Calcareous Nannofossils Biostratigraphy of Shiranish Formation (K-306) well, Northern Iraq

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ABSTRACT

Twenty Samples of Shiranish Formation from the well (K-306), Kirkuk area, northern Iraq, are collected and studied on the basis of stratigraphic ranges of the recorded calcareous nannofossils. Eighty-nine species in the studied section reveals five biozones arranged from oldest to youngest as follows:

1.*Quadrum trifidum* Interval Biozone (CC22) Part
2.*Tranolithus phacelosus* Interval Biozone (CC23)
3.*Rienhardtites lives* Interval Biozone (CC24)
4. *Arkhangelskilla cymbiformis* Interval Biozone (CC25)
5. *Nephrolithus frequens* Rang Biozone (CC26) Part

These Biozones are correlated with other calcareous nannofossils biozones, from both local and regional sections, leading to conclude the age of Campanian-Maastrichtian.

Keywords: Calcareous nannofossils, Biostratigraphy, Cretaceous, Iraq.

الطباقية الحياتية لمتحجرات النانو الكلسية لتكوين شرانش في بئر (K-306)، شمالي العراق

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الملخص

درس عشرون نموذج من تكوين شرانش في بئر (K-306)، منطقة كركوك، شمالي العراق، بالاعتماد على الامتدادات الطباقية لمتحجرات النانو الكلسية المسجلة لتسعة وثمانين نوعاً، ظهر في المقطع قيد الدراسة خمسة أنطقه حياتية هي من الأقدم الى الأحدث كالاتي:

1-*Quadrum trifidum* Interval Biozone (CC22) Part
2-*Tranolithus phacelosus* Interval Biozone (CC23).

3-*Reinhardtites levis* Interval Biozone (CC24)

4-*Arkhangelskilla cymbiformis* Interval Biozone (CC25)

5-*Nephrolithus frequens* Rang Biozone (CC26) Part

تمت مضاهاة الأنطقة الحالية مع الأنطقة المحلية والعالمية، وأستنتج عمر التكوين بالكامبانيان المتأخر– الماسترختيان.

الكلمات الدالة: متحجرات النانو الكلسية، طباقية حياتية، العصر الطباشيري، العراق.

INTRODUCTION

Shiranish Formation was first described in (Shiranish Islam, near Zakho, northern Iraq, the type section that appears in outcrops immediately above and below the village, lat. (31°11'32"N.), long. (42°50'30"E.)) The thickness is 227.8 meters (Bellen et al., 1959).

The studied section lies in Kirkuk area at (K-306) (lat. 35°50'50"N.) and (long. 43° 40' 28"E.), it consists of limestone and marly limestone between depths (1550-1670) m., so the thickness is about (120) m. (Fig.1). Shiranish Formation aged Campanian to Masstrichtian in Ba. (8) well (Al-Badrani and Al-Assaf, 2011) and by Campanian for the lower unit in Sinjar anticline.(Al-Badrani,2012), Al-Wazan (2013) aged Late Campanian to Masstrichtian for studied section by planktonic Foraminifera.

Fig. 1: Location map for the studied section at K- 306.

MATERIALS AND METHODS

Twenty samples of limestone and marly limestone are selected for studying the calcareous nannofossils using the thin sections (under transmitted- light microscope). The calcareous nannofossils are extracted by using the method (H) given by Armstrong and Brasier (2005).

NANNOBIOSTRATIGRAPHY

Depending on the stratigraphic distribution of the recorded species, five biozones are identified as Murphy and Salvador, 1999. (Fig. 2).

***1-Quadrum trifidum* Interval Part Biozone (CC22) Part**

Definition: Interval biozone of *Quadrum trifidum* (Stradner in Stradner and Papp, 1961) Prins and Perch-Nielsen in Manivit et al. 1977.

Boundaries: the biozone determinate from first occurrence of *Quadrum trifidum* (Stradner in Stradner and Papp, 1961) Prins and Perch-Nielsen in Manivit et al. 1977, to the last occurrence of species *Eiffilithus eximus* (Stover, 1966) Perch- Nielsen, 1968, (Fig. 2).

Thickness: from (1663-1670m.) (7 m.).

