

## POLGÁR-CSŐSZHALOM

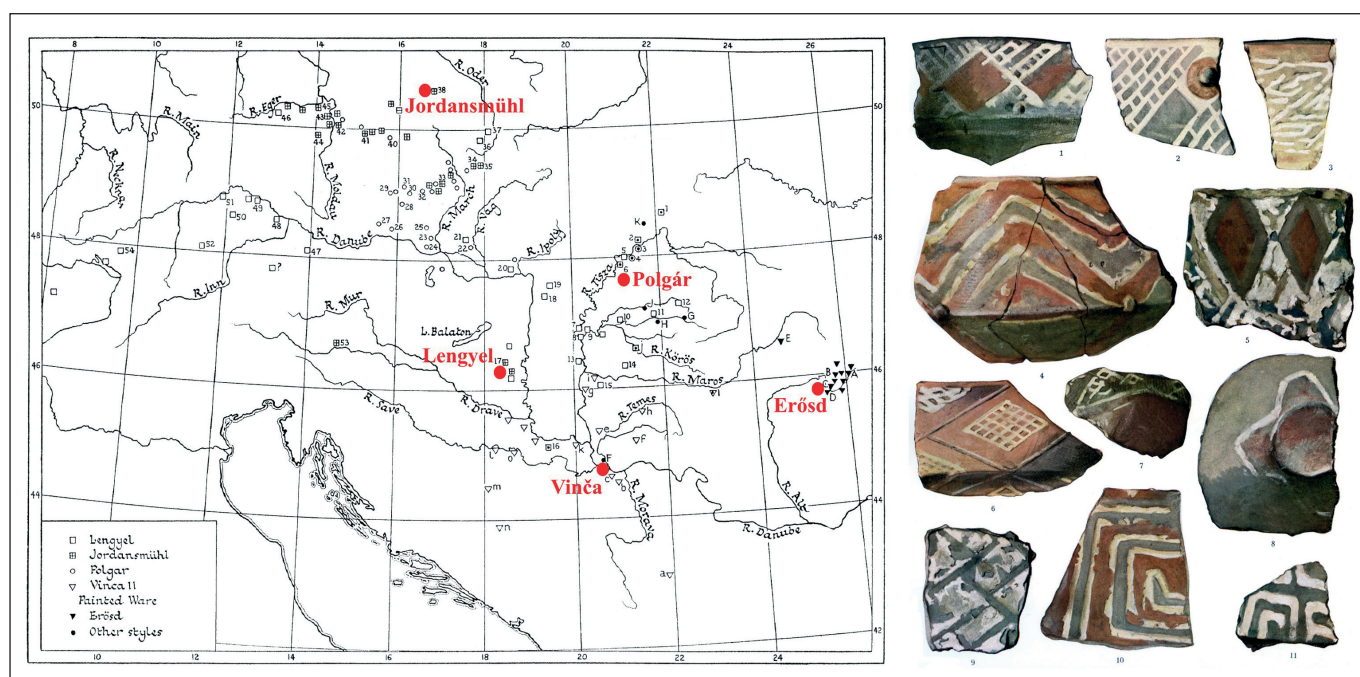
Results of the new multidisciplinary investigations of a Late Neolithic settlement in the Tisza region

ANDRÁS FÜZESI<sup>1</sup> – GÁBOR MESTERHÁZY<sup>2</sup> – GÁBOR SERLEGI<sup>3</sup> – GÁBOR MÁRKUS<sup>4</sup> – PÁL RACZKY<sup>1</sup>

*The Polgár-Csőszhalom site first became known to Hungarian and international archaeological scholarship in 1929. Following Ida Bognár-Kutzián's earlier excavation, the large-scale, complex investigation of the site was begun in 1989, whose main goal was a better understanding of both the site and its environment. The joint application of new research methods opened entirely new perspectives in archaeological research. Aerial archaeological photography, magnetometer surveys and geoarchaeological investigations combined with GIS modelling and field surveys enriched the canvas of the Late Neolithic communities settling at Polgár-Csőszhalom and on Polgár Island with countless new details and hues.*

### PREVIOUS RESEARCH

The Polgár-Csőszhalom site first came to the attention of international archaeological scholarship in 1929, when Vere Gordon Childe put the site yielding red and white painted pottery on his map showing the distribution of similar painted wares in the Danubian Basin (*Fig. 1*). In his comprehensive overview, he distinguished the Vinča II style in Serbia, the Lengyel style in Transdanubia, the Jordansmühl style in Silesia



*Fig. 1: V. Gordon Child's map of the sites characterised by different painted pottery wares in the Danube Basin. The most typical pottery styles are represented by the Polgár culture in the Tisza region, Vinča II in Serbia, Lengyel in Transdanubia, Jordansmühl in Silesia and Erősd along the upper reaches of the Olt. Painted pottery from Polgár-Csőszhalom published in Ferenc Tompa's 1929 monograph.*

<sup>1</sup> Department of Prehistory and Early History, Faculty of Humanities, Institute of Archaeological Sciences, Eötvös Loránd University.

<sup>2</sup> Site Diagnostics Group, Department of Archaeological Services, Gyula Forster National Centre for Cultural Heritage Management.

<sup>3</sup> Institute of Archaeology, Research Centre for the Humanities, Hungarian Academy of Sciences

<sup>4</sup> Archaeodata 1998 Bt.

and the Erőd style along the upper reaches of the Olt in addition to what he then called the Polgár culture. He assumed a closer link between these styles and sites in the context of the Danubian II complex, which he reconstructed as a broader cultural civilisation.<sup>5</sup> The first excavation on the site in 1957 revealed that the Csőszhalom settlement mound was an accumulation of several superimposed occupation layers made up of burnt house debris and other settlement remains. The 3–4 m high artificial mound was thus the northernmost representative of the South-East European tell settlements in the eastern half of the Carpathian Basin.<sup>6</sup>

The Institute of Archaeology of the Eötvös Loránd University (Budapest), the Museum für Vor- und Frühgeschichte (Frankfurt am Main) and the Déri Museum (Debrecen) launched a complex archaeological research project in 1989, whose goal was not only a better understanding of the Neolithic settlement at Polgár-Csőszhalom, but also of its one-time environment. The joint application of new research methods at the time of the political transition in Hungary opened entirely new perspectives in archaeological research. Aerial archaeological photography and magnetometer surveys revealed, for the first time, the remains of multiple buried ditches that had once enclosed the Csőszhalom tell settlement.<sup>7</sup> The integrated geoarchaeological studies involving geomorphological, hydrological, pedological and palaeobotanical analyses of the broader environment of the Csőszhalom settlement shed light on the interaction between the Late Neolithic community occupying the site and its environment.<sup>8</sup>

The pre-development excavations preceding the construction of the M3 Motorway section near Csőszhalom between 1995 and 2000 indicated that there was an extensive single-layer horizontal settlement around the Csőszhalom mound. The nearly 400 m by 80–90 m large investigated area roughly indicated the horizontal settlement's northern and southern boundary, but only yielded indirect information regarding its east to west extent. We estimated the settlement's entire size as covering an area of approximately 28 hectares, which exceeded by far the contemporaneous settlements on the Hungarian Plain that were 10–12 hectares large on the average. In 2006, we opened an east to west oriented 1000 m long trial trench, which indicated that the settlement was even larger and had covered some 38.6 hectares (Fig. 2). In addition to roughly determining the settlement's spatial extent, we also submitted seventy samples for classical radiocarbon dating in 1998, which indicated that the occupation of the Csőszhalom tell fell be-

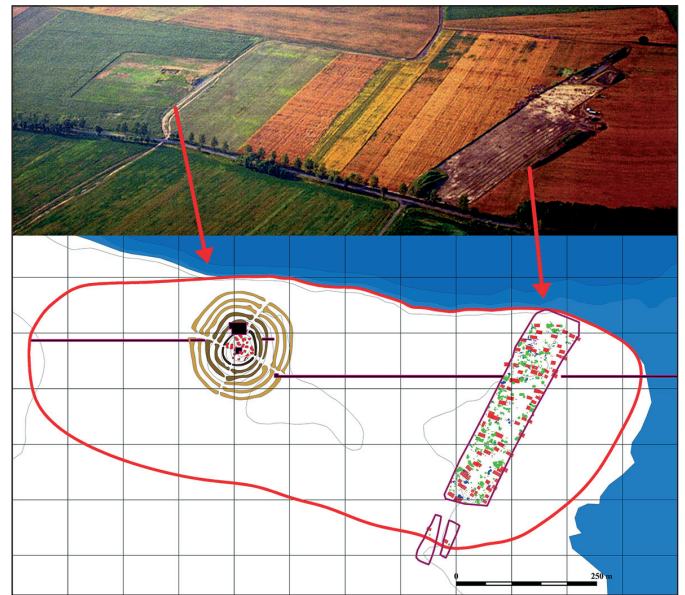


Fig. 2: Aerial photo and plan of the Late Neolithic settlement at Polgár-Csőszhalom based on the investigations between 1989 and 2010 (after Raczky, Pál – Anders, Alexandra: Activity loci and data for spatial division at a Late Neolithic site-complex (Polgár- Csőszhalom: a case study). In: *Leben auf dem Tell als soziale Praxis*, ed. Hansen, Svend (Bonn: Habelt, 2010), 143–163). The plan shows the then estimated 38.6 hectares extent of the settlement (red line), the tell settlement ringed by multiple ditches and the excavated area of the horizontal settlement (outlined in mauve).

