Mixed carbonate clastic sediment facies of the Paleocene – L.Eocene Kolosh Formation from selected locations in North Iraq

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Abstract:
As a result of a petrographic study of (70) samples from Sundar and Kora sections of Kolosh Formation ,north Iraq,it is found that the sediment of this formation represent a mixture of carbonate-clastic sediments and the following microfacies have been identified; foraminfera biomicrite, biomicrite, laminated biomicrite and calcareous litharenite.
The environment of deposition are mostly Inner neritic in upper succession and outer neritic at the base of the formation at Sundar section and outer neritic at Kora section

Introduction:
Seventy samples were collected from two outcroped sections of Kolosh Formation (Paleocene –L.Eocene), north Iraq. The first section is at Sundar Village located to the northeast of Duhok city with a thickness about 76m. The second section is at Kora Village, Shaqlawa area with a thickness about 84 m. (Fig 1).

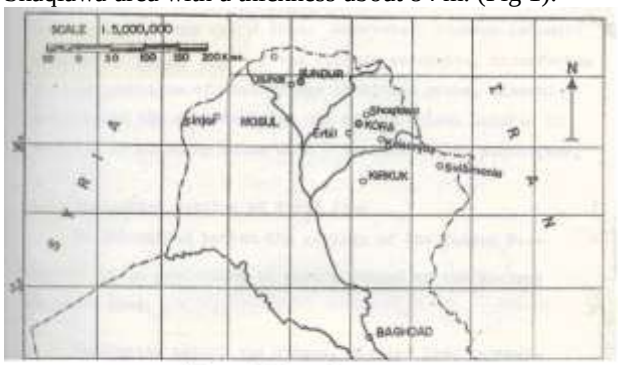

Figure (1) Location map

Geologically, the studied sections of Kolosh Formation is located within the folded zone in which folding forms a broad intervene between the Nape front and the unfolded forelands and is characterized by large elongated anticlinal folds (Fig. 2).

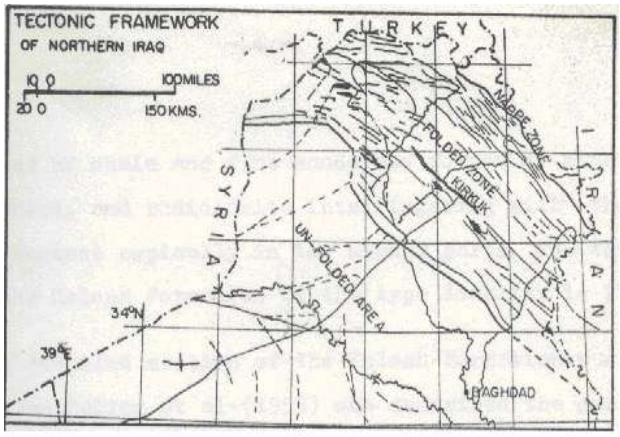

Figure (2) Tectonic framework of northen Iraq (Dunnington 1958)

The Kolosh Formation occurs in abroad belt, oriented approximatelly northeast-southwest following the Zagros Mountain front and exposed in many localities. The facies of Paleocene – L. Eocene rocks distribution have indicated by Dunnington (1952) (Fig. 3).

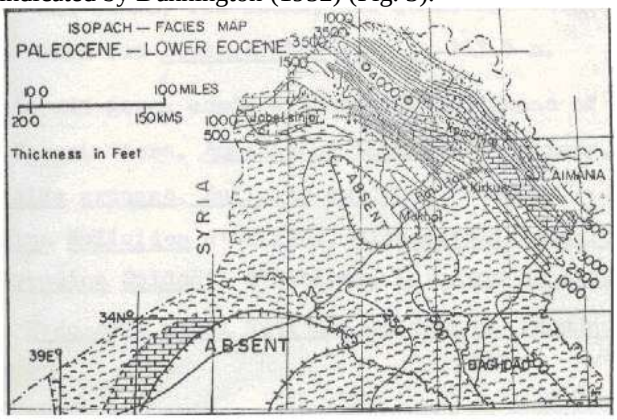

Figure (3) Isopach-facies map of Paleocene-L. Eocene sediments

The detailed type section of Kolosh Formation was given by Van Bellen et. al. (1959), who described the succession from top to bottom as;
-limestone and marl (144m.).
-Limestone (30m.).
-Limestone and shale, red shale and sandstone (113.5m.).
-Blue shale and green sands with occasional fauna.

