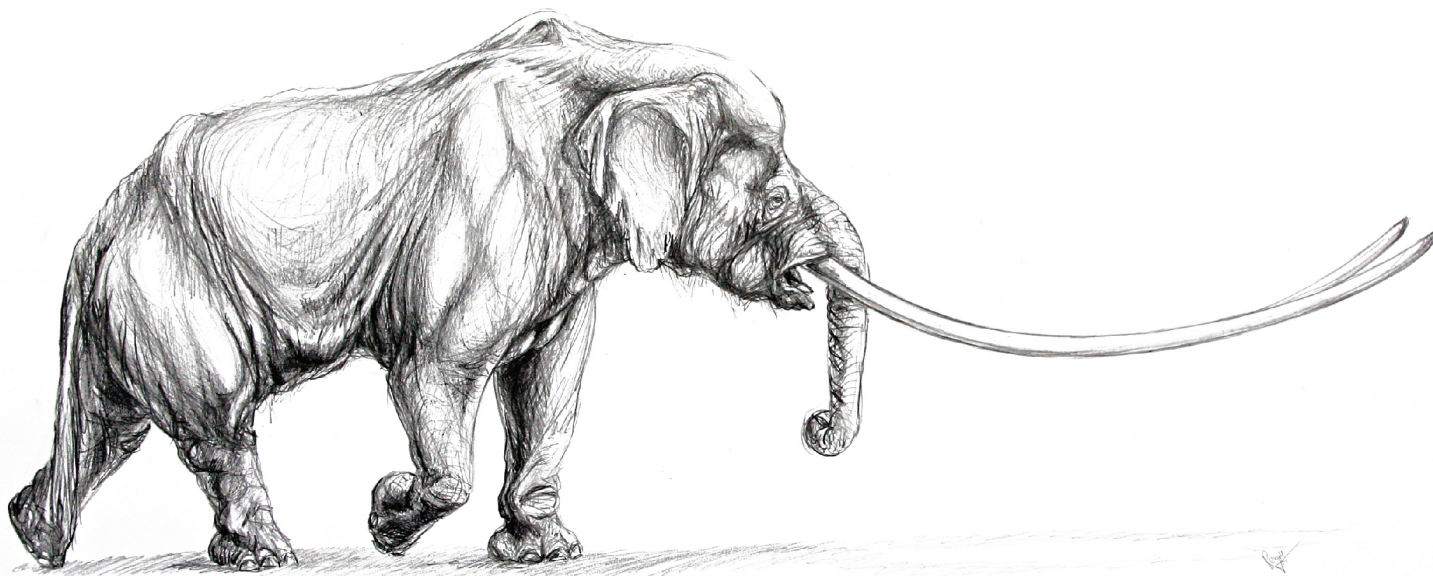




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## **ABSTRACT BOOK**

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## "Black" elephant bones in a cave: the case of Charkadio cave on Tilos Island, Greece

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The objective of this paper is to study the origin of the black colour of skeletal remains recovered from the fossiliferous site in Charkadio Cave on Tilos Island (Dodekanese, Greece). This site has given thousands of fossils of the endemic elephant of Tilos *Elephas tiliensis*, which were found in the cave deposits at a depth of 0-4 meters from zero point, in sediment rich in volcanic tuff that was redeposited in the cave. These dwarf elephants lived on the island during the Upper Pleistocene and part of the Holocene (+/- 45.000 - 3.500 years BP) (Theodorou et al, 2007). The associated fauna includes long bones of *Testudo marginata* and various bird remains. Material of sub endemic deers (*Dama dama*) is also present at Charkadio but about 90.000 years earlier than the elephants (Bachmayer et al. 1976; Symeonidis 1972; Theodorou et al, 2007). Up to this moment it has not been possible to document the coexistence of the Tilos elephants and Neolithic man.

During the processing and preparation of skeletal material coming from the excavation periods of 2001 and 2012 (work realized for THALES -MIS380135), numerous dark coloured (brown-dark brown-black) skeletal remains were discovered. These findings are of great interest, as black bones have also been observed and studied in numerous sites all over the world (Chadefaux et al, 2009; Reiche, 2010; Simmons et al, 1999; Stathopoulou et al, 2004; 2013), and have often been connected to the presence of fire due to humans. The possibility of burnt bones in the cave would allow us to imply for the first time, the coexistence of man and elephants on the island.

Black colouring of skeletal material at archaeological and palaeontological sites can be attributed to burning, oxide staining or a combination of both procedures. (Reiche, 2010; Shashack-Gross, 1997). The identification of burnt bone through the study of features such as colour has been one of the most common methods in zooarchaeological research, though increasingly the need for analytical techniques has become obvious (Nicholson, 1993). As a result, various such techniques and methods have been applied on "dark coloured" bones in the past and many attempts towards a straightforward analytical protocol concerning the presence of burning in osteological material have been made (Goncalves, 2012; Hanson & Cain, 2007; Lebon et al, 2008; Piga et al, 2009; Stathopoulou, 2008; Stathopoulou et al, 2004; 2013).

During our study, a combination of modern analytical techniques are applied on a selection of "black" bones as well as samples of the surrounding sediment from the Charkadio cave, in order to explore the origin of their colouration. Specifically Optical microscopy, Scanning Electron Microscopy (SEM) combined with X-ray Microanalysis (EDXA), X-ray Diffraction (XRD) and Infrared Spectroscopy techniques are applied.

The preliminary results on the histology, mineralogical and chemical composition, crystallinity and structural parameters, due to diagenesis but also due to possible burning, will be presented and their correlation to the palaeontological context discussed.

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