

Paleoecology and paleobiogeography of Paleocene ostracods in Dineigil area, South Western Desert, Egypt



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ABSTRACT

Seventy three rock samples were extracted from the Paleocene interval (fourty three meter) in the Dineigil area, South Western Desert, Egypt. The ostracod assemblages in these samples were qualitatively studied. The ostracods are well preserved which allowed us to recognize thirty two species belonging to eighteen genera and nine families. The recorded ostracods could be differentiated into two assemblages. The first assemblage comprises an overlapping combination of the Esna Type and Garra Type and indicates an inner-middle shelf environment (50–70 m depth). The second one comprises a combination of the Tethyan Type and Esna Type, indicating a transitional environment from the middle shelf to the outer shelf (deep infraneritic). The paleobiogeographic distribution of the investigated ostracods shows a strong resemblance to those in many areas of North Africa and Middle East, and a slight affinity to those in West Africa and the South Atlantic.

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1. Introduction

The Paleocene (65–55 Ma) was characterized by dramatic shifts in the climate system and carbon cycle (Westerhold et al., 2011). The most studied warming event is the Paleocene/Eocene Thermal Maximum (PETM) which occurred ~55 Ma (Zachos et al., 2008). Other hyperthermal events in the Paleocene epoch have also been recorded; the Latest Danian Event (LDE) ~61.7 Ma (Bornemann et al., 2009), the Danian/Selandian transition ~61 Ma (Speijer, 2003), and the Mid Paleocene Biotic Event (MPBE) ~58.2 Ma (Bernaola et al., 2007).

Ostracods appear to show no replacement of species across the PETM in a deep sea Tethyan sections and the deep western North Atlantic (Guernet and Belliner, 2000; Guernet and Molina, 1997). Marked ostracod change have been described from a middle neritic settings in Egypt (Speijer and Morsi, 2002). However, in the deep sea, ostracods, in contrast with benthic foraminifera, largely survived the massive environmental changes of the PETM; this was

accompanied by a temporary drop in species diversity and ecological diversity but with no evidence for an excursion fauna of ostracods (Yamaguchi and Norris, 2012).

In Egypt, Paleocene ostracods have attracted numerous researchers (e.g. Boukhary et al., 1982; Khalifa et al., 1984; Ismail, 1992, 1996; Elewa et al., 1999; Morsi, 1999, 2000; Bassiouni and Morsi, 2000; Shahin, 2000, 2005; Shahin and El-Nady, 2001; Elewa, 2002; El-Nady, 2002; Speijer and Morsi, 2002; Morsi and Speijer, 2003; Elewa and Morsi, 2004; Ismail and Ied, 2004, 2005; Morsi et al., 2008). However, the Paleocene ostracods of the South Western Desert have received little attention (Bassiouni and Luger, 1990; Boukhary et al., 2013).

The present study aims to analyze the ostracod content of the Paleocene sequence, and to construct the paleoenvironmental setting based on the paleoecology and paleobiogeography of the Paleocene ostracods in the Dineigil area, South Western Desert, Egypt (Fig. 1).

2. Geological settings

The Arabian craton which consolidated in late Paleozoic times was flooded by shallow seas. Structurally, the shelf area of Egypt, which surrounds the Arabo-Nubian massive, can be subdivided in