<sup>5</sup> Childe, V. Gordon: *The Danube in Prehistory* (Oxford: Oxford University Press, 1929), Map III, 68–111.

<sup>6</sup> For an overview of early research, see Bánffy, Eszter – Bognár-Kutzián, Ida: *The Late Neolithic tell settlement at Polgár-Csőszhalom, Hungary. The 1957 excavation*. BAR International Series 1730, Central European Series 4 (Oxford: Archaeopress, 2007).

<sup>7</sup> For an overview of previous research at the site, see Raczky, Pál – Anders, Alexandra – Faragó, Norbert – Márkus, Gábor: [Short report on the excavation in 2014 at Polgár-Csőszhalom](#). *Dissertationes Archaeologicae ex Instituto Archaeologico Universitatis de Rolando Eötvös Nominatae* Ser. 3 (2014)/2, 363–375. (last accessed August 18, 2016).

<sup>8</sup> For a review of previous research, see Sümegi, Pál – Gulyás, Péter – Persaits, Gergő: The Geoarchaeological Evolution of the Loess-covered Alluvial Island of Polgár and its Role in Shaping Human Settlement Strategies. In: *Moments in Time. Papers Presented to Pál Raczky on His 60th Birthday*. *Ősrégészeti Tanulmányok/Prehistoric Studies* 1, ed. Anders, Alexandra – Kulcsár, Gabriella (Budapest: L'Harmattan, 2013), 901–912.

tween 4840 and 4560 BC.<sup>9</sup> We thus obtained a broad spatial and chronological reference system for the site, which enabled the reconstruction of the emergence and subsequent development of the settlement complex at Polgár-Csőszhalom.

### NEW SCALES AND APPROACHES TO SETTLEMENT HISTORY

The field surveys conducted as part of the British-Hungarian Upper Tisza Project (UTP) in the “Polgár Block”, the area between Polgár and Tiszadob along the Tisza, involved the identification and mapping of archaeological sites across a roughly 280 km<sup>2</sup> large area, offering a wider perspective on the cultural setting of the Polgár-Csőszhalom settlement.<sup>10</sup>

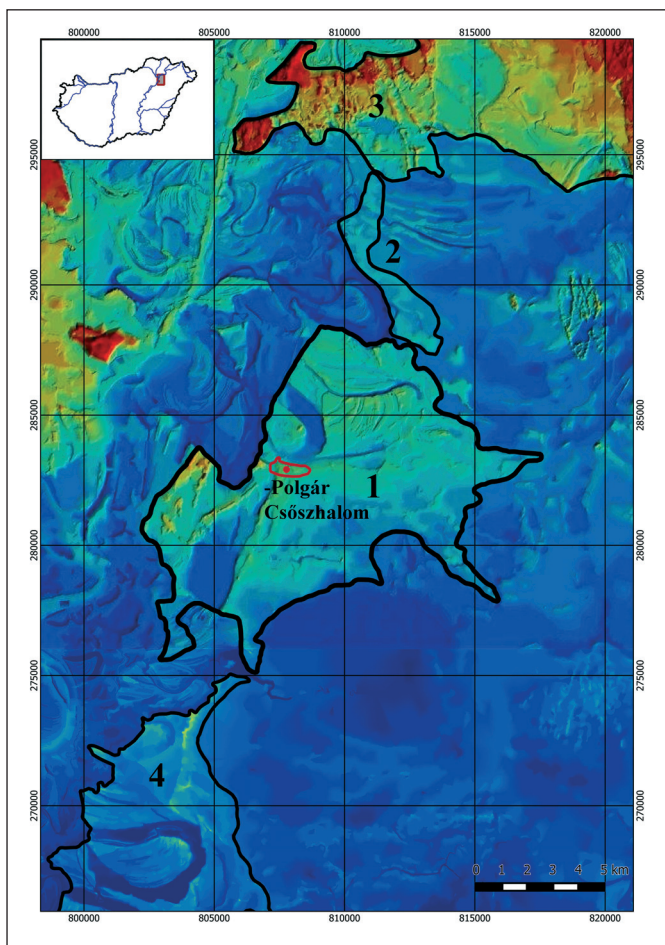


Fig. 3: The digital terrain model of the upper Tisza channel with the flood-free elevation of Polgár Island, the natural micro-regional habitat in the Late Neolithic.  
 1. Polgár Island, 2. land corridor to Tiszadob Island, 3. Tiszadob Island, 4. Tiszacsege Island (made by Gábor Tímár; 2003).

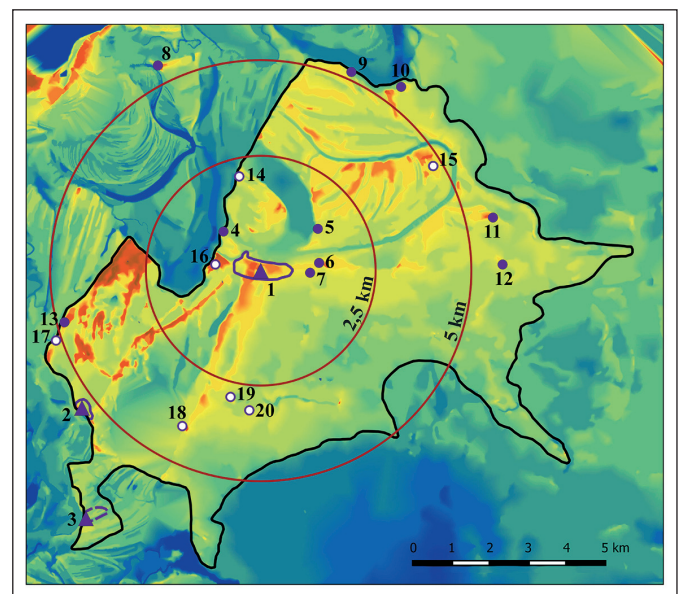


Fig. 4: Late Neolithic sites on Polgár Island, based on archaeologically verified locations (1–13) and locations known from the archaeological literature (14–20):  
 1. Polgár-Csőszhalom, 2. Polgár-Bosnyákdomb (tell-like), 3. Folyás-Kígyós-domb (tell-like) (Varjas-hát, earlier known as Polgár-Kígyós-domb), 4. Polgár-Tunyai-tanya, 5. Polgár-Kengyel-köz, 6. Polgár 013 (UTP site), 7. Polgár-Kengyel-oldali-dűlő, 8. Polgár-Boldog-rét, 9. Újtikos-Demeterkút, 10. Újtikos-Vaskapu, 11. Polgár-Horti-legelő II, 12. Polgár-Kis-Horti-dűlő, 13. Polgár-Király-ér-part, 14. Polgár 023 (UTP site), 15. Polgár-Kengyel-köz V, 16. Polgár-Kenderföldek, 17. Polgár-Király-ér-part III, 18. Polgár 047 (UTP site), 19. Polgár-Piócási-dűlő, 20. Polgár-Piócási-dűlő 2 (Kásahalmi-dűlő). The concentric circles with a radius of 2.5 and 5 km mark the boundaries of the narrower and broader subsistence areas.

<sup>9</sup> Hertelendi, Ede – Svingor, Éva – Raczky, Pál – Horváth, Ferenc – Futó, István – Bartosiewicz, László: Duration of tell settlements at four prehistoric sites in Hungary. *Radiocarbon* 40 (1998)/2, 659–665.

