



Research Article

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Middle Bronze Age Settlement in Czeladź Wielka – The Next Step Toward Determining the Habitation Model, Chronology, and Pottery of the Silesian-Greater Poland Tumulus Culture

<https://doi.org/10.1515/opar-2022-0316>

received February 13, 2023; accepted August 6, 2023

Abstract: The article presents the results of research on the habitation model, chronology, and pottery production of the Silesian-Greater Poland Tumulus Culture at Czeladź Wielka settlement (Góra county). The site of the Czeladź Wielka is the first published settlement of the Tumulus culture from the area, providing the first evidence for developing a model of habitation change between the Early and Late Bronze Age. The typochronological analyses allowed positioning the finds in the Middle Bronze Age, while radiocarbon dating placed the site between the late sixteenth and fifteenth century BC. Quantification of technological traits were used to define the general characteristics of Tumulus culture pottery in the region showing the preference for coarse, undecorated, or textile-impressed ceramics. Spatial analyses indicate the presence of a clustered settlement pattern characterized by discard of ceramic material in cultural layer. The findings suggest continuity of certain cultural traits from the preceding Únětice and the influence of contemporary Trzciniec cultural circle.

Keywords: Czeladź Wielka, Tumulus culture, settlement, pottery analysis, chronology

1 Introduction

The appearance of the Tumulus culture societies in Western Poland in the Middle Bronze Age (MBA) coincides with the period of social transformations. The change toward using barrow rather than flat cemeteries (Makarowicz, 2017a), intensification of metal production (Stępiak, 1986; Staniuk, 2015, 2023), and an increasingly mobile socio-economic system (Gedl, 1975, 1992; Gediga, 1978) are but a few examples of processes associated with this transitional time. While the first two are well-documented in the empirical studies, the main argument for the increased mobility is the sudden decline in settlements between the Early Bronze Age (EBA) and MBA (Gedl, 1975, pp. 13–15; Gediga, 1978, p. 132; Kłosińska, 1997, p. 101; Kaczmarek, 2012a, pp. 59, 161; 2012b).

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These findings are well-reflected in the Silesian-Greater Poland border area, where numerous funerary contexts are characterized by a fairly large number of metal artefacts, despite the absence of any forms of settlements (Cwaliński, 2012; Jaeger & Pospieszny, 2011; Makarowicz, 2017a, p. 132; Staniuk, 2023). The site in Czeladź Wielka (Góra County, Lower Silesian Voivodeship; Figure 1) is a crucial new archaeological discovery (Talarczyk-Andrałojć & Andrałojć, 2010, 2011; Talarczyk-Andrałojć, Andrałojć, & Siara, 2012)¹, which sheds light on non-funerary characteristics of cultural change in the second half of the second millennium BC, allowing revision of the nearly 100 years old criteria of distinguishing the Silesian-Greater Poland Tumulus Culture (SGPTC) (Gedl, 1975; Gediga, 1978; Kostrzewski, 1924a,b). This will be based on the identification of habitation practices associated with the site and an attempt at establishing their dynamics in relation to other MBA sites in the region. Due to a limited number of available radiocarbon dates in the region and their absence from the immediate surroundings, the settlement of Czeladź Wielka represents the first case study for determining the absolute chronology of settlement occupation of the SGPTC in the region.

2 History of Research on MBA Occupation in the Silesian-Greater Poland Border Area

The issue of MBA settlements is a consequence of three contemporary prehistoric processes, as well as the chronometric methodology in the Silesian-Greater Poland border area.

The first process is the collapse of the Central European EBA civilization resulting in the disappearance of well-defined cultural traits of the Únětice culture (Kadrow, 1998, 2001). Its disappearance was associated with the emergence of the Tumulus cultural circle, in which SGPTC is a part (Gedl, 1975, pp. 77–82; Gediga, 1978; Makarowicz, 2017a). The cultural change was characterized by practicing of inhumation and cremation burial rites on same cemeteries, low frequency of ceramic finds, the lack of permanent settlements, and the invention of a new metallurgical style (Blajer, 1999; Harding, 2000; Ignaczak & Makarowicz, 1998a; Kłosińska, 1997, p. 7; Kristiansen & Larsson, 2005; Kaczmarek, 2012a, p. 157; Kneisel, 2012; Makarowicz, 2010). The clear cut-off from the preceding EBA proved challenging for conventional archaeology, where transitions between cultural groups were generally associated with gradual changes in material culture.

The second process is the increasing frequency of “eastern” traits in SGPTC, associated with the Trzciniec cultural circle (TCC) (Gardawski, 1959; Ignaczak & Makarowicz, 1998a; Kłosińska, 1997; Makarowicz, 2010). This trend was especially recognized in Central Poland on the fringe of what has been dubbed as the distribution of area of the SGPTC (Gardawski, 1959; Kłosińska, 1997). While the SGPTC was defined on the basis of funerary finds and metal artefacts, the sites associated with TCC include settlements with rich collections of ceramic finds and low frequencies of metal artefacts (Górski, 2007; Makarowicz, 2010). While the relationship between the groups is not contested, the exact nature of their relations and forms of interaction remain open for interpretation (Gedl, 1975; Gediga, 1978; Innerhofer, 2000; Kłosińska, 1997).

The main source of the discussion and the third underlying issue is the small number of settlements which have been associated with the SGPTC, as well as their ephemeral archaeological characteristics (Gedl, 1975; Gediga, 1978; Kłosińska, 1997; Kaczmarek, 2012b). The discovered sites were recognized as indicative of short-term occupation typical of camps, rather than stable settlements (Gedl, 1975; Kłosińska, 1997; Kaczmarek, 2012a, p. 157). As such, it amplifies the discontinuity of settlement practices from the EBA or even the contemporary TCC (Czebreszuk, 2013; Górski, 2007; Jaeger, 2018; Makarowicz, 2010). Despite the long history of

¹ Excavations of Czeladź Wielka were requested by KRUSZGEO Polskie Kopalnie S.A. and carried out by Refugium S.C. company to precede the exploitation of the Kowalowo I aggregate. The site was excavated between 2010 and 2012. The supervisor of the excavation was Małgorzata Talarczyk-Andrałojć, who was supported by Karolina Siara in 2012. The archaeological works covered four archaeological sites – Czeladź Wielka 12, 18, 20, and 29. Although the materials presented in this article originate mostly from Czeladź Wielka 18, we decided to overrule the site distinctions established on the basis of surface collections, and treat them as a single research area – Czeladź Wielka.

