



Grain size, sorting and matrix as indicators of energy of depositional environment of Tanuma formation east of Baghdad

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Abstract

Sorting, groundmass and roundness degree is used as an indicators that referred to depositional environment energy for the formation of Tanuma through checking (90) thin sections of rocks samples collected in the studied area in the east of Baghdad. Results revealed that Tanuma formation was divided into three energy water areas and this has been shown through energy curves which in turn depends on grain size, sorting and groundmass. The formation located in low energy curves. In words, it located in quiet deep water. Basically, the formation consisted of limestone with groundmass of micrit.

Key words: Grain size, Sorting, Matrix, Environment, Tanuma, Baghdad.

Introduction

Tanuma formation in the east of Baghdad contains a lot of limestone of the cretaceous period, it was studied for the first time by (Van Bellen, 1959) in Zb- Well (AL-Khayat and Razoyan, 1979) and re-described by (Owen and Naser, 1958) in both areas (Baghdad and Kut). The formation is described as consisting of black shelly limestone, whereas, (AL-Khayat and Razoyan, 1979) divided the formation into several facies units. Buday, (1980) has a detailed description of Tanuma formation and mentions that it forms with Al-Sadi formation one secondary depositional cycle. AL-Sadooni, (1981) studied Tanuma formation and concluded that this formation is depositional in a sub-basinal environment of the open sea whereas the formation facies is deposited within a quiet marine shelf environment.

The French oil company (Total, 1981) has studied Tanuma formation in terms of sedimentary and the study reached to a conclusion that Tanuma formation is deposited in the shallow middle shelf with a medium depths and low depositional energy. Al-Hamadani, (1986) conducted a regional study of Tanuma and Abu-Khasib formation and indicates

that minerals clay represented by Illite and Kaolinite in Tanuma formation is higher than those exists in Al-Khasib formation. The ratios are concentrated in both the upper and lower parts of Tanuma formation. Stratigraphic sequence method is used for the formation cycle of late Tournian-early Campanian by Al-Shaoush, (2002) in Al-Qurna in the south of Iraq to determined both depositional formations forming Tanuma and Khasib.

This study attempted to description the Sorting, groundmass and roundness degree is used as an indicators that referred to depositional environment energy of Tanuma formation in an area located east of Baghdad city.

Materials and Methods

The study area is located in east of Baghdad (Figure 1), and contains a lot of limestone of the cretaceous period. Sorting, groundmass and roundness is used as an indicators that refers to depositional environment energy for the Tanuma formation through checking (90) thin sections of subsurface rocks samples collected in the studied area in the east of Baghdad.

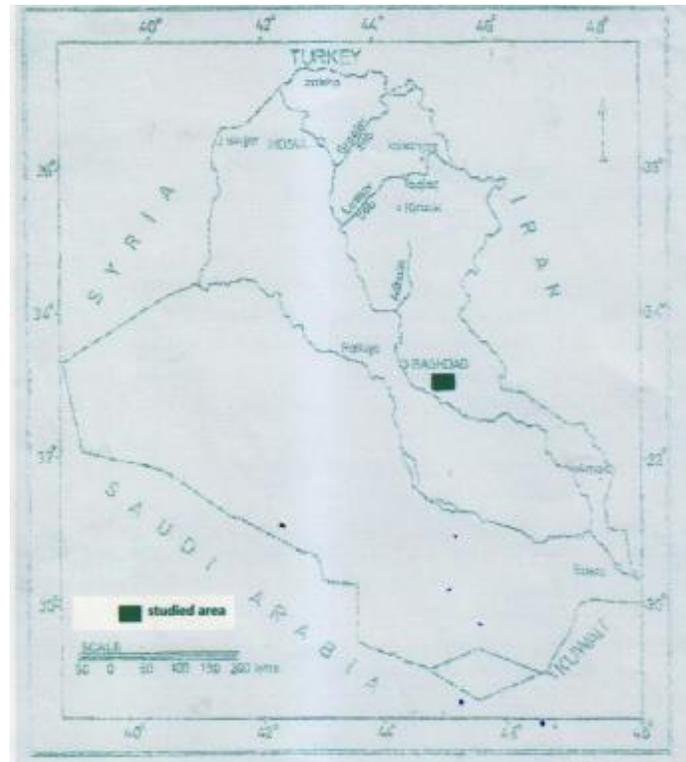


Figure (1): Location of the studied area

Results and Discussion

Petrography of Tanuma formation

Rocks of Tanuma formation includes limestone and minerals that exists in, such as, dolomite at the lower end of the formation and with a little percentage. The groundmass rocks consists of matrix with high proportion of rocks content from Tanuma formation. More often, matrix is mixed with mud.

The groundmass is one of the most important indicators that determine the severity of energy of depositional where the matrix deposits in an environment with a quiet energy dispositional, whereas, calcite-sparite deposits in a high power energy of depositional environment. As for the non skeletal grains, pellets is noted spreading in the upper parts of the formation. Olides is witnessed, too, and limited in the upper parts of the formation which shows shallow water of high energy.

