

Funerary Practices of the Middle to Late Bronze Age Transition in Unterradlberg, Lower Austria. An Interdisciplinary Approach to Investigate Burial Mounds and Cremation Graves

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Abstract

During the Middle Bronze Age Tumulus Culture, the predominant burial practice shifted from inhumation to cremation, ultimately leading to uniform urnfields in the Late Bronze Age. To examine the transition from the Middle to the Late Bronze Age (14th to 12th century BC), this paper focuses on four burial mounds and five cremation graves located in Unterradlberg, Lower Traisen Valley (Lower Austria), as a case study. Despite poor preservation, the study includes archaeological evaluation, osteological analysis, strontium isotope analysis, and radiocarbon dating. The graves exhibit a variety of architectural elements, such as ‘door openings’ of burial chambers, indicating deliberate reuse or manipulation of funerary space. The osteological analysis identified 14 individuals (six adults, eight children), suggesting communal burials. The ⁸⁷Sr/⁸⁶Sr ratios of two adults indicate a possible non-local origin. The results highlight the experimental character of the transitional period and provide insights into regional developments in burial practices.

Keywords

Middle Bronze Age, burial mounds, Tumulus Culture, Late Bronze Age, Urnfield Culture, Lower Traisen Valley, burial practice, cremation

Zusammenfassung – *Bestattungspraktiken am Übergang der Mittel- zur Spätbronzezeit in Unterradlberg, Niederösterreich. Ein interdisziplinärer Ansatz zur Untersuchung von Hügelgräbern und Brandbestattungen*

Während der mittelbronzezeitlichen Hügelgräberkultur wandelte sich die vorherrschende Bestattungspraxis von der Körper- zur Brandbestattung, was schließlich zu einheitlichen Urnenfeldern in der Spätbronzezeit führte. Zur Untersuchung des Übergangs von der Mittel- zur Spätbronzezeit (14.–12. Jh. v. Chr) werden die vier Hügelgräber und fünf Brandbestattungen der Fundstelle Unterradlberg im Unteren Traisental (Niederösterreich) als Fallstudie herangezogen. Trotz der Herausforderungen durch die schlechte Erhaltung der Kontexte beinhaltete die Untersuchung die archäologische Auswertung der Befunde und Funde, osteologische Analysen, Strontiumisotopenanalysen sowie Radiokarbondatierungen. Die Grabkonstruktionen in Unterradlberg umfassen eine Vielfalt an baulichen Elementen wie „Eingangssituationen“, die die bewusste Wiederverwendung oder Manipulation von Gräbern nahelegen. Osteologisch konnten insgesamt 14 Individuen (sechs Erwachsene, acht Kinder) identifiziert werden, was zudem auf gemeinschaftliche Bestattungen hindeutet. Die ⁸⁷Sr/⁸⁶Sr Verhältnisse von zwei erwachsenen Individuen weisen auf eine nicht-lokale Herkunft. Die Ergebnisse verdeutlichen den experimentellen Charakter der Übergangszeit und ermöglichen Einblicke in die regionalen Entwicklungen der Bestattungspraktiken.

Schlüsselbegriffe

Mittelbronzezeit, Hügelgräber, Hügelgräberkultur, Spätbronzezeit, Urnenfelderkultur, Unteres Traisental, Bestattungspraxis, Brandbestattung

1. Introduction

The Middle Bronze Age (1600–1300/1200 BC) represents an important transitional phase in the Central European Bronze Age, particularly evident in changing funerary practices. Within around 300 years, the burial practice gradually transformed from inhumation to cremation (Sørensen, Rebay-Salisbury 2023). As the name of the prevailing archaeologically defined Tumulus Culture indicates, the dead were increasingly buried underneath burial mounds built out of wood, soil, and stone. Nevertheless, there is a considerable variance observable in funerary practices across regional groups (Furmánek, Veliačik, Vladár 1999; Primas 2008; Rebay-Salisbury et al. 2020; Sørensen, Rebay-Salisbury 2023). Differences appear not only in the material culture but also in grave forms, including mounds, flat graves, and cist graves, and in the varying occurrence of inhumation, cremation, or bi-ritual cemeteries. The reuse practice of adding further grave structures and burials to already existing burial mounds demonstrates the desire for a communal funerary space. These practices often render the detailed assessment of grave features more complex, particularly when preservation is poor due to agricultural activity or secondary openings. In combination with the sometimes limited contextual or stratigraphic information, the destruction of closed contexts poses further challenges for the study of Middle Bronze Age funerary practices.

In light of these challenges, the bi-ritual burial ground of Pitten, south of the Danube, is particularly significant for the research on changing funerary customs within a site. Pitten is located in Lower Austria and comprises a total of 221 graves, spanning the entire Middle Bronze Age (Hampl, Kerchler, Benkovsky-Pivovarová 1985; Benkovsky-Pivovarová 1991; Blischke 2002; Nönnig 2002; Sørensen, Rebay-Salisbury 2008). Further research on graves from the Middle Danube Tumulus Culture in eastern Austria is limited to a few small sites, containing mainly inhumation burials that were heavily affected by agricultural activities (e.g. Berg 1960; Kaus 1984; Kaus 1985; Neugebauer, Neugebauer-Maresch 1990; Neugebauer 1994; Wewerka 1999; Blesl, Krumpel 2005; Ebner 2007). During the later phase of the Middle Bronze Age, cremation burials became increasingly prevalent at Pitten, as a growing number of documented cremation burials indicate. Many of these cremation burials involved on-site pyres within body-length graves, often surrounded by soil and stone structures like mounds and cylindrical graves. Some graves featured urns or scattered cremated remains, indicating a different handling of the cremated body parts (Rebay-Salisbury 2010, 64–67). Eight urn graves of the latest occupational phase in Pitten indicate a shift in the depositional practice of placing the cremated remains inside a vessel (Sørensen,

Rebay-Salisbury 2008, 154). This shift ultimately led to the Late Bronze Age Urnfield Culture with standardized urnfields as the predominant burial custom for the next centuries (Lochner 2021, 22–23).

A growing body of research deals with the question of whether the onset and spread of these large-scale adaptations of burial customs associated with cremations and the Urnfield Culture was a local phenomenon or based on the migration of people (Cavazzuti et al. 2019b; Cardarelli et al. 2020; Cavazzuti et al. 2021; Sørensen, Rebay-Salisbury 2023). Recent methodological developments now permit the analysis of strontium isotope ratios of cremated human remains, which can be compared to local geological strontium isotope ratios (Snoeck et al. 2015, 107). Through weathering, strontium is released from the bedrock, enters the biosphere and is subsequently incorporated into human bone tissue via food consumption (Bentley 2006, 137). A comparison of $^{87}\text{Sr}/^{86}\text{Sr}$ ratios measured from plants growing in different geological zones and human bone and teeth samples allow the location of food sources to be determined and therefore provide indirect evidence for land use and mobility patterns (Ericson 1985, 503; Price, Burton, Bentley 2002, 117).

To gain a nuanced understanding of cremated human remains from late Middle Bronze Age grave contexts, the case study of Unterradlberg in the Lower Traisen Valley provides a valuable source for a detailed archaeological and bioarchaeological assessment. This study aims to shed light on the relative and absolute dating as well as on the social dimensions of the burial ground, including osteological and isotopic data. Additionally, it seeks to contextualize the adoption of cremation as a burial practice and aims to shed light on changing and persistent funerary customs. Finally, this paper investigates how an interdisciplinary approach, combining archaeological, osteological, zooarchaeological, and isotopic analyses, contributes to a deeper understanding of these often poorly preserved features.

2. The Lower Traisen Valley and the Unterradlberg Site

The Lower Traisen Valley is situated 60 km west of the city of Vienna and is considered to be one of the best archaeologically investigated areas in Lower Austria. The valley holds a geographically significant position, with a north-south axis via the river Traisen and a west-east axis via the Danube. From the 1980s onwards, many archaeological sites were uncovered as a result of a highway construction, gravel mining, and the expansion of industrial areas (Neugebauer, Gattringer 1984, 51; Neugebauer 1987, 3). For the Early Bronze Age, the two large cemeteries of Franzhausen I and II with over 2,200 graves provide an excellent example for the study of burial customs of this period (Neugebauer 1992; Neugebauer 1997, 23). Middle Bronze Age features



Fig. 1. Map of the Traisen Valley and the Unterradlberg site (Map: <https://atlas.noel.gv.at/>; graphic: H. Skerjanz).

are present in the Lower Traisen Valley (Neugebauer, Gatttringer 1989, 68; Neugebauer, Gatttringer 1990, 59–60; Blesl, Krumpel 2005, 39), yet they comprise a comparatively small proportion of the archaeological record, particularly when it comes to a detailed post-excavation analysis of features and finds. Late Bronze Age urnfield cemeteries and aspects of their funerary implications have been studied in the past, especially in relation to the sites Getzersdorf, Inzersdorf ob der Traisen and Franzhausen-Kokoron (Kaus 1971; Groiß 1976; Lochner, Hellerschmid 2010; Lochner 2013; Fritzl 2017; Lochner 2021; Mittermair 2022; Fritzl et al. 2024).

The site of Unterradlberg (Fig. 1) offers a rich record of archaeological contexts, including prehistoric and historic features. Traces of Bronze Age activities indicate a considerable use of the valley plains, as an Early Bronze Age burial ground (Neugebauer et al. 1991, 50), Late Bronze Age settlement structures, and Urnfield period graves demonstrate (Neugebauer, Blesl 1998, 27; Blesl, Krumpel 2004, 31; Adametz 2009). The earliest Middle Bronze Age burial mounds were documented in close proximity to the Early Bronze Age burial ground. Three circular ditches with wooden postholes indicate the remnants of burial mounds. Unfortunately, no human remains were documented (Neugebauer et al. 1991, 50). The later Middle Bronze Age burial mounds and cremation burials of Unterradlberg were situated further south on the western bank of the Lower Traisen Valley and were uncovered during a large-scale rescue

excavation undertaken by the Austrian Federal Monuments Office under the direction of Christoph Blesl between 2002 and 2003 (Blesl, Neugebauer, Preinfalk 2003; Blesl, Krumpel 2004). In between the late Middle Bronze Age contexts, one Late Neolithic/Early Bronze Age¹ inhumation burial of a male in a flexed position without any grave goods and an Epi-Lengyel urn grave were documented (Blesl, Krumpel 2004, 31; Skerjanz 2024, 57).

3. Materials and Methods

In the course of the excavation, nine Middle Bronze Age grave contexts were documented. All contained cremation burials and varied in both construction and preservation. For the purpose of this study, the graves are either referred to as burial mounds ($n = 4$) or more generally as cremation graves ($n = 5$). Classification as burial mounds was based on the prevailing stone structures, overall dimensions, and additional architectural elements indicating deliberate visibility. These include entrances and grave chambers as well as stone rings and ditches that may have marked the boundary of the mound fill. Further indicators include the central placement of cremated remains within these structures and the presence of subsequent burials oriented towards them

¹ An obtained radiocarbon date yielded the date 3806 ± 24 BP, 2341–2142 calBC (95.4 % probability).

(for a detailed description and interpretation of each context, see section 5).

The cremated remains were sieved (fraction size: > 10 mm, 5–10 mm, 2–5 mm and < 2 mm), and fragments were identified and sorted to the body regions cranium, thorax, arms, legs, and autopodia; unidentifiable fragments were sorted based on their type into diaphyseal, epiphyseal, and unidentified fragments (Brickley, McKinley 2004; Großkopf 2004). Fragments of single body areas were weighed separately and the total weight was calculated. The osteological assessment comprised the determination of the minimal number of individuals (MNI). Furthermore, the rough estimation of the burning stage based on bone coloration (Wahl 1981) and the identification of pathological lesions was conducted. Sex estimation was performed based on metric and morphological traits where suitable elements were available (Acsádi, Nemeskéri 1970; Cavazuti et al. 2019a). Age at death was estimated based on tooth roots and the stage of epiphyseal closure (Schaefer, Black, Scheuer 2009; AlQahtani, Hector, Liversidge 2010). Size characteristics, the wall thickness of long bones, the structure and thickness of diploe of cranial fragments (Großkopf 2004), and growth-related bone remodelling (Gosman et al. 2013) were used to distinguish between nonadult and adult individuals. If double or multiple burials were evident, the remaining bone fragments that could not be assigned to one specific individual were assigned to the individual with the largest amount of identifiable bone fragments. During the sorting process of the cremated remains, burnt and unburnt animal bones were separated, counted, weighed, and classified by species.

In total, 19 strontium isotope ratios ($^{87}\text{Sr}/^{86}\text{Sr}$) were measured from fully calcined human bones and teeth from ten individuals (adults: $n = 5$, nonadults: $n = 5$; see Tab. 2) recovered from seven grave contexts. The sampling strategy focused on suitable diaphyses ($n = 11$), ribs ($n = 2$), petrous parts ($n = 2$), and dentine ($n = 4$) to capture potential variations in $^{87}\text{Sr}/^{86}\text{Sr}$ related to different life stages (Tütken 2010, 35; Veselka et al. 2021, 2; Frère et al. 2025, 3). The samples were prepared according to the protocols by Snoeck et al. 2015. The measurements of the $^{87}\text{Sr}/^{86}\text{Sr}$ were performed on a Nu Plasma 3 MC-ICP mass spectrometer (PD017 from Nu Instruments, Wrexham, UK) following Gerritzen et al. 2024. Strontium concentrations were also measured on the same instrument, as described in Boonants et al. 2025. The results were then put into context with the already established baseline map of the bioavailable $^{87}\text{Sr}/^{86}\text{Sr}$ (BASr) in the Lower Traisen Valley (Fritzl et al. 2024, 151–152).

Additionally, eight bone fragments from six grave contexts were sampled for radiocarbon dates. In all cases, the same bone fragments used for the $^{87}\text{Sr}/^{86}\text{Sr}$ analysis were

dated to allow direct comparability between the strontium signals and the radiocarbon dates (see Sabaux et al. 2024). The aim of the ^{14}C sampling was to obtain at least one absolute date for each grave complex. All burials contained scattered cremated remains, and contextual information about the initial deposition was obscured due to poor preservation. Where more than one individual was identified osteologically, efforts were made to sample both individuals. However, this was not always feasible due to the uncalcinated state or the low weight of available bone fragments. The ^{14}C dating followed the protocols for AMS dating of cremated human remains from Boudin et al. 2015, Van Strydonck et al. 2005 and Wojcieszak et al. 2020. The radiocarbon dates were calibrated and visualized as a KDE plot in OxCal 4.4 (Bronk Ramsey 2009) based on the atmospheric data from Reimer et al. 2020. To estimate the limits of the burial grounds' occupancy duration, the functions *boundary*, and *span* were applied.

4. Results

4.1. Archaeological Evaluation

All grave contexts were severely disturbed, either through secondary opening after the initial deposition, superimposition of other features, or ploughing. Due to these formation processes, most of the pottery finds were incomplete and highly fragmented. The reconstructed pottery finds included amphorae, cups, jugs, and large pots (see Pls. 3–5, 7–8) and align with pottery finds from the later phase of the Middle Danube Tumulus Culture, while also exhibiting first elements of the Early Urnfield Culture repertoire (Willvonseder 1937; Říhovský 1982). Metal objects were affected by corrosion and comprised 26 objects, including daggers, pins, pin shaft fragments, spiral tubes (*Spiralröllchen*), spiral rings (*Noppenringe*), two small spirals, fragments of sheet metal objects, an awl, and a fragmented, unidentifiable metal object (see Pls. 1–2, 5–6).

The typology of daggers and pins yielded relative chronological information for three grave contexts (563, 602, 818). The daggers are of the Kunětice type (see Pl. 1, no. 563_6) and Blučina variant (see Pl. 6, no. 817_1). Furthermore, a Deinsdorf type (see Pl. 6, no. 818_11), *Kolbenkopf* (see Pl. 2, no. 600_14), and bi-conical pin (see Pl. 2, no. 628_2) were categorized. These types originate in the Middle Bronze Age and extend into the Late Bronze Age, specifically aligning with Reinecke's phases Bz C2, D, and beginning of Ha A (Říhovský 1979, 95). Worth noting is that relative dating was restricted to these three grave contexts due to the exclusive presence of these diagnostic daggers and pins within them. Further find categories include pottery finds and typical metal assemblages of both male and female costumes of the Middle Bronze Age (Nönnig

Grave	Total weight [g]	Fragments [n]	Identified species	Remarks bone elements	Remarks demography
563	5.14	5	pig, sheep/goat, cow	pig rib, cow molar	newborn pig, root etching post depositionally
627	43.21	6	pig	mostly ribs, one molar	n/a
742	1.13	1	sheep/goat	one single rib	n/a
814	1.84	16	sheep/goat	mainly ribs, two metapodia	juvenile goat
817	14.77	9	pig, cow	burnt and unburnt cow and pig bones	adult male pig
818	147.44	118	pig, sheep/goat	large parts of a pig skeleton: longbones, feet, ribs, phalanges	mostly adult pig, juvenile sheep/goat, infantile pig

Tab. 1. Overview of faunal remains sorted from the cremated human remains.

2002, 11, 78; Sørensen, Rebay-Salisbury 2008, 156). Due to the unrestored state of the metal objects, a definite typological classification was not possible for at least two objects (see Pl. 5, no. 818_12; Pl. 2, no. 632_1). In addition to the pottery and metal finds, a single lithic flake was documented (see Pl. 1, no. 563_2). The unburnt animal bone fragments comprised only a small number of ungulate tooth fragments and unidentifiable diaphyseal fragments. Most of the unburnt faunal remains were found in the general fill of the mounds and not inside the grave chamber. Stray finds comprise a *Noppenring* and an awl with a square cross-section (see Pl. 5, nos. 628_13, 628_11), typically found in women's graves during the Middle Bronze Age (Benkovsky-Pivovárová 1985, 74).