<sup>10</sup> Chapman, John: Social power in the early farming communities of Eastern Hungary – Perspectives from the Upper Tisza region. *Jósa András Múzeum Évkönyve* 36 (1994), Fig. 2. 93.

The digital terrain model of the Tisza region too offered new perspectives in the study of the one-time natural environment. The geographic unit of what we designated as “Polgár Island” was determined within the system of the diachronic shifts in river channels and the flood-free elevations.<sup>11</sup> This roughly 93 km<sup>2</sup> large loess-covered area rising above the floodplain provided an excellent habitat for the area’s Late Neolithic communities (Fig. 3). This area, which could be well circumscribed in terms of its hydrology and geological characteristics, became study area for the large-scale investigation of the Polgár-Csőszhalom settlement.

We have conducted several field surveys since 2012 in order to reconstruct the settlement network of the Polgár micro-region and its diachronic changes. Alongside modern survey techniques, we consistently used the same set of criteria, leading to the re-assessment of some already known sites and the identification of new ones.<sup>12</sup> The registration of the exact spatial position of the archaeological finds meant that the distribution of the finds of each archaeological period could be exactly determined for every site.<sup>13</sup> As a result of these surveys, we identified thirteen new sites and verified seven other sites of the Late Neolithic known from the earlier archaeological literature (Fig. 4). We could distinguish two zones based on their location: one cluster lying around Polgár-Csőszhalom within a distance of 1–1.5 km and another cluster lying 5 km from the settlement. The settlement network was quite clearly dominated by the Polgár-Csőszhalom site, which marked the centre of Polgár Island. In terms of size and settlement type, the next tier of the settlement hierarchy is represented by the tell-like settlements at Bosnyákdomb and Kigyós-domb, both of which lie on the edge of the south-western floodplain. The other settlements can be assigned to the category of small, farmstead-like sites in this settlement system. It seems to us that these

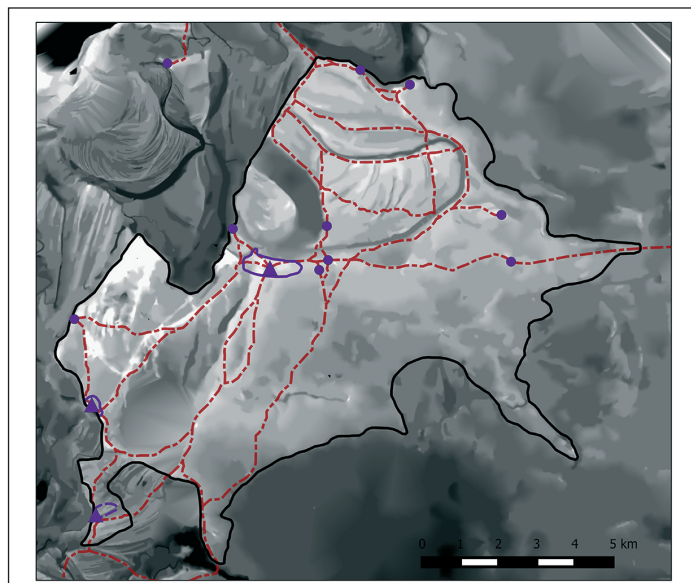


Fig. 5: Reconstruction of the pathway network between the Late Neolithic settlements of Polgár Island based on a least-cost path network analysis. The routes (red dashed lines) in part lead to the two tell-like settlements of Bosnyákdomb and Kigyós-domb (triangles) in the southern part of Polgár Island and in part link ten smaller farmstead-like settlements in the narrower environs of Csőszhalom in the northern part (after Gábor Mesterházy’s analysis for his PhD thesis, currently in preparation, 2016).

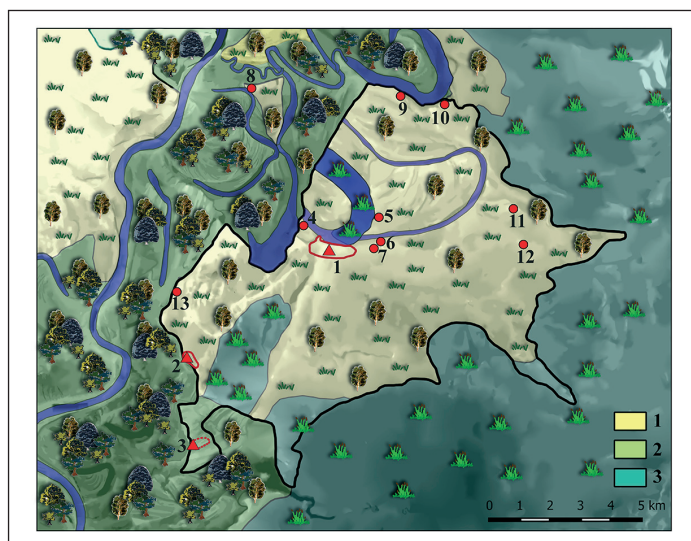


Fig. 6: Reconstructed vegetation zones and their distribution on Polgár Island, an alluvial lag surface, during the Late Neolithic: 1. open vegetation (pastures, steppe, cultivated fields), 2. gallery woods, 3. marshland areas (after Sümegei et al. 2005)

<sup>11</sup> Tímár, Gábor – Sümegei, Pál – Horváth, Frank: Late Quaternary dynamics of the Tisza River: Evidence of Climatic and tectonic controls. *Tectonophysics* 410 (2005)/1–4, 97–110; Sümegei, Pál – Csökmei, Bálint – Persaits, Gergő: The evolution of Polgár island, a loess-covered lag surface and its influences on the subsistence of settling human cultural groups. In: *Environmental Historical Studies from the Late Tertiary and Quaternary of Hungary*, ed. Hum, László – Gulyás, Sándor – Sümegei, Pál (Szeged: University of Szeged, 2005), 141–164.

<sup>12</sup> Gábor Mesterházy’s PhD research project in the Institute of Archaeological Sciences, Eötvös Loránd University.

<sup>13</sup> Mesterházy, Gábor: Regionális léptékű terepbejárás módszertani lehetőségeinek vizsgálata Magyarországon. *Archaeológiai Értesítő* 138 (2013), 265–279.

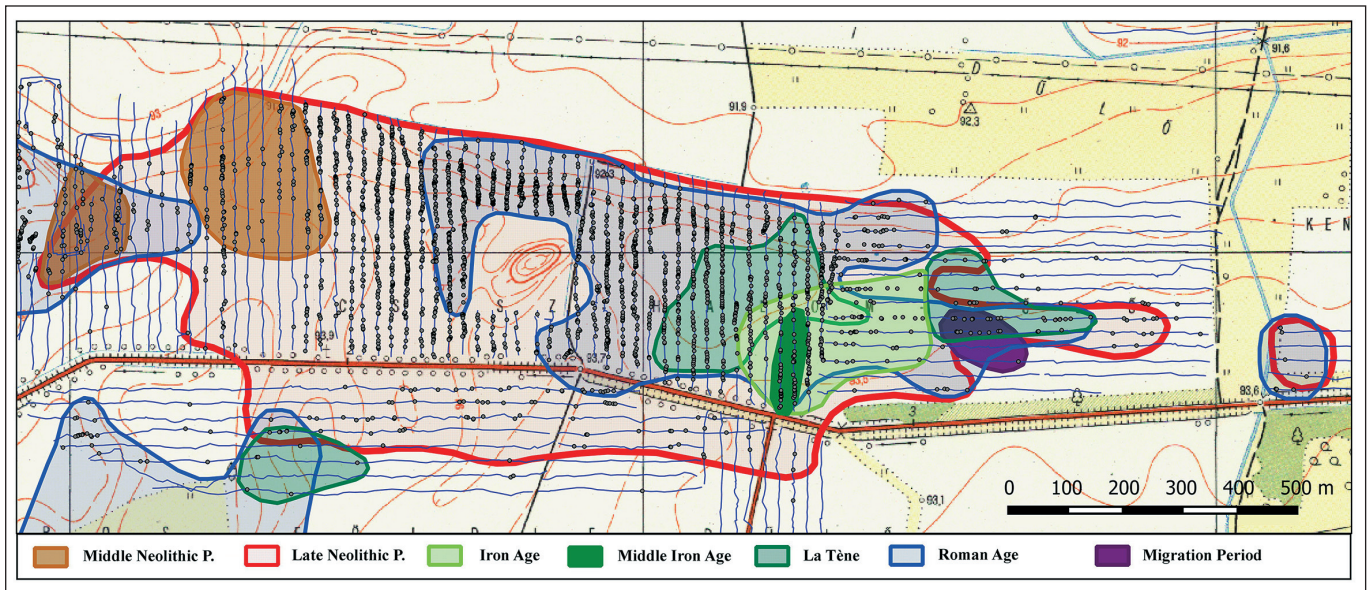


Fig. 7: Spatial distribution of pottery fragments from the systematic surface collection according to archaeological periods. The boundaries of the scatters of Late Neolithic artefacts are highlighted (based on Gábor Mesterházy's analysis, 2016).

