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Microfacies Analysis the Lower-middle Miocene Succession, Kirkuk area

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ABSTRACT

The Lower-Middle Miocene succession in kirkuk area include the Serikagni, Euphrates, Dhiben, Jeribe and Fatha formations in addition to Govanda and Ghar formation. The Euphrates, Dhiban, and Jeribe formations for study in Ja-26 and Hr-41 wells at Kirkuk area have similar facies and difficult recognized in order to Dhiban Formation separated with them. Therefore Euphrates ,Dhiban, and Jeribe formations are favored one group where to be similar in paleoenvironment depositonal and facies analyses. Which most them are formed from restricted marine and shallow open marine environments that consisting of lime mud stone, wakestone and packstone which consist skeletal grains of fossils especially milolid and nonskeletal grains of pellits and peloids in addition to dolomite and dolomitic mud and wackestone. The sabkha environment is recognized to Dhiban Formation and at the Jeribe Formation there are fixed occurrence of blue marl facies which represent the deep marine environment and fossilifrous peloidal packestone-grainestone facies represent shoal environments. The Fatha Formation and Serikagni Formation are considered resigning formations where Serikagni Formation is recognized by planiktonic deep marine environment while Fatha Formation is recognized dependence on location of sequence stratigraphy that is characterized high thick of salt, gypsum, anhydrate rocks in addition thin interbeded carbonates rocks.

Introduction:

The study area lies within the unstable shelf within the Hemrin- Makhule subzone which lies within the foothill zone and upper part of the Tigris subzone of the Meso-potamian zone (Buday and Jassim 1987). The studied succession area includes Jumbur-26 and Hemrin-41 .Fig.(1). The Lower-Middle Miocene cycle an important cycle in the Tertiary which include reservoir and seal rocks. This cycle was divided in- to two subcycles, the Lower Miocene subcycle and the Middle Miocene subcycle.

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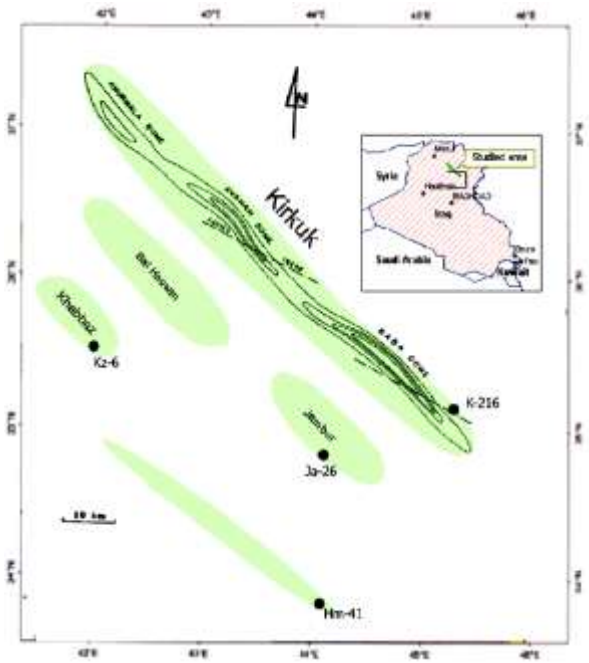

Fig.(1)Location map of the study area. (After Dunnington 1958 , Majid and Veizer , 1986)

The Lower subcycle is characterized by prevalent carbonate sedimentation. It ends by lagoons where evaporates were laid down (Buday 1980). The formations of subcycle include Ghar, Euphrates, Serikagni and Dhiban formations. The Middle subcycle represents new transgression covering a considerable area and overlapping the former basin in the Northeast but less extensive in the Southwest. The subcycle is characterized by lagoonal evaporates of the Fatha Formation with transgressive and almost purely calcarous Jeribe Formation at its base, while Govanda Formation is present in the Northeast.

There are many general previous studies such as(Van Bellen et-al, 1959),(Buday 1980) , Al-Hashim and Amer(1985),in addition important theses is introduced by (Abid1997) and(AL-Ghreri 1985,2007) the Western desert that include biostratigrphy studies for the Oligocene and Miocene formations, but there are an important study was introduced by Ibrahim (1997) who considered the Euphrates and Jeribe formations to be one unite while the Dhiban Formation represents a member within this unit .

