IRAQI Academic Scientific Journals

Samarra Journal of Pure and Applied Science

SJPAS

www.sjpas.com

p ISSN: 2663-7405
e ISSN: 2789-6838

Nannobiostratigraphy of Jaddala Formation in (K- 152) well, Kirkuk oilfield, Northern Iraq

Mahfoudh Abdulla Al-Hadeedy*
Department of Geology, College of Science, University of Mosul, Iraq

https://doi.org/10.54153/sjpas.2023.v5i2.641

Article Information

Received: 23/07/2023
Revised: 15/08/2023
Accepted: 20/08/2023
Published:30/12/2023

Keywords:

Calcareous Nannofossils, Biostratigraphy, Eocene, Jaddala

Corresponding Author

E-mail: mahfoudhali@uomosul.edu.iq
Mobile: 0770171341

Abstract

From the Jaddala Formation in northern Iraq in the (K152) well, there are (12 species) of calcareous nannofossils described (belonging to 8 genera)، (6 families) following a detailed analysis of calcareous nannofossils. The Jaddala Formation comprises one biostratigraphic zones that have been discovered, *Coccolithus staurion* Partial Taxon range biozone (CP13c) and its age has been assessed to be in the middle Eocene. Therefore, we proposed a middle Eocene (Lutetian to Bartonian) date for the Jaddala Formation.

Introduction

Henson was the first identified the Jaddala Formation in 1940 (unpublished report) from the type section near Jaddala village in Jabal Sinjar in the Foothill Zone. It includes 342 m of chalky and marly limestones and marls [1]. The underlying formation is unconformably Sinjar limestone Formation, while the above formation is unconformably Serikagni Formation, [1]. The formation is widespread, notably in wells, and reflects the offshore facies in western and central Iraq [2].

The Jaddala Formation's stratigraphic relationships with the Dammam and Avanah formations imply a late Early Eocene-Late Eocene date. The formation is predictable outside Iraq in Saudi Arabia (The upper parts of the Hibr Formation), Syria, and Iran (the Middle Pabdeh Formation is comparable to the Jaddala Formation) [2].

The studied section is located in the unstable shelf tectonic unit of Iraq [2]. The (K-152) oil well of the current study is a part of Baba Dome which represents a part of the Kirkuk oil field, which is situated north-northwest of Kirkuk city Fig.1. The thickness of the study section

is about (127 m), and range between (1012-885 m. in depth), Lithologically consist of Limestone alternated with Marly Limestone. Lower contact is Aaliji Formation (unconformable surface) while upper contact is Palani Formation (unconformable surface). Ten samples were investigated to identify the calcareous nannofossils. Using calcareous nannofossils, the geological succession of the Eocene in Iraq has been the subject of several research, including: [3-6]. The goal of this research is to fix the age of the studded section by examining calcareous nannofossils.

