

Microbiostratigraphy of Eocene Calcareous deposits in South -West Iran (NW Pul-e-Dukhtar)

Parvaneh Rezaei Roozbahani*, Maryam Fathipur*

*Department of Geology, College of Basic Sciences, Khorramabad Branch, Islamic Azad University, Khorramabad, Iran.

ABSTRACT- Microbiostratigraphy of the Eocene Calcareous deposits (Talezang Formation) in Southwestern Iran (NW Pul-e-Dukhtar) were investigated with respect to their benthic foraminifera range. On the basis of micropalaeontological determination 26 genera and 10 species of benthic foraminifera, and 4 genera of calcareous algae (accompanied by a number of non-foraminifera) have been identified and based on the associated index foraminifera two biozones have been selected: *Cuvillerina eocenica*-*Miscellanea miscellanea* -*Flosculina pasticilata* Assemblage Zone and *Nummulites autricus*-*Orbitolites* -*Fabiania* Assemblage Zone that indicating a Ypresian –Lutetian age (Early to Middle Eocene) for the Talezang Formation in the studied area. © 2014 Bull. Georg. Natl. Acad. Sci.

Key words: Micro biostratigraphy, Eocene, Pul-e-Dukhtar, Iran

In order to study the lithostratigraphy and biostratigraphy of Eocene Calcareous deposits (Talezang Formation) in south-west of Iran, a suitable geological section as named of Kaveh section in northwestern Pul-e-Dukhtar was selected and sampled. The methodology in this research includes library, field and laboratory studies. **A)** Library studies include all materials and scientific achievements related to the subject under study such as books, articles, magazines, unpublished reports, theses and the internet as well. Important information was also derived from personal communications with specialists. **B)** In the field geology studies, various visits have been done for the overall geological analysis of the area under study for a better understanding of the geological formations and the relationships between various structures and the identification of the faults in the region. Following this procedure the sampled locations were selected by means of air photographs, topographical maps 1:50000, geological map of 1:100000 Pul-e-Dukhtar and the field visits made. The sampling of the geological section under study has been done in variable distances (10 cm to up to one meter) with respect to the facies differences of the strata, and all sampling locations have been spray-marked. Generally five main factors were considered in measuring the sections: 1- strike, 2- dip, 3- Azimuth, 4 inclinations, 5- length. The real thickness of the layers were then determined through the triangular method. In total the number of the sample taken from the sections under study is 134. **C)** Laboratory studies include the preparation of thin sections from all collected rock samples. The microfossils were studied and determined using a binocular microscope MEDIC-101BN.

Discussion

The Kaveh section is located about 10 km NW of Pul-e-Dukhtar city and 2.5-3km W of the village Kaveh (latitude: N 33°11'51", longitude: E 47°43'05"). This area belongs to the Zagros folded, a geological province which extends in southeastern direction to Central Iran and the Persian Gulf. The Kaveh section is a westward facing slope of 450.60m width exposing Early Paleocene to Late Eocene strata. On the basis of primary studies the Paleocene consists of the Amiran Formation which is 170.60m thickness and lithological consist dark olive green, sandstone, siltstone and barren zone. And the Eocene consists of the Talezang Formation (Ypresian) which is about 130.70 m. thicknesses and lithological consist limestones and The Kashkan Formation (Lutetian) which is about 149.30 m. thickness and lithological consist red shale, sandstone, conglomerate and barren zone. Thus in this research we study only the Talezang Formation. On the basis of studied done the Tale-Zang Formation in Kaveh section. Overlies the Amiran

