

جمهورية العراق وزارة التعليم العالي والبحث العلمي جامعة بابل –كلية العلوم قسم علم الأرض التطبيقي



مشروع بحث تخرج السحنات الدقيقة لتكوين الفرات في منطقة كربلاء - النجف

للطالبة

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اشراف

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Microfacies Analyses of Euphrates Formation in Karbala _ Najaf area

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اقرار المشرف

	أشهد بان موضوع البحث
والمنجز من قبل الطالب	الموسوم
إفنا في قسم علم الارض كلية العلوم جامعة	قد اجري تحت اشر
يوس في علوم الارض وذلك للفترة من	بابل كمتطلب جزئي لنيل شهادة البكالور
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التوقيع: الاسم الثلاثي للسيد المشرف اللقب العلمي: التاريخ:

بنا الحين التالية التحقيق التحق التحقيق ال التحقيق الت التحقيق التحق

سورة المجادلة ((الآية 11))

الاهداء وصلت رحلتي الجامعية إلى نهايتها بعد تعب ومشقة... وها أنا ذا أختم بحث تخرجي بكل همة ونشاط . وأمتن لكل من كان له فضل في مسيرتي وساعدني ولو باليسير إلى من أفضلها على نفسي، ولم لا؛ فلقد ضحَّت من أجلي ولم تدخَّر جُهداً في سبيل إسعادي على الدوَّام (أ مي الحبيبة) نسير في دروب الحياة، ويبقى من يسيطر على أذهاننا في كل مسلك نسلكه صاحب الوجه الطيب، والأفعال الحسنة. فلم يبخل على طيلة حياته (والدي العزيز) إلى أصدقائي، وجميع من وقفوا بجواري وساعدوبي بكل ما يملكون، وفي أصعدة كثيرة (أقدم لكم هذا البحث)، وأتمنى أن يحوز على رضاكم .

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Abstract

The Miocene succession in the southwest desert of Iraq revealed the presence of the Euphrates Formations. Thirteen of thin sections from three boreholes have undergone detailed petrographic identification.

Microfacies characteristics of the whole successions showed the presence of skeletal and non-skeletal grains within the Euphrates. The Euphrates microfacies reveal .Five types use details gained from textural and faunal properties helped in the designation of microfacies zones. The microfacies of the Euphrates Formation show Miogypsina packstone, fossiliferous packstone, Bioclastic wackestone –packstone, Dendritina packstone, peloidal packstone

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Chapter One Introduction

Chapter One Introduction

1-1 Preface

The lower Miocene succession in karbala - Najafa area is represented by Euphrates Formation. The Euphrates Formation (Lower Miocene) was first described by (Bellen RC et al. 1959) where the type section was near Wadi Fuhaimi near Anah. The formation is composed of dolomitic, fossiliferous, and oolitic limestone with green marls at the top (Cytroky and Karim 1971). Buday(1980) divides this formation into three units from bottom to top: unit A, cavernous and conglomeratic limestone; unit B,shelly limestone; and unit C, marly and chalky limestone.Many scientists studied this formation in different locations from the stratigraphy, sedimentology, and the environment of deposition, point of view (Al-Ghreri 1985; Gayara and Taha 1989, 1995; Ali 2011; Al-Dabbas et al. 2013).

1-2 Aim of the Study

The main aim of the study is to investigate the Euphrates Formation area, from the following aspects: Microfacies analysis and depositional environmental interpretation aimed to wards a better understanding of the depositional setting.