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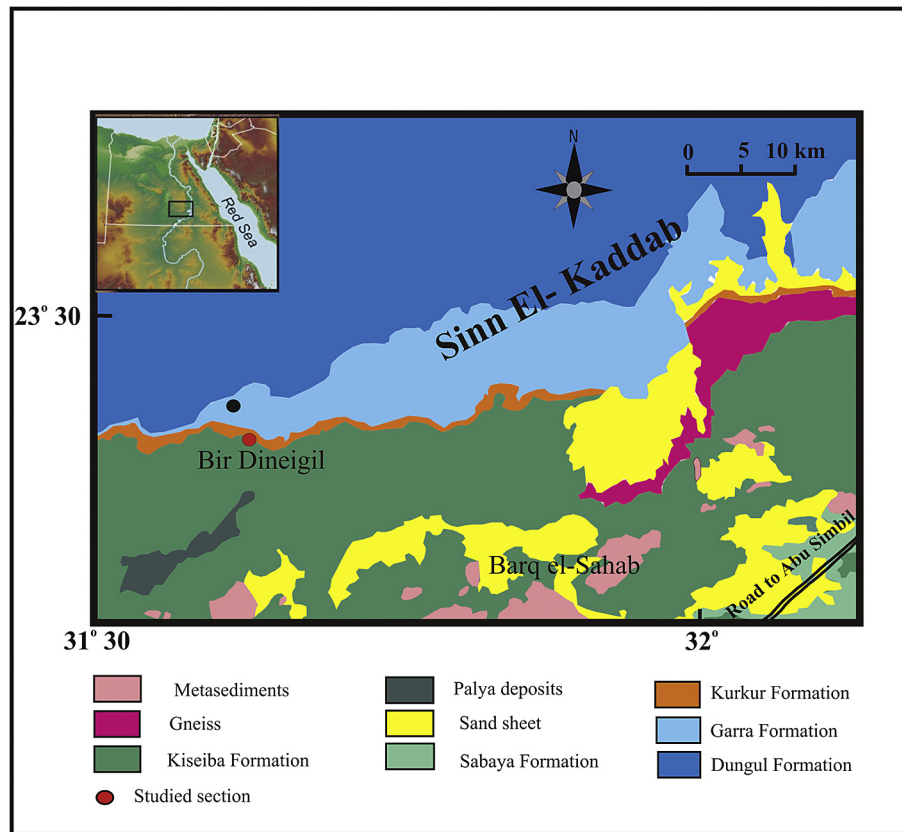


Fig. 1. Location and geological map of the Dineigil area (After Youssef, 2014).

Late Cretaceous and Early Paleocene times into two units: the Stable Shelf and the Unstable Shelf (Said, 1978). The Stable Shelf extended over southern Egypt and is covered by less than 1000 m of sediments (Youssef, 2003). The Stable Shelf can be subdivided into two majors, generally north-south trending basins. The Dakhla basin extends over the western part of the country and the upper

Nile basin which extends over the eastern parts of the country. These basins are delimited to the southwest by the Calanscio-Uweinat- Gilf El Kebir High and to the south by a sequence of uplifts, the Uweinat-Aswan High (e.g. Klitzsch, 1978; El-Azabi and Farouk, 2011; Farouk, 2016). The study area located in the southern part of Dakhla basin.

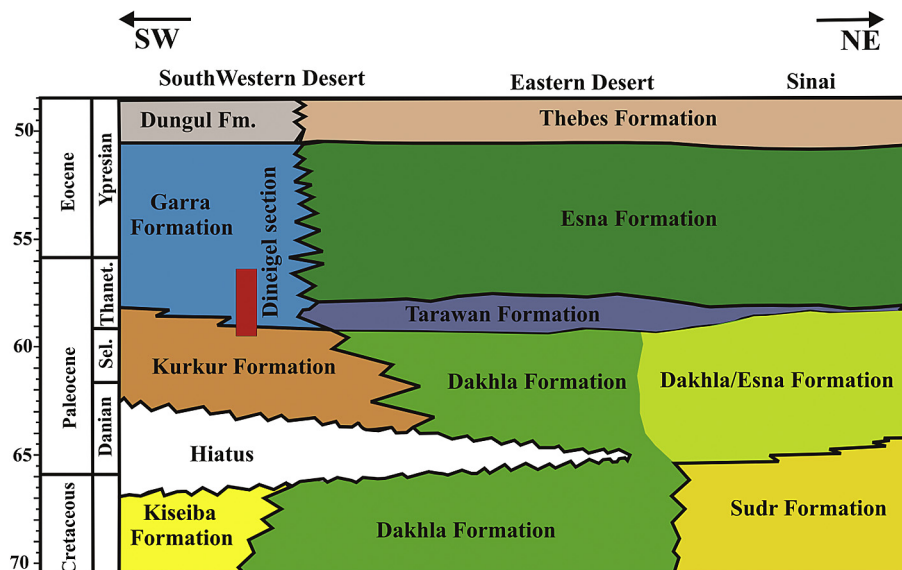


Fig. 2. Lithofacies correlations for the Maastrichtian to Ypresian interval in a NE-SW transect across Egypt. after Kosták et al., 2013. The stratigraphical range of the studied outcrop is indicated in red color. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

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