4.2. Osteological Assessment

The detailed osteological assessment identified a minimum number of 14 individuals² out of all nine grave contexts and comprised six adults and eight nonadults. For most of the adults, a detailed age at death and sex estimation was not possible due to the absence of diagnostic bone elements. In the case of the nonadults, based on open epiphyseal joints and tooth development, the age at death comprised both infants I (0–6 years) and II (6–12 years) stages.

The uniform coloration observed across all individuals roughly indicates a minimum burning stage IV after Wahl 1981 (650 °C and higher), leading to an overall white appearance with some grey discoloration. Corroded metal and green staining could be identified on some bone fragments. The weight of the cremated remains varies significantly and resonates with the overall preservation of the individual grave contexts. No discernible pattern of overrepresentation of any specific body area was observed.

² A detailed catalogue of the osteological assessment for each grave context is available as Online Appendix 1: https://austriaca.at/onlineArchA110_Skerjanz_etal_Appendix1.

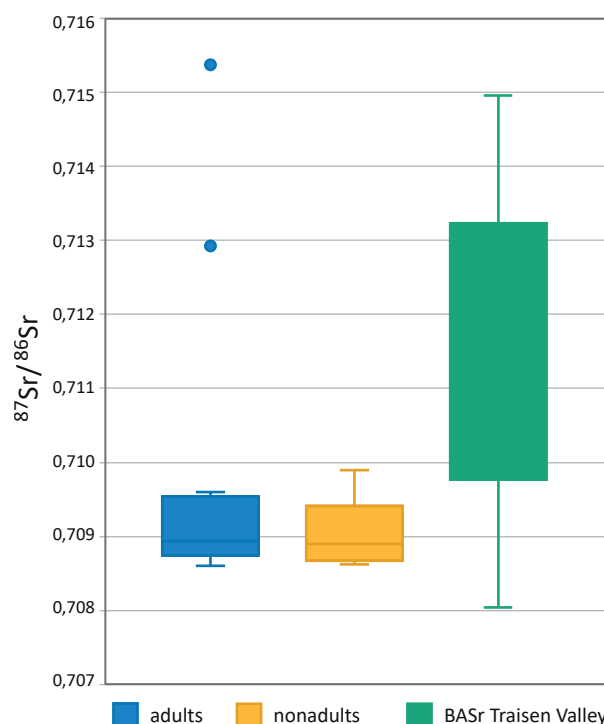


Fig. 2. $^{87}\text{Sr}/^{86}\text{Sr}$ distribution in adults and nonadults compared to the bioavailable $^{87}\text{Sr}/^{86}\text{Sr}$ of the Traisn Valley region (BASr after Fritzl et al. 2024).

Pathological lesions were evident in at least three individuals (two adults, one nonadult). They included ectocranial lesions and an active periostitis on a neurocranial fragment of a nonadult individual (Rajić Šikanjić et al. 2024, 138).

4.3. Zooarchaeological Analysis

In total, 141 burnt and 14 unburnt faunal remains were separated from the cremated human remains. The burnt animal bones showed a more heterogenous coloration compared to the human remains, suggesting that they were exposed to varying degrees of heat during the cremation process. The faunal assemblage is primarily dominated by pig (*Sus scrofa domesticus*) and sheep/goat (*Ovis/Capra*), with cow

(*Bos taurus*) represented mainly by fragmented molars and diaphyseal fragments (Tab. 1). The demographic profile of the animals indicates the presence of neonate, juvenile, and adult pigs, as well as juvenile sheep/goats. Grave chamber 818 stands out due to the presence of a substantial portion of an adult pig skeleton that included long bones, ribs, and phalanges.

4.4. Strontium Isotope Analysis

Previous studies of strontium isotope ratios and interpretation of mobility patterns of prehistoric societies in Austria included unburnt teeth, bones, and analyses of the biologically available $^{87}\text{Sr}/^{86}\text{Sr}$ from prehistoric sites in Lower Austria (Irrgeher et al. 2012; Neugebauer-Maresch, Lenneis 2015; Retzmann et al. 2020). The latest results from

Grave/Fn (sample no.)/Ind	Bone element	Osteol- ogy	Lab code $^{87}\text{Sr}/^{86}\text{Sr}$	$^{87}\text{Sr}/^{86}\text{Sr}$	2SE	[Sr] (ppm)	Lab Code ^{14}C	^{14}C years BP	Cal BCE (95.4 %)
563/3/Ind I	tibia	adult	MF200	0.712945	0.000007	116	RICH-31783	3008 ± 25	1308–1191 (75.7 %) 1382–1342 (12.1 %) 1180–1158 (3.9 %) 1145–1128 (3.7 %)
563/1/Ind I	rib	adult	MF235	0.708709	0.000007	123	n/a	n/a	n/a
563/1/Ind II	diaphysis	nonadult, infans I	MF236	0.708923	0.000008	281	n/a	n/a	n/a
627/10/Ind I	humerus	adult, ambig. female	MF203	0.708990	0.000007	112	RICH-31787	2964 ± 26	1266–1107 (91.6 %) 1096–1079 (2.1 %) 1070–1055 (1.8 %)
635/6(1)/Ind I	femur	adult	MF202	0.709464	0.000031	n/a	RICH-31790	3023 ± 26	1322–1198 (70.8 %) 1391–1336 (23.2 %) 1141–1133 (0.8 %) 1171–1165 (0.6 %)
635/6(2)/Ind I	femur	adult	MF204	0.708656	0.000007	139	RICH-31789	3114 ± 25	1442–1368 (57.4 %) 1356–1296 (38.1 %)
742/2/Ind I	diaphysis	adult	MF205	0.708701	0.000007	174	RICH-31788	2922 ± 25	1213–1044 (92.1 %) 1032–1018 (3.3 %)
814/5/Ind I	tibia	nonadult	MF206	0.709881	0.000007	95	RICH-31782	2980 ± 24	1284–1118 (95.0 %) 1366–1360 (0.5 %)
814/5/Ind I	petrous part	nonadult, infans I	MF230	0.708656	0.000008	116	n/a	n/a	n/a
814/5/Ind II	petrous part	nonadult, infans II	MF231	0.708588	0.000006	113	n/a	n/a	n/a
816/1/Ind I	diaphysis	nonadult?	MF233	0.708811	0.000009	138	n/a	n/a	n/a
818/10/Ind II	radius	nonadult, infans I	MF207	0.709220	0.000008	117	RICH-31785	3026 ± 29	1326–1198 (67.7 %) 1396–1332 (26.1 %) 1142–1132 (1.0 %) 1172–1164 (0.7 %)
818/10/Ind I	femur	adult	MF201	0.715417	0.000011	271	RICH-31786	2994 ± 25	1298–1125 (91.4 %) 1373–1354 (4.0 %)
818/10/Ind I	femur	adult	MF232	0.709074	0.000007	110	n/a	n/a	n/a
818/10/Ind I	rib	adult	MF234	0.709578	0.000009	92	n/a	n/a	n/a
818/10/Ind I	dens caninus	adult	MF237C	0.708909	0.000008	166	n/a	n/a	n/a
818/10/Ind I	dens mo- laris 3	adult	MF237M3	0.708859	0.000006	160	n/a	n/a	n/a
818/10/Ind I	dens pre- molaris	adult	MF237PM	0.708824	0.000008	154	n/a	n/a	n/a
818/10/Ind I	dens incisivus	adult	MF237I	0.708565	0.000009	136	n/a	n/a	n/a

Tab. 2. Overview of the osteological and isotopic data.

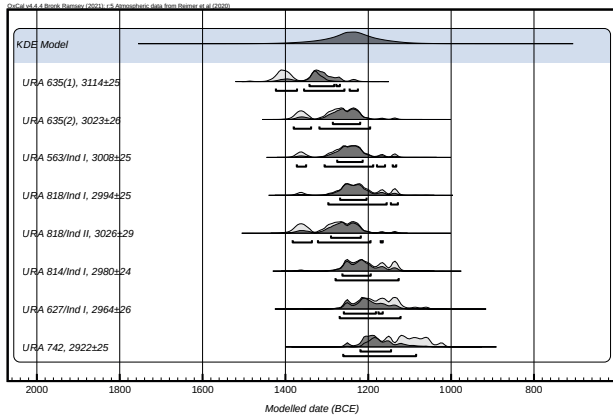


Fig. 3. A KDE model of the radiocarbon dates shows a peak between the 13th and the 12th century BC.

the Traisen Valley and the Early Urnfield burial ground of Inzersdorf ob der Traisen by Michaela Fritzl et al. significantly expanded the data for the bioavailability of strontium (BASr) in the region (Fritzl et al. 2024). The BASr results of the geological zones ranged from 0.7080 to 0.7150. In this study, a differentiation of the bioavailable strontium isotope ratios of the geology from the hills surrounding the valley and the plains of the valley was observed. The cut-off point was set at 0.7090, whereby the higher values primarily reflect the $^{87}\text{Sr}/^{86}\text{Sr}$ from the elevated regions and the lower values that of the lower alluvial plains.

The ratios ($^{87}\text{Sr}/^{86}\text{Sr}$) obtained from the cremated human remains of Unterradlberg range from 0.7086 to 0.7129 and the strontium concentrations ([Sr]) range from 92 to 281 ppm (Fig. 2 and Tab. 2). The $^{87}\text{Sr}/^{86}\text{Sr}$ of the adult and nonadult individuals generally falls within the BASr range of the Traisen Valley and predominantly matches with the lower alluvial plains, where the site of Unterradlberg is located. However, two ratios (563/3/Ind I, 818/10/Ind I) are higher and fall outside the 95 % confidence regions of the Unterradlberg samples, even showing discrepancies between certain bone elements within the same grave context (e.g. between long bones and ribs, or between two femora). The detailed results of the $^{87}\text{Sr}/^{86}\text{Sr}$ of each individual case will be discussed together with the overall interpretation of the grave contexts in section 5.

4.5. Radiocarbon Analysis

The KDE model used to visualize the distribution of the calibrated dates (Fig. 3) reveals one peak, indicating a single phase of the burial ground in Unterradlberg with the highest overlap between the 13th and 12th centuries BC. The radiocarbon dates obtained show a possible duration of 123 to 293 years for the 1 σ probability and 50 to 437 years for the 2 σ probability. The span of dates covers a wide range,

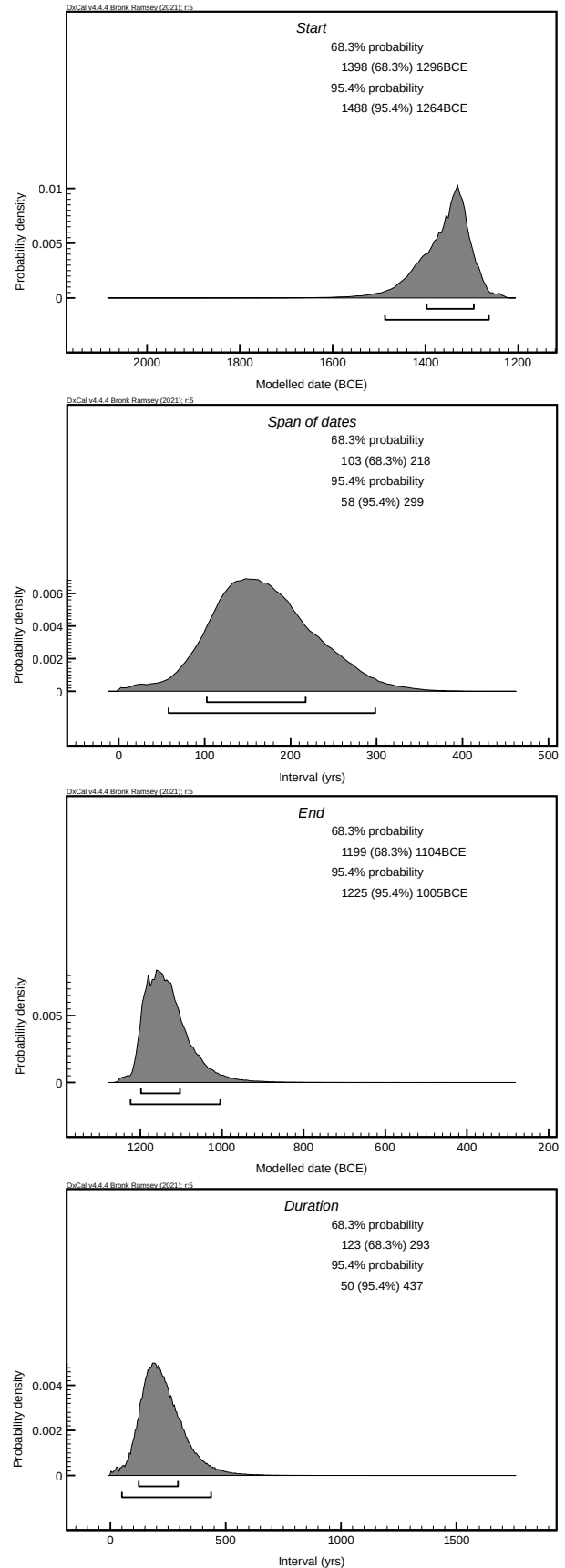


Fig. 4. Start and end boundary, span of dates and duration of the burial ground.

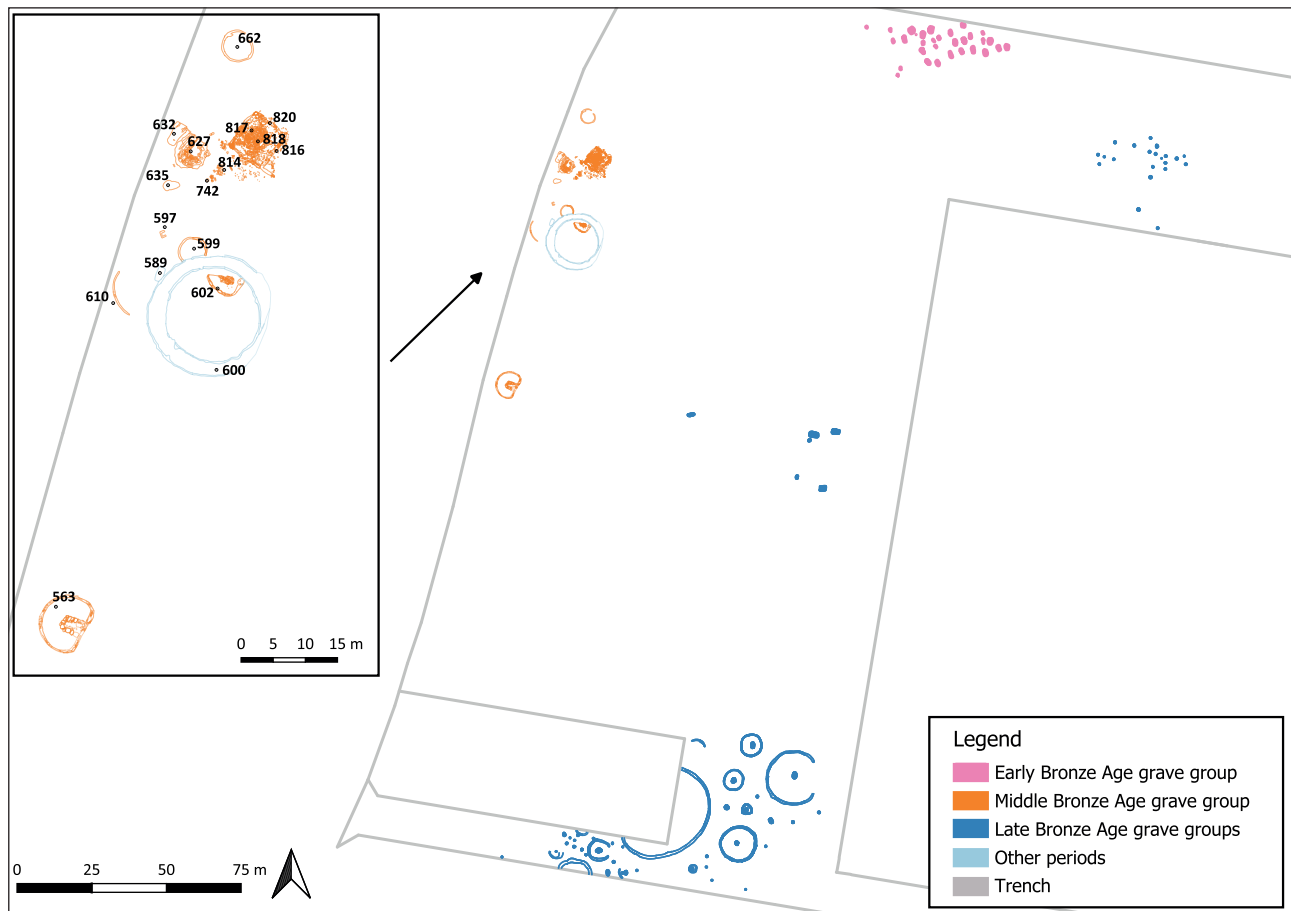


Fig. 5. Map of the different grave groups at the Unterradlberg site. The detailed map section shows the discussed graves and their feature numbers (Graphic: H. Skerjanz).

limiting a more precise dating. The beginning of the burial ground falls between 1485 to 1263 BC for the 2σ and 1391 to 1296 BC for the 1σ probability. The end of the burial ground dates from 1228 to 1012 BC for the 2σ and 1199 to 1105 BC for the 1σ probability (Fig. 4).

5. Discussion and Interpretation of the Grave Contexts

5.1. Structure of the Burial Ground

The overall structure of the burial ground in Unterradlberg was impacted by the effects of agricultural activity that disturbed nearly all features (Fig. 5). The remnants of four ditch features (SU 597, 599, 610, 662) indicate that the Middle Bronze Age burial site probably included further graves that were completely levelled. The distance and empty spaces between some of the mounds further supports this. In close proximity to the Middle Bronze Age burial mounds (Neugebauer et al. 1991, 50; Blesl, Neugebauer, Preinfalk 2003, 31–32), a total of three grave groups of the Urnfield Culture were documented (see Fig. 5, in dark blue; Blesl, Krumpel 2004, 32). Grave group one consisted of seven heavily destroyed longoval grave pits lined with stones.