The succession at Ja-26well (Fig.-2) include Serikagni, Euphrates, Dhiban, Jeribe, and Fatha formations, with remarking at (1888-1892 m.) depth the Euphrates Formation represents a tongue within Serikagni Formation: while the Euphrates, Dhiban, Jeribe, and Fatha formations are represented at Hr-41(Fig-3), and with noticing at (386-388 m.) the Serikagni Formation represents a tongue within Euphrates Formation.

In the subsurface the Euphrates Formation according to (Van Bellen et-al 1959) and (Ditmer et-al 1971) lies within two strips each of which lying along the Southwestern and Northwestern shore areas of the basin respectively. The Southwestern strip lies on the stable shelf to the Southwest of the Euphrates River.

The second strip lies within the Northeastern shoreline and forms a very narrow strip mostly in the Kirkuk and Qalian subzones, the Euphrates Formation at Ja-26 and Hr-41 appears with limited occurence, also interfinger with the Serikagni Formation.

The fossil recognized Miogypsinod (Plt.2-F),while Boreles melo curdica as index fossil is identified in jeribe Formation (Plt.4-F).

Facies Analysis and Depositional Environments:

1. Euphrates Formation:

The Euphrates Formation was deposed in restricted marine and shallow open marine environments.

The restricted facies of the Euphrates Formation is characterized by non fossilefrous lime mudstone, neomorphized with anhydrite pore fillings (Plt 1-C, E) and anhydritic lime mudstones with few forams (Plt 1-B). It also consist of fossilefrous peloidal wackestone, the fossils are mainly millolids (Plt 1-D,F) in addition to dolomitic and dolomtized wackstone.

The shallow open marine environment is charactrized mainaly by fossilifrous wackestones consisting mainly of milolid (Plt.1-A) Rotaliolidi and bioclasts (Plt.2-C) with anhydrite pore filling also Pelletal packstone only in Ja-26. Miogypsina Sp. Wackestone as a tongue of the Euphrates within the Serikagni Formation in (Ja-26 at 1889-1890) (Plt. 2-F).

Generally the Euphrates Formation is limited in the study area compared with the stable distribution of the formation forms a very narrow strip lying mostly on the Kirkuk and Qalian subzone of the foothill zone.

2. Dhiban Formation:

The Dhiban Formation was deposited mainly in Sabkha, restricted marine and shallow open marine environments.

The restricted environment is recognized mainly by dolomtic mudstone with anhydrite pore filling and interbedded with anhydrite (Plt.2-A,B) , (Plt.3-B,C) Miliolid mudstones to wackestones are also present dolomitic peloids , ooids wackstone are also present pelletal packstone is shown only in Ja-26 at (1843-1844m.) (Plt.2-D).

The shallow open marine facies which appears only in Hr-41 is recognized by wackestones and wackestones to packstones with abundant milolid , penoropls , rotalids , echodirmata, mullsca and shell fragments. (Plt.2-E), (Plt.3-F) The Sabkha is characterized mainly by anhydrite deposits.

3. Jeribe Formation:

The Jeribe Formation was deposited mainly in restricted, shallow open marine ,shoal and deep marine environments. This formation is recognized with abundant skeletal and nonskeletal grains.

The restricted environment is recognized by lime mudstone dolomitized mudstone and dolomitic fossilierous mudstone to wackestone and wackestones to packstone that have mainly milliolids, sometime rare algaes, intraclasts , pelletal , bioclasts , mullusca , peloidal and ooidal.

The shallow open marine facies is characterized by dolomitized and dolomitic mudstones (Plt.3-D) , (Plt.4-C), and lime mudstones to wackestone consisting brayzoa , miliolids. Also wackestones to packestones consisting of forams and diversity of skeletal grains and non skeletal grains.(Plt. 4-B,D,E). The shoal environment appears only in Ja-26 within (1777-1778m.) and characterized by fossiliferous peloidal packstone to grainstone with abundant bioclasts (Plt.3-A).

The deep marine environment facies appear only in Ja-26 at (1816-1821m.) and consist of blue marls.

