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Sedimentiogical study for subsurface section of Abu Khasib

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Abstract

Abu Khasib formation, east of Baghdad, is studied via checking (95) thin section collected from a field east of Baghdad, in terms of fossils and minerals. The limestone of the studied area consists of skeletal grains like planktonic foraminifera, echinoderms and algae, and these stones have micrite groundmass, whereas,Peloids is an example for non-skeletal grains. The most prominent digenetic processes are cementation, delomitization and dissolution.

Key words: Abu Khasib, Sediment, Fossils, Dolomite, Baghdad.

Introduction

Abu Khasib reservoir is located in eastern Baghdad and the field is a convex fold towards south east – north west of Baghdad influenced by many faults. Abu Khasib formation was studied first by (Van Bellen, 1959) in Zubair – 3, well being the perfect section and later on in Baghdad and Kuwait by (Owen and Naser 1958). AL-Khayat and Razoyan, (1979) divided Abu Khasib formation into six units and pointed to facies containing oil. Whereas, Buday (1980) fully, described the formation and considered both Tanuma and Sadi formations as one secondary sedimentary cycle. AL-Sadooni (1981) mentioned in one of his studies that Abu Khasib formation facies deposited in a basinal open – sea environment. The French Company (Total, 1981) conducted a sediment study on the formation to reach a conclusion that the formation deposited in the middle shelf (Al-Hamadani, 1986). The final study for the company characterized Abu Khasib formation facies by mud – supported texture. A study carried out on the microfacies limited the sediment environment and formation age to the southern part of Iraq. Whilst, stratigraphic sequence analysis method for the formation of (Early Campanian – Late Turonian) cycle in a field west Qurna in the south of Iraq to determine the depositional environment of Abu Khasib (Al-Shaoush, 2002). It has been discussed, in detail, clay minerals in both Tanuma and Khasib formations and the extent of effect of such minerals on the reservoir properties to conclude that Abu Khasib formation includes little proportion of Shelly (Jan, 2013a, b).

This study attempted to description the formation of Abu Khasib in an area located east of Baghdad city.

Materials and Methods

The studied area is located in east of Baghdad (Figure 1), from the top is bounded by Tanuma formation and from the bottom Al-Kefil formation. The thickness of the formation in the study area is, almost, (105) m. The bottom contact surface of the formation is considered at the first appearance for Anhydrite mineral as cement and this appearance is the beginning of sedimentation of Abu Khasib formation and, subsequently, deemed among the most important once in Iraq.

Results and Discussion

Abu Khasib formation is studied in terms of fossils and minerals. A longitudinal section for the formation is studied (Figure 2). Among the most prominent planktonic foraminifera are *Globotron-cana sp.* (figure 1-1), *Globigerina sp*. (figure 1-2) in addition to *Phithonella sp*. and *Hetrohelix sp*. These foraminifera are kept well and, sometimes, their chambers are filled with micrite. The existence of these foraminifera shows the depth of water and scattered in all parts of the formation.

The major Benthonic foraminifera are: *Rotalina sp.* (figure 1-3) and *Penoroplis sp.* These are the fossils that mark the formation of Abu Khasib and show the (middle – late Cenomanian). The chambers of these foraminifera are filled with micrite and microspirite and their existence refer to warm shallow areas. *Echinoderms* (figure 1–4) and *Crinoids*. This type, widely, spreads in the section and the reference of its existence shows open sea with salinity of 40% and has astral & radial shapes. Another kind of skeletal grains is *Ostracoda* (figure 1–2) with a little proportion and exists in the bottom of the formation, as well as, *Pelecypods* and Peloids with little proportion, too. The most prominent non-skeletal grains is Peloids (figure 2-2) which consists of either circular or oval grains and exists in the bottom of the formation.

