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The times of a Bronze Age tell and outer settlement: Maklár-Baglyashalom, NE Hungary, explored by systematic core drilling and radiocarbon dating

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Received: November 9, 2025 • Accepted: March 2, 2026

Acta Archaeologica Academiae Scientiarum Hungaricae

77 (2026) 1, 1–31

DOI:
10.1556/072.2026.00053

ORIGINAL RESEARCH PAPER

ABSTRACT

In this paper we present the results of a systematic core drilling campaign at Maklár-Baglyashalom in 2021, that took aim at the central tell part of the site, its enclosure(s) and (house) anomalies in the outer part of the settlement. The location of the future tell of Baglyashalom was first occupied some time around 2000 BC, starting from a plot distinctly smaller than the current mound which developed in its place over the next 400 years. Most likely, the surrounding ditch is actually somewhat younger than the initial cluster of houses and related to an already growing and expanding on-tell section of the community at Maklár. After potential dispersed earlier beginnings, an outer settlement thrived in the surroundings of Baglyashalom from broadly the 19th century cal BC onwards, *i.e.* slightly after the first phase of on-tell occupation. At some stage, this outer section of the Maklár community itself was enclosed by a narrow outer demarcation that was already being filled in again during the heyday of both the tell and the outer settlement during the Middle Bronze Age. The radiocarbon dates presented in this paper show that both the tell and the outer settlement were continuously occupied at least until the 17th century BC. Beyond that, at least from the outer settlement there are still local indications of occupation which continued well into the subsequent Late Bronze Age in absolute terms.

KEYWORDS

settlement archaeology, Early to Middle Bronze Age, north-eastern Hungary, tell and multi-phase outer settlement, stratigraphy, radiocarbon dates

INTRODUCTION

The first systematic overview of Bronze Age occupation in the Borsod region that extends from the foothill zone of the Bükk mountains in the north-west towards the adjacent lowlands and the Tisza river in the east was provided 1968 by Nándor Kalicz in his seminal monograph on the Early Bronze Age in north-eastern Hungary.[1] His catalogue served as the starting point for the *Borsod Region Bronze Age Settlement* project (BORBAS), a German-Hungarian cooperation initiated in 2012, that focuses on the late Early to Middle Bronze Age (Hungarian terminology; *c.* 2200/2100 to 1500/1400 cal BC) tell or tell-like settlements in the Borsod region (Fig. 1) as part of a long-term endeavour to contribute to a more nuanced understanding of Bronze Age tell-living and the different regional traditions of tell communities in the Carpathian Basin.[2]

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[1] Kalicz (1968).

[2] E.g. Kienlin et al. (2018a); Fischl et al. (2022).

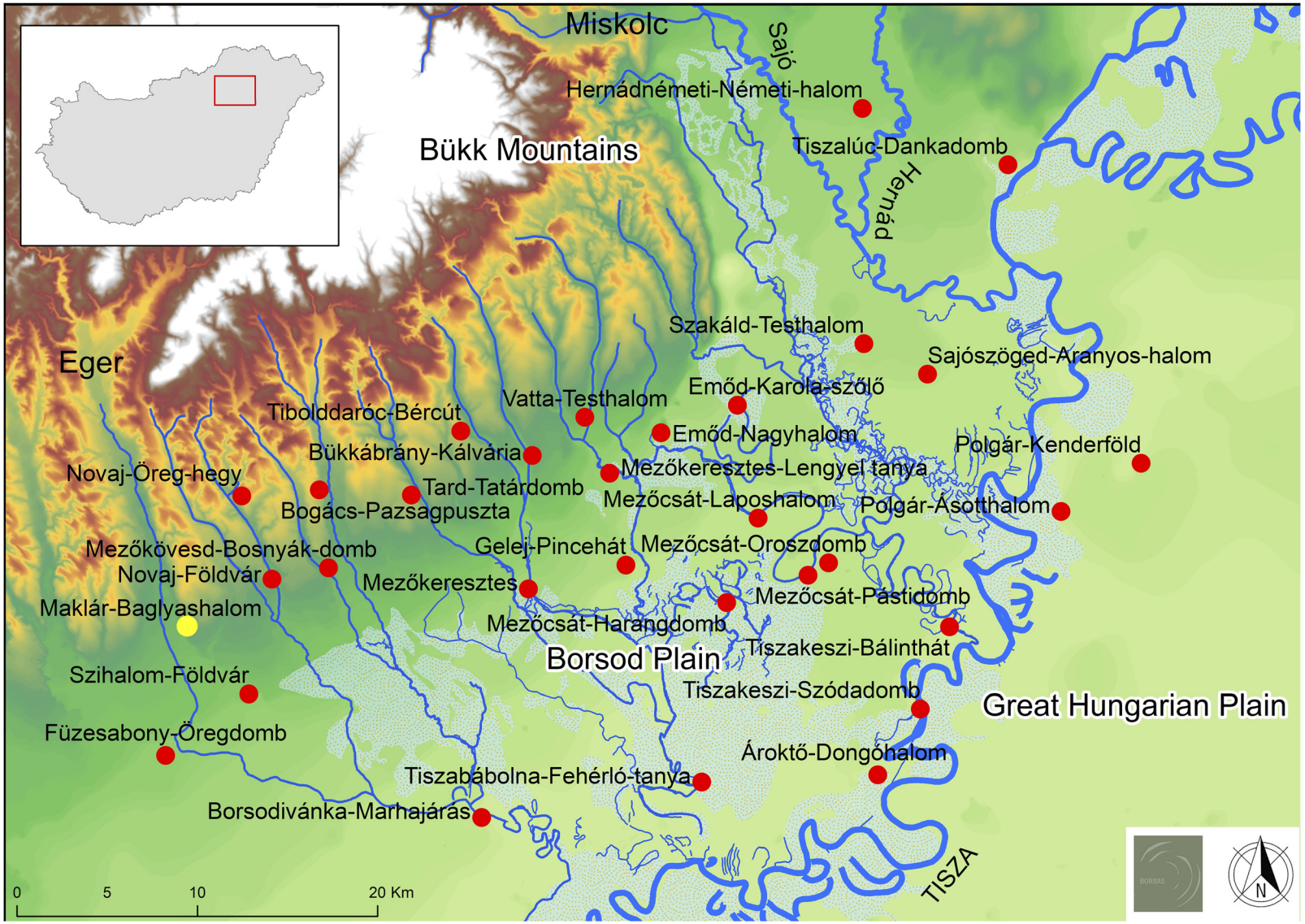

Fig. 1. Distribution of the Early and Middle Bronze Age multi-layer settlement mounds on the Borsod plain and in the foothill zone of the Bükk mountains; marked in yellow: the location of Maklár-Baglyashalom

In the initial phase of the project, BORBAS sought to verify Kalicz' information in the field and provide an up-to-date documentation of their state of preservation and potential for future research. All accessible sites were systematically investigated using a gridded surface survey and magnetometry,[3] focusing, in particular, on the previously largely unknown outer settlement parts beyond the central multi-layered section, the tell itself. The combination of both methods showed that the spatial layout of the sites is considerably more complex and variable than hitherto assumed.[4] It was possible to broadly relate the inner and outer settlement parts in chronological terms, *i.e.* assign them to the local Early Bronze Age Hatvan period and/or the subsequent Middle Bronze Age Otomani-Füzesabony period respectively,[5] and arrive at some initial conclusions concerning their functional and social relationship. Thus, for example, in magnetometry we see broadly the same size and type of houses both on-tell and off-tell, and according to surface finds the practice of metallurgy as well as the use of copper or bronze objects evidently were not restricted to some alleged tell-based elites as was often assumed in previous research.[6]

During the current, second project phase excavations were carried out at the tell settlement of Borsodivánka-Nagyhalom (2015–2024),[7] while a systematic core drilling programme is currently still under way. Again, targeting all accessible sites in the region, the aim here is to obtain information on the layer thickness and the development of their central tell or tell-like section, the backfilling history of their ditches and the *in situ* preservation, if any, of off-tell houses in their outer settlement.[8] Systematic radiocarbon dating is conducted on organic sample material from the cores, in order to establish the chronological relationship and the lifespan of the tell and the outer settlement parts respectively, as well as to provide absolute dates for the abandonment history of our sites, *i.e.* the end of Bronze Age tell-living in the Borsod region. In addition, a first small-scale excavation has already been carried out in Bükkábrány-Kálvária (2022–2023; unpublished) partly uncovering the remains of a multi-phase house in the site's outer settlement. However, a systematic comparison of on-tell and off-tell households in architectural, functional and social terms by means of targeted excavations on several sites is still pending and will be the aim of our oncoming, third project phase.

In this paper we present the results of a systematic core drilling campaign at Maklár-Baglyashalom, that took place in September and October 2021, taking aim at the central tell part of the site, its enclosure(s) and (house) anomalies in the outer part of the settlement. Known already since the 19th century, the tell of Maklár-Baglyashalom was also listed by N. Kalicz,[9] and the surface finds from previous inspections kept in the Museum of Eger were published by Á. Mengyán.[10] Combined to material from an albeit unsystematic surface survey on part of the tell and outer settlement in the BORBAS framework, they indicate a Hatvan to Füzesabony period occupation of the site.[11] Also, as part of our BORBAS project a comprehensive magnetometer survey of the tell and outer settlement was carried out already in 2016.[12] This work formed the basis for our subsequent activities reported in this paper and informed the layout of the 2021 core drillings.

Maklár-Baglyashalom is the westernmost site examined by the BORBAS project, situated on the verge of the foothill zone of the Bükk mountains, *c.* 800 m south-east of the modern village of Maklár (Figs 1 and 2). It is located on the eastern terrace running along the valley of the Eger river in this section, *c.* 20 m above the present-day valley bottom, and provides a fairly typical example of the 'composite' sites that characterise the Early to Middle Bronze Age Borsod region with a multi-layer, tell or tell-like core, a fairly massive ditch and a surrounding outer settlement of varying size and intensity.[13] The main components of the settlement are already visible on the surface, including the mound and the slight depression left by the ditch (Fig. 3). In suitable aerial photography there are greyish patches discernible, indicative of anthropogenic soil formation and/or genuine cultural layers that still cover the central part of the site and at least certain sections of the outer settlement. More detailed information to be discussed in this paper on the layout and duration of the Bronze Age settlement at Maklár comes from the geomagnetic survey covering a total of 6.2 ha, and the systematic core drilling programme carried out in order to establish the stratigraphic sequence of the site – mainly its inner part and enclosure – and to radiocarbon date its main components, the tell, the ditch(es) and selected house anomalies from the outer settlement.

METHODS

The magnetometer data used in this study was acquired already in 2016 with a five-sensor *Sensys* gradiometer system operated with a line spacing of 0.5 m and a sample interval of 0.05 m. Throughout the work of the BORBAS project this layout yielded good results in terms of precision and resolution while at the same time enabling us to cover large settlement areas at reasonable speed. For methodological reasons our data is biased towards burnt structures and houses that stand out from their surroundings by their higher Nanotesla (nT) readings. With a depth of penetration

[3]Fischl and Pusztai (2018); Kienlin et al. (2018b).

[4]Kienlin (2018).

[5]For culture context see Fischl and Kienlin (2019).

[6]For critical discussion see Kienlin (2015) 56–67.

[7]E.g. Fischl and Kienlin (2024) 240–251; Fischl et al. (2025).

[8]See, for example, Kienlin (2020) part III.

[9]Kalicz (1968) 119, Fig. 45.

[10]Mengyán (2019) 288–290.

[11]Kienlin et al. (2018b) 205; see also Kalicz (1968) 119.

[12]See Kienlin et al. (2018b) 205–211.

[13]E.g. Kienlin (2018).

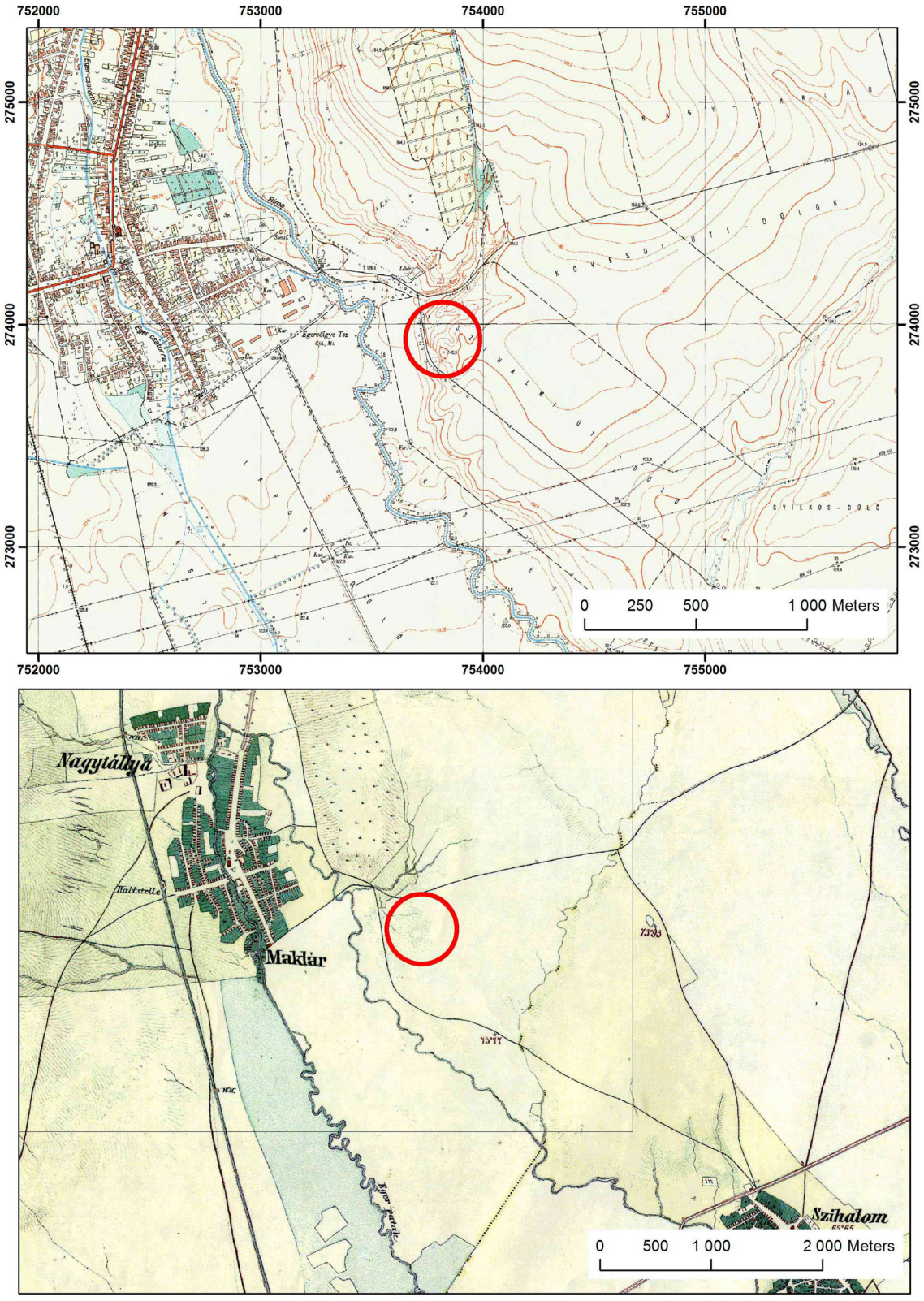

Fig. 2. Maklár-Baglyashalom in its present setting (above) and the topographic situation as shown by the Second Austrian-Hungarian Military Survey, 1806–1869 (below)

Fig. 3. Aerial photograph of Maklár-Baglyashalom seen from the south in 2021, in the background the Bükk mountains

of about 1–1.5 m it is important to bear in mind that on all multi-layer sections of our sites we may be looking at the combined features from various depths in the stratified sequence and of different age condensed into a static image. For this reason in our project geomagnetic data is systematically combined with core drillings for information on layer thickness and the underlying stratigraphy. In the outer settlement, on the other hand, where normally one would expect single-phase occupation only, the signal seen may either come from *in situ* features still preserved like pits or the – rare – remains of house walls or floors, or it may in fact be caused by the leaching and displacement of magnetised anthropogenic material into the underlying geology. The latter effect has been observed on a number of sites where magnetometry was repeated after a couple of years of the continued destruction of the site by ploughing, and there still was an albeit weaker signal than in the original measurement even though core drilling showed that there were no more *in situ* layers left. For this reason, too, we will turn to soil chemistry, and in the long-run want to test if completely destroyed house features still show in the ground by their chemical fingerprint.

Systematic core drilling is applied by BORBAS as part of our second project phase since 2017 with the aim to better understand our findings in magnetometry, the stratigraphy of the sites, and in order to obtain sample material for radiocarbon dating. The *Stitz* drilling system used consists of percussion-, *i.e.* Cobra-driven extension rods and open window samplers designed to maintain stratigraphic integrity of the deposits of 8 cm, via 6 cm, down to 5 cm diameter, raised by a hydraulic lifting system. That is, unlike some other projects that use a much smaller number of closed cores, our aim is a closer coverage of the site, combined with the interpretation of the cores in the field (with the option of adapting our sampling strategy to the actual conditions), their description, including information on depth, texture, composition, colour as well as contacts between deposits, photographic documentation, and targeted sampling from distinct archaeological layers – initially for flotation only and in the meantime also for soil chemistry. The flotation of our soil samples and the determination of the sample material recovered for radiocarbon dating – preferably short-lived macro remains, but also charcoal, given the small sample volume and limited choice of suitable material in the stratigraphic sections of interest – is carried out either at the Laboratory for Archaeobotany, Department of Prehistoric Archaeology, University of Cologne, or at the Archaeobotany branch of *ArchaeoConnect* GmbH, Tübingen. The standard layout of our core drillings comprises at least a transect of drill holes all over the central, multi-layer part of our sites and throughout their ditch, typically with a spacing of 5 m, plus a representative number of additional drill holes in house anomalies of the outer settlement.