A preliminary evaluation of finds suggests they fall into the phase Ha A1. These long oval graves are comparable to those of further burial grounds from the Earlier Urnfield Culture like Inzersdorf ob der Traisen, Horn and Plaikka that indicate a gradual development of burial customs (Lochner 1991a; Lochner 1991b; Müller, Preinfalk, Preinfalk 2015; Fritzl 2017; Lochner 2021). The second grave group included 25 urn graves and roughly dates to the phase Ha A1–Ha A2. The third grave group in the south can be roughly dated to the phases Ha A2 to Ha B1 and comprises 35 urn graves encircled by ditches. Secondary openings of the burial mounds and flat graves discussed here indicate the grave structures were visible or remembered to a certain extent. This evidences a diachronic and gradual change of funerary customs displayed in distinct feature groups.

5.2. Burial Mound 563

Although most of the mound fill had eroded, the complex showed an intact foundation of a grave chamber built with flat stone slabs and an opening towards the southeast (Fig. 6). The grave chamber was surrounded by an irregular



Fig. 6. Burial mound 563 with cremated remains (in yellow) inside the grave chamber (Graphic: H. Skerjanz; photo: © Federal Monuments Office Austria).

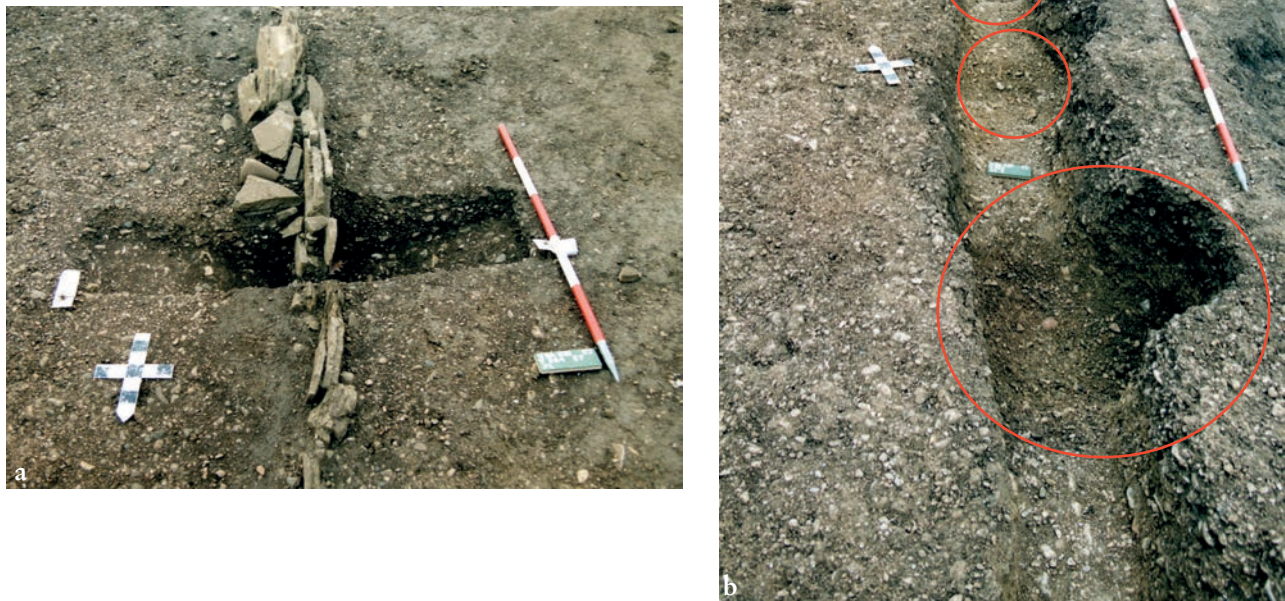


Fig. 7. Construction elements of burial mound 563. – a. Vertically placed stone slabs inside the ditch; b. Three postholes situated inside the ditch and in front of the chamber entrance (Photos: © Federal Monuments Office Austria, edited by H. Skerjanz).

ditch filled with vertical stone slabs that displays a rather atypical construction element for this time period. The side of the mound with the opening was slightly flattened. Postholes in the ditch fill in front of the entrance indicate wooden structures that probably prevented the mound fill from collapsing inside the chamber (Fig. 7; Krenn-Leeb 2019, 52–55). Two concentrations of cremated human remains were found within the chamber, one in the west and one in the east. However, the poor preservation of the entire structure makes a separation uncertain. While both concentrations included adult remains, it remains unclear whether these represent one or two individuals. In contrast to the western concentration, the eastern concentration contained both adult and nonadult remains. A three-rivet dagger of the Kunětice type was placed on top of the western concentration. Besides that, only highly fragmented pottery could be identified. The calibrated radiocarbon date of 1382–1128 calBC for the 2σ probability correlates well with the relative dating (Bz C2 to Bz D) of the dagger (Novák 2011, 99–100).

The strontium isotope ratio of the nonadult (diaphysis: 0.7089) is consistent with the local BASr. The ratio of adult cremated remains also falls within the BASr but shows a higher ratio in the tibia fragment (0.7129) compared to a rib (0.7087) fragment. At least two scenarios are possible: 1) both elements belonged to one adult individual that was highly mobile and moved from the hills to the plains, as

the tibia takes longer to remodel than the rib, which corresponds with the values of the lower elevations or 2) the sampled fragments belonged to two different adult individuals with slightly different origins.

5.3. Burial Mound 602

Burial mound 602 was superimposed by a later, larger Roman period burial mound which disturbed the feature (Fig. 8). Approximately one-third of the original mound's construction was preserved, consisting of a central stone packing enclosed by a stone circle built on the contemporaneous walking horizon. The construction is comparable to mounds of the burial sites in Winklarn or Pitten (Willvonseder 1937, 47; Hampl, Kerchler, Benkovsky-Pivovarová 1981, 107; Mader 2018, 203). The *Kolbenkopf* pin is similar to further finds from Moravia that highlight the Middle to Late Bronze Age transition (Říhorský 1979, 95). The only skeletal evidence, a single cremated human diaphyseal fragment, was found near the stone packing and may not be directly associated with the original burial. The fragment's size suggests it belonged to an adult, but its exact location and association remain unclear.

5.4. Burial Mound 627

Grave context 627 was the best-preserved mound, characterized by the arrangement of different-sized stones stacked on top of each other and lined on the sides by elongated

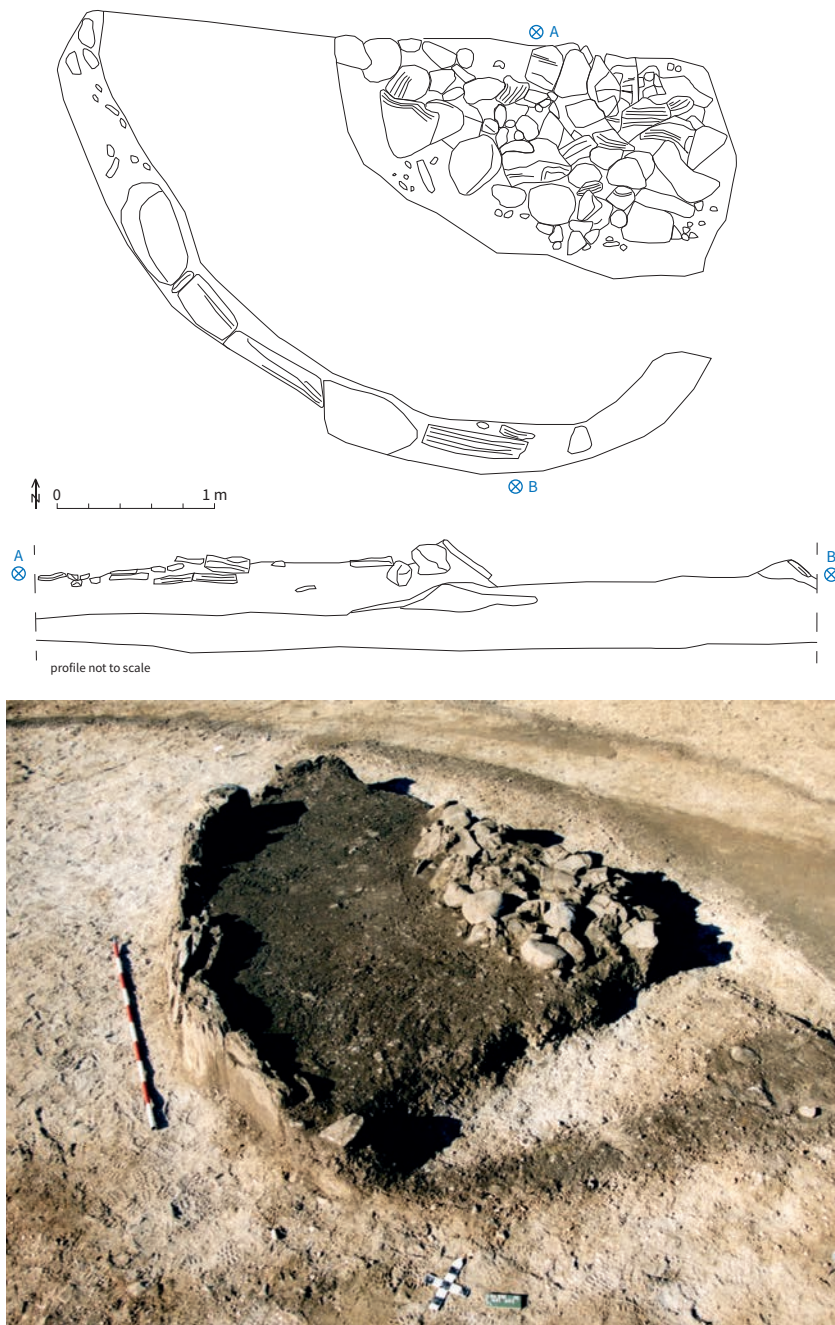


Fig. 8. The remnants of burial mound 602 were partially destroyed by a Roman burial mound (Graphic: H. Skerjanz, photo: © Federal Monuments Office Austria).

sandstones (Fig. 9). The long oval grave chamber was constructed with flat stone slabs.

Despite the grave's good preservation, it underwent re-opening after the initial deposition, evident from the displaced gravel and scattered cremated remains mixed with dark brown soil fill. Mound 627 shows similarities to the cylindric graves in Pitten, characterized by a flat top that could point to a wooden construction closing the top of the chamber (Sørensen, Rebay-Salisbury 2008, 166). The osteological analysis revealed at least one adult individual; sex was estimated as ambiguous with a tendency towards female. Furthermore, a nonadult individual of the age group

infans Ia (0–3 years) was identified. Apart from a few small bronze fragments, no grave goods were documented, further supporting the theory of a secondary opening or manipulation of the context.

In between the outer stone lining of the burial mound, a pottery concentration was documented. Large cooking pots and cups were identified, pointing to the use of the pottery during the funerary ritual, perhaps in the course of the construction process. Some fragments had large graphite inclusions and a graphite-coated surface decorated with channels. Radiocarbon dating yielded a date of 1266–1055 calBC for the 2σ probability and indicates the end of the Bz D phase

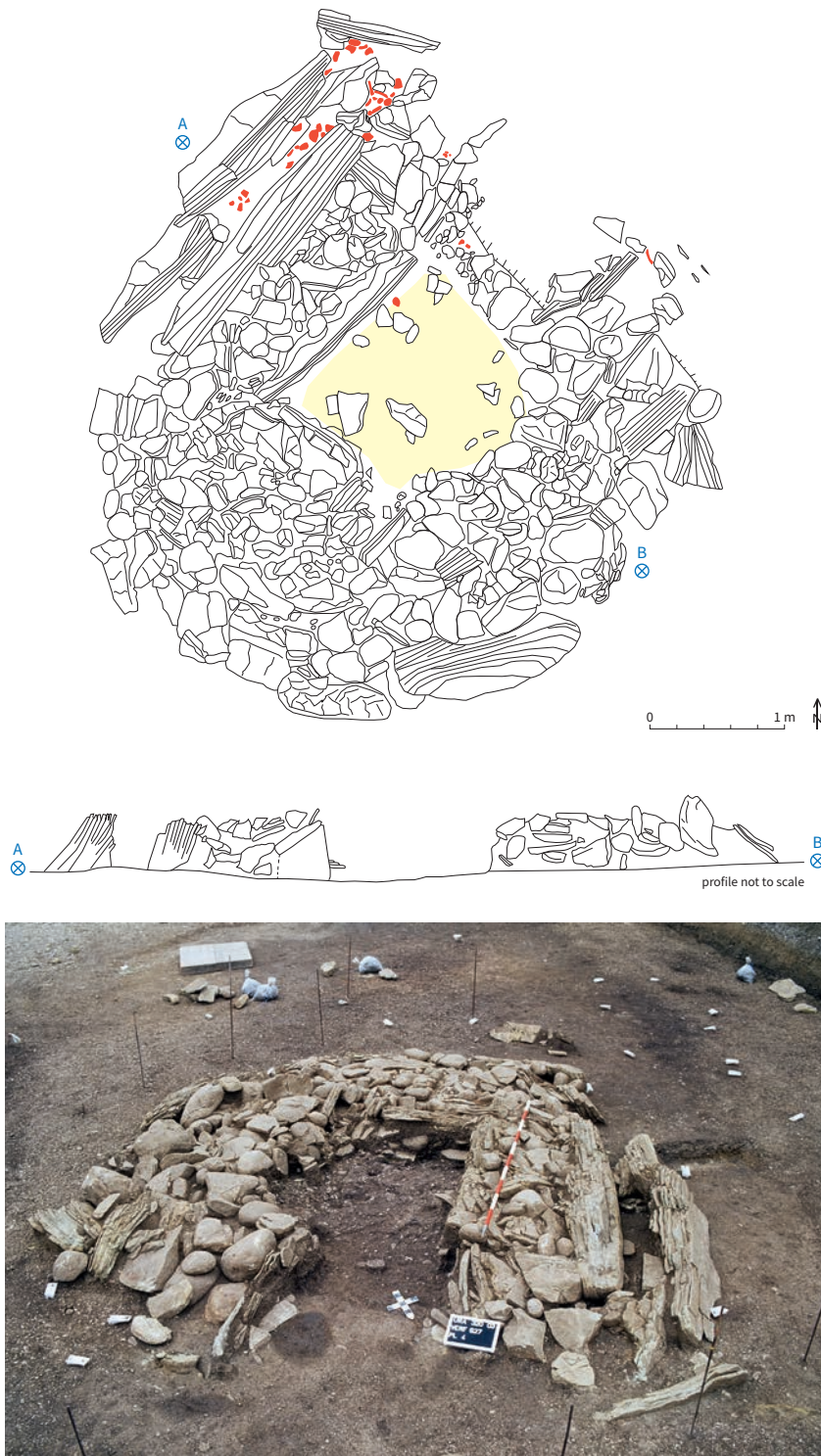


Fig. 9. Above: Burial mound 627, planum 2 with cremated human remains (in yellow) scattered inside the northeast-oriented grave chamber. A concentration of pottery fragments (in red) was found in the north and near the entrance area (Graphic: H. Skerjanz); Below: burial mound 627 and disturbed grave chamber, planum 3 (Photo: © Federal Monuments Office Austria).

and the beginning of the Ha A1–A2 phase. The $^{87}\text{Sr}/^{86}\text{Sr}$ ratio of the adult humerus (0.7089) falls within the local range of the Traisen Valley. Since no further elements were suitable for analysis, a comparison of different strontium ratios could not be established for burial mound 627.