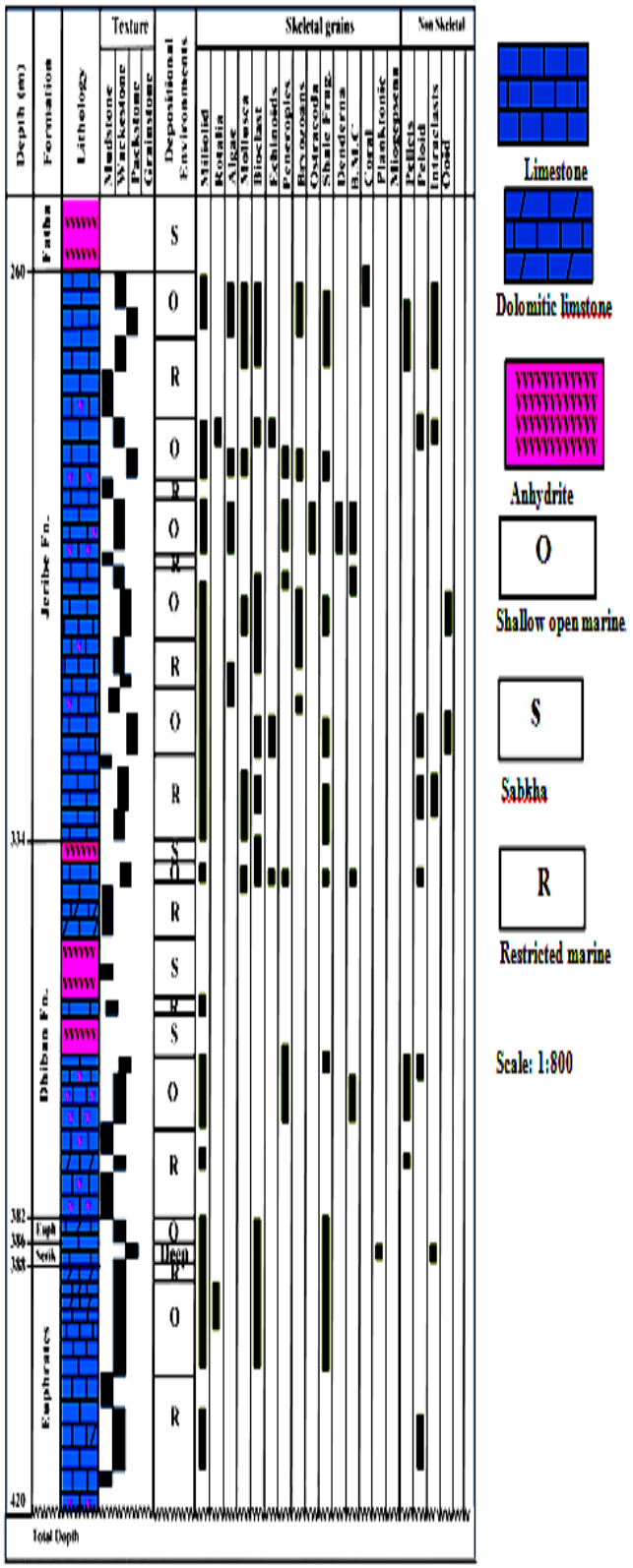

Fig.(3) Distribution of microfacies and paleoenvironments at (Hr. 41) well.

