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Luminescence dating of the lacustrine record of Vršac (Carpathian Basin, Serbia) – implications for a palaeoenvironmetal reconstruction

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The Carpathian Basin is one of the key areas to investigate the influence of the continental, Mediterranean and Atlantic climate interaction over Europe and the dispersal of Anatomically Modern Humans (AMH). The available Upper Pleistocene and Holocene (geo)-archaeological archives in the region are mainly loess-paleosol records and isolated find-spots. Long lacustrine records are sparse and do not always span the whole last glacial cycle. In the area around Vršac, we drilled a 10 m core to contribute to the palaeoenvironmental reconstruction of the Carpathian Basin and to add further research to the investigations at the nearby Early Upper Palaeolithic site of Crvenka-At. Electrical Resistivity Tomography (ERT) was used to find the best-suited drilling location. We applied luminescence and radiocarbon dating, because a robust chronology is important for the interpretation of the sedimentary record. Pulsed OSL measurements were carried out to identify the best sampling positions. We expect runoff from the catchment being the main source of the lacustrine sediments, because coarse fluvial input is absent. Knowledge about the depositional conditions is important in luminescence dating to evaluate partial bleaching prior to deposition, which may cause age overestimation. Therefore, we compared infrared stimulated luminescence (IRSL) signals with post infrared infrared stimulated luminescence (pIRIR) signals, which bleach at different rates. Estimation of a representative water content has major influence on the age estimate, but remains challenging in luminescence dating. We measured the present day water content as well as the saturation water content, to account for variations over time. Luminescence and radiocarbon ages differ greatly from each other. According to the laboratory experiments, luminescence dating was reliable and we conclude that radiocarbon ages were underestimated because of an intrusion of younger organic material. The initial results demonstrated the potential of the drill core. Integrating more proxy data will be useful to enhance the importance of the geoarchive at Vršac for a better understanding of the last glacial cycle in the Carpathian Basin.