Previous work:
According to Wetzel (1958), the Tangero Formation underlies the Kolosh Formation unconformabily and overlaid by the Gercus Formation
and the contact is probably unconformable.
According to Wetzell (1958), the Kolosh Formation is hetrogenous and varies both horizontally and vertically intergrading into and interfingering with the Sinjar limestone and the sediment of Khurmala Formation, this is well illustrated in the wells of Iraqi Petrolum Company, Kirkuk area. Southwards and westwards, the clastic sediments of the formation passes into globigerinal marl and marly limestone.
Janson and Anon (1961) mentioned that the Kolosh Formation is represented by mudstone, silt, argillceous or marly limestone with interbedded detrital limestone. Ditmar (1971) indicated that the type section of Kolosh Formation includes in its upper part the Sinjar limestone.
According to Buday (1973), the lower contact of Kolosh Formation is clearly unconformable and transgressive and the clastic of Kolosh Formation resulted from the erosion of Tanjero or in some parts the Qulqula and other Cretaceous-Jurassic Formations.
Abdel-Razak(1995) mentioned that the Kolosh Formation at Banik village is mostly structurally controlled, and is represented by sandstone, claystone and limestone. Also, Aziz (1995) described the Kolosh Formation at Daff Kash area in the north thurst zone and

its composed of green, gray calcareous claystone and siltstone with sandstone interbedded with fossiliferous limestone.

The age of the Kolosh Formation according to Ditmar (1971) depending on paleontological studies in the type section is Paleocene while the L. Eocene might be present and represented by interbedded limestone .

Kassab (1982) pointed out that the base of the Kolosh Formation is of middle Paleocene and Buday (1980) indicated that the Kolosh Formation is mostly of Paleocene age.

Kadem (1979) indicated that the Kolosh Formation deposited in the outer and inner neritic zones.

Lithofacies:

The lithology of the studied sections are indicated in detail in figures (4, 5). The sundar section are mostly composed of:

-Clastic fine sediment (fine sand and silt) (49 m.) with microfauna and organic remains.

-clayey silt (20m.)

-Silty marl (7m.)

The Kora section composed of the following lithology :

-Silty shale (30m.)

-Siliceous limestone (5m.)

-Silty shale rich in microfauna with organic remains (49m.)