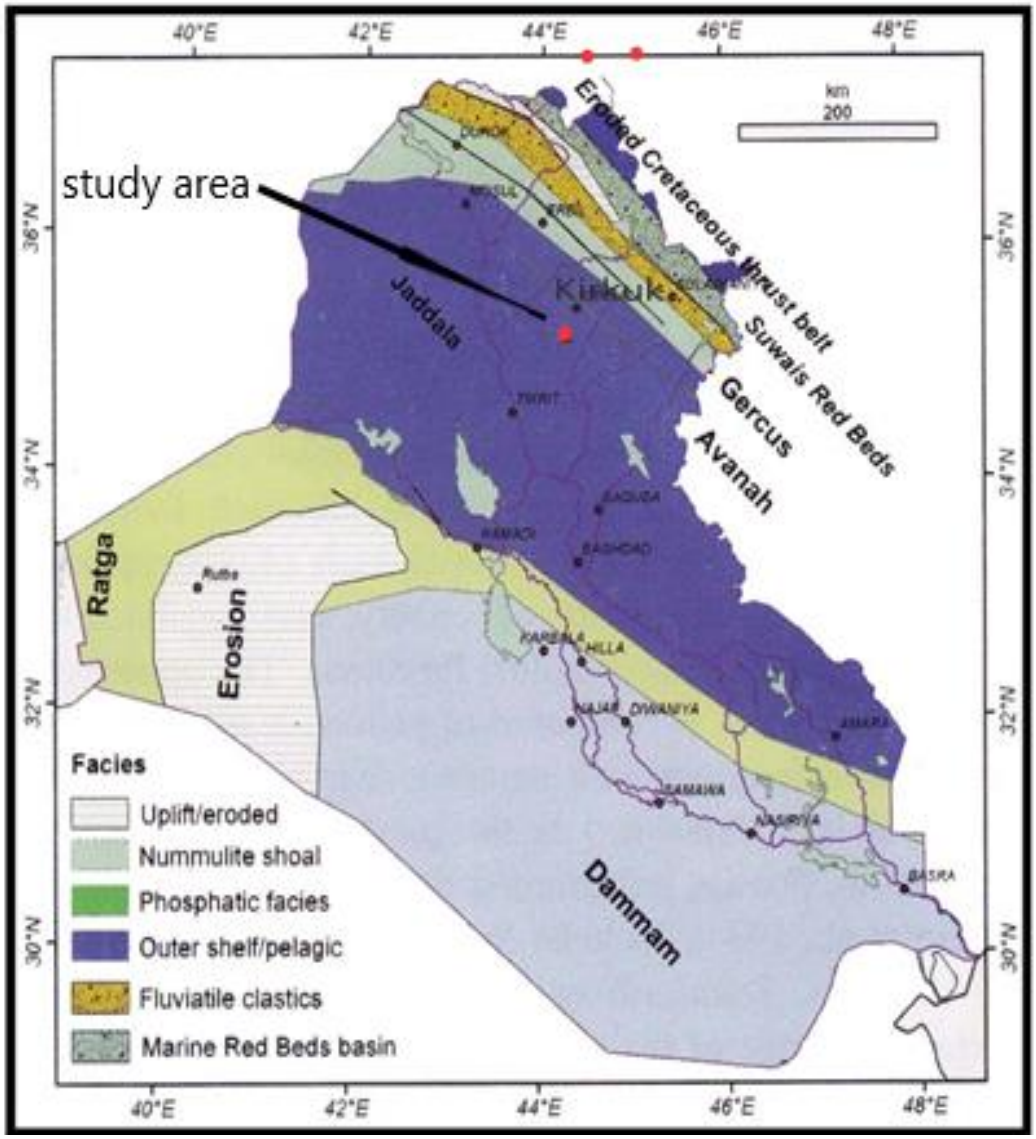

Fig. 1: Paleogeographic map from Middle Eocene display the study area, [2].

Materials and Methods

A thorough search of calcareous nannofossils for Jaddala Formation was conducted. The formation is approximately 127 meters long and is composed of limestone and marly limestone Fig. 2. The calcareous nannofossils that were opted are studied utilizing the methodology for paleontological investigations [7].

Results and Discussion

Identification of the 12 species and description of the major calcareous nannofossils from the Jaddala Formation in the (K-152) oil well are the goals of systematic classification. The

higher taxonomy often uses the [8]and [9] system. The information and photos are kept in the Geology Department, Science College, at Mosul University. Fig.2.

A- Nannopaleontology

1- Heterococcoliths

Family Helicosphaeraceae [10]

Genus *Helicosphaera* [10]

Helicosphaera seminulum [11]

Helicosphaera sp. [11]

Family Coccolithaceae [12]

Genus *Coccolithus* [12]

Coccolithus pelagicus [12]

Genus *Erocsonia* [13]

Erocsonia formosa [14]

Family Noelaerhabdaceae, 1970

Genus *Cyclicargolithus* [15]

Cyclicargolithus abisectus [16]

Cyclicargolithus sp. [16]

Genus *Reticulofenestra* [17]

Reticulofenestra umbilicus [18]

Family Prinsiaceae [17]

Genus *Toweius* [17]

Toweius occultatus [19]

2– Nannoliths

Family Discoasteraceae [20]

Genus *Discoaster* [20]

Discoaster nodifer [21]

Family Sphenolithaceae [22]

Genus *Sphenolithus* [22]

Sphenolithus obtusus [15]

Sphenolithus pseudoradians [23]

Sphenolithus sp. [23]

