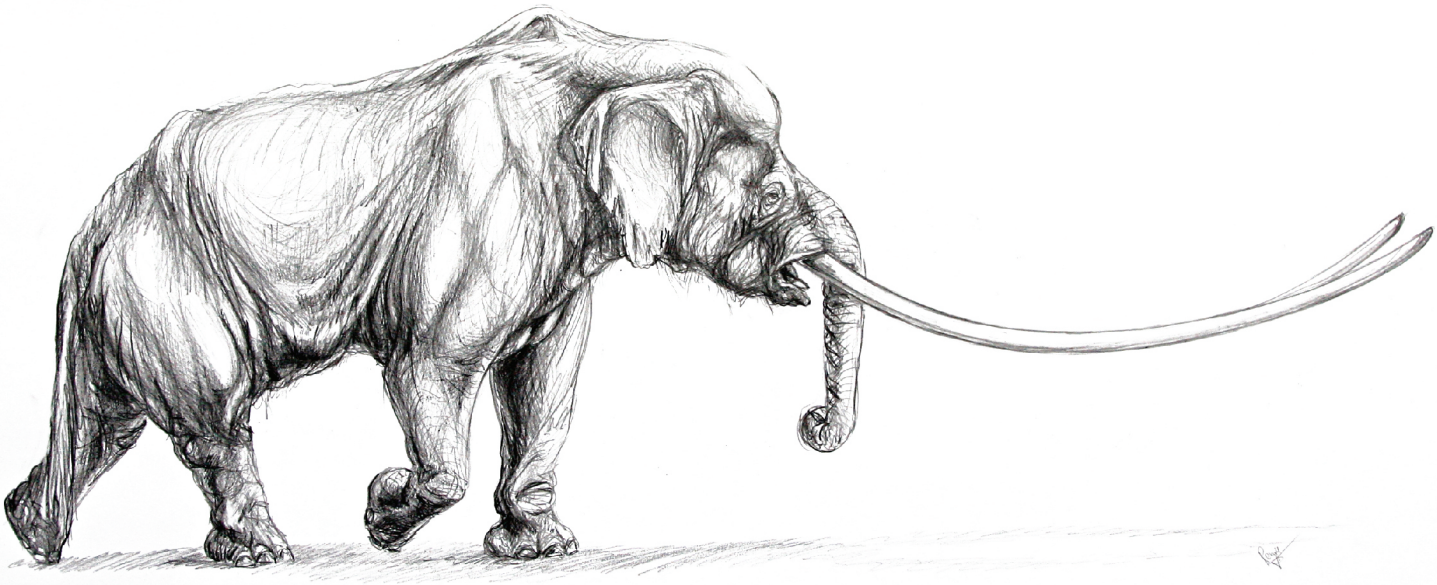
SCIENTIFIC ANNALS of the School of Geology,
Aristotle University of Thessaloniki

SPECIAL VOLUME 102



VIth International Conference on Mammoths and their Relatives

GREVENA
SIATISTA
GREECE 2014

ABSTRACT BOOK

Editors:
Dimitris S. KOSTOPOULOS, Evangelos VLACHOS, and Evangelia TSOUKALA

THESSALONIKI, MAY 2014

Palaeoenvironmental information from isotopic fingerprints of the Early Villafranchian *Mammut borsoni* from Milia (Grevena, Macedonia, Greece)

Elissavet DOTSIKA ✉, Evangelia TSOUKALA, Paraskevi CHANTZI, Petros KARALIS, and Efstathios HELIADIS

Skeleton and tooth remains of the zygodont *Mammut borsoni* (Hays, 1834) (Proboscidea) were identified at Milia in Grevena, W. Macedonia. The present study focussed on tooth remains of this proboscidean. Among the elephantoids, zygodon mammutids are the most conservative; however fossils were unearthed in a state of generally poor preservation with a high degree of post-mortem mineralization. The right M3 upper molar is better preserved than M2, and retains relatively unaltered enamel of about 5.8 mm to 7.6 mm in thickness. Roots on these molars appear to be well-developed and robust. The lower molar m3 is located in the middle of the mandible remnant, and along with m2, comprises less than a third of the total length of the jaw (Tsoukala, 2000). The third permanent molar is the last to erupt and show wear, and is considered to represent the natural limit of mammut's life (Arppe, 2009).

Tooth enamel structure is essentially non-porous and almost entirely inorganic. Additional enamel form during life by accretion, and is not altered in composition after the initial crystallization. Thus, we believe that the palaeoenvironment and palaeodiet of the mammutid are recorded within the enamel of these molar teeth; we analyzed the tooth enamel of these specimens to determine the carbon isotope composition of hydroxyapatite carbonate (Dotsika et al, 2011; Merceron et al, 2013; Pushkina et al, 2014).

About 100 mg of powered sample were used for isotopic analysis which carried out in Stable Isotope Unite of Institute for Advanced Materials, Physicochemical Processes, Nanotechnology & Microsystems of NCSR "Demokritos" in Greece. The external precision based on multiple sample measurements was about 0.1‰ for $\delta^{13}C$ results. Also elemental microanalysis spectrometer with energy dispersive X-ray (Energy Dispersive X-ray, EDX) in a scanning electron microscope (Scanning Electron Microscopy, SEM) were carried out, at the same institute, where results reflected the hydroxyapatite carbonate structure of enamel through the dominant presence of Ca, P.

The interpretation of isotopes concluded probably on the presence of C3 type of diet.

References

Arppe, L. 2009. Isotopic records of terrestrial ice age environments in mammoth bioapatite. Publications of the Department of Geology. D. , no. 17 , University of Helsinki, Helsinki. ISBN: 978-952-10-4275-1, http://hdl.handle.net/10138/23703.

Dotsika, E., Zisi N., Tsoukala E., Poutoukis D., Lykoudis S., Giannakopoulos A., 2011. Palaeoclimatic information from isotopic signatures of Late Pleistocene *Ursus ingressus* bone and teeth apatite (Loutra Arideas Cave, Macedonia, Greece). Quaternary International 245, 291-301.

Merceron G., Kostopoulos D., Bonis L., Fourel F., Koufos G., Lécuyer C., Martineau F., 2013. Stable isotope ecology of Miocene bovids from northern Greece and the ape/monkey turnover in the Balkans. Journal of Human Evolution 65, 185-198.

Pushkina D., Bocherens H., Ziegler R., 2014. Unexpected palaeoecological features of the Middle and Late Pleistocene large herbivores in southwestern Germany revealed by stable isotopic abundances in tooth enamel. Quaternary International, Available online 1 February 2014, ISSN 1040-6182.

Tsoukala E., 2000. Remains of a Pliocene *Mammut borsoni* (Hays, 1834) (Proboscidea, Mammalia), from Milia (Grevena, W. Macedonia, Greece). Annales de Paléontologie 86, 165-191.

edotsika@ims.demokritos.gr

Citation:
Dotsika, E., Tsoukala, E., Chantzi, P., Karalis, P., Heliadis, E., 2014. Palaeoenvironmental information from isotopic fingerprints of the Early Villafranchian *Mammut borsoni* from Milia (Grevena, Macedonia, Greece). Abstract Book of the VIth International Conference on Mammoths and their Relatives. S.A.S.G., Special Volume 102: 10.