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Palaeontology of the upper Miocene vertebrate localities of Nikiti (Chalkidiki Peninsula, Macedonia, Greece) History, stratigraphy and fossiliferous sites[☆]



George D. Koufos

Aristotle University of Thessaloniki, Department of Geology, Laboratory of Geology and Palaeontology, 54124, Thessaloniki, Greece

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ABSTRACT

The fossiliferous sites of Nikiti are located north of the homonymous village at the beginning of the Sithonia Peninsula in Chalkidiki (Macedonia, Greece). The Neogene deposits of Chalkidiki outcrop mainly in its western part and consist of four successive formations: Antonios Fm. (clastic, fluvial; early/middle Miocene – ?Vallesian), Triglia Fm. (fluvio-terrestrial; late Miocene), Trilophos Fm. (marine-brackish; end of Miocene) and Gonia Fm. (fluvio-lacustrine; Pliocene). In the Nikiti area, two different formations were recognized in the Neogene deposits. The clastic Nikiti Fm. overlies unconformably the metamorphic basement and consists of loose, cross-bedded conglomerates, alternated with lenses or lenticular intercalations of red-brown sandy sediments. The Nikolaos Fm. includes the lacustrine deposits which overlay the Nikiti Fm. and consists of alternated lenses or lenticular intercalations of clays, sands, sandstones and fresh-water marly limestones at the top. They can be correlated to the Triglia Fm. and Trilophos Fm. of western Chalkidiki, respectively. Several fossiliferous sites and spots have been found in the Nikiti region but two of them provided a rich mammal fauna; one of them gave also some bird and reptile remains. The excavations in the Nikiti region started in 1990 and they are divided in two periods: 1990–1998 (“old collection”) and 2004–2009 (“new collection”). Both collections include a large number of fossils and provide insights to the dating of the Neogene deposits as well as to the late Miocene biochronology and palaeoecology in this eastern Mediterranean area.

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1. Introduction

The Nikiti fossil mammal sites are situated around the homonymous village in the isthmus connecting the Sithonia Peninsula with the main body of the Chalkidiki Peninsula, which is located in Macedonia (northern Greece), southeastern to Thessaloniki (Fig. 1). The Neogene and Quaternary deposits are common in the Chalkidiki Peninsula, including several mammal localities, which cover the time-period from the beginning of middle Miocene to Pleistocene. The mammal fauna discovered in the Nikiti localities provided several taxa, including some new ones, and contributed remarkably to the knowledge of the late Miocene mammal faunas of Greece and the wider eastern Mediterranean region. The hominoid primate *Ouranopithecus macedoniensis* (Bonis, Bouvrain, Geraads and Melentis, 1974) and the cercopithecoid *Mesopithecus* Wagner, 1839 are among the most important discoveries in the Nikiti sites (Koufos, 1993, 1995, 2016a). The present article provides a historical review of the discovery and excavations of the Nikiti sites. Although known

(Syrides, 1990), a short summary of the Neogene/Quaternary stratigraphy of Chalkidiki Peninsula is given for helping readers to understand the geological and stratigraphic setting of the described fossils.

2. History of the discovery and excavations in the Nikiti region

The presence of fossil mammal remains in the Nikiti region was known since a long time but the information recycled among the villagers and never reached the university and the palaeontologists working there. Some tusk and bone fragments, found by the villagers, housed in the town hall for many years. In the spring of 1990, some mammal fossils were discovered during the construction of a country road connecting the villages of Nikiti and Agios Nikolaos. The workers collected some fossils (mainly teeth) and one of them showed these to a restaurant of the neighboring village Ormos Panagias. One of my students, Christos Stagonis, who was working in the restaurant at that time, realized that they were fossils and brought to me two hipparion teeth. At the same time, the major of the village, Michalis Anagnostaras, contacted and informed me about the presence of the fossils. Immediately I went with George Syrides to Nikiti. Here, we recognized a fossiliferous lens, which was cut

[☆] Corresponding editor: Dimitris S. Kostopoulos.
 E-mail address: koufos@geo.auth.gr

