

paleoecology of the Maastrichtian and Danian sediment at North of Central Alborz, Iran, based on Planktonic foraminifera

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Abstract

In order to study the fossil contents of the Ziarat-kola section for biostratigraphical purposes the 212 meters was sampled at Central Alborz. The sequence is mainly made up of monotonous grey- green to light grey marl. Based on Planktonic foraminifera age of Maastrichtian-Danian is determined to the section.

Four zone were determined by the benthic foraminifera morphogroup for showing oxygen and productivity change. The approximate Low oxygen and high food supply has been indicates zone of one that increase infauna to epifauna morphotype percent is low (nearness 60% infauna , 40% epifauna). In zone two, with due attention to equal percent of Epifauna ratio to infauna , intermediate oxygen and food supply is anticipated .The decreasing epifauna foraminifera and increasing infauna demonstrates low oxygen and high food supply condition at zone of three. In zone four, increasing epifauna (approximate 90 percent) that are indicated high oxygen condition and low food supply. Analysis of planktonic foraminifera assemblage at this section with Cretaceous biostratigraphical provinces is indicating a close similarity with Tethyan provinces.

Keywords: Ziarat-kolasection, Biostratigraphy, Planktonic foraminifera, Paleobathymetry, Paleoproductivity

Introduction

The Alborz mountain system in northern Iran extending in a sinuous manner for about 2000 km from the Lesser Caucasus of Armenia and Azerbaijan Republics of the former Soviet Union in the northwest to the Paropamisus Mountains of northern Afghanistan to the east. (Alavi 1996).

Stoklin and Nabavi(1973) have divided extensive W-E range of Alborz in three main zones:

- 1- West Alborz zone and Azarbayjan
- 2- Central Alborz zone including south-central Alborz, north-central Alborz and anti-Alborz.
- 3- Kopet-Dagh Zone

The area of study located in central Alborz

Material and Method

The section studied is located eight km south of Ziyarat-kola village, south of Behshahr in northern flank of Central Alborz Mountains. At this locality (E:53° 40' 10G, N: 36° 30' 51G) the section consists about 212m. thickness of monotonous grey- green to light grey marl (Fig. 1). The very high rate of sediment accumulation in the studied area created a great potential for accurately evaluating the timing of environmental changes during the late Maastrichtian and early Danian. A total of 91 samples were collected from the section, which were soaked in water with diluted hydrogen peroxide, washed through 63µm, 150µm and 250µm sieves, and dried until clean foraminiferal residues were recovered. About 300 individuals were picked up for each sample in two size fractions (63-150µm and >150µm) and mounted on dark cardboard slides for identification. At the same time, the quantitative study of two populations splited reduces the bias in first and last appearances due to the Signor-Lipps effect.

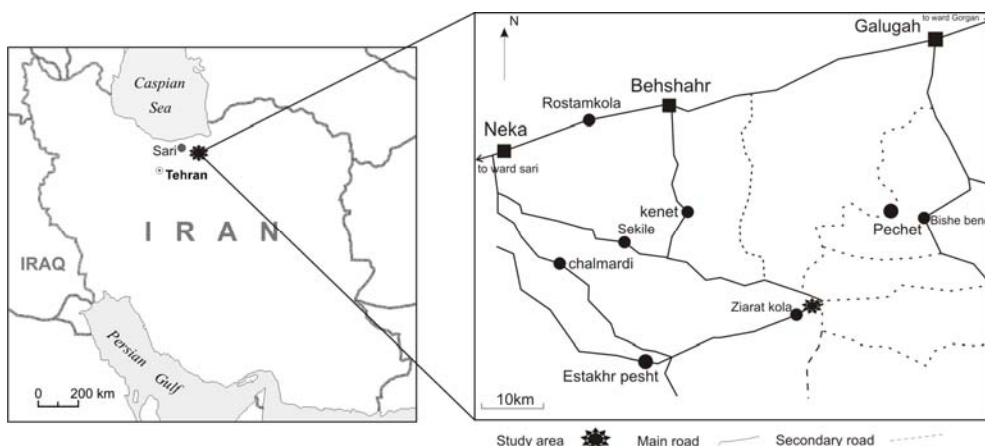


Fig. 1- Location map of the studied area in the Behshahr, North of Iran.

Discussion

Planktonic foraminifera are one of the best groups for determination environmental condition especially in the upper cretaceous due to having high diversity and identification ability and global distribution.

Hence In this study, isolated planktonic foraminifera are studied because of the suitable lithology which is marl and calcareous marl and high abundance.

Deep-sea benthic foraminifera show a variety of test shapes that apiece determined environmental condition. Last data on living individuals from modern oceans suggest that test morphology of benthic foraminifera is correlated to microhabitat preferences (Corliss and Chen 1988).

