THE “ELEPHANTS” AND THE OSTRACODS: A 7 MY OLD TALE FROM THE UNITED ARAB EMIRATES

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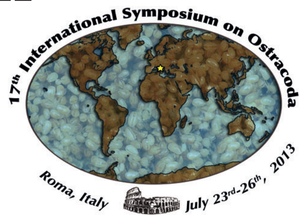


Introduction

The Baynunah Formation (Whybrow, 1989), outcrops in a large coastal area in the western region of the Abu Dhabi Emirate called Al Gharbia (*Fig. 1*). The thickness of the Baynunah Formation (BF) is of several tens of meters and reaches 50m at the type section (Jebel Barak). The BF has been long known for its rich fossil content (Bibi et al. 2013).

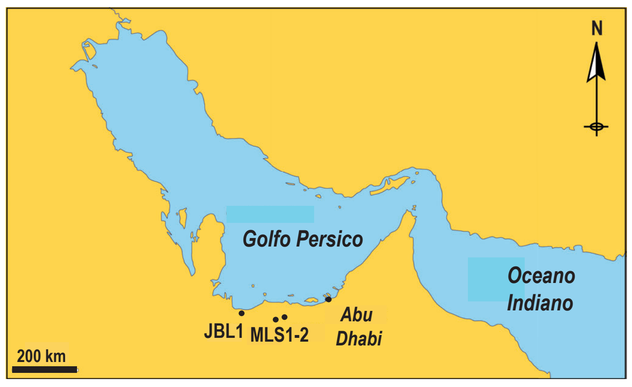


Fig. 1 Location of the sections sampled for ostracod analyses.

Stratigraphy

At the base, the BF is made by fluvial conglomerates and well developed paleosoils, rich in vertebrates remains, and by whitish carbonates. The tabular top is composed by a complex of sands and carbonates with gypsum veins (Whybrow & Hill 1999) (*Fig. 2)*. The basal conglomerate is rich in remains of continental fossils (terrestrial and aquatic) like vertebrates (fishes, turtles, crocodiles, rodents, large mammals, primates), invertebrates (bivalves, gastropods and ostracods) and vegetal remains. Thanks to this rich association and to paleomagnetic analyses, the BF has been dated between 8 and 6 Ma (Whybrow & Hill 1999; Bibi et al. 201 3). Recently (Bibi et al. 2012) have discovered several trackways referred to proboscidate herds and single individuals (Fig. 3).

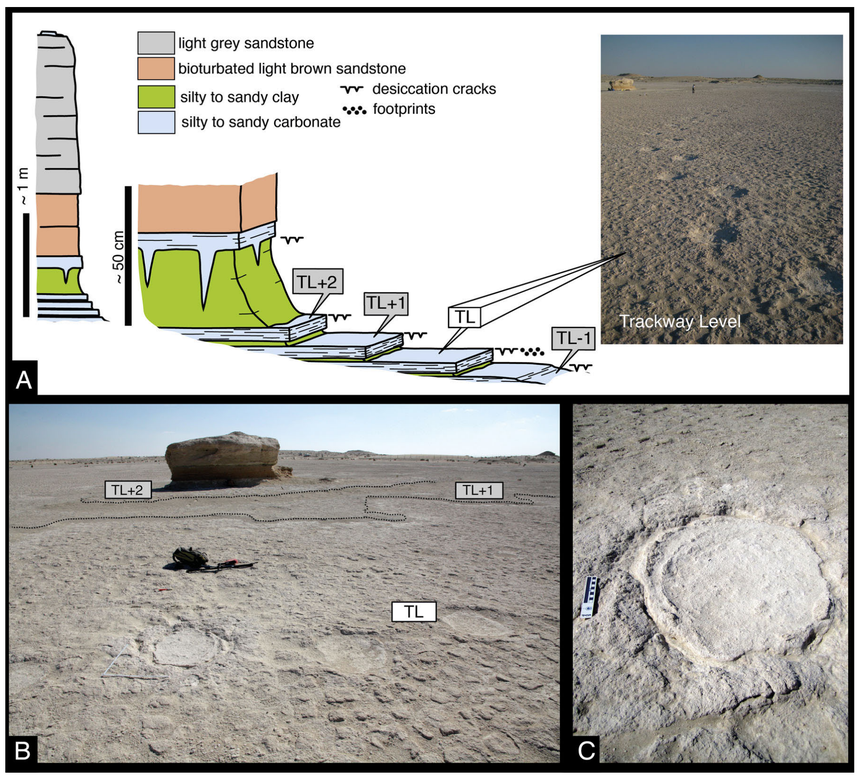


Fig. 2 . Schematic log of the Mleisa 1 section: (A) TL indicates the track bearing carbonate layer. The stratigraphy above refers to the geological section in the background. (B) overview of the carbonate layers. (C) detail of a single proboscidean footprint. (from Bibi et al. 2012)