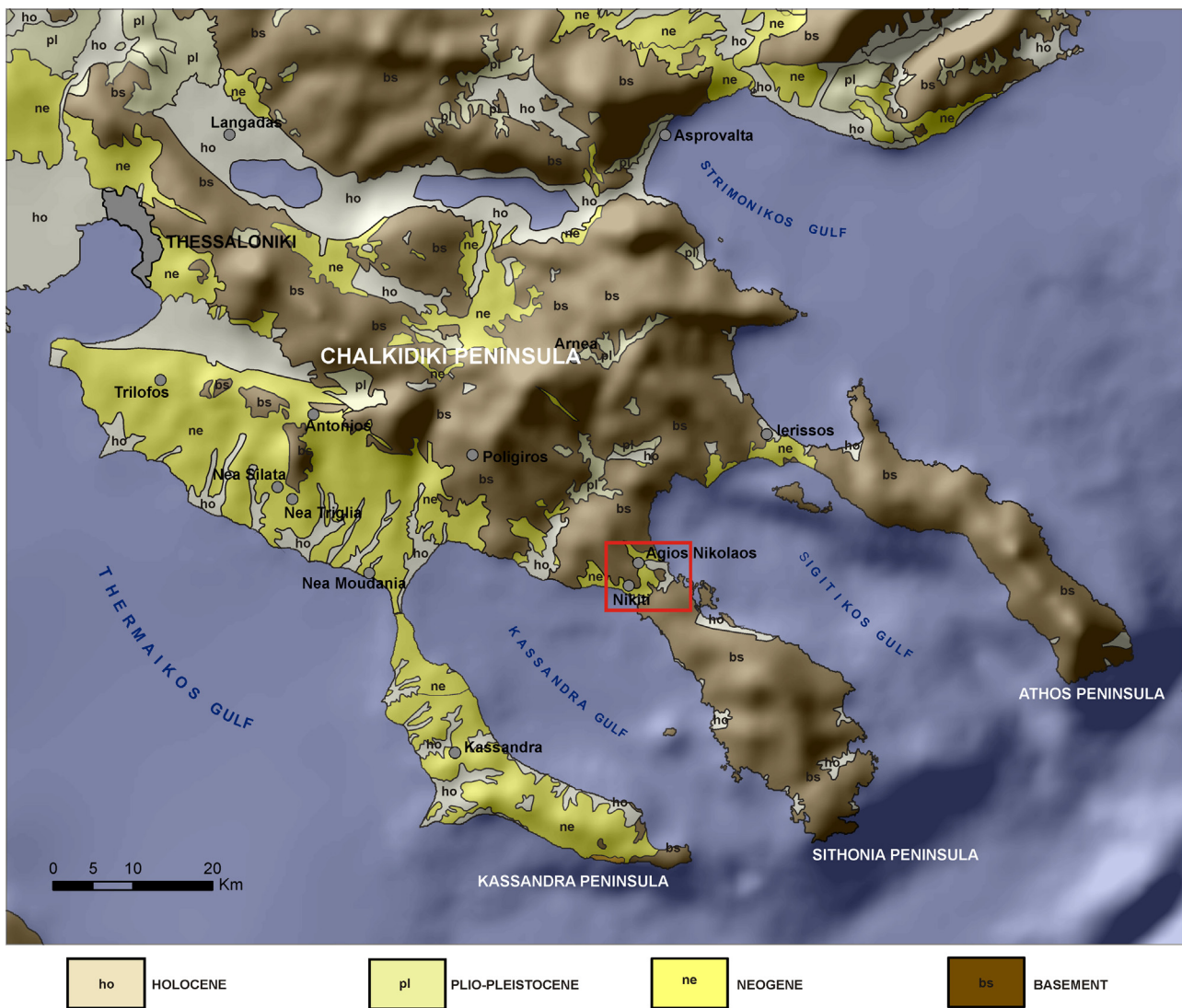


Fig. 1. Geological map of the Chalkidiki Peninsula, indicating the Neogene/Quaternary deposits of the area (from Mountrakis et al., 2006). The red rectangle indicates the area with the Nikiti fossiliferous sites.

by the road under construction. Unfortunately, a large part of the lens was already destroyed and the debris were pushed in a ravine by the bulldozer working there, but some remains of broken fossils rested on the surface. These fossil remains were collected immediately but our efforts to find more fossils in the debris were unsuccessful. Most of the fossils were broken by the bulldozer, while their bad preservation, as well as their drop in the ravine helps to their entire catastrophe.

In summer 1990, a team led by the author started a systematic excavation and fossil collection in this fossiliferous site, named Nikiti 1 (NKT). The initial collection provided some preliminary results for the fauna and age of the locality (Koufos et al., 1991). The field work in the Nikiti region continued since 1998 and a great number of fossils have been unearthed. In the meantime, the prospecting of a wider area led to the discovery of other fossiliferous sites, the most important of which is Nikiti 2 (NIK), excavated periodically from 1992–1998. After a five-year break, a second period of excavations started in Nikiti from 2004 to 2009 (Figs. 2 and 3). The fossils collected during the second period of excavations are numerous, enriching remarkably the previous collection and enabling a better knowledge of the fauna and its relationships, as well as the precise dating of the localities.

The Nikiti fossil collection is divided in two parts corresponding to the first excavation period (“old collection”) and to the second one (“new collection”). The “old collection” consists of numerous fossils from NKT and less from NIK; it was described in a series of articles (Koufos, 1993, 1995, 2000; Kostopoulos, 1994; Kostopoulos and Koufos, 1996, 1999; Kostopoulos et al., 1996; Vlachou and Koufos, 2002); a revision of the “old collection” is given in the present volume. The “new collection”, including several new and important fossil remains, as well as turtles and birds, is described in the present volume. The most important addition is the presence of the cercopithecoid *Mesopithecus* and two new hipparion species from NIK (Koufos, 2016a; Koufos et al., 2016a). The case of the carnivores is also worth noting, as the “old collection” lacks carnivores but the “new collection” includes several ones (Koufos, 2016b; Koufos et al., 2016a). The “new collection” also includes some rhinocerotid bones and some indeterminate bones of mastodonts from NKT (Koufos et al., 2016a).

Several colleagues, undergraduate and postgraduate students participated in the excavations and preparation of the fossils. Some of the students became palaeontologists and they are now working in various institutes. Below I list the names (with the most recent title) and the period they worked in the Nikiti area of all (except the

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