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RECONSTRUCTION OF PALAEOENVIRONMENT DURING QUATERNARY SEDIMENTATION IN THE VRGORAČKO POLJE

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EXTENDED ABSTRACT

One of aims of project Standardisation and Applied Investigation of Quaternary Sediments in Croatia (SAPIQ) is investigation of karst fields, including sedimentology and dynamics in the Vrgoračko polje area during the Pleistocene and Holocene.

The Vrgoračko polje is situated at the southern edge of the Dalmatian Zagora with Dinaric elongation, enclosing the area of 37 km^2, and elevation above the sea level is between 20 and 28 m. The most important water stream of this area is the Matica River. Its water originates from the springs in the north-west of Vrgoračko polje and flows into the Bačinska lake through swallow holes (Figure 1) and artificial Prigon channel. Before the digging of the additional drainage canals, it used to be a permanent lake. Data were collected from the drilling cores, outcrops and by geoelectric measurements.

Between older clays and younger lake lime is clear erosional border (Figure 2) or layer representing an archive of intensive dynamics of erosion and resedimentation as a consequence of periodical strong current flows. The older Pleistocene sediments are represented by clay silt and clay deposited in swamp, intensively coloured by iron and manganese oxide and hydroxide impregnations (Figure 3). Whitish Holocene lake lime is almost completely composed from charachean algae, ostracods and molluscs (Figures 2, 4).

Fig. 1 Swallow holes on south-east part of the Vrgorac polje.

Fig. 2 Clear erosional border between clay silt and clay and lake lime.

Carbonate intercalations in the clay sediments were deposited due to extensive erosion of the lake lime from the north-west. Quick deposition rates on the top of still unsolidified clay sediment are marked by Soft Sediment Deformations (SSD) (Figure 3). The lake was periodically partially dried up, giving the place for pedogenetic processes to appear. Recently, soil and older sediment erosion is still present, but in much smaller extent.