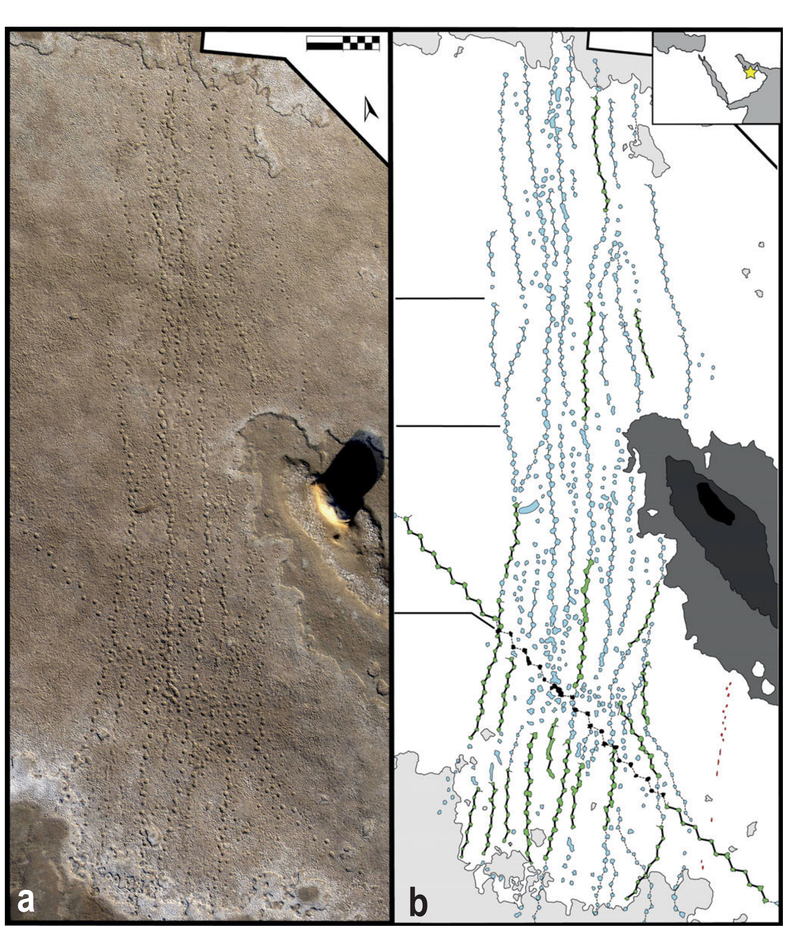


Fig. 3. Close-up of the central portion of Mleisa1. (a) The kite aerial orthophotomosaic. (b) Corresponding colour map of the trackways, with the prints forming each trackway connected by lines. Track sections that were measured and reported in figure 2a are connected by solid lines and numbered, with tracks sections in green indicating those used to calculate the minimum herd profile (figure 2b). Remaining proboscidean prints are shown in blue (herd) or black (solitary individual in the herd area). A single non-proboscidean trackway is shown in red (from Bibi et al. 2012).

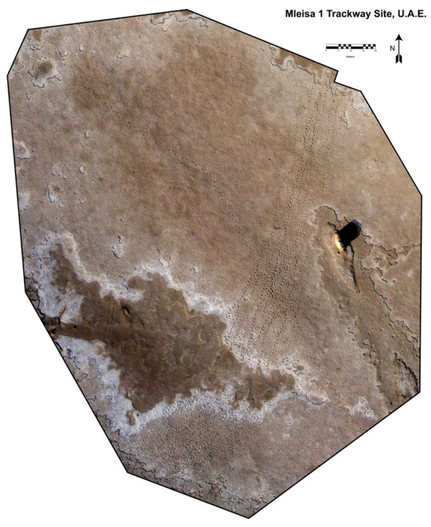
Acknowledments
The wonderful reconstruction of the Mleisa 1 herd has been kindly provided by Mauricio Anton. http://www.mauricioanton.com/

Ostracod Analyses

To better understand the environment the proboscidate herd was crossing, a series of carbonate samples for micropaleontological analyses were taken exactly on the track bearing layer . No foraminifera have been found whereas an interesting ostracod assemblage has been recovered (Fig. 4). *Cyprideis* cf. *torosa* is the dominant species with non-tuberculate forms (Plate1, IJKLM). *C. torosa* is typical of shallow brackish water environments. When occurring with non tuberculate forms, indicates salinty > 5‰ (Frenzel et al. 2012). *Heterocypris salina* (Plate1, GH) occurs both in slightly brackish waters together with other halophyl species, and in true freshwater (Meisch 2000). *Vestalenula cylindrica* (Plate 1, ABC) is typical of interstitial habitats, of springs linked to fluvial, marshy and hypogean environments (Gross 2004). Also some juvenile valves of *Candona* sp. (Plate1, F) occur. *Prolimnocythere* sp. (Plate1, DE) is the less common taxon and also the less known genus, referred to fresh to slightly brackish waters, with slow current (Schornikov 2007).