Paleoecology

Oxygen and productivity

The comparison of fossil and modern benthic foraminifera and morphotype analysis (e.g. Corliss, 1985; Corliss and Chen, 1988; Jones and Charnock, 1985), allows us to infer probable microhabitat preferences and environmental parameters such as the nutrient supply and oxygenation sea floor (e.g. Bernhard, 1986; Fontanier et al., 2002; Murray, 2001),

Corliss (1985, 1991), Jones and Charnock (1985), Corliss and Chen (1988) and Alegret et al 2003. Subdivided benthic foraminifera to two morphotypebenthic foraminifera with plano-convex, biconvex and rounded trochospiral tests, tubular and coiled flattened milioline and palmate tests, have an epifaunal mode of life, these living at the sediment surface or in its upper few centimeters. Infaunal morphogrup , living in the deeper layers of the sediment. They have cylindrical or flattened tapered, spherical, rounded planispiral, flattened ovoid, globular unilocular or elongate multilocular tests.. At this section in order to determining paleoproductivity rate use benthic foraminifera. In benthic foraminifera used from ratio morphotypes epifauna to infauna morphotypes that epifauna showing well oxygen and decrease food supply condition and infauna indicate high food supply condition. Four zone were determined by the benthic foraminifera morphogroup for showing oxygen and

productivity change(Fig.2). The approximate Low oxygen and high food supply has been indicates zone of one that increase infauna morphotype to epifauna is few(nearness 60% infauna , /40% epifauna). In zone two, with due attention to equal percent of Epifauna ratio to infauna , intermediate oxygen and food supply is anticipated .The decreasing epifauna foraminifera and increasing infauna with high glauconite and pyrit percent that deposited in low oxygen condition demonstrates low oxygen and high food supply condition at zone of three. In zone four, increasing epifauna (approximate 90 percent) and some where marl is red causeto Fe_2O_3 that are indicated high oxygen condition and low food supply.

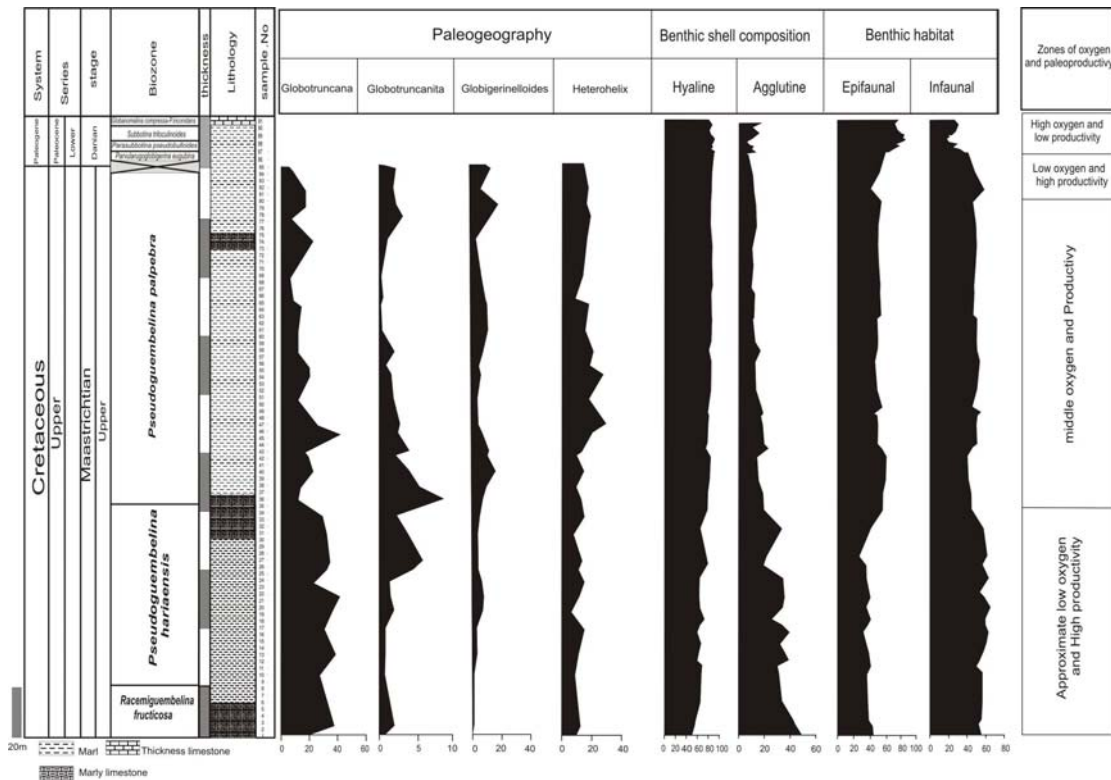


Figure2. Percent of some genres of Planktonic foraminifera , Epifauna and infauna ratio and determining oxygen and productivity.

Paleogeography

During the Cretaceous two provinces Boreal and Tethyan were discreted from each other by a transitional belt created by the action of warm surface water currents (Bailey & Hart, 1979). The boreal and austral provinces have specialist assemblage:

They are characterized by forms with globular chambers and thin walls. The following genera, these regions: *Hedbergella*, *Globigerinelloides*, *Heterohelix*, *Whiteinella*, *Archaeoglobigerina*, *Rugoglobigerina* (Caron, 1985).

The warm water provinces are characterized by thick-walled species, ornamented by keels. The keeled taxa *Globotruncana* and *Globotruncanita*, *Gansserina*, *Contusotruncana* occupy the Tethyan province. By studied analysis of planktonic foraminifera assemblage at this section especially genres of *Globotruncana*, *Globotruncanita*, *Heterohelix*, *Globigerinelloides*, *Gansserina* with Cretaceous biostratigraphical provinces is indicate a close similarity with Tethyan provinces.

Conclusion

Four zones were determined by the benthic foraminifera morphogroup for showing oxygen The decreasing epifauna foraminifera and increasing infauna percent and productivity change. demonstrates low oxygen and high food supply condition at zone of one and three. In zone two, with due attention to equal percent of Epifauna ratio to infauna, intermediate oxygen and food supply is anticipated. In zone four, increasing epifauna that are indicated high oxygen condition and low food supply. Comparing Planktonic assemblages recovered from this section with those of Cretaceous biogeographical provinces indicate a close similarity with those of Tethyan provinces.

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