1-3 Methodology:-

Using a polarized microscope to define petrographic and digenetic features . Also the work was based on a detailed foraminifera identifiedcation

1-4 Stratigraphy and Tectonic Setting

The studied succession was referred to the Miocene cycle (Buday, 1980), and represented by the Euphrates Formation (Lower Miocene), The cycle as whole is characterized by the folding and uplift of the Eugeosyinclinal area and by the continuation of the sedimentation in the Miogeosynclinal trough and on the shelf area, (Buday, 1980). The sedimentation in the shelf area was mostly calcareous - evaporitic. The cycle can be divided into two subcycles, the lower subcycle is characterized by a very slight subsidence and with prevalently calcareous sedimentation. It ended by a lagoonal episode during which evaporates were laid down, (Buday, 1980). The upper cycle is partly transgressive but its sediments might develop in the center of the main foredeep basin gradationally form the lower one. It is marked by calcareous (or calcareous-conglomeratic) sedimentation at its beginning and then by calcareous evaporitic sedimentation.

Al-Sayyb and Valek in 1968 mentioned that the basement rocks are shallow ranging in depth between (3-5) km., consisting of granitic rock or may be of metamorphic type, (Buday 1973), recorded in the tectonic map one direction of fault which is north-south corresponding with A bu-jir fault which separate the stable shelf from the unstable shelf. The long and short linements of NW-SE direction are typical for this subzone parallel to the Euphrates fault zone, probably partly shifted by faults of approximately NE-SW and NS trends. (AL-Ameri, 1983).



Figue (1-1) Stratigraphic correlation Miocene Formations (compiled according Jassim and Goff ,2006).

1-5 Preview Studies

The original description was given by Boeckh in 1929. It was later amended by Bellen in 1957. The formation type locality lies near wadi Fuhaimi in Anoh trough on the stable shelf. The Formation is composed at the type locality, of Shelly, chalky, well-bedded recrystallized limestone, (Bellen et al., in 1959). The thickness in the type locality is (8)m only. The thickness in the surrounding areas, as well as in the boreholes is usually many times more, reaching to a maximum of (100) m, average thickness around (60-70) m, (Buday, 1980).

Ctyroky and Karim, (1971), AL-Ghreri, (1985) made a very detailed evaluation of the fauna and determined its age as a late lower Miocene and early middle Miocene.

Prazak, (1974) proved that only lower Miocene - preorbulina beds are represented.

The Euphrates limestone Formation was deposited under shallow marine-reef and lagoonal conditions, with local coral and lithophyllid reef and with intermittently occurring fore-reef condition, on the one side, and lagoonal condition on the other side, (Buday 1980). AL-Mubarak (1971) divided the Formation into four units named A, B, C and D. whereas AL-Mehaidi in 1975, described this Formation from outcrops between the AL-Razaza-Habanyia area and divided the Formation into three members:-

- a- Basal breccia member consist of fragmented Nummulitic limestone and chert.
- b- Om sufaya chalky limestone.

c- limestone marl member.

AL-Ghreri (1985). Near upper Euphrates Valley area divided the Formation into two faunal benthonic zones.

AL-Meheidi, 1975, The lower contact of the Euphrates Formation is usually unconformable. The Formation overlies the Eocene rock (Dammam Formation).

The upper contact of the Formation is conformable the covering Formation is mostly the Nfayil Formation .

CHAPTER TWO petrographic

CHAPTER TWO petrographic

2.1 Preface

The aim of this chapter is to diagnose the petrography characteristic of thin sections in order to delineate the depositional environment of the Lower Miocene studied sections. Thin sections were classified on the bases of Dunham's classifications (1962) .Study reveals that the carbonate grains represented within the LowerMiocene successions are both skeletal and non-skeletal grains. The main components of the skeletal grains are benthonic foraminifera, Molluscs (pelecypoda and gastropoda) ,algae,ostrcoda,while non-skeletal grains are represented by peloids,Ooids , grapstone , and lithoclastes.The Lower Miocene succession is represented in this study by the Euphrates Formation Formation .

2-2 Petrography

The Euphrates succession is rich in fossils, shows deep facies as marl units, restricted facies bearing peloids, Miogypsina, Dendiritina, miliolid, Peneroplis, and open marine facies bearing Miogypsina associated with pelecypods and bioclasts.

The main microfacies characters of the Euphrates Formation were obtained from the Karbala borehole section , while in Najaf composite sections carbonate grains were not recognized because the limestones were highly recrystallized . Peloids were the major component of the non–skeletal grains.