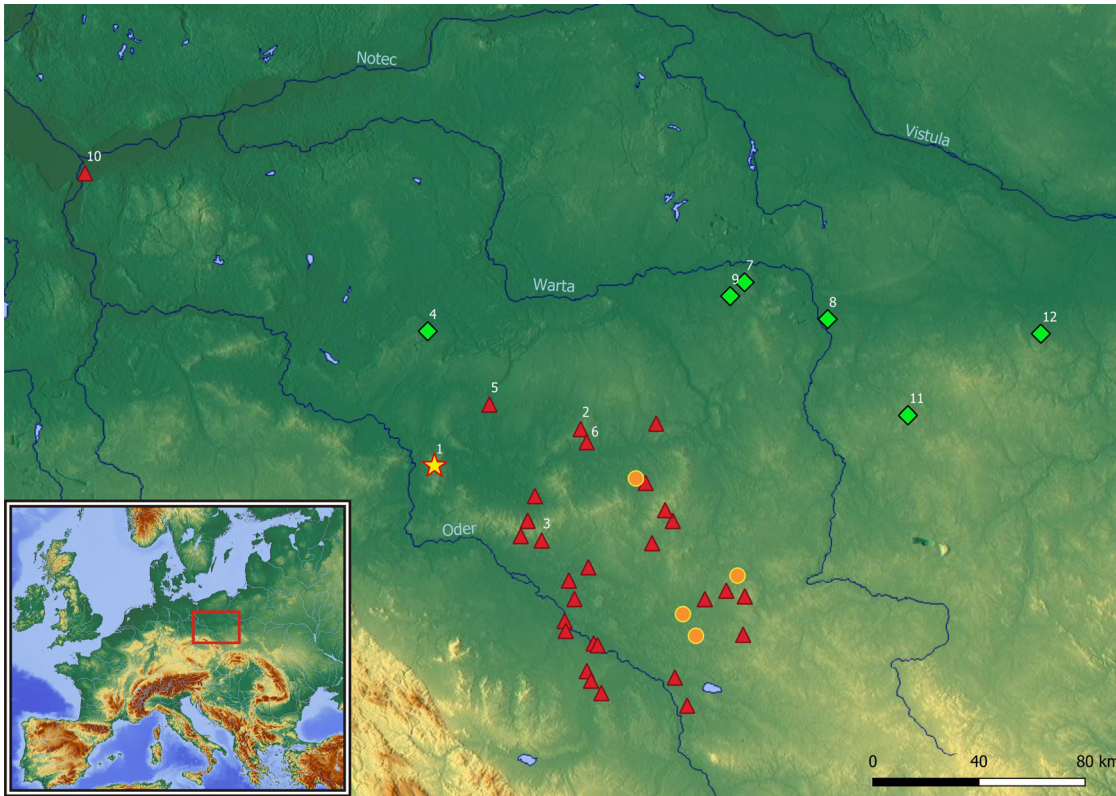


Figure 1: Location of Czeladź Wielka (yellow star) in the Silesian-Greater Poland border area and Early and Middle Bronze Age barrow cemeteries (red triangles), hoards (orange circles), and settlements (green diamonds). Radiocarbon dated sites mentioned in the text: 1 – Czeladź Wielka, 2 – Krotoszyn, 3 – Niedary, 4 – Bruszczewo, 5 – Pudliszki, 6 – Las Krotoszyn, 7 – Szczepidło, 8 – Cichmiana 2, 9 – Krągola 6, 10 – Górzycza, 11 – Lutomiernsk-Koziówki 3a–c, and 12 – Polesie 1.

research in the region (Lasak, 1996, 2001), this system of short-term occupation is yet to receive a coherent definition and diachronic investigation. The existing studies focused almost exclusively on investigating funerary rites, which was supported by a fairly large number of flat and barrow cemeteries in the area (Cwaliński, 2012; Gedl, 1975; Gediga, 1978; Lasak, 1996, 2001; Staniuk, 2023). The result of these studies was a general model of cultural development pointing toward an increasing importance of Danubian influence which was transformed into a specific, local form of metallurgy and burial rite (Gedl, 1992; Innerhofer, 2000; Kaczmarek, 2012a).

Methodologically, the underlying challenge for a diachronic study was the incompatibility of EBA and MBA chronology of the SGPTC sites. While the EBA chronology is based on radiocarbon dates, later phenomena (excluding TCC) are based on typological sequences. New radiocarbon dates from the region using samples acquired through coring suggest a complex history of landscape changes around MBA barrow cemeteries (Stróżyk, 2019). However, they are not associated with specific material culture or other cultural traits. Other radiocarbon dates from Tumulus contexts, e.g., Czechia, Moravia, or Germany, originate from graves with finds without analogies in the SGPTC and therefore should not be used as proxies for estimating the chronology in Poland (Krištuf & Rytíř, 2009; Müller & Lohrke, 2009; Šabatová & Parma, 2020). As a result of this archaeological conundrum, the conventional dating is generally accepted – the emergence of the Tumulus cultural circle corresponds to Reinecke's BB₁, approximately 1600–1500 BC (Innerhofer, 2000; Kneisel, 2012; Müller & Lohrke, 2009), which overlaps with the disappearance of the Únětice culture (Czebreszuk, Müller, Jaeger, & Kneisel, 2015; Kneisel, 2012; Müller, 2012; Silska, 2012, p. 202).

Given the outlined issues, we believe that the identification and characterization of the habitation model in Czeladź Wielka allows reconsideration of the occupational traits of SGPTC, which together with radiocarbon dating, allows outlining the character of cultural change in the Silesian-Greater Poland border area between the EBA and MBA.

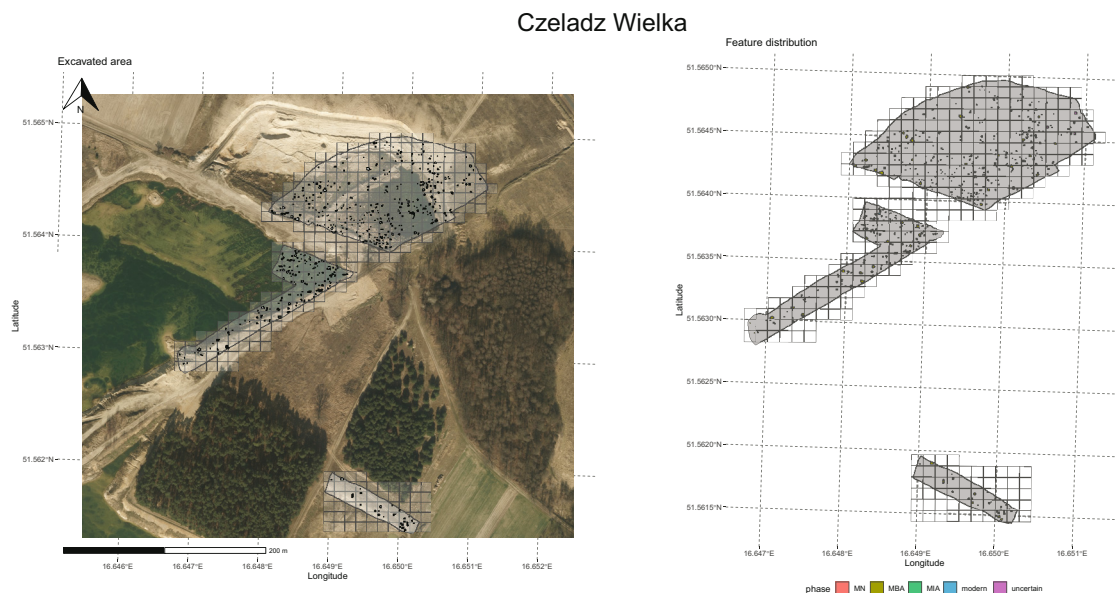


Figure 2: Plan of the Czeladź Wielka site. MN – Middle Neolithic, MBA – Middle Bronze Age, and MIA – Middle Iron Age.

3 Czeladź Wielka – Site Characteristics

The site of Czeladź Wielka is located ca. 3.5 km west of Wąsosz and is located on the border of four mezoregions: the Leszczyńska Heights, Żmigród Basin, Głogów Ice Marginal Valley, and Trzebnica Hills (Kondracki, 1994; Solon *et al.*, 2018). The site was established on the upper part of a hillslope overlooking the Barycz and Orla Valley, on its northern and eastern side (Figure 2). The intersection of the two rivers was 1.5 km away from the site and there was a small spring in the immediate vicinity of the site. Majority of the site is part of the agricultural area with the western part of the site covered by a forest, which limits the possibility of determining its full extent. The geology of the site is characterized by sands with occasional patches of rocky layers (Talarczyk-Andrałojć & Andrałojć, 2011, p. 4; Talarczyk-Andrałojć *et al.*, 2012, p. 9).

The site was discovered in 1980s during field surveys and was later positively verified during excavations in 2010 (Talarczyk-Andrałojć & Andrałojć, 2011, p. 3; Talarczyk-Andrałojć *et al.*, 2012, pp. 3–4). The excavations covered 214 ares and reported 127 MBA features (Figure 2; Talarczyk-Andrałojć *et al.*, 2012, p. 150). The overwhelming majority were pits but other features included 2 hearths, 33 postholes, remains of 2 house constructions (semi-sunken floor houses), as well as 17 features with post-consumption animal remains (Talarczyk-Andrałojć *et al.*, 2012, pp. 148–150).