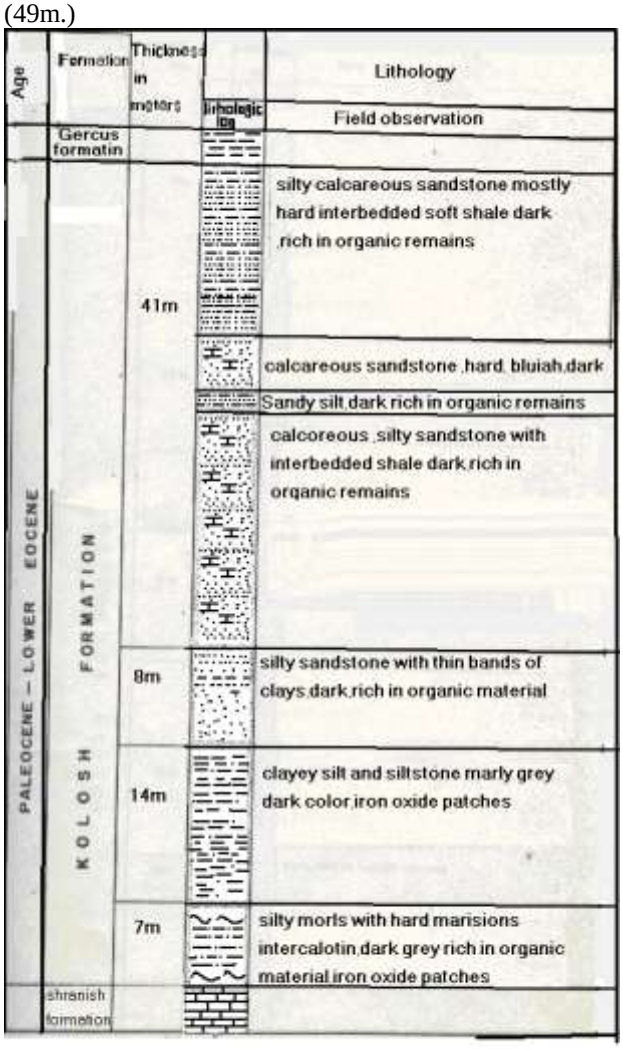

Figure (4) lithology of Kolosh Formation at Sandur section

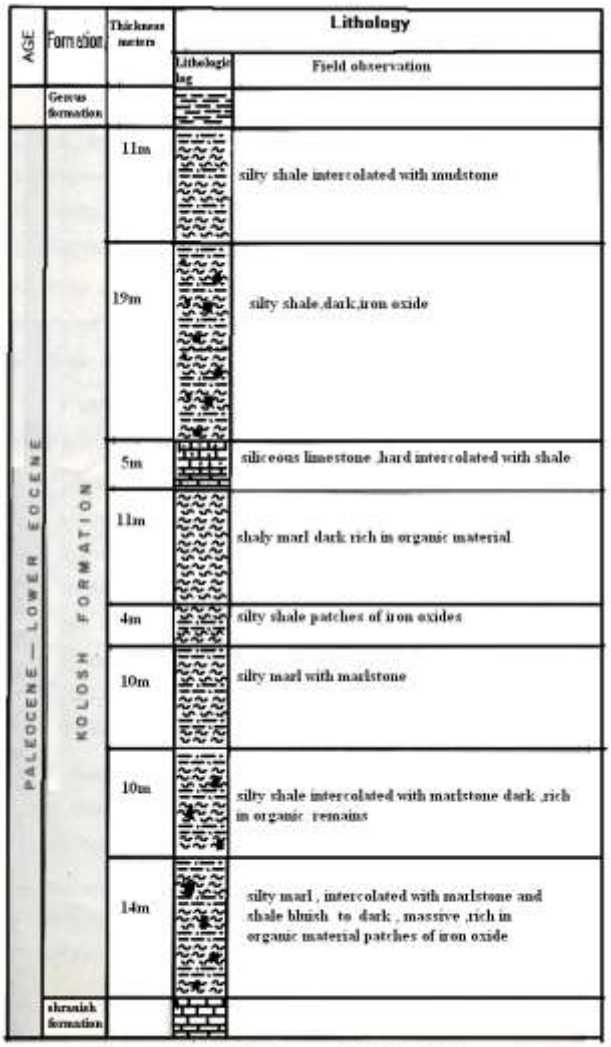

Figure (5) Lithology of Kolosh Formation at Kora section

Biofacies Associations:

The following biofacies have been identified from the study of seventy thin sections of the two studied sections of Kolosh Formation (Lindholm, 1988) (Plates 1-7);

1- Foraminiferal Biomicrite

2- Biomicrite

3-Laminated Biomicrite

4-Calcareous litharenite

The details of these associations as follows:

1-Foraminiferal Biomicrite

This association is represented by rocks highly rich in planktonic and benthonic foraminifera in amatrix of microcrystalline carbonate and clays. The planktonic species are more abundant than benthonic. The most identified fauna are:

Globorotalia angulata, Globigerina bulloides, Nodosaria zippi, Fumcoporella diplopora, Gumbelina and Ostracods (plate 1,2).

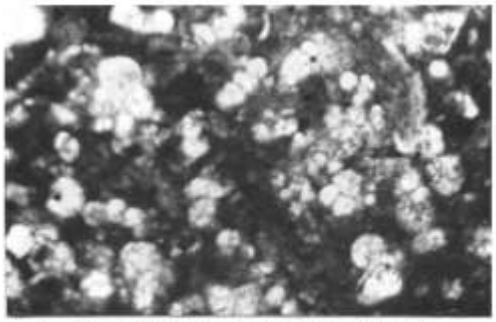

Plate (1) Microfacies association No. 1
(Foraminiferal biomicrite) Sundur section (X 70).