topographical data reflect a complex socio-ecological system extending across the entire territory of Polgár Island, which is also confirmed by the research findings of the Körös Regional Archaeological Project.<sup>14</sup>

We prepared a series of flood and precipitation models to determine the settlement and floodplain zones, and we also used these models for reconstructing the one-time pathways system. The least-cost path network analysis, combined with the reconstruction of the terrain and the hydrological conditions, outlined the most likely routes between the known sites. A theoretical pathway network of the entire territory of Polgár Island was then prepared based on the individual pathway sections (Fig. 5); this network indicated the period's communications routes and can in this sense be interpreted as a local network in the context of the period's communities and their environment.

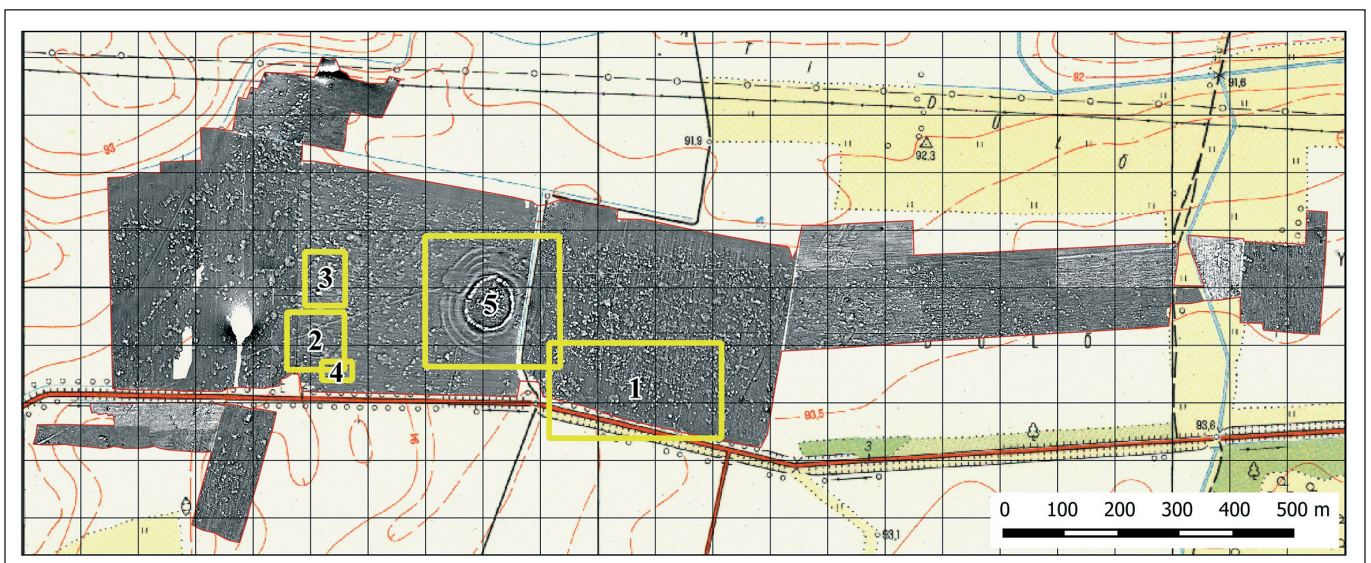


Fig. 8: Results of the magnetometer survey of the Late Neolithic settlement at Polgár-Csőszhalom (combined plan, based on the survey by Gábor Márkus in 2013 and Gábor Serlegi in 2015 and 2016, made by Gábor Serlegi, 2016). Enlarged images of the areas within the yellow boxes are shown in Figs 9–12 and 14.

<sup>14</sup> Parkinson, William A.: *The Social Organization of Early Copper Age Tribes on the Great Hungarian Plain*. BAR International Series 1573. (Oxford: British Archaeological Reports, Arceopress, 2006), 139–144.

The palaeoenvironmental investigations aimed at the reconstruction of the vegetation of Polgár Island revealed that the micro-region was covered with forested steppe, steppe and gallery woods before the spread of Neolithic economies. Around 5600/5500 BC, with the local spread of arable farming and stockbreeding, these subsistence activities were practiced in the immediate vicinity of the settlements. By the Late Neolithic, between 5000 and 4500 BC, complex farming saw a spatial expansion and reached the floodplain zones enclosing Polgár Island. Human activities had a dramatic impact on the environment: the woodland in the interior and on the floodplain virtually disappeared by the period's end (Fig. 6).<sup>15</sup>

The field survey of the Late Neolithic site of Polgár-Csőszhalom, the central settlement of Polgár Island, was conducted in four phases in 2015. We could distinguish fifteen sub-periods within the five main archaeological periods on the site based on the roughly 3300 pottery sherds collected during the survey. We found a very intensive scatter of finds for some 350–450 m to the east and west of the tell,

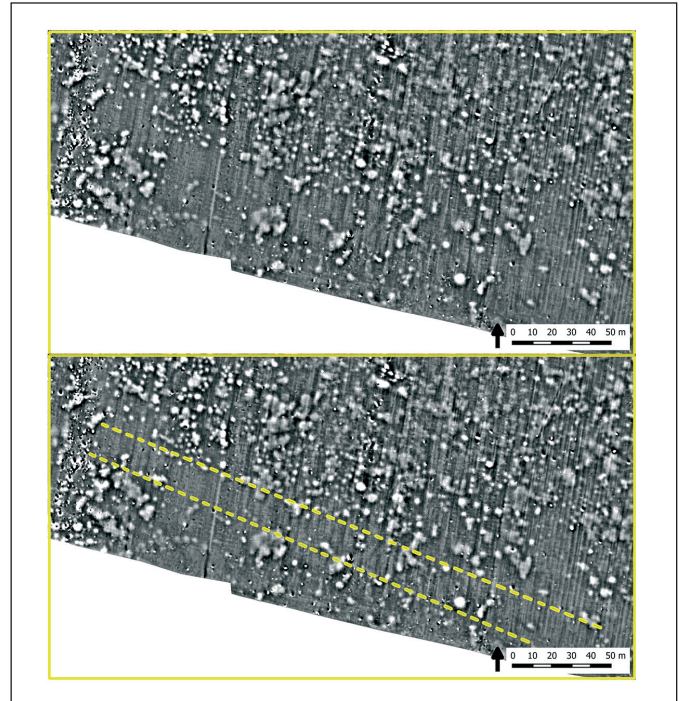


Fig. 9: The pathway leading to the south-eastern entrance of the circular enclosure system at Polgár-Csőszhalom (dashed yellow line) on the magnetometer image; the 10 m wide pathway could be traced along a 300 m long section among the many features of the horizontal settlement (Fig. 8, box 1).