The site stratigraphy comprised of a modern humus layer, cultural layer, seven different types of soil characterized by different frequency and fraction of stone inclusions, and a subsoil (Talarczyk-Andrałojć *et al.*, 2012, pp. 22–25). The prehistoric sequence was partially destroyed by Early Modern Period activities – ditches, digs, and tree stumps. The intensity of activities on the sites proved challenging for onsite chronological estimation of features. The majority of archaeological material (ca. 57%) was documented in the cultural layer. However, during excavations, it became clear that the ceramic material forms isolated concentrations which could be linked to the underlying soil structure (Talarczyk-Andrałojć *et al.*, 2012, p. 132). The documented features were mostly small- or medium-sized, generally with a single, brownish, or grayish fill. Fills found in the remaining features were heavily disturbed.

The majority of recovered finds were ceramic fragments; approximately 5500 pottery sherds were documented, an overwhelming majority of which were dated to the MBA (Talarczyk-Andrałojć *et al.*, 2012, p. 132). Other finds were rare, excluding a handful number of flint or bone artefacts, no other types of material culture were discovered (Talarczyk-Andrałojć *et al.*, 2012, pp. 132–133).

Based on other reports of Bronze Age settlements in the Silesian-Greater Poland border area, no other comparable site from the second half of the second millennium BC was documented, including sites identified during field surveys (Talarczyk-Andrałojć et al., 2012).

4 Ceramic Analysis

The absence of available reference samples for MBA settlement ceramics was the main reason behind the decision to examine the entire available material. This process was made to determine the most prevalent traits of local pottery production. The methodology followed the system established for EBA and MBA settlement pottery in Central Hungary (Staniuk, 2020). Throughout the data collection, the system was modified to include traits specific for the finds from Czeladź Wielka. The data collection included macro- and micromorphological evaluation of shapes, decoration, and macroscopic analysis of technology.

In total, 49.06 kg of ceramic material were examined. The sample included complete forms and selected finds (1,096 units) and mass finds (4,382 units). The material was highly fragmented, the vast majority (ca. 90%) of material had a surface area equal to or less than 5 cm × 5 cm. The majority of finds were indeterminate body sherds (441) and rims (357).

4.1 Macromorphology

The only set of completely preserved vessels were miniature forms, three of which typologically correspond to the beaker type from Polesie 1 (Górski, Makarowicz, & Wawrusiewicz, 2011, pp. 47–50), and one to the bowl type (Górski et al., 2011, pp. 45–47). For the perforated vessels, the only possibility of typological assignment was based on the upper vessel part, which corresponds to other similar artefacts found in TCC contexts (Górski et al., 2011; Grygiel, 2012; Makarowicz, 2010, 2016). The discovered forms were of slightly different shape: CZE_SF_487 had a semi-spherical shape and was accompanied by a standing foot; CZE_SF_491 had a conical shape; CZE_SF_488 was conical with a profiled base. The miniature bowl (CZE_SF_505) with irregular wall shape can only generally be associated with monopartite, unprofiled bowls (Figure 3).

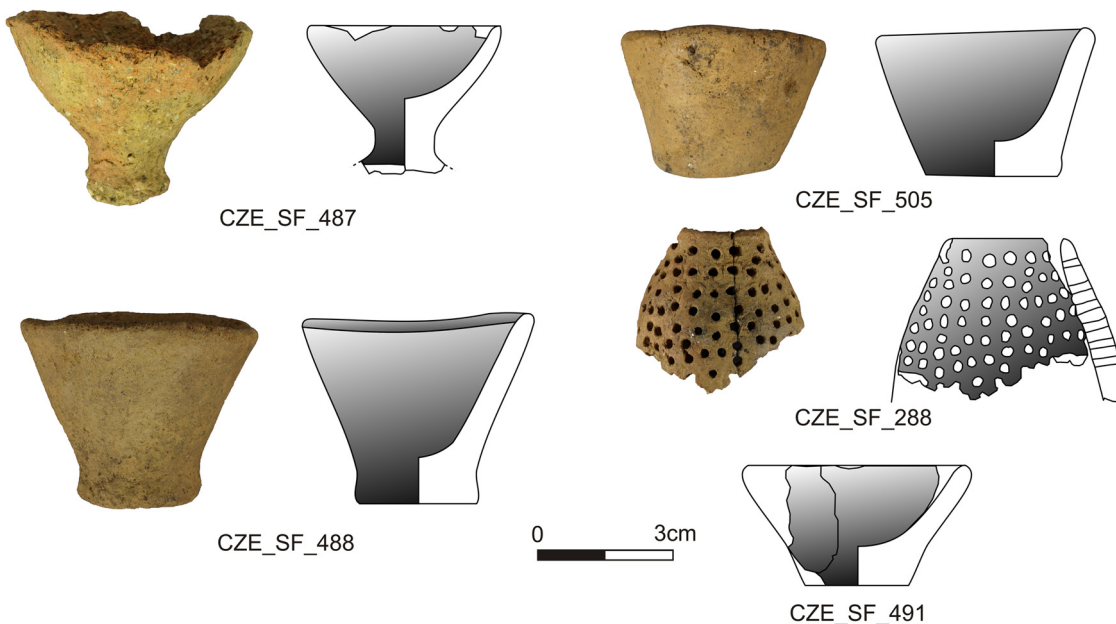


Figure 3: Documented vessel forms in Czeladź Wielka.

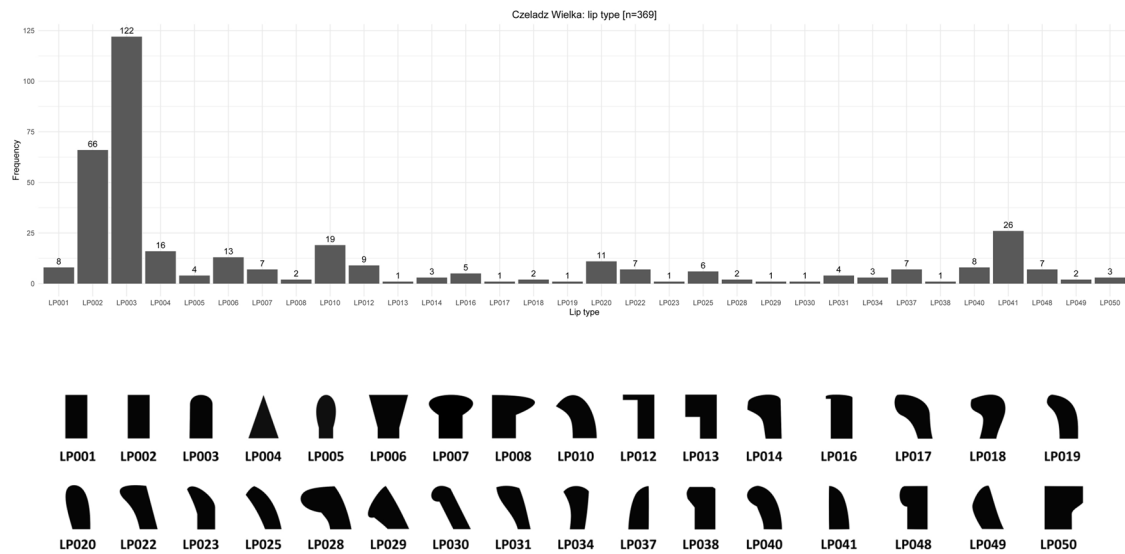


Figure 4: Distribution of lip types.