Correlation and Discussion: This biozone is correlated with Zone CC22 (*Quadrum trifidum* zone) of Sissingh, 1977 in the late Campanian. . and correlated UC15 biozone which is studied by Burrnet in Bown (1998), which aged late Campanian age. (Gradstein et al., 2012) (Fig. 2).

***2- Tranolithus phacelosus* Interval Biozone (CC 23)**

Definition: Interval biozone of *Tranolithus phacelosus* Stover, 1966.

Boundaries: The biozone determinate by last occurrence *Eiffilithus eximus* (Stover, 1966) Perch- Nielsen, 1968, to the last occurrence *Tranolithus phacelosus* Stover, 1966.

Thickness: from (1663- 1640m.) (23 m.)

Correlation and Discussion: This biozone is correlated with CC23 (*Tranolithus phacelosus* biozone) which studied by the Sissnghii (1977) wich aged of the late Campanian - early Maasterchtian. and correlated UC16, UC17 biozone which is studied by Burrnet in Bown (1998) wich aged Campanian-early Maastrichtian, age. (Gradstein et al., 2012), (Fig.2).

3- *Reinhardtites levis* Interval Biozone (CC24)

Definition: Interval biozone of *Reinhardtites levis Prins* and Sissingh in Sissingh, 1977.

Boundaries: The biozone determinate by Last occurrence *Tranolithus phacelosus* Stover, (1966) to the last occurrence Reinhardtites *levis* Prins and Sissingh in Sissngh, 1977

Thickness: from (1640-1610m.) (30 m.)

Correlation and Discussion: This biozone is correlated with CC24 (*Reinhardtites levis* biozone) which studied by the Sissnghii (1977) at the age of the late Campnian - early Maastrichtian. and correlated UC18 biozone which is

studied by Burrnet in Bown (1998) which aged Maastrichtian age. (Gradstein et al., 2012), (Fig. 2).

***4- Arkhangelskiella cymbiformis* Interval Biozone (CC25)**

Definition: Interval biozone of *Arkhangelskiella cymbiformis* Vekshina, 1959

Boundaries: The biozone determinate by last occurrence *Reinhardtites levis* Prins and Sissingh in Sissngh, (1977) to the first occurrence *Nephrolithus frequens* Górka, (1957).

Thickness: from (1610-1580m.) (30 m.).

Correlation and Discussion: This biozone is correlated with (CC25) (*Arkhangelskiella cymbiformis* Biozone) Sissingh, (1977) and divided into three subdivisions (CC25a, CC25b, CC25c) by the first appearance of the species *Arkhangelskiella cymbiformis* and the first appearance of species *Lithraphidites quadratus* at Maastrichtian age, and correlated UC19 biozone which is studied by Burrnet in Bown (1998) which aged Late Maastrichtian age. (Gradstein et al., 2012) (Fig.2).

5-*Nephrolithus frequens* Rang Biozone (CC26) Part

Definition: Rang biozone of *Nephrolithus frequens* Górka, (1957).

Boundaries: The biozone determinate by first occurrence to the last occurrence of *Nephrolithus frequens* Górka, (1957).

Thickness: from (1580-1550m.) (30 m.).

Correlation and Discussion: This biozone is correlated with *Nephrolithus frequens* biozone (CC26) which aged Late Maastrichtian Sissingh, (1977), and correlated UC20 biozone which is studied by Burrnet in Bown (1998) which aged Late late Maastrichtian age. (Gradstein et al., 2012), (Fig. 2).

CONCLUSIONS

Shiranish Formation in (K-306) well consists of biozones for calcareous nannofossils, these are from older to younger (Figs. 2 and 3):

1.*Quadrum trifidum* Interval Biozone (CC22) Part

2.*Tranolithus phacelosus* Interval Biozone (CC23)

3.*Rienhardtites lives* Interval Biozone (CC24)

4. *Arkhangelskilla cymbiformis* Interval Biozone (CC25)