2-2-1 Skeletal grains

Miogypsina sp. : It is an excellent index fossil for the Lower Miocene time interval . It occurs both in lagoon and shallow subtidal environments of open platform (Flugel,2004). Sartorio and Ventarini (1988) indicated a fore barrier environment for these .

The first appearance of Miogypsina sp. In Karbala section is at 38.8 meters (Plt 1.B) and last appearance at 26.5 meters (Plt 1.A). It is accompanied with many other foraminifera such as , Dendiritina , miliolid , Peneroplis , rotalid , Elphidium ,also with pelecypods , and gastropods . Miogypsina is abundant at the first 4.5 meters of Euphrates Formation within a Miogypsina packstone facies (Plt 1.F).

Dendiritina : restricted or lagoonal environment (Flugel,2004)) .In this study, Dendiritina is observed abundant at Karbala borehole section with its last appearance occurring at 34.4 meters (Plt 1.C) and its first appearance is at 45.5 meters (Plt 1.E) . It is abundant enough to classify the rock as Dendiritina

packstone . Peneroplis : Peneroplis and Dendiritina both are Peneroplidae . Peneroplis is recognized at 29.3 meters (pl.1.D) . The latter two depths may be Peneroplis Planatas .Other foraminifera such as miliolids, rotalids are recognized within formation , (pl.1.F) .Molluscs : mainly pelecypods,whole shells are abundant at 26.5 m with many Miogypsina sp. , and shell fragments . At depth 40.1 m pelecypods are also abundant , some of them are recognized as thin small shell fragments . It becomes rare at 41.6 m .

2-2-2 Non-skeletal grains

Non-skeletal grains within the Euphrates Formation are represented by peloids only . Peloids are well sorted at depth 44.6 m ,with Dendiritina sp. at depth from 34.1-35.5 meters at Karbala section , it occurred at Najaf section .

Plate 1



A- Miogypsina sp.in the Euphrates Formation (Karbala section) .

B- Miogypsina sp.in Miogypsina packstone in the Euphrates Formation .

C- *Dendiritina* sp.in peloidal packstone in the Euphrates Formation (Karbala section).

D-Dendiritina with Peneroplis in Dendritina packstone(Karbala section).

E- Dendiritina in Dendiritina packstone(Karbala section).

F-Miogypsina sp.with miliolid in Miogypsina packstone(Karbala section).

CHAPTER TREE Microfacies Analysis

CHAPTER TREE

Microfacies

3.1 Preface

Five types of microfacies are recognized at Karbala Formition ,on the classified on the bases of Dunham's classifications (1962) :

3.2 Microfacies

Three types of microfacies are recognized indicating this at Karbala Formition :

A- Miogypsina packstone at depths 26.5-31.0 meters and at 36.0 -39.0 meters . Associated fauna : pelecypods, gastropods, rotalid , echinoderm fragments, shell fragments similar to ramp microfacies (13) (Flugel,2004), which is bioclastic wackestone with abundant larger foraminifera (Plt2.A).

B-Fossiliferous packstone at depth 39.0-40.5 meters. Associated fauna are pelecypoda, gastropods, ostracoda, and shell fragments similar to ramp microfacies (13) which is wackestone /packstone with larger foraminifera .(Plt2.B)

B- Bioclastic wackestone –**packstone** at depth 40.5 and 41.8 meters . Associated fauna are pelecypoda ,rotalids whole tests accompanied with abundant shell fragments and echinodermata fragments similar to microfacies no.10 (Flugel,2004), which is bioclastic wackestone-packstone with skeletal grains.

D- Dendritina packstone with Peneroplis and gastropods ,which is packstone with abundant foraminifera or algae . (Flugel,2004) .

E- peloidal packstone at Karbala section depth 35.0 meters . Associated fossils are : Dendritina, Miogypsina and other unidentified .