In general, miniature forms in the SGPTC are considered “foreign” or at least rare objects (Gedl, 1992, p. 17); the single reported example is the artefact discovered in a grave in Krzelów – a direct analogy for the CZE_SF_487 form (Gedl, 1975, p. 113, Tab. 2:4). The remaining vessels lack direct analogies, although miniature vessels are well-documented in TCC, Lusatian, or, in general, Bronze Age archaeology of Central Europe (Górski *et al.*, 2011; Kłosińska, 2008; Oleszczak & Twardowski, 2011; Wójcik, 2020).

4.2 Micromorphology

Due to the small number of preserved vessels, typological evaluation was based on the examination of micromorphological traits. These were almost exclusively limited to lip shapes (Figure 4).

In total, 32 types were distinguished with types LP003, LP002, LP041, LP010, LP004, LP006, and LP020 representing the most common solutions. Types LP003 and LP002 are common for Central European Bronze Age, which suggest that pottery production between EBA and MBA remains stable in terms of some micromorphological traits.

4.3 Technological Analysis

Macroscopic analysis of technology was based on fresh breaks or cleaned existing breaks. The main objective of the analysis was to determine the degree of technological homogeneity of the assemblage.

Clay preparation was fairly consistent; crushed rock temper was the dominant non-plastic inclusion (ca. 98%), in some instances combined with sand, mica, or crushed rocks of a higher fraction (gravel). The second most frequent non-plastic inclusion was sand (ca. 2%). Single sherds tempered with grog or without visible inclusions were documented. During data collection, it became apparent that the crushed rock inclusion was usually white. Although the exact frequency was not counted, we estimate that at least 70% of the pottery with crushed rock inclusions comprised of white crushed rocks. This observation is in accordance with the technological markers for Late Únětice, Tumulus, or TCC assemblages in the Polish Lowlands (Diers, 2010; Ignaczak & Makarowicz, 1998a,b; Silska, 2012). The majority of the assemblage was characterized by moderate

distribution of non-plastic inclusions in the clay matrix (ca. 73%), followed by poorly distributed inclusions (ca. 15%). Size-wise, the group of inclusions between 1 and 3 mm was preferred (ca. 75%), followed by large inclusion measuring above 3 mm (ca. 13%). Overall, it was not observed that the amount of temper resulted in the cracking of external vessel surface (ca. 86%).

Based on the combination of technological traits (type, size, and visibility of inclusions on the vessel surface), 27 technological groups were identified. Group 15 (61%) was the most frequent (Figure 5a).

The high degree of fragmentation severely impacted the possibility of determining wall construction techniques. As such we decided to focus exclusively on analyzing the wall thickness distribution (Figure 5b). The majority of finds fell between the 6 and 9 mm (88%) range, which points toward preference of thick-walled vessels. The presence of wall-thickness exceeding 9 mm suggests the limited presence of large storage forms used for storage. Although the detailed documentation of techniques was problematic, it is suggested that coiling supplemented by pinching vessel bases was used. Both techniques are core building methods in Central European Bronze Age (Kreiter, Sofaer, & Budden, 2006; Mogielnicka-Urban, 1984; Michelaki, 2006; Staniuk, 2020).

Exterior surface treatment was characterized by 13 surface types, dominated by smoothing, light burnishing, and textile impressions (Figure 5c). In some cases, two types of surface treatment were documented (e.g., EST020, EST033, EST034, EST035).

Interior surface treatment was more constrained with only seven types documented (Figure 5d). Smoothing and burnishing were also frequent, one instance of roughening was recognized (eventually very strong scrubbing), as well as surfaces without any special treatment.

Examination of cross-section coloring suggests that the majority of finds were fired in reducing atmosphere (Figure 5e). In the majority of cases, the cross-section was not uniformly colored, which suggests that maintenance of stable firing conditions was impossible. This led to the surfaces varying in color from the core.

4.4 Decoration

Each element unassociated with the technological steps presented above was treated as part of decoration to avoid unclear criteria of treating certain elements as more functional than others, e.g., lugs or ribs (Staniuk, 2020, p. 194). In total, 370 decorated fragments were distinguished (ca. 7%). The low frequency of decorated ceramics is common among MBA settlements in the Polish Lowlands (Górski et al., 2011; Makarowicz, 2013, 2016). The vast majority of decoration was placed on the body (ca. 95%).

The most frequent decorative technique was impressing, followed by incising, and applying different elements (Figure 6a). The remaining techniques suggest local familiarity with other decorative techniques but at the same time highlight reluctance toward their adaptation. Unexpectedly a single example of painted decoration was documented, achieved with a black substance reminiscent of birch tar (cf. Figure 9).

Most common decorative elements were textile impressions, which represent more than a half of all encountered decorative elements (ca. 53%; Figure 6b)². This confirms the postulated importance of textile decoration as a marker of SGPTC pottery production found across the Silesian-Greater Poland border area (Gedl, 1975, pp. 62–64; 1992, p. 13; Gediga, 1978, p. 159).

The second most frequent decorative element was ribs. Although this specific decoration is well-documented in prehistoric inventories of the Polish Lowlands, it was also well-established in the EBA, e.g., Bruszczewo (Müller, Czebreszuk, & Kneisel, 2010). Other SGPTC contexts with ribs include Grabonóg, Wielka Lipa, Latowice, or Grodnica (Gedl, 1975; Lasak, 2001). Ribs were also frequently encountered in the Lusatian Urnfield culture, e.g., Korzecznik 14 and Narkowo 9 (Czebreszuk, 1990; Czebreszuk, Ignaczak, & Łoś, 1997; Ignaczak, 2002). However, in the MBA, it is generally associated with the TCC, where it is also present in the Early and Classical phases (Makarowicz, 2016, p. 221).

² A detailed analysis of textile pottery will be presented elsewhere (Skrzyńska et al. in preparation).