THE CENTRAL TELL PART OF THE SITE

Including the tentative reconstruction of its western section destroyed by a quarry, the tell part of Maklár-Baglyashalom is slightly oval, has an inner diameter of *c.* 90–116 m and covers an area of *c.* 0.7–0.8 ha.[14] It falls at the upper end of the – as such rather uniform – range of *c.* 0.2–0.6 ha attested on the majority of the Borsod sites,[15] but beyond mere size it is notable primarily for its good preservation and the evidence of internal settlement layout. Numerous (burnt) houses between *c.* 4–5 m broad *c.* 10–15 m long can be seen in the magnetometer data, most of them broadly orientated in a north-south direction (Fig. 4). Although the house anomalies are not always easily separated and possibly stem from different occupation levels (see below), most likely we see various phases of up to three rows extending in east-west direction with *c.* 6 to 7 houses per row. Two of these, thought to have been rather stable in spatial terms, though potentially with some shift along the predominant north-south axis, were standing rather close-by in the middle and north, plus a southern one separated by a small alley. However, in the latter section, in particular, there are also (house) anomalies of slightly different orientation, and it is possible that we see the condensed picture of several phases of a less clearly structured and less stable occupation in spatial terms.

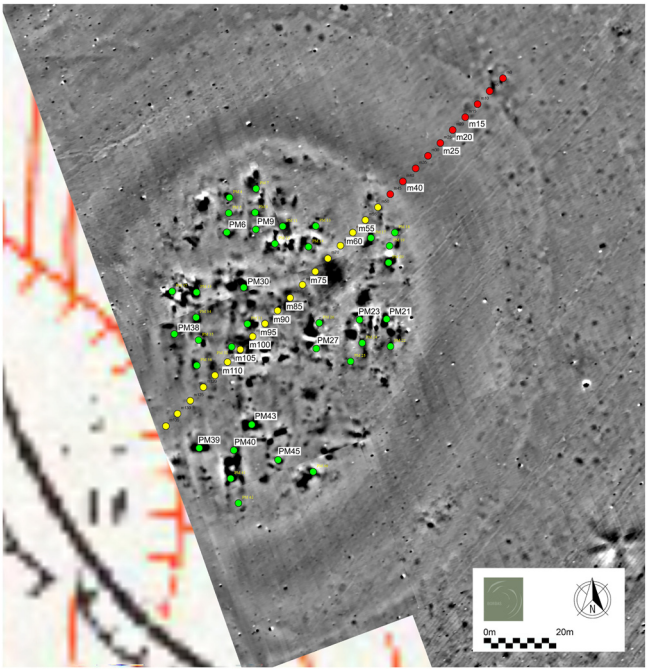

Fig. 4. Detail of the magnetometer data from Maklár-Baglyashalom (greyscale plot; data range [black to white]: ± 10 nT) with the 2021 transect of core drillings (yellow dots: mound; red dots: ditch) and additional cores targeting selected house anomalies (green dots); highlighted und numbered are the cores from which radiocarbon dates are available

[14] Kienlin et al. (2018b) 205–211.

[15] Kienlin (2018) 55–57.

Houses arranged in parallel order, as deduced from magnetometry for Maklár-Baglyashalom, often located at distances down to just some 1–2 m, have also been identified in the excavation at nearby Füzesabony-Öregdomb[16] and more recently in Borsodivánka-Marhajárás.[17] A similar pattern may be evident in the magnetometry of Mezőcsát-Laposhalom most likely with two lines of houses only.[18] Thus, while details clearly differ, such as the number of rows of houses (potentially two to three) or their orientation (from broadly north/south to north-west/south-east), there is a clear pattern emerging. We may generally expect a fairly standardised settlement layout on the central multi-layer part of our Borsod sites with houses of broadly the same size throughout and no indications of in any way 'special' or 'elite' buildings. However, this is neither to claim that tell-living would have been in any way 'static', nor that it was by necessity densely packed as perhaps implied by magnetometry. For example, in the northern section of Mezőcsát there may have been a larger open area devoid of intense occupation, and it is important always to recall that not all the anomalies seen must stem from houses standing at the same time. We have to take into account that any tell is a dynamic whole, composed of houses and households each with their own trajectory. In fact, there is good evidence, from the Borsod region and beyond, of on-tell plots temporarily abandoned. Any such open space may have served as an additional activity zone for adjacent households until the next house generation was built in its place.[19] It may have become a matter of conflicting claims; or it may have been used for dumping all kinds of debris and waste as was evidently the case at some stage at Borsodivánka-Marhajárás.[20]

The results of core drilling

For a better understanding of these dynamics and the temporal depth of occupation, short of a full excavation systematic core drillings combined to radiocarbon dating of organic samples obtained from the cores are the most viable way. Accordingly, in line with our BORBAS standard protocol[21] at Maklár-Baglyashalom a transect of core drillings was carried in 2021, extending through the multi-layer tell part of the site and the surrounding ditch at a spacing of 5 m (Fig. 4 [yellow and red dots]). Additionally, in this case further core drillings took place targeting selected house anomalies in an attempt to achieve a better spatial coverage of on-tell occupation through time (Fig. 4 [green dots]).

In terms of general occupation history, the resulting profile shows that the mound in its centre is preserved up to a height of slightly more than 2 m and in some sections still features up to 6 or 7 settlement phases (Fig. 5) that developed over a period of at least 400 radiocarbon years (for discussion see below). More specifically, 'settlement remains' as seen in our cores is a composite category mainly comprising two distinct elements, namely presumable household waste or settlement debris on the one hand and genuine 'architectural' remains – counted as distinct settlement 'phases' above – on the other.

Under the first heading, there are distinct blotchy layers of debris, everything from a couple of centimeters to occasionally more than one meter in thickness, which may either occur on top of formal floor levels (*i.e.* inside houses) or – in the absence of a corresponding floor – appear to have been deposited in the vicinity of houses (*e.g.* Fig. 6, cores m85 [meters 2 and 3], m100 [meter 3] and m105 [meter 3]). Along the stratigraphic sequence these anthropogenic layers are thought to have come on us largely where they had originally been deposited during Bronze Age occupation, *i.e.* '*in situ*', and their thickness clearly speaks for a certain intensity and/or duration of settlement activity that allowed the accumulation of so much material. Often these layers are of a brown-greyish, 'ashy' hue, similar to the debitage known from the excavation of on-tell houses.[22] Of a slightly different texture and hue, this material can also be found, however, on top of the sequence in core drilling and on the surface in some sections of Maklár-Baglyashalom itself and elsewhere.[23] In this position it is thought to be typically redeposited due to post-depositional changes such as erosion or ploughing (*e.g.* Fig. 6, cores m85 [meter 1], m100 [meter 1] and m105 [meter 1]). While the exact formation of this 'ashy' material is still unclear, it is thought to involve decomposed vegetal household waste and organic 'architectural' remains such as reed or straw for floor coverings, the branches and twigs used in wattle and daub construction or reed used for roofing *etc.*[24] Household waste and debris in this sense may have slowly built up during the lifetime of (adjacent) households, or alternatively may show indications of distinct dumping events with larger chunks of burnt daub, charcoal or pottery deposited in a patchy, banded layer context.

In contrast, genuine architectural remains include levelling layers and/or proper floors directly related to the construction of houses, as well as the occasional reddish layers of burnt daub *etc.* from the destruction of a building by fire followed by the levelling and *in situ* preservation of (a part of) its burnt remains. In this group, we find clearly discernible layers of a couple of centimeters only up to occasionally *c.* 10–20 cm thickness and of varying colour and texture (*e.g.* Fig. 6, cores m85 [meters 2 and 3], m90 [meter 1], m95 [meter 2] and m105 [meters 2 and 3]).

[16] Szathmári (1992) 135–136; Szathmári et al. (2019) 301–302.

[17] Fischl and Kienlin (2024) 243–251; Fischl et al. (2025).

[18] Kienlin et al. (2018b) 213–219.

[19] E.g. Sørensen and Vicze (2013) 164–176; Vicze and Sørensen (2023) 185–187.

[20] E.g. Fischl and Kienlin (2024) 242–243.

[21] Kienlin et al. (2018a); Kienlin (2020); Kienlin et al. (in press).

[22] E.g. Borsodivánka-Marhajárás or Toboliu-Dâmbu Zănăcanului in nearby western Romania; Fischl and Kienlin (2024) 240–251; Lie et al. (2019) 358–363; Lie (2024) 294–301.

[23] E.g. Tard-Tatárdomb; Kienlin et al. (2018b) 241, Fig. III-74.

[24] Lie (2021) 257–258.

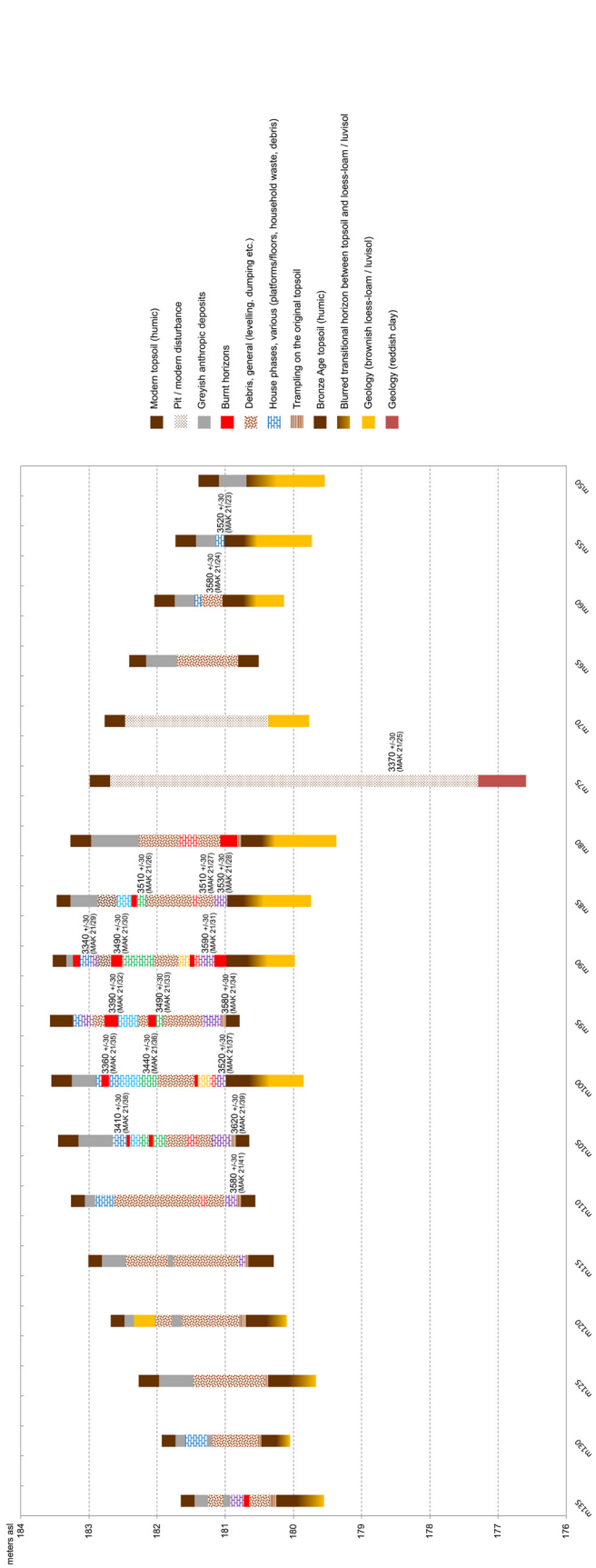

Fig. 5. Maklár-Baglyashalom. Core drilling profile through the tell section of the site with the schematised representation of the stratigraphy and the uncalibrated radiocarbon dates in their context

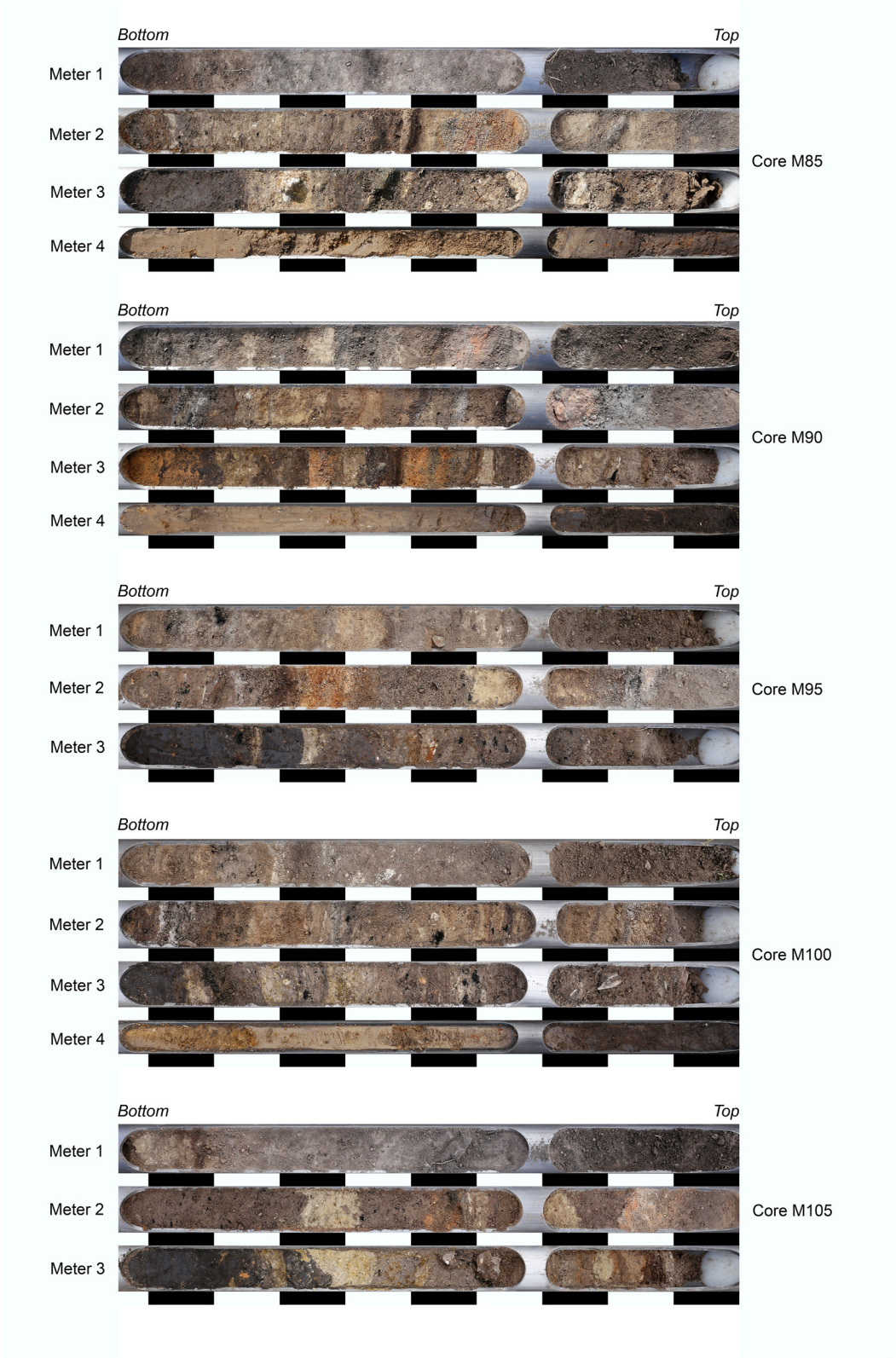

Fig. 6. Cores m85, m90, m95, m100 and m105 from the transect across the central tell section of the site

The most pronounced floor levels exhibit a brown or lighter brownish yellow hue. Unlike debris deposited inside or in the vicinity of nearby houses (see above), 'floors' in this sense are more homogeneous, typically without much evidence of human impact such as pottery or daub (with the notable exception of trampling on their top), and of clayey-loamy texture, *i.e.* they give the impression of a careful choice of the building material used, its deliberate preparation and application to level out the uneven ground ('levelling layers') and/or as a substructure or base plate (proper 'floors') of the houses built on top. Excavations show that such levelling layers, platforms or floors may not only occur inside or underneath houses themselves, but may also extend outside under the house eaves and/or are found covering the small alleys between contemporaneous houses.[25] However, in any case they have a clear spatial and constructive relationship to the architectural remains of (neighbouring) houses. The same, of course, is true for the ashy layers and at times quite massive packages of burnt daub indicative of houses destroyed by fire and levelled before a new building came to be erected in their place (*e.g.* Fig. 6, cores m85 [meter 2], m90 [meters 1, 2 and 3] and m95 [meter 2]).

