Journal of Archaeological Science 40 (2013) 3740–3753

Contents lists available at SciVerse ScienceDirect

Journal of Archaeological Science

journal homepage: http://www.elsevier.com/locate/jas

First chronometric dates (TL and OSL) for the Aurignacian open-air site of Românești-Dumbrăvița I, Romania

Christoph Schmidt [a,*], Valéry Sitlivy [b], Mircea Anghelinu [c], Victor Chabai [d], Holger Kels [e], Thorsten Uthmeier [f], Thomas Hauck [b], Ion Băltean [g], Alexandra Hilgers [a], Jürgen Richter [b], Ulrich Radtke [h]

[a] Institute for Geography, University of Cologne, Otto-Fischer-Str. 4, 50674 Köln, Germany
[b] Institute of Prehistoric Archaeology, University of Cologne, Weyertal 125, 50923 Köln, Germany
[c] Department of History and Letters, Faculty of Humanities, Valahia University of Târgoviște, Str. Lt. Stancu Ion, 34-35, 130115 Târgoviște, Romania
[d] Crimean Branch of the Institute of Archeology, National Ukrainian Academy of Sciences (NUAS), Yaltinskaya Street, 2, 95007 Simferopol, Ukraine
[e] Department of Geography, Physical Geography & Geoecology, RWTH Aachen University, Templergraben 55, 52056 Aachen, Germany
[f] Institute of Prehistoric Archaeology, University of Erlangen, Kochstraße 4/18, 91054 Erlangen, Germany
[g] Heritage Advice S.R.L., Str. Nicolae Titulescu, 1, 280/B/63, 510096 Alba Iulia, Romania
[h] University of Duisburg-Essen, Rectorate, Universitätsstr. 1, 45117 Essen, Germany

ARTICLE INFO

Article history:
Received 17 August 2012
Received in revised form
21 March 2013
Accepted 8 April 2013

Keywords:
Luminescence dating
Heated artefacts
Upper Paleolithic
Aurignacian
Balkans
Anatomically modern humans

ABSTRACT

Currently, absolute dates for the emergence of the Early Upper Paleolithic and the timing of the earliest dispersal of anatomically modern humans (AMH) into Europe are sparse. This is especially true for regions adjoining the Eastern Mediterranean and Central Europe with its dense clusters of sites along the Austrian and German Danube Valley. This article makes a first step toward filling this gap and, for the first time, presents absolute ages for the open-air site of Românești-Dumbrăvița I (Banat, SW Romania) located close to the Oase Cave where some of the oldest AMH fossils were found. A set of heated artefacts recently excavated from the Aurignacian layer GH3 was dated by thermoluminescence (TL) and gives early chronometric dates for this technocomplex in Romania.

The luminescence behavior of artefact samples required the use of different multiple- and single-aliquot measurement protocols to obtain reliable age information. In addition, analyses of glow curves and the performance during regenerative-dose measurements allowed us to distinguish two types of samples. Since one group is characterized by poor dose reproducibility, only samples showing reliable luminescence behavior were considered for final age interpretations. As a result, we could determine that the last heating of artefacts from GH3 happened most likely between ~39 ka (single-aliquot age estimate) and ~45 ka (multiple-aliquot age estimate) ago, with a weighted average age of the GH3 finds of 40.6 ± 1.5 ka (including all data). These dates were confirmed by OSL dating of sediments of the find layer. Such an early age fits well to technological and typological features, which place the dated lithic assemblage at the very beginning of the development of the Aurignacian technocomplex usually seen as a proxy for the earliest wide spread presence of AMH in Europe.

