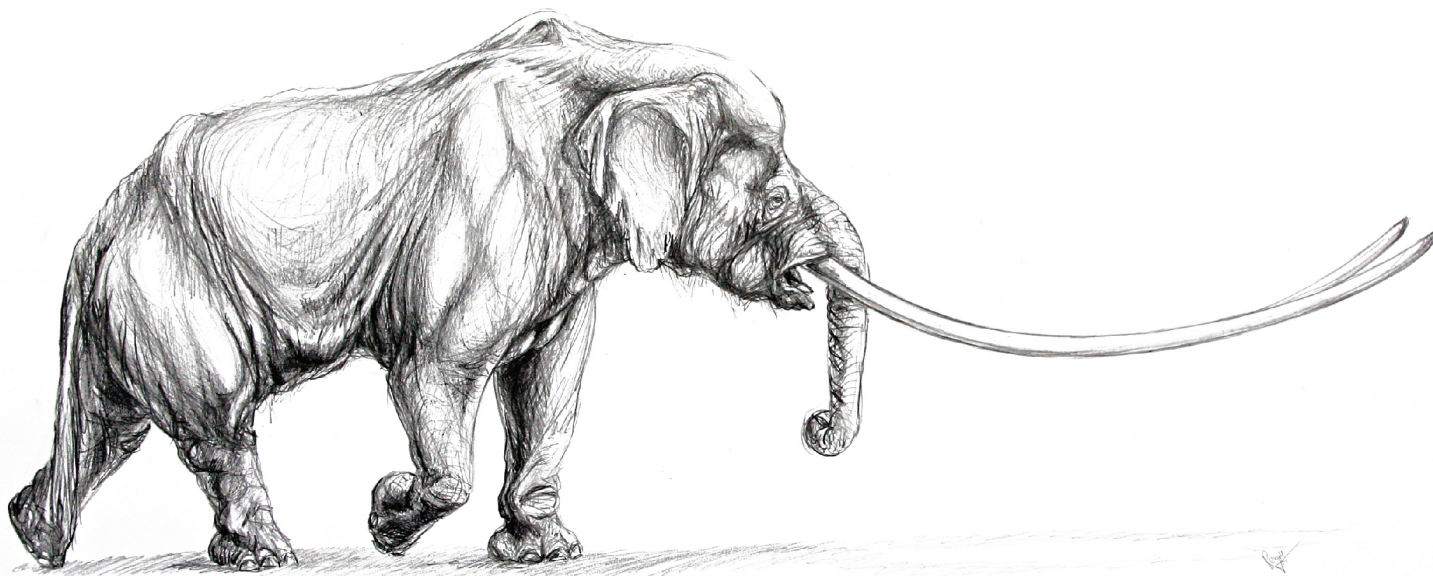




SCIENTIFIC ANNALS of the School of Geology,
Aristotle University of Thessaloniki

SPECIAL VOLUME 102



GREVENA
SIATISTA
GREECE 2014

VIth International
Conference
on Mammoths
and their Relatives

ABSTRACT BOOK

Editors:

Dimitris S. KOSTOPOULOS, Evangelos VLACHOS, and Evangelia TSOUKALA

THESSALONIKI, MAY 2014

An almost complete skeleton of a large *Deinotherium* (Proboscidea, Mammalia) from the Late Miocene of Aghia Photia, Siteia (Crete Island, Greece)

George ILIOPOULOS ✉, Charalampos FASSOULAS, and Marianthi TZORTZI

A significant number of fossiliferous land mammal localities from the Miocene of continental Greece and Eastern Aegean Sea Islands have been well known for decades. Nevertheless, until a decade ago the Miocene of Crete Island had been represented by just five land mammal localities (van der Made 1996), three of them from the central part of the island (Kastelios Hill, in de Bruijn et al., 1971), Plakias (de Bruijn and Meulankamp, 1972), Melambes (Bonneau and Ginsburg, 1974), one from the western part (Vrysses, in Benda et al., 1968) and one from the eastern (Petras Siteia, in Leinders and Meulankamp,

1978). During the last decade, the Cretan Miocene land mammal localities have been doubled in number, with four new localities from the eastern part of the island (Maronia, in Athanassiou, 2004; Gela Aghia Photia, in Poulakakis et al., 2005, Fassoulas and Iliopoulos, 2011; Aghia Photia and Zakros, in Fassoulas and Iliopoulos, 2011), and an ichnofossil locality from the western part (Iliopoulos et al., 2012). The determined taxa and stratigraphic data indicate that the age of the respective faunas ranges from the Middle (Astaracian) to the Late Miocene (Tourolian) (van der Made 1996; Fassoulas and Iliopoulos, 2011).