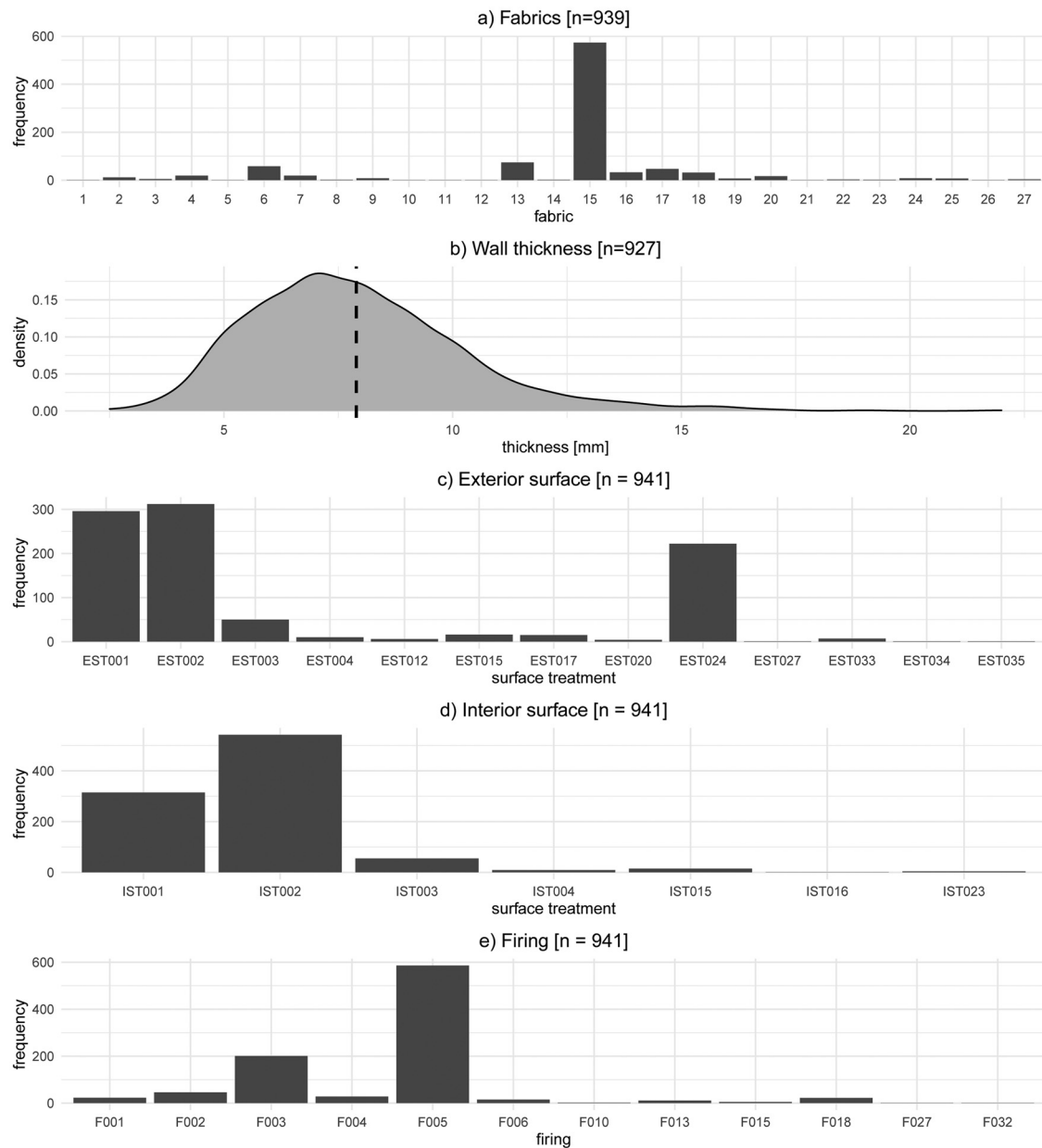


Figure 5: Technological analysis: (a) Distribution of ceramic fabrics; (b) wall-thickness analysis; (c) exterior surface treatment (EST001 – smoothed, EST002 – lightly burnished, EST003 – burnished, EST004 – well-burnished, EST012 – brushed, EST015 – indeterminable, EST017 – roughened, EST020 – burnished and roughened (two surfaces), EST024 – rugged, EST027 – horizontally finger-roughened, EST033 – burnished and rugged (two surfaces), EST034 – lightly burnished and roughened (two surfaces), and EST035 – smoothed and brushed (two surfaces)); (d) interior surface treatment (IST001 – smoothed, IST002 – lightly burnished, IST003 – burnished, IST004 – well-burnished, IEST015 – indeterminable, IST016 – roughened, IST023 – unmodified); (e) F001 – all oxidized, F002 – all reduced, F003 – oxidized exterior/reduced interior, F004 – reduced exterior/oxidized interior, F005 – oxidized sandwich, F006 – reduced sandwich, F010 – reduced exterior-oxidized-reduced-oxidized-reduced interior, F013 – all light gray, F015 – reduced exterior-oxidized core-reduced interior, F018 – melted (secondarily burnt), F027 – reduced exterior-sandwich-oxidized interior, and F032 – reduced exterior-oxidized core-reduced interior.

The decorated assemblage from Czeladź Wielka was also characterized by the presence of lugs which are found in Tumulus, TCC, and Early Lusatian Urnfield contexts (Górski *et al.*, 2011; Makarowicz, 2016, p. 222). The first cultural contexts are associated with funerary finds, e.g., Smoszew or Obrót (Cwaliński, 2010). For TCC, a large collection of different lugs was also discovered in Polesie 1 (Górski *et al.*, 2011). For the Early Lusatian

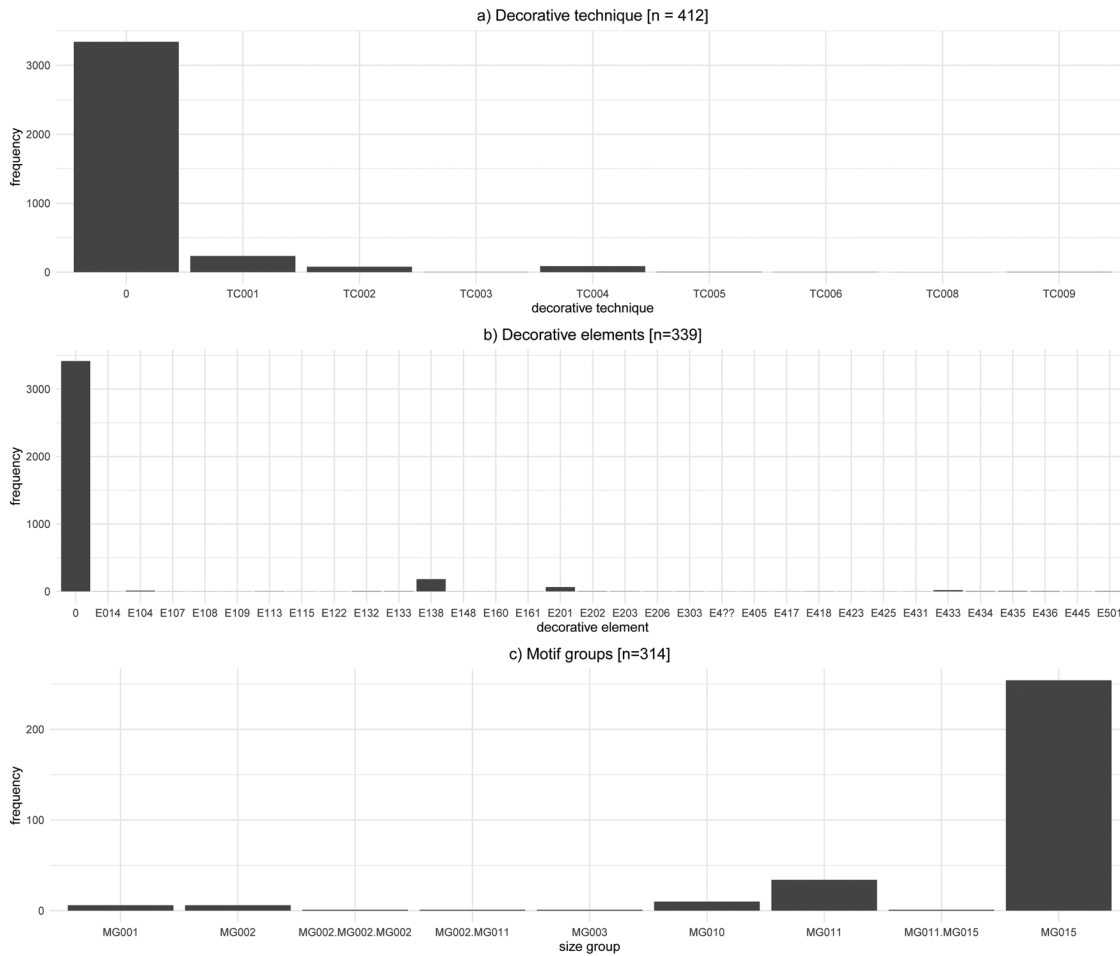


Figure 6: Decorative analysis. (a) Techniques (TC001 – impressed, TC002 – incised, TC003 –channeled, TC004 – applied, TC005 – perforated, TC006 – pressed, TC008 – painted, and TC009 –pulled); (b) elements (E104 – impressed vertical finger, E107 – impressed lentil, E108 – impressed half-ellipsis, E109 – impressed tear, small, E113 – impressed oval, rounded, wide, E115 – impressed oval, pointed, thin, E122 – impressed notches, one rounded edge, E132 – impressed finger horizontal, E133 – impressed finger with vertical nail, E138 – thick-thread textile impression, E148 – impressed single fingernail, E160 – impressed semi-circular dot, small, E161 – impressed horizontal D-shaped stamp with a concave upper edge, E201 – incised line (unknown ends), E202 – incised line, one rounded, E203 – incised line, one pointed end, E206 – incised indent, thin, E303 – channeled line, two rounded ends, E405 – applied lug, rounded, medium pointed, E417 – applied lug, elongated, large, E418 – applied lug, elongated, large, flattened top, E423 – applied lug, oval, medium, E425 – applied lug, rectangular, small, E433 – applied rib, long, triangular profile, E434 – applied rib, long, rectangular profile, E435 – applied rib, long, rounded profile, E436 – applied rib, long, trapezoidal profile, E445 – applied horizontal lug, long, flat, and E501: circular perforation); (c) motif groups (MG001 – linear motifs, MG002 – strip motifs, MG002.MG002.MG002 – multiple strip motifs; MG002.MG011 – strip and rib motifs, MG010 – lugs, MG011 – ribs; MG011.MG015 – rib and surface motifs, and MG015 – surface motifs).

contexts, they are mostly associated with Kietrz phases IIb and Iic (Gedl, 1979, pp. 30–33). Other examples include analogies from Kuyavia (sites Ciechrza and Zgłowiączki; Ignaczak, 2002) and the Wielkopolska Lowland (site Korzecznik 14; Czebreszuk, 1990; Ignaczak, 2002).