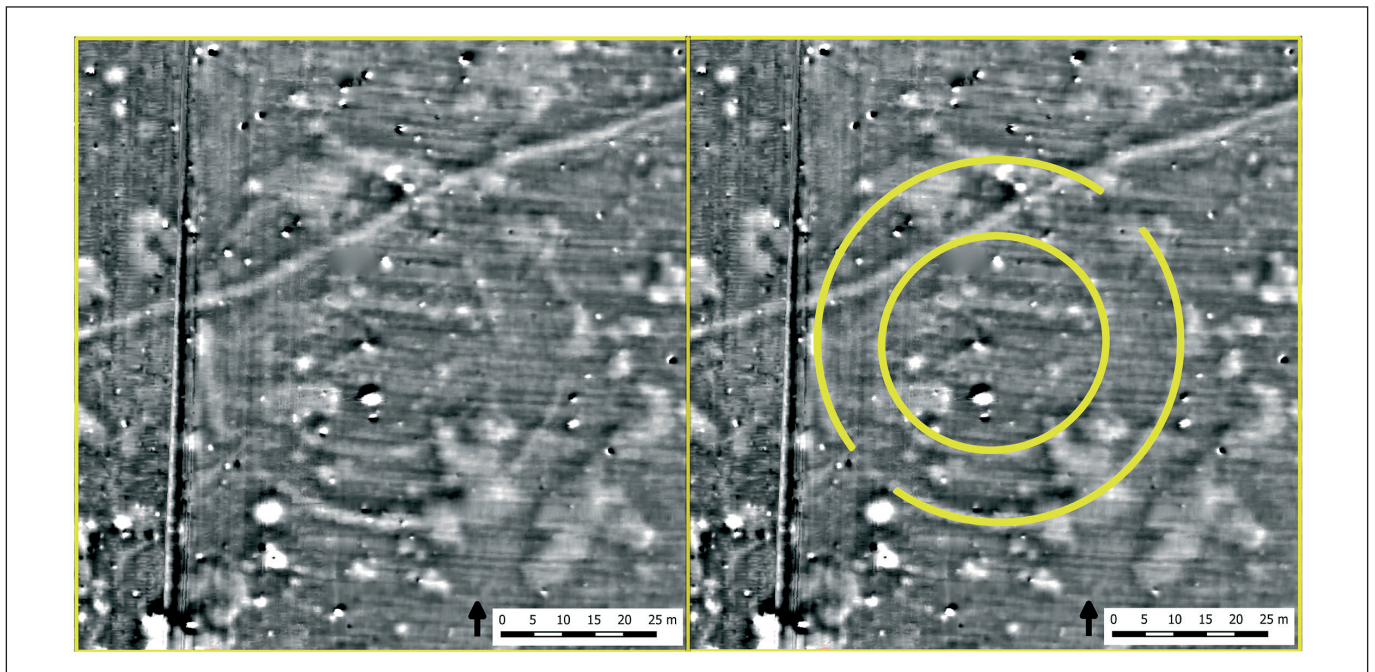


Fig. 10: A double circular enclosure with a diameter of 40 m and 60 m, respectively (outlined in yellow), was identified 300 m south-west of the Polgár-Csőszhalom tell on the magnetometer image (Fig. 8, box 2), which was investigated by a sounding excavation in 2014 (Raczky, Pál – Anders, Alexandra – Faragó, Norbert – Márkus, Gábor: *Short report on the excavation in 2014 at Polgár-Csőszhalom*. *Dissertationes Archaeologicae ex Instituto Archaeologico Universitatis de Rolando Eötvös Nominatae Ser. 3* (2014)/2, 363–375. (last accessed August 18, 2016).

<sup>15</sup> K. Magyar, Enikő – Chapman, John – S. Fairbairn, Andrew – Francis, Mark – de Guzman, Margarita: Neolithic human impact on the landscapes of North-East Hungary inferred from pollen and settlement records. *Vegetation History and Archaeobotany* 21 (2012), 279–302.

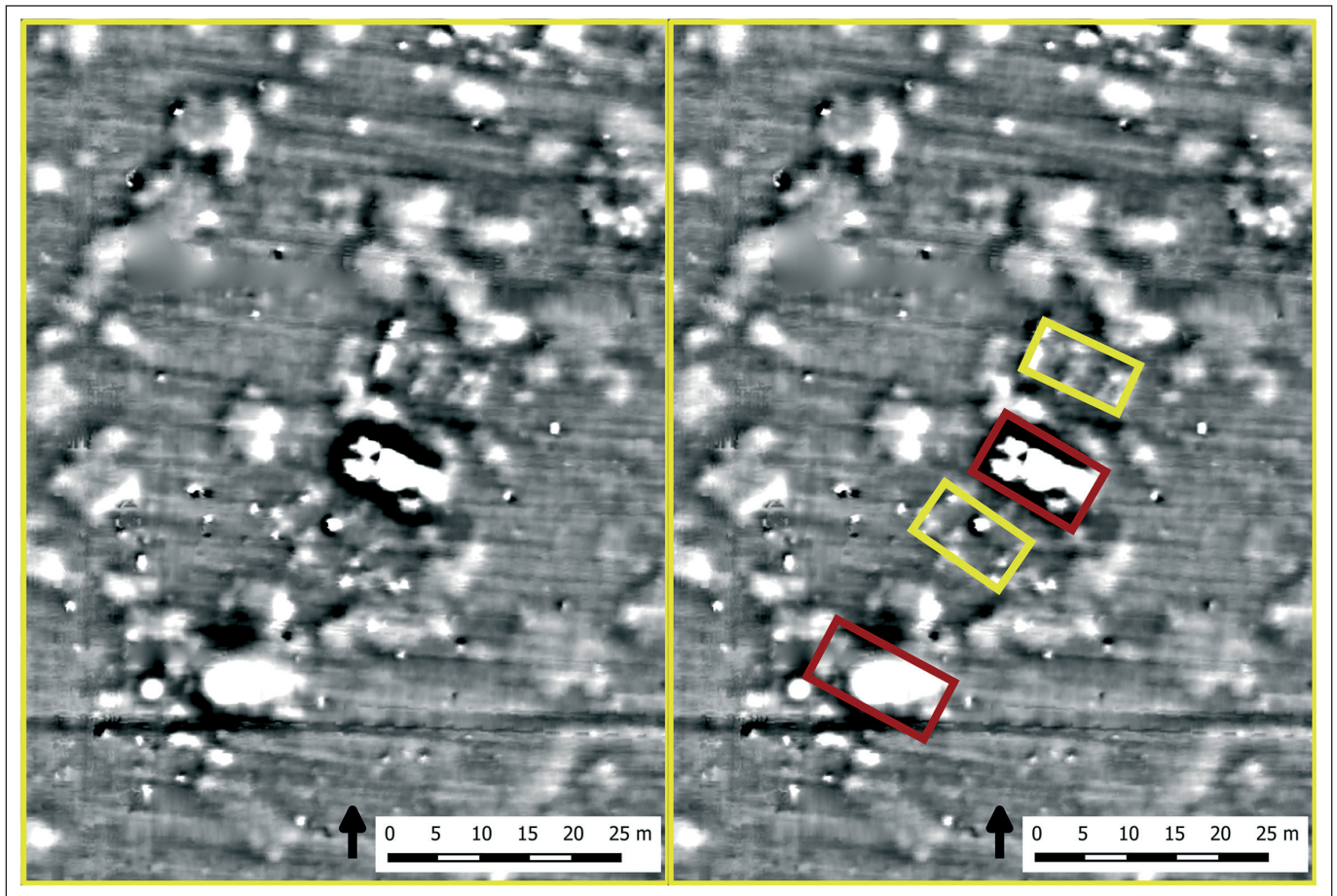


Fig. 11: Several rectangular anomalies fell into the 15–30 nT/m range in the western part of the horizontal settlement at Polgár-Csőszhalom, which were interpreted as indicating the debris of burnt houses (red rectangles) and post-framed buildings (yellow rectangles). On the testimony of the magnetometer survey, these houses were arranged in rows in this area (Fig. 8, box 3).

while the scatter of pottery fragments ended at the Hódos Stream towards the north, marking the settlement's natural boundary. Owing to the changing and uneven conditions under which observations could be made, the intensity of pottery sherds decreased significantly in the adjacent eastern, southern and western areas. A continuous scatter of Late Neolithic finds could be recorded across a 75 hectares large area (Fig. 7).

