7 STRUCTURAL CONTROL, DEPOSITIONAL ENVIRONMENT AND GEO-ARCHAEOLOGICAL CONDITIONS IN THE MEGALOPOLIS BASIN, SOUTHERN GREECE

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7.1 INTRODUCTION

The Megalopolis Basin (MB) is an intra-montane basin, located in the actively extending domain of the Hellenic Arc, in the central Peloponnese (Fig 1). Its sedimentary fill includes an initial deposition of Pliocene lacustrine marly sands and marls, succeeded by Pleistocene fluvial and lacustrine, lignite-bearing sediments and Late Quaternary fluvial terraces of the Alfeios river (Lüttig and Marinos, 1962; Vinken, 1965). The paleogeographic setting and depositional environment(s) of the MB were controlled by the interplay between tectonic activity and climatic fluctuations throughout the Quaternary, two controlling factors that function at different time scales.

7.2 BASIN FILL AND STRUCTURAL CONTROLS ON SEDIMENTATION

The post-Pliocene basin fill of the MB includes the Megalopolis and Apiditsa formations (fm) and the Marathousa member. Megalopolis fm represents a fluvial depositional environment and includes metamorphic clasts (quartzites and schists). Non-systematic paleoflow measurements indicate that it was sourced from the E-ESE; however, within the present-day catchment of the Alfeios drainage basin, no metamorphic outcrops are present (Fig. 1). Thus, the occurrence of metamorphic clasts within the Megalopolis fm can be explained by a stream piracy that must have occurred during the late stages of deposition, which cut off the ba-

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sin portion that fed the basin with metamorphic clasts. Such an event is believed to be the result of the NNW-ward propagation of the Sparta fault system and the uplift of the Leontari horst at the southern extremity of the MB.

Apiditsa fm was sourced from the W/WSW and contains no metamorphic clasts. Its source area lies in the bedrock outcrops (Pindos Unit) that border the MB from the west. It is a formation whose deposition lasted throughout the evolution of the MB and is mapped as chronostratigraphically equivalent to the Megalopolis fm; from the re-evaluation of borehole data and field reconnaissance it is found to mostly overlie the Megalopolis fm at its basal part. However, towards the top it appears to be partly overlain by it. The deposition of the Apiditsa fm is believed to be controlled by the tectonic activity on the western boundary of the MB, through the NNW-SSE, east-throwing Ellinitsa Fault and (possibly) the Lykaion Fault System. The lignite-bearing Marathousa member is regarded to be the distal equivalent to the Megalopolis and Apiditsa fm. It interfingers stratigraphically both with the Megalopolis fm in the east and with the Apiditsa fm in the west and its sedimentological characteristics show a gradual change from purely limnic to transitional to fluvial from east to west.

Moreover, the configuration of the pre-Pliocene basement of the MB appears to also have played a part in the evolution of the basin, which presents a fault-controlled bedrock salient between Kyparissia and Marathousa villages (Fig. 1), with the alpine bedrock cropping out at the former location and a basement horst (Leontari) located at the southern part of the MB (Fig. 1). Some of these faults, which had formed a fault-controlled paleorelief, were transgressively covered by the ba-

