

Stratigraphy and Foraminiferal Biozonation of Upper Cretaceous deposits in south-west of Iran (Khorramabad-Kuhdasht)

Leila Toulabi, Parvaneh Rezaei Roozbahani

Abstract

Foraminiferal biozonation of upper cretaceous deposits (Sarvak Formation) in south-west of Iran (the road of Khorramabad to Kuhdasht) were investigated with respect to stratigraphical range of the identified benthic foraminifera in Sarab-dureh section. The lithostratigraphical studies shows presence of limestone and clayey limestone in this section. And microbiostratigraphical studies done on 90 thin sections from Sarvak Formation in this section indicates the existence of 21 genera and 9 species of benthic foraminifera (accompanied by a number of non -foraminifera). Based on assessment of existing set of foraminifera, *Dicyclina schlumbergerina* - *Chrysalidina gradata* - *Valvulamina picardi* assemblage Zone has been proposed for Sarab-dureh section. Micro paleontological studies suggest Cenomanian age for Sarvak Formation in this section.

Key words: Foraminifera, Biozonation, Cretaceous, Khorramabad-Kuhdasht, Iran

© 2015 BBT Pub. All rights reserved.

Introduction

In order to study the lithostratigraphy and biostratigraphy of Upper Cretaceous deposits (Sarvak Formation) in the road of Khorramabad to Kuhdasht (E Khorramabad) a suitable geological section as named of Sarab-dureh section 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all materials and scientific achievements related to the subject under study such as books, articles, magazines, unpublished reports, theses and the internet as well.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 1:250000 Khorramabad 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-inclination, 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 90

C) Laboratory studies include the preparation of thin sections from all collected rock samples. The microfossils were studied and determined using a binocular microscope Kyowa-medilux-12.

Discussion

The Sarab-dureh section is located about 45 km E of Khorramabad city and 15 km NE of the village Sarab-dureh (latitude: N 33°32'45", longitude: E 48°20'12"). (Figure 1) This area belongs to the Zagros folded, a geological province which extends in southeastern direction to Central Iran and the Persian Gulf. The Sarab-dureh section is a westward facing slope of 245.40m width exposing Early Cretaceous (Albian) to Late Cretaceous (Coniacian) strata. On base of primary studies the Early Cretaceous (Albian) consists of the Garau Formation which is 2.30m thickness and lithological consist dark gray to green shale and barren zone. and the Late Cretaceous consist of the Sarvak Formation (Cenomanian) which is about 133.70 m. thickness and the Surgah Formation (Coniacian) which is about 109.40 m. thickness and both lithological consist calcareous deposits (limestone). Thus in this research we study only the Sarvak Formation. On base of studied done the Sarvak Formation in Sarab-dureh section. overlies the

Garau Formation with a disconformity and underlies the Surgah Formation with a paraconformity. And lithostratigraphically can be subdivided into 8 units as follows: (From bottom to top):

- (Unit 1):21.80 m. light gray medium bedded limestone with thin bedded limestone intrabeds.
 (Unit 2):14.30m. Light gray thick-bedded to masive limestone with some of macrofossil.
 (Unit 3):25.30 m.dark gray medium to thick bedded limestone with some of macrofossil .
 (Unit 4):8.50 m. dark gray thin bedded clayey limestone.
 (Unit 5):18.70m. light gray medium bedded limestone.
 (Unit 6):13.80m. Dark gray thick-bedded to massive limestone with some of macrofossil.
 (Unit 7):13.70m. Light gray medium bedded limestone with thin bedded clayey limestone intrabeds.
 (Unit 8):18:70 m. dark gray medium bedded limestone.

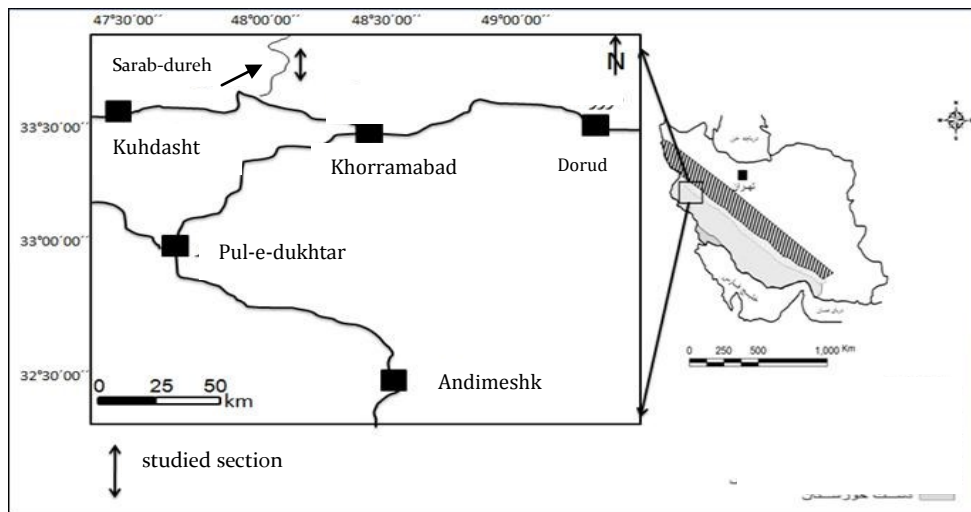


Figure 1: Locality Of Studied Section

Foraminiferal biozonation

A total number of 80 rock samples were collected from Sarvak Formation and Various literature such as Harlan Johnson 1961 ,Mehrnush & Partoazar 1977 Loeblich & Tappan 1988 Kalantary 1972 1992 ,Sampo 1969 were used to identify the microfossils. In total, based on micropaleontological determinations 21 genera and 9 species of benthic foraminifera, as well as a number of other micro-and macrofossils were identified from the Sarvak Formation which altogether indicates Cenomanian age.

