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Geological and geochemical characteristics of sedimentary rocks in Kremna, basin (Serbia)

Tamara Perunović (1), Branimir Jovančićević (1), Ilija Brčeski (1), Aleksandra Šajnović (2), Ksenija Stojanović (1), Vlada Simić (3), and Milica Kašanin-Grubin (2)

(1) Faculty of Chemistry, University of Belgrade, Studentski trg 12-16, 11 000 Belgrade, Serbia, (2) Institute of Chemistry, Technology and Metallurgy IChTM, Centre of Chemistry, University of Belgrade, Njegoseva 12, 11000 Belgrade, Serbia, (3) Faculty of Mining and Geology, University of Belgrade, Djušina 7, 11 000 Belgrade, Serbia

Studying lacustrine sediments is important because of their potential economic value since they often bear coal, oil shales and non-metallic mineral raw materials. Besides this, lacustrine sediments offer valuable information on the climate conditions which existed during the sedimentation. In Serbia there are 14 lacustrine basins spanning in age from Oligocene to Lower Pliocene.

The aim of this study was to examine Lower Miocene Kremna basin, located in southwest Serbia. Kremna basin is a small basin, covering 15km2, but sedimentologically very interesting. For the purpose of this study, 43 sediment samples were taken from a borehole at different depths, from surface to 343 m depth of the basin. The borehole ended in weathered serpentinite. Mineralogical composition of sediments was determined using thin-sections and X-ray diffraction analysis, contents of macro-and microelements and rare-earth elements were determined by ICP-ES and ICP-MS techniques. Also, elemental analysis was applied to determine the contents of carbon, sulphur and nitrogen and n-alkanes, isoprenoide aliphatic alkanes and bitumen were also determined using GC-MS technique.

Mineralogical analyses proved presents of several lithological types in Kremna basin: clastic sediments, tuffs, tuffaceous sediments, marlstones, dolomites, magnezites, and coal of non-economic value. Occurrence of sirlezite and sepiolite was also determined. Furthermore, according to all obtained results two faciae were determined: alluvial-marginal lacustrine and intrabasinal. Alluvial-marginal facies originated from predominantly ultramafic rocks which underlie the basin. Magnezites and Mg-marls and Mg-dolomites are dominant sediments in this facies. These sediments formed under arid, slightly saline conditions. Intrabasinal facies is represented mostly with marls, Mg-marls and dolomitic limestones. These sediments were deposited under a more humid climate with increase in paleoproductivity. The uppermost sediments of Kremna basin are represented with marly dolomite. Due to the swallowing of the basin sediments became relatively rich in predominantly land plant material. Tuffs and tuffaceous sediments were determined in both faciae.