While our core drilling data obviously does not lend itself to any detailed architectural reconstruction, both the apparent variability in the 'levelling layers' or 'floors' encountered, and the good overall match of what is tentatively identified as house remains with the evidence from excavated sites are noteworthy and require some comments. At Borsodivánka-Marhajárás, some 19 km distance across the Borsod plain and partly excavated in recent years, the use of some kind of carefully prepared substructure – similar to what is suggested here for Maklár-Baglyashalom – was the rule throughout the sequence.[26] These platforms and floor levels of varying thickness clearly show in the profiles of the excavation and could also be detected in core drillings carried out behind them as part of a comparison of methods.[27] The same holds true for the outer settlement of Bükkábrány-Kálvária where, even though the micromorphological examination is still pending, the use of some kind of clayey-loamy floors is evident from the small-scale excavation and core drilling in a multi-phase house in the site's outer settlement.[28]

However, beyond general consistency in building practices there is also variability that may relate to the specific environmental setting of individual sites down to specific household traditions, and that may be difficult to detect by core drilling alone. Thus, for example, presumably in order to stabilise the ground and create a clean surface for house building, construction at Borsodivánka, located in a swampy area of the lowlands, often began with the deposition of plant materials such as reed still visible as distinct phytolith layers in micromorphology. This is a feature without parallels so far at Maklár-Baglyashalom in the foothill zone and lacking excavated floor sequences. Variability is also evident at Borsodivánka itself, for in the course of time and even between contemporaneous houses there are distinct differences in architectural solutions. For example, the base material used for floor levels and/or its preparation, *e.g.* by adding temper, can be different. Thus, the most common floor at Borsodivánka is the rather thick platform mentioned above composed of the local loamy fluvial sediment and poorly sorted sand. However, early in the sequence there is also evidence of a different approach and the use of finer sediment for thinner, chaff-tempered floors.[29]

Similar findings come from Toboliu-Dâmbu Zănăcanului in nearby Romania, where for the first time it is possible to systematically compare on-tell and off-tell building practices.[30] At this site, all on-tell houses had a carefully built platform made of yellow silty clay,[31] a technique only found in some houses of the huge outer settlement of this tell, *e.g.* the uppermost house excavated in Trenches 6/7, and two other houses that have only been investigated by core drilling so far.[32] In contrast, other houses in the outer part of the site had more 'informal' so-called 'earthen floors' made of trampled sediment. Such systematic differences in architectural practices like the presence or absence of carefully built platforms at the beginning of a house clearly raise the question of different household traditions in the various parts of such sites.[33] It is telling in this respect, that at Toboliu even when a built platform occurs off-tell, the details and the timing of its construction were different from those of the on-tell platforms. For in the outer settlement post-holes cutting through it indicate that the platform was built before the construction of the walls, while all on-tell platforms were built only after the walls of the house were already standing.[34] We must also be aware, however, of more or less contingent variability in architectural solutions – at least such beyond our archaeological understanding and also potentially introducing a bias when working with small-scale excavations or core drillings only – such as when individual rooms in the same house differ in the kind of substructure or platform used, or if during the various renovation phases of a house new floors were applied.

Turning back to Maklár-Baglyashalom, in spatial terms it is interesting to see that proper architectural remains as defined above at the beginning of occupation can only be found right in the centre of the subsequent tell (Fig. 7). Thus, in the profile shown in Fig. 5 there are *in situ* remains of

[25] E.g. Borsodivánka-Marhajárás; Fischl and Kienlin (2024) 243–245; Fischl et al. (2025).

[26] Fischl and Kienlin (2024) 240–251; Kovács et al. (2024) 9–11; Fischl et al. (2025).

[27] Kienlin et al. (in press) Fig. 13.

[28] Kienlin et al. (in press) Fig. 14.

[29] Fischl and Kienlin (2024) 248; Kovács et al. (2024) 9–11.

[30] Găvan et al. (2024).

[31] E.g. Lie (2024) 295–301.

[32] Găvan et al. (2024) 334–340; Lie et al. (2024) 723–726.

[33] Găvan et al. (2024) 345–346.

[34] Lie (2021) 257, 261.

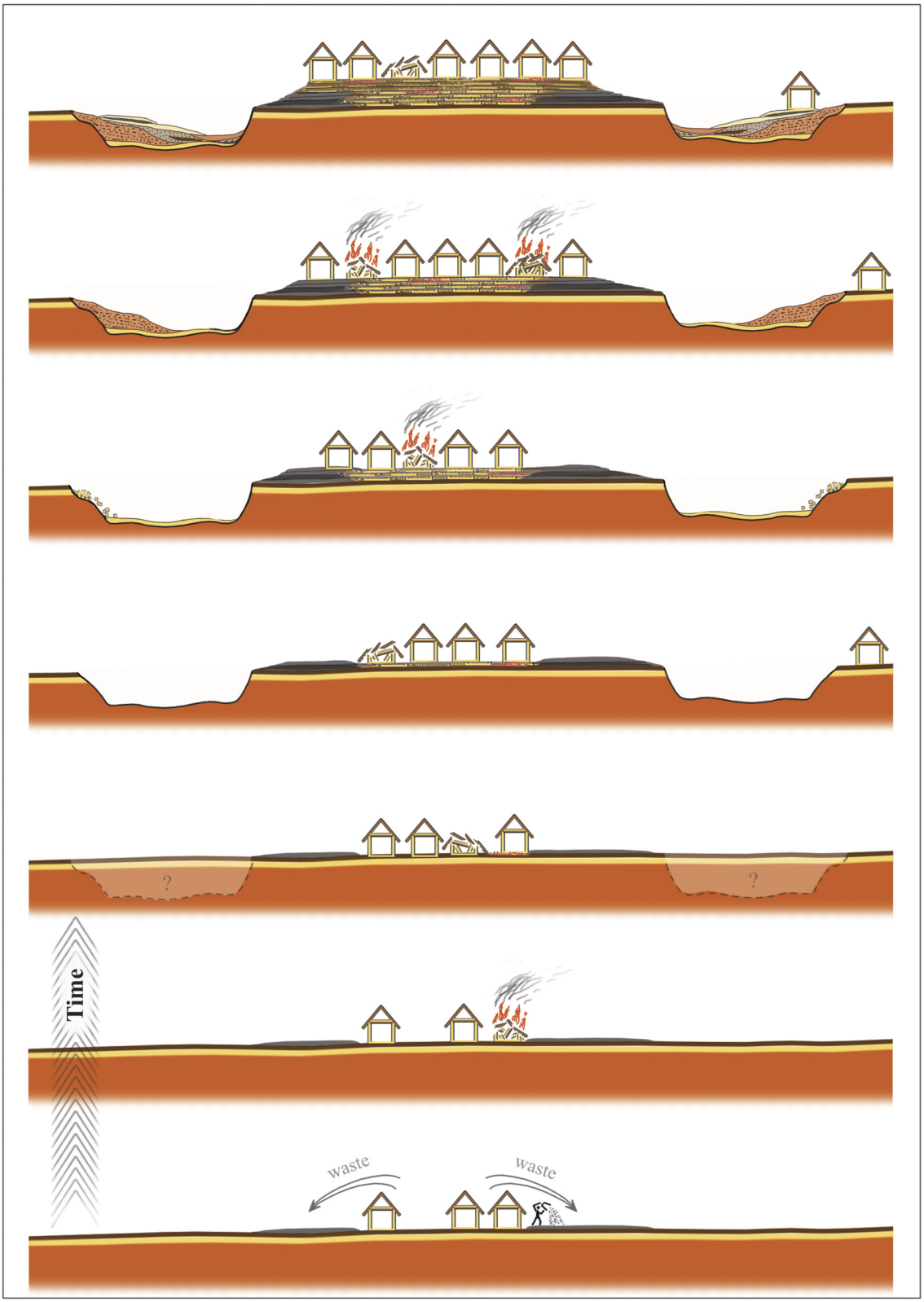

Fig. 7. Reconstruction of the assumed development of the inner multi-layered part of the settlement at Maklár-Baglyashalom (drawing by László Gucsi)

'phase 1' buildings only from core m115 in the south-west through to at least core m80 in the north-east.[35] This finding is confirmed by a mapping of this phase based on the additional cores from the mound beyond the transect that shows levelling layers, platforms and/or proper floors only underneath a part of the middle and northern rows of (later) houses visible in magnetometry (Fig. 8, yellow dots). As such, of course, this 'phase 1' must not be mistaken as a snapshot or the exact moment when the future tell was founded, for both the radiocarbon dates discussed below and the presence of trampling underneath some of these early houses (*e.g.* Fig. 5, cores m95 and m105) indicate temporal depth. So not all 'phase 1' houses encountered, including two fire incidents at the beginning of the sequence in cores m80 and m90, would have been standing at the same time. It is evident, however, that they bring us as close to the beginning of settlement activity at Baglyashalom as we can get, and that these beginnings took place on a relatively limited area underneath the subsequent tell only.

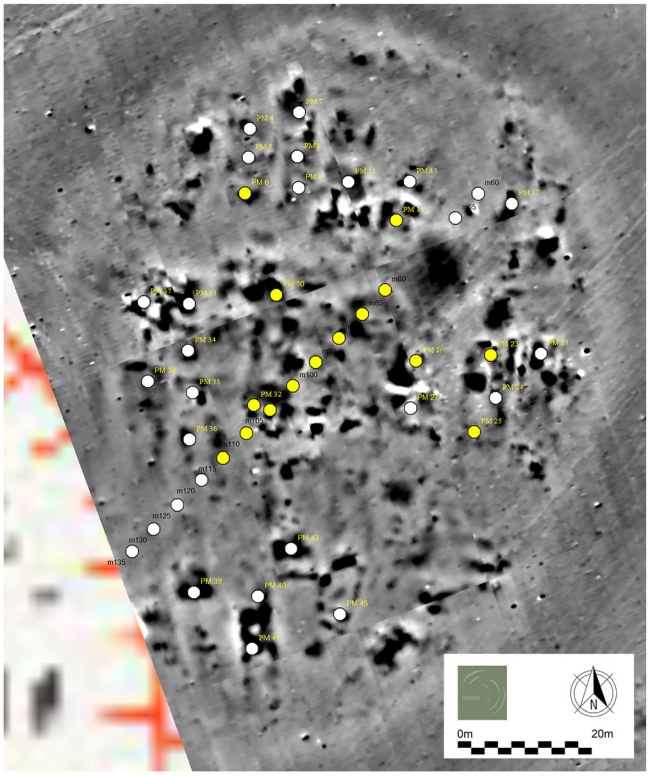

Fig. 8. Maklár-Baglyashalom. Mapping of the occurrence of 'phase 1' settlement remains in the original core area of Maklár-Baglyashalom (yellow dots: *in situ* remains of platforms and floors; white dots: waste and debris deposited outside the core area) (greyscale plot of the magnetometer data; data range [black to white]: ± 10 nT)

Beyond the original core area thus defined, we repeatedly see trampling (*e.g.* Fig. 5, cores m120 and m130), *i.e.* the upper few centimeters of the Bronze Age topsoil mechanically compressed and with human impact such as small, rounded pieces of daub, pottery and charcoal, covered by general household waste and debris that was deposited outside nearby houses of the original 'centre' (Fig. 8, white dots). But it is obvious that for some time to come no formal buildings were erected in this zone, while on the inside we see the continuous, gradual building up of proper settlement layers from this early point onwards. Eventually, this core area featured up to 6 or 7 superimposed settlement phases (from about core m85 to m105 in the profile Fig. 5), and only at some later stage in the sequence did occupation actually extend 'outwards' (Fig. 7) when houses began to be erected on top of the debris of previous generations that had accumulated along the edge of the slowly growing mound (*e.g.* Fig. 5, cores m60, m130 and m135). It is these phases that are visible in magnetometry. And it is likely that the less clearly structured layout of occupation in the southern part of the tell noted above is related to the fact that this section was only settled somewhat later, and with less strict norms and traditions concerning the plots occupied than in the original core area. Only then did the mound of Baglyashalom reach its final size of *c.* 0.7–0.8 ha and did feature the up to three potential rows of *c.* 6 to 7 houses discussed above.

Absolute chronology: the results of on-tell radiocarbon dating

In terms of radiocarbon dates, based on a series of 29 datings from the transect (18) and the surrounding cores on the mound (11) the development of the tell at Maklár-Baglyashalom just outlined comprised a period of at least 400 years, from broadly the 20th to at least the 17th century cal BC (Fig. 9 and Table 1).[36] The two oldest dates from a platform early in the sequence in core PM30 dated to *c.* 2141–1951 cal BC (95.4%; sample no. MAK 21/47: 3670 BP ± 30) and from a trampling layer on top of the old A horizon underneath the first house in core m105 at *c.* 2123–1891 cal BC (95.4 %; sample no. MAK 21/39: 3620 BP ± 30) may even indicate an earlier beginning of settlement activity before 2000 cal BC. From both the stratigraphic sequence and the radiocarbon dates it is evident that we can expect a fairly continuous occupation – if not on the level of individual house plots, that may always show discontinuities, then at least at the level of the growing settlement mound as a whole. In contrast, as usual on tells the end of occupation is much

[35]The two subsequent cores m75 and m70 come from a massive, presumably modern disturbance almost 6 m deep in core m75. This feature is visible both in magnetometry and aerial photography from 1978, where it shows as an interruption of the (eroded) greyish anthropogenic material that covers the surface of the mound – a clear indication that it is a modern disturbance, perhaps in connection to the quarry that partly destroyed the western edge of the tell. It is unclear, therefore, how far exactly 'phase 1' occupation extended into this direction (but see the mapping in Fig. 8 below).

[36]All samples in this paper were dated at Beta Analytic, Miami (FL), USA. All radiocarbon dates used in this paper were calibrated in OxCal v. 4.4.4 software, based on the IntCal20 atmospheric curve.

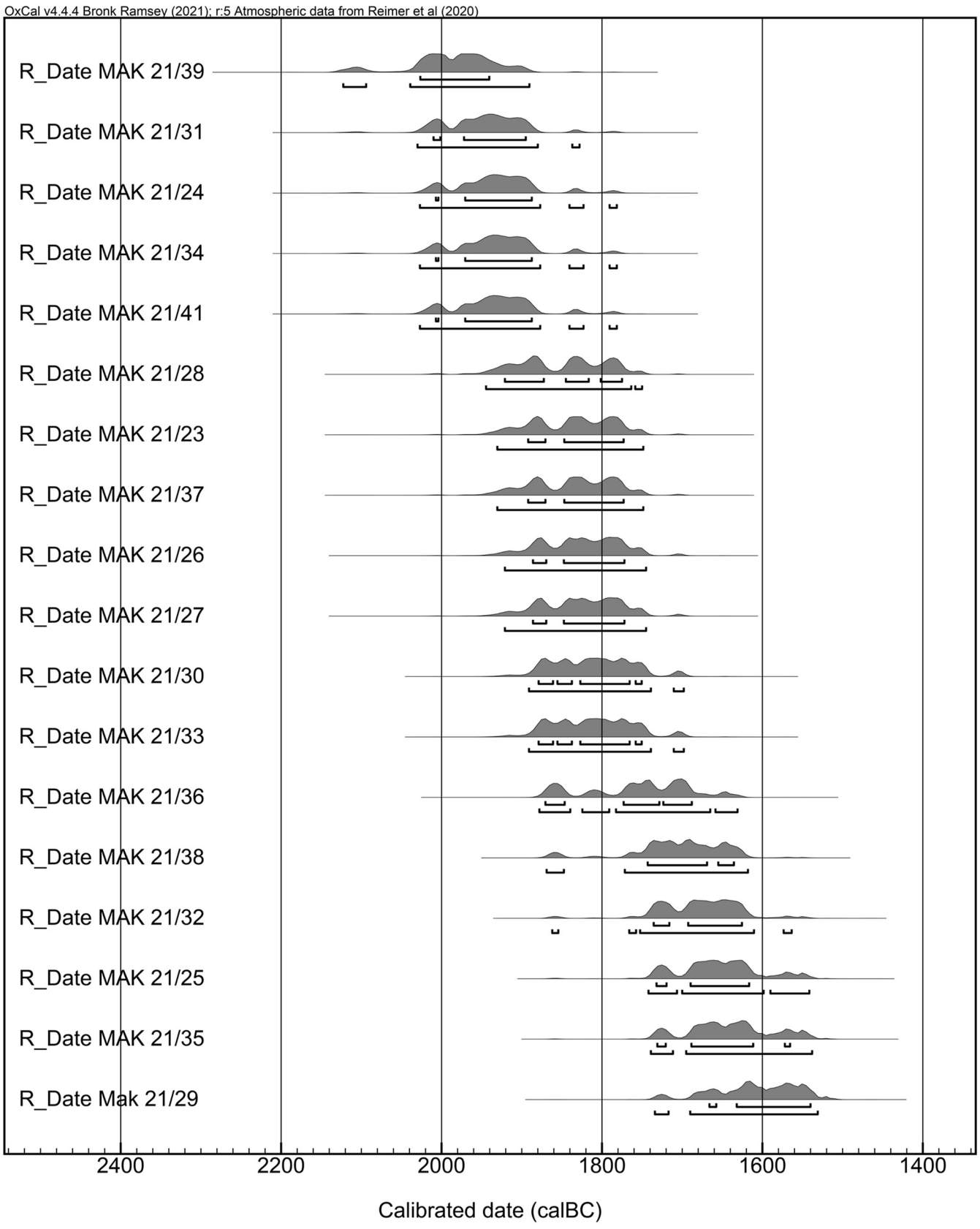

Fig. 9. Maklár-Baglyashalom. The calibrated radiocarbon dates from the core drillings on the tell, sorted by radiocarbon age (dates from transect cores)