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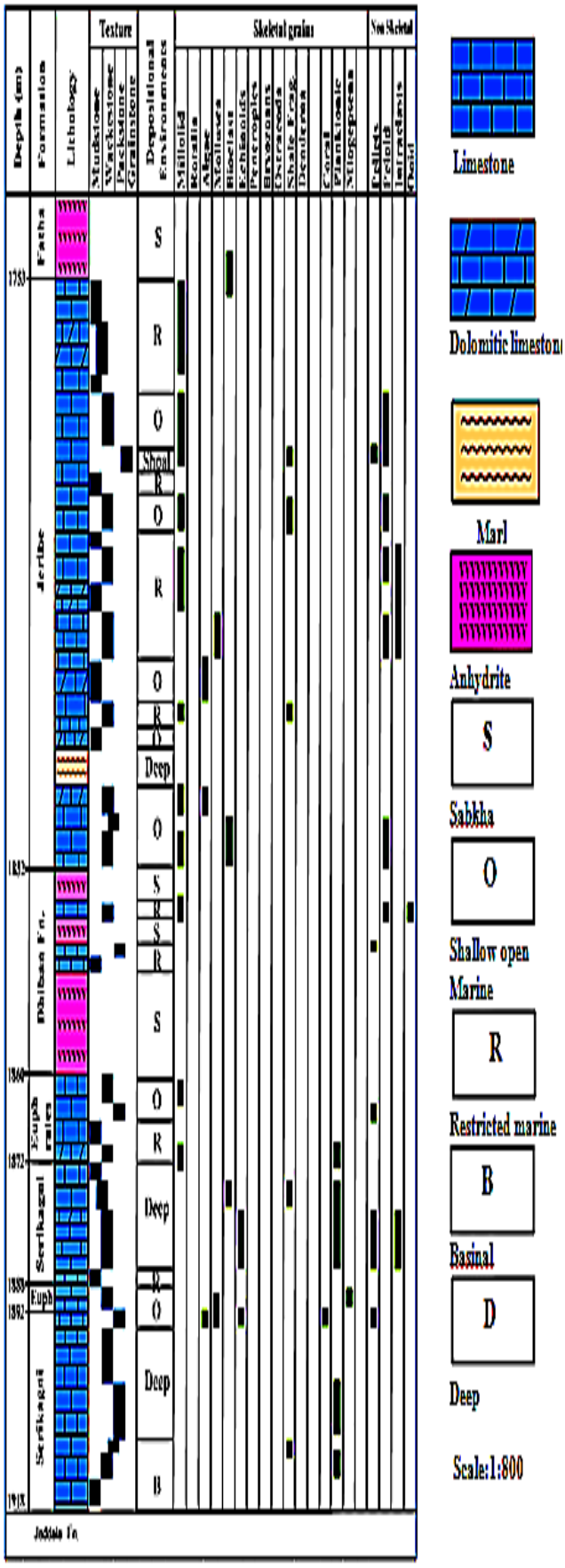
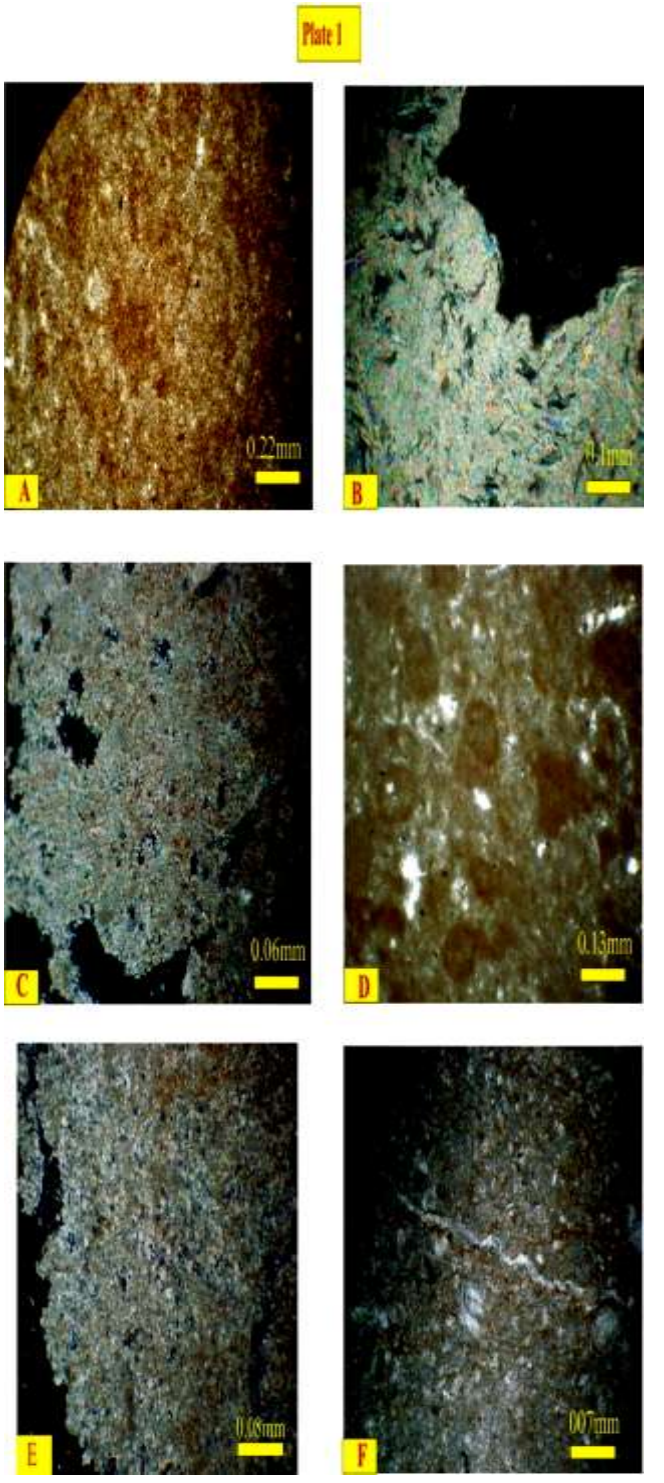