1. Introduction

The origin of anatomically modern humans (AMH) in Africa and their dispersal to Eurasia is one of the key topics in prehistoric archeology. The human fossil record now permits the reconstruction of a dispersal of this species from the region of origin in Northeast Africa, where AMH is recorded as early as 200 ka (for an overview see McBrearty and Brooks, 2000), via the Near East into Eurasia. In this scenario, Europe was peopled considerably late, but – according to latest investigations into paleoanthropology and the radiocarbon chronology at Grotta di Cavallo (Benazzi et al., 2011) and Kent's Cavern (Higham et al., 2011) – at a fast pace (but see Banks et al., 2013; White and Pettitt, 2012 for different views on the matter). It is still an open question whether the speed of the earliest peopling of Europe by modern humans, as it is indicated by the fossil record, is best explained by preferred corridors of dispersal (like the Danube Valley: Conard, 2002; Conard and Bolus, 2003), or

* Corresponding author. Present address: Geographical Institute, Geomorphology, University of Bayreuth, Universitätsstr. 30, 95440 Bayreuth, Germany. Tel.: +49 (0)921 55 2267; fax: +49 (0)921 55 2314.
E-mail address: christoph.schmidt@uni-bayreuth.de (C. Schmidt).

0305-4403/$ – see front matter © 2013 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.jas.2013.04.003

a spatially wide frontier within a "wave of advance"-model (Eswaran, 2002). In both models, the Balkans play a crucial role both in the exact dating of the first dispersal of AMH out of Africa into Europe and in the elucidation of possible migratory routes.

It is widely agreed that the Aurignacian and its temporal–spatial variant, the Protoaurignacian (Bon, 2006; Teyssandier, 2007), are among the earliest industries securely produced by AMH (see Bailey et al., 2009, or for the case of the Ulluzian Benazzi et al., 2011). These industries are dominated by the full range of Upper Paleolithic features such as standardized microlithic implements, personal ornament and parietal art, as well as large scale land use patterns and social networks. As the earliest chronometric dates for the European Aurignacian (of 36.5 ka uncalBP: Zilhão, 2011; or even slightly earlier: Conard, 2002; Conard and Bolus, 2003; Higham et al., 2012) are contemporaneous to the oldest AMH fossils in Europe, it is this industry that enables the investigation of the earliest resilient settlement of North-Western latitudes by members of this species.

Due to its geographical position between the Balkans and Central Europe, Romania holds a strategic position for understanding the early dispersal of AMH and for tracking the emergence of the Aurignacian phenomenon *sensu lato*. This potential has already been directly proved by the discovery of the oldest anatomically modern Human fossil remains in Europe at Oase Cave (Peştera cu Oase, Southern Banat) in 2002, followed by direct ^{14}C dating to ~35 ka uncalBP (40.7 ka calBP) (Trinkaus et al., 2003). Proper chronological control plays a central role in linking the fossil finds of Oase Cave to the lithic industry produced by the first European AMH. However, the lack of an associated archeological context for the Oase finds, coupled with the traditional view of a long persistence of the Middle Paleolithic and the very late Upper Paleolithic chronology documented across Romania (Cârciumaru, 1999; Păunescu, 2000, 2001), make the story exciting, but less clear. It has remained incomplete as a narrative since no archeological context in the area has documented, at the very least, a comparable chronology (Anghelinu et al., 2012). Moreover, it is precisely the chronology of the Aurignacian technocomplex in Romania that appears as particularly deficient today.

According to the current state of knowledge (Anghelinu and Niţă, in press), the Aurignacian in Romania is, with different degrees of certitude, to be found in several, quite distant regions: The North-Eastern area, particularly along the Prut river (e.g. Mitoc-Malul Galben: Otte et al., 2007); along the Danube valley to the south (e.g. Ciuperceni, Vădastra: Păunescu, 2000); Southern Transylvania, with the open air settlements at Poieniţă and Malul Dinu Buzea and several unclear occurrences in cave contexts (Păunescu, 2001; Horvath, 2009); the North-Western area (Oaş and Maramureş lowlands) with the sites of Călineşti I, Călineşti II, Remetea Şomoş and Boineşti (Dobrescu, 2008); and in the South-Western part of Romania (Mogoşanu, 1978), with several settlements to be discussed in further details below. All other occurrences remained undated, with the exception of Mitoc-Malul Galben Aurignacian, which provided a rather late chronology (31–29 ka uncalBP).