(Figure 9 continued on next page)

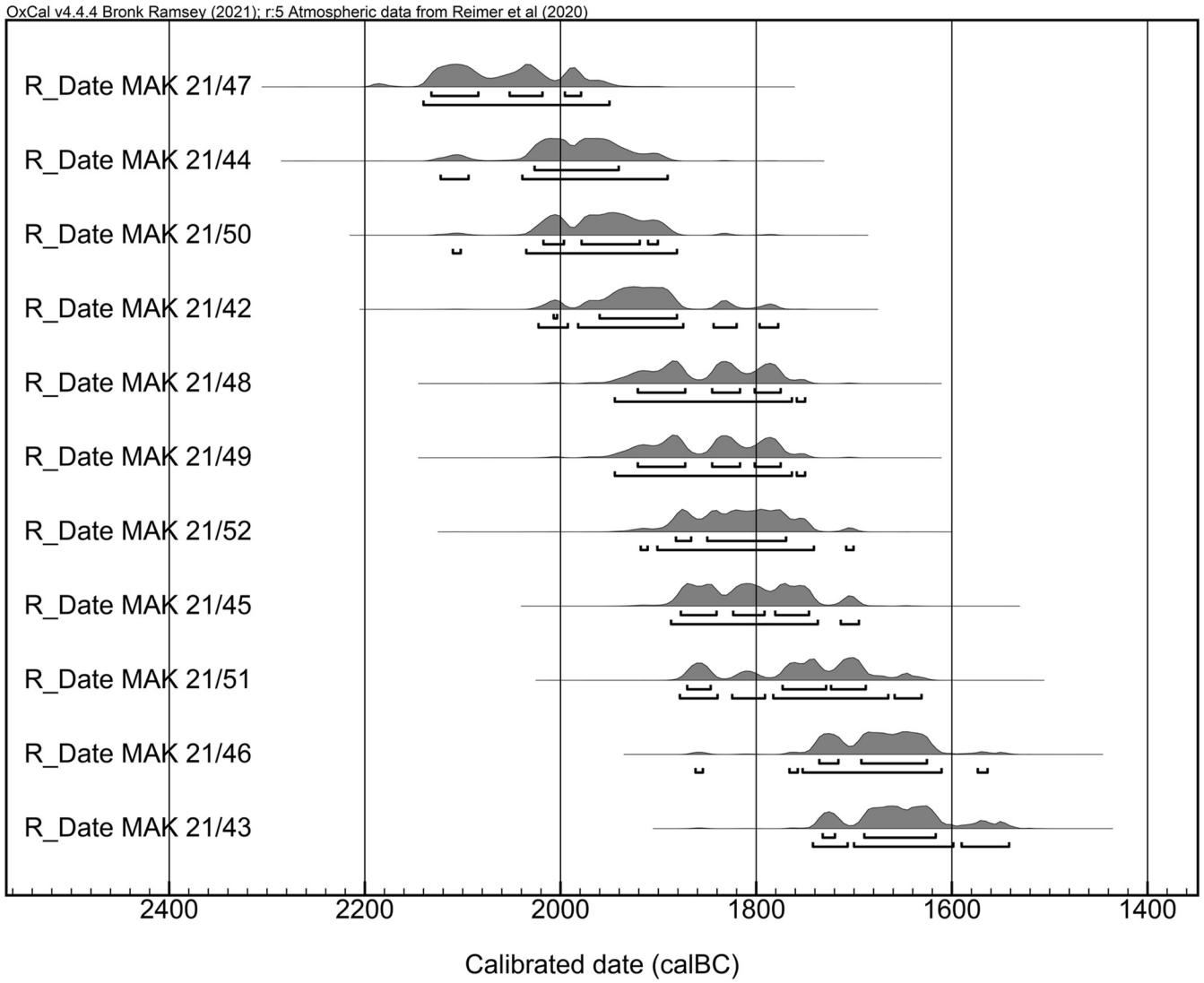

Fig. 9. Continued (dates from additional cores outside the transect)

more difficult to determine because it is unknown how much substance was lost due to several thousand years of erosion, and how close to the original end of the stratigraphic sequence the 'final' layers dated actually were. Thus, the two youngest dates from a burnt horizon close to the end of the *in situ* sequence of core m100 at c. 1740–1539 cal BC (95.4%; sample no. MAK 21/35: 3360 BP ± 30) and from debris on top of a floor late in the surviving sequence in core m90 dated to *c.* 1735–1532 cal BC (95.4 %; sample no. MAK 21/29: 3340 BP ± 30) may only give an approximation of the actual abandonment of the site (see also below on the corresponding evidence from the ditch and outer settlement).

As such, the dates obtained from Baglyashalom are fairly consistent and show a good overall match with the stratigraphic sequence if one takes into account their spatial position in a growing and dynamic mound (Fig. 7). Thus, starting with the transect through the tell (Fig. 5 and Table 1), four of the five oldest 'phase 1' dates actually come from trampling layers on top of the old A horizon (core nos. m95 [sample no. 21/34] and m105 [sample no. MAK 21/39]) or from platforms and house floors at the beginning or at least very early in the stratigraphic sequence of core nos. m90 (sample no. MAK 21/31) and m110 (sample no. MAK 21/41) in the centre of the mound. A fifth one, also consistent in absolute terms with this early occupation phase, comes from debris deposited on the old topsoil in core m60 on the edge of the area that was initially settled (sample no. MAK 21/24). In contrast, sample no. MAK 21/28 from a potential renewal of the first floor in core m85 has yielded a radiocarbon date on the transition to the next, 'middle' horizon, too young at first sight for its stratigraphic position (but in good accordance with the younger date of sample no. MAK 21/27 from a layer above it), and this is also true for sample no. MAK 21/37 related to the first platform of the sequence in core m100. Such findings may

Table 1. Maklár-Baglyashalom. List of the C14 dates from the tell with contextual information, sorted by radiocarbon age

Sample no.	Lab. no.	BP	cal BC	Sample material	Context	
Mound, transect						
MAK 21/39	Beta - 671424	3,620 ± 30	2123–1891cal BC (95.4%)	*Triticum monococcum*	core m105, 273–280 cm	trampling on top of old A horizon
MAK 21/31	Beta - 671416	3,590 ± 30	2031–1829 cal BC (95.4%)	Cerealia	core m90, 267–282 cm	first platform/floor in sequence (incl. renewal phases)
MAK 21/24	Beta - 671409	3,580 ± 30	2028–1782 cal BC (95.4%)	Cerealia	core m60, 70–90 cm	debris on top of old A horizon, edge of original core area
MAK 21/34	Beta - 671419	3,580 ± 30	2028–1782 cal BC (95.4%)	*Triticum monococcum*	core m95, 270–280 cm	trampling layer on top of old A horizon
MAK 21/41	Beta - 671426	3,580 ± 30	2028–1782 cal BC (95.4%)	Pisum	core m110, 268–273 cm	first floor in sequence
MAK 21/28	Beta - 671413	3,530 ± 30	1945–1751cal BC (95.4%)	charcoal	core m85, 263–266 cm	renewal of first platform/floor in sequence
MAK 21/23	Beta - 671408	3,520 ± 30	1931–1749 cal BC (95.4%)	Cerealia	core m55, 61–69 cm	first platform/floor in sequence, edge of mound
MAK 21/37	Beta - 671422	3,520 ± 30	1931–1749 cal BC (95.4%)	Emmer	core m100, 276–286 cm	debris on first platform in sequence
MAK 21/26	Beta - 671411	3,510 ± 30	1922–1746 cal BC (95.4%)	Lens	core m85, 147–160 cm	levelling/platform, middle of sequence
MAK 21/27	Beta - 671412	3,510 ± 30	1922–1746 cal BC (95.4%)	Triticum	core m85, 240–255 cm	dumping or pit, middle of sequence
MAK 21/30	Beta - 671415	3,490 ± 30	1892–1699 cal BC (95.4%)	Cerealia	core m90, 116–130 cm	burnt horizon/house, middle of sequence
MAK 21/33	Beta - 671418	3,490 ± 30	1892–1699 cal BC (95.4%)	charcoal	core m95, 167–176 cm	floor of burnt house, middle of sequence
MAK 21/36	Beta - 671421	3,440 ± 30	1879–1632 cal BC (95.4%)	charcoal	core m100, 150–167 cm	platform with debris, middle of sequence
MAK 21/38	Beta - 671423	3,410 ± 30	1870–1619 cal BC (95.4%)	bone	core m105, 82–93 cm	platform/floor, late in sequence
MAK 21/32	Beta - 671417	3,390 ± 30	1863–1564 cal BC (95.4%)	charcoal	core m95, 76–87 cm	ashy layer/burnt horizon, upper part of sequence
MAK 21/25	Beta - 671410	3,370 ± 30	1743–1542 cal BC (95.4%)	bone	core m75, 460–480 cm	inhomogeneous infill of modern disturbance/shaft
MAK 21/35	Beta - 671420	3,360 ± 30	1740–1539 cal BC (95.4%)	charcoal	core m100, 73–84 cm	ashy layer/burnt horizon, late in sequence
Mak 21/29	Beta - 671414	3,340 ± 30	1735–1532 cal BC (95.4%)	Hordeum frag., Polygonum	core m90, 55–66 cm	platform with debris, late in sequence
Mound, outside transect						
MAK 21/47	Beta-753962	3,670 ± 30	2141–1951 cal BC (95.4%)	charcoal	core PM30, 258–267 cm	platform/floor (incl. renewal phases), early in sequence
MAK 21/44	Beta-753959	3,620 ± 30	2123–1891 cal BC (95.4%)	Cerealia indet.	core PM21, 46–53 cm	debris/dumping of burnt material on edge of original core area
MAK 21/50	Beta-753965	3,600 ± 30	2111–1882 cal BC (95.4%)	Triticum dic./monoc. (HSB)	core PM40, 158–164 cm	dumping on edge of original core area
MAK 21/42	Beta-753957	3,570 ± 30	2023–1778 cal BC (95.4%)	*Triticum dicoccon*	core PM6, 175–190 cm	debris in top of first platform/ floor in sequence
MAK 21/48	Beta-753963	3,530 ± 30				

(continued)

Table 1. Continued

Sample no.	Lab. no.	BP	cal BC	Sample material	Context	
			1945–1751 cal BC (95.4%)	Cerealia indet. (Fragm.)	core PM38, 158–168 cm	tramping/debris on top of old A horizon on edge of original core area
MAK 21/49	Beta-753964	3,530 ± 30	1945–1751 cal BC (95.4%)	charcoal	core PM39, 39–47 cm	platform/floor, upper part of sequence
MAK 21/52	Beta-753967	3,500 ± 30	1919–1701 cal BC (95.4%)	Cerealia indet. (Fragm.)	core PM45, 65–78 cm	debris/burnt horizon, upper part of sequence
MAK 21/45	Beta-753960	3,480 ± 30	1888–1696 cal BC (95.4%)	Cerealia indet. (Fragm.)	core PM23, 50–60 cm	platform, upper part of sequence
MAK 21/51	Beta-753966	3,440 ± 30	1879–1632 cal BC (95.4%)	charcoal	core PM43, 47–50 cm	ashy layer/burnt horizon, upper part of sequence
MAK 21/46	Beta-753961	3,390 ± 30	1863–1564 cal BC (95.4%)	Cerealia indet. (Fragm.)	core PM27, 40–50 cm	debris/burnt horizon, end of sequence
MAK 21/43	Beta-753958	3,370 ± 30	1743–1542 cal BC (95.4%)	*Prunus insititia*/ spinosa	core PM9, 35–46 cm	debris/burnt horizon, end of sequence

simply be due to the poor resolution of radiocarbon dates as such, or to intrusive sample material due to (Bronze Age) human activity in an intensively settled area or subsequent bioturbation. From a more systematic perspective, however, it is important to recall that no tell ever consists of continuous layers throughout, and that – with certain exceptions – there are no 'universal' phases or horizons that affected the entire settlement at exactly the same time. Hence, in chronological terms the dates from sample nos. MAK 21/28 and 21/37 may simply be an indication that the earliest occupation at Baglyashalom was both asynchronous and of a certain duration. Alternatively, from a spatial perspective, we have to reckon with a discontinuous building up of layers and at a different pace on adjacent plots. Hence, in some places younger material may still have been deposited on the old topsoil, while elsewhere it had long since been covered and sealed by previous settlement activity.

Next in the sequence, there is a couple of dates that both in radiocarbon terms and with regard to their stratigraphic position represent some 'middle' horizon, during which the initial core area was slowly growing into a mound and eventually occupation expanded outwards. The latter development is nicely illustrated by sample no. MAK 21/23 from the platform of a house right on top of the old A horizon in core m55 – situated on the previously unsettled edge of the growing mound (elsewhere covered by debris from the inside as seen in nearby core m60) and with a radiocarbon date clearly younger than the first beginnings of the settlement further inside. Just like this previous phase, however, the 'middle' horizon as well in the interior represents a complex stratigraphic succession of several superimposed houses or households, each potentially with its own 'logic' and succession of repeated renewals that unfolded over an extended period of time as seen in the corresponding radiocarbon dates.

Finally, from the transect there are four radiocarbon dates representing the youngest settlement horizon preserved *in situ* on the tell of Baglyashalom.[37] All of them come from well-defined stratigraphic contexts late in the respective core's sequence, be it the final platform itself in core m105 (sample no. MAK 21/38), the debris of burnt houses late in the sequence of cores m95 and m100 (sample nos. MAK 21/32 and 21/35) or the household waste and debris deposited on top of a late platform in core m90 (sample no. MAK 21/29). In this group, it is nicely confirmed what has been said above on the dynamics of social life on tells and the potentially discontinuous building up of occupation layers: All the radiocarbon dates in this group are clearly younger and separated from those of the previous 'middle horizon'. However, at only slightly different depths just below the modern surface, they also expose clear temporal depth thus highlighting the complexities of building activities and the 'messiness' of household life during the last phases of the settlement that survived for us to study.

This picture is confirmed and enriched in terms of spatial coverage by the dates from the additional cores taken outside the central transect (Fig. 4 and Table 1). In this group there are four more dates that belong to 'phase 1' as deduced above, among them the oldest date so far from the mound at all (see already above) from a platform early in the stratigraphic sequence of core PM30 (sample no.

[37]For the sake of completeness, in this group we include sample no. MAK 21/25 from the infill of what is thought a massive modern disturbance (see above). This sample has no meaningful archaeological context. As such, it is not surprising that it yielded a Bronze Age date, since any material excavated on the (presumably modern) occasion of digging this shaft (or what whatever else) and subsequently filled back in again would obviously have come from the remains of the Bronze Age tell.

MAK 21/47). In addition, from the original core area of settlement activity at Baglyashalom there is an early date from debris on top of the first platform in core PM6 (sample no. 21/42). Further outside towards the edge of the subsequent mound the early deposition and dumping of debris and household remains – as opposed to proper architecture during this phase – is confirmed by two early dates from corresponding 'debris' layers in cores PM21 and PM40 (sample nos. MAK 21/44 and 21/50). In contrast, sample no. 21/48 from a similar context – trampling or debris on top of the old A horizon in core PM38 – yielded a distinctly younger date, identical actually with sample no. 21/28 from the original core discussed above, and arguably the same interpretation applies: On the edge of the mound as well we may expect a discontinuous initial building up of layers. It seems that not the entire perimeter of the original core area was covered with debris from inside in equal measure right from the start.

Among the four somewhat younger dates, thought to correspond to the 'middle' horizon discussed above, there is sample no. MAK 21/45 from the uppermost preserved platform in core PM23 on the eastern edge of the initial core area. The rather early end of occupation in this core may be related to erosion and loss of younger layers on the slope of the mound in this area. The other three dates in this group from sample nos. MAK 21/49, 21/51 and 21/52 all come from towards the top of cores taken from the southern part of the tell (core nos. PM39, PM43 and PM45). They nicely confirm the above interpretation that this area was only settled – on top of debris previously deposited in this area – as occupation expanded outward from the original core during some advanced 'middle' phase. In contrast, the two additional dates in this group representing the 'end' of occupation (sample nos. MAK 21/43 and MAK 21/46), do not really contribute to the absolute dating of the abandonment of the site. At the end of the sequence of cores PM9 and PM27 respectively, they both come from burnt debris thought related to the destruction by fire of the houses seen in their place in magnetometry. However, their absolute dates are somewhat older than the youngest ones obtained from the transect above. Given erosion and recent agricultural use of the tell, none of them, of course, necessarily reflects anything like the absolute end of settlement activity and human presence on the mound of Maklár-Baglyashalom.

THE DITCH ENCLOSING THE CENTRAL TELL PART OF THE SITE

Apart from its unclear and possibly somewhat younger beginnings relative to the initial cluster of houses in its interior, the ditch surrounding the tell at Maklár-Baglyashalom is also of interest because of a later modification on its outside that has remained unrecognised so far.

Based on the evidence from magnetometry and the corresponding depression that is still visible on the surface, in our original publication the width of the ditch was given as *c.* 14–18 m, and since there are no overlying anomalies the still correct conclusion was drawn that (this part of) the enclosure was gradually infilled after the end of occupation.[38] In this interpretation it was assumed that a faint whitish (*i.e.* slightly negative) anomaly *c.* 15–17 m wide which runs along the outside of the ditch (Fig. 4) originates from cultural layers building up in this section of the outer settlement or at least is due to anthropogenic changes in soil chemistry due to rather intense use and occupation of this area.