5.5. Cremation Grave 632

The heavily disturbed grave comprised an elongated, shallow pit with a parallel stone lining facing northeast (Fig. 10). The stone lining exhibits similarities to the nearby burial mound 627, particularly in the orientation of the pit, potentially indicating a further opening. However, the original

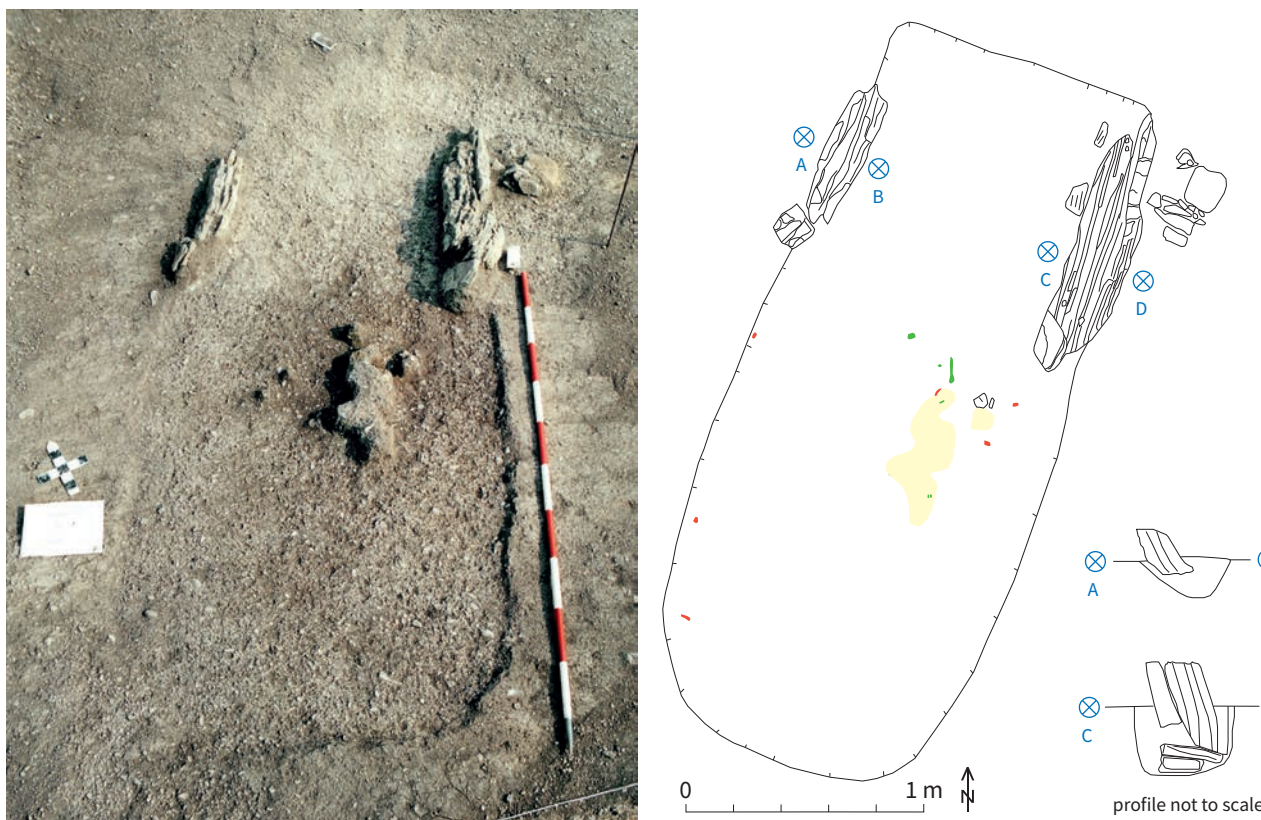


Fig. 10. Cremation grave 632 with cremated human remains (in yellow), pottery finds (in red) and metal finds (in green) (Photo: © Federal Monuments Office Austria; graphic: H. Skerjanz).

grave form remains uncertain. The cremated remains of a nonadult individual (infans I – infans II; 3–9 years) could be identified within the disturbed grave. A bi-conical pin was documented atop the concentration of cremated human remains. It had a zigzag and horizontal lines ornamentation, a type with a longer period of use, and therefore does not provide a precise relative chronological date (Říhový 1979). Further accompanying metal objects included three fragmented spiral tubes (*Spiralröllchen*), a rolled metal sheet fragment, and a massive, unidentifiable metal object found at the boundary of the grave. The grave goods comprise parts of a jewellery ensemble that align with those commonly associated with female Middle Bronze Age burial contexts (Nönnig 2002, 11). Due to the poor preservation of the cremated human remains, radiocarbon analysis was not feasible, preventing absolute dating.

5.6. Cremation Grave 635

A further highly disturbed cremation grave was documented in the southern part of burial mound 627 (Fig. 11). The long, irregular, oval pit had a maximum depth of 0.2 m and included an amphora, a cup, and four pin shaft fragments. The scattered cremated remains of one adult and one nonadult individual were deposited in the centre. No traces

of stone elements or mound soil were present. The radiocarbon dates range from 1442 to 1296 calBC and 1391 to 1133 calBC (2 σ).

The discrepancy of 0.0008 between the two $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of 0.7094 and 0.7086 from two separate femora pieces needs to be discussed further. The turnover rate of bones, especially the inorganic parts, is not fully understood (Fahy et al. 2017), and though one individual could yield varying results even within one bone, this discrepancy could also indicate two distinct individuals. In a study by Charlotte Sabaux et al., the cut-off point is set by a discrepancy of 0.0010 of the same bone elements (Sabaux et al. 2024). However, due to the scarcity of comparable data and the poor preservation of grave context 635, a definite interpretation should be treated with caution.

5.7. Grave Complex/Burial Mound 817

Complex 817 was characterized by a layer of small stones, which appear to be the remnants of a previously existing grave structure. The whole complex revealed multiple contexts (graves 816, 814, 742), seemingly added and deposited around the central grave structure (chamber 818) (Fig. 12). Disturbed areas suggest evidence of subsequent secondary openings. Modern ploughing activities have further

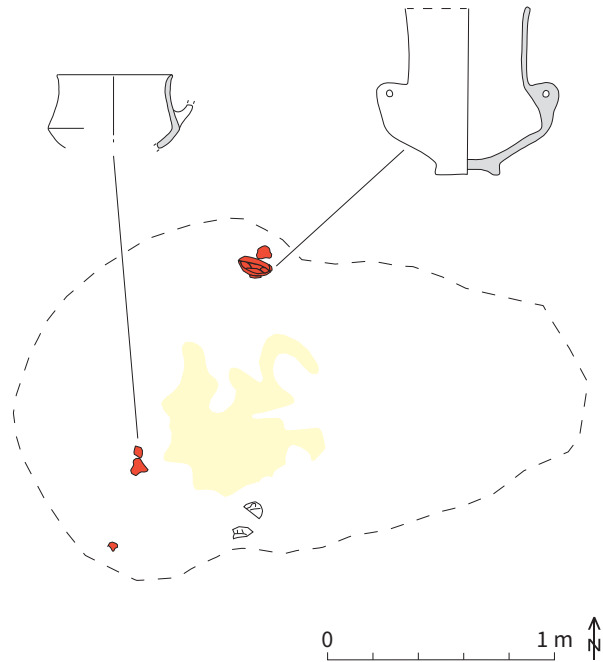


Fig. 11. Heavily disturbed cremation grave 635 (Photo: © Federal Monuments Office Austria) with cremated human remains (in yellow) and pottery finds (in red) (Graphic: H. Skerjanz).

contributed to the disturbance, with visible ploughing tracks on the first planum. The grave complex can be divided into at least two distinct parts. To the northwest of the stone layer, an additional stone setting was documented, likely representing a second, added grave structure. Scattered fragments of cremated remains and pottery were found sporadically throughout the entire area of burial complex 817. However, due to the destruction of the site, it is not possible to definitively attribute these finds to specific depositions or as displaced material from documented grave contexts. There is a distinct possibility that further burials were placed within the stone setting. This highlights the versatile use of these burial monuments and the challenges involved in interpreting the find situation. Compared to the other burial mounds in Unterradlberg, complex 817 stands out due to the use of small stones, forming a stone layer. Mound fillings consisting of smaller stones that were piled on top of each other are comparable to graves 15, 29, and 153 at Pitten (Hampl, Kerchler, Benkovsky-Pivovarová 1981, Pls. 18, 27, 64).

5.7.1. Central Burial 818

The central burial of grave complex 817 was revealed in its entirety in planum 2 (Fig. 13). The burial complex had a total diameter of approximately 7–8 m, which is comparable to the size of other mounds of the Middle Bronze Age

(Falkenstein 2017, 79). It was surrounded by an irregular, square ditch (SU 820).

Large stones were placed as a visible boundary of the structure on the corners of the ditch. Underneath the stone layer 817, the long oval burial chamber 818 was enclosed and covered by larger, elongated stones. Inside the chamber, the cremated remains of a minimum of one adult and one nonadult individual as well as pottery and bronze finds were commingled. Both individuals had ectocranial lesions, and two cranial fragments of the nonadult individual indicate periosteal reactions. These pathological lesions suggest chronically ill individuals, possibly suffering from anaemia, vitamin deficiencies or inflammatory processes (Brickley 2018; Buikstra 2019). A secondary opening of the central burial chamber is not evident, and ploughing activity strongly impacted the finds and cremated remains. The large number of burnt animal bones identified as a pig commingled with the cremation remains can be interpreted as a ritual offering, either as part of feasting activities or as a pyre good. Furthermore, two opposing hamati of a sheep/goat could also indicate a symbolic offering or meat consumed at the ceremony (Lochner 2021, 158).

The $^{87}\text{Sr}/^{86}\text{Sr}$ of an adult femur (0.7154) from grave context 818 falls 0.0004 above the range of the BASr of the Traisen Valley. Compared to the values of another femur

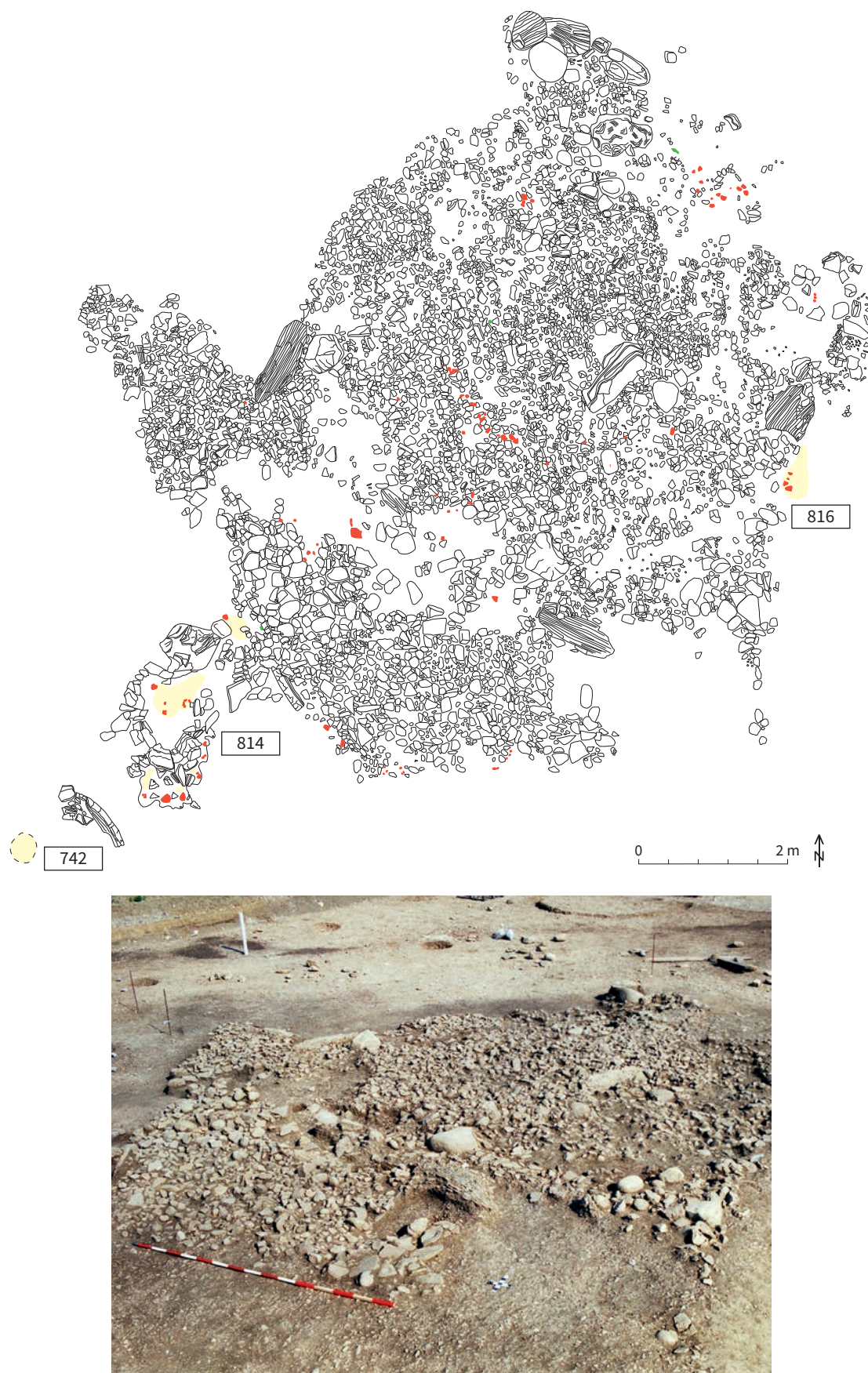


Fig. 12. Overview of grave complex 817, planum 2 (Graphic: H. Skerjanz, photo: © Federal Monuments Office Austria).

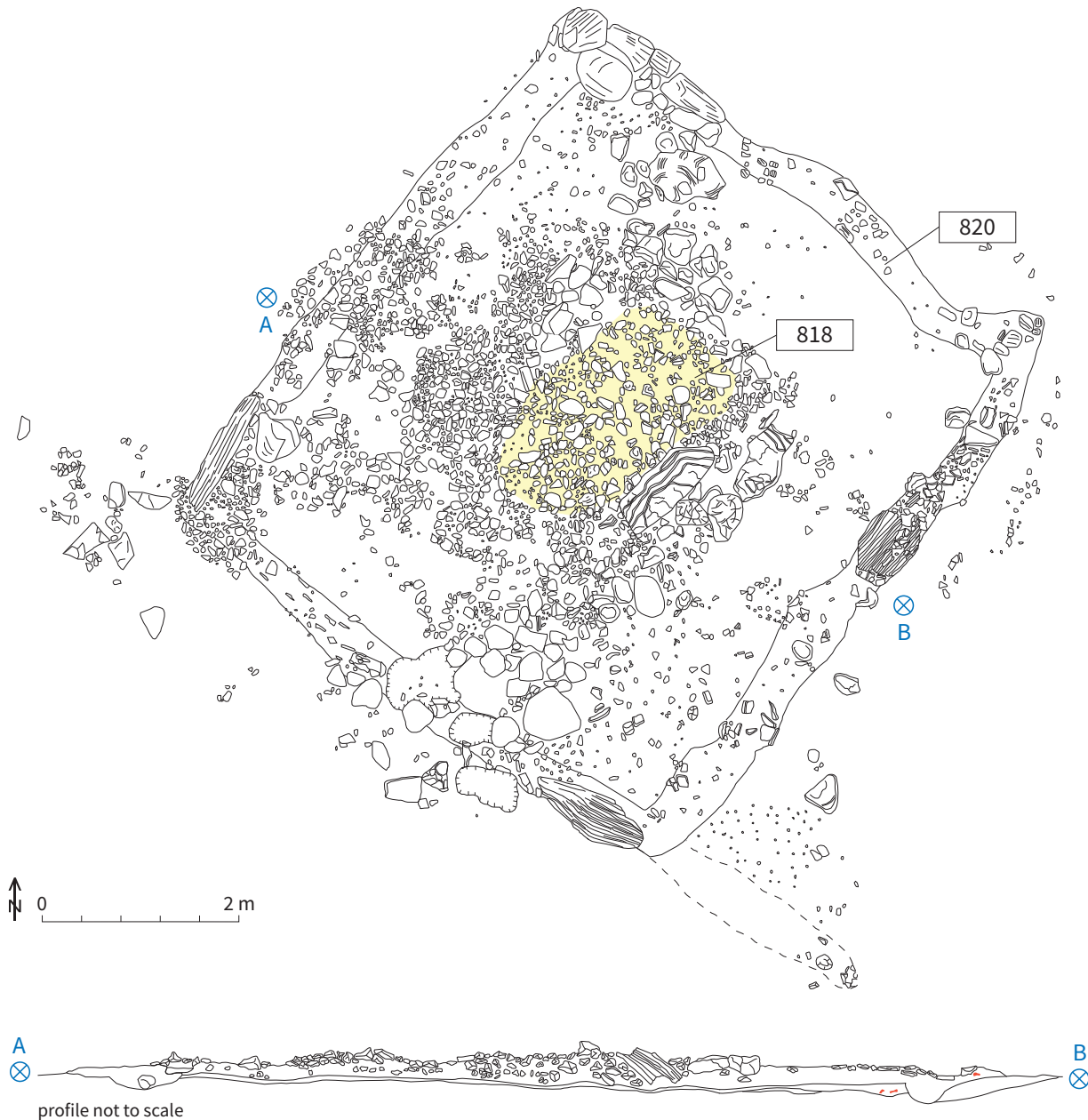


Fig. 13. Grave complex 817, planum 3 revealed the central burial chamber 818 with the elongated concentration of cremated human remains (in yellow) (Graphic: H. Skerjanz).

(0.7090), four dentine samples, and one rib (0.7095), the discrepancies are even more apparent (Fig. 14). Whereas the dentine of the molar and the premolar show a similar ratio (0.7088), the canine (0.7089) is a bit higher, and the incisor (0.7085) a bit lower.

With the majority of samples from this grave context falling within the BASr of the Lower Traisen Valley, the elevated $^{87}\text{Sr}/^{86}\text{Sr}$ of the femur indicates that the burial chamber contained not only one adult and one nonadult, but at least one further adult individual that could not be distinguished morphologically. Furthermore, this elevated $^{87}\text{Sr}/^{86}\text{Sr}$ of

the respective adult individual shows a mixture of different food sources for the last 10 to 20 years before death. This indicates a distinct food intake pattern compared to the rest of the community, suggesting a non-local origin of the individual.

All radiocarbon dates fall into the transitional period from the Middle to the Late Bronze Age and the Bz D to Ha A1 phase. Crucial for the relative dating of the grave context was the Blučina-variant dagger in combination with the Deinsdorf-type pin (Říhový 1979, 74; Novák 2011, 100–103), which are typical finds from graves assigned to

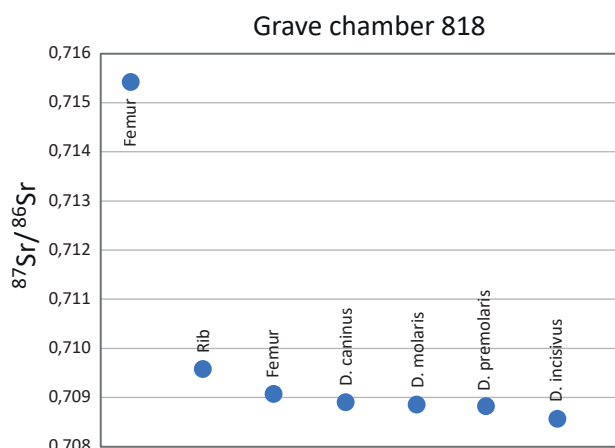


Fig. 14. $^{87}\text{Sr}/^{86}\text{Sr}$ distribution of two femora, a rib, and four dentine fragments, including a *dens caninus*, *dens molaris*, *dens premolaris* and *dens incisivus* (Graphic: H. Skerjanz).

either the Tumulus or Urnfield Culture and align with the range of the absolute dates. The pottery ensemble consisted of an amphora, an amphora-like vessel, a cup, and a jug (see Pls. 7–8). The pottery was coated with graphite and decorated with vertical channels. The pottery finds mostly correlate with the transitional phase Bz D (Říhorský 1982, 171).