Concerning diagenetic processes, Recrystalliz-ation, is among the major ones which in turn decreases the permeability and porosity in stones. Dolomitization is another digenetic process that spreads in all parts of the formation, especially, in the bottom in a rhombic crystal form floating at the bottom of the micrite (figure 2–3). Dolomitization has a great effect on reservoir stones that keeps the initial porosity or it could increase the secondary porosity of them. This process helps forming reservoir repository for Hydrocarbone materials, water and raw minerals. Another kind of digenetic process is dissolution for shells of fossils leaving chambers. This is common in the upper and bottom parts of formation and filled with Pyrite (figure 2– 4) and sometimes with micrite or Spary Cement. Cementation has intensive effect on reservoir characteristics (Friedman and sander, 1978). The greater the severity of dissolution, the more increasing in cementation, which in turn leads to closing pores. Cementation is recognized in the bottom of formation.

Authigenic minerals as Pyrite spreads either in the groundmass or fills chambers of some skeletal grains. The existence of Pyrite shows reductive environment, deep sea and slow dissolution and, subsequently, decreases porosity in limestone (Wilson, 1975). Silica is another type of Authigenic minerals. Full crystals inside the chambers are the Authigenic minerals, whereas, those in size of (Silt) are transformed from other areas (Fluegel, 2010).

Conclusion

Abu Khasib formation consists of limestone, basically, including Planktonic foraminifera such as *Globogerrina sp*. and *Globotroncana sp.* that shows depth of water and Benthonic foraminifera as *Rotalina sp.* and *Penoroplis sp*. in the shallow water. The most prominent digenesis process is Recrystaization, Dolomitazation and dissolution that have great effect on permeability. Depositional environment is the basin open sea one.

