

Nov. 2014

PAGES
PAST GLOBAL CHANGES

**cirques
& lakes**
PN-II-RU-TE-2012-3-0386

Editor
Marcel MINDRESCU

Associate editor
Ionela GRADINARU

Late Pleistocene and Holocene climatic variability in the Carpathian-Balkan region. Abstracts volume



**Late Pleistocene and Holocene Climatic Variability
in the Carpathian-Balkan Region**

ABSTRACTS VOLUME



Ștefan cel Mare University Press

Ștefan cel Mare University Press

Climatological and environmental change as derived from physical and geochemical loess sediment properties: Examples of last glacial loess sites from the Pannonian Basin

Frank Lehmkuhl¹, Christian Zeeden¹, Janina Böskén¹, Eileen Eckmeier¹, Ulrich Hambach², Thomas Hauck³, Nicole Klasen⁴, Slobodan Markovic⁵, Igor Obreht¹, Philipp Schulte¹, Pal Sümegi⁶, Daniel Veres⁷ and Anja Zander⁴

¹ Department of Geography, RWTH Aachen University, Templergraben 55, D-52056 Aachen, frank.lehmkuhl@geo.rwth-aachen.de

² Chair of Geomorphology, University of Bayreuth, 95440 Bayreuth, Germany

³ University of Cologne, Institute of Prehistoric Archaeology, Albertus-Magnus-Platz, D-50923 Cologne, Germany

⁴ Institute of Geography, University of Cologne, Albertus-Magnus-Platz, D-50923 Cologne

⁵ Department of Geology and Paleontology, University of Szeged; H-6722 Szeged, Egyetem; Hungary

⁶ Chair of Physical Geography, Faculty of Sciences, University of Novi Sad, Trg Dositeja Obradovića 3, 21000 Novi Sad, Serbia

⁷ Romanian Academy, Institute of Speleology, Cluj-Napoca, Romania and Faculty of Environmental Sciences and Engineering, Babes-Bolyai University, Cluj-Napoca, Romania

Project aims

The Project B1 within the CRC 806 "Our way to Europe" is focused on the "Eastern Trajectory" of modern human migration from Africa into Europe. The Middle East, Anatolia, Balkans and Southeastern Europe constitute the principal areas to be investigated.

Within these larger regions key areas were selected for combined archaeological and geoarchaeological research, fieldwork having delivered case studies for initial Modern Human adaptational systems, yet to be fully analysed. During the first stage of the B1 research programme (2009-2013), key areas were in Jordan (Wadi Sabra/Petra), in Romania (Upper Timiş valley/Southern Banat) and in Ukraine (Doroshivtsy / Northern Bukovina, Chernivtsi region), all within the Marine Isotope stage (MIS) 3/2 time range. Thus, the first phase of the CRC focused on locations of Early Upper Palaeolithic sites in selected morphological positions, and specifically the upland-lowland comparative concept. It is anticipated to (1) intensify regional studies in the Serbian Banat and western Romania, now with a north-western extension in Hungary. Chronologically we continue research into later MIS 3 archaeological and geological archives (40,000 to 20,000 B.P.), now also extending the time range to late Middle Palaeolithic (e.g. Garandhal and Bükk), and reaching back to the earlier MIS 3 and MIS 4 time range.

Southeastern Europe has become a special research focus since two early Homo sapiens individuals have been found at Oase Cave in the Southern Banat (Trinkaus et al. 2003). As the fossils lack any stratigraphic context, cultural and environmental circumstances of these Homo finds have remained unclear. In the neighbourhood of Oase Cave, however, a whole number of

early Upper Palaeolithic sites, embedded in loess sequences were known since the 1950's (Mogasanu 1978). A couple of those sites were now re-investigated by our research team, with surprising results. Conceptually we are following the idea of upland-lowland interaction, which combines such parameters as sedimentary transport, sediment distribution, palaeosol development in different altitudes, steered by palaeoclimate in space and time. Beneath that, some detailed studies concerning site-formation processes and quality of open-air sites (sedimentary development, palaeoecology, multilayering, reworking, human impact on soils and sediments) will be conducted at selected spots.

During the second phase of the CRC (2013-2017) we will try to improve the regional environmental record (Banat / southwestern Carpathian Mountains) by including further Loess sequences from the Serbian Banat (cf. Markovic et al. 2011). Meanwhile, the Romanian colleagues (cf. Baltean 2011) invited us to investigate the famous Oase Cave complex itself. Test trenches were excavated at Pestera cu Abri, one of the shelters only some meters away from the Oase entrance.

The question is the mountains in the northwestern proximity of the Banat represent facing one of the MIS 3-"Refugia" which are usually claimed to be the last strongholds of Neanderthal man - in our case, however, the region rather appears to have attracted early Sapiens. The recent Banat findings support our research strategy to include Loess section from both, upland and lowland positions.