The examined assemblage provided evidence of strongly perforated surfaces, possibly associated with strainers or ember covers (*Windlicht*). For MBA contexts of the Carpathian Basin, this distinction is used to separate thick-walled vessels with wide diameters as forms employed in cooking practices (Budden, 2007, Figure 2.14; Nyíri, 2011, 4. Kép, 8), while other thin-walled forms with narrow diameters and spherical profile are associated as forms placed on top of glooming fires to illuminate enclosed spaces (Figure 7; Staniuk, 2020). In the Polish Lowlands, the first interpretative variant was preferred, although the forms discovered in Szczepińsko or Polesie 1 could be interpreted as used for illumination (Górski et al., 2011; Makarowicz, 2016).



Figure 7: Hypothetical effect of using an ember cover for illumination.

Considering the thickness of sherds with perforated surfaces discovered in Czeladź Wielka (5, 6, 7, 8, and 9 mm), both forms could have been used on site.

In Czeladź Wielka, the preferred way to implement decoration was to cover the entire surface of the vessel (Figure 6c). Ornament combination was very rare, which at least partially can be explained by the high fragmentation of the ceramic material. Irrespective of preservation, the decoration analysis confirms that if decorative traits are to be considered as cultural markers, the analyzed inventory should be associated with the SGPTC due to the prevalence of textile decorations. However, the large frequency of ribs points toward influence from the TCC.

4.5 Spatial Analysis

Spatial analysis of find distribution was linked to two types of archaeological features: refuse pits and cultural layer. Initially the distribution of features was used to infer the presence of linear structures associated with functional divisions within the settlement, proving the existence of stable architecture. Analysis of feature distribution ruled out the presence of fixed architecture (no spatial correlation, one identified structure measuring more than 100 m² is indicative of later Early Modern Period architecture). We determined that later activities on the area of the archaeological site resulted in the formation of secondary features with re-distributed MBA finds. This is further supplemented by the low frequency of ceramic materials found in features, which contrasts with the distribution of material in the cultural layer, as well as radiocarbon dating (Figure 8).

The distribution of finds in the cultural layer highlights the presence of “empty spaces” within the site, as well as the existence of intense deposition zones. This points toward a clustered settlement model, where the group used intensively one part of the occupied area leading to an increased deposition of ceramic material. After a while (maybe a season), the group would move across the occupied area, allowing post-depositional factors to start affecting the distribution of finds in a radial fashion. This occupational model was documented on other MBA sites, e.g., Szczepidło or Polesie 1 (Górski *et al.*, 2011; Makarowicz, 2016). The commonality of this settlement model could suggest an existence of stronger ties between the SGPTC and TCC.

5 Absolute Chronology

We acquired four radiocarbon samples from the site (Table 1). Radiocarbon dating took place in the Poznan Radiocarbon Laboratory. Three samples were acquired from archaeological features – 214, 316, 460. The fourth sample was obtained from a vessel found in the cultural layer of sector HaII/82 D. The dated bone samples

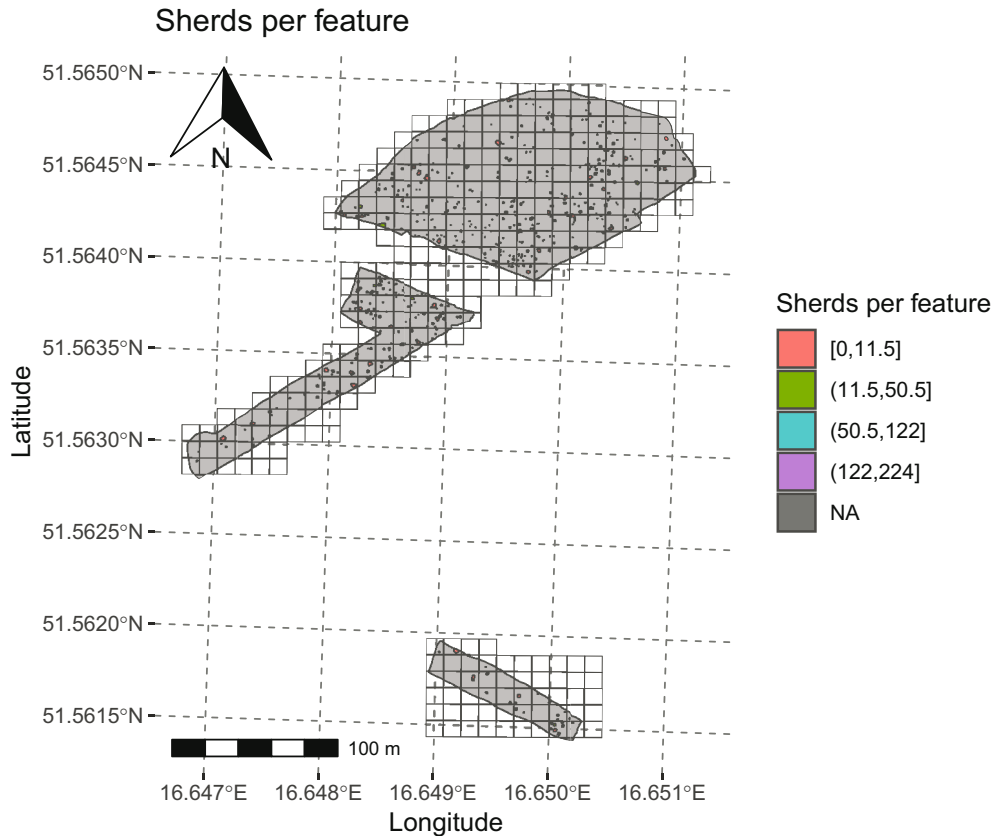


Figure 8: Site plan with the distribution of MBA ceramics in the cultural layer.

suggest that the animal bones were deposited in the Early Modern Period, despite the selection of features with MBA ceramics. As such the post-depositional transformations of the prehistoric occupation was substantial.

The dated ceramic vessel proved more successful, the wood tar found on the ceramic vessel (sample Poz-143258) had an estimated date of 3215 ± 35 BP, which after calibration in OxCal v. 4.4 (Bronk Ramsey, 2009; Reimer et al., 2020) was dated to 1506–1445 (68.2%) and 1536–1416 (95.4%) cal BC (Figure 9). This indicates that the site can be safely placed in the second half of the second millennium BC, between the late sixteenth and fifteenth century BCE.

The radiocarbon date from Czeladź Wielka is the first absolute date from the Silesian-Greater Poland border area, especially from a settlement context. Based on a comparative analysis with other dated sites in Western and Central Poland, the site of Czeladź Wielka was used after the decline of the fortified settlement in Bruszczevo, simultaneously with the creation of a new, long-term occupation in Szczepidło or Polesie 1 (Figure 10). The site was contemporary with the barrow in the Krotoszyn Forest or short-term occupation of Cichmiana 2 or Krągola, as well as the cemetery in Górzycyca. Given the disintegration of the Únětice culture, the dating of the materials from Czeladź Wielka suggests a very short-term period of cultural change between the EBA and MBA, which rather quickly resulted in an emergence of a new habitation model. Its overlap with the TCC could point toward a direction of origins or at least drawing of inspirations from a different cultural milieu.