Fig.(2) Distribution of microfacies and paleoenvironments at (Ja-26) well.



A- Dolomitized wackestone with milliolid (Hr-41 at 387m.) Euphratse Fn.

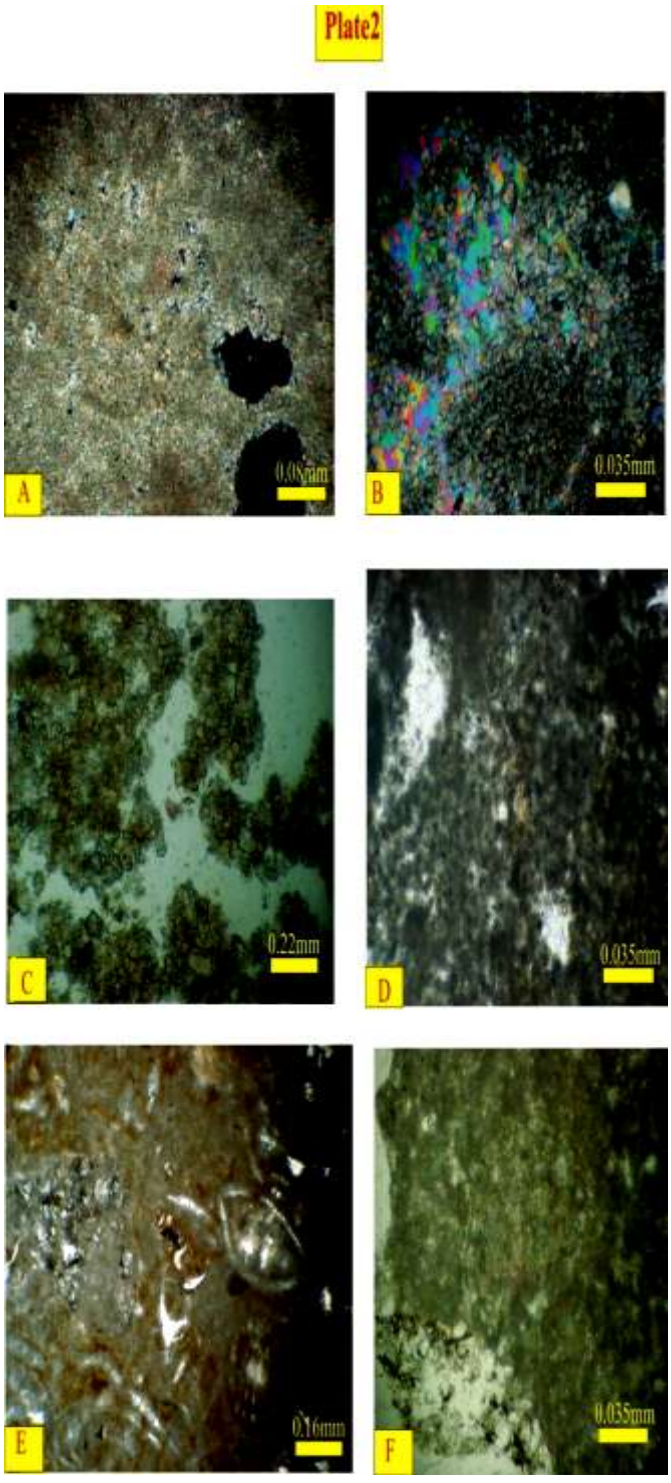
B- Anhydrite lime mudstone (Hr-41 at 404m.) Euphratse Fn.