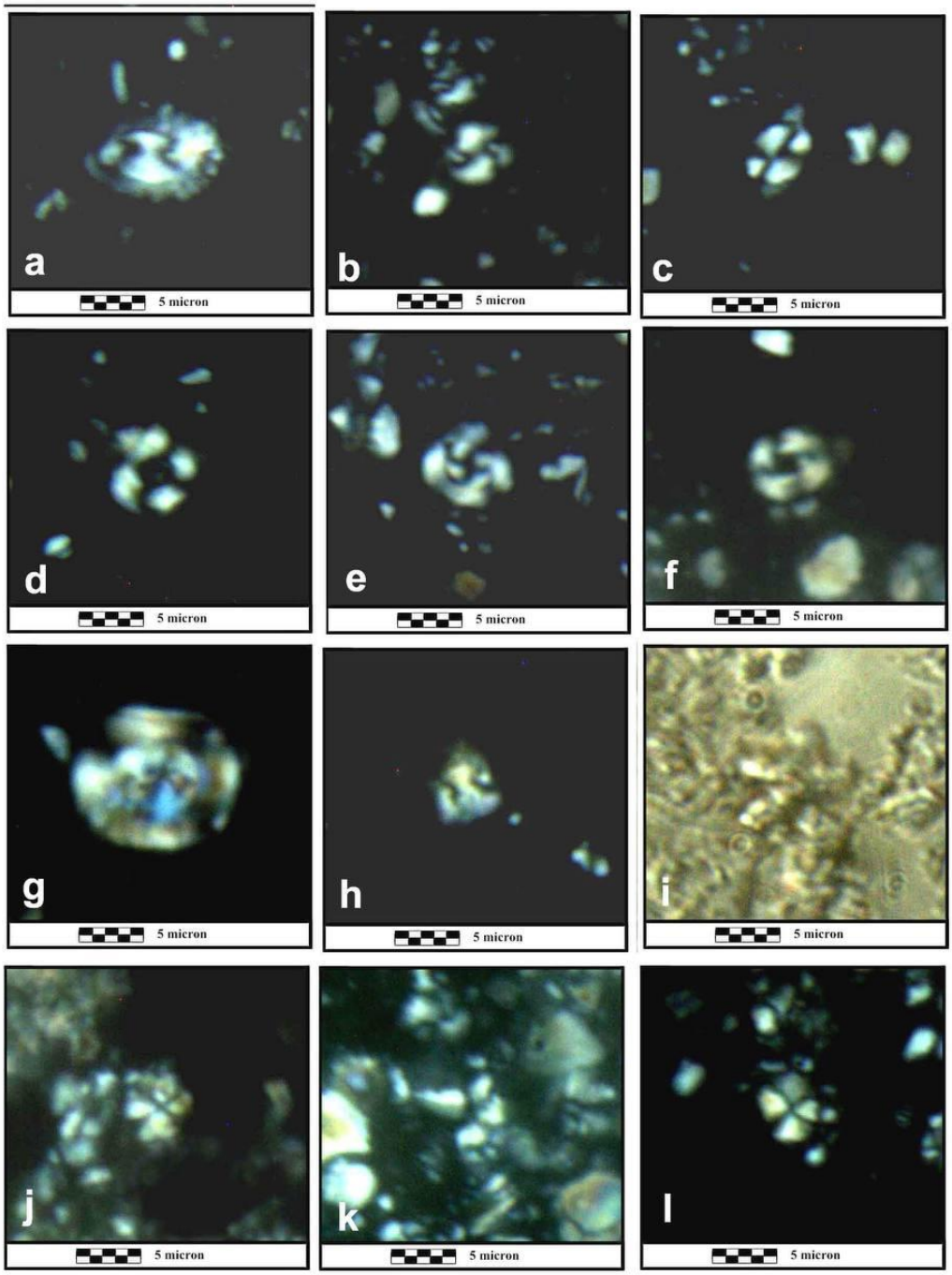

Fig. 2: Each sample from Jaddala Formation in (K- 152) well, Kirkuk oilfield.

