



## Grain size, sorting and matrix as indicators of energy of depositional environment of Abu-Khasib formation east of Baghdad

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### Abstract

A total of 190 thin sections have been examined for stone samples collected from Halfaia – 1 in the south of Iraq. Al-Mishrif formation, basically, consists of limestone including Planktonic Foraminifera and Benthonic Foraminifera, as well as, minerals like Dolomite. The formation is divided into three energy water areas: high, transitional and low areas.

Key words: Abu Khasib, Grain Size, Sorting, Matrix, Energy of depositional, Baghdad.

### Introduction

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

Petrography of Mishrif Formation: Al-Mishrif formation stones, comprises, limestone and texture of fossils and pelloids, whereas, the groundmass, at the bottom of the formation, represents Micrite. Generally, the existence of Micrite refers to deep environment unlike Spary-Cement that shows shallow environment and, in turn, fills the blanks among grains, as well as, gaps resulting from dissolving. Another metal is Dolomite that takes the form of fine scattered crystals. There is also the Pyrite with authigenic minerals in the form of aggregations.

Hydrodynamic Energy Levels: Folk (1962) divided the water energy environment, (figure 2) into the followings:

- High energy zone.
- Transitional energy zone.
- Low energy zone.

High energy zone is characterized with high-speed water which leads to winnowing Micrite and forming Sparite with very good sorting & roundness and tends to balling. Increasing speed leads to crush of grains and, consequently, to bad sorting and less balling, as well.

Sparry groundmass refers to high energy environment.

Transitional energy refers to authigenic speed and which, in turn, does not, fully, wash Micrite. Moreover, the groundmass comprises Sparite and Micrite; and grains have good rounding and gradation. Low energy zone is characterizes by low speed of water and the groundmass consists of Micrite with bad gradation and rounding.

The variation in the speed of water results in diversity of water energy and thus to the formation of different texture and good classifications for limestone, the classifications of limestone depend on fluid movement, depth of water and movement of water waves, as well. The environmental factors, such as depth, effect various environments (Sherwani and Mohammed, 1993).

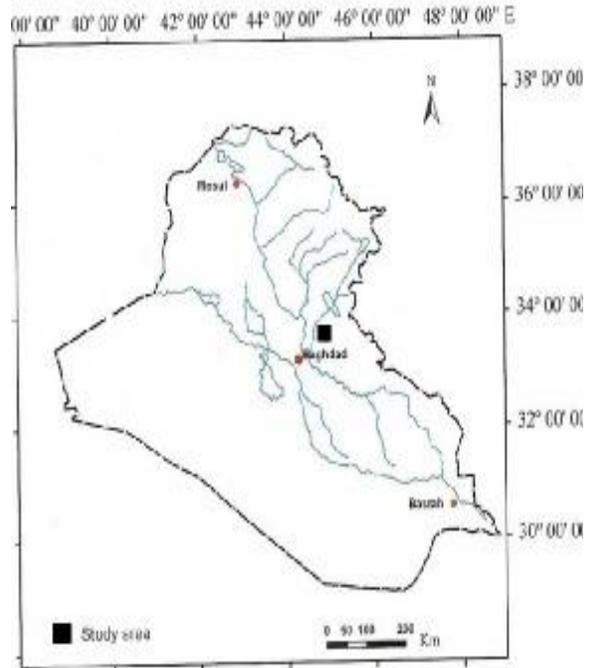


Figure (1): Location of the studied area

### Conclusion

In term of water energy, the formation of Al-Mishrif is divided into three zones depending on the gradation, sorting, rounding as well as groundmass. The zones start with low energy including Mycrite in the lower formation and end with high energy in the upper formation including Sparry Calcite.

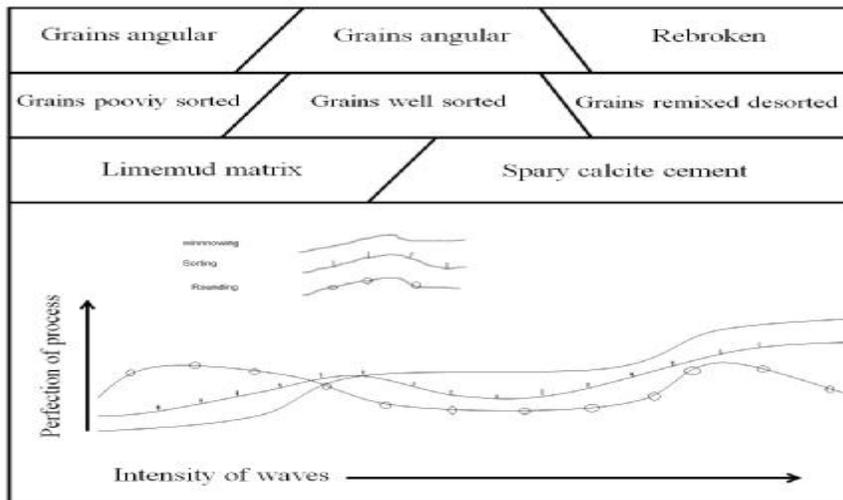


Fig.2: Winnowing, sorting and rounding are controlled by the intensity of hydrodynamic processes after Flok (1962).

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