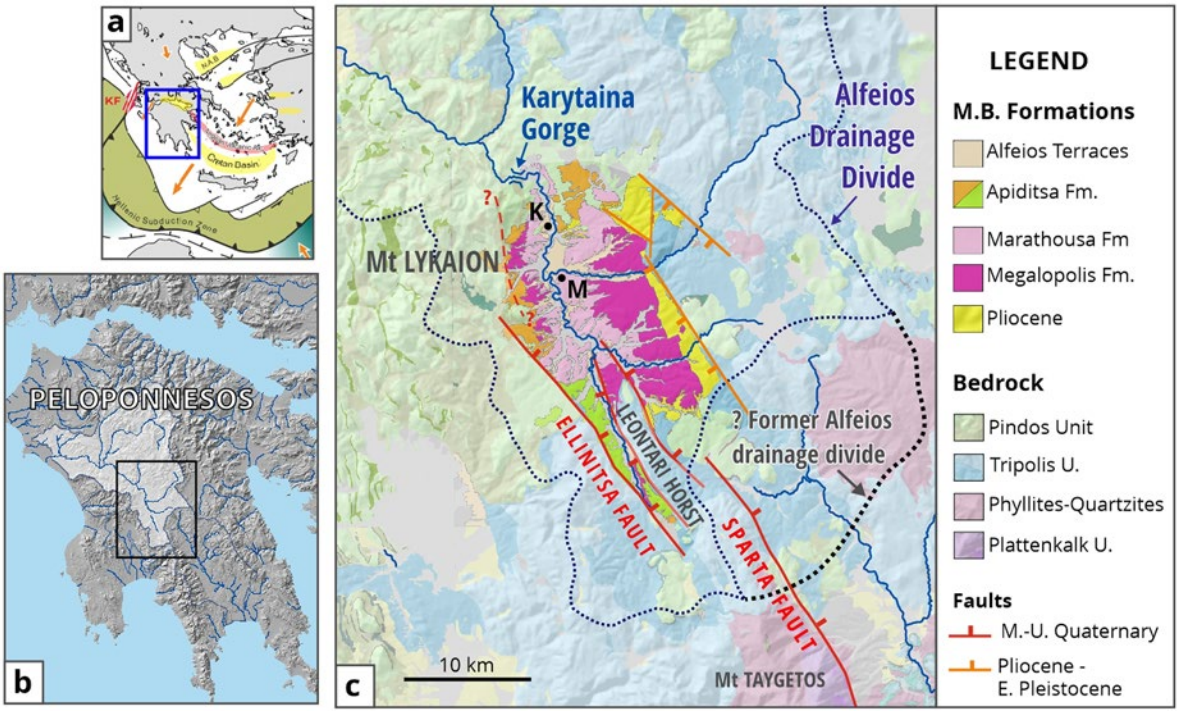

Figure 1: (a) General location map. Yellow shading denotes active extensional domains. Orange arrows denote GPS velocity vectors: KF: Kefallonia Fault; NAB: North Aegean Basin. (b) Shaded relief map of the Peloponnesos; highlighted is the drainage basin of the Alfeios River. (c) Generalized geological map of the Megalopolis Basin (MB). Fault ticks on downthrown block. K and M stand for the locations of Kyparissia and Marathousa villages, respectively.

sin deposits, remained active at least during the early stages of sedimentation in the basin (Kranis et al., 2020).

The last stage in the evolution of the MB is characterized by the establishment of the modern Alfeios drainage, initially depositing floodplain sediments, subsequently cutting into them and form terraces, following episodic(?) drops of its base-level, owing to alternating climatic conditions and/or surges of fault activity. Finally, the breaching of the basement salient in the NNW (Karytaina gorge), led to the establishment of the present-day base level, with Alfeios cutting into its more recent deposits.

7.3 GEO-ARCHAEOLOGICAL IMPLICATIONS

We suggest that prehistoric human habitation was governed not only by climatic and societal conditions, but also by local geological and tectonic factors. The Megalopolis Basin provides such examples: hominins exercised their activities at locations where the geological conditions were favorable: (i.e., avoiding marshy, swampy ground), while being close to freshwater (i.e., river- or lakeside). Such conditions can be provided by suitable geological formations, which can be either 'stable' basin sediments or bedrock outcrops. The former can be represented by the Apiditsa and Megalopolis formations, while the latter are the carbonate outcrops of the Pindos Unit. The findings at the Marathousa 1 and Kyparissia sites (Panagopoulou et al., 2018; Athanassiou et al., this volume; Karkanas et al., this volume) are located at the flanks of a basement salient within the MB, which is controlled by intra-basinal NNW-SSE and ENE-SSW faults.

Thus, the interplay between tectonics, climate and sedimentation provides the necessary conceptual framework in the process of geo-archaeological and paleoanthropological investigations.

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