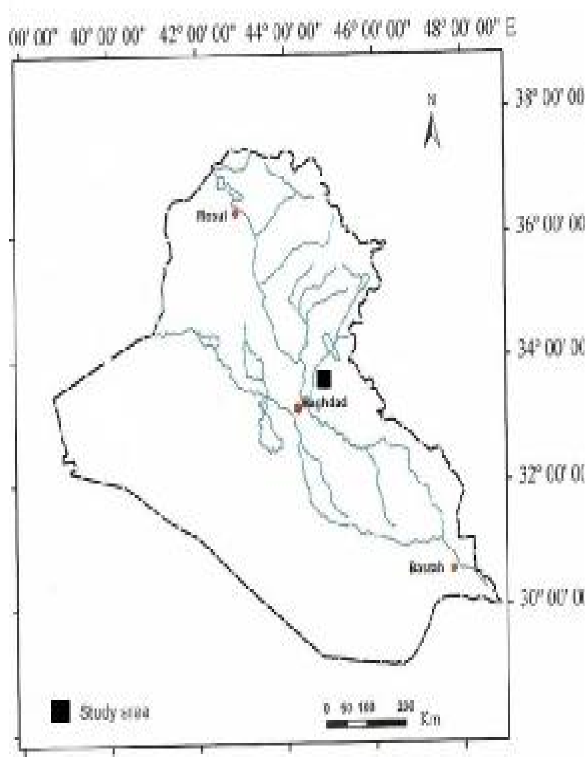

Figure (1): Location of the studied area

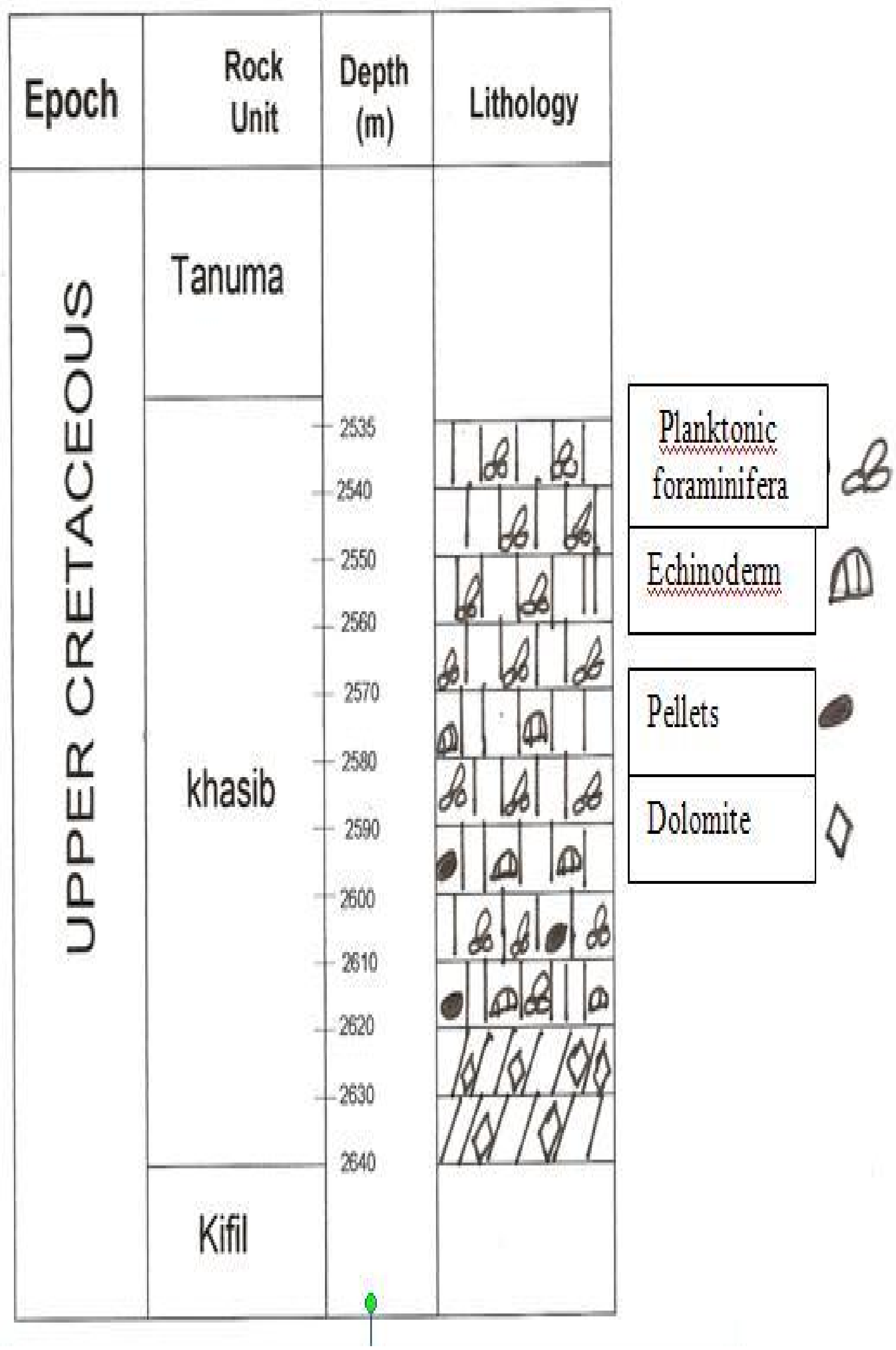

Figure (2): General stratigraphical section

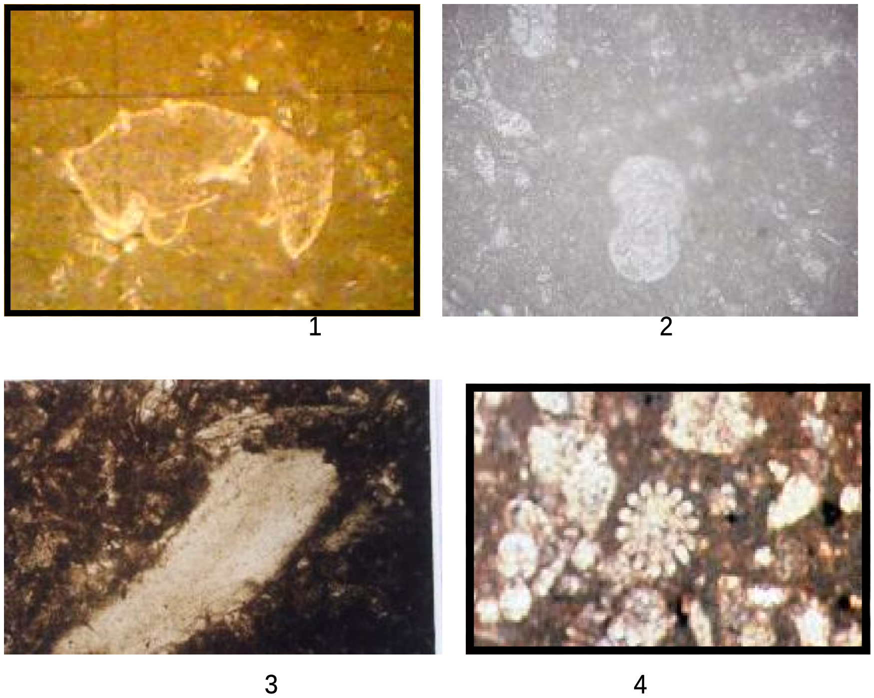

Figure (3): Microscopic section (40x) *Globotrncana sp.* in the groundmass of micrite (1), *Globigerina* sp. in the groundmass of micrite (2), Part