(a) *Helicosphaera seminulum* Bramlette and Sullivan (Sample No.5), (b)*Helicosphaera* sp., (Sample No.2), (c) *Coccolithus staurion* Bramlette and Sullivan(Sample No.4), (d) *Erocsonia formosa* (Kamptner, 1963) (Sample No.6) ,(e) *Cyclicargolithus abisectus* (Muller,1970) (Sample No.4), (f) *Cyclicargolithus* sp. (Sample No.2), (g) *Reticulofenestra umbilicus* (Levin, 1965)Martini and Ritzkow, (Sample No.3) (h) *Toweius occultatus* (Locker, 1967) (Sample No.8) , (i)*Discoaster nodifer* (Bramlette and Riedel, 1954) (Sample No.5), (j) *Sphenolithus obtusus* Bukry(Sample No.6), (k) *Sphenolithus* pseudoradians Bramlette and Wilcoxon(Sample No. 9), (l) *Sphenolithus* sp. (Sample No. 2).

B- Nannobiostratigraphy

Coccolithus staurion partial Taxon Range biozone (CP13c)

This a *Coccolithus staurion* partial Taxon range biozone definite by the last existence of *Toweius occultatus* and the first appear of *Discoaster nodifer*. Its depths range from 960 to 940 meters. This biozone shares similarities with the higher altitudes of *Nannotetrina fulgens* biozone that [18] examined and to the middle Eocene (Lutetian) biozone *Coccolithus staurion* biozone, which was examined by [24]. Additionally, this biozone matches with *Nannotetrina* spp. biozone that which investigated by [25]. Fig.3 and Fig.4.