5.7.2. Cremation Grave 814

Cremation grave 814 was located in the southwestern part of grave complex 817 (Figs. 12, 15). The grave featured a long oval grave chamber that was constructed with stone slabs. The cremation grave showed signs of disturbance, probably due to secondary openings. The inside of the chamber was heavily disturbed, with the remaining soil mixed with highly fragmented pottery and cremated remains and the underlying geological gravel exposed. The grave fill, cremated remains, and some of the stone slabs were removed from the grave structure and deposited around the stone construction. The osteological analysis of grave 814 revealed two nonadult individuals with a similar age at death.

The $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of both individuals (0.7086, 0.7085) align with the established BASr range of the Traisen Valley. This suggests that both individuals consumed food from the region in their last years of life. The otic capsule of the petrous part only incorporates strontium during the first two years of life. Thus, it reflects the strontium ratio intake in early childhood (Veselka et al. 2021). Discrepancies exist between the tibia (0.7098) and the petrous part (0.7086) of Individual I, with a difference of 0.0012. The tibia's elevated strontium ratio compared to the petrous part suggests a potential shift in food intake during a later stage of life. This suggests a shift towards a more diverse diet and access to various food sources as the child aged. However, it cannot

be ruled out that the tibia belongs to a further individual, who could not be differentiated by morphology. The analysis of the burnt animal bones commingled with the cremated human remains indicates parts of a juvenile sheep/goat, which could have been provided as a meat offering on the funeral pyre.

The ^{14}C date of Individual I falls between 1284 and 1118 calBC for the 2σ probability. The rim fragments of amphorae, a small metal spiral and a fragmented metal button could be identified in the area around the grave chamber. Miniature amphorae fit into the typological find spectrum of the Middle Danube Tumulus Culture and are often associated with nonadult graves (Furmánek, Veličák, Vladár 1991, 97; Furmánek, Veličák, Vladár 1999, 67). At Pitten, a total of 14 graves contained double or multiple burials of nonadults, either buried together with another nonadult or an adult. This suggests a practice of adding younger individuals to existing burials, potentially reflecting social perceptions based on age (Sørensen, Rebay-Salisbury 2008, 157–158). In the case of grave 814, the dislocated remains made it impossible to determine the sequence of burials. However, the community deliberately buried both individuals in an isolated stone enclosure. This enclosure served as a burial chamber, which may have been part of a smaller burial mound or flat grave that adjoins the central burial 818. Subsequent burials in the form of added burial mounds are known from the Middle Bronze Age and usually resulted in the irregular shape of the entire burial complex (Primas 2008, 56).

5.7.3. Cremation Grave 816

Along the southeastern side of grave complex 817, cremation grave 816 was documented as a shallow, irregular feature (see Fig. 12). The cremated remains of a probable nonadult individual were mixed with soil and pottery fragments. The burial was deposited alongside the ditch SU 820, indicating a subsequent added burial oriented alongside the ditch and the boundary of the stone layer that contained a wall fragment of a graphite-coated amphora with diagonal channels. The $^{87}\text{Sr}/^{86}\text{Sr}$ of a diaphysis (0.7088) falls within the BASr of the Lower Traisen Valley. Grave context 816 could potentially contain a scattered burial that was deposited alongside the larger central burial 818.

5.7.4. Cremation Grave 742

Cremation grave 742 was located southwest of cremation grave 814 (see Fig. 12). The concentrated cremated remains of an adult individual were mixed with dark brown soil in a shallow depression with no further grave structures that could be documented. The $^{87}\text{Sr}/^{86}\text{Sr}$ of a diaphysis (0.7087) indicates local food consumption and fits with the

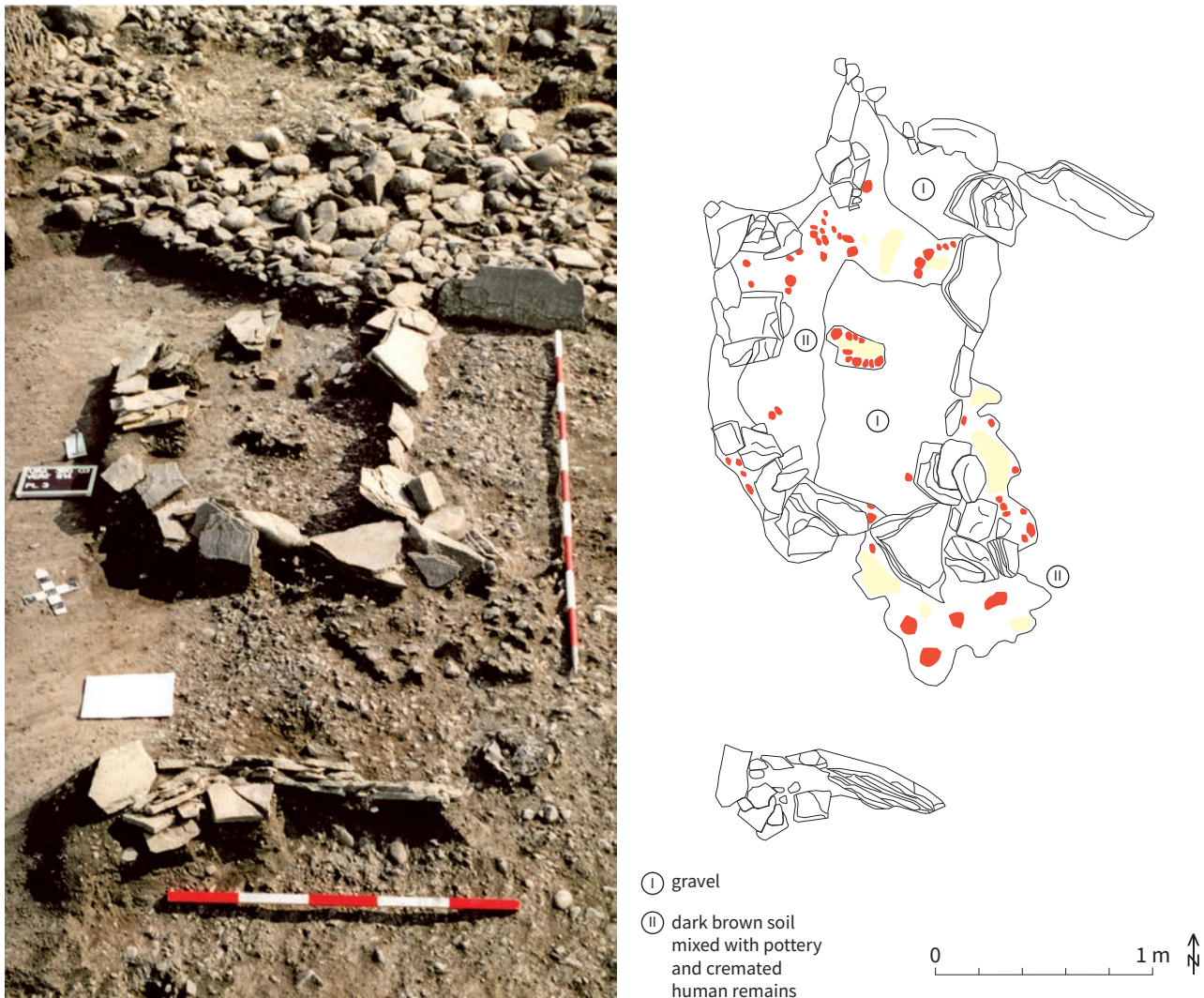


Fig. 15. Cremation grave 814 indicates a secondarily opened grave chamber, evident in the displacement of soil, pottery, and cremated human remains outside the grave structure (Photo: © Federal Monuments Office Austria; graphic: H. Skerjanz).

bioavailable $^{87}\text{Sr}/^{86}\text{Sr}$ of the region. The obtained absolute date falls between 1213 and 1018 BC for the 2σ probability and shows one of the youngest dates obtained from the burial site in Unterradlberg. However, the absence of pottery or metal objects hinders establishing a relative date.

6. General Discussion

6.1. Chronological and Cultural Framework

Absolute dating offers valuable insights into the potential contemporaneity or temporal overlap of diverse funerary practices, particularly for cremation burials. The method complements traditional archaeological classification and relative dating by providing an additional dimension for investigating the simultaneous occurrence of varied burial rites (Waltenberger et al. 2023; Fritzl et al. 2025) and has been used to evaluate the chronological frameworks of the Late Bronze Age in past studies (Della Casa, Fischer 1997).

Combining all radiocarbon data, the results indicate the later phase of the Middle and the early phase of the Late Bronze Age. This correlates well with the metal finds and the typo-chronological classification of the find material to Reinecke's phases Bz C2, Bz D and Ha A1 (Reinecke 1965), roughly spanning from the 14th to the 12th century. The KDE plot (Fig. 3) shows a peak of occupation between the 13th and 14th centuries or Reinecke's phase Bz D. In eastern Austria, this phase is considered to be a transitional stage, defined as the Late Tumulus Culture and Early Urnfield period (Lochner 2021, 22). With the onset of the Late Bronze Age, cremating the dead was fully implemented as the predominant burial practice. The development towards a standardized cremation practice may have been favoured earlier and reflects a diachronic and gradual process of adaptation (Cavazzuti et al. 2022; Sørensen, Rebay-Salisbury 2023).

The pottery finds from Unterradlberg indicate a gradual change in which new and traditional elements were combined. This is particularly evident for the pottery in grave 818 (see Pls. 7–8), which includes amphorae-like vessels and graphite-coated pottery with channel decorations, comparable with Jiří Říhový's work on the finds from the beginning of the Urnfield Culture in Moravia (Říhový 1982).

The finds are frequently discovered within varied burial modes, including burial mounds, flat graves with scattered burials, and urn graves, without necessarily demonstrating a linear development. The combination of absolute and relative dates can be a great tool to revise traditional views of unilinear developments and concentrate on the social implications of possible contemporaneous burial customs of communities, adapting certain funerary traits differently. In a cultural-historical framework, different burial customs have traditionally been associated with different cultures or peoples. However, the assumption that archaeologically defined material cultures represent a social group or even an ethnic group has been increasingly criticized and revised in recent years (Roberts, Vander Linden 2011). Especially in view of 'changing times', the importance of the interconnectedness of people and networks (Cavazzuti et al. 2022) is becoming ever clearer, which in turn challenges and emphasizes the complexity of social interpretations based on material culture.

6.2. Limited Osteo-biographical Information

The fragmentation and overall preservation of cremated human remains obscures the osteo-biographical information of individuals. Consequently, interpretations regarding social dimensions of burial grounds must be taken under careful consideration, particularly in the case of the disturbed graves at Unterradlberg, where closed contexts were absent. Assemblages of fragments of cremated human remains are often interpreted as single individuals, if age and sex indicators do not contradict this and multiplications of bone elements are absent. However, especially when communal cremation pyre places are used, a representative assemblage from potentially multiple biological individuals may be collected to constitute an individual for burial. This symbolic, social individual is not strictly the same as the cremated remains of a biological individual. Age and sex estimation of cremated remains relies on specific bone elements that are often poorly preserved after cremation (McKinley 2008, 190; Cavazzuti et al. 2019a, 2–4). Similarly, the identification of double or multiple burials is challenging, requiring either the presence of duplicate bone elements or discernible differences in bone size (Wahl 1981). The osteological evaluation of Unterradlberg revealed a higher number

of identified nonadults ($n = 8$) compared to adults ($n = 6$). Nonadults were more distinguishable from adults due to the nature of their smaller bones, open epiphyses and deciduous teeth root fragments. By contrast, further analysis such as $^{87}\text{Sr}/^{86}\text{Sr}$ of the same adult bone elements is needed to suggest a potentially higher MNI, which highlights possibilities for future application. However, further research investigating the turnover rate of human bone tissue is needed, as it is not yet fully understood. Therefore, interpretations need to be treated with caution (Fahy et al. 2017; Sabaux et al. 2021; Sabaux et al. 2024).

The total weight of cremated remains from Unterradlberg is disproportionately low, particularly for nonadult individuals. A study on the weight of cremated human remains obtained from modern cases suggests that the expected cremation weights of individuals comprise approximately 3.5 % of total body weight for adults and 2.5 % for nonadults (Warren, Maples 1997). The reasons for the low amounts of cremated remains in prehistoric contexts are manifold and must be considered individually, especially due to the issues of different preservation and documentation of grave contexts. Factors such as the burning temperature of the pyre, taphonomic processes, excavations, and the washing of bones can all contribute to increased fragmentation and the loss of weight (McKinley 1994, Harvig, Lynnerup, Ebsen 2012; Waltenberger et al. 2023). However, these factors alone cannot account for the consistently low weights. Funerary behaviour could offer an additional explanation. A *pars pro toto* selection or any other deliberate selection influences the weight of deposited cremations (Rebay-Salisbury 2010, 65). These behaviours could potentially be identified through osteological analysis and the comparison of those bone elements that are present. Further associated rituals such as cleansing cremated remains in rivers or depositing parts of them elsewhere are primarily known from ethnographic studies (Oestigaard 2000, 31–32; Kaliff, Oestigaard 2004, 93). While these provide valuable ideas regarding the treatment of cremated remains, they remain difficult to verify archaeologically.

Low weights and high fragmentation pose one of the major challenges for reconstructing the social dimensions of a buried community. Reduced cremation weights often correlate with the absence of diagnostic elements needed to determine the sex and estimate the age at death (Großkopf 2004, 95–97). The secondary openings and disturbances of the grave contexts from Unterradlberg in particular have significantly compromised the osteological data, impacting the assessment of the human remains, their location and their placement within the grave structures. However, a general trend towards double or multiple burials is evident, suggesting the use of graves for multiple individuals, fitting

in the picture of communal burial complexes of Middle Bronze Age burial grounds (Gimbutas 1965, 285).

6.3. Burial Practices and Funerary Behaviour

The evaluation of the grave context of Unterradlberg suggests a set of different funerary activities. Pottery fragments, often discovered outside the burial chambers, may imply feasting activities during which drinking and cooking vessels were broken and deposited. Interpreting the presence of burnt and unburnt animal bones within some of the cremation grave contexts requires considering multiple possibilities. The remains may represent food consumed during funerary rituals, like feasting activities. Alternatively, animals or parts of animals may have been intentionally included on the pyre as offerings or in the course of symbolic gestures. This could reflect the sequential addition of animal remains to the pyre at different stages of the cremation process, as the large quantity of pig bones from grave 818 indicates. Nevertheless, while an interpretation as pyre goods or funerary feast waste is possible, it is not the sole explanation to be considered, especially when faunal remains are scarce. A study by Giulia Gallo, Vera Aldeias and Mareike Stahlschmidt demonstrated that fire can cause heat-related alterations to buried bones in the underlying soil (Gallo, Aldeias, Stahlschmidt 2025). Sporadically burnt faunal remains, e.g. non-fleshy body parts, may therefore reflect a taphonomic process involving domestic or settlement waste that was unintentionally collected after the cremation process.

The burial complexes from Unterradlberg revealed an outstanding diversity in architectural grave features and had an average diameter of six to eight metres. The variability is apparent in the use and arrangement of stone material and wooden structural elements like postholes, chambers, and entrances. The experimentation with burial rites and grave forms including ‘door openings’ aligns with the burial customs of the transformative character of the Middle Bronze Age (Sørensen, Rebay-Salisbury 2008, 166; Sørensen, Rebay-Salisbury 2023, 92–94). Three openings in Unterradlberg show that there was a deliberate intention to maintain access to the burial chamber. These openings could indicate a range of activities, including the addition of further burials or the manipulation or removal of objects and cremated remains. The postholes likely provided structural support, preventing soil collapse into the chamber (Krenn-Leeb 2019, 52–55) and potentially prolonging the active use of the mounds as a burial ground.

Despite the limitations of osteological analysis, it is evident that multiple individuals, typically an adult and a child, were buried alongside one another in each mound. In the cremation graves, both single and double burials were

observed. Grave complex 817 illustrates the practice of subsequent added burials, either in separate stone constructions (814) or scattered along the mound’s sides (816, 742). The deliberate orientation of nonadult burials towards the primary burial (Rebay-Salisbury et al. 2020, 79–80) is a recurring pattern in Unterradlberg. This could indicate social differentiation and the importance of considering aspects like kinship and family ties (Fokkens 1997; Risch et al. 2023).

Compared to inhumation, cremation involves a significantly greater investment of labour and resources (Falkenstein 2017, 87), including the procurement of wood for the pyre (Primas 2008, 63). The erection of a mound increases the invested labour even further, and the construction and maintenance of pyres and burial mounds demands expertise and skill in construction and to control and maintain a consistent burning temperature. The motivation behind these prominent monuments, with an average diameter of six to eight metres, likely involved a complex interplay of political, social and ideological factors. Burial mounds were visible in the landscape long after the death of the deceased and could, for example, justify the territorial claims of a community (Bailey 1997, 26). Furthermore, the partially destroyed mound 602 provides evidence of the durable visibility of burial grounds, evidenced by the superimposition on it of a Roman burial mound, potentially highlighting them as landscape markers.

