

CALCAREOUS NANNOFOSSILS FROM THE KONARAK AREA OF THE COASTAL MAKRAN, IRAN: A NOTE

Fatemah Hadavi

Dept. of Geology, Faculty of Science, Ferdowsi University of Mashhad, Iran

Abstract: For the first time, the calcareous nannofossils from the marly deposits of Konarak (Iranian coastal Makran) have been studied using both light- and electron-microscopy. From the nannofossil data, the material has been dated as NN11 (Late Miocene *Discoaster quinqueramus* Zone) of Martini's (1971) standard biozonation scheme.

Introduction

The Konarak area is located in the eastern part of the Iranian coastal Makran (S of latitude 26°N). The regional geology of the Makran of Iran has been studied by an Australian group (McCall *et al.*, 1985; McCall, 1997) for the Geological Survey of Iran (GSI), whilst the Makran of Pakistan, a direct geological continuation of the Iranian Makran, has been studied by Platt *et al.* (1985), with nannofossil data outlined in Harms *et al.* (1984). The Makran is thus known to be of considerable tectonic interest, and has significant petroleum potential.

In 1989, a group of geologists from the GSI studied the Iranian Makran region (part of the Makran Project, for which >100 nannofossil samples were analysed by the author). The aim of the present work is to provide a date for selected Neogene sedimentary deposits of Konarak using nannofossils. The studied samples and photographic negatives are deposited in the Geological Unit of the Ferdowsi University of Mashhad.

A total of 16 samples were collected for the study of nannofossils and ostracods. The samples are characterised by a high percentage of ostracods and lack of foraminifera (except in one sample).

Biostratigraphy

All of the samples except for KM5, KM6, KM11 and KM15 were barren. Preservation is generally poor to moderate, with evidence of solution and overgrowth on specimens. The abundance of calcareous nannoplankton in this material is low but a few samples contain enough index fossils to date them. Coccolith species recognised in this study are listed in Table 1 along with their relative abundances (full taxonomic references can be found in Perch-Nielsen, 1985).

Discoaster brouweri forms 50% of the *Discoaster* assemblages in the productive samples and was found together with rare *Discoaster quinqueramus* and *Amaurolithus ninae*. On the basis of the first occurrence

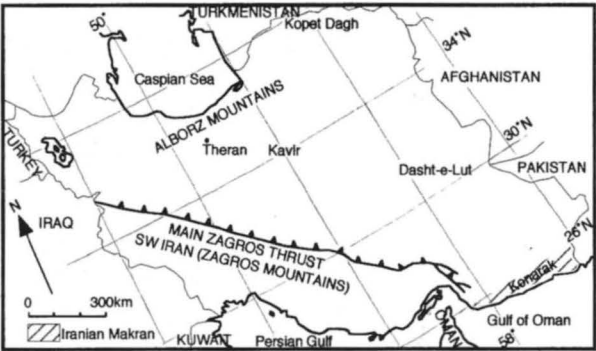


Figure 1: Location map of the studied area.

Methods

Smear-slides were prepared from raw samples for LM analysis. These were studied with the LM at x1250 magnification. SEM examination was carried out on just one sample. The main purpose of this examination was to illustrate the key species used in the age determination.

Section studied

A location map and cross-section for the interval studied are shown in Figures 1 and 2, respectively. The section is 800m thick, composed of soft, greenish-grey marl with fine- to medium-grained sandstone intercalations, and is strongly

TAXON	SAMPLE	KM15	KM11	KM6	KM5
<i>Calcidiscus macintyreii</i>		F	C	F	VR
<i>Coccolithus pelagicus</i>		F	F	C	F
<i>Reticulofenestra pseudoumbilicus</i>		C	F	C	C
<i>Reticulofenestra haqii</i>			R	R	
<i>Reticulofenestra minuta</i>			R		
<i>Rhabdosphaera clavigera</i>			R	F	
<i>Pontosphaera indoceanica</i>			R	F	
<i>Amaurolithus</i> sp.		F	R	F	F
<i>Amaurolithus ninae</i>			R		VR
<i>Sphenolithus abies</i>		F	F	C	R
<i>Helicosphaera carteri</i>		F	F		
<i>Helicosphaera</i> cf. <i>H. sellii</i>			F		
<i>Discoaster brouweri</i>		C	C	C	C
<i>Discoaster neorectus</i>					C
<i>Discoaster calcaris</i>				C	
<i>Discoaster variabilis</i>			C	F	
<i>Discoaster quinqueramus</i>		C	F	F	VR
<i>Thoracosphaera</i> sp.			C	C	
NANNOFOSSIL ZONE		NN11			

Table 1: Distribution of Late Miocene calcareous nannofossils, Konarak area. VR = very rare (1%), R = rare (<4%), F = few (4-8%), C = common (8-12%).

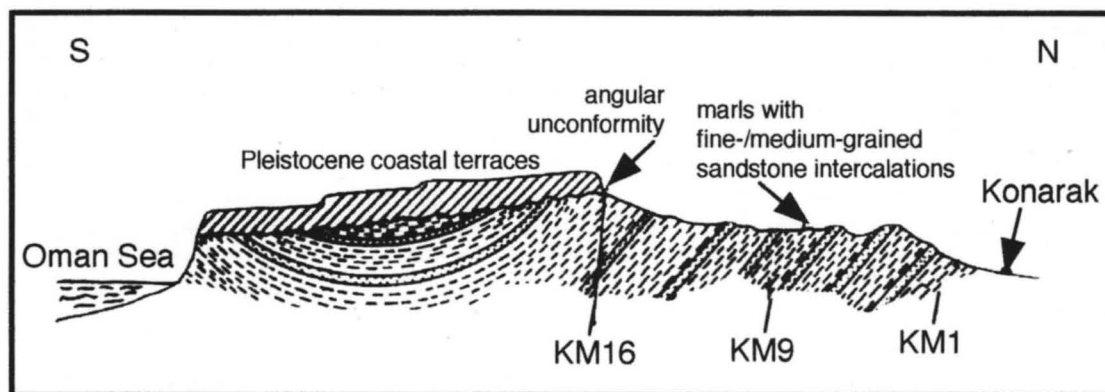


Figure 2: Schematic geological section of the marine deposits of the Konarak area.

of *A. ninae* in NN11 and the presence of *D. quinqueramus*, the sampled interval falls within NN11 (*D. quinqueramus* Zone) of Martini's (1971) standard zonation.

