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Formation processes of a reopened early Bronze Age inhumation grave in Austria: The soil thin section analyses

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ABSTRACT

Early Bronze Age and early medieval inhumation graves in (central) Europe had often been re-opened a short time after burial and, in most cases, grave goods were removed. To improve the understanding of the archaeological evidence of these graves, one re-opened grave from a large early Bronze Age (Wieselburg/Gáta culture) cemetery in Weiden am See, eastern Austria, was excavated using a microstratigraphic protocol to maximize data collection for the reconstruction of the context formation process and, consequently, the interpretation of the re-opening process. In this article the results of the soil thin section analyses are presented and discussed.

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1. Introduction

To improve our understanding of formation processes of reopened graves and to create a reference for future analyses, a reopened inhumation grave at the early Bronze Age cemetery of Weiden am See, eastern Austria, was excavated and examined using a microstratigraphic approach. A combination of methods was applied to maximize the range of data to use to reconstruct formation processes at excavation (single-finds recording, wet-sieving of sediments) and post-excavation (micromorphology, geochemical and mineralogical characterization of sediments, radiocarbon dating, 3D visualization of archaeological features and integration with results of post-excavation analysis). However, this paper will focus on the micromorphology results, as this analysis provides the crucial microstratigraphic framework for interpreting the depositional sequence and formation processes within the grave, and is the basis for which the results of other proxies can be integrated.

The Wieselburg/Gáta Culture is an early Bronze Age Culture (2000–1600 BCE, Bronze Age A2) located in eastern Austria and west Hungary, south of the Danube, as well as parts of south-western Slovakia (Hicke, 1987; Krenn-Leeb, 2011; Leeb, 1987). Cemeteries contained up to a few

hundred graves where the dead were typically buried in individual graves in coffins or stone settings, accompanied by jewelry (copper alloy jewelry and necklaces with amber beads, animal teeth) and copper alloy objects (e.g. daggers) and pottery. The bodies were oriented southwest-northeast (women on their right and men on their left sides) with their lower limbs in flexed or hyperflexed position. It was common that the graves were reopened and copper alloy objects were removed. The position of the finds and skeleton attest to reopening that usually took place not long after burial; there is evidence that bodies were not fully decomposed when this reopening occurred and hollow spaces permitted movement within the graves (Neugebauer, 1988).

Generally, central European early Bronze Age and early medieval period inhumation cemeteries often contain large numbers of graves that were reopened soon after burial, usually with evidence for removal of grave goods (Aspöck, 2005, 2011, 2015; Aspöck and Klevnäs, 2011; Klevnäs, 2013; Kümmel, 2009; Neugebauer, 1991; Neugebauer-Maresch and Neugebauer, 1997; Rittershofer, 1987; Sprenger, 1999; van Haperen, 2010; Zintl, 2012). This phenomenon has traditionally been interpreted as ‘grave robbery’, i.e. looting of graves driven by purely materialistic motives. More recent research has questioned this interpretation by examining reopening practices from a broader perspective, leveling hypotheses and case studies drawn from social anthropological research (e.g. Aspöck, 2005: 226–235; Kümmel, 2009; van Haperen, 2010, 2013). In particular, the

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discussion on early medieval grave reopening has been lively and has resulted in differentiation of types of 'grave robbery' (Aspöck, 2011, 2015; Aspöck and Klevnäs, 2011; Aspöck et al., 2016; Klevnäs, 2007, 2013, 2015; van Haperen, 2010, 2013; Zintl, 2012).

However, analysis and interpretation of reopened graves often ends where the archaeological evidence is poorly understood. It is, for example, often difficult to distinguish between the results of natural processes of decomposition and of human intervention in a grave. Generally, decomposition processes play an important role in the interpretation of reopened graves because the state of the body and grave furniture upon reopening can potentially be inferred from the archaeological evidence, providing a timeframe for the reopening of the grave. Hence, understanding decomposition processes and, in a wider sense, the formation processes of the archaeological evidence of reopened inhumation graves is crucial for their interpretation. In a pilot study, one reopened grave in an Austrian Wieselburg Culture cemetery was excavated using a microstratigraphic method to maximize data for the reconstruction of specific, complex depositional and post-depositional processes within this grave (Table 1).

Micromorphology is well established as a tool for interpreting archaeological site formation processes. The technique has been widely applied to understand and interpret the use of settlement space (e.g. Banerjea et al., 2015a; Matthews, 1995; Shahack-Gross et al., 2005; Shillito and Ryan, 2013) and the reworking of archaeological stratigraphy by post-depositional processes (e.g. Canti, 2003; Devos et al., 2009; French, 2003: 123, 156; Gé et al., 1993; Macphail, 1994; Macphail et al., 2003; Weiner, 2010).

Table 1
Research questions with linked micromorphology samples.