5. *Nephrolithus frequens* Rang Biozone (CC26) Part

This biozones aged Late Campanian- Maastrichtian for studied section

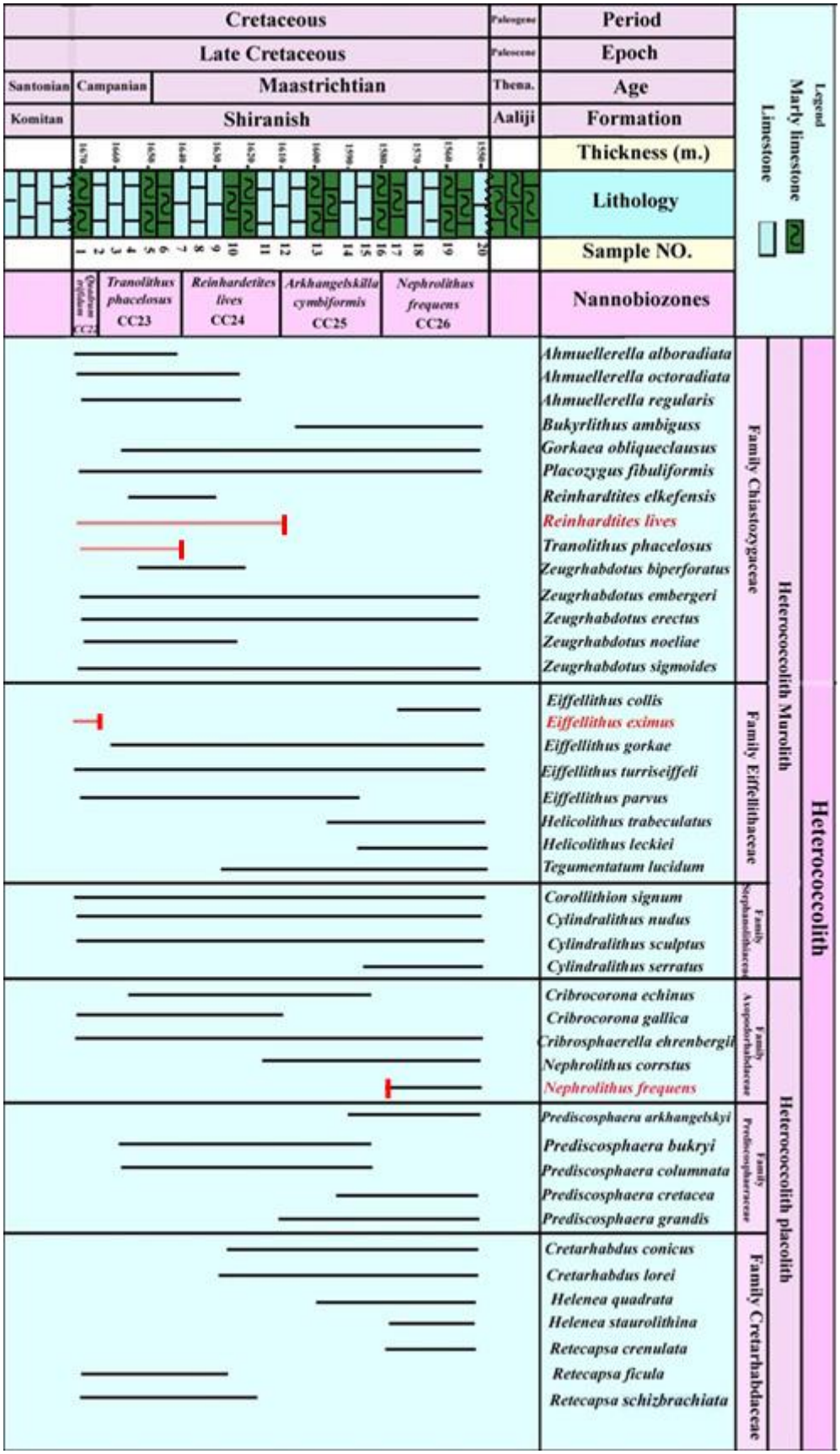


Fig 2a: Biostratigraphic chart of