The results of core drilling

In the meantime, at least on the inside of the profile (looking outward from the tell) acquired by core drilling in 2021 our previous interpretation is in fact confirmed (Fig. 10). For from core m40 through to core m25 there are up to 2.9 m of the slow final infill rich in humic material (Fig. 11, core m40 [meters 1–3]) that is typically seen on the Borsod sites and corresponds with the slightly positive anomaly caused by the ditches in magnetometry.[39] This material was gradually washed into the ditch and deposited there after the settlement had been abandoned. At Maklár just as elsewhere it is found on top of previous layers or infill phases that either had slowly accumulated in the ditch for a longer time before or may represent more distinct dumping 'events' (for both see Fig. 11, core m40 [meters 4–6]). In total, then, the ditch originally was up to *c.* 5.8 m deep from the current surface.

In marked contrast to this sequence, that one would expect, on the outside of the ditch at Maklár-Baglyashalom, starting in core m25 and much more massive in cores m20 and m15, there is evidence of rapid dumping on a large scale (Fig. 10). The material used for this is patchy, in some sections features a lot of human impact and is often based on the reddish clay from the underlying geology that must have been excavated and deposited on the outside upon the construction of the original ditch (*e.g.* Fig. 11, cores m15 [meters 4–5] and m20 [meters 4–5]).[40] This layer or rather package of up to *c.* 3 m thickness most likely represents an intentional backfill into the original ditch – a somewhat surprising finding, first encountered and discussed in detail at Emőd-Nagyhalom a couple of years ago.[41] So far then, at least on these two Borsod sites there is unambiguous evidence that the enclosure visible both in magnetometry and on the surface had a much more substantial early phase that was partly backfilled from the outside. At Maklár this

[38] In the west a section of the ditch and a small part of the tell were destroyed by a quarry; however, from its preserved course it is thought very likely that the ditch originally enclosed the entire inner part of the site; Kienlin et al. (2018b) 205.

[39] For further examples see Kienlin (2020) 110–131.

[40] For direct *in situ* evidence of the disposal of the material excavated from the ditch towards the outside and on top of the remains of previous settlement activity in this area see Emőd-Nagyhalom; Kienlin et al. (in press).

[41] Kienlin et al. (2019) 204–213; see also Kienlin et al. (in press).

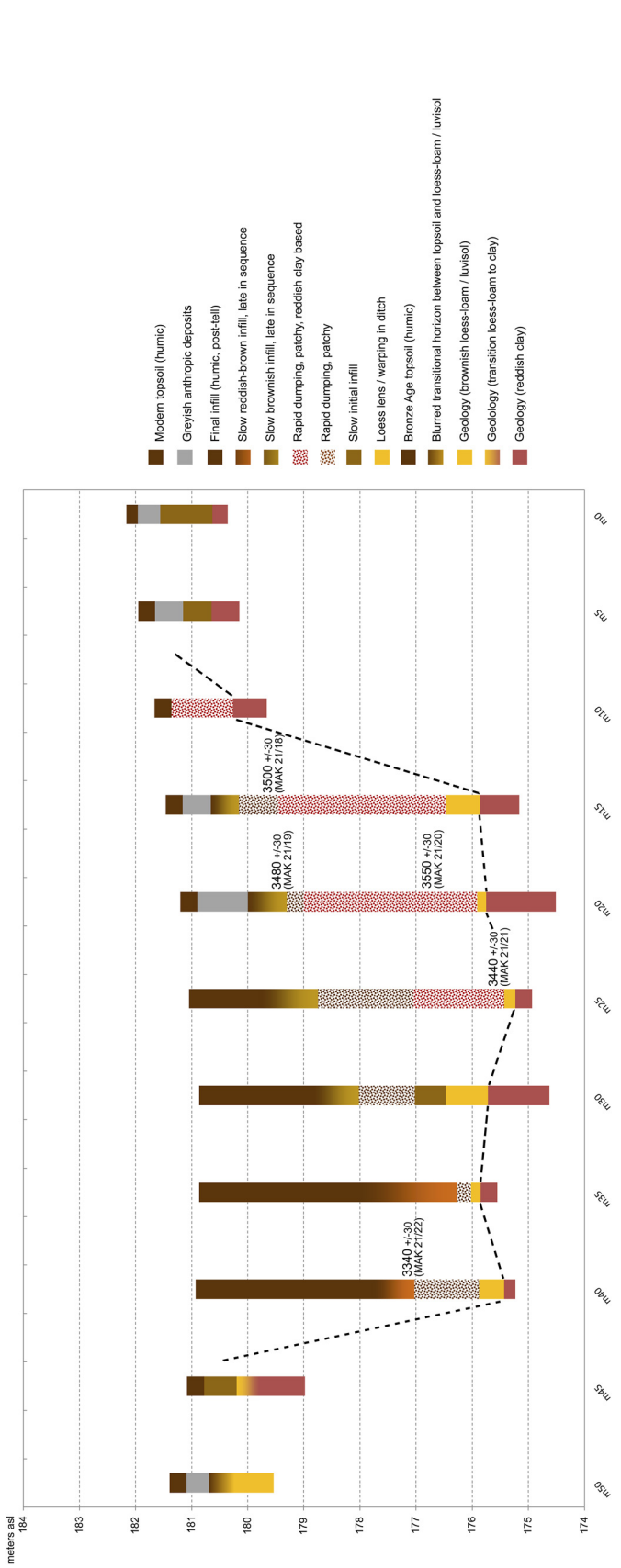

Fig. 10. Maklár-Baglyashalom. Core drilling profile through the ditch with the schematised representation of the infill phases and the uncalibrated radiocarbon dates in their context

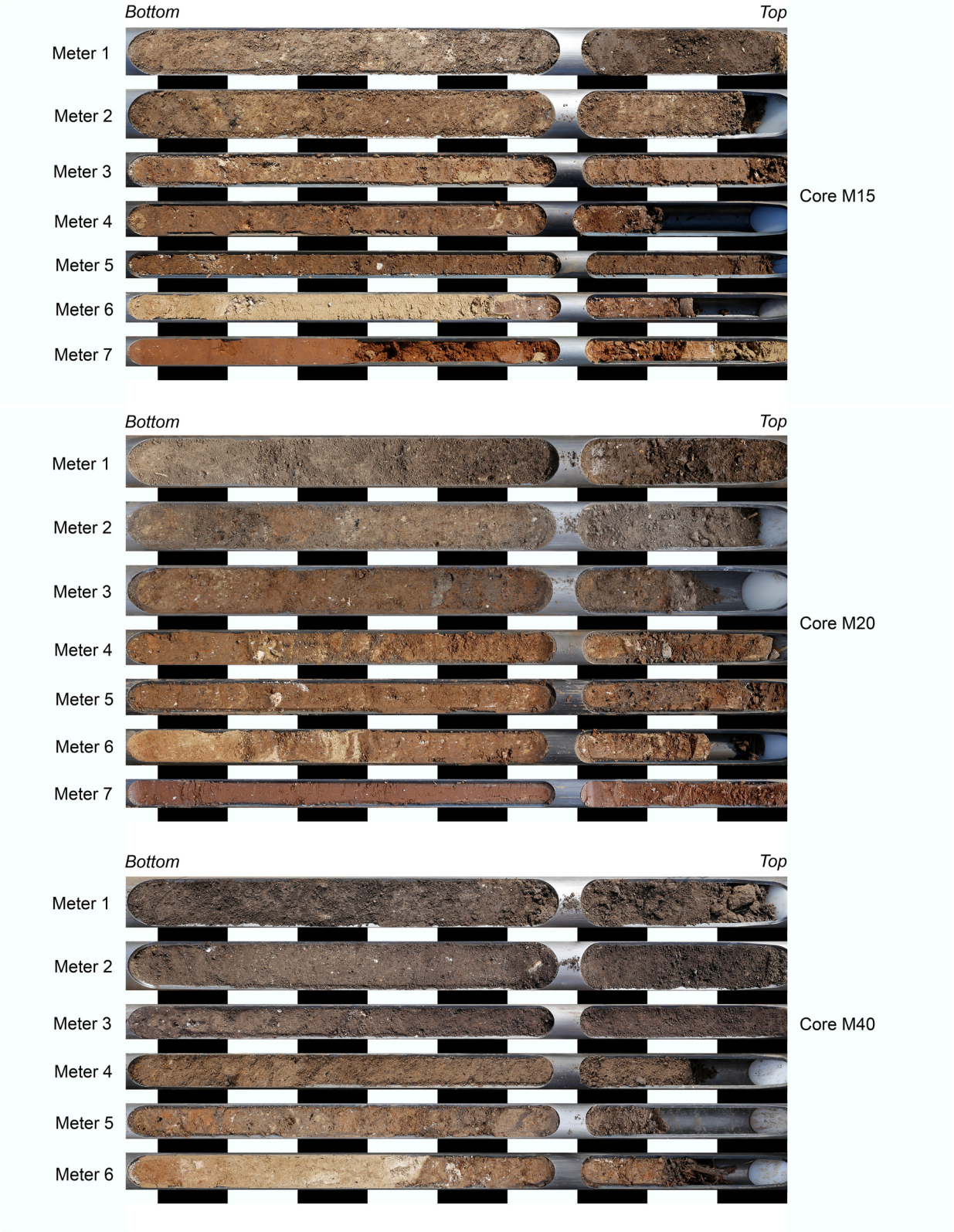

Fig. 11. Maklár-Baglyashalom. Cores m15, m20 and m40 from the transect across the ditch enclosing the central tell

original ditch was more than 25 m broad, from between cores m45/m40 to m15/m10 respectively (Fig. 10), and includes part of the faint whitish anomaly referred to above (Fig. 4). At both sites, too, even though preservation is worse at Maklár than at Emőd-Nagyhalom, judging by the anomalies seen in the magnetometer data of this section and corresponding radiocarbon dates (see below), this zone was reoccupied at some stage well into the lifetime of the community, and its occupation blended into that of the wider outer settlement.

We do not know, of course, what social dynamics precisely were operating in the background, and what ultimately prompted the decision to partly fill in the ditches at Emőd-Nagyhalom and Maklár-Baglyashalom. However, the findings at both sites suggest that unforeseeable, contingent events may ultimately have triggered such an endeavour – itself a laborious undertaking and process rather than a distinct 'event' – of potentially far-reaching consequences for the entire community involved. Thus, at Emőd-Nagyhalom it was argued, but could not be conclusively proven, that at some stage the walls of the initial massive ditch may have partly collapsed, and that the infill took place in response to its already deteriorating condition.[42] Something similar may also apply to Maklár, because throughout the profile at the bottom of the ditch there is a conspicuous layer of loess-loam, up to *c.* 0.75 m thick in core m30, that does not naturally occur at this depth (Fig. 10). Throughout the foothill zone of the Bükk mountains the underlying geology consists of more or less heavily eroded, yellow to brownish loess-loam or luvisols on top and reddish clay below, a sequence the remains of which can still be found underneath the tell itself as well as in the outer settlement. The homogeneous appearance of this material with little human impact (Fig. 11, cores m15 [meter 6] and m40 [meter 6]) rather speaks against gradual erosion as a cause for the displacement of this geological layer. Also, the predominant use of reddish clay deposited on the outside upon the original construction of the ditch (see above) for the backfill makes it unlikely that loess-loam would have been deliberately extracted further outside for the initial stage of the infill only. It is possible, therefore, that the continuous layer of loess-loam at its bottom (with hardly any evidence of previous deposits of washed-in material underneath) represents a rather 'catastrophic' event, when the ditch was still kept in good repair and regularly cleaned – most likely, perhaps, in terms of a massive collapse of its upper walls. This conclusion may also be supported by the distinct absence of any remaining, comparable loess-loam cover in cores m5 and m0 on the outer edge of the ditch (Fig. 10), even though later erosion may also have played a role here.

The results of radiocarbon dating of the ditch infill

As part of the standard work programme of the BORBAS project core drillings in the enclosures and radiocarbon dates from organic samples obtained this way are used to reconstruct the backfilling history of the ditches and serve as a proxy for the 'end' of the settlement. Overall, this approach yields good results,[43] even though the recovery rate and context of dateable material obviously varies. Furthermore, one must always bear in mind that these dates may not directly refer to the abandonment of the site, but rather to the end of the regular maintenance of the ditch and the subsequent gradual infill by erosion *etc.* over an extended period of time.

From the ditch enclosing the central tell at Baglyashalom so far there is only a relatively limited number of five radiocarbon dates (Fig. 12 and Table 2), which tend to confirm the backfilling history as reconstructed in the preceding paragraph, even though they are not really helpful in relation to the question raised above when the ditch was constructed relative to the tell-to-be in the interior (Fig. 7).

Appropriately, the youngest date at *c.* 1735–1532 cal BC (95.4%; sample no. MAK 21/22: 3340 BP ± 30) comes from a slow reddish-brown infill layer, late in the sequence and directly underneath the beginning of the final infill in core m40 in the inner section of the ditch (Fig. 10 and Table 2). This is in good accordance with the youngest dates from the tell discussed above. Even though both lines of evidence do not necessarily represent the absolute end of Maklár-Baglyashalom the fact that right afterwards the final infill was building up in the ditch may suggest that we are fairly close to it in absolute terms.

By comparison, two dates from towards the lower end, *i.e.* the beginning, of the rapid backfill in cores m25 and m20 from the outer section of the ditch are older (Fig. 10 and Table 2), as they should be if the above interpretation of the infill history is correct – confirming as they do that the partial backfill of the outside part of the ditch took place sometime during the lifespan of the settlement. However, they are also disparate and at *c.* 2014–1771 cal BC (95.4%; sample no. MAK 21/20: 3550 BP ± 30) and *c.* 1879–1632 cal BC (95.4%; sample no. MAK 21/21: 3440 BP ± 30) respectively reflect the nature of this layer which consists of inhomogeneous material at some stage collected in the nearby surroundings in order to fill in a part of the ditch.[44] If anything, the younger one of them, sample no. MAK 21/21 from core m25, may provide a *terminus post quem* for the backfill which would nicely correspond to the developed 'middle' phase on the tell as outlined above.

The last two dates also come from the outer part of the ditch, both of them on top of the rapid backfill often based on the reddish clay from the underlying geology, but they are related to the 'event' of the backfill in different ways (Fig. 10 and Table 2). The older one of them, sample no. MAK 21/18 from core m15 comes from a rapidly deposited layer of somewhat different texture and hue from the reddish material underneath. However, this layer may well also

[42] Kienlin et al. (2019) 211.

[43] E.g. Kienlin et al. (2019); Kienlin (2020).

[44] Since sample no. MAK 21/20 is from charcoal there may also be some old wood effect involved here.