Formation and underlies the Kashkan Formation with a disconformity. And lithostratigraphically can be subdivided into 7 units as follows: (From bottom to top): 23.80 m. cream to light gray ,medium bedded limestone with thin bedded limestone intrabeds(Unit 1) -17.40 m light gray ,medium bedded limestone (Unit 2)-12.80 m. dark gray thick-bedded to masive limestone with some of macrofossil (Unit 3)- 18.20 m. light gray ,medium to thick bedded limestone with some of macrofossil (Unit 4)-18.40 m. light gray ,medium bedded limestone with thin bedded clayey limestone intrabeds(Unit 5)-13.40 m. dark gray , thick-bedded to masive limestone with some of macrofossil (Unit 6)-26.70 m light gray ,medium bedded limestone (Unit 7).from this rock unites a total number of 134 rock samples were collected and Various literature such as Sampo 1969 ,Mehrnosh & Partoazar 1977 Loeblich & Tappan 1988 Kalantary 1992 were used to identify the microfossils. In total, based on micropaleontological determinations 26 genera and 10 species of benthic foraminifera, 4 genera of calcareous algae as well as a number of other micro-and macrofossils were identified from the Talezang Formation which altogether indicate Ypresian- Lutetian(Early to Middle Eocene)age. The identified benthic foraminifera are as follows: *Miscellanea miscellanea* ,*Cuvillerina eocenica* , *Flosculina pasticilata* ,*Nummulites globulus*,*Triloculina trigonula*,*Haplophragmium slingeri*, *Nummulites autricus*,*Assilina cf. granulosa*, *Pseudolituonella reicheli*,*Operculina complanata* ,*Assilina sp.*, *Sakesaria sp.*, *Discorbis sp.*, *Orbitolites sp.*, *Soudia sp.*,*Rotalia sp.*, *Opertorbitolites sp.* ,*Cibicides sp.*,*Alveolina sp.*,*Calcarina sp.*, *Somalina sp.*,*Miscellanea sp.*,*Fabiania sp.*,*Bigenerina sp.*,*Asterigerina sp.*, *Discocyclina sp.*, *Anomalina sp.*,*Valvulina sp.*, *Textularia sp.* .The identified non-foraminifera include the following ones: Calcareous algae: (*Distichoplax biserialis*, *Solenomeris sp.* , *Lithothamnium sp.*, *Lithophyllum sp.* Red algae, Green algae.)-coral ,ostracoda,gastropoda , bryozoa, echinodermata fragment ,lamellibranchia shell .Following these studies, based on the first and last occurrences and the proposed stratigraphical range of the identified microfossils, two assemblage zone were considered for the Talezang Formation in studied section , as follow as:

Biozone I: *Cuvillerina eocenica*-*Miscellanea miscellanea* -*Flosculina pasticilata* Assemblage Zone

The thickness of this biozone is 50.20 m. the base of this biozone which is located at the beginning of the section under study, is concordant with the first appearance of index microfossils. (*Cuvillerina eocenica*-*Miscellanea miscellanea* -*Flosculina pasticilata*) associated with *Soudia sp.*,*Somalina sp.*,*Sakesaria sp.*, and the special specieses of *Assilina* related to Early Eocene ,and its end is concordant with the first appearance of important microfossil *Orbitolites sp.* *Fabiania sp.* related to Middle Eocene. The most characteristic microfossils associated with this biozone are as follows: *Miscellanea miscellanea* , *Nummulites globulus*, *Cuvillerina eocenica* , *Triloculina trigonula*,*Haplophragmium slingeri*, *Pseudolituonella reicheli*, *Flosculina pasticilata* *Sakesaria sp.*, *Assilina sp.*,*Discocyclina sp.*,*Soudia sp.*. Considering the identified microfossil associations and particularly based on the presence of *Cuvillerina eocenica*, the age of this biozone is suggested to be Ypresian.(Early Eocene). With regard to the age, this biozone is comparable with the *Opertorbitolites* subzone presented by Wynd (1965) from Iran's south-western regions (Zagros).

Biozone II: *Nummulites autricus*- *Orbitolites* -*Fabiania* Assemblage Zone

The thickness of this biozone is 80.50 m. The base of this biozone is concordant with the first appearance of Middle Eocene index microfossil(*Orbitolites sp.* -*Fabiania sp.*) associated with *Nummulites autricus*, *Miscellanea miscellanea* , *Assilina cf. granulosa* ,*Calcarina sp.*,*Sakesaria sp.*, and its end is concordant with the last appearance of important microfossil *Nummulites autricus* , *Fabiania sp.* The most characteristic microfossils associated with this biozone are as follows: *Miscellanea miscellanea* , *Assilina cf. granulosa* ,*Flosculina pasticilata* , *Nummulites autricus*, *Haplophragmium slingeri* ,*Nummulites globulus*, *Orbitolites sp.*, *Sakesaria sp.*,*Calcarina sp.*,*Nummulites sp.*, *Fabiania sp.* .Considering the identified microfossil associations and particularly based on the presence of *Calcarina sp.* , *Fabiania sp.*, *Nummulites autricus*, the age of this biozone is suggested to be Lutetian(Middle Eocene). With regard to the age, this biozone is comparable with the *Somalina* subzone, *Linderina* subzone,

Truncorotalides-Globorotalia spinulosa Assemblages zone presented by Wynd (1965) from Iran's south-western regions (Zagros).

Conclusion

In contrast to stratigraphic data of the geological map 1:100000 Pul-e-Dukhtar, the Talezang Formation in Kaveh section is proved to be of Ypresian. To Lutetian age. the Ypresian (Early Eocene) succession is marked by the presence of *Cuvillerina eocenica*, *Miscellanea miscellanea*, *Flosculina pasticilata*, *Soudia* sp., *Somalina* sp., *Sakesaria* sp., etc. and the Lutetian (Middle Eocene) is marked by the presence of *Nummulites autricus*, *Assilina* cf. *granulosa*, *Calcarina* sp., *Fabiania* sp. etc. also two main general faunal assemblages can be defined, according to the relative abundance of benthic foraminifera in studied section.

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