studied section

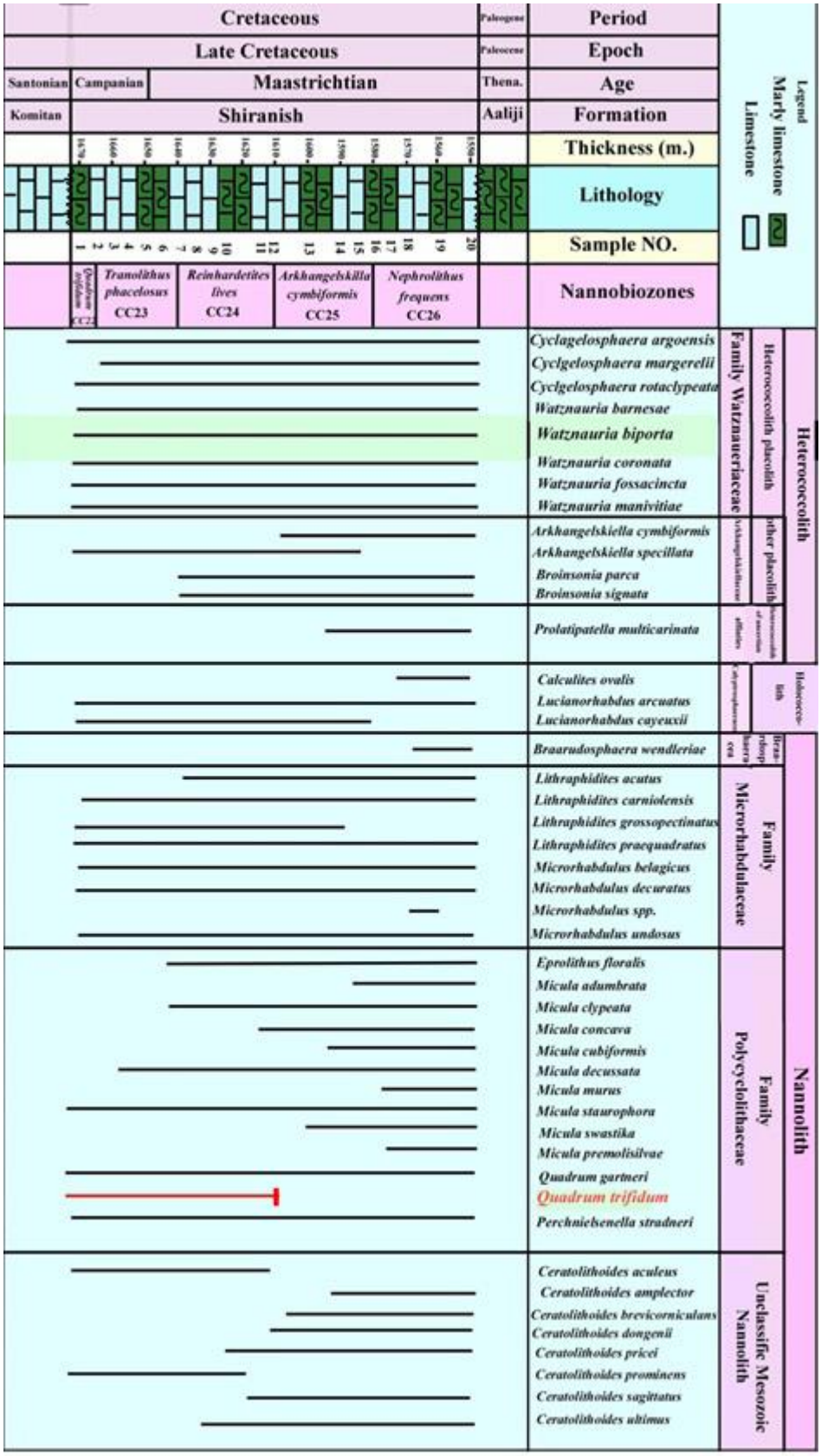
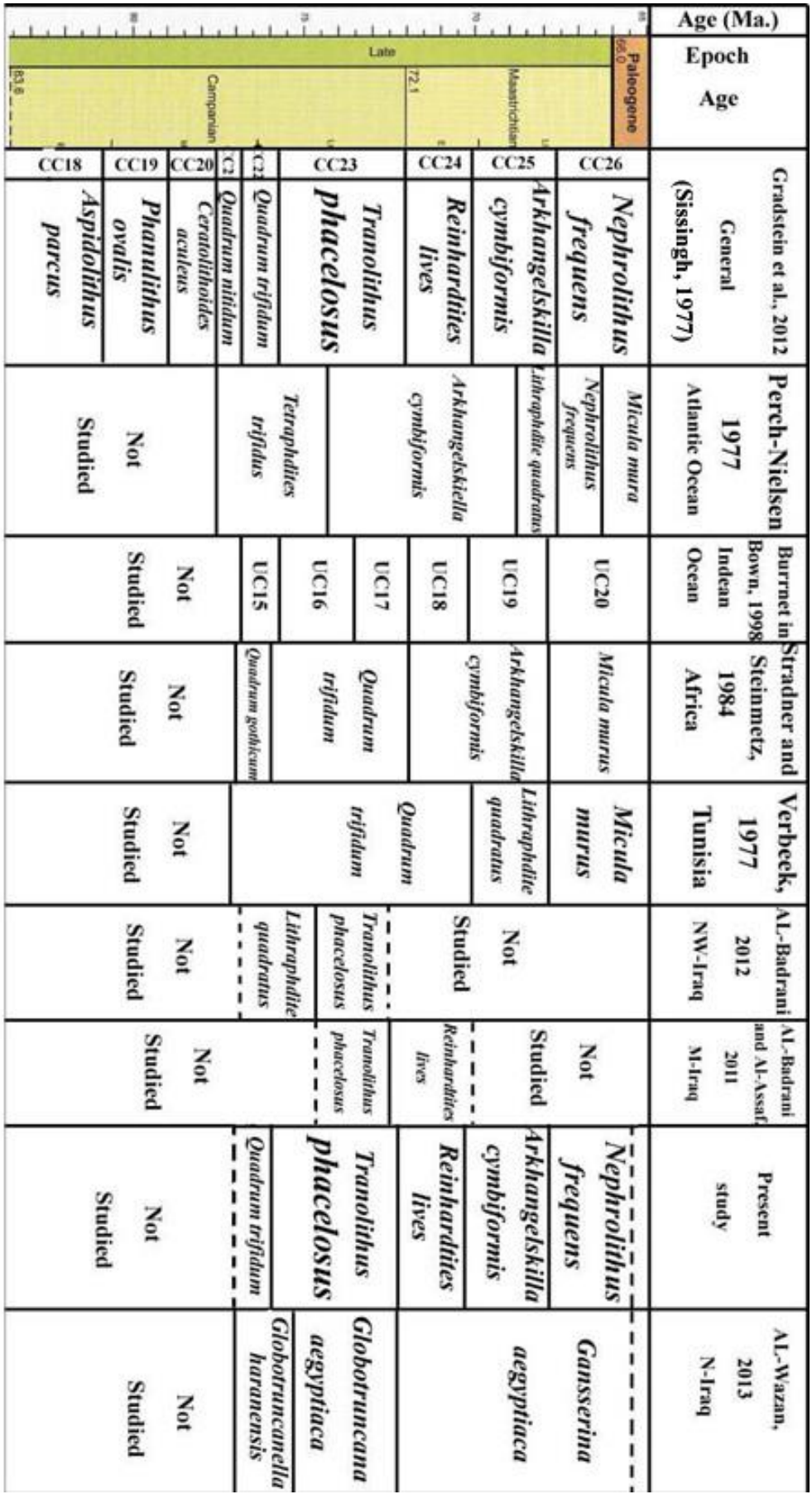


