are; medium and rounded-grained, semi hard grains, well sorted, yellowish to light brown in color. This description indicates the rocks are Calcarenite sediments. The composition of Gargaresh formation carbonate grains that was reworked in sand size, quarts with many shells that mentioned above constitute the formation as a result of reworked deposits. The sedimentary structures of the formation are cross bedding, ripple marks and lamination. The cross bedding with ripple marks indicate the formation reworked deposits by wind of Aeolian origin. The petrographic investigation indicated that the formation contains skeletal grains (Algae, Intraclasts, Echinoderm, Foraminifera, and Bryozoa), Non skeletal grains are quartz. The formation characterized by high primary and secondary (Vuggy) porosity. The hard rock throughout the formation displays good properties for building construction.

Conclusion

The Pleistocene deposits were divided into three rock units from base to top: Qasr al Haj Formation, Jeffara Formation, and Gargaresh Formation. Referring to the previous description of the Gargaresh formation and based on different lithological elements, we divided the section into six units. The Sedimentological and petrographic investigations of Gargaresh Formation were represented by a medium rounded-grained, semi hard Calcarenite, well sorted, yellowish to light brown in color. The formation characterized by much sedimentary structure such as lamination, ripple marks, with cross bedding. The skeletal grains contain: The abundant are Foraminifera, Algae, with a very rare fragments, echinoderms, Intraclasts, Bryozoa. The non-skeletal grains are quartz.

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