C- Neomorphised lime mudstone (Ja-26 at 1866-1867m.) Euphratse Fn.

D- Neomorphised lime mudstone (Hr-41 at 403.6 m.) Euphrates Fn .

E- Peloidal wackestone (Hr-41 at 409m.) Euphratse Fn.

F- Milliolid wackestone (Ja-26 at 1868-1869m.) Euphratse Fn.



A- Dolomitic mudstone (Hr-41 at 372m.) Dhiban Fn .

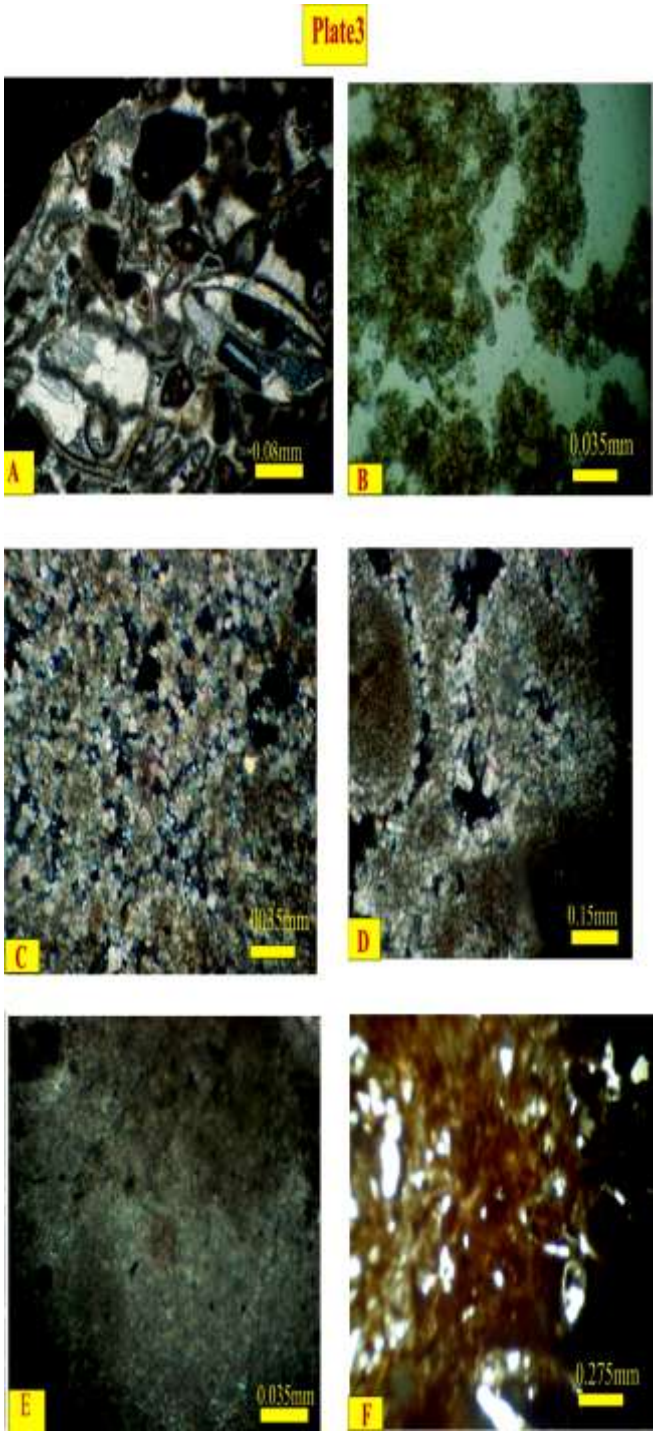
B- Dolomitic mudstone with fill anhydrite (Ja-26 at 1844-1845) Dhiban Fn

C- Dolomitic wackestone (Hr-41 at 382m.) Euphrates Fn .

D- Pelletal packstone (Ja-26 at 1843-1844m.) Dhiban Fn .

E-Miliolid wackestone-packstone (Hr-41 at 336.5m.) Dhiban Fn.

