**Supplementary** **material - Geomorphological evolution of the Petrovaradin Fortress Palaeolithic site (Novi Sad, Serbia)**

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**Supplementary material to chapter Introduction- A brief geological setting**

Early, Middle and Late Miocene sediments were preserved continuously only on the northern slope of the mountain. Sediments from the Early Miocene were formed in subtropical water environment, at a depth of hundreds of meters. At some places it contains allochtonous dark coal formed at shallow depth (0.6-2.5 m). Sediment analysis at the northern and southern slope of the mountain shows that both sediment series did not belong to the same lacustrine system. The sedimentary environment during the Middle Miocene changed predominantly to the marine, neritic zone. A Tortonian age was confirmed by fossil micro and macro fauna. During the Sarmatian and Pannonian stages in the Late Miocene the sedimentary environment became brackish with deposition of conglomerates, sandstone, sands, gravel and limestone during the Early Sarmatian, but marls and clay with a rich fossil fauna of bivalves and gastropods during the later Sarmatian. Sediments of the Pannonian, as equivalent of Middle and Late Sarmatian, are famous for their white marls, which are being exploited for the industry purpose (Čičulić-Trifunović and Rakić, 1977).

Within the Pliocene three stages are distinguished: Pontian, Early Paludinian (known as Zanclean in Mediterranean stages, or Dacian in Central Paratethyan stages), Middle Paludinian and Late Paludinian (known as Piacenzian in Mediterranean stages, or Romanian in Central Paratethyan stages) (Marović et al., 2002). Pontian sediments are located at the periphery of the mountain, where they are overlain by Quaternary sediments. Pontian sediments were formed in a shallow water environment with numerous fossil remains of Viviparus. Paludinian rocks are present in the wider region of Novi Sad. Multi-colored sands and clays were formed in a completely fresh-water environment, while at the northern mountain slopes lignite started to form. The Middle Paludinian is documented by fossil fauna and yellow sands, with increased amounts of metallic minerals. The mica content decreased, which was interpreted as a change in depositional processes. The Late Paludinian was not documented in the Fruška Gora Mountain, but it exists nearby Novi Sad where it represented by sandy and gravelly sediments (Čičulić-Trifunović and Rakić, 1977).

**Supplementary material to chapter Methods**

Topographic map of Novi Sad was scanned and digitized in *ArcMap 10.1*. The Digital Elevation Model (DEM) was created from the elevation points and contour layer via System Toolboxes > Spatial Analyst Tools > Interpolation > Topo to Raster. The DEM was then used for the slope determination, as the continuous data is required. The slope map was made via Slope 3D analysis which calculates the maximum rate of change in value from that cell to its neighbors. Each cell has eight neighbor cells around it. DEM is fitted to a plane to the z-values of a 3 x 3 cell pattern. The slope value of this plane is calculated using the average maximum technique. The lower the slope value, the flatter the terrain; the higher the slope value, the steeper the terrain (Burrough and McDonell, 1998). The product of this analysis is Supplementary Figure 1. Here it can clearly be seen which surfaces of the Fruška Gora Mountain are less steep and thus, considered to be river terraces. Expert judgment was used to determine the final look of the terraces. Their cross-section can be found in Figure 2 in the manuscript.

DEM model was presented in 2D and 3D on Supplementary Figure 2. Different colors indicate five terraces, which are used in this study. The Petrovaradin fortress is built on the terrace at 120-125 m. above mean sea level, here presented by light blue color.

**References**

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Čičulić-Trifunović, Rakić, M.O. (1977). Explanatory book for sheet Novi Sad, Basic Geological Map 1:100.000. Beograd: Federal Geological Survey. pp 54.

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Supplementary figure captions

Supplementary Figure 1. Slope map created from the Digital Elevation Model of Fruška Gora Mountain. The red color presents the steepest parts of the northernmost part of the mountain. The slopes are given in degrees.

Supplementary Figure 2. (A) 3D model and (B) 2D model of Danube terraces on the northernmost part of the Fruška Gora Mountain.