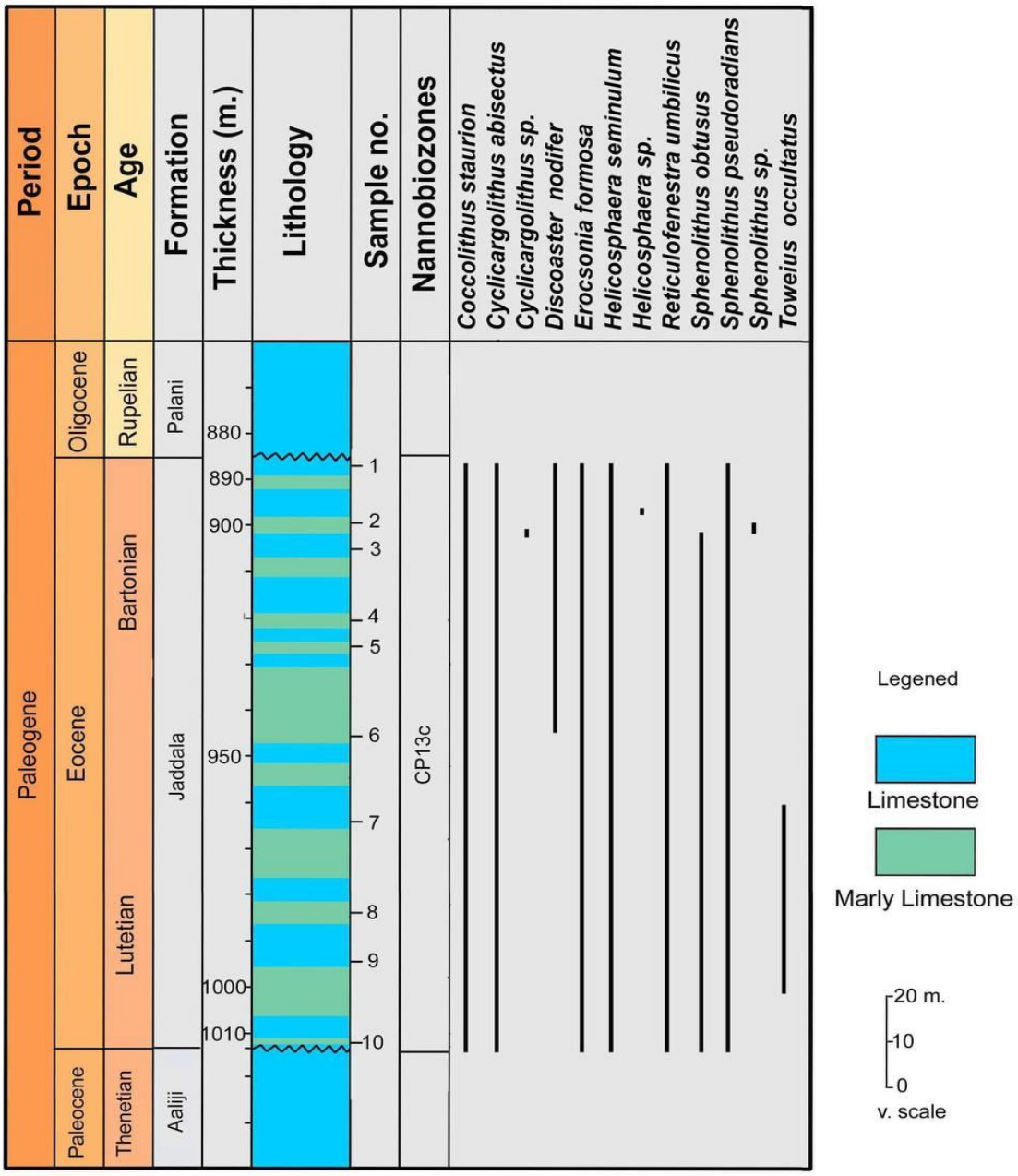

Fig. 3: Calcareous nannofossils distribution throughout study section.