F-Miogypsina wakestone consider tongue Euphrates Fn . within Serikagni Fn. (Ja-26 at 1889-1890 m.) Serikagni Fn.



A- Fossiliferous packstone-grainstone (Ja-26 at 1777-1778m.) Jeribe Fn .

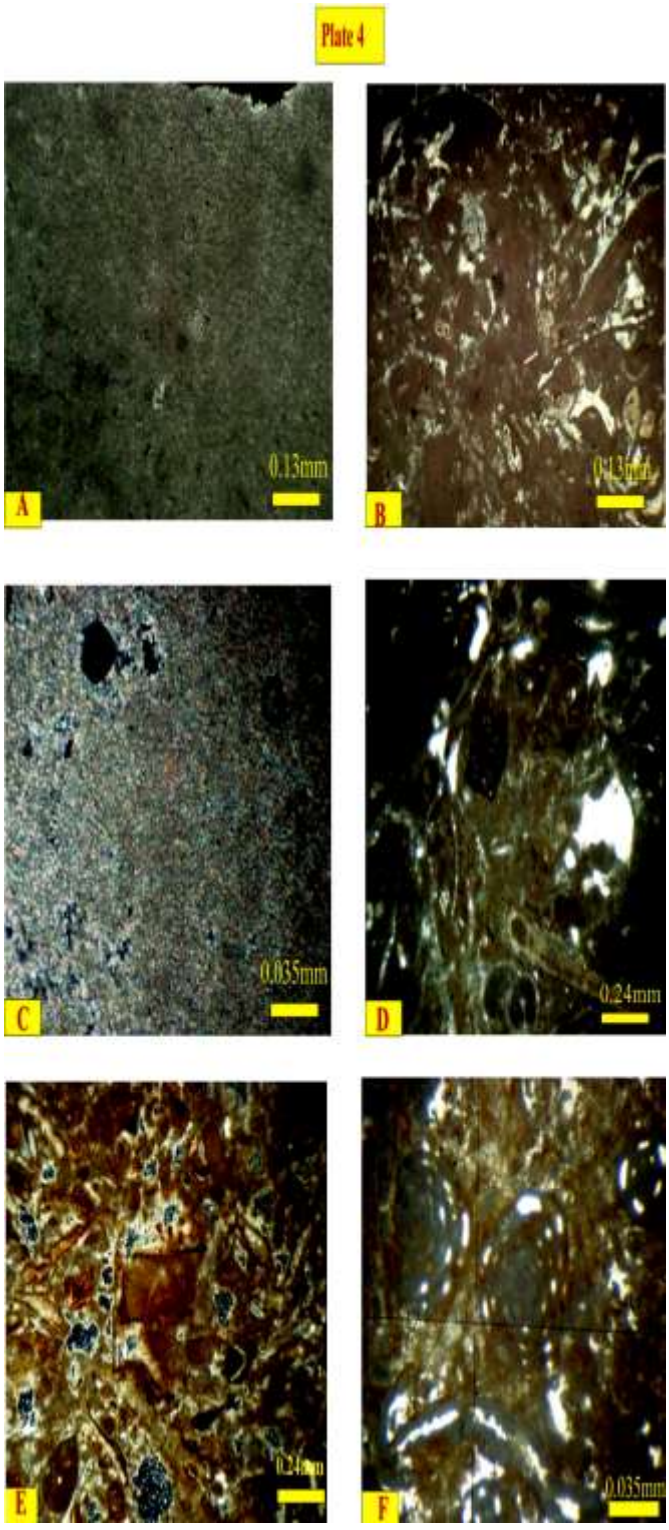
B- Dolomitic mudstone (Hr-41 at 372m.) Dhiban Fn.

C- Dolomitic mudstone (Hr-41 at 379m.) Dhiban Fn.

D-Dolomitic mudstone (Ja-26 at 1805-1806m) Jeribe Fn.

E- Lime mudstone (Ja-26 at 1787-1788m.) Jeribe Fn .

F- Shell fragments bioclastic wack-packstone (Hr-41 at 337.5m.) Dhiban Fn.



A-Neomorphised lime mudstone (Kz-6 at 2413.2 m.) Jeribe Fn .

B- Fossiliferous wackestone milliolids (Kz-6 at 2418.4 m.) Jeribe Fn.