	MLS1	MLS2	JB1	JB1
Cyprideis cf. *torosa* (Jones 1850)	+++	+++	++	+
Vestalenula cylindrica (Straub 1952)	+			
Heterocypris salina (Brady 1868)		+	++	++
Candona sp. juv				--
Prolimnocythere sp.	-			

Fig. 4 Ostracods from Mleisa 1. Each sample = 100 gr of dry sediment. For each taxa the indication of the number of valves recovered is reported. +++ rich (>100); ++ abundant (100-50); + common (50-20); - scarce (20-10); - - very scarce (<10).



The Mleisa 1 site kite aerial orthophotomosaic (from Bibi et al. 2012)

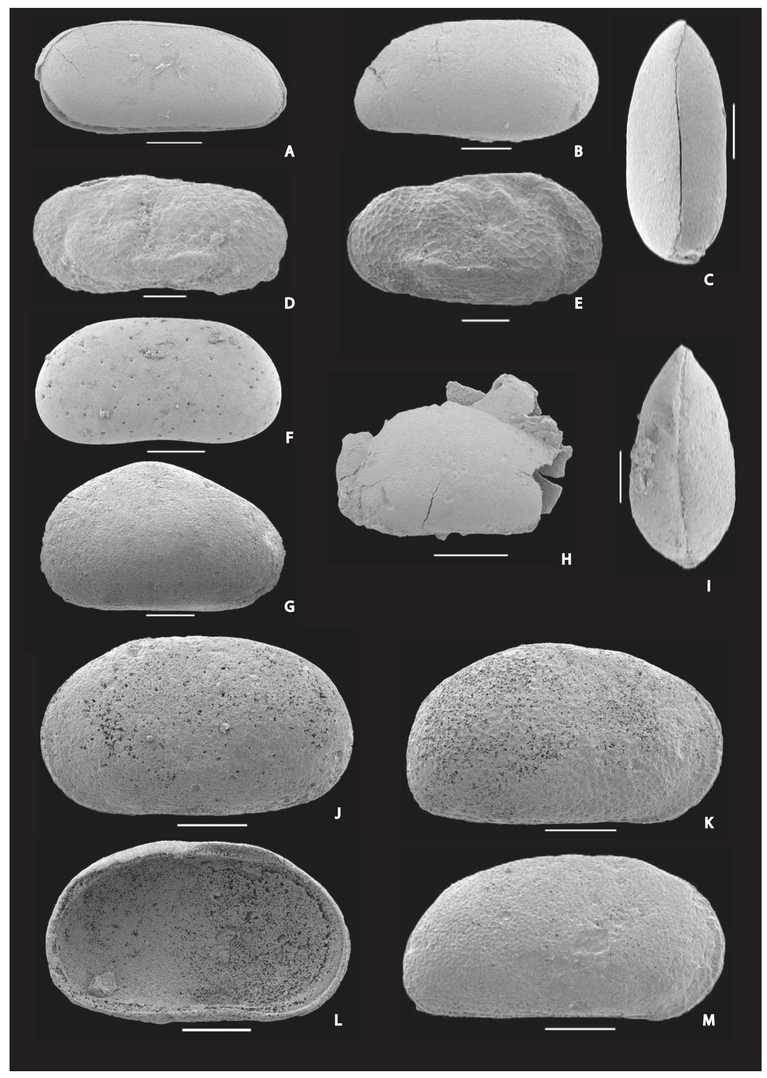


Plate1: Ostracods found in the carbonate laevels. White bar = 100μ

Conclusions

The ostracod assemblages indicate a shallow, fresh to slightly brackish water body. The salinity was probably linked to evaporation and not to a direct connection with the sea. *H. salina* and some species of *Candona* tolerate diseccation. This could imply that the water body developed seasonally and could diseccate occasionally. The importance of these data lies in the fact that, before this study, the carbonate layers of the BF were referred to a general “tidal environment”. Instead, a direct connection with the sea can be excluded. Detailed micropaleontological and sedimentological studies are in progress and they will provide further elements to define the water body that these old giants were crossing during the Late Miocene.

Fig. 5. Reconstruction of the Mleisa1 herd with Stegotretrabelodon. **© Mauricio Antón**

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