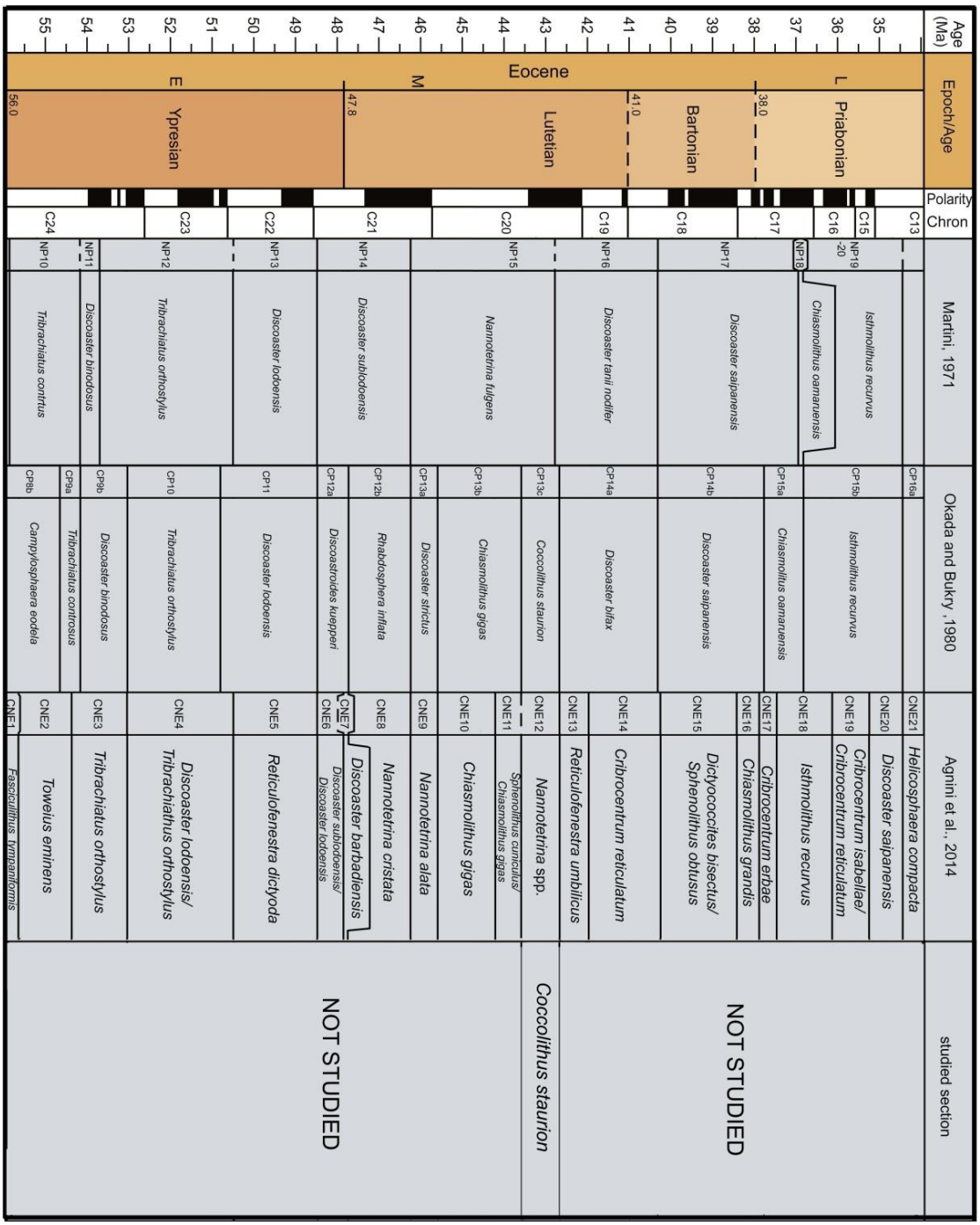

Fig.4: Calcareous nannofossil biozones compared chart for study section.

Conclusions

One biostratigraphic zone is proposed from Jaddala Formation in (K-152) oil well that is: Coccolithus staurion Partial Taxon range biozone (CP13c); It suggested the middle Eocene (Lutetian to Bartonian) as the age of formation

Acknowledgments: The author would like to thank the Geology Department of Mosul, University for providing the lab for this work.

References

1. Bellen, R. C., Van, Dunnington, H. V., Wetzel, R. and Morton, D. M. (1959) Lexique stratigraphique international, Vol. III: Asie , Fascicule 10 a, Iraq, 333pp.

2. Jassim, S. Z. and Goff, J. (2006) Geology of Iraq. Dolin, Prague and Moravian Museum, Brno,341 pp.

3. Al-Badrani, O. A. (2007) The study of calcareous nannofossils of Middle Eocene – Lower Miocene successions in Sinjar Anticline section, Northwest Iraq. Unpublished Ph.D. Thesis, College of Science, University of Mosul, 119 pp (In Arabic).

4. Al-Badrani, O. A. (2011). Nannobiostratigraphy of Jaddala Formation in well (Kh 12/7) West Iraq. Iraqi Journal of Earth Sciences, 11(1): 71 - 84.

5. Al-Badrani, O. A. and Al-Zubaidi, A. S. (2015). Nannobiostratigraphy of Jaddala Formation (type section), Sinjar anticline, NW Iraq. Journal of Nannoplankton Researches, 35, special Issue (Abstracts), 15pp.

6. Al-Badrani, O. A., Al-Shareefi, I.Y. and Al-Zubaidi, A. S. (2021). Calcareous nannofossils of the Ratga Formation, Swab Member, (Early Eocene) in Keyhole (KH7/7), Iraqi Western desert. Iraqi Bulletin of Geology and Mining, 17(2), 1 – 15.

7. Armstrong, H. and Brasier, M. (2005). Microfossils Black well publishing, U.S.A., 296pp.

8. Young, J. R. & Bown, P. R. (1997). Cenozoic calcareous nannoplankton classification. Journal of Plankton Researches, 19:36-47.

9. Perch-Nielsen, K. (1985). Cenozoic calcareous nannofossils. In: Bolli, H. M., Saundes, J. B. and Perch-Nielsen, K. (eds.), Plankton stratigraphy. Cambridge University Press, Cambridge p.427-554.

10. Black, M. (1971). Coccoliths of the Speeton Clay and Sutterby Marl. Proceedings of the Yorkshire Geological Society, vol. 38, part 3, no. 18, pp. 381- 424.

11. Bramlette, M. N. and Sullivan, F. R. (1961). Coccolithophorids and related nannoplankton of the early Tertiary in California. Micropaleontology,7(2):129 – 188.

12. Poche, F., (1913). Das System der Protozoa. Arch. Protistenk., Vol.30, p. 125 – 321.

13. Blak, M. (1971). The systematics of coccolith in relation to the palaeontological record. In, B. M. Funnell and W. R. Riedel (eds.) The Micropaleontology of Oceeans, pp. 24- 611. Cambridge University Press.