6.4. The Question of Mobility

Despite the small sample size, two of the ten sampled individuals (Tab. 2) had elevated $^{87}\text{Sr}/^{86}\text{Sr}$ ratios. The $^{87}\text{Sr}/^{86}\text{Sr}$ of an adult femur (0.7154) from grave context 818 reflects different food intake patterns compared to the rest of the community and indicates an individual with non-local origin, specifically for the last 10–20 years before death (Tütken 2010). The ratio of an adult tibia (0.7129) from burial mound 563 falls within the local $^{87}\text{Sr}/^{86}\text{Sr}$ range, but outside the general trend of the other sampled individuals, and therefore suggests another possible non-local origin. However, due to the nature of the poorly preserved cremated remains and number of analysed grave contexts, the limited sample size restricts a conclusion beyond the individual mobility of these two adults. Sex estimation was not possible in most of the cases, limiting the information about possible sex-specific mobility. The $^{87}\text{Sr}/^{86}\text{Sr}$ ratios of nonadults closely resemble those of most of the adult individuals, fitting into the local BASr of the Traisen Valley.

7. Conclusions

The burial mounds and cremation graves of Unterradlberg offer a unique insight into the burial practices of the transitional period from the Middle to the Late Bronze Age in eastern Austria. Despite the poor preservation of features, finds, and cremated remains, the combined archaeological and bioarchaeological investigation not only established a robust chronological dating of the site but also revealed a detailed picture of a variety of funerary practices. These include the cremation process, the construction of mounds and specific elements like ‘door openings’, feasting-related activities, and the continuous use of the features, as indicated by burials that were added at later date. Osteological analysis revealed the presence of a minimum number of six adults and eight children. The results indicate double, multiple, or consecutive burials within large grave complexes, which suggests communal burials. Strontium isotope analysis shed light on individual mobility and increased the MNI of at least one additional adult that could not be distinguished morphologically. The presence of funerary practices and typo-chronological elements from both the Middle Danube Tumulus Culture and the emerging Urnfield Culture underscores the site’s significance in understanding this transitional period. It is characterized by the adaption and abandonment of specific funerary traits and a broader social implication of changing behaviour in the treatment of the dead.

Acknowledgements

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Appendix 1

A detailed catalogue of the osteological assessment for each grave context can be found at:
https://austriaca.at/onlineArchA110_Skerjanz_etal_Appendix1.

Catalogue of Features and Finds

Burial mound SU 563, 564, 565

Planum: 1–2
 Length grave chamber: 3.4 m
 Width grave chamber: 1.2 m
 Length total: 8.8 m
 Width total: 7.4 m
 Depth (max.): 0.10 m
 Description: An elongated burial chamber with a northeast orientation (SU 563), defined by a stone slab lining and a stone-filled ditch (SU 564). Within the chamber, two concentrations of cremated remains were discovered, with a dagger found among the western concentration. Some finds were documented on the walking horizon around the mound (SU 565).

Find number: 563_6 (Pl. 1)

Dagger
 Type: Kunčice
 Find location: inside the grave chamber
 Material: metal (bronze)
 Preservation: corrosion
 Length: 14.77 cm
 Width: 2.75 cm
 Thickness: 0.56 cm
 Diameter rivets: 0.6 cm
 Description: Three-rivet dagger with a pronounced central rib on both sides. The rivets are slightly bent; the two lower rivets are positioned slightly asymmetrically.

Find number: 563_11 (Pl. 1)

Pin
 Find location: inside the grave chamber
 Material: metal (bronze)
 Preservation: fragmented
 Length: 1.78 cm
 Width: –
 Diameter shaft: 0.37 cm
 Description: Fragmented pin shaft with a round cross-section.

Find number: 564_11

Metal sheet fragment
 Find location: between ditch SU 564 and grave chamber SU 563
 Material: metal (bronze)
 Preservation: highly fragmented
 Length (max.): 1.9 cm
 Width: –
 Diameter: 0.12 cm
 Description: Fragments of an unidentified metal sheet object.

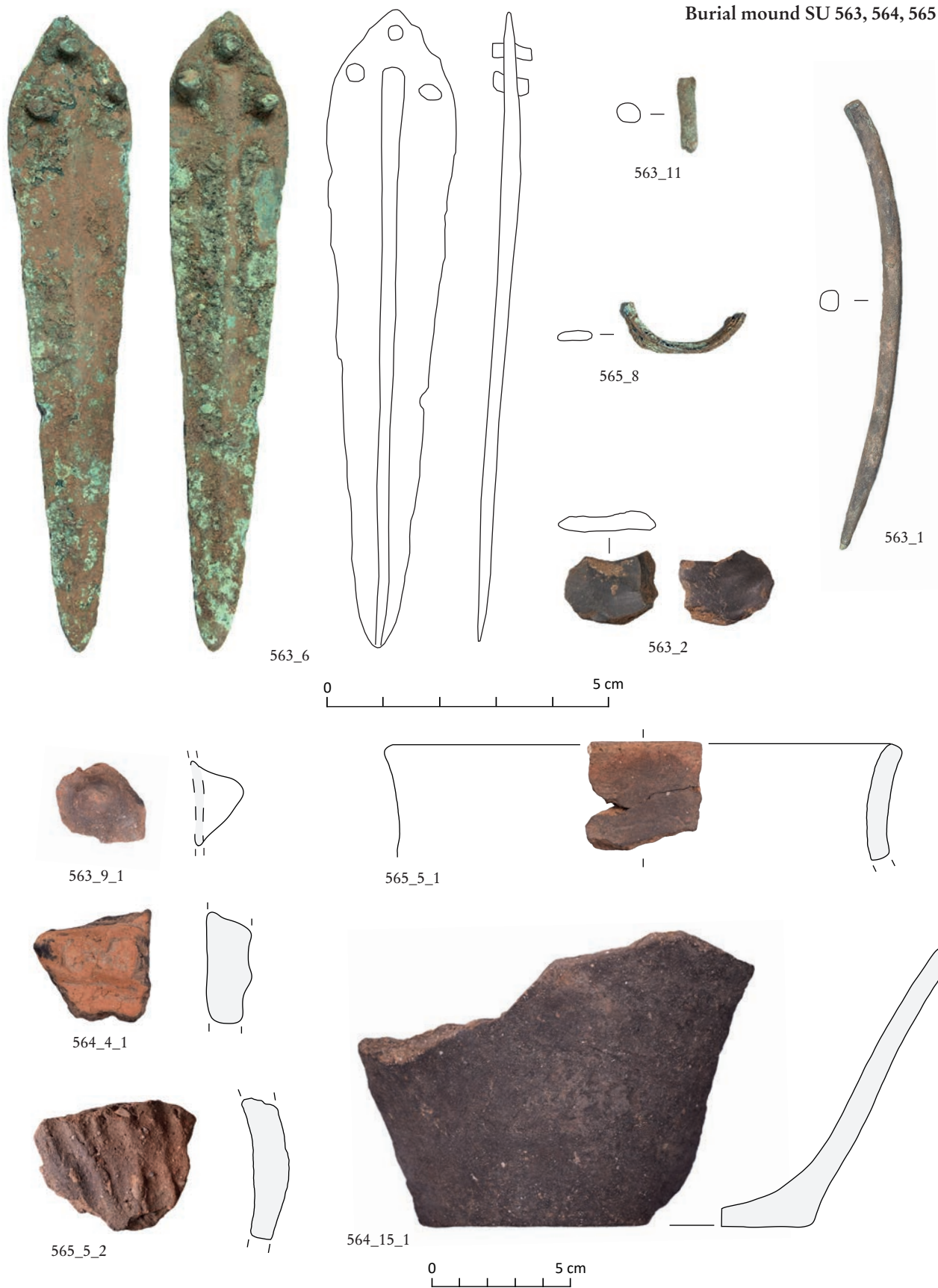
Find number: 565_1

Metal sheet
 Find location: walking horizon surrounding burial mound 563
 Material: metal (bronze)
 Preservation: highly fragmented
 Length (max.): 0.6 cm
 Width: –
 Thickness: 0.3 cm
 Description: Fragments of an unidentified metal sheet object.

Find number: 565_7

Ring
 Find location: walking horizon surrounding burial mound 563

Burial mound SU 563, 564, 565



Pl. 1. Metal, pottery and lithic finds (Drawings and photographs: H. Skerjanz).

Material: metal (bronze)
 Preservation: highly fragmented, corroded
 Length: 1.8 cm
 Width: –
 Thickness: 0.4 cm
 Description: Fragments of a metal ring, probably belonging to find number 565_8.

Find number: 565_8 (Pl. 1)

Ring
 Find location: walking horizon around burial mound 563
 Material: metal (bronze)
 Preservation: fragmented
 Length (max.): 2.9 cm
 Width (max.): 0.5 cm
 Diameter: 0.1 cm
 Description: Fragmented metal ring, cross-section flattened, oval.

Find number: 563_2 (Pl. 1)

Flint
 Find location: within the western part of the grave chamber
 Length: 2.6 cm
 Width: 2.1 cm
 Thickness: 0.46 cm
 Description: Flint flake with a black, matte surface.

Find number: 563_9_1 (Pl. 1)

Pottery: Wall fragment
 Material: medium-coarse clay with mica and inhomogeneous small stones (max. inclusion size 2.1 mm)
 Preservation: –
 Surface modification: –
 Firing atmosphere: alternating firing
 Colour exterior surface: black to reddish brown
 Colour interior surface: black to reddish brown
 Decoration: knob
 Description: Fragmented knob with fingerprints preserved.

Find number: 564_4_1 (Pl. 1)

Pottery: Wall fragment
 Material: fine clay with sand and mica (max. inclusion size 0.2 mm)
 Preservation: abraded
 Surface modification: –
 Firing atmosphere: oxidizing firing
 Colour exterior surface: reddish brown
 Colour interior surface: black, secondary burning
 Decoration: finger dab bar
 Description: Wall fragment with finger dab bar; blackened areas indicate secondary burning.

Find number: 564_15_1 (Pl. 1)

Pottery: Base fragment
 Material: medium-coarse clay with mica and stones (max. inclusion size 1.9 mm)
 Preservation: sintered
 Surface modification: graphite-coated exterior and interior surface
 Firing atmosphere: reducing
 Colour of exterior surface: black to dark grey
 Colour of interior surface: black to dark grey
 Decoration: –
 Description: Base fragment with a flat base. Graphitized interior surface, only partially applied on the exterior surface.

Find number: 565_5_1 (Pl. 1)

Pottery: Rim fragment
 Material: medium-coarse clay with mica, quartz and graphite inclusions (1.7 to 5.8 mm)
 Preservation: sintered
 Surface modification: –
 Firing atmosphere: alternating
 Colour exterior surface: grey-black, reddish spots
 Colour interior surface: grey-black, reddish spots
 Decoration: –
 Description: Slightly flaring rim fragment of a pot.

Find number: 565_5_2 (Pl. 1)

Pottery: Wall fragment
 Material: medium-coarse clay with mica, quartz, stones (inclusion size 0.1–0.5 mm)
 Preservation: sintered break
 Surface modification: –
 Firing atmosphere: alternating
 Colour of exterior surface: dark red to black
 Colour of interior surface: dark red to black
 Decoration: vertical finger line grooves
 Description: Wall fragment with vertical finger line grooves.

Find number: 563_1, 563_7, sorted from cremated remains

Burnt animal bones
 Number of fragments: 5
 Weight: 5.14 g
 Species: pig, sheep/goat
 Note: fragments of a neonatal pig
 Weight of unidentified bones sorted from 564_3, 565_7, 565_15: 23 g

Burial mound 601, 602

Planum: 1
 Length central stone packing: 2.4 m
 Width central stone packing: 1.40 m
 Length (total): 4 m
 Width (total): 2.8 m
 Depth: 4 cm
 Description: Remnants of a burial mound with central stone packing encircled by a stone ring. Cut and partly destroyed by the ditch of a Roman burial mound.

Find number: 600_14 (Pl. 2)

Pin
 Type: *Kolbenkopf* with rounded ridges
 Find location: inside the ditch of the Roman burial mound (600), which disturbed the Middle Bronze Age burial mound 601, 602
 Material: metal (bronze)
 Preservation: lower part fragmented and heavily corroded
 Length: 11.96 cm
 Width: –
 Diameter: 1.16 cm
 Description: The upper area of the pin is thickened and decorated with a total of fourteen transverse rounded ridges. The end of the head is slightly flattened, resulting in an oval cross-section.

Burial mound 602



600_14 (SU 602)

Cremation grave 632



628_1 (SU 632)



632_4



632_3



632_5

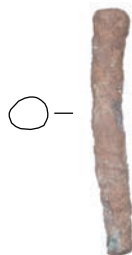


632_1



628_2 (SU 632)

Cremation grave 635



635_3



635_4



635_12_1



635_12_2



Pl. 2. Metal finds (Drawings and photographs: H. Skerjanz).

Cremation grave 632

Planum: 1–3

Length: 3.1 m

Width: 1.40 m

Depth: 10 cm

Description: An elongated, northeast-oriented pit with two parallel stone settings and cremated human remains in loamy-humic soil.

Find number: 632_1 (Pl. 2)

Metal object

Find location: outside cremation grave, western part

Material: metal (bronze?)

Preservation: surface heavily corroded, fragmented

Length: 2.9 cm

Width: 2.36 cm

Thickness: 0.67 cm

Description: Massive metal fragment with two rounded edges and a fragmented side, found near grave 632.

Find number: 632_3 (Pl. 2)

Spiral tube, 'Spiralröllchen'

Find location: in cremation grave

Material: metal (bronze)

Preservation: fragmented

Length: 0.9 cm

Width: 0.7 cm

Diameter of the wire: 0.18 cm

Description: Spiral tube with six coils and a round cross-section.

Find number: 632_4 (Pl. 2)

Spiral tube, 'Spiralröllchen'

Find location: inside cremation grave

Material: metal (bronze)

Preservation: fragmented

Length: 1.5 cm

Width: 0.63 cm

Diameter of the wire: 0.12 cm

Description: Spiral tube with 14 coils and a round cross-section.

Find number: 632_13

Metal sheet

Find location: inside cremation grave

Material: metal (bronze)

Preservation: highly fragmented

Length (max.): 0.9 cm

Width (max.): 0.7 cm

Thickness: 0.06 cm

Description: Fragmented metal sheet object.

Find number: 628_1 (SU 632) (Pl. 2)

Spiral tube, 'Spiralröllchen'

Find location: Planum 1, inside cremation grave

Material: metal (bronze)

Preservation: fragmented, corroded

Length: 1.86 cm

Width: 0.73 cm

Diameter of the wire: 0.15 cm

Description: Spiral tube with 14 coils. The top part is bent, and the wire has a round cross-section.

Find number: 628_2 (SU 632) (Pl. 2)

Pin

Type: Pin with bi-conical head

Find location: Planum 1, inside cremation grave

Material: metal (bronze)

Preservation: complete

Length: 17.5 cm

Width: –

Diameter: pin head 1.14 cm; pin shaft max. 0.56 cm

Description: Pin with biconical head, rounded tip and round shaft cross-section. Upper quarter of shaft decorated with an alternating pattern made of transverse lines, zigzag and angled incisions.

Cremation grave 635

Planum: 1–3

Length: 2.6 m

Width: 1.6 m

Depth: 20 cm

Description: Irregular, shallow pit with no clear boundaries. The cremated human remains were found within reddish-brown loamy soil.

Find number: 635_12_1 (Pl. 2)

Pin

Find location: inside concentration of cremated remains

Material: metal (bronze)

Preservation: fragmented, bent

Length: 4.36 cm

Width: –

Diameter: 0.43 cm

Description: A bent, fragmented pin shaft with a round cross-section.

Find number: 635_12_2 (Pl. 2)

Pin

Find location: inside concentration of cremated remains

Material: metal (bronze)

Preservation: fragmented, bent

Length: 3.68 cm

Width: –

Diameter: 0.38 cm

Description: Fragmented and bent pin shaft fragment with a round cross-section.

Find number: 635_4 (Pl. 2)

Pin?

Find location: inside concentration of cremated remains

Material: metal (bronze)

Preservation: corroded, traces of heat damage

Length: 3.79 cm

Width: –

Diameter: pin head 0.67 cm; pin shaft 0.38 cm

Description: Possibly a fragment of a pin, heavily bent and corroded. The head is rounded and elongated. There is a notch below the head.

Find number: 635_3 (Pl. 2)

Pin

Find location: inside concentration of cremated remains

Material: metal (bronze)

Preservation: fragmented

Length: 3.4 cm

Width: –

Diameter: 0.53 cm

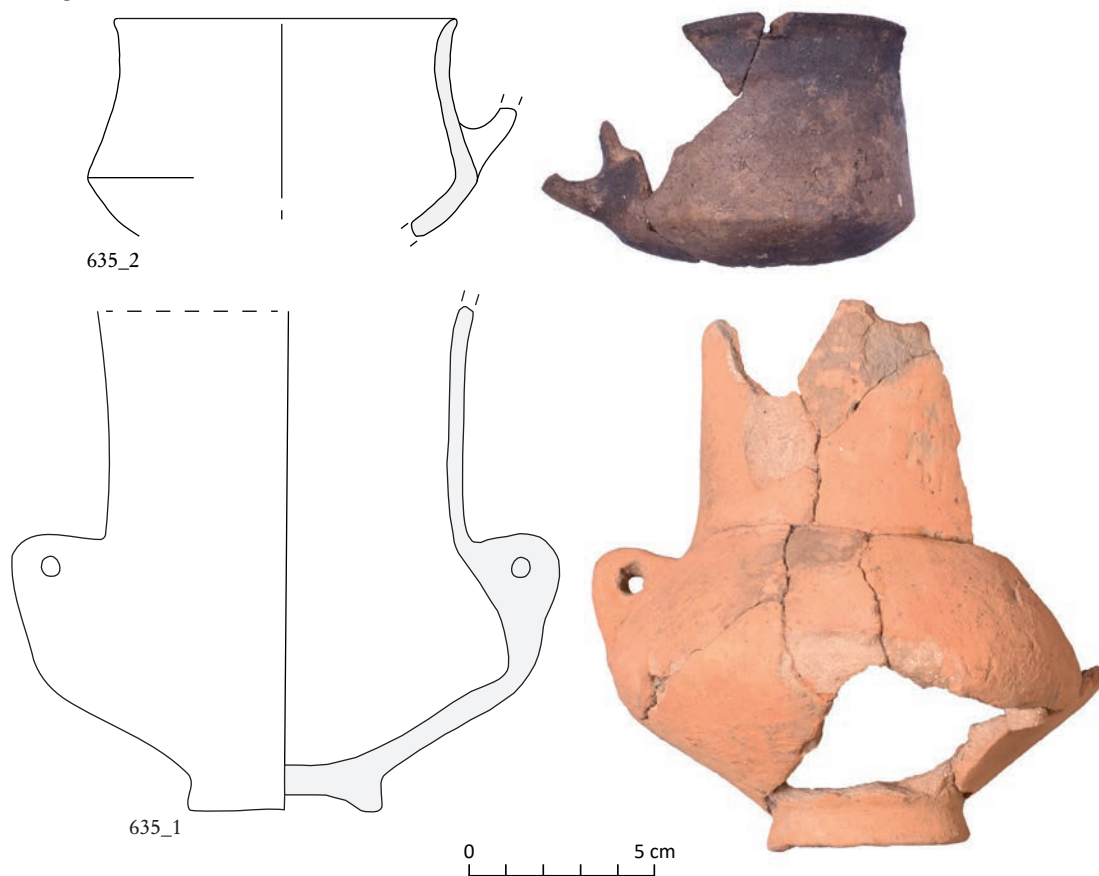
Description: Pin shaft fragment with round cross-section.