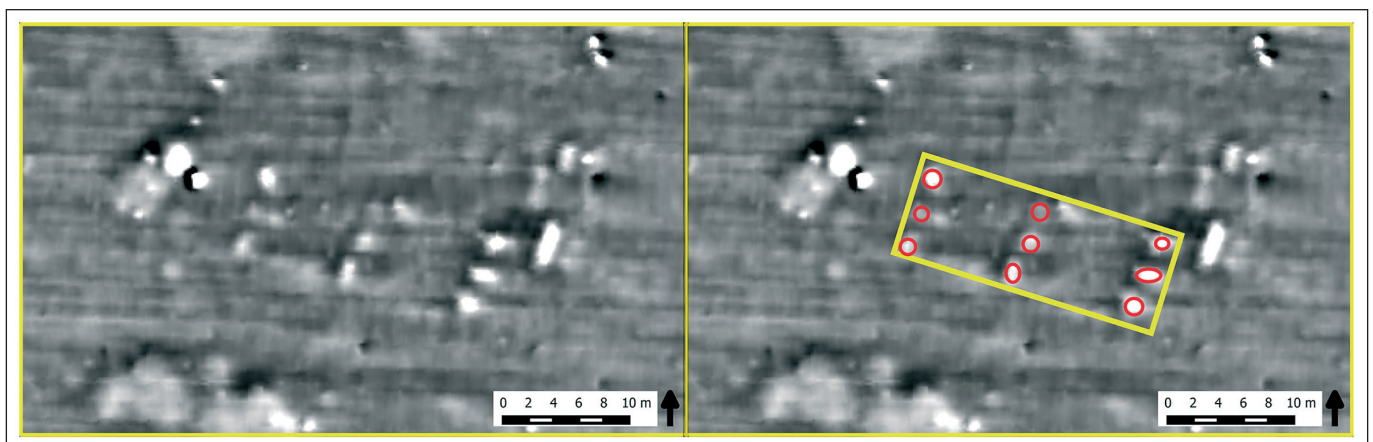


Fig. 12: The houses of which only the burnt remains of the main posts survived (red circles), but lack a burnt debris layer overlying the house, can be clearly made out on the magnetometer image of the Polgár-Csőszhalom settlement. A building of this type was identified south-east of the double circular enclosure, which was investigated by a ground-truthing excavation in 2014 (Fig. 8, box 4).

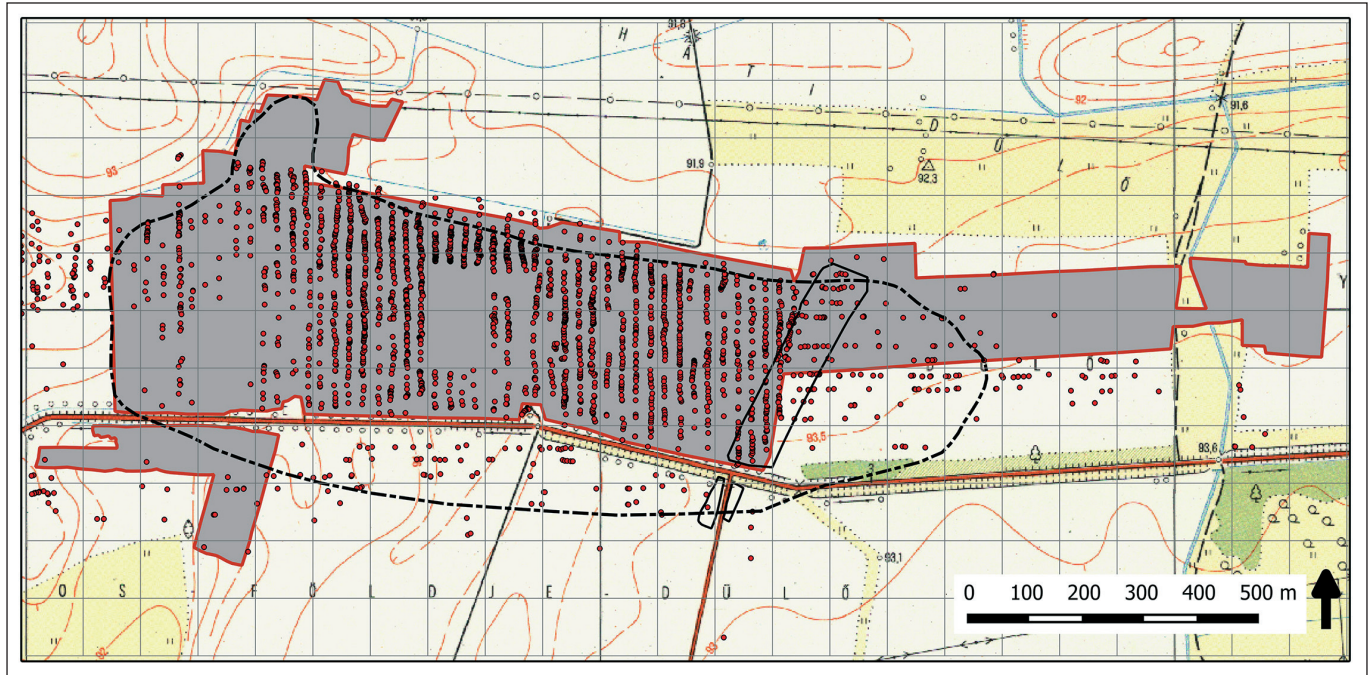


Fig. 13: The probable boundary of the Late Neolithic settlement at Polgár-Csőszhalom (black dashed line) based on the information provided by the surface scatter of pottery fragments (red dots) and the magnetometer survey (grey area); the excavated area is outlined in black. The estimated size of the settlement is roughly 65.8 hectares.

The most recent magnetometer survey of the site was performed in three phases, in part owing to the differing vegetation cover of the site and in part owing to the different owners of the land on which the site lies. First, in 2013, in collaboration with Archaeodata 1998 Bt., we surveyed the tell and the field to its east, an area of roughly 30 hectares using a SENSYS MAGNETO®-MX ARCH 16 channel magnetometer with sensors mounted at 0.25 m intervals along a 4 m wide sensor frame. In December 2015 and spring 2016, in collaboration with the Institute of Archaeology of the Research Centre for the Humanities of the Hungarian Academy of Sciences, we surveyed an additional 35 hectares towards the east and west using a SENSYS MAGNETO®-MX-PDA 5 channel magnetometer with sensors mounted at 0.5 m intervals. Similarly to the field survey, the magnetometer surveys too indicated intensive human occupation and yielded exciting new data on the internal layout of the site (Fig. 8).

We detected a 10 m wide area devoid of any anomalies indicating archaeological features lying south-east of the clearly outlined tell and the multiple ditches ringing it, which we interpreted as the road leading to the tell (Fig. 9). We found another double circular enclosure (with diameters of 40 m and 60 m) some 300 meters south-west of the tell, which we investigated with a sounding excavation in 2014 (Fig. 10). We identified the traces of several houses axially aligned towards the tell. In addition to post-framed buildings, there were several oblong anomalies, especially on the western side, which we interpreted as burnt houses. The features falling into the 15–30 nT/m

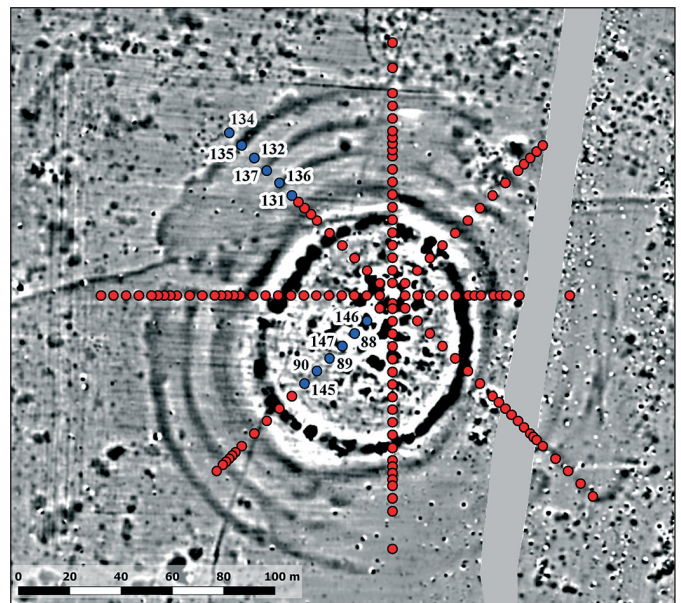


Fig. 14: The sampling locations (red dots) of the soil cores extracted on the tell settlement at Polgár-Csőszhalom between 1989 and 1991 (coring project by Gábor Rózsa and András Varga, reconstruction by András Füzesi, 2016). The sampling locations on Fig. 15 are marked with blue.