Plate (2) Microfacies association No. 1
(Foraminiferal biomicrite) Kora section (X 70).

This association reflects an outer neritic environment of awarm sea with normal salinity effected by oxidizing conditions (Lindholm, 1988).

2.Biomicrite Association

Rocks belongs to this association are massive, composed of microcrystalline carbonate and clays as amatrix and the rocks rich in broken tests and fragments of foraminifera. Planktonic foraminifera are the most dominant and mostly well preserved. This association is recorded in both Sudar and Kora sections (plate 3,4) and reflected a shallow marine environment effected by wave action (Lindholm,1988).

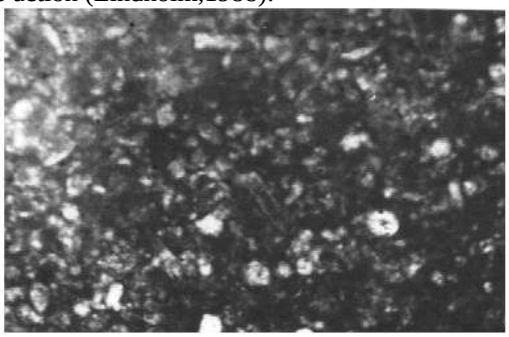

Plate (3) Microfacies association No. 2
(biomicrite) Sundur section (X 70).

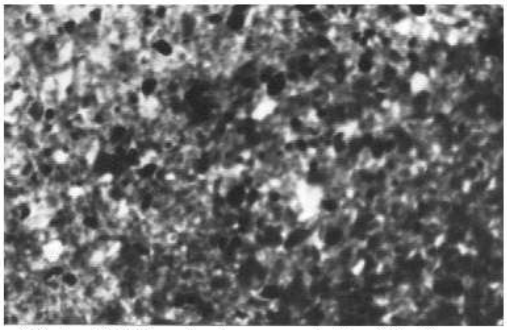

Plate (4) Microfacies association No. 2
(biomicrite) Kora section (X 70).

3-Laminated biomicrite association

Rocks represented this association are fossiliferous and laminated composed mainly of microcrystalline carbonate and clays that may be stained by iron oxide. Foraminiferal tests have good preferred orientation in a certain direction. Lamination is attributed to the nature of the clay minerals. Planktonic foraminifera are the most dominant and are mostly well preserved and some of the tests of the foraminifra are replaced iron oxides .

This association is recorded in both Sundur and Kora sections (plate 5,6) and reflected quiet deep neritic environment in a warm sea with normal salinity effected by slightly agitated water(Lindholm, 1988).

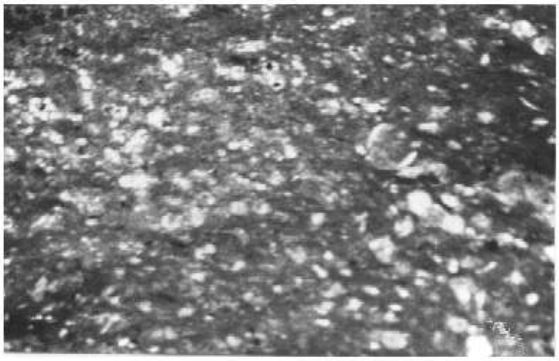

Plate (5) Microfacies association No. 3
(Laminated biomicrite) Sundur section (X 70).

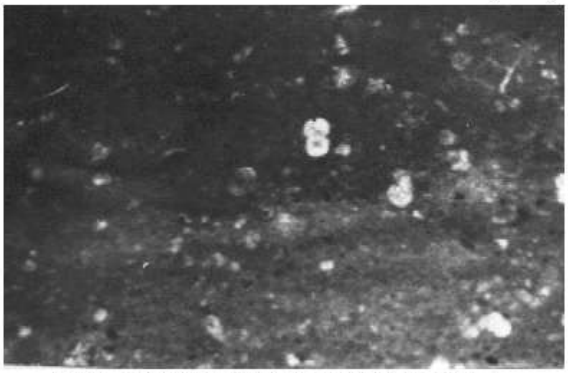

Plate (6) Microfacies association No. 3
(Laminated biomicrite) Kora section (X 70).