1. What was the original appearance of the grave (burial of individual 2) before the reopening?
 - Sample 450: Are there remains of the top coffin board in this sample? What type of deposit is SE6, which was the top layer inside the coffin - is it the remains of a wooden board? What are the differences between the sediments above and inside the coffin?
 - Sample 454: What is the nature of the grey-lilac layer (SE12; Munsell® color, 2000 2.5Y 7/1) which outlines the vertical shape of the coffin?
 - Sample 669: What was the nature of sediments underneath the space of the coffin where not affected by the reopening?
2. When and how did the reopening of the grave take place?
 - Samples 310, 311 (lower area of profile): was this the refill of the intervention pit or original grave fill?
 - Sample 454: What are the differences (deposit and formation types) between the original grave fill outside of the coffin and the refill of the intervention pit?
3. What kind of grave manipulations took place upon reopening?
 - Is there evidence for micro remains from grave goods that have been removed in any of the samples?
4. When and how did the refilling after the reopening take place? Was the grave refilled immediately – by human activity, or did it refill slowly and naturally, or were there more episodes of refilling?
 - Sample 364: Is this the refill of the intervention pit or erosion after intervention? How is this sediment different to the grave fill?
 - Sample 366: Original grave fill or intervention pit refill (compare to sample 364)?
 - Samples 451, 470, 471, 592: How did the refill of the intervention pit take place – quick or slow? Is there evidence for weathering or fine sedimentation in this area? Are there micro-remains from (human) bone?
5. How did natural formation processes affect the final archaeological evidence of a reopened grave?
 - Sample 591: What is the nature of the sandy sediments in the coffin? How have they been deposited?
 - Sample 642: What is the nature of the sediments underneath the left tibia and fibula – how did they form?
6. What was the original appearance of the top burial (individual 1)?
 - Samples 250, 251: was the surface of SE2 a pit that was left from the reopening or was a separate pit cut for SE1 and burial 1, and if yes, was it left open or refilled immediately?
 - Samples 189, 226: Is it possible to find surfaces/interfaces around the body of individual 1? Was the body put directly on the soil and was there a hollow space around the body (e.g. wooden structure)?

Micromorphological examination of graves is an understudied area of research (Kutterer et al., 2014a, 2014b: 181) without the wealth of published comparative case studies or experimental material that is available for the study of the use of settlement space. This problem should be able to be addressed with the conclusion of the InterArChive project (Usai et al., 2014), which will provide interpretative frameworks for more robust micromorphological examinations of grave taphonomy. Micromorphology provides significant potential for understanding the depositional formation processes and post-depositional alterations (Macphail et al., 2013) relating to burial taphonomy, particularly for disturbed graves (Huckleberry et al., 2003) and sedimentation rates within burials (Sandgathe et al., 2011).

Within graves there can be considerable variation in chemistry and micromorphology on both intra- and inter-site level, linked to environmental contrasts and taphonomic variation. Post-burial changes are highly complex, and there can be evidence for mobilisation/depletion, transportation and re-deposition of soil/sediment displaying preferential spatial patterns in relation to the different parts of skeletons and graves (Usai et al., 2014). In particular, the area below the cranium has been identified as an area for processes relating to calcite mobilisation and sedimentation (Kutterer et al., 2014a, 2014b: 181).

This paper aims to examine how micromorphology can contribute to reconstruct the formation process and to answer the following research questions that are typically asked for reopened graves with specific reference to key questions pertaining to the buried human remains (Table 1):

1. What was the original appearance of the grave before the reopening?
2. When and how did the reopening of the grave take place?
3. What kind of grave manipulations took place upon reopening?
4. When and how did the refilling of the grave take place? Was the grave refilled immediately – by human activity, or did it refill slowly and naturally, or were there more episodes of refilling?
5. How did natural formation processes affect the final archaeological evidence of the reopened grave?

2. Material and methods

2.1. Site and excavation

Weiden am See, Austria, is a multi-period site (Fig. 1) located 1 km off the contemporary shores of Lake Neusiedl, a 35 km long and <2 m deep endorheic lake in the Austrian-Hungarian border lands (Hicke, 1987: 14). Since 2012, rescue excavations have recovered over 200 early Bronze Age of the Wieselburg Culture graves, around half of them reopened (Fig. 2, Franz et al., 2014).

In 2013 one grave (object 229, MNR 32026.13.03, Gst 1023/439-444) was excavated with close attention to the evidence for reopening (Video 1: excavation process). As part of the rescue excavations, about 1 m of topsoil had already been removed with a digger, and the outline of a large grave pit with set blocks of stone and some human bones (a humerus and a femur) were visible at the beginning of the excavation. The excavation identified stratigraphic units and, where relevant, additional surfaces within these units. The grave was half-sectioned after excavation of the top individual to determine the depth of the grave and to ascertain if there would be more individuals buried underneath.

Documentation included drawing plans, three-dimensional single-finds recording (all finds larger than 1 cm), and the documentation of all features (outlines, surfaces, boundaries) using a Leica Tachymeter TCR 407 controlled by a field computer (Dibble and McPherron, 1991; Händel, 2010). The evidence was photographed from a ladder/elevated position so that the resulting photographs were as close as possible to directly overhead. These vertical images covered the complete feature. Additionally, many oblique shots were taken to capture details, which later allowed the use of the complete image collection in an image-based modelling workflow (Video 1: excavation process). All excavated

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