Find number: 635_1 (Pl. 3)

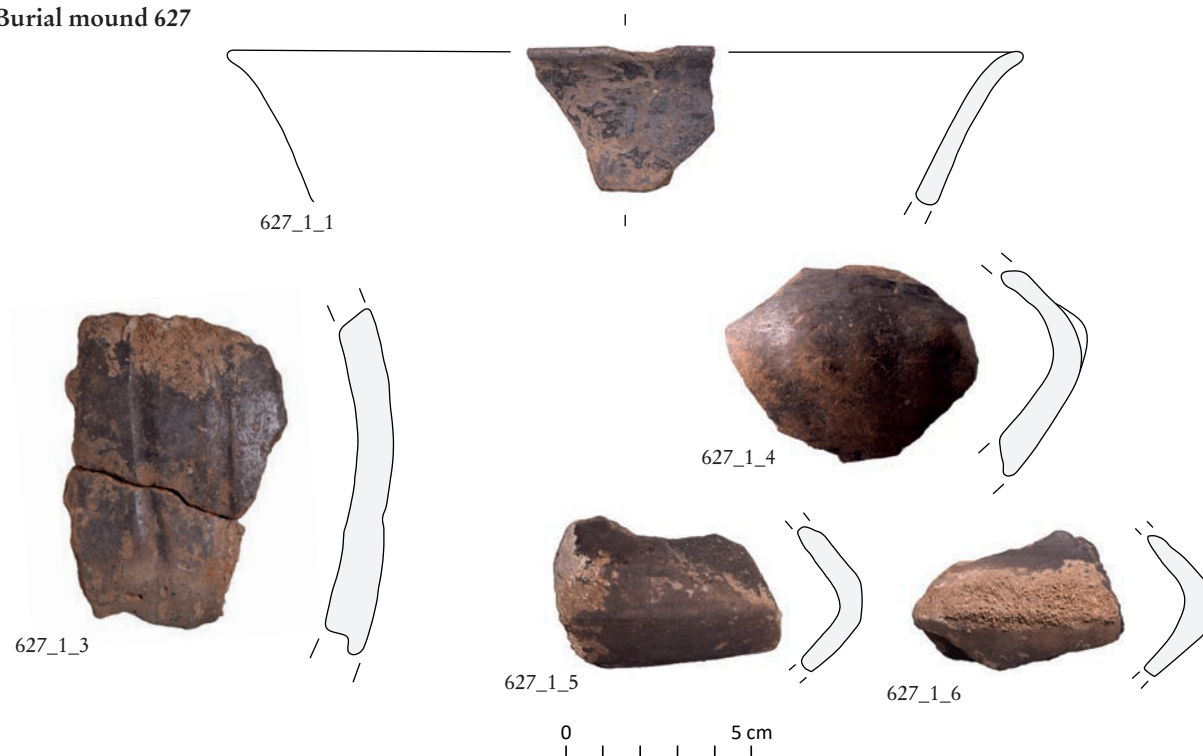
Pottery: Amphora

Material: fine clay with sand and mica, inhomogeneous graphite inclusions (max. inclusion size 0.2 mm)

Cremation grave 635



Burial mound 627



Pl. 3. Metal and pottery finds (Drawings and photographs: H. Skerjanz).

Preservation: sintered, abraded
 Surface modification: –
 Firing atmosphere: oxidizing
 Colour of exterior surface: ochre, orange-reddish
 Colour of interior surface: ochre, orange-reddish
 Decoration: knob
 Description: Amphora, 50 % preservation, vertical neck and remains of a knob below the vessel's maximum diameter.

Find number: 635_2 (Pl. 3)

Pottery: Cup
 Material: coarse clay with mica, inhomogeneous small stones and graphite (max. inclusion size 4.6 mm)
 Preservation: sintered, abraded
 Surface modification: –
 Firing atmosphere: alternating
 Colour of exterior surface: reddish-brown, black
 Colour of interior surface: reddish-brown, black
 Decoration: –
 Description: Fragmented cup with a slightly flaring rim and fragmented handle above belly break.

Burial mound 627

Planum: 1–4
 Length total: 5.4 m
 Width total: 4.8 m
 Length chamber: 1.2 m
 Width chamber: 90 cm
 Depth chamber: 23 cm
 Description: The burial mound consisted of a stone packing lined by elongated sandstones on the north side and an entrance oriented towards the northeast. Within the burial chamber, cremated remains were mixed with dark brown soil and gravel.

Find number: 627_1_1 (Pl. 3)

Pottery: Cup
 Material: medium-coarse clay with inhomogeneous stones (max. inclusion size 1 mm)
 Preservation: sintered
 Surface modification: graphite coating, polished
 Firing atmosphere: oxidizing
 Colour of exterior surface: black
 Colour of interior surface: black
 Decoration: –
 Description: Rim fragment of a cup, slightly protruding rim.

Find number: 627_1_3 (Pl. 3)

Pottery: Wall fragment
 Material: fine clay with mica, interspersed with stones (max. inclusion size 0.2 mm)
 Preservation: sintered
 Surface modification: graphite coating on exterior surface
 Firing atmosphere: alternating
 Colour of exterior surface: black, reddish-brown spots
 Colour of interior surface: black, reddish-brown spots
 Decoration: channels
 Description: Sintered wall fragment with channels.

Find number: 627_1_4 (Pl. 3)

Pottery: Wall fragment
 Material: fine clay interspersed with graphite, red quartz inclusions, mica (max. inclusion size 2.2 mm)
 Preservation: sintered, especially interior surface

Surface modification: graphite coating only exterior surface
 Firing atmosphere: reducing
 Colour of exterior surface: black, dark grey
 Colour of interior surface: brown (sinter)
 Decoration: shallow, diagonal channels and a knob
 Description: Graphite-coated wall, heavily sintered on the inside, small knob and shallow, smoothed channels.

Find number: 627_1_5 (Pl. 3)

Pottery: Wall fragment
 Material: fine clay interspersed with small stones and mica (max. inclusion size 1 mm)
 Preservation: heavily sintered
 Surface modification: –
 Firing atmosphere: reducing
 Colour of exterior surface: grey sintered
 Colour of interior surface: black, grey sintered
 Decoration: –
 Description: Wall fragment of a cup with a faceted carination, probably the same vessel as 627_1_6.

Find number: 627_1_6 (Pl. 3)

Pottery: Wall fragment
 Material: fine clay with small stones and mica (max. inclusion size 1 mm)
 Preservation: heavily sintered
 Surface modification: –
 Firing atmosphere: reducing
 Colour of exterior surface: black
 Colour of interior surface: black
 Decoration: –
 Description: Wall fragment of a cup with a faceted carination, probably the same vessel as 627_1_5.

Find number: 627_1_7 (Pl. 4)

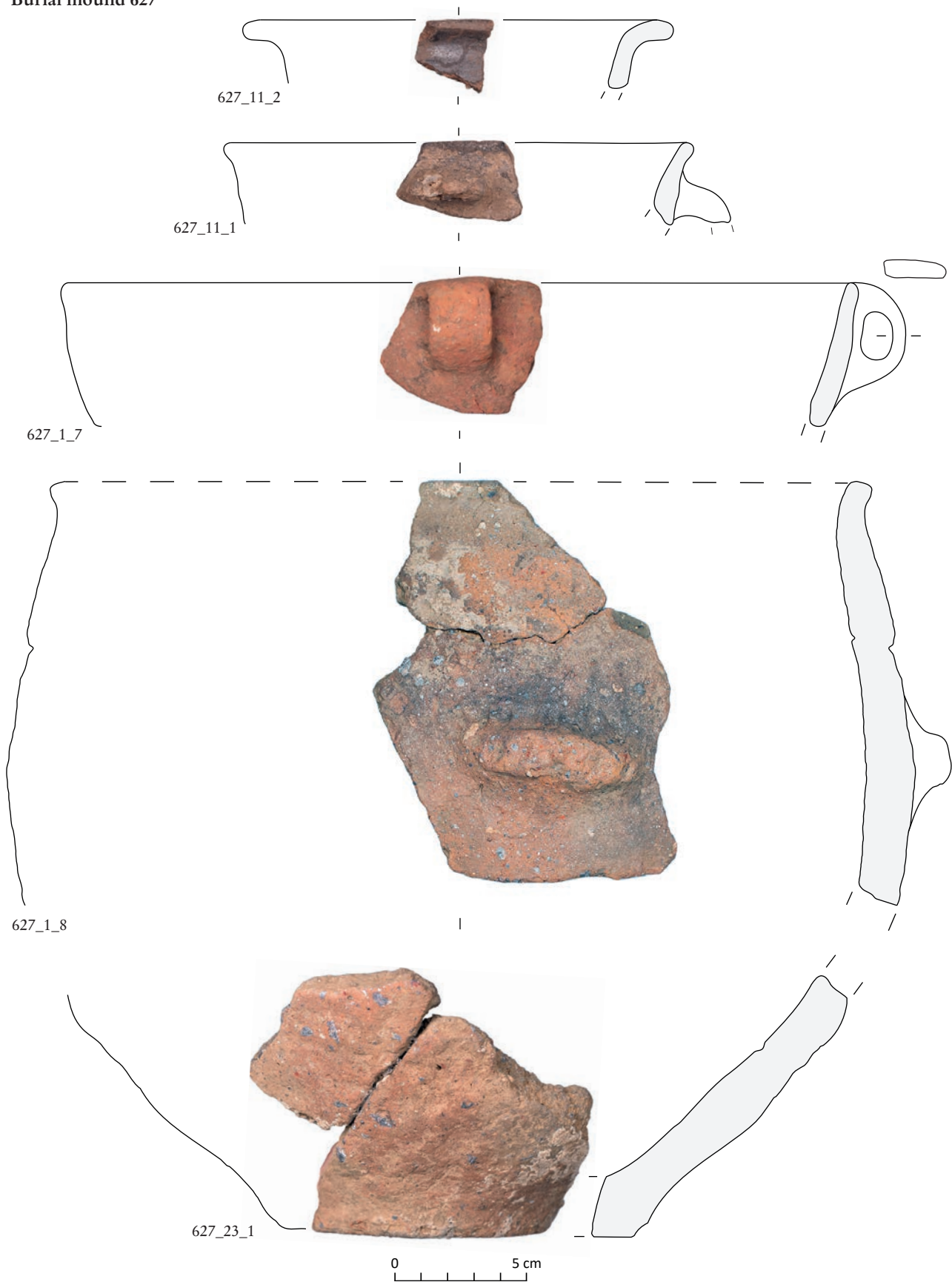
Pottery: Rim fragment
 Material: medium-coarse clay with stones, graphite and mica (max. inclusion size 1.5 mm)
 Preservation: heavily sintered, porous surface
 Surface Modification: –
 Firing atmosphere: oxidizing
 Colour of exterior surface: ochre-reddish
 Colour of interior surface: ochre-reddish
 Decoration: –
 Description: Porous rim fragment with an attached handle, probably of a pot.

Find number: 627_1_8 (Pl. 4)

Pottery: Rim fragment, pot
 Material: coarse clay interspersed with small stones, graphite, mica (max. inclusion size 6.2 mm)
 Preservation: sintered
 Surface modification: graphite-coated interior surface
 Firing atmosphere: alternating
 Colour of exterior surface: reddish brown, black spots
 Colour of interior surface: dark grey to black
 Description: Large pot with graphite inclusions and finger dab bar, same vessel as 627_23_1/627_1_12.

Find number: 627_11_1 (Pl. 4)

Pottery: Rim fragment
 Material: medium-coarse clay interspersed with stones, graphite, and mica (max. inclusion size 2.8 mm)
 Preservation: sintered

Burial mound 627

Pl. 4. Pottery finds (Drawings and photographs: H. Skerjanz).

Surface Modification: –

Firing atmosphere: reducing

Colour of exterior surface: black

Colour of interior surface: black

Decoration: –

Description: Rim fragment with a strap handle beneath the rim.

Find number: 627_11_2 (Pl. 4)

Pottery: Rim fragment

Material: medium-coarse clay with sand and small stones (inclusion size 0.6–3.9 mm)

Preservation: partially sintered

Surface modification: graphite coating exterior and interior surface

Firing atmosphere: oxidizing

Colour of exterior surface: black to dark grey

Colour of interior surface: black to dark grey

Decoration: –

Description: Protruding rim fragment with traces of graphite coating.

Find number: 627_23_1/627_1_12 (Pl. 4)

Pottery: Base fragment, pot

Material: coarse clay with small stones, graphite and mica (max. inclusion size 7.3 mm)

Preservation: sintered

Surface modification: graphite coated on the exterior surface, partially on interior surface

Firing atmosphere: alternating

Colour of exterior surface: reddish-brown with grey spots

Colour of interior surface: dark grey to black

Description: Base fragment of a pot, same vessel as 627_1_8.

Find number: 627_7, sorted from cremated human remains

Animal bones

Number of fragments: –

Weight: 41.89 g

Species: pig

Notes: ribs, diaphyses, teeth

Weight of unidentified fragments 627_6, 627_12, 627_9: 27 g

Grave complex 817

Planum: 2

Length: c. 8 m

Width: c. 7 m

Description: The entire grave complex consisted of a small-scale stone layer. It featured an irregular square ditch (SU 820) and the grave units 818, 742, 814 and 816.

Cremation grave 742

Description: The cremated human remains were found in a small depression, without any evidence of a grave structure.

Find number: 742_1, sorted from cremated human remains

Animal bones

Number of fragments: 1

Weight: 1.13 g

Species: sheep/goat

Notes: rib fragment

Cremation grave 814

Planum: 1–3

Length: c. 2.5 m

Width: c. 1.2 m

Description: The grave structure comprised stone slabs forming a stone chamber. The grave exhibited evidence of a secondary opening, leading to the displacement of cremated human remains, pottery, soil, and stone slabs outside the chamber.

Find number: 814_12 (Pl. 5)

Pottery: Rim fragment

Material: fine clay with mica, sand (max. inclusion size 0.2 mm)

Preservation: sintered

Surface modification: –

Firing atmosphere: oxidizing

Colour of exterior surface: ochre-reddish brown

Colour of interior surface: ochre-reddish brown

Decoration: –

Description: Heavily sintered rim fragment with a small eyelet handle, part of a small amphora.

Find number: 628_24_1 (Pl. 5)

Pottery: Wall fragment

Material: fine clay with mica, sand (max. inclusion size 0.2 mm)

Preservation: heavily sintered

Surface modification: –

Firing atmosphere: oxidizing

Colour of exterior surface: ochre-reddish brown

Colour of interior surface: grey-brown sintered

Decoration: flat knob

Description: Wall fragment with a flat knob, part of an amphora.

Find number: 814_12_2 (Pl. 5)

Pottery: Base fragment

Material: fine clay with mica, sand (max. 0.2 mm)

Preservation: heavily sintered

Surface modification: –

Firing atmosphere: oxidizing

Colour of exterior surface: ochre-reddish brown

Colour of interior surface: grey-brown sintered

Decoration: –

Description: Concave base fragment of an amphora.

Find number: 628_24_2 (Pl. 5)

Pottery: Rim fragment

Material: fine clay with mica, sand (max. inclusion size 0.2 mm)

Preservation: heavily sintered

Surface modification: –

Firing atmosphere: oxidizing

Colour of exterior surface: reddish-grey

Colour of interior surface: grey-brown

Decoration: –

Description: Heavily sintered rim fragment with a small eyelet handle, probably part of a small amphora.

