

The Palaeolithic site Bistricioara-Lutărie III in the Romanian Carpathians – Insights from various luminescence methods

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The loess derivates on top of the terrace gravels in the Bistrita valley (Carpathians, northeastern Romania) host a large number of Palaeolithic settlements, some of which reveal several distinct cultural layers characterised by charcoal, other combustion features and/or scattered lithics. While the youngest productive layers at the site Bistricioara-Lutărie III (BL III) are associated with Gravettian and Epigravettian technocomplexes, the knowledge about older occupations remains diffuse. Definitely, the high density of last glacial settlements in such a harsh environment represents a puzzle. Furthermore, new excavations in 2015 exposed large (>1 m) combustion features without a related lithic inventory and of unknown origin (natural fires or fires places).

The present contribution aims at fathoming the versatile applications of luminescence methods to tackle the unsolved questions at BL III. Despite methodological deficiencies concerning grain size dependent age discrepancies, optically stimulated luminescence (OSL) of quartz demonstrated the archive's chronological depth (>76 ka above terrace gravels) and placed the youngest cultural layer (CL1) in the Last Glacial Maximum, in agreement with radiocarbon (¹⁴C) dates (Trandafir et al. 2015). This cultural layer yielded a set of heated lithics (flint) during the recent excavation, providing the opportunity to directly date human presence by thermoluminescence (TL) and to reconcile these ages with (independent) methods dating different events (OSL, ¹⁴C). Such a comparison of techniques also serves at testing the accuracy of explorative TL measurement protocols under 'natural conditions'. Finally, detached from any chronological issues, the temperature-dependent sensitisation of the 110 °C quartz TL peak – in analogue to the flint TL signal – potentially allows determining the maximum heating temperature of samples from the combustion features (Göksu et al. 1989), which in turn helps elucidating whether the fires were of natural or anthropogenic origin.

References

Göksu, H.Y., Weiser, A., Regulla, D.F., 1989. 110 °C TL peak records the ancient heat treatment of flint. *Ancient TL* 7, 15-17.

Trandafir, O., Timar-Gabor, A., Schmidt, C., Veres, D., Anghelinu, M., Hambach, U., Simon, S., 2015. OSL dating of fine and coarse quartz from a Palaeolithic sequence on the Bistrita Valley (Northeastern Romania). *Quaternary Geochronology* 30, 487-492.