



Dwarf elephant bearing karst and volcanoclastic deposits from Charkadio Cave, Tilos, Greece

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Dwarf forms elephants, hippopotamus and cervids are well known from several Mediterranean islands like Sicily, Malta, Crete, Cyprus and the Cyclades and Dodecanese islands (Rhodes, Tilos, Kos). This study concentrates on sediments exposed in Charkadio Cave on Tilos.

The Charkadio Cave was formed during the middle to upper Pleistocene within Mesozoic limestones. Tilos has no volcanic history itself but was strongly influenced by Pleistocene volcanic activities from neighboring volcanic islands like Kos, Giali and Nisyros.

The cave is located 2.4 km south of the village Megalo Chorio. The entrance of the cave faces west and lies 120 m above the sea level. The present-day cave is built up by one 4.5 m high room and covers an area of 180 m². Several excavation campaigns have taken place since the 1970s. The recovered fossils include mainly dwarf elephant bones (80 individuals), besides cervides and even myropodes.

The originally shaft-like cave is filled by a more than 20 m thick sedimentary succession. Two cross-sections within the uppermost 6 m were studied. The deposits can be subdivided into five units. The lowermost unit is built by poorly sorted, bedded reddish cave clay. The second unit consists of poorly sorted reddish silt with abundant

limestone clasts from the roof of the cave.

This unit is overlain by a characteristic flowstone layer. The fourth unit is reddish silt with some limestone clasts. The clayey-silty deposits are followed by a bedded sandy layer containing dwarf elephant bones. The clayey-silty units comprise quartz and calcite. Main clay minerals are smectite, illite and kaolinite with traces of chlorite. Heavy mineral assemblages show a dominance of amphiboles and authigenic barite. The sandy unit is dominated by quartz and feldspar. Calcite was only found in the upper- and lowermost parts. Abundant nodular phosphate concretions are present within the sandy deposits. Pumice fragments from this unit can be correlated with the Kos Plateau Tuff (161 ka). The heavy mineral assemblage is dominated by pyroxenes and apatite.

The clayey-silty units are interpreted as autochthonous karst sediments. They mainly consist of insoluble material (“terra rossa”) of the surrounding limestones. The second unit represents a collapse zone. $^{230}\text{Th}/^{234}\text{U}$ dating of cervid bones provided an age of ~ 140 ka. The collapse process was followed by a fall of the groundwater level. Together with wet climate and vegetation this provided the conditions for drip- and flowstone formation. $^{230}\text{Th}/^{234}\text{U}$ dating gives an age of ~ 107 ka. The composition of the dwarf elephant bearing sandy unit reflects a change from karst relict sediments with only little volcanic influence to volcanic dominated sediments derived from outside the cave.