14. Haq, B. U. (1971). Paleogene calcareous nannoflora Parts I-IV. Stockholm Contribution Geology, 25:1-158.

15. Bukry, D. (1971). Coccolith stratigraphy Leg. 6. Initial Report of the Deep Sea Drilling Project, VI: 965-1004.

16. Wise, S. W., and Wind, F. H., (1977). Mesozoic and Cenozoic calcareous nannofossils recovered by DSDP Leg 36 drilling on the Falkland Plateau, south-west Atlantic sector of the Southern Ocean. Initial Reports of the Deep-Sea Drilling Project vol.36, pp. 269–491.

17. Hay, W. W. and Mohler, H. P. (1967). Calcareous, nannoplankton from Early Tertiary Rocks at Pont Labau, France, and Paleocene - Early Eocene Correlations. Journal Paleontology, 41(6): 1505 -1541.

18. Martini, E. (1971). Standard Tertiary and Quaternary calcareous nannoplankton zonation. In Farinacci, A., (Ed.), Proceedings II Planktonic Conference, Roma, 1970, 2:739-785.

19. Perch-Nielsen, K. (1971). Elektronemikroskopische Untersuchngen an Coccolithen und verwandten Formen aus dem Eozan von Danemark. det Kongelige Danske Videnskabernes Selskab Biol. Skrifter,18(3):1-76.

20. Tan, S.H. (1927). Discoasteridae incertae sedis. Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen te Amsterdam, 30(3): 411-419.

21. Bukry, D. (1973). Coccolith stratigraphy, eastern equatorial Pacific, Leg 16 Deep Sea Drilling Project. In: van Andel, T.H.,1-Health, G.R., et al., Initial report of the Deep-Sea Drilling Project, XVI. Washington, D. C.: US. Gov. printing office, p.6571-6531.

22. Deflandre, G., (1952). Classe des coa:olitbophorides. In: P.P. Grasse (ed.), Traite de loologie, Vol. I, p. 439 – 70.

23. Bramlette, M. N. & Wilcoxon, J. A. 1967. Middle Tertiary calcareous nannoplankton of the Cipero section, Trinidad, W.I. Tulane studies Geol. Paleont., 5, 93-131.

24. Okada, H. and Bukry, D(1980). Supplementary modification and introduction of code numbers to low-latitude coccolith biostratigraphy zonation (Bukry, 1973,1975). Marine Micropaleontology, 5(3):321- 326.

25. Agnini, C., Fornaciari, E., Raffi, I., Catanzariti, R., Pa¨like, H., Backman, J. and Rio, D. 2014). Biozonation and biochronology of Paleogene calcareous nannofossils from low and middle latitudes. Newsletters on Stratigraphy, 47(2): 131-181.

IRAQI Academic Scientific Journals
Samarra Journal of Pure and Applied Science
SJPAS
مجلة سامراء للعلوم البحتة والتطبيقية
www.sjpas.com
p ISSN: 2663-7405
e ISSN: 2789-6838

الطباقية الحياتية لمتحجرات النانو الكلسية لتكوين جدالة في البئر(K-152)، حقل كركوك النفطي، شمالي العراق

محفوظ عبد الله الحديدي*
قسم علوم الارض، كلية العلوم، جامعة الموصل، العراق

معلومات البحث:
تأريخ الاستلام: 2023/07/23
تاريخ التعديل :2023/08/15
تأريخ القبــول: 2023/08/20
تاريخ الـنشر: 2023/12/30
الكلمات المفتاحية:
متحجرات النانو الجيرية طباقية حياتية ، الايوسين، جدالة، العراق
معلومات المؤلف

الخلاصة:
دراست متحجرات النانو الجيرية لمقطع من تكوين جدالة في البئر النفطي (K-152) من شمالي العراق، إذ شخص 12 نوعا تعود الى 8 اجناس والتي تكون عائديتها الى 6 عوائل من متحجرات النانو الجيرية. وحدد نطاق حياتي واحد ضمن تتابعات التكوين وهو النطاق *Coccolithus staurion* Partial Taxon range biozone (CP13c); الذي منه حدد عمر الايوسين الاوسط (اللوتيشيان-بارتونيان) لتكوين جدالة.