Fig. 2b: Biostratigraphic chart of studied section



CC = Cretaceous Coccolith UC= Upper Cretaceous Coccolith

Fig. 3: Comparison between the calcareous nannofossils biozones for the studied section.

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PLATE 1

1,2 *Reinhardtitus levis* Prins and Sissingh, in Sissingh 1977, bar = 5-micron, (1) Polarized Light Photo (2) Gypsum Light Photo.

3,4 *Tranolithus phacelosus* Stover, 1966, bar = 5-micron, (3) Polarized Light Photo (4) Gypsum Light Photo.

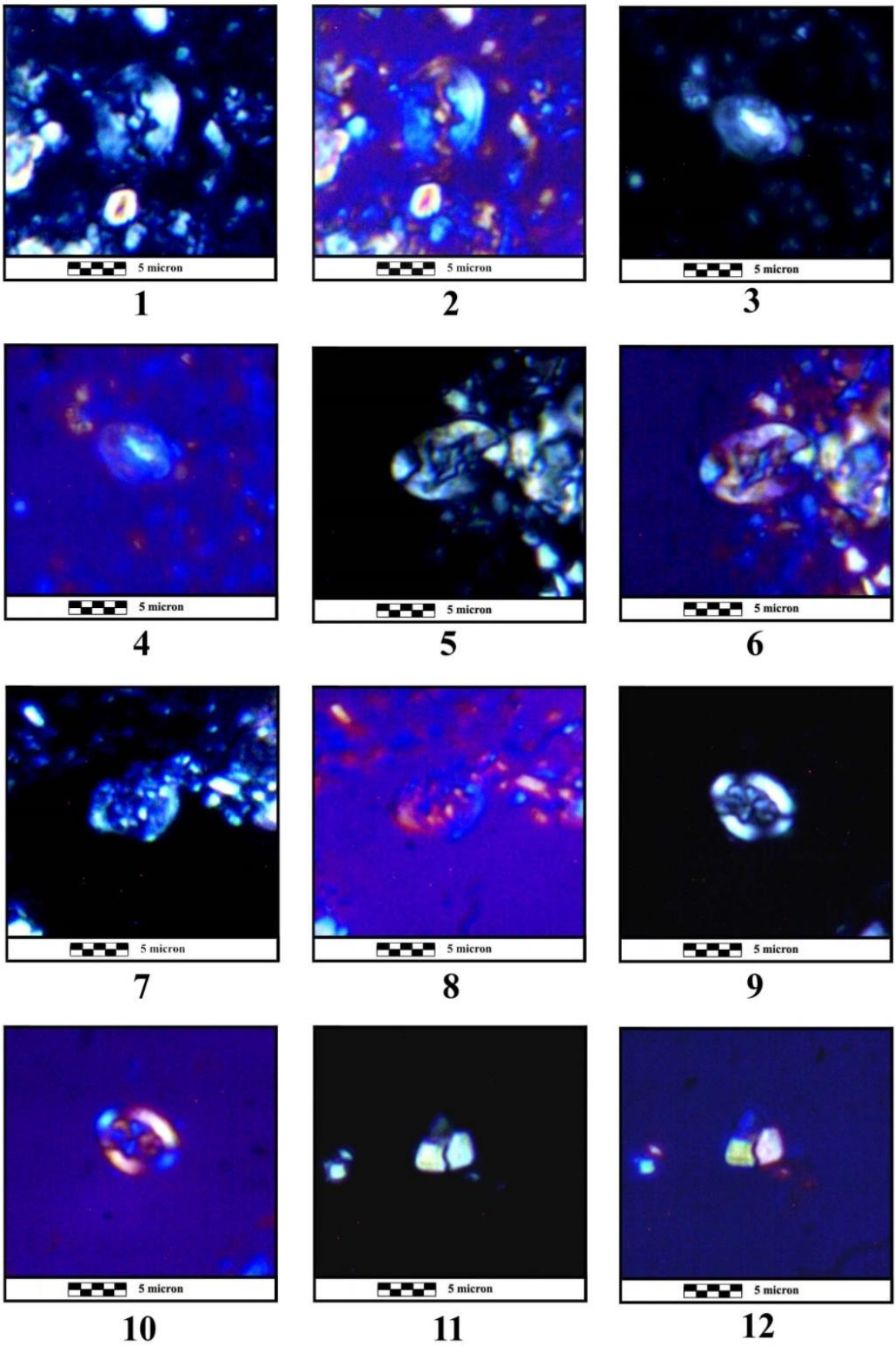
5,6 *Eiffellithus eximius* (Stover, 1966) Perch-Nielsen, 1968, bar = 5-micron, (5) Polarized Light Photo (6) Gypsum Light Photo.

7,8 *Nephrolithus frequens* Górka, 1957, bar = 5-micron, (7) Polarized Light Photo (8) Gypsum Light Photo.

9,10 *Arkhangelskiella cymbiformis* Vekshina, 1959, bar = 5-micron, (9) Polarized Light Photo (10) Gypsum Light Photo.

11,12 *Quadrum trifidum* (Stradner In Stradner and Papp 1961) Prins and Perch-Nielsen in Manivit et al. 1977, bar = 5-micron, (11) Polarized Light Photo (12) Gypsum Light Photo.

PLATE 1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