Fig. 1. The complete right mandible of *D. proavum* from Gela, Aghia Photia with tooththrow (p3-m3) and tusk in place.

Maximum anteroposterior diameter of the mandible = 1040 mm.

From 2002 to 2010, the Natural History Museum of Crete (NHMC) conducted systematic excavations at the locality of Gela, in Aghia Photia (Siteia eastern Crete, Greece), where the remains of a large proboscidean were revealed. The fossil assemblage was found within the fluvial sediments of the Skopi formation, and more specifically in red brown clays which are overlaid by grey sandstones of subtidal origin. 115 bone and teeth specimens have been recovered, including 21 out of a total of 22 teeth, a complete right mandible with all teeth in place and a left tusk. Taphonomic analysis of the recovered specimens indicates that they all came from a single individual. The study of the collected material showed that they belong to an exceptionally large *Deinotherium* (Fassoulas and Iliopoulos, 2011; Iliopoulos et al., in press; Poulakakis et al., 2005). This is evident from the size of the complete right mandible with an anteroposterior length of 1040 mm and a maximum length (perimeter) of the attached tusk of 1470 mm (figure 1). The size of the mandible can be correlated with the equally large specimens of *D. thraceiensis* from Ezerovo (1120 mm, Kovachev and Nikolov, 2006) and *D. gigantissimum* from Romania (1200 mm, Stefanescu, 1910). Furthermore, the Gela tusk is considerably longer than the longest known *Deinotherium* tusk from Montredon (1240 mm, Tobien 1988). Originally, based on the view of Harris (1973) and Huttunen (2002) that all large sized deinotheres belong to one species the material had been determined as *D. giganteum* (Poulakakis et al., 2005; Fassoulas and Iliopoulos, 2011; Iliopoulos et al., in press). Nevertheless, taking in mind the metrical similarities and recently published works on the taxonomy and chronology of deinotheriidae (Pickford and Pourabrishami, 2013; Markov, 2008; Böhme et al., 2012; Aiglstorfer et al., published on line), the studied material can be attributed to *D. proavum* (Eichwald 1831), a species which stands for the group that includes the synonymised taxa *D. gigantissimum*, *D. thraceiensis* and *D. indicum* (Pickford and Pourabrishami, 2013). Therefore, the age of the assemblage can be considered as Late Miocene and more specifically as early MN11 (Early Turolian).

The presence of *D. proavum* on Eastern Crete cannot be considered as coincidental, as two more localities have recently yielded *Deinotherium* remains. In 2004, Athanasiou described a *D. giganteum* mandibular part with m1 from the locality of Maronia, located close to Siteia, and some *D. giganteum* bone and teeth fragments were reported from a new locality near Zakros (Fassoulas and Iliopoulos, 2011). In both cases, the determinations should be reconsidered and thus the respective material should be attributed also to *D. proavum*. In addition, tooth specimens of *Microstonyx* cf. *major* have been discovered from nearby localities such as Petras (Leinders and Meulenkamp, 1978), Aghia Photia (Fassoulas and Iliopoulos, 2011), as well as a lower m3 of *M. cf. major* has been found in the actual locality of Gela.

Therefore, it can be concluded that during the Late Miocene well established terrestrial environments could be found on Eastern Crete, and a connection with Anatolia can be inferred. Despite the fact that a small number of Middle and Late Miocene localities were already known from the Central and Western part of the island, these findings shed light on the paleogeography of the Miocene of Crete which still is not well known.