Plate2



A- Miogypsina packstone, Euphrates Formation (Karbala section).

B- Fossiliferous packstone , Euphrates Formation (Karbala section.

C-Dendritina packstone, Euphrates Formation (Karbala section) .

D- Dendritina packstone, Euphrates Formation (Karbala section) .

E- Intraclastic peloidal packstone-grainstone, Euphrates Formation(Najaf section) .

3.3 Environments of Euphrates Formation

The formation was deposited under different environments within the carbonate platform, they are shallow open marine, inner barrier, and shoal environments.

A-Shallow Open Marine Environment

The shallow open marine environment represents an open platform, which subjects to vigorous oceanic activity. It may range in depth from a few meters to several hundred meters. The deposition is largely below wave-base in this environment, it may restrict if ponded behind a reefrimmed shelf that has only sluggish circulation (Ahr, 1985). This environment is represented by the following microfacies in Euphrates Formation:

1- Fossiliferous Packstone Microfacies

An assemblage of whole larger benthic foraminifera constitutes the main components of this facies, Miogypsing sp., Textularia sp.,

as well as algaes and echinoid fragments. This facies is highly affected by recrystallization, calcite cement is partly or completely filling the pore space. This facies reflect deposition in a shallow open marine similar to SMF type -10 (Wilson, 1975).

2- Bioclastic Packstone Microfacies

This facies is represented by the abundance of shell fragments of gastropods, Miliolids, calcareous algae and Ostracods. This facies also effected by recrystallization and biomolds are filled with calcite cement. Fragmentation of skeletal grains depends primarily on wave energy, this facies similar to SMF type –9, (Wilson, 1975).

B-Inner Barrier Environment

This environment represents the back-reef area, which consists of reef debris adjacent to the reef-flat, passing shoreward to quite water lagoon, (Tucker, 1985). The main facies is representing of this environment in Euphrates Formation is the bioclastic peloidal packstone microfacies. The facies consists mainly of gastropod shells associated with calcareous algaes, Ostracods and foraminifera.

Recrystallization affected this facies and moldic pores are filled with fibrous cement.

Peloidal packstone microfacies which consist mainly of peloids, rare bioclastics the peloids are poorly sorted and affected by recrystallization.

C-Shoal Environment

The shoal environment is a belt of high tidal current and wave activity, which is located along the seaward margin of carbonate platform. Depths of deposition in this environment are less than (5-10) meters above wave-base, (Tucker, 1985). This environment in Euphrates Formation is represented by peloidal packstone - grainstone microfacies and consists mainly of abundant peloids, rare bioclasts, and interaclasts. The peloids are well sorted and rounded. This facies is usually deposited within a high energy shoals and similar to SMF type -11, (Wilson, 1975).

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الخلاصة

كشفت خلافة الميوسين في الصحراء الجنوبية العربية العراق The Miocene successi

وجود تشكيلات الفرات خضعت ثلاثة عشر من الأقسام الرقيقة من

sections from three boreholes have unde

ثلاثة آبار مفصلة

Microfacies characteristics of

الاختطاف بأكملة microfacies

اظهرت خالص وجود الحبوب الهيكلية وغير الهيكلية داخل الفرات

presence of skeletal and non

تحديد الهوية التروغرافية petro

أظهرت خصاص microfacies للاختطاف بأكمله وجود الحبوب الهيكلية وغير الهيكلية داخل الفرات

تكتشف microfacies للفرات عن خمسة أنواع تستخدم التفاصيل المكتسبة من خصائص النصي

والحيوانات التي ساعدت في تعيين مناطق الميكروفات . تظهر microfacies لتكوين الفرات

Bioclastic ، حزمة الأحفورية ، Miogypsina Packstone

Wackestone Packstone Dendritina Packstone Peloidal Packstone



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مشروع بحث تخرج

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للطالبة

فاطمة سالم سرحان جياد

بكالوريوس علوم علم الارض التطبيقي

العام الدر اسي 2024-2023

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