of *Rotalina* (Rotalid) (3) and Section of *Echinoderm* (4).

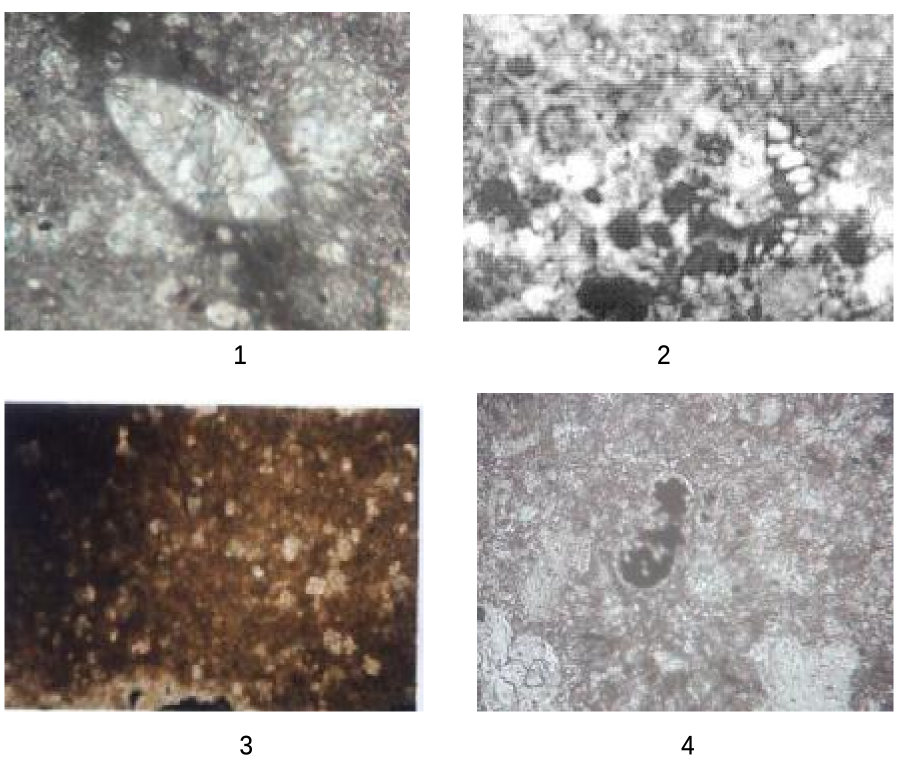

Figure (4): Microscopic section *Ostracod* in microsparite matrix 40x (1), Pellets in micrite matrix100x (2), Dolomite in groundmass of micrite100x (3) and Pyrite in the chambers of Globigerina 40x (4).

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