Energy of environment of Tanuma formation

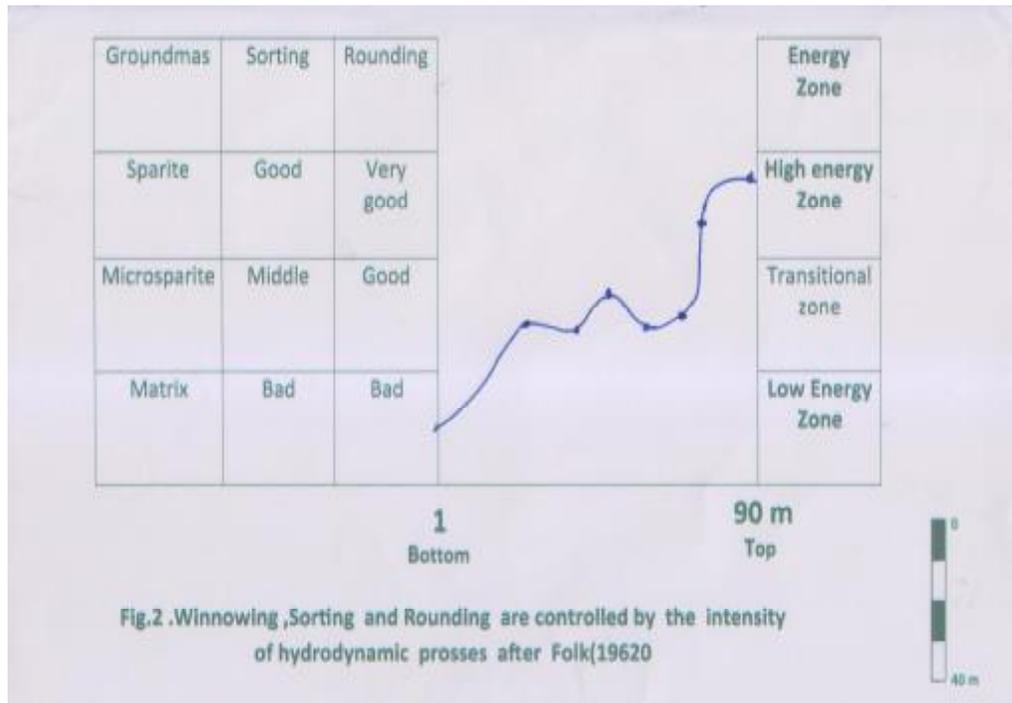
Fluegel, (2010) has divided energy of environment into three parts:

- 1 - High energy zone: This zone is characterized by sparite groundmass that is highly sorted and rounded. The grains tend to be rounded or spherical and winnowing of groundmass which consists of micrite. In case of increasing energy grains are broken and this means bad gradation again.
- 2 - Transitional power zone: groundmass is microsparite with good rounding and sorting.
- 3 - Low energy zone: groundmass is micrite with bad rounding and sorting.

All limestone classifications depend on energy of deposition (depth of water) and movement of water waves (Plumley *et.al.*, 1962), these factors lead to differences in hydroenergy power and thus lead to various tissue (Fig. 2) that most waves are located in low energy zone.

Conclusion

Tanuma formation is divided into three water areas and this has been shown through energy curves which in turn depends on gradation, sorting and groundmass. The formation locates in low energy curves. In words, it locates in quiet deep water.



References

- Al-Hamadani, A.m., 1986. Sedimentological and geochemical formation of khasib, Tanuma and sadi. Ph. D. thesis, College of Science, University of Baghdad.
- AL-Khayat, A. and Razoyan A.M., 1979. The geology of sadi, tanuma, khasib and mishriff formations in halfya Field. INOC,Basrah,23p.
- Al-Shaoush, M.A., 2002. Accumulation faces and sediment systems, formation of khasib, Tanuma and sadi west of Qurna field, south of Iraq. MSc. thesis, College of Science, University of Basrah.
- AL-Sadooni, F.N., 1981. Sedimentological study of khasib formation in well EB-16 and Tanuma formation in Well EB-17: INOC, Baghdad, 11p.
- Buday, T., 1980. The regional geology of Iraq, V.1: Stratigraphy and paleogeography, state organization for minerals, Mosul, Dar Al-Kutub publication house, 445.
- Fluegel, E., 2010. Microfacies of carbonate rocks 2nd ed.,. Sp. Verlag, 984.
- Owen, B. and Naser S.N., 1958. The Stratigraphy of Kwait – Basra area in: habitat of oil, A symposium. Amer. Assoc. Petrol Geol. Bull.,: 1252-1278.
- Plumley, w.J., Risley G.A., Graves R.W. and kaly, M. E., 1962. (Cited from Fluegel, E., 2010).
- Van Bellen, R.C., Dunnigton H.V. Wetzel R. and Morton D.M., 1959. Lexique international Asie, Vol.3, Fasc. 10a, Iraq, Paris 333p.
- Total, C.F.P., 1981. East Baghdad field sedimentological study of Hartha, Tanuma and Khasib formations (R1, Ri, R2, R3, R4 Reservoirs): Unpublished report, INOC, Baghdad, 49p.