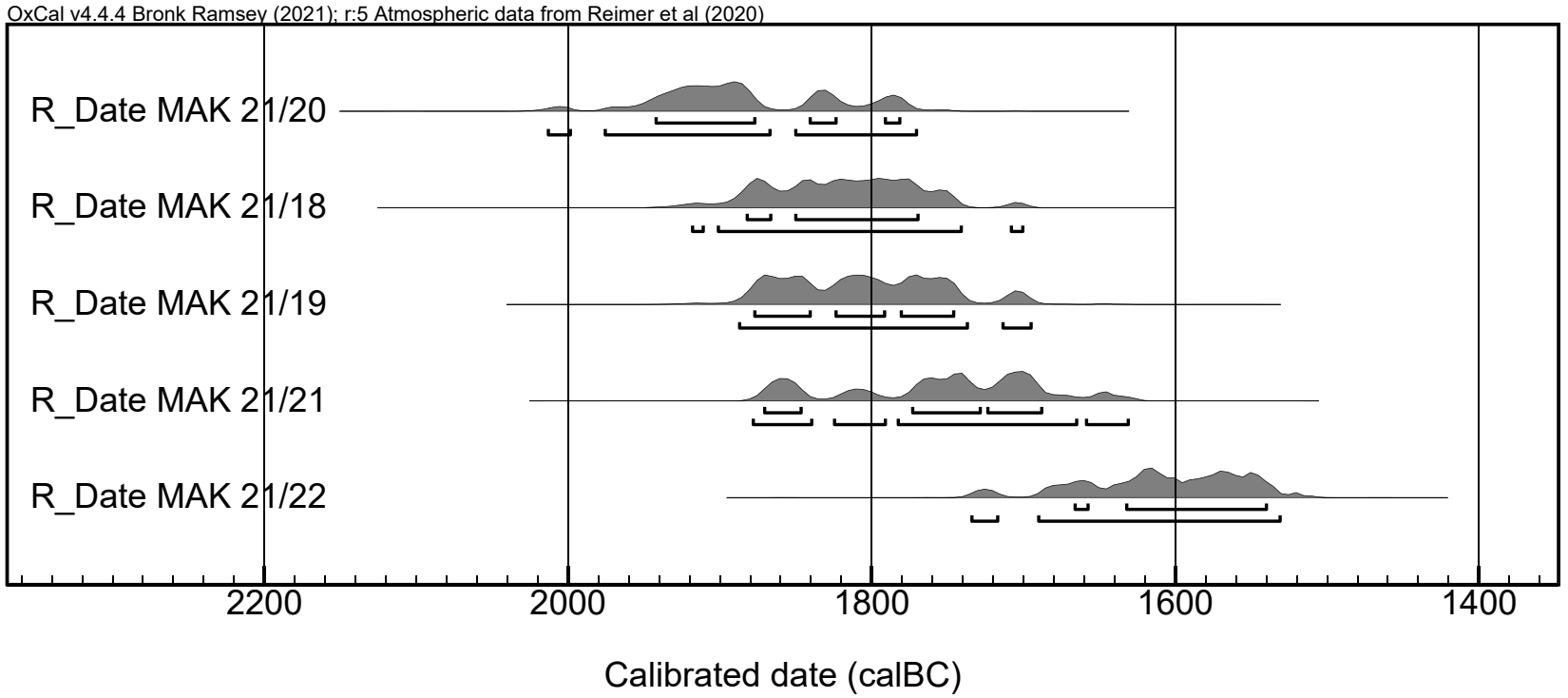

Fig. 12. Maklár-Baglyashalom. The calibrated C14 dates from the core drilling transect through the ditch, sorted by radiocarbon age

Table 2. Maklár-Baglyashalom. List of the C14 dates from the infill of the ditch with contextual information, sorted by radiocarbon age

Sample no.	Lab. no.	BP	cal BC	Sample material	Context	
MAK 21/20	Beta - 671405	3,550 ± 30	2014–1771 cal BC (95.4%)	charcoal	core m20, 414–426 cm	outer section; rapid initial dumping, patchy, reddish clay based
MAK 21/18	Beta - 671403	3,500 ± 30	1919–1701 cal BC (95.4%)	bone	core m15, 170–190 cm	outer section; rapid dumping, patchy (on top of initial reddish clay based dumping)
MAK 21/19	Beta - 671404	3,480 ± 30	1888–1696 cal BC (95.4%)	charcoal	core m20, 160–180 cm	outer section; slow brownish infill, late in sequence (on top of dumping)
MAK 21/21	Beta - 671406	3,440 ± 30	1879–1632 cal BC (95.4%)	bone	core m25, 535–550 cm	outer section/transition to main anomaly; right above bottom of rapid initial dumping, patchy, reddish clay based
MAK 21/22	Beta - 671407	3,340 ± 30	1735–1532 cal BC (95.4%)	charcoal	core m40, 380–395 cm	inner section/main anomaly; slow reddish-brown infill, late in sequence (below final infill)

still be a part of the endeavour of backfilling the ditch, maybe just representing a distinct dumping event late in the backfill sequence. Similar to sample no. MAK 21/20 above, its rather early radiocarbon date of *c.* 1919–1701 cal BC (95.4%; 3500 BP ± 30) just reflects the age of the settlement debris collected and thrown into the ditch during this specific episode. In contrast, the younger date comes from a slowly deposited, brownish layer on top of the backfill in core m20 which is clearly distinct in terms of texture and hue from the dumping underneath it. So with this layer, no doubt younger than the backfill in stratigraphic terms, we see the subsequent effect of erosion and the slow accumulation of material originating from the nearby outer settlement on top of the infill. This interpretation is not contradicted by a radiocarbon date at *c.* 1888–1696 cal BC (95.4%; sample no. MAK 21/19: 3480 BP ± 30), slightly older than our *terminus post quem* for the backfill from sample no. MAK 21/21 above. Same as with the rapid backfill itself, any remains of nearby occupation, which were redeposited on top of it by erosion, themselves may have come from a previous phase of the outer settlement. In general terms of erosion occurring alongside the edge of the backfilled zone, which may not quite have reached the level of the surrounding area throughout,[45] in both cores m20 and m15 the same process can still be seen in operation later on (Figs 10 and 11, cores m20 [meter 1] and m15 [meter 1]): At the end of their respective sequence there is the greyish anthropogenic deposit (visible in magnetometry as faint whitish anomaly) apparently eroded from the outside (see, for example, cores m5 and m0) into what must have been a slight depression that had remained from the original ditch.

[45] Alternatively, or in addition, a further compaction of the backfilled material itself may have occurred over time and further contributed to a slight depression in this area.

In sum, then, even though from the enclosure there are relatively few dates only they correspond well with the stratigraphy of the infill. They also broadly match the lifespan of the tell as deduced above. For systematic reasons, however, they do not allow any conclusions to be drawn about the construction of the ditch relative to the tell and the outer settlement: They start somewhat later than the occupation of the mound, but this is also what one would expect if the ditch was maintained and kept clean for some time without sediments allowed to accumulate on its bottom. On the other end, however, the youngest dates from the mound and the ditch are contemporaneous in radiocarbon terms, and may well bring us somewhere close to the end of intense on-tell settlement activity at Maklár-Baglyashalom (for the outer settlement see below).

THE OUTER SETTLEMENT AND DEMARCATION

Despite the rather small number of clearly visible burnt houses, compared for example to Emőd-Nagyhalom or Tard-Tatárdomb, the outer settlement at Maklár is notable for its long lifespan as deduced from a series of radiocarbon dates from well preserved *in situ* contexts and its complex history of occupation including – at some stage – the existence of a second, outer enclosure.

In magnetometry, the outer settled area covers a semicircular zone extending more than 100 m outward to the east from the darkish, *i.e.* slightly positive anomaly caused by the slow, final infill of the ditch surrounding the tell part of the site (Fig. 13). On the inside, that is to say, the outer settlement extends to *above* the backfill into the inner ditch as discussed in the preceding paragraph. In this section there are numerous general pit anomalies and at least one or two burnt houses which provide unambiguous evidence of the reoccupation sometime after the partial dismantling of the

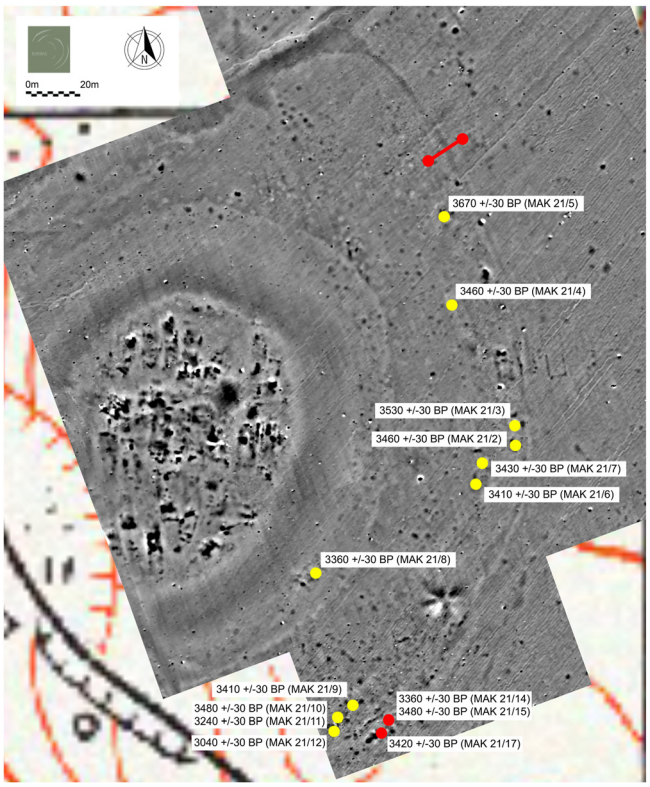

Fig. 13. Maklár-Baglyashalom. The uncalibrated C14 dates from houses and pits in the outer settlement mapped on the magnetometry (red dots: cores OT25 and OT26 with dates from the infill of the outer ditch 2) (greyscale plot; data range [black to white]: ± 10 nT)

original enclosure and the (re-)integration of this zone into the wider outer settlement.

Correspondingly, further outside there are also numerous point anomalies most likely originating from settlement pits for storage *etc.*, sometimes distinctly clustered and indicative of the location of households, plus a couple of rather poorly visible rectangular house anomalies themselves.[46] While their size between *c.* 4.5–5.5 m broad and *c.* 10–14 m long is in good accordance with the on-tell houses discussed above, due to their poor magnetic visibility or preservation it is more difficult to discern a distinct spatial arrangement of these off-tell houses. For some of them it is possible that they were standing with their long sides parallel to the enclosure(s), like at Tard-Tatárdomb or in the inner 'ring' at Emőd-Nagyhalom,[47] but others may also simply reflect a broadly north(-west) to south(-east) orientation. This apparent variability should not come as a surprise, however, because we can be fairly sure that the houses seen in magnetometry were not all standing at the same time (see below). Hence, different approaches to organising settlement layout through time can be expected.

The latter point, the ongoing negotiation of social space in the outer settlement throughout the lifetime of the community, is also evident with regard to a narrow outer demarcation ('ditch 2'), *c.* 2–3 m wide in magnetometry, at a distance of *c.* 60–80 m from the darkish anomaly of the inner ditch 1 (Fig. 13). Unlike the main ditch, this structure is not visible on the surface, and the anomaly is not equally well discernible or preserved throughout. However, most likely it was continuous along the entire eastern perimeter of the site, from a gully in north to somewhere on the southern slope, just beyond the area covered by magnetometry.[48] At the time of our original publication, it was not possible to assign this enclosure a definitive Bronze Age date. However, it was noted that to the east it cuts or is overlain by a group of houses, and to the south it is partly superimposed by general pit anomalies. In the meantime, even though there are obvious limits to the stratigraphic information obtained by core drilling alone, radiocarbon dates prove that this enclosure was in existence and already infilled during the Middle Bronze Age (see below). Theoretically, then, it may still have cut through and subdivided a larger pre-existing settled area for some time. However, perhaps more likely given the group of eastern houses mentioned, potentially overlying the ditch anomaly, we see in fact an outward expansion of occupation after the original outer demarcation had fallen out of use.

Be that as it may in detail, an additional enclosure of the outer settlement is a rare finding on our Borsod sites, since typically this part of the community was left open towards the outside world. Access could easily be gained to any fields, pasture or other special purpose plots outside the 'village'. And the limits of the settled area itself may have been fluid in the first place, such as when the 'last house' of the community was variously defined every generation as another building was added along one line of houses, while another one was abandoned and reclaimed by nature.[49] The only other site with an outer demarcation that may – at some stage – have enclosed the entire community, *i.e.* both the tell or tell-like core *and* what would otherwise be conceived as the 'outer' settlement is Tard-Tatárdomb.[50] Between both sites there are obvious differences regarding the size and duration of their inner multi-layer part, as well as the proportion of on-tell versus off-tell households. Yet together they provide otherwise unattested evidence of the attempt to more closely incorporate the entire community and to set it apart symbolically from a wider outside world. Such an interest taken may have been passing only, and it may have occurred at different stages of the sites' existence – mind a couple of outside houses on both sites possibly ante- or postdating the outer demarcation, and the overlying anomalies and radiocarbon dates at Maklár suggestive of its infilling at some point during the existence of the settlement. However, at least at some stage the outer enclosure brought both sites up to a hitherto unknown size of

[46]See already Kienlin et al. (2018b) 206–207.

[47]Kienlin et al. (2018b) 180–181, 239.

[48]See already Kienlin et al. (2018b) 205–206.

[49]See also Kienlin (2020) 190.

[50]Kienlin et al. (2018b) 237–243.

a community possibly more closely *incorporated*, but in any case different from what would have been the case in the absence of an outer demarcation. At Maklár, specifically, it is interesting to see such negotiation of social space and community going on both on the inside – the partial backfilling of ditch 1 – and towards the outside of what at some stage must have been distinctly structured and dynamic communities.

The results of core drilling and radiocarbon dating in the outer settlement

Despite the rather poor magnetic visibility of proper houses, by targeting some of the more promising anomalies samples for radiocarbon dating could be obtained from a couple of in fact rather well-preserved contexts throughout the outer settlement (Figs 13 and 14). Apart from pits (*e.g.* Fig. 14, cores OT18 and OT27), some of the cores in question even feature platforms or formal floors similar to those seen on-tell (*e.g.* Fig. 14, cores OT9, OT14 and OT22 [meter 1]), debris related to household activities (*e.g.* Fig. 14, cores OT14 and OT24 [meter 1]) or the characteristic remains of houses destroyed by fire with the more or less thick layers of ashes and burnt daub (*e.g.* Fig. 14, cores OT14 and OT23 [meter 1]) which make them visible in magnetometry.

In addition, the outer ditch was sampled by a transect of drill holes 10 m long with a spacing of 1 m in its northern section, which is more clearly discernible in magnetometry (Figs 13 [red line] and 15). This work confirmed the status of the linear anomaly as the remains of a ditch. It is somewhat more than 2 m wide between cores GA1H/GA1G and GA1E/GA1D and at present still a maximum of *c.* 2.9 m deep in core GA1F. The original depth may have been somewhat greater, though probably not very much so, since there obviously was erosion that affected the original surface and loess-loam cover in the area. This is particularly evident in the outer cores GA1B, GA1A and GA1 where the underlying reddish clay is encountered directly underneath the modern topsoil. The infill of the ditch in this section is at least two-phase, with a clayey-loamy, reddish-brown layer slowly deposited at its bottom and an equally slowly deposited brownish, humic final infill on top. Unfortunately, none of the cores from this transect yielded dateable material, but there are three dates from the infill in cores OT25 and OT26 that actually took aim at anomalies overlying the ditch in its southern section (Fig. 13, red dots). From the combined evidence of these it is apparent that the outer enclosure had already fallen into disuse sometime during the Middle Bronze Age occupation of the outer settlement. It was by and large slowly filled in by erosion before in some sections like the one probed by cores OT25 and OT26 renewed settlement activity took place close by or on top of its remains.

In total, there are 11 radiocarbon dates from settlement features in the outer settlement, plus the three datings mentioned from the infill of the outer ditch 2 (Fig. 16 and Table 3). In terms of potential early beginnings, even though it was obtained from charcoal and may have an old wood effect, there is at least one date from the potential platform of a house in core OT17 which at *c.* 2141–1951 cal BC (95.4%; sample no. MAK 21/5: 3670 BP ± 30) matches the oldest date discussed above from 'phase 1' underneath the tell (Fig. 9, sample no. MAK 21/47). Likewise, for example, our recent work at Emőd-Nagyhalom has proven long-term, multi-phase habitation in the outer settlement of this site,[51] and we surely have to expect settlement activity in the wider surroundings of our tells-to-be right from the start or even predating them.

However, based on the datings currently available, it is also apparent that compared to Emőd-Nagyhalom evidence of early occupation in the outer settlement at Maklár-Baglyashalom is scant. The beginnings of tell-living in any micro-region is a broad horizon, during which the locations were first settled that later developed into tells, not a distinct event.[52] And the same applies to every individual site in terms of the beginnings of the tell and the outer settlement relative to each other, which have to be established by reference to dated contexts rather than just assumed.

At Maklár, then, the current dates imply that unlike the tell with a couple of early radiocarbon datings and *in situ* layers from 'phase 1' occupation (even though in a limited original core area only), the outer section of this community only saw any more intense occupation somewhat later, starting during broadly the 19th century cal BC (Fig. 16). From this horizon there are at least three radiocarbon dates that overlap with the middle phase of on-tell occupation as defined above (Table 3, sample nos. MAK 21/3, 21/2 and 21/4).[53] A group of younger dates, in turn consistent with those from the corresponding upper layers of the mound (*e.g.* Table 3, sample nos. MAK 21/7, 21/6 and 21/9) show that subsequently the outer settlement was continuously occupied and coexisted with the growing and expanding tell until at least the 17th century cal BC.

Turning back to the enclosures in relation to this sequence, in this latter, younger group sample no. MAK 21/8 deserves attention even though, unfortunately, its stratigraphic context is not entirely clear (Fig. 13 and Table 3). The sample may either come from debris related to the house anomaly visible in the place of core OT20, or it may still be related to the backfilling into the outer section of ditch 1 underneath. Dated to *c.* 1740–1539 cal BC (95.4%; 3360 BP ± 30) the former may seem indicated – a rather late house in the sequence that came to stand on top of the infilled ditch (Fig. 7). Alternatively, however, it cannot be entirely ruled out that the date refers to continued dumping into the slight depression left behind in place of the ditch, prior actually to proper reoccupation of this section.

Regarding the outer enclosure, there is one sample from the bottom of its infill in core OT26 in its southern section

[51] Kienlin et al. (in press).

[52] See also Kienlin (2020) 104, Fig. III-73 for a summary of the published C14 dates from BORBAS so far.

[53] Sample no. MAK 21/10 in this group, from a burnt horizon/debris in core OT23, is from charcoal and probably has an old wood effect and/or comes from mixed up debris from different phases. It is overlying sample no. MAK 21/11 from a platform, *i.e.* a better, closed context, with a Late Bronze Age date from short-lived sample material (see below).