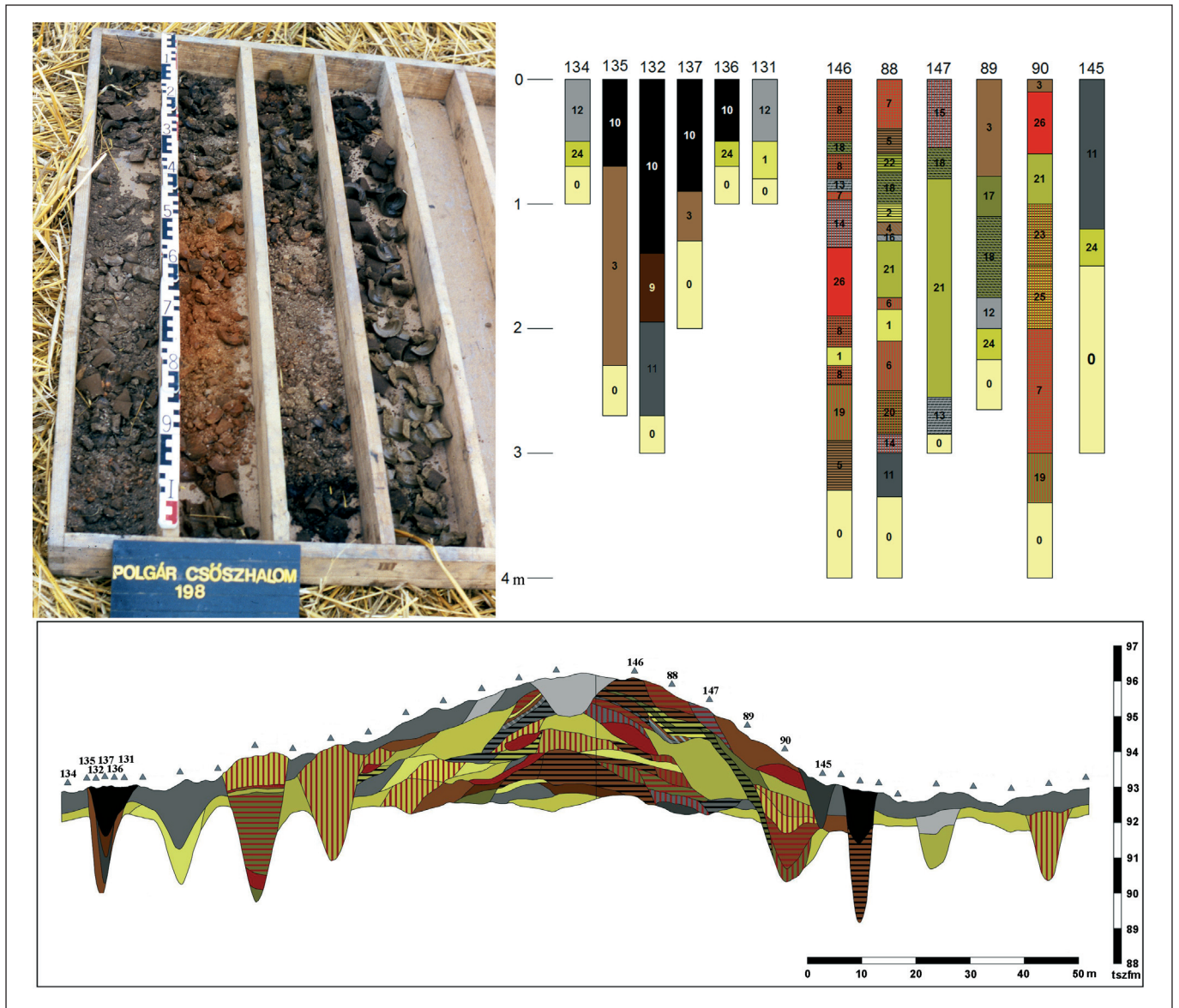


Fig. 15: The probable layer sequence of the tell settlement at Polgár-Csőszhalom based on the combined section of the north-western and south-western cores (reconstruction by András Füzesi, 2016).

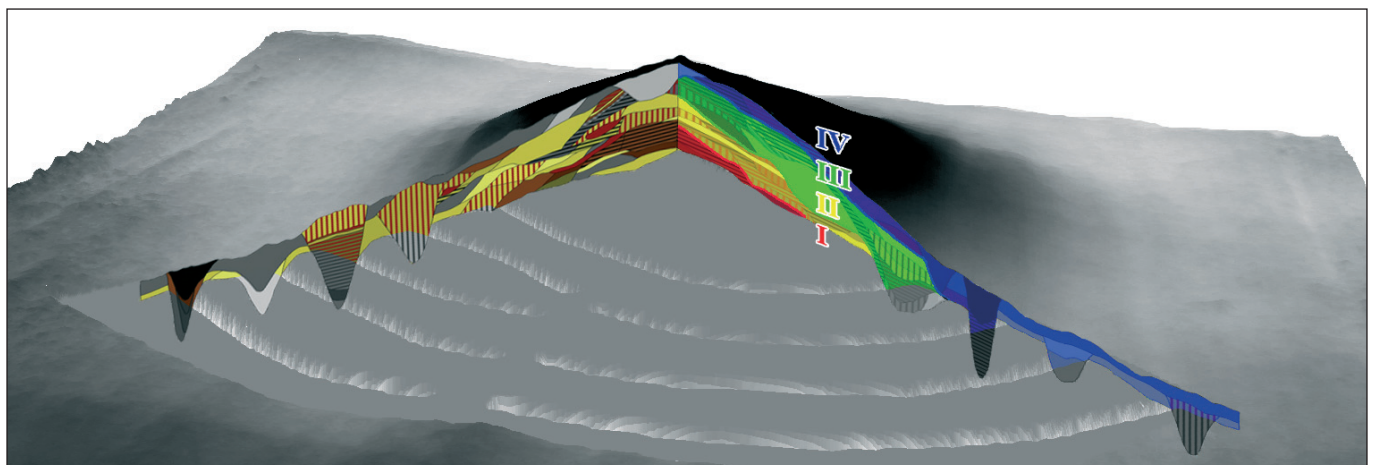


Fig. 16: 3D model of the probable layer sequence of the Late Neolithic tell settlement at Polgár-Csőszhalom based on the north-western and south-western sections (reconstruction by András Füzesi, 2016).  
I–IV: the main building horizons of the tell settlement.

range showed a concentration in this area (Figs 11–12). The groundplans of the houses were outlined by the burnt debris layers or the burnt patches of the one-time posts. Several parallels from South-East Europe suggest that the houses had been deliberately burnt as part of special activities and it seems that similar activities had been performed at Polgár too.

The spatial extent of the Late Neolithic settlement at Polgár-Csőszhalom was determined from the surface distribution of pottery and the data of the magnetometer surveys, which indicated that the settlement had covered an area of 65.8 hectares (Fig. 13), making this settlement definitely stand out in the context of the cultural network spanning several regions in the Late Neolithic of the Tisza region.

The soil corings on the tell settlement at Polgár-Csőszhalom were co-ordinated by András Varga in May and August 1989 and in July 1991. A total of 149 cores were extracted from the tell settlement's layer sequence from well-identifiable points along the cardinal and intercardinal directions (Fig. 14). The 2–5 m long cores were evaluated for their pedological and archaeological information by András Varga and Gábor Rózsa. Individual fill levels were distinguished according to their colour, nature and secondary constituent elements. The presence of ash, charcoal and burnt daub was treated as representing particularly important markers of human activity (Fig. 15). We could identify the debris of burnt houses, fills indicating levelling activity on the tell and pits of diverse function with the aid of computer simulations, which we now used instead of the earlier manually drawn colour images. Based on the data of the cores, we could prepare sections of the layer sequence of the settlement mound in each cardinal direction. The image of the layer sequence thus gained conformed to the four main occupation levels identified during the excavations (Fig. 16).

Several magnetometer surveys were made between 1991 and 2013 of the tell settlement at Polgár-Csőszhalom. Their comparison shows that the earth-moving during the excavations, agricultural activity and the pollution from the dirt track across the tell settlement's edge now cover the eastern segment of the enclosure system (Fig. 14). A similar phenomenon can be noted in the tell's central area, where the backfilling of the excavation trenches changed the area's geomagnetic conditions. The 40 m by 40 m magnetometer survey on a 0.5 m grid

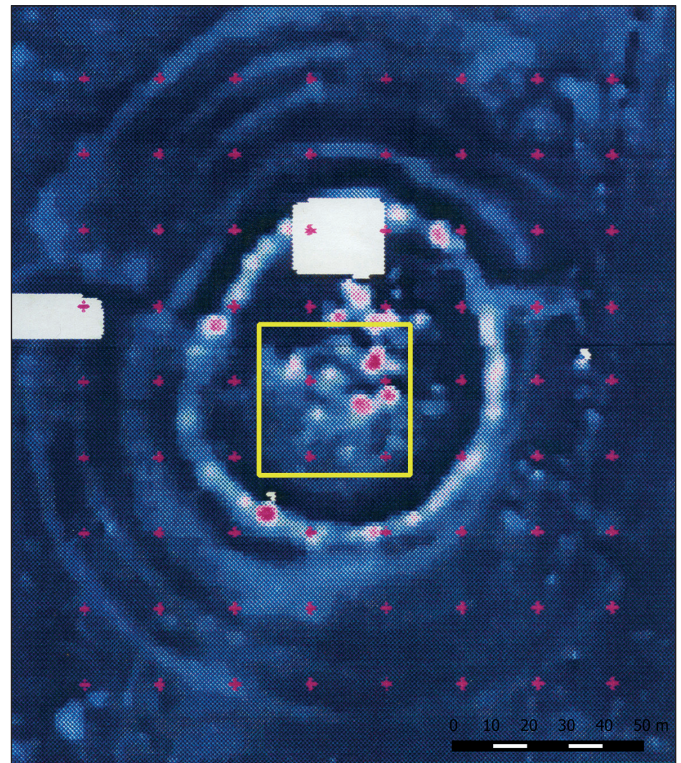


Fig. 17: The magnetometer survey of the tell settlement at Polgár-Csőszhalom with details of the 40 m by 40 m central area (yellow box, made by András Füzesi, based on the survey by Balázs Székely in 1991).