4-Calcareous litharenite association

It is composed of rock fragments and detrital minerals cemented by spary calcite with few fragments of foraminifera, indicating deposition in a shallow marine environment receiving abundant detrital material. This association is recorded only in the upper part of Sundar section (Lindholm, 1988) (plate 7) .

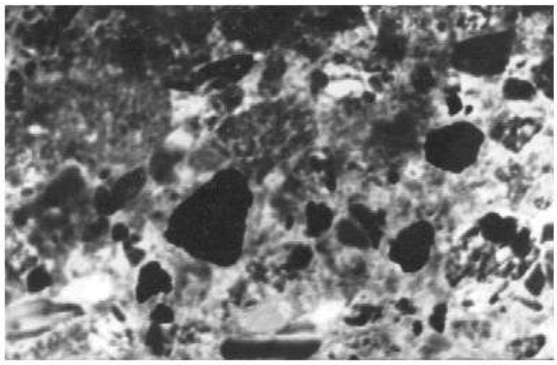

Plate (7) Microfacies association No. 4
(Calcareous litharenite) Sundur section (X 70).

Conclusion:

From the nature of the Kolosh sediments in the studied sections and fauna content, it concluded that four associations have been recognized; foraminiferal biomicrite, biomicrite, laminated biomicrite and calcareous litharenite. According to these biomicrofacies associations and to the nature of the Kolosh sediments and to the fauna content it is that Kolosh Formation were deposited in a marine environment in the outer and inner neritic zones (Figure 6).

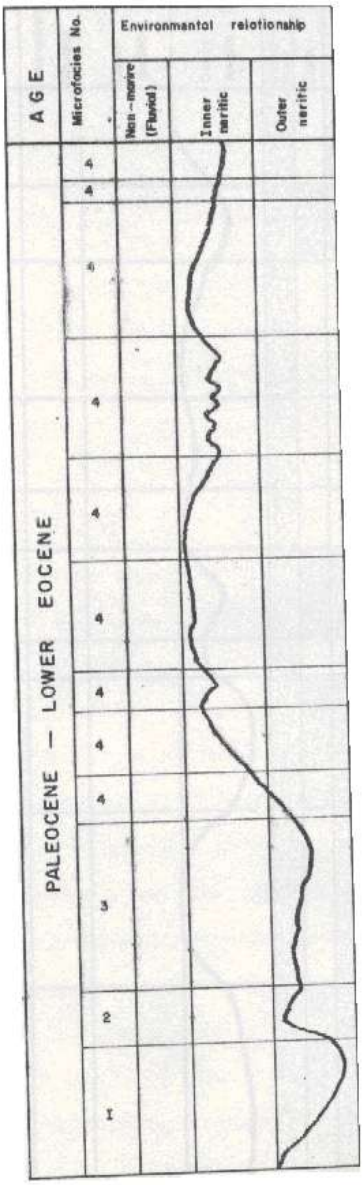

Figure (6) Environmental relationship and Biomicrofacies of Kolosh Formation

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سحنات خليط الكاربونات – الرسوبيات الفتاتية للبليوسين –الايوسين المتأخر لتكوين كولوش من مقاطع مختارة، شمال العراق

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الملخص:

نتيجة دراسة ٧٠ نموذج من مقطعي صندور وكوري لتكوين الكولوش في شمال العراق وجد بأن رسوبيات هذا التكوينهي خليط من الكاربونات والصخور الفتاتية وأمكن التعرف على أربعة مجاميع من السحنات الدقيقة وهي:

سحنة كاربونات حياتية دقيقة غنية بالفورامنيفرا، كاربونات حياتية دقيقة ،كاربونات حياتية متطبقة وسحنة الحجر الرملي الكاربونية ،وأن بيئة الترسيب هي بيئة شاطئية عميقة في الجزء الاعلى من التتابع وبيئة شاطئية ضحلة في الجزء الاسفل من مقطع صندور وبيئة شاطئية ضحلة في مقطع كوري.