The identified benthic foraminifera are as follows:

Valvulamina picardi, *Chrysalidina gradata*, *Nautiloculina oolithica*, *Haplophragmium slingeri*, *Dicyclina schlumbergerina*, *Nezzazata conica*, *Hemicyclammina sigali*, *Nezzazata simplex*, *Pseudolituonella reicheli*, *Alveolina* sp., *Cuneolina* sp., *Nummoloculina* sp., *Rhapydionina* sp., *Pseudochrysalidina* sp., *Chrysalidina* sp., *Dicyclina* sp., *Biloculina* sp., *Triloculina* sp., *Quinqueloculina* sp., *Pyrgo* sp., *Valvulamina* sp., *Ammobaculites* sp., *Discorbis* sp., *Valvulina* sp., *Textularia* sp. ,

The identified non-foraminifera include the following ones: rudist, coral ,ostracoda,gastropoda ,echinodermata fragment., green and red algae,

Following these studies, based on the first and last occurrences and the proposed stratigraphical range of the identified foraminifera, just one assemblage zone were considered for the Sarvak Formation in studied section as follow as:(Table 1)

Dicyclina schlumbergerina – *Chrysalidina gradata* -*Valvulamina picardi* Assemblage Zone

The thickness of this biozone is 133.70 m. The base of this biozone which is located at the beginning of the section under study, is concordant with the first appearance of Cenomanian index foraminifera (*Chrysalidina gradata*, *Dicyclina schlumbergerina* and *Nummoloculina* sp., and its end is concordant with the last appearance of important foraminifera *Valvulamina picardi* and *Chrysalidina* sp.. The most characteristic foraminifera associated with this biozone are as follows: *Hemicyclammina sigali*, *Nezzazata simplex*, *Dicyclina schlumbergerina*, *Nezzazata conica*, *Pseudolituonella reicheli*, *Valvulamina picardi*, *Chrysalidina gradata*,

Nautiloculina oolithica, *Haplophragmium slingeri*, *Nummoloculina* sp., *Rhapydionina* sp., *Alveolina* sp., *Cuneolina* sp.,

Considering the identified foraminifera associations, the age of this biozone is suggested to be Cenomanian. With regard to the age, this biozone is comparable with the *Prealveolina*-algae assemblage zone presented by Wynd 1965 from Iran's south-western regions (Zagros)

Conclusion

The Sarvak Formation in Sarab-dureh section is fossiliferous and proved to be of Cenomanian age on base of lithological studies, this Formation consist limestones and clayey limestones and is marked by the presence of *Dicyclina schlumbergerina*, *Valvulammina picardi*, *Chrysalidina gradata*, *Hemicyclammina sigali*, *Nummoloculina* sp., *Rhapydionina* sp., etc. and one main general faunal assemblage can be defined, according to the relative abundance of benthic foraminifera in studied section.

References

1. Aghanabati, A. (2004) Iran's geology. Geological survey of Iran.
2. Bordenave, M.L (1995). The Cretaceous Source Rocks in the Zagros Foothills of Iran This paper was presented at the "AAPG/SVG International Congress" on March 14-17, 1993, in Caracas, Venezuela; an abstract was published in the AAPG Bulletin in February 1993.
3. Harlan Johnson, J. 1961: Limestone-building algae and algal limestones. , Golden, Colorado School of Mines, internet search.
4. Kalantari, A. 1972: Microbiostratigraphy of the Cretaceous to lower Eocene succession in Khorramabad-Kermanshah area, bull. of the Iranian petrol institut, No. 48.
5. Kalantary, A. (1992) Lithostratigraphy and microfacies of Zagross, v. 12 421, pp, Iran's National Oil Co. Press.
6. Loeblich, A.R. and Tappan, H. (1988) Foraminiferal genera and their classification. Van Nostrand Reinhold Company, New York. 970 pp.
7. Mehrnush, M. and Partoazar, H. 1977 Selected Microfauna of Iran. Geological Survey of Iran , Report No. 3
8. Sampo, M. 1969: Microfacies and Micrifossile of the Zagros area, S.W Iran (from Permian to Miocene). Int. Sed Pet. Series, Vol. 12, pp. 1-102.
9. Wynd, J. G. 1965. Biofacies of the Iranian Oil Consortium Agreement Area. - IOOC Report No., 80 pp. (unpub).

Leila Toulabi, Department of Geology, Khorramabad Branch, Islamic Azad University, Khorramabad, Iran

Parvaneh Rezaei Roozbahani, Department of Geology, Khorramabad Branch, Islamic Azad University, Khorramabad, Iran