Find number: 628_30 (Pl. 5)

Small Spiral

Find location: south of grave 814

Material: metal (bronze)

Preservation: fragmented

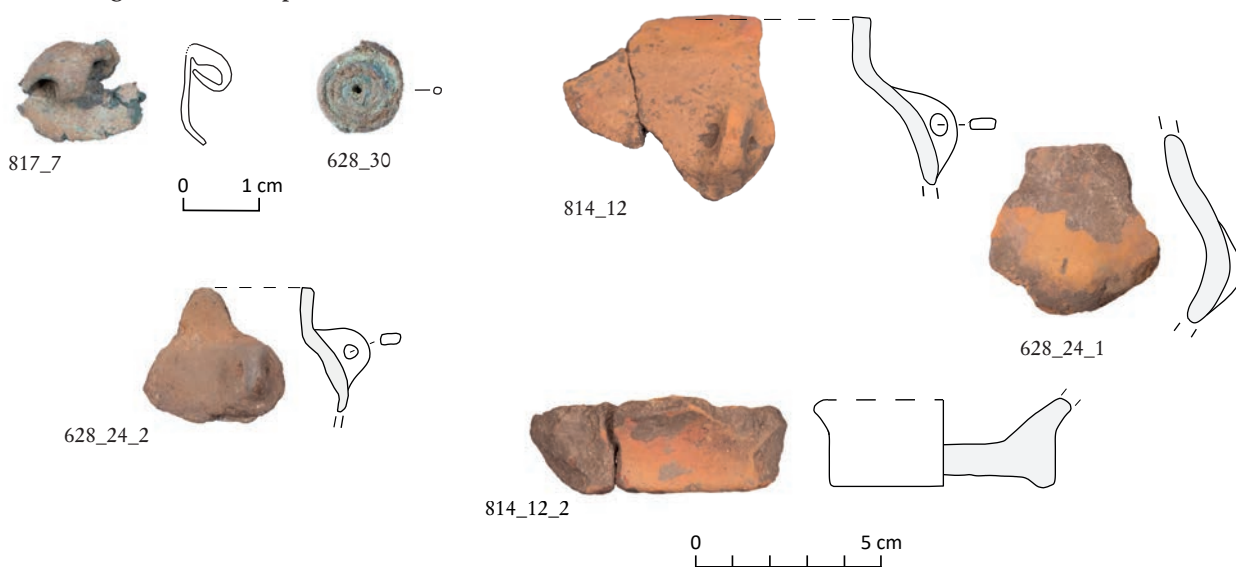
Length: 1 cm

Width: 0.16 cm

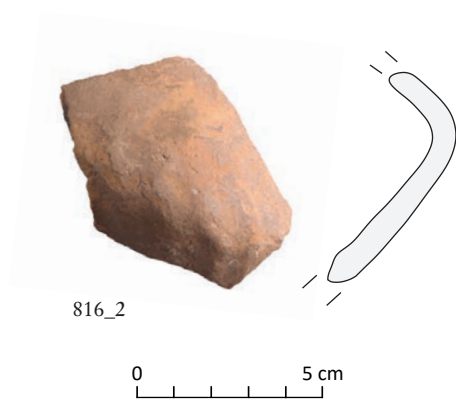
Diameter: 0.09 cm

Description: Small spiral with five coils, wire has a round cross-section.

Cremation grave 814, Complex 817



Cremation grave 816, Complex 817



Stray finds, Complex 817



Burial chamber 818, Complex 817



Pl. 5. Metal and pottery finds (Drawings and photographs: H. Skerjanz).

Find number: 817_7 (Pl. 5)

Metal sheet object

Find location: north of grave 814

Material: metal (bronze)

Preservation: fragmented

Length: 1.2 cm

Width: –

Diameter: 0.09 cm

Description: Small, fragmented bronze sheet with folded eyelet, probably a button.

Find number: 814_5, sorted from cremated human remains

Animal bones

Number of fragments: 16

Weight: 1.84 g

Species: sheep/goat

Notes: juvenile individual

Weight of unidentified fragments 814_11: 5 g

Cremation grave 816

Planum: 2

Length: 0.52 m

Width: 0.20 m

Depth: 3 cm

Description: A shallow, irregular to elongated depression filled with sandy-humic, medium-brown soil and fragments of cremated remains.

Find number: 816_2 (Pl. 5)

Pottery: Wall fragment

Material: fine clay with small stones, inhomogeneous graphite and mica (max. inclusion size 0.2 mm)

Preservation: heavily sintered

Surface modification: matte black coating, strongly affected by abrasion; traces of graphite coating

Firing atmosphere: oxidizing

Colour of exterior surface: ochre-red

Colour of interior surface: ochre-red

Decoration: diagonal channels

Description: Concave wall fragment with diagonal channels and traces of graphite coating, probably of an amphora.

Find number: 817_1 (Pl. 6)

Dagger: 'Griffzungendolch'

Type: Kunéice, Variant: Blučina

Find location: northern part of chamber 818

Material: metal (bronze)

Preservation: fragmented and bent, surface shows signs of corrosion

Length: 11.5 cm

Width: 2.24 cm

Thickness (max.): 0.44 cm

Description: Dagger with two rivet holes on a flat tang (*Griffzunge*) aligned along the central axis of the dagger. Rivet hole on terminal end fragmented, rivet missing. Other rivet preserved, projects more prominently on one side. Pronounced central ridge extends along from tip to tang.**Find number: 817_3 (Pl. 5)**

Small spiral

Find location: inside grave chamber 818

Material: metal (bronze)

Preservation: fragmented

Length: 1.02 cm

Width: –

Thickness: 0.18 cm

Description: A small spiral with three coils and an oval cross-section.

Find number: 817_12 (Pl. 5)

Spiral tube, 'Spiralröllchen'

Find location: inside grave chamber 818

Material: metal (bronze)

Preservation: fragmented, unravelled wire

Length: 2.36 cm

Width: –

Diameter: 0.1 cm

Description: Unravelled spiral tube with a flat cross-section.

Find number: 817_13_1 (Pl. 8)

Pottery: Rim fragment

Material: medium-coarse clay with homogenous mica, sporadically stone inclusions and sand (max. inclusion size 1.8 mm)

Preservation: sintered

Surface modification: –

Firing atmosphere: reducing

Colour of exterior surface: black, red spots

Colour of interior surface: black

Decoration: –

Description: Plain rim fragment of a pot.

Find number: 817_14, sorted from cremated human remains

Animal bones

Number of fragments: 9

Weight: 14.77 g

Species: pig, cow

Notes: both burnt and unburnt bones of adult pig and cow

Weight of unidentified fragments: 817_26: 10 g

Stray finds**Find number: 628_11 (Pl. 5)**

Awl

Find location: stray find from area of burial mound, exact location not recorded

Material: metal (bronze)

Preservation: fragmented in the upper section

Length: 6.78 cm

Width: –

Diameter: 0.27 cm

Description: Slightly bent awl with a square cross-section, one end pointed and one flattened.

Find number: 628_13 (Pl. 5)

Spiral ring, 'Noppenring'

Find location: stray find from area of burial mound, exact location not recorded

Material: metal (bronze)

Preservation: fragmented

Length: 2 cm

Width: 0.82 cm

Diameter: 0.11 cm

Description: *Noppenring* with seven coils.**Find number: 628_27, sorted from cremated human remains**

Animal bones

Number of fragments: 1

Weight: 1.32 g



Pl. 6. Metal finds (Drawings and photographs: H. Skerjanz).

Species: unidentifiable

Notes: rib fragment

Weight of unidentified fragments 628_34, 628_15, 628_20: 69 g

Grave chamber 818

Planum: 4

Length: 3.4 m

Width: 2.2 m

Depth: 30 cm

Description: The remnants of a long oval burial chamber, encircled by stones of varying sizes. The material within the chamber consisted of dark brown to brown sandy loam with sparse gravel inclusions. Cremated human remains, pottery and metal finds were scattered throughout the chamber.

Find number: 818_11 (Pl. 6)

Pin

Type: Deinsdorf

Find location: inside the grave chamber

Material: metal (bronze)

Preservation: corroded, the lower pin shaft is slightly bent

Length: 19.5 cm

Width: –

Diameter: head 1.5 cm; shaft max. 0.65 cm

Description: Pin with a spherical head and thickened neck, decorated with 22 parallel transverse incised lines and a single zigzag line below.

Find number: 818_12 (Pl. 5)

Pin

Type: *einfacher Keulenkopf?*

Find location: inside the grave chamber

Material: metal (bronze)

Preservation: heavily corroded, original surface barely visible, bent pin shaft

Length: 12.5 cm

Width: –

Diameter: head 0.79 cm; shaft 0.87 cm

Description: The head of the pin fragment is oval in cross-section, thickened and elongated. The central part of the pin shaft appears thickened, although this may be an effect of severe corrosion. The original surface is not visible and the chronological classification is uncertain.

Find number: 818_13 (Pl. 5)

Pin

Find location: inside the grave chamber

Material: metal (bronze)

Preservation: fragmented

Length: 2.5 cm

Width: –

Diameter: 0.25 cm

Description: Fragments of a pin shaft with round cross-section.

Find number: 818_4_2 (Pl. 8)

Pottery: Jug

Material: fine clay with mica and sand (max. inclusion size 0.2 mm)

Preservation: sintered

Surface modification: graphite-coated exterior and interior surface

Firing atmosphere: reducing

Colour of exterior surface: black to dark grey

Colour of interior surface: black to dark grey

Description: Upper part of a jug with a slightly flaring rim and a strap handle attached at the rim.

Find number: 818_4_1 (Pl. 8)

Pottery: Rim fragment

Material: fine clay with sand (max. inclusion size 0.2 mm)

Preservation: sintered

Surface modification: graphite-coated exterior and interior surface

Firing atmosphere: reducing

Colour of exterior surface: black to dark grey

Colour of interior surface: black to dark grey

Decoration: –

Description: Fragment with faceted rim, slightly flaring outwards.

Find number: 818_7_1 (Pl. 7)

Pottery: Amphora

Material: fine clay with sand and mica (max. inclusion size 0.2 mm)

Preservation: sintered

Surface modification: graphite-coated exterior and interior surface

Firing atmosphere: oxidizing

Colour of exterior surface: black to dark grey

Colour of interior surface: black to dark grey

Decoration: vertical channels

Description: Amphora with a long neck and a slightly flaring rim, decorated with vertical channels.

Find number: 818_6_1 (Pl. 7)

Pottery: Amphora-like vessel

Material: medium-coarse clay interspersed with small stones, sporadic red quartz inclusions and mica (max. inclusion size 1 mm)

Preservation: sintered

Surface modification: exterior surface graphite coated and polished

Firing atmosphere: reducing

Colour of exterior surface: black

Colour of interior surface: black

Decoration: vertical channels, knob

Description: Amphora-like vessel with a preserved base and body. Neck and rim not preserved. The vessel is decorated with a knob on the shoulder, just below the transition to the neck, and vertical channels on the shoulder and body. In total, an additional 70 small fragments, possibly from the same vessel, were counted.

Find number: 818_6_2 (Pl. 7)

Pottery: Amphora-like vessel

Material: medium-coarse clay interspersed with small stones, sporadic red quartz and graphite inclusions, mica (max. inclusion size 1 mm)

Preservation: sintered

Surface modification: exterior surface graphite coated and polished

Firing atmosphere: reducing

Colour of exterior surface: black

Colour of interior surface: black

Decoration: vertical channels, eyelet handle with concave, rounded cross-section

Description: Probably the same vessel as 818_6_1.

Find number: 818_9_1 (Pl. 7)

Pottery: Rim fragment

Material: fine to medium-coarse clay interspersed with homogeneous small stones and red quartz inclusions (max. inclusion size 0.9 mm)

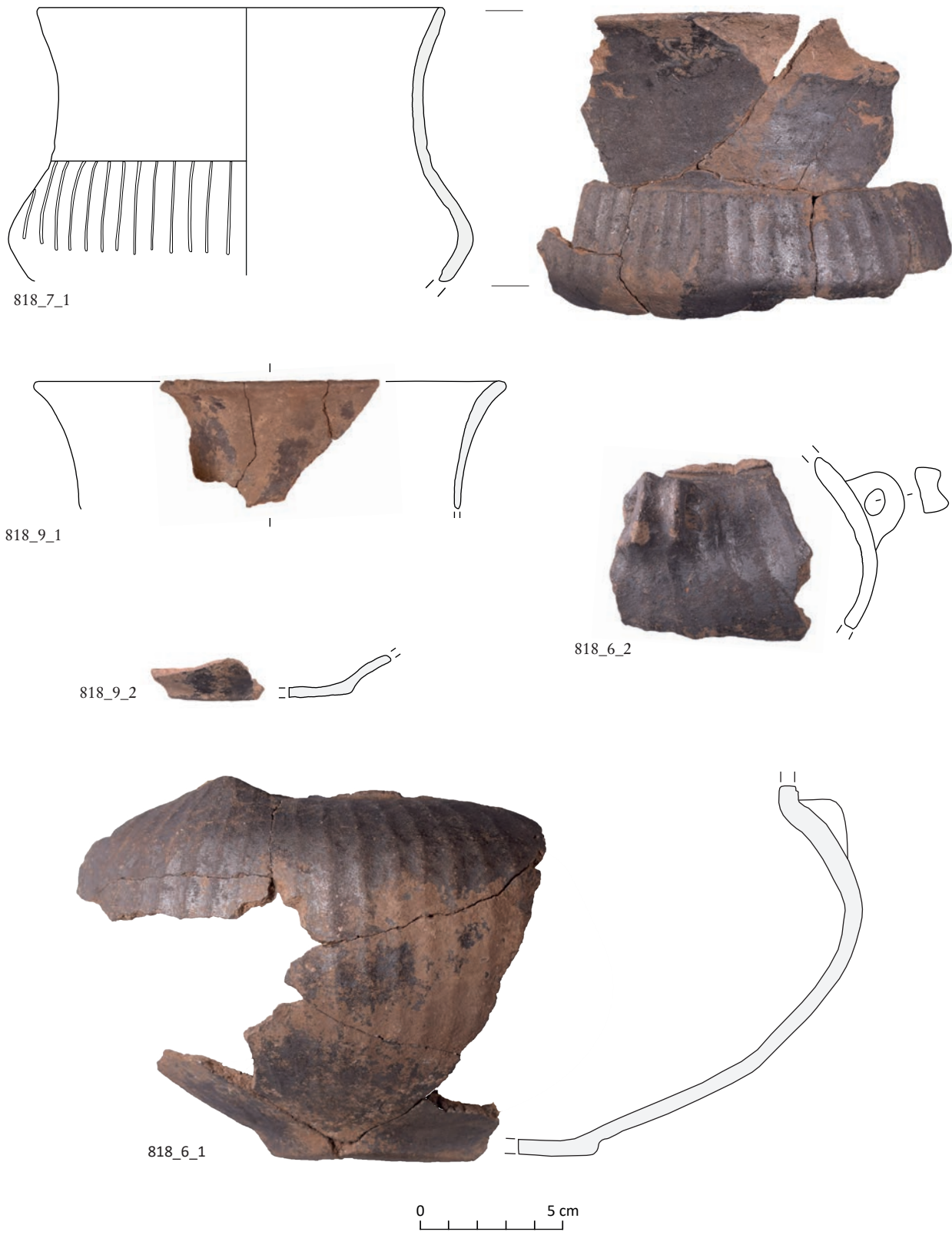
Preservation: heavily sintered

Surface modification: exterior and interior surface graphite coated and polished

Firing atmosphere: reducing

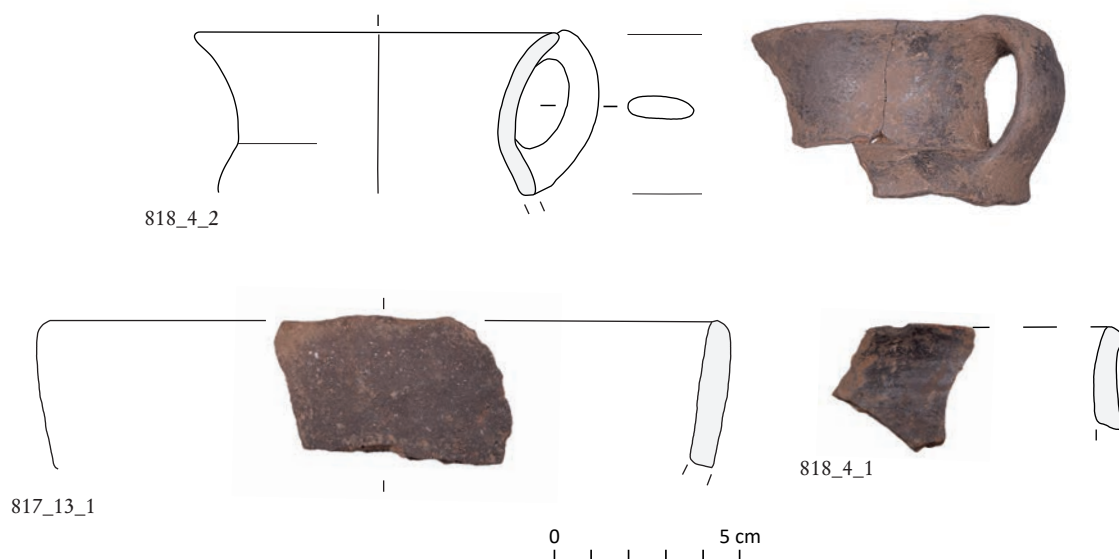
Colour of exterior surface: black, grey sinter

Burial chamber 818, Complex 817



Pl. 7. Pottery finds (Drawings and photographs: H. Skerjanz).

Burial chamber 818, Complex 817



Pl. 8. Pottery finds (Drawings and photographs: H. Skerjanz).

Colour of interior surface: black, grey sinter

Decoration: –

Description: Flaring rim fragment of a cup.

Find number: 818_9_2 (Pl. 7)

Pottery: Base fragment

Material: medium-coarse clay interspersed with small stones, sporadically red quartz and graphite inclusions, mica (max. inclusion size 1 mm)

Preservation: sintered

Surface modification: exterior surface graphite coated and polished

Firing atmosphere: reducing

Colour of exterior surface: black

Colour of interior surface: black

Decoration: –

Description: Fragmented flat base, probably the same vessel as 818_9_1.

Find number: 818_1, 818_10, 818_17, sorted from cremated human remains

Animal bones

Number of fragments: 118

Weight: 147.44 g

Species: pig, sheep/goat

Notes: Juvenile sheep/goat, as well as a juvenile and an adult pig. Large fragments of adult pig including long bones, phalanges, and ribs. Burnt and unburnt teeth of sheep/goat. Further remains of sheep/goat (foot bones and lower limbs) indicate one individual, as two hamata show perfect symmetry.

Weight of unidentified fragments 818_16: 16 g

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