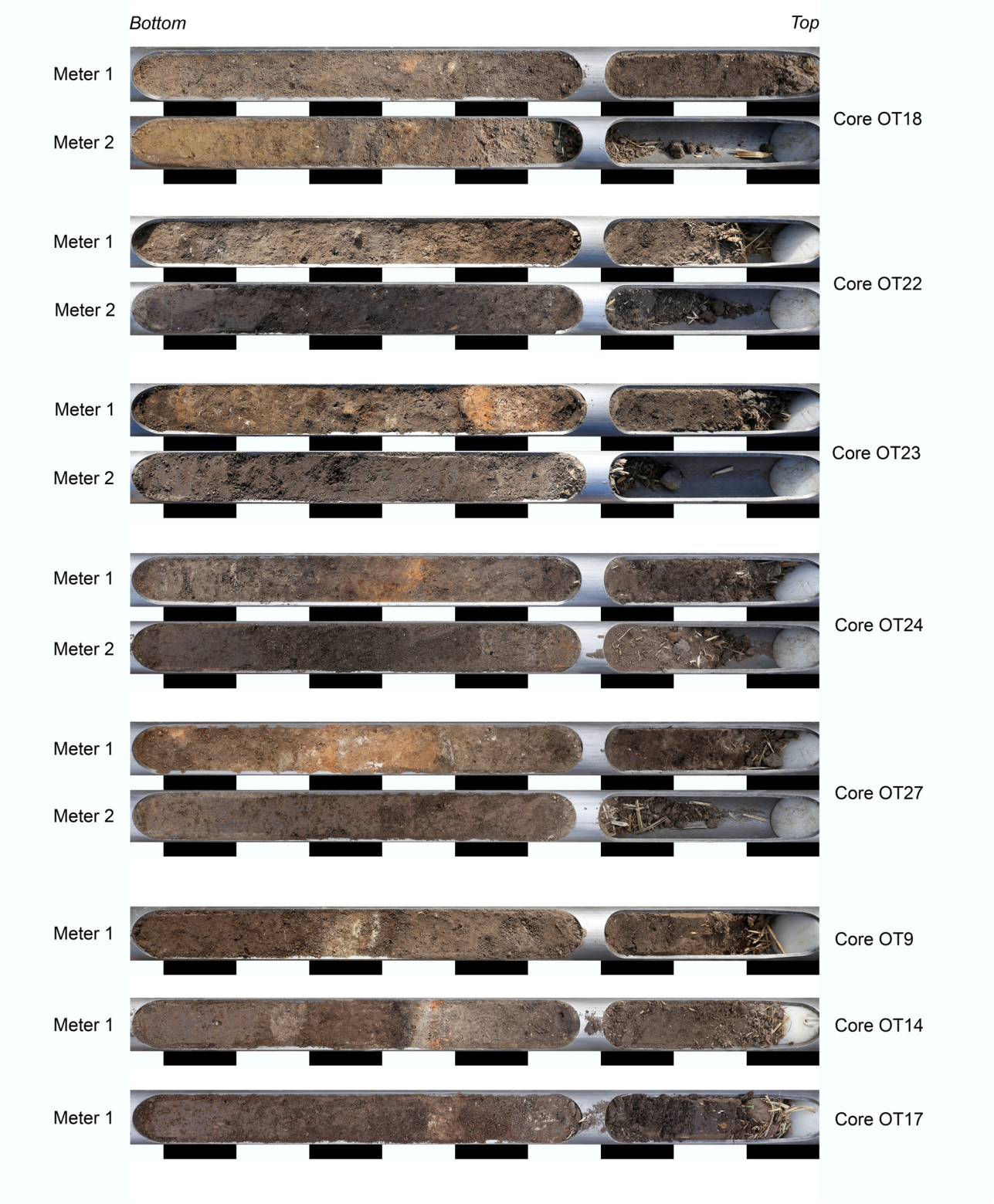

Fig. 14. Maklár-Baglyashalom. Cores OT9, OT14, OT17, OT18, OT22, OT23, OT24 and OT27 from settlement features in the outer part of the site

dated to *c.* 1873–1622 cal BC (95.4%; sample no. MAK 21/17: 3420 BP ± 30) that falls into the younger part of the sequence of dates from the outer settlement (Figs. 13 and 16 and Table 3). Two additional dates from the infill into the outer ditch 2 come from various depths of nearby core OT25. The earlier one originates right from the bottom of

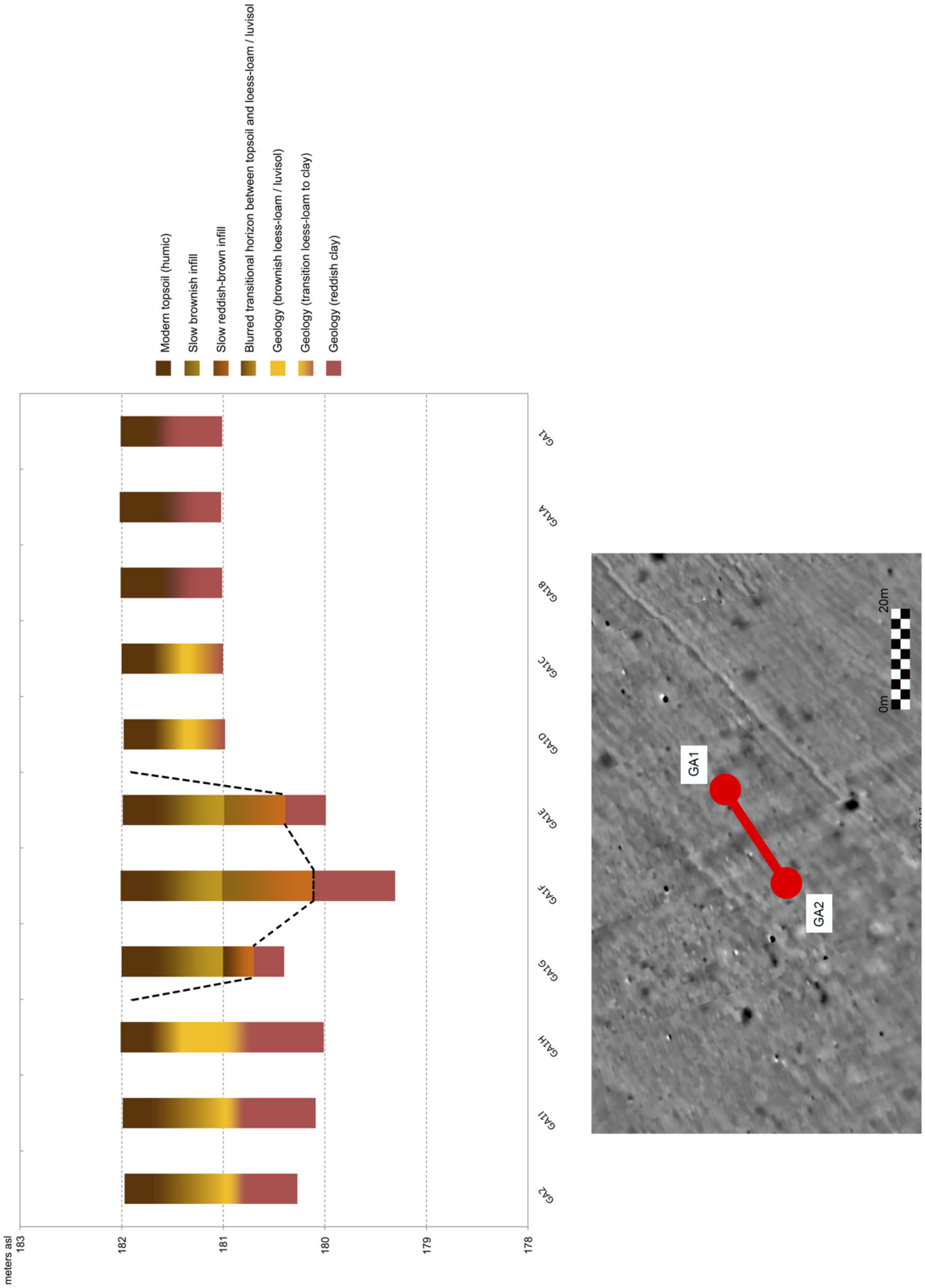

Fig. 15. Maklár-Baglyashalom. Core drilling profile through the outer enclosure with the schematised representation of the infill phases

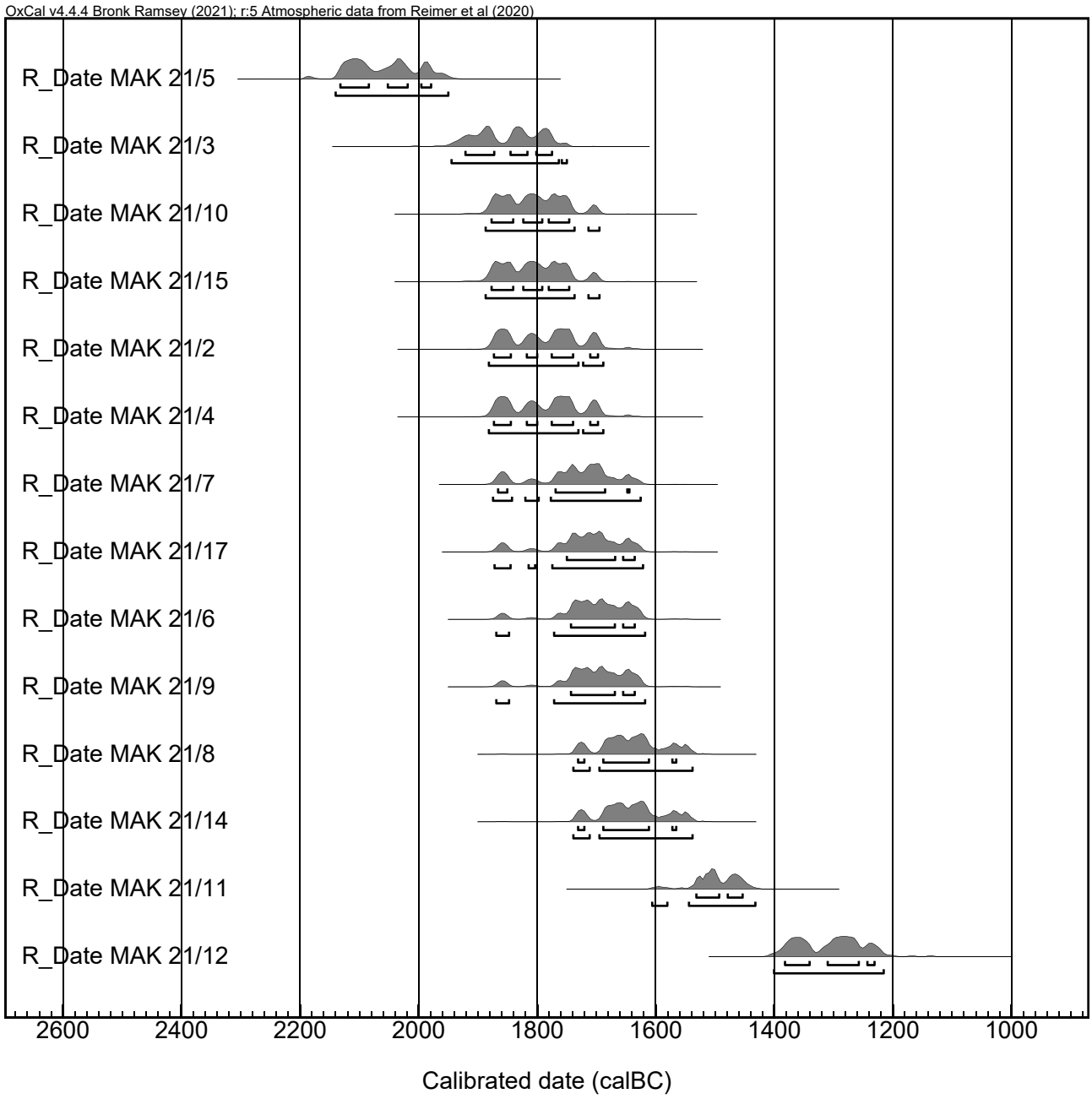

Fig. 16. Maklár-Baglyashalom. The calibrated C14 dates from the outer settlement, sorted by radiocarbon age

the ditch and dates to *c.* 1888–1696 cal BC (95.4%; sample no. MAK 21/15: 3480 BP ± 30). Compared to sample no. MAK 21/17 it is older, as such illustrating that the infill of the ditch – even in the immediate vicinity – was never a linear process and/or potentially involved material of different age eroding into the enclosure from the nearby surface. The younger one, from higher up in the infill in core OT25 is dated to *c.* 1740–1539 cal BC (95.4%; sample no. MAK 21/14: 3360 BP ± 30), and also falls well into the younger horizon of settlement activity as outlined above. In sum, that is to say, the outer enclosure was open and in full 'operation' with some debris accumulating at its bottom at about the same time that the outer settlement as such experienced an upturn and intensification of settlement activity (see above). And it was already slowly infilled again well during the heyday of both the tell and the outer settlement at Maklár.

Eventually, with regard to the end of Middle Bronze Age tells, it is striking that from the outer settlement at Maklár-Baglyashalom there are two dates – one from the platform of a house, the other from the debris of a burnt house – that are clearly younger than the majority of datings from the tell and outer settlement discussed so far (Fig. 16 and Table 3). At *c.* 1607–1433 cal BC (95.4%; sample no. MAK 21/11: 3240 BP ± 30) and *c.* 1401–1216 cal BC (95.4%; sample no. MAK 21/12: 3040 BP ± 30) in absolute terms they overlap with the Late Bronze Age as represented by the cemeteries of Maklár-Nagyrét II and Maklár-Koszpérium on the far,

Table 3. Maklár-Baglyashalom. List of the C14 dates from the outer settlement with contextual information, sorted by radiocarbon age

Sample no.	Lab. no.	BP	cal BC	Sample material	Context	
MAK 21/5	Beta - 649967	3,670 ± 30	2141–1951 cal BC (95.4%)	charcoal	core OT17, 51–55 cm	house, remains of platform(?)
MAK 21/3	Beta - 649965	3,530 ± 30	1945–1751 cal BC (95.4%)	charcoal	core OT14, 71–75 cm	house, platform(?) on top of old A horizon
MAK 21/10	Beta - 649972	3,480 ± 30	1888–1696 cal BC (95.4%)	charcoal	core OT23, 40–50 cm	burnt horizon/debris of destruction
MAK 21/15	Beta - 649977	3,480 ± 30	1888–1696 cal BC (95.4%)	bone	core OT25, 200–210 cm	outer demarcation, bottom
MAK 21/2	Beta - 649964	3,460 ± 30	1882–1689 cal BC (95.4%)	bone	core OT13, 46–55 cm	house, eroded anthropic layer
MAK 21/4	Beta - 649966	3,460 ± 30	1882–1689 cal BC (95.4%)	charcoal	core OT15, 64–74 cm	unburnt house, eroded anthropic layer or platform
MAK 21/7	Beta - 649969	3,430 ± 30	1875–1626 cal BC (95.4%)	charcoal	core OT19, 55–78 cm	house or pit, burnt layer
MAK 21/17	Beta - 649979	3,420 ± 30	1873–1622 cal BC (95.4%)	bone	core OT26, 160–180 cm	outer demarcation, bottom
MAK 21/6	Beta - 649968	3,410 ± 30	1870–1619 cal BC (95.4%)	charcoal	core OT18, 155–168 cm	(house or) pit, just above bottom
MAK 21/9	Beta - 649971	3,410 ± 30	1870–1619 cal BC (95.4%)	bone	core OT22, 81–87 cm	house, trampling on top of platform
MAK 21/8	Beta - 649970	3,360 ± 30	1740–1539 cal BC (95.4%)	charcoal	core OT20, 160–175 cm	house on top, or still dumping into inner ditch
MAK 21/14	Beta - 649976	3,360 ± 30	1740–1539 cal BC (95.4%)	bone	core OT25, 160–180 cm	outer demarcation, infill
MAK 21/11	Beta - 649973	3,240 ± 30	1607–1433 cal BC (95.4%)	macro remains (Hordeum)	core OT23, 70–85 cm	house, platform
MAK 21/12	Beta - 649974	3,040 ± 30	1401–1216 cal BC (95.4%)	macro remains, grain/seed	core OT24, 55–64 cm	house, burnt horizon/debris of destruction

western side of the Eger stream as seen from Baglyashalom.[54] Therefore, even though for the transition between both periods we cannot rely on a continuous record of both settlement and burial evidence on both sides of the Middle to Late Bronze Age 'divide', we do know that in our micro-region there was continuous occupation throughout, and that both 'periods' overlap.[55] This finding, too, should not come as a surprise: just like their beginnings, the 'end-of-tells' in any given region is a broad horizon during which tell-living lost attraction and cohesion, not an historical event. Likewise, for example, from Toboliu in nearby Romania there is also evidence – from pottery finds and radiocarbon dates – of 'Late Bronze Age' presence in the wider outer settlement of the Early to Middle Bronze Age tell.[56]

[54]E.g. Mengyán and Hrabák (2023); Kienlin et al. (in prep.).

[55]See also, for example, Sava and Ignat (2016); Sava (2020); Molloy et al. (2023) 132–133, 137–138.

[56]Lie et al. (2024) 726–727.

DISCUSSION

Core drillings, obviously, cannot replace an excavation. Nonetheless, in a region of more than 20 tell or tell-like settlements, which a some stage constituted the socio-cultural landscape of the Early and Middle Bronze Age, they are a viable way to come to terms with fundamental questions of chronology such as the absolute lifespan of individual sites as well as the actual times of their coexistence or overlap. Core drillings furthermore provide valuable insights into the development and decline of our sites, not all of which can realistically be excavated. Underneath seeming conformity in basic layout, they offer a fascinating glimpse of the slightly different outcome of the social process and the dynamics of these complex communities that each followed their own trajectory. Such complexity must not be ignored or subsumed under grand narratives of the 'rise of Bronze Age society', or for that matter Bronze Age tells as 'chiefly centres' somehow dominating the landscape largely bereft of archaeological evidence.