6 Discussion

We begin the identification of habitational practices in Czeladź Wielka by examining the settlement model. Currently, a systemic approach for distinguishing settlement types in Bronze Age archaeology is relatively

Table 1: Radiocarbon dates from the Czeladź Wielka site

No.	Lab. No.	Material	BP	Calibrated		Context	Comments
				68.30%	95.40%		
1	Poz-138150	Bone	170 ± 30	AD 1667 (13.2%) 1691	AD 1660 (17.4%) 1700	Feature 214	1.4% N, 5.0% C, 2.7% coll
				AD 1728 (32.2%) 1782	AD 1721 (46.4%) 1816		
				AD 1796 (6.7%) 1809	AD 1833 (12.2%) 1889		
				AD 1921 (16.2%)...	AD 1908 (19.5%)...		
				AD 1695 (20.4%) 1725	AD 1683 (26.1%) 1735		
2	Poz-138151	Bone	100 ± 30	AD 1812 (18.3%) 1839	AD 1803 (69.3%) 1930	Feature 316	1.5% N, 5.3% C, 2.4% coll
				AD 1846 (3.5%) 1852			
				AD 1877 (26.0%) 1916			
				AD 1637 (47.9%) 1670			
				AD 1780 (20.4%) 1798			
3	Poz-138152	Bone	245 ± 30	AD 1523 (11.0%) 1572	AD 1630 (53.5%) 1683	Feature 460	0.7% N, 3.5% C, 1% coll
				AD 1737 (3.0%) 1755	AD 1761 (26.4%) 1802		
4	Poz-143258	Wood tar	3215 ± 35	1506–1445 BC	1536–1416 BC	Potsherd/inventory number 1/2010	

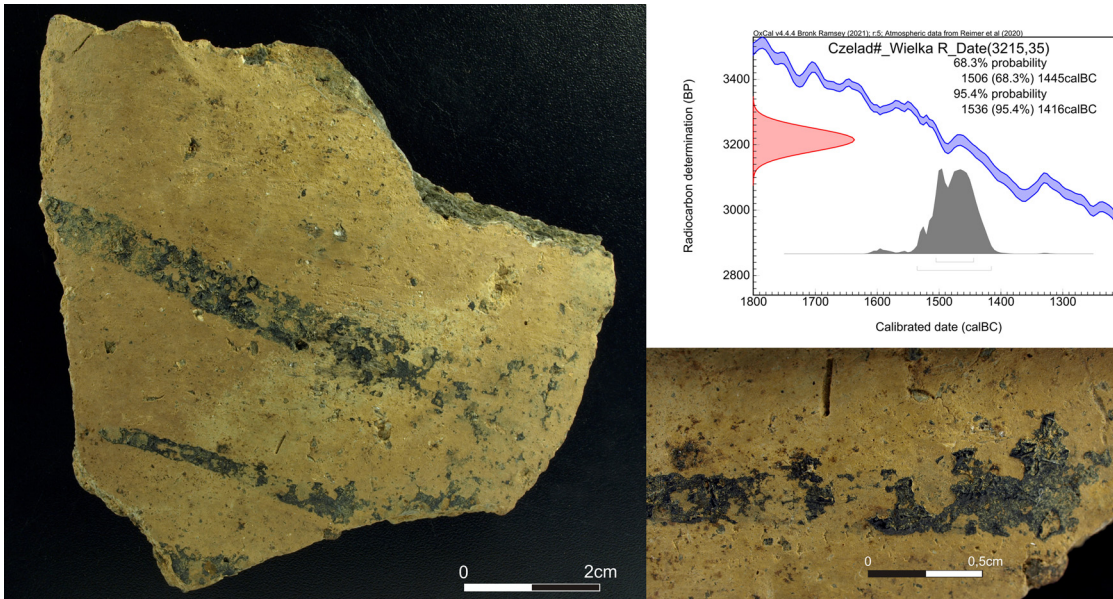


Figure 9: The vessel with painted ornament used for radiocarbon dating.

open (Brück & Fokkens, 2013; Harding, 2000; Sørensen, 2010), with locally documented domestic architecture suggesting that occupational models in the Polish Lowlands were relatively diverse (Makarowicz, 2010). Based on the size of the occupied area and the characteristics of the archaeological record, we consider the settlement as representative of a seasonal model similar to a short-term camp. The low number of features associated with permanent architecture, limited to 30 postholes and a single semi-sunken floor house, points toward the use of temporary dwellings. The large number of pits, assuming that several of them can be dated to the MBA, suggest a refuse management strategy employed to reduce the excessive number of discards on the occupied surface. Last but not least, the linearly-arranged “empty spaces” suggest the presence of occupational zones within the camp.

We treat the accumulation of archaeological finds in the cultural layer as an additional argument in favor of the seasonal occupation model. A similar situation was encountered in Lgów, Szczepidło, or Polesie 1 (Grygiel, 1977, p. 64; Górski et al., 2011; Makarowicz, 2016). In all cases, ceramics were the dominant find type. The overall homogeneity of the ceramic material suggests short-term occupation without a long-term occupational practice, a pattern especially common for other MBA sites in the Polish Lowlands (Makarowicz, 2010, p. 96).

The chronological positioning of the site further supports the short-term occupational model of Czeladź Wielka. The relative dating of described finds especially the textile-impressed pottery, as well as the absolute dating positions in firmly in the half of the second millennium BC, specifically the fifteenth century BC. Overall, this time period represents a transitional time when the societies living in the post-Únětice world are yet to adapt the cremation burial rite associated with the Urnfield culture (Kadrow, 1998; Kristiansen & Larsson, 2005; Nørgaard, Pernicka, & Vandkilde, 2021). This corresponds to phase BB₁ and the increasing influence from the Carpathian Basin (Kaczmarek, 2012a, p. 157), as well as the rise of barrow cemeteries in the Silesian-Great Poland border area, e.g., Smoszew (Stróżyk, 2019), as well as across Central Europe (Chvojka et al., 2011; Křišťuf & Rytíř, 2009).

While the occupational model can be considered short-term, we consider certain line of evidence as maintained by a complex social group. The stylistic diversification of material culture within a relatively small collection of artefacts can only partially be explained by functional choices (use of ceramics for food preparation and storage). It most likely points to a pottery network linked to specific potters or workshops. If stylistic differentiation such as the number of different lip types can be treated as evidence of different pottery