References

- Aiglstorfer, M., Göhlich, U.B., Böhme, M., Gross, M. A partial skeleton of *Deinotherium* (Proboscidea, Mammalia) from the late Middle Miocene Gratkorn locality (Austria). *Palaeobiodiversity and Palaeoenvironments* doi: 10.1007/s12549-013-0140-x.
- Athanassiou, A., 2004. On a *Deinotherium* (Proboscidea) finding in the Neogene of Crete. *Carnets de Géologie. Notebooks on Geology*, Letter 2004/05 (CG2004_L05).
- Benda, L., Hiltermann, H., Kuss, S. E., Symeonidis, N. K., 1968. Der erste *Mastodon*-Fund der Insel Kreta. *Annales Geologiques des Pays Helleniques* 20, 167-177.
- Böhme, M., Aiglstorfer, M., Uhl, D., Kullmer, O., 2012. The antiquity of the Rhine River: stratigraphic coverage of the Dinotheriensande (Eppelsheim Formation) of the Mainz Basin (Germany). *PLoS One* 7(5), e36817.
- Bonneau, M., Ginsburg, L., 1974. Découverte de *Dorcatherium puyhauberti* ARAMBOURG et PIVETEAU (Mammalia) dans les faciès continentaux de base de la molasse tertiaire de Crète (Grèce): Conséquences stratigraphiques et tectoniques. *Compte Rendu Sommaire des Séances de la Société Géologique de France*, Paris (1), 11-12.
- De Bruijn, H., Meulenkamp, J.E., 1972. Late Miocene rodents from the Pandanassa Formation (Prov. Rethymnon), Crete, Greece. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen*, Amsterdam, 75 (1), 54-60.
- De Bruijn, H., Sondaar, P.Y., Zachariasse, W.J., 1971. Mammalia and Foraminifera from the Neogene of Kastellios Hill (Crete). A correlation of continental and marine biozones. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen*, Amsterdam, 74 (5), 1-22.
- Eichwald, E., 1831. *Zoologia Specialis quam expositis animalibus tum vivam, tum fossilibus potissimum Rossiae in universum, et Poloniae in specie Vilnae, typis Josephi Zawadzki*, pp. 404.
- Fassoulas, C., Iliopoulos, G., 2011. The excavations of *Deinotherium giganteum* from Siteia: life and environment in Crete during the Miocene. *Proceedings of the 10th International Cretological Congress*, Chania 1-8/10/2006, Greece, Vol A1, pp. 15-29.
- Harris, J.M., 1973. *Prodeinotherium* from Gebel Zelten, Libya. *Bulletin of the British Museum (Natural History) (Geology)* 23(5), 285-348.
- Huttunen, K., 2002. Deinotheriidae (Proboscidea, Mammalia) dental remains from the Miocene of Lower Austria and Burgenland. *Annalen des Naturhistorischen Museums in Wien* 103A, 251-285.
- Iliopoulos, G., Fassoulas, C., Lymberakis, P., Poulakakis, N., in press. A complete skeleton of *Deinotherium giganteum* (Proboscidea, Mammalia) from the Late Miocene of Siteia (Crete Island, Greece). *Proceedings of the 6th European Geoparks Meeting*, Lesbos Island 5-8/10/2005, Greece.
- Leinders, J.J., Meulenkamp, J.E., 1978. A *Microstonyx* tooth from eastern Crete; paleogeographical implications of Cretan Tortonian mammal associations. *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen* 81, 416-424.
- Markov, G., 2008. The Turolian proboscideans (Mammalia) of Europe: preliminary observations. *Historia naturalis bulgarica* 19, 153-178.
- Pickford, M., Pourabrishami, Z., 2013. Deciphering Dinotheriensande deinotheriid diversity. *Palaeobiodiversity and Palaeoenvironments* 93(2), 121-150.
- Poulakakis, N., Lymberakis, P., Fassoulas, C., 2005. A *Deinotherium giganteum* KAUP, 1829 (Proboscidea, Deinotheriidae) from the middle Miocene of Siteia (East Crete, Greece). *Journal of Vertebrate Paleontology* 25(3), 732-736.
- Tobien, H., 1988. Contributions à l'étude du gisement Miocène Supérieur de Montredon (Hérault). Les grands mammifères. 7. Les proboscidiens Deinotheriidae. *Palaeovertebrata (Mémoire extraordinaire)*. *Palaeovertebrata*, 18, 135-175.
- van der Made, J., 1996. Pre-Pleistocene land mammals from Crete. In: Reese DS (ed) *Pleistocene and Holocene fauna of Crete and its first settlers*. Prehistory Press, Madison, pp. 69-79.

✉ iliopoulosg@upatras.gr



Citation:

Iliopoulos, G., Fassoulas, C., Tzortzi, M., 2014. An almost complete skeleton of a large *Deinotherium* (Proboscidea, Mammalia) from the Late Miocene of Aghia Photia, Siteia (Crete Island, Greece). *Abstract Book of the VIth International Conference on Mammals and their Relatives*. S.A.S.G., Special Volume 102: 72-73.