C- Dolomitized mudstone (Ja-26 at 1808-1809m.) Jeribe Fn .

D- Fossiliferous packstone with milliolids , mollusc , shell fragments and bryozoa (Hr-41 at 287m.) Jeribe Fn.

E- Fossiliferous bioclastic packstone with intraclastis , mollusc and vuge (Hr-41 at 268.75m.) Jeribe Fn .

F- Fossiliferous wackestone with *Boralis melo curdica* (Hr-41 at 290m.) Jeribe Fn .

Conclusions:

In the present study of paleoenviornments and microfacies analysis of the Euphrates Formation, Dhiban Formation, and Jeribe Formation shows different subenvironments within the carbonate platform. The Euphrates Formation was deposited in restricted environment represented by lime mudstone neomorphized with anhydrite pore filling, fossiliferous peloidal wackestone in addition to dolomitic and dolomitized wackestone. The shallow open marine facies in the Euphrates Formation is characterized mainly by fossiliferous wackestone consisting of miliold, rotaliolidi and bioclasts with anhydrite pore filling in addition to pelletal packestone .

The Dhiban Formation was deposited in restricted environment represented mainly by dolomitic mudstone with anhydrite pore filling in addition to mudstone to wackestone consisting of miliold and peloid . The shallow open marine was recognized by wackestone and wackestone to packestone with abundant miliold , rotalids and echodirmata . The sabkha environment is represented by anhydrite facies .

The Jeribe Formation was deposited in restricted environment is recognized by lime mudstone , dolomitized mudstone and dolomitic fossiliferous mud to wackestone and wacke to packestone . The shallow open marine facies is characterized by dolomitized and dolomitic mudstone and lime mudstone to wackestone also wacke to packestone consisting of foram and diversity of skeletal grains . The deep marine and shoal environment are of limited

occurrences which are represented by marl facies and fossiliferous peloidal packstone – grainstone facies respectively.

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التحليل السحني لتتابع المايوسين الاسفل- الاوسط ، منطقة كركوك

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الخلاصة:
يتضمن تتابع المايوسين الاسفل –الاوسط كل من تكوين السركاكني ، تكوين الفرات ، تكوين الذيبان ، تكوين الجريبي، تكوين الفتحة اضافة تكوين الغار وتكوين كوفاندة. من خلال دراسة التتابع في منطقة كركوك عند بئر 26- جمبور وبئر حمرين-41 تم التعرف على تكوين الفرات وتكوين الذيبان وتكوين الجريبي حيث تم ملاحظة التشابهة السحني لهذة التكاوين الثلاثة حيث هنالك صعوبة للتميز بين تكوين الفرات وتكوين الجريبي بالرغم من وجود تكوين الذبان بينهما لذا يفضل ان تكون هذه التكاوين مجموعة واحد حيث التشابهة في بيئة الترسيب والتي تقع ضمن البيئة البحرية المحصورة والبيئة البحرية المفتوحة. ان سحنات هذه التكاوين الثلاث تتضمن سحنة الحجر الجيري الطيني و الواكي والمرصوص الحامل للحبيبات الهيكلية وخصوصا متحجرات المليولد والحبيبات الغير هيكلية من البليت البليوليد اضافة الى الدولومايت.

ان بيئة تكوين الذبان تمثل بيئة السبخة بينما بيئة الجريبي والفرات حيث وجود حجر المارل الازرق الذي يمثل البيئة البحرية العميقة اضافة الى البيئة الضحلة المتمثلة بسحنة الحجر الجيري الحبيبي والمرصوص الحاملة الحبيبات الهيكلية والبليوليد. تكوين الفتحة وتكوين سركاكني يعتبران تكوينان مستقلان حيث تكوين السركاكني يمثل البيئة البحرية المتمثلة بسحنة الحجر الجيري الحملة للمتحجرات الطافية بينما تكوين الفتحة الذي تم تميزه اعتمادا على موقعه في التتابع حيث السمك العالي من الصخور الملحية والجبسم والانهيدرايت والتي يتخللها صخور الحجر الجيري الرقيقة.

الكلمات المفتاحية: سحنة دقيقة ، تكوين ، عصر المايوسين، بيئة ، ترسيب ، تتابع.