Exemplary work

The Paleolithic sites Românești and Coșava are situated at the foothills of the Banat Mountains in western Romania and provide an important testament of life of the first European modern humans (*Homo sapiens sapiens*) during Middle Pleniglacial. Even though these sites have been extensively excavated, little is known about the site formation of related loess-like sediments and soils. Luminescence data at the two investigated sections confirm sediments from the penultimate glacial period up to the Holocene. In western Romania geoscientific analysis resulted in the detection of an intra-MIS-3 soil horizon of almost interglacial quality (Fragipan type) connected with an Aurignacian (Early Upper Paleolithic) find horizon at a short loess sequence at Cosava (Kels et al. 2014). The occurrence of such soil formation processes were probably restricted to an intermediate level of elevation (200 m a.s.l.) at the south-western fringe of the Banat mountains. Complementary Loess sections which we found at the lowland location of Semlac (east of Temesvar) lack any comparable indications of a possible environmental amelioration during stage 3 (Schulte et. al., submitted). For the first time in the Banat, we obtained luminescence ages from loesses and loess-like sediments along with highly differential sedimentological and elemental analyses. Additional sections from the Banat highland and from the Banat lowland, where the loess cover becomes mightier, were also sampled, following a catena from the Carpathian Mountains towards the West. Such basic studies were needed, as there was stagnation in loess research for more than 30 years in the Banat and just a few sections became known (Conea 1969, 1972). The current CRC studies allow for the expectation that even some shorter sequences from the Carpathian foothills with their strong soil development (stagnic Albeluvisoil overprinting older pre-weathered horizons) can be interpreted and integrated in a regional stratigraphic model.

At Doroshivtsy (Dnistr Canyon, Western Ukraine) we contributed mainly geoscientific analysis within a team of Ukrainian archaeologists and a leading loess expert from Belgium (P. Haesaerts;

see Koulakovska et al., 2012, Schulte et al, submitted). The sequence turned out to be one of the most important loess records for the LGM, comprising around 10 metres of MIS 2 deposits with seven archaeological horizons. As initial palaeosols are present, environmental ameliorations during MIS 2 are possibly indicated, thus explaining the abundant evidence for preferred MIS 2 human settlement in the northwestern Black sea area. The position of the site inside a steep valley might explain frequent human occupation (as a hunting ground close to hot springs) caused by a particular microclimate, attested by high sedimentation rates. Initial soils indicate cyclicity of the regional Upper Wuermian climate. Our fieldwork at this site is finished and laboratory analysis will be completed during the next CRC phase.

Further field work took place in October 2013 and in April and May 2014. Time was spent in the regions around Tokaj, Miskolc and the Balaton in Hungary, Vrsac and Nis in Serbia, and the Dobruja Region in Romania. For all sites detailed sampling for different methods took place.

Acknowledgements

The authors would like to thank the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG) for funding of the project in the context of the CRC 806 "Our way to Europe", subproject B1 "The „Eastern Trajectory“: Last Glacial Palaeogeography and Archaeology of the Eastern Mediterranean and of the Balkan Peninsula". We would like to thank several colleagues for support during the field work, especially Valéry Sitlivy, Holger Kels, and several helpers from Hungary, Romania, Serbia, and Germany.

References

- Baltea, I. (2011) The Palaeolithic in Banat. In: Draşovean, F., Jovanovic, B. (Eds.), *The Prehistory of Banat, The Palaeolithic and Mesolithic*, Bucureşti, vol.1, pp.19-76.
- Conea, A. (1969) Profils de loess en Roumanie. In: Fink, J. (Ed.), *La stratigraphie des loess d'Europe*, Bulletin de l'Association française pour l'étude du Quaternaire, Suppl. INQUA, pp. 127-134.
- Conea, A., Bally, R., Canarache, A. (1972) Guidebook to Excursion of the Inqua Loess Symposium in Romania, 11-15 September 1972. Geological Institute, Guide-books to excursions, 10, Bucharest, 54 pp.
- Kels, H., Protze, J., Sitlivy, V., Hilgers, A., Zander, A., Anghelinu, M., Bertrams, M., Lemkuhl, F. Accepted. Genesis of loess-like sediments and 1 soils at the foothills of the Banat mountains, Romania – Examples from the Paleolithic sites Româneşti and Coşava. *Quaternary International*, <http://dx.doi.org/10.1016/j.quaint.2014.04.063>.
- Koulakovska, L., Usik, V., Haesaerts, P. (2012) Early Paleolithic of Korolevo site (Transcarpathia, Ukraine). *Quaternary International* (223–224) 116-130.
- Marković, S.B., Timar-Gabor, A., Stevens, T., Hambach, U., Popov, D., Tomić, N., Obreht, I., Jovanović, M., Lemkhul, F., Kels, H., Gaudenyi, T., Gavrilov, M.B. (2014) Environmental dynamics and luminescence chronology from Orlovat loess-palaeosol sequence (Vojvodina, Northern Serbia): initial results and perspectives. *Journal of Quaternary Science*.
- Mogoşanu, F. (1978) Paleoliticul din Banat. Cu un studiu paleoclimatic și geo-cronologic. *Academia de științe Sociale și Politice a Republicii Socialiste România*. Institutul de Arheologie Bucureşti. XXXII: 152 p.; Bucureşti.

- Schulte, P., Lehmkuhl, F., Kels, H., Loibl, C., Klasen, N., Hauck, T. (submitted) Environmental change indicated by grain-size variations and trace elements: Examples from two different sections – the sandy-loess sediments from the Doroshivtsy site (Ukraine) and the loess section Semlac (Romania). Extended abstract submitted: DUST2014 - 1st International Conference on Atmospheric Dust.
- Trinkaus, E., Milota, Ş., Rodrigo, R., Mircea, G., Moldovan, M. (2003) Early modern human cranial remains from the Peştera cu Oase, Romania. *Journal of Human Evolution* (45) 245-253.