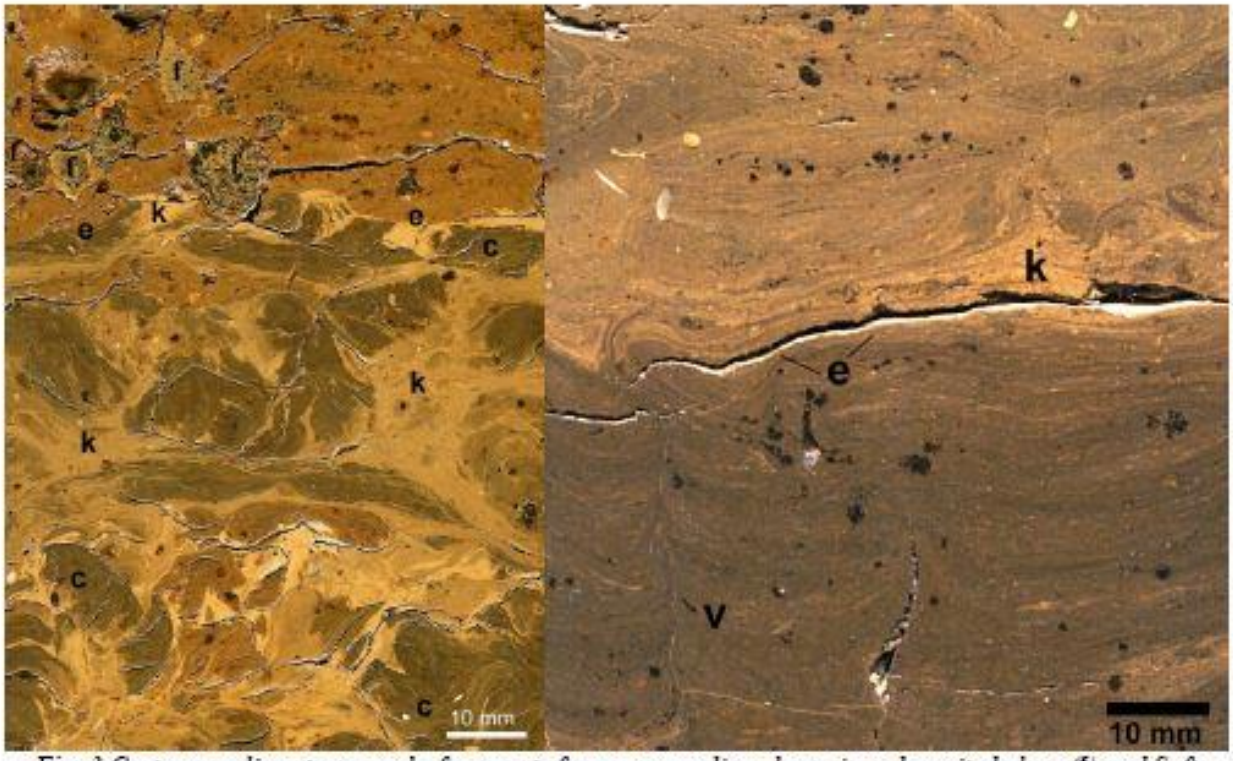

Fig. 3 Cretaceous limestones rocks fragments from surrounding slopes in redeposited clays (f) and Soft Sediment Deformations in laminated lake sediment (layer between clays and lake lime): Convolution of laminas (c), erosional border (e), water escape (v), redeposited material of lake lime (k).

Fig. 4 Fossil remains of organisms that compose lake lime in the Vrgorac polje:Operculums, Ostracodes, Characean taluses and Gyrogonites.

Geophisical investigations were performed by geolectrical sounding on three profiles. Twenty nine geoelectric sounds was measured in the length of about 4000 m. The position of profiles in the field is determined in order to define contacts between lithological unites: Holocene lake lime, Pleistocene clay and Cretaceous limestones, and to define possible presence of other lithological unit sedimented in paleokarst.

Quantitative interpretation of field measured diagrams of geoelectric sounding was based on determination of the value of electrical resistivity and thickness of the registered geoelectric units (Figures 5, 6). It came out that most of sediment that fills-in paleodepresion made of Cretaceous limestones is limestone breccia with clay matrix.

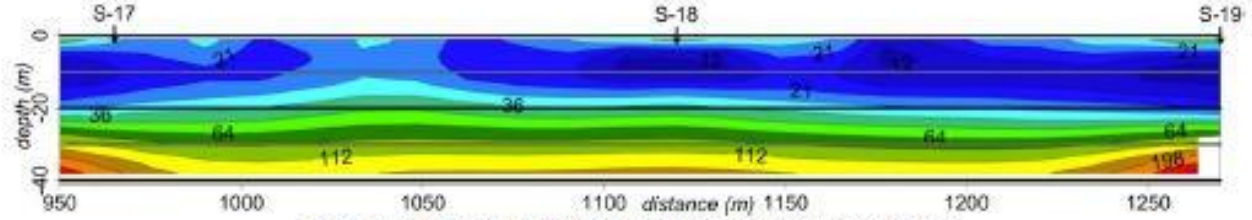

Fig. 5 Field measured diagrams of geoelectric sounding

Four lithologic members are separated: 1 lake lime; 2 clay; 3 limestone breccia with clay matrix; 4 limestones (Figure 6).

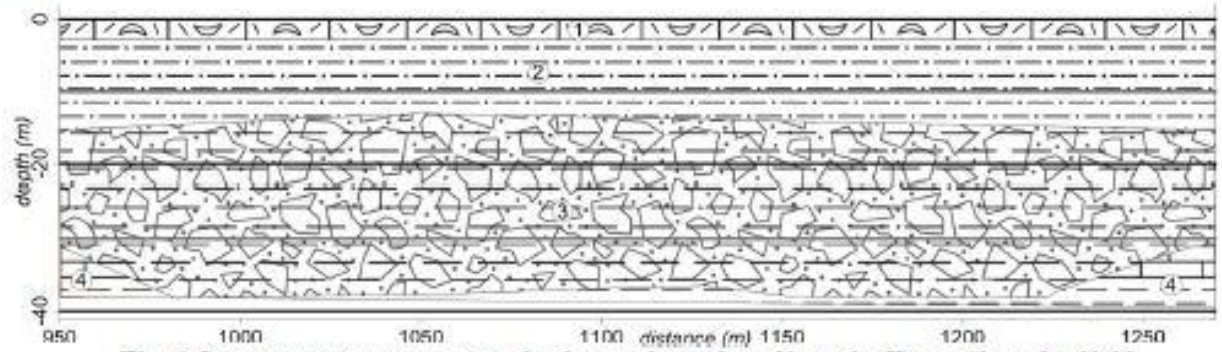

Fig. 6 Quantitative interpretation of sedimentological profile in the Vrgoračko polje fileld.

Key words: soft sediment deformations (SSD), lake lime, Quaternary, geoelectrical sounding, palaeoenvironment, Vrgoračko polje

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