Of all mentioned areas, the Banat Aurignacian stands apart for several reasons. Apart from their relative proximity to the Oase Cave (Fig. 1), the three identified settlements here – Tincova, Coşava and Românești-Dumbrăviţa (Mogoşanu, 1978) – provided medium to large collections with undisputable Aurignacian features. In addition, the original excavator promptly compared the Banat occurrences with Krems-Hundssteig in Austria, a settlement itself thought to represent an early phase of the Aurignacian technocomplex, currently acknowledged as the Krems-Dufour type of Aurignacian (Kozlowski, 1965; Demidenko, 2000-2001; Demidenko and Otte, 2007; Demidenko and Noiret, 2012).

However, despite the clear similarities documented between the Banat lithic collections and the Krems-Dufour Aurignacian, the initial estimations, based on pollen diagrams and straight geochronological readings of the sedimentary archives (Mogoşanu, 1978; Cârciumaru, 1989, 1999), pointed to a time span considerably younger than any known Eurasian Aurignacian occurrence: Herculane I/Tursac for the single layer at Tincova, and Herculane II/Laugerie for the main concentration (level III) at Românești-Dumbrăviţa. According to the Western-based geochronological framework used by Romanian archaeologists those days, slightly changed meanwhile (e.g. Bosselin and Djindjian, 2002), the Herculane I/Tursac positive oscillation was taking place around 24.5 and 26.5 ka uncalBP, while the Herculane II/Laugerie episode was displaying a chronology between 18.5 ka and 19.7 ka uncalBP. Perhaps not surprising, based on the content of the lithic collections, several authors questioned these initial assessments in favor of older geochronological estimations (e.g. Arcy – Chirica et al., 1996 or Hengelo Interstadials – Bălţean, 2011) or ignored them altogether (Teyssandier, 2003, 2007, 2008; Zilhão, 2006). Unfortunately, the Banat Aurignacian sites, altogether lacking organic material, have remained undated so far. It is evident that archeological and palynological arguments are insufficient for establishing a comprehensive regional chronology as the age of the same assemblages fluctuated from ~37 ka uncalBP to ~18 ka uncalBP.

The contradiction between the information provided by the lithic collections and the geochronological estimations based on palynology resulted in new small scale excavations at the site Românești-Dumbrăviţa I in 2009 and 2010, coupled with comprehensive sedimentological and tephra analyses, sampling for optically stimulated luminescence (OSL), thermoluminescence (TL) dating, and a full reassessment of the existing lithic collection. Several attempts were made to clarify both the relative and the absolute chronology of the Aurignacian find layers at this settlement. A tephra layer was identified above the main Aurignacian find layer (GH3), but a clear assignment to a known-age eruption has so far failed (D. White, pers. comm. to M. A. 2011). While clearly converging toward a chronology older than previously estimated, today both the archeological and sedimentological methods used have proved to be not sufficient enough for determining more accurately the temporal status of this industry. Fortunately, recent excavations here bore a set of heated artefacts of sufficient size for TL dating, which is capable of providing age estimates of the last – intentional or accidental – exposure to fire and thus most likely directly dates human presence. We therefore present for the first time chronometric data for the Aurignacian industry found at Românești-Dumbrăviţa I, obtained using multiple- as well as single-aliquot dating protocols. The implications of an early presence of this technocomplex in South-Western Romania are also briefly discussed.

2. The Aurignacian in Banat: reassessing the open-air site of Românești-Dumbrăviţa I

2.1. Geographical and archeological setting

The Paleolithic open-air site of Românești-Dumbrăviţa I (Timiş district) is located at the confluence of the rivers Bega Mare and Bega Mica, occupying about 4 ha (Fig. 1). Situated on a flat, just slightly inclined top of a local river terrace (45°49′02.41″ N, 22°19′15.12″ E; elevation ca. 212 m a.s.l.), the huge settlement was established at the periphery of the Poiana Ruscă Mountains. These foothills of the Banat Mountains are situated in the Eastern part of the historical region Banat, close to the edge of the Carpathian Mountains (see also Kels et al., submitted for publication). Here, a thin cover of silty and loess-like sediments was accumulated during the last glacial period which has been only poorly studied up to