The presence of abundant shallow-water ostracods indicates a shallow marine environment for this basin. This may have implications for the biostratigraphic interpretation of the nannofloras, in that the assemblage may be reworked: Young (pers. comm., 1997) found reworking to be a pervasive problem in the Makran of Pakistan

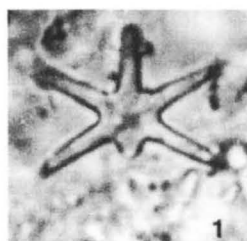
Acknowledgement

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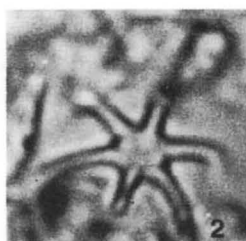
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PLATE 1



D. brouweri
Neg. # 94-FH-8



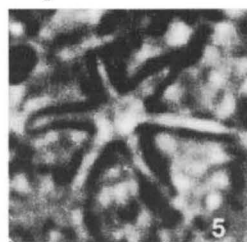
D. brouweri
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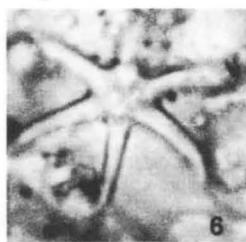
D. brouweri
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D. brouweri
Neg. # 94-FH-19



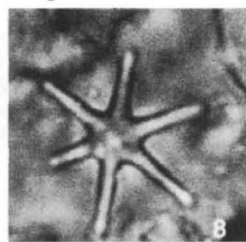
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D. brouweri
Neg. # 94-FH-21



D. brouweri
Neg. # 94-FH-23



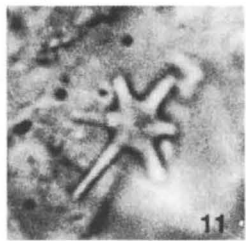
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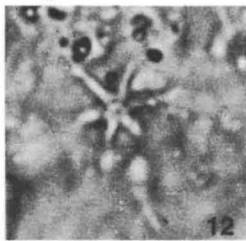
D. brouweri
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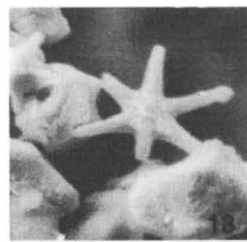
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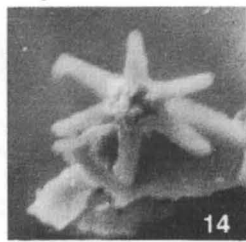
D. brouweri
Neg. # 94-FH-27



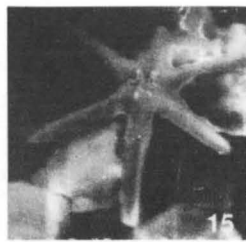
Discoaster sp.
Neg. # 94-FH-35



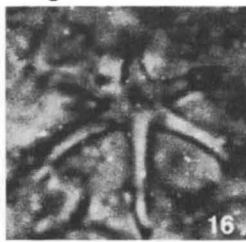
D. brouweri
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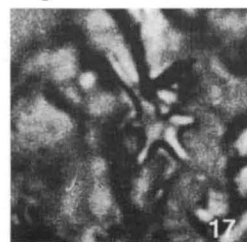
D. brouweri
Neg. # 94-FH-31



D. brouweri
Neg. # 94-FH-32



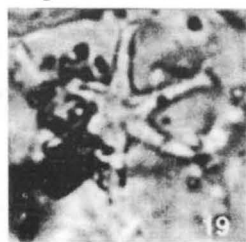
D. calcaris
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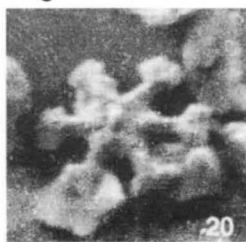
D. quinqueramus
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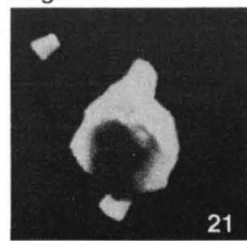
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Neg. # 94-FH-37



D. variabilis
Neg. # 94-FH-34



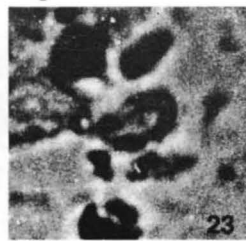
D. variabilis
Neg. # 94-FH-33



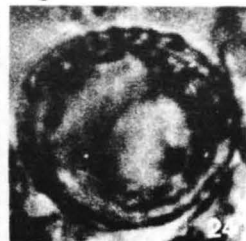
A. amplificus
Neg. # 94-FH-28



Amaurolithus sp.
Neg. # 94-FH-29



H. cf. H. sellii
Neg. # 94-FH-38



Thoracosphaera sp.
Neg. # 94-FH-41