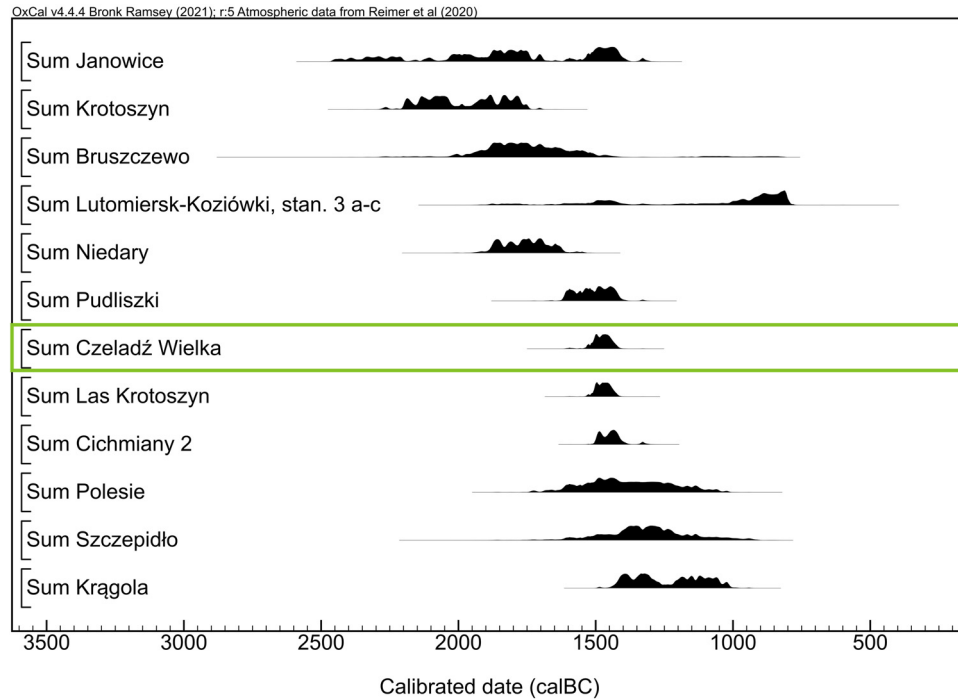


Figure 10: Sum Probability Distribution of radiocarbon dating from Czeladź Wielka and other Bronze Age radiocarbon dated sites in the region (Butent, 1992; Czebreszuk *et al.*, 2015; Górski *et al.*, 2011; Grygiel, 2012; Makarowicz, 2010, 2013, 2017b; Stróżyk, 2019).

workshops, the people living in Czeladź Wielka had access to wares produced by more than a dozen individuals.

From a technological standpoint, these workshops were most likely drawing from a shared technological skillset, all based on the standardized choice of non-plastic inclusions – crushed rocks. This preference represents a continuity of practices established in the preceding Únětice period (Dibbern, 2010; Diers, 2010; Silska, 2012). Persistence of this practice should be considered as one of the threads for maintaining knowledge despite the large-scale social changes between the EBA and MBA in the region. Wall thickness of the vessels points toward a certain degree of specialization, since the majority of finds are thick-walled vessels used for transport, storage, and processing of pottery. These functional properties are often accompanied by larger volumes of vessels, which require acquisition of motor skills which come with experience. Furthermore, the differentiation of surface treatments based on the size of the vessels is a further argument toward a functionalist perspective on pottery production – a wider skillset was used to finish the exterior of the vessel than the interior. Consistency of visual preferences was also documented since the majority of vessels were characterized by a reducing firing atmosphere, although it was not successfully maintained. As such, the pottery of Czeladź Wielka fits well into the Central European Bronze Age ceramics, where the rise of metallurgy was not immediately tied to the improvement of pottery firing techniques (Kreiter, 2007; Michelaki, 2006; Staniuk, 2020).

The absence of fine ware ceramics raises questions regarding the consumption practices, which were perhaps overtaken by nonceramic vessels. Alternatively, this could be treated as a change toward collective food consumption where a single pot was used to eat from by a group of people.

The high frequency of textile impressed ceramics is in accordance with the accepted traits of the SGPTC (Gedl, 1975, 1992; Gediga, 1978; Lasak, 2001). However, the recent advances in textile pottery research points toward both a long chronology of textile impressions, as well as the Pan-European rise of textile ceramics in the MBA (phases BA₂-BB₁; Kłosińska, 1997, p. 41; Schaefer-Di Maida, 2017; Schaefer-Di Maida & Kneisel, 2019). The origin of this practice is usually tied to the EBA ceramics of the Hatvan culture (Kłosińska, 1997, p. 47), despite the limited distribution of area of this cultural group (north-eastern Hungary and south-eastern Slovakia).

In the Polish Lowlands, the high frequency of textile impressed pottery was reported for the EBA settlement of Bruszczewo (Schaefer-Di Maida & Kneisel, 2019) and the Middle–Late Bronze Age settlement in Szczepidło (Makarowicz, 2016). However, the frequency of textile impressions in Czeladź Wielka is relatively higher than that in both these sites (ca. 3% of the entire material; Bruszczewo – ca. 2%; Szczepidło – ca. 0.5%). Other SGPTC sites had a much lesser proportion of textile-impressed ceramics (Gedl, 1975, pp. 62–64).

However, the overall low frequency of pottery decoration in Czeladź Wielka is also a trait associated with MBA pottery. The variety of documented elements, such as impressions, applications, or incisions were additional production steps which were generally avoided in pottery production. Currently, no explanatory model for the low frequency of decoration was provided for the MBA, primarily due to the scarcity of available ceramic inventories. However, the studies of decorative motifs on metal artefacts (Gedl, 1992) suggest that aesthetic principles and regional preferences were well-established in the MBA. The existence of parallel stylistic networks suggests a complex exchange model encompassing different items, each subject to selection based on different principles. This points to a complex social model, requiring independent investigation of possible links between craftsmanship, social status, and distribution networks for the different artefacts. Given the existing data on ceramic finds from Czeladź Wielka, we emphasize the overall visual similarity of finds to the TCC assemblages (Kłosińska, 1997; Makarowicz, 2010). While the problem of syncretism between the SGPTC and TCC is not new, our results highlight the importance of comparative analysis of stylistics and technology between these two groups (Gardawski, 1959; Gedl, 1975; Gediga, 1978; Ignaczak & Makarowicz, 1998b).

Overall, the emerging image of the social model of the SGPTC is a complex one: on the one hand, based on short-term habitation, it potentially emerges as a result of the political vacuum created by the disintegration of the Únětice culture, on the other, it represents a well-maintained and integrated system of skill transmission. As such, we suggest that we are dealing with specialized, well-integrated, small groups of people, who were able to organize short-term occupation and traverse the landscape. Although Czeladź Wielka fits in with existing hypotheses of the occupational models in SGPTC (Kłosińska, 1997; Kaczmarek, 2012a; Makarowicz, 2017a; Vandkilde, 2007), our findings on the material culture point toward the complexity of social organization during the mid-second millennium BC.

7 Conclusion

Based on stratigraphic and material culture studies, we suggest that the SGPTC site in Czeladź Wielka represents a model of short-term seasonal occupation in the MBA. The radiocarbon dating corresponds to the decline in the EBA settlement in Bruszczewo and the spread of short-term occupation from the Silesian-Greater Poland border area toward north-east in the fifteenth century BC.

The short-term occupation model was probably accompanied by a well-established system of pottery production, most likely explained by a complex social model maintained by small groups of people. The high frequency of textile decorated pottery may confirm the validity of existing cultural markers for the SGPTC. However, its low frequency points toward the need to refine the existing definitions to other ceramic traits. Other decorations suggest links to the TCC, while the overall low frequency of decoration is representative of other MBA sites in the Polish Lowlands. Since Czeladź Wielka represents one of the first documented settlement sites for the MBA in the Silesian-Greater Poland border area, we believe it will provide the basis to re-evaluate other excavated and unpublished sites to improve our current state of knowledge of the SGPTC settlement system in the region.

Acknowledgements: The radiocarbon dating analysis was funded by a grant from the Faculty of Archaeology of Adam Mickiewicz University in Poznań (DEC-2/WArch/2021). The authors would like to thank Mr. Waldemar Hass, the Head of the Museum of History and Archaeology in Głogów for lending the archaeological materials from the Czeladź Wielka site. Separate and special thanks are given to Mrs. Natalia Bartczak for her kindness, help, and support with the organization of formal matters.

Funding information: The radiocarbon dating analysis was funded by a grant from the Faculty of Archaeology of Adam Mickiewicz University in Poznań (DEC-2/WArch/2021).

Author contributions: All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Conflict of interest: Authors state no conflict of interest.

Data availability statement: The collected data and code used for the analyses in R (R Core Team, 2018) and OxCal 4.4 (Bronk Ramsey, 2009; Reimer et al., 2020) are available under the following link: https://github.com/bobexer/2022_czeladzwielka.

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