The location of the future tell of Maklár-Baglyashalom was first occupied some time around 2000 BC, starting from a piece of land distinctly smaller than the current mound that developed and grew in its place over the next 400 years. The tell is currently preserved up to a height of slightly more than 2 m and in some sections still features up to 6 or 7 settlement phases. It is unclear when exactly the ditch that encloses this part of the site was added. However, it has been argued that the enclosure may actually be somewhat younger than the initial cluster of houses in its interior and related to an already growing and expanding on-tell section of the community at Baglyashalom.

This finding is of interest, not so much because it implies growth through time of the original 'core' community at Maklár-Baglyashalom, but rather because of the resulting questions concerning their organisation of social space (see Fig. 7 above). For if the ditch was in existence right from the start but the initial settlement only occupied a part of the enclosed area, leaving a strip of some 20–30 m width uncovered on every side, one wonders if and how the future growth of the community could be anticipated, or what other reasons they had for their initially oversize enclosure.

Recent fieldwork at Emőd-Nagyhalom suggests that such questions may be based on false premises, implying as they do in line with popular narratives on Bronze Age society that the future tell always was the traditional centre of such communities, fortified right from the start, and with claims to tradition and on-site seniority that may have translated into power differentials and/or uneven access to resources *etc*. On the contrary, at Emőd-Nagyhalom it could be proven that the enclosed, multi-layer part of the site, the tell-to-be, was only set apart from a larger settled area well into the lifetime of this community, because upon the construction of the ditch the remains of older houses on the enclosure's future outside were covered by the excavated material.[57] We cannot automatically assume that what we interpret as the 'central' multi-layer part of such sites was in fact their origin and the original 'centre' of a distinctly structured settlement built in order to house various and supposedly somehow 'ranked' groups of people.

Unfortunately, at Maklár-Baglyashalom we lack corresponding evidence like at Emőd-Nagyhalom. We do not know, therefore, when exactly – or rather during what extended period of time – in the sequence of the (future?) tell and outer settlement the ditch separating them was dug. However, both the mismatch pointed out between the rather small initial 'core' area and the enclosed space, and the slightly oval course of the ditch – as opposed to more 'perfectly' roundish examples often seen on our sites – may warn us against assuming an early date and design of the ditch. We must be wary of assuming in retrospect that the inhabitants of our sites held notions of social stratification and of their community extending far into the future – such as the assumption that some postulated (only in the future: on-tell) elites anticipated the power of their own descendants by an oversize ditch early in the sequence at Baglyashalom. Instead, there is a distinct likelihood that the enclosure at Baglyashalom was only established after the original 'core', as discussed above, had increased in number of inhabitants and area, and when the future outer settlement saw an upturn and intensification of settlement activity after potentially modest beginnings only. Every site has to be understood in its own right – including wherever possible a detailed understanding of the chronological, as well as, of course, the social and functional relation of its various parts – rather than being subsumed under some preconceived notion about the fortified chiefly seat in control of a politically and economically dependent open 'suburbium' or satellite settlements in the wider surroundings *etc*.

Interestingly, too, some time after its construction, the original enclosure was already partly backfilled again from the outside, and there is evidence of (re-)occupation and the integration of this zone into the outer settlement beyond. The implications of such findings have been discussed at length elsewhere.[58] At least at Emőd-Nagyhalom with its somewhat better preserved outer settlement it is clear that with the establishment of new houses on top of the backfill the community involved saw a major remodelling in terms of their organisation of social space. Unfortunately, because of the poorer preservation and/or magnetic visibility (*i.e*. the smaller number of burnt houses) at Maklár there is no direct correlate to the different orientations of houses seen in the various parts of the outer settlement at Emőd. However, at Maklár as well there is unambiguous evidence of renewed occupation in the backfilled area, and the partial backfilling into their ditches certainly has implications for the conflicting interpretations of such enclosures that either focus on the necessity of elites or on the communal element involved in the establishment of such structures.[59] In light of the backfilling observed at both Emőd and Maklár it is unlikely that the effort expended on their construction and maintenance was a matter of mere 'elite' dominance. Rather, such enclosures, their 'use' and eventually abandonment, one way or another must have been communally sanctioned and understood to be desirable and worthwhile by the wider community. There may clearly have been different interests involved – from tell to outer settlement – in their creation and upkeep, but there were also obvious limits as to what could be agreed upon. And quite obviously so there were limits to any attempt to enforce that these ditches were preserved intact, if that was what those living on-tell may have wanted, potentially profiting most directly from 'their' enclosure.

If such modifications are indicative of the enclosure's changing meaning and the ongoing negotiation of social space among the various sections of the Maklár community, the same is evident in the wider outer settlement that – after potential dispersed earlier beginnings – thrived in the surroundings of Baglyashalom from broadly the 19th century

[57] Kienlin et al. (in press).

[58] Kienlin et al. (2019); Kienlin (2020).

[59] cf. Kienlin (2020) 108–110, 185–187.

cal BC onwards, *i.e.* slightly after the first phase of on-tell occupation. At some stage, this outer section of the Maklár community itself was enclosed by a narrow outer demarcation. It could be established that this ditch (2) was open and fully operational at about the time of the upturn in settlement activity in the outer settlement area. It was slowly being filled in again already during the heyday of both the tell and the outer settlement during the Middle Bronze Age. Rather than subdividing the outer part of the Maklár community, house and pit anomalies overlying some sections of this enclosure imply that there was in fact an outward expansion of occupation after it had fallen out of use.

The 48 radiocarbon dates presented in this paper imply that both the prospering tell and the outer settlement coexisted and were continuously occupied at least until the 17th century BC. Beyond that, due to the ongoing destruction by erosion and agricultural use it is impossible to say if Baglyashalom was still occupied, but from the outer settlement there are at least local indications that small-scale occupation continued well into the subsequent Late Bronze Age in absolute terms. The end of Middle Bronze Age tell-living was a slow transition, not a distinct historical event – neither in a specific region such as the Borsod plain, nor in the Carpathian Basin as a whole. It was only after a couple of generations that the old ways of tell-living had completely lost their normative power, and the old places were entirely abandoned.

ACKNOWLEDGEMENTS

The fieldwork reported on in this paper would not have been possible without the support and kind cooperation of Maximilian Zerrer and Ferenc Kustár (both *ArchaeoConnect*, Tübingen, back then) as well as Patrick Berger, Frederic Ebel, Lara Helsberg, Gian-Luca Paul, Lisa Schuhmacher, Lara van der Schüür and Hannah Windelschmidt (all of them University of Cologne). Tanja Zerl, Laboratory for Archaeobotany, Department of Prehistoric Archaeology, University of Cologne kindly did the flotation and sample preparation for radiocarbon dating; the dating was done smoothly and efficiently by Beta Analytic Inc., Miami. We are indebted to András Gömöri (University of Miskolc) for his comments on an earlier draft of this paper. We would also like to thank László Gucsi, Budapest, for his drawing of Fig. 7, and Sandia Brandsch, University of Cologne, for her help in editing the text and creating the illustrations.

REFERENCES

Fischl, K.P. and Kienlin, T.L. (2019) (Eds.). *Beyond divides. The Otomani-Füzesabony phenomenon. Current approaches to settlement and burial in the North-eastern Carpathian Basin and adjacent areas*. Universitätsforschungen zur prähistorischen Archäologie, 345. Habelt, Bonn.

Fischl, K.P. and Kienlin, T.L. (2024). Houses and households in the Early to Middle Bronze Age of the Borsod Plain, North-Eastern Hungary. In: Kienlin, T.L. (Ed.), *Household practices and houses. Current approaches from archaeology and the sciences*. Cologne contributions to archaeology and cultural studies, 4. Universitätsforschungen zur prähistorischen Archäologie, 399. Habelt, Bonn, pp. 229–270.

Fischl, K.P. and Pusztai, T. (2018). Aerial photography and surface survey. In: Kienlin, T.L., Fischl, K.P., and Pusztai, T. (Eds.), *Borsod Region Bronze Age Settlement (BORBAS). Catalogue of the Early to Middle Bronze Age tell sites covered by magnetometry and surface survey*. Universitätsforschungen zur prähistorischen Archäologie, 317, Habelt, Bonn, pp. 93–145.

Fischl, K.P., Kienlin, T.L., and Pusztai, T. (2022). *A rend nyomában. 4000 éves települések a Bükkalján és a Borsodi-síkság területén* [In search of order. 4,000-year-old settlements in the Bükkalja and the Borsod Plain]. Martin Opitz Kiadó, Budapest.

Fischl, K.P., Pusztai, T., Buzás, M., Röpke, A.K., Drunagel, E., Anvari, J., Gucsi, L., Balázs, Á. and Kienlin, T.L. (2025). Reconstructing two buildings and architectural decorations on the Bronze Age tell of Borsodivánka-Nagyhalom (Northeastern Hungary). *Acta Archaeologica Academiae Scientiarum Hungaricae*, 76: 55–81.

Găvan, A., Lie, M.A., and Kienlin, T.L. (2024). Off-tell houses at the Bronze Age multi-component settlement in Toboliu (Romania). In: Kienlin, T.L. (Ed.), *Household practices and houses. Current approaches from archaeology and the sciences*. Cologne contributions to archaeology and cultural studies, 4. Universitätsforschungen zur prähistorischen Archäologie, 399. Habelt, Bonn, pp. 329–350.

Kalicz, N. (1968). *Die Frühbronzezeit in Nordost-Ungarn. Abriss der Geschichte des XIX-XVI. Jahrhunderts v. u. Z.* Archaeologia Hungarica, Series nova, 45. Akadémiai Kiadó, Budapest.

Kienlin, T.L. (2015). *Bronze Age tell communities in context. An exploration into culture, society, and the study of European Prehistory, 1: Critique. Europe and the Mediterranean*. Archaeopress archaeology. Archaeopress, Oxford.

Kienlin, T.L. (2018). Borsod Region Bronze Age settlement: 'Diversity in uniformity'. In: Kienlin, T.L., P. Fischl, K., and Pusztai, T. (Eds.), *Borsod Region Bronze Age Settlement (BORBAS). Catalogue of the Early to Middle Bronze Age tell sites covered by magnetometry and surface survey*. Universitätsforschungen zur prähistorischen Archäologie, 317. Habelt, Bonn, pp. 11–91.

Kienlin, T.L. (2020). *Bronze Age tell communities in context. An exploration into culture, society, and the study of European Prehistory, 2: Practice. The social, space, and materiality*. Archaeopress archaeology. Archaeopress, Oxford.

Kienlin, T.L., Fischl, K.P., and Pusztai, T. (2018a). *Borsod Region Bronze Age Settlement (BORBAS). Catalogue of the Early to Middle Bronze Age tell sites covered by magnetometry and surface survey*. Universitätsforschungen zur prähistorischen Archäologie, 317. Habelt, Bonn.

Kienlin, T.L., Fischl, K.P., and Pusztai, T. (2018b). Catalogue. In: Kienlin, T.L., Fischl, K.P., and Pusztai, T. (Eds.), *Borsod Region Bronze Age Settlement (BORBAS). Catalogue of the Early to Middle Bronze Age tell sites covered by magnetometry and surface survey*. Universitätsforschungen zur prähistorischen Archäologie, 317. Habelt, Bonn, pp. 147–280.

Kienlin, T.L., Lie, M.A. and Fischl, K.P. (2019). Emőd-Nagyhalom. A non-invasive approach to the multi-phase enclosure and outer settlement of a Bronze Age tell site in North-eastern Hungary. In: Fischl, K.P. and Kienlin, T.L. (Eds.), *Beyond divides. The Otomani-Füzesabony phenomenon. Current approaches to settlement and burial in the North-eastern Carpathian Basin and adjacent areas*. Universitätsforschungen zur prähistorischen Archäologie, 345. Habelt, Bonn, pp. 195–229.

Kienlin, T.L., Mengyán, Á., and P. Fischl, K. (in prep.). A micro-regional perspective on the MBA/LBA transition in the Carpathian Basin: Maklár in North-eastern Hungary. *Ziridava*.

Kienlin, T.L., Save, S., Gömöri, A., Lie, M.A., and P. Fischl, K. (in press). Negotiating space at Emőd-Nagyhalom: The spatio-temporal dynamics of a Bronze Age mound, its enclosure and multi-phase outer settlement. *Praehistorische Zeitschrift*, in press.

Kovács, G., Röpke, A., Anvari, J., P. Fischl, K., Kienlin, T.L., Kulcsár, G., Vicze, M., and Pető, Á. (2024). Construction materials and building techniques. Comparing anthropogenic sediments of three Middle Bronze Age sites from Hungary. *Archaeological and Anthropological Sciences*, 16(143), https://doi.org/10.1007/s12520-024-02027-z

Lie, M.A. (2021). A particular case of Bronze Age household. In: Kienlin, T.L. and Găvan, A. (Eds.), *Bronze Age tell settlements in North-Western Romania. Current approaches and recent investigations*. Universitätsforschungen zur prähistorischen Archäologie, 364. Habelt, Bonn, pp. 253–275.

Lie, M.A. (2024). Structure layouts as a means of understanding household activities at the Bronze Age tell site of Toboliu (Western Romania). In: Kienlin, T.L. (Ed.), *Household practices and houses. Current approaches from archaeology and the sciences*. Cologne contributions to archaeology and cultural studies, 4. Universitätsforschungen zur prähistorischen Archäologie, 399. Habelt, Bonn, pp. 291–311.

Lie, M.A., Găvan, A., Cordoş, C., Kienlin, T.L., Fazecaş, G., and Gogâltan, F. (2019). The Bronze Age tell settlement at Toboliu (Bihor County, Romania). A brief outline of recent investigations. In: P. Fischl, K. and Kienlin, T.L. (Eds.), *Beyond divides. The Otomani-Füzesabony phenomenon. Current approaches to settlement and burial in the North-eastern Carpathian Basin and adjacent areas*. Universitätsforschungen zur prähistorischen Archäologie, 345. Habelt, Bonn, pp. 351–368.

Lie, M.A., Găvan, A., Kienlin, T.L., Röpke, A., Zickel, M., and Zerl, T. (2024). Exploring the chronostratigraphy of a Bronze Age settlement through core drilling. *Praehistorische Zeitschrift*, 99: 702–733, https://doi.org/10.1515/pz-2023-2026

Mengyán, Á. (2019). Middle Bronze Age finds from the southern foothills of the Bükk Mountains (North-eastern Hungary). Case studies of Maklár-Baglyashalom, Novaj-Földvár and Szihalom-Árpád vár. In: P. Fischl, K. and Kienlin, T.L. (Eds.), *Beyond divides. The Otomani-Füzesabony phenomenon. Current approaches to settlement and burial in the North-eastern Carpathian Basin and adjacent areas*. Universitätsforschungen zur prähistorischen Archäologie, 345. Habelt, Bonn, pp. 277–294.

Mengyán, Á. and Hrabák, Z. (2023). Maklár-Nagyrét II. Bronze Age cemetery and settlement (Preliminary report). *Hungarian Archaeology*, 12(2): 8–16, https://doi.org/10.36338/ha.2023.2.1

Molloy, B., Bruyère, C., Jovanović, D., and Milašinović, L. (2023). Creating communities, decreasing difference: the timing (and dating) of the emergence of Late Bronze Age channel-decorated pottery at the settlement and associated cemetery of Gradište Iđoš. In: Bălărie, A., Heeb, B., Metzner-Nebelsick, C., and Nebelsick, L. (Eds.), *Local traditions, culture contact or migration? The pottery of Cruceni–Belegiš–Gáva type as a cultural marker in Southeast Europe during the Late Bronze Age*. Editura MEGA, Cluj-Napoca, pp. 127–153.

Sava, V. (2020). The Late Bronze Age pottery in the South-Eastern Carpathian Basin. *Slovenská Archeológia*, 68: 253–296.

Sava, V. and Ignat, A. (2016). The beginning of the Late Bronze Age in the Lower Mureş Basin. An overview. In: Gogâltan, F. and Cordoş, C. (Eds.), *Prehistoric settlements: Social, economic and cultural aspects. Seven studies in the Carpathian Area*. Editura MEGA, Cluj-Napoca, pp.181–199.

Sørensen, M.L.S. and Vicze, M. (2013). Locating household activities on a Bronze Age tell. In: Madella, M., Kovács, G., Berzsenyi, B., and Briz i Godino, I. (Eds.), *The archaeology of household*. Oxbow, Oxford, pp. 159–178.

Szathmári, I. (1992). Füzesabony-Öregdomb. In: Meier-Arendt, W. (Ed.), *Bronzezeit in Ungarn. Forschungen in Tell-Siedlungen an Donau und Theiss*. Museum für Vor- und Frühgeschichte, Frankfurt a. M., pp. 134–140.

Szathmári, I., Guba, S., Kulcsár, G., Serlegi, G., Vágvölgyi, B., and Kiss, V. (2019). Füzesabony-Öregdomb Bronze Age tell settlement. New insights on the settlement structure. In: P. Fischl, K. and Kienlin, T.L. (Eds.), *Beyond divides. The Otomani-Füzesabony phenomenon. Current approaches to settlement and burial in the North-eastern Carpathian Basin and adjacent areas*. Universitätsforschungen zur prähistorischen Archäologie, 345. Habelt, Bonn, pp. 295–315.

Vicze, M. and Sørensen, M.L.S. (2023). *Living in a tell: Memory and abandonment. Százhalombatta-Földvár phase I (Late Koszider)*. Archaeologia Hungarica, 55. Százhalombatta archaeological expedition, 4. Hungarian National Museum, Budapest.