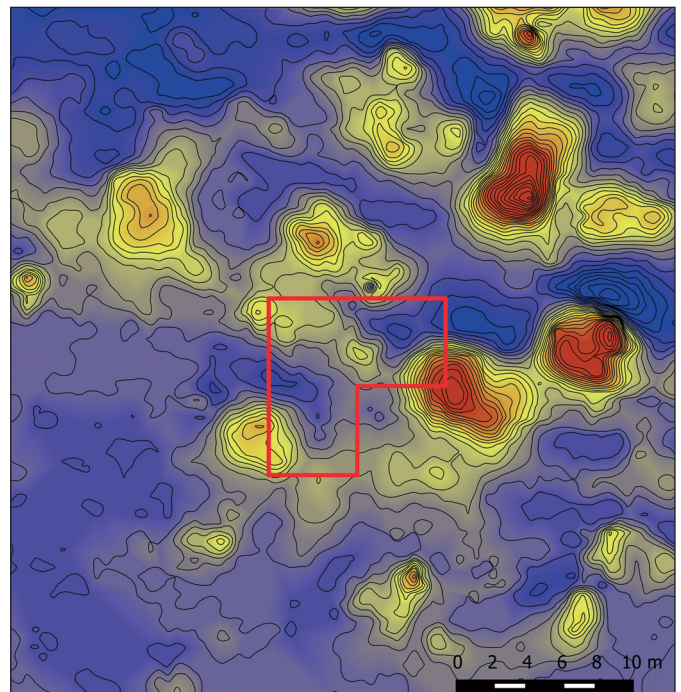


Fig. 18: The magnetometer survey of a roughly 40 m by 40 m large area on a 0.5 m grid in the central area of the tell settlement at Polgár-Csőszhalom showing the locations of the burnt buildings (made by András Füzesi, 2016, based on the survey by Balázs Székely in 1991). The excavated area is outlined in red.

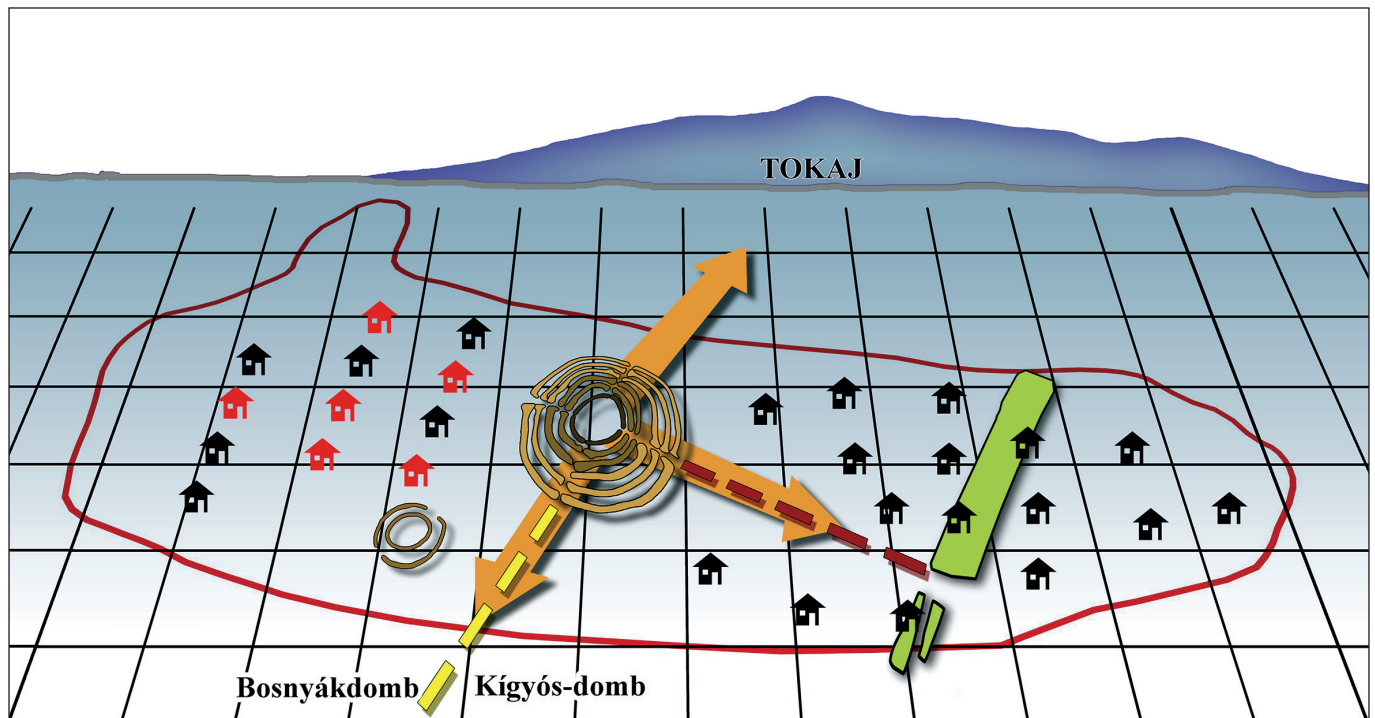


Fig. 19: The complex analyses enabled the modelling of the Late Neolithic settlement at Polgár-Csőszhalom.

The features of the tell ringed by multiple enclosures and the horizontal settlement formed an organic unit.

The directions indicated by the entrances of the enclosure system ringing the tell extended the settlement's inner network into a broader micro-regional and regional context.

conducted by the Department of Geophysics of the Eötvös Loránd University in 1991 shows the central area of the Csőszhalom tell (Fig. 17). An intensive double anomaly surrounded by anomalies with similar magnetic properties was recorded in the area's centre (Fig. 18). The subsequent excavation of the area revealed the presence of burnt houses in the intersection area of the four entrances through the circular enclosure system. These centrally located houses, containing special and unusual archaeological finds, were enclosed by various other structures. The central location of the tell settlement's burnt houses and the north-west to south-east orientation of the horizontal settlement's houses reflect two entirely different systems of spatial organisation and, presumably, two different space-time reference systems in the life of the community once occupying the Polgár-Csőszhalom settlement.<sup>16</sup>

The complex analyses enabled the modelling of the Late Neolithic settlement at Polgár-Csőszhalom (Fig. 19). The tell ringed by the circular enclosures and the horizontal settlement was physically linked by a road that led to the enclosure system's south-eastern part. The north-eastern entrance of the circular enclosure faced Mount Tokaj towering over the horizon. The least-cost path network analyses suggested that the south-western entrance of the enclosure system looked towards the southern part of Polgár Island, towards Kígyós-domb and Bosnyákdomb. These elements reflected the various scales of the area's mental regionscape; at the same time, this network pointed beyond the local settlement area and blended into a broader micro-regional and regional territory. The houses of the horizontal settlement lying east of the tell showed no traces of burning, while the house west of the tell were often burnt. The double enclosure south-east of the tell can be interpreted as the mobilising "architecture" of a larger community. The main spatial elements of the settlement at Csőszhalom represent the foci of different activities performed by communities with a diverse social make-up and their manifold interactions, as well as the settlement's different temporal horizons.

<sup>16</sup> Raczky, Pál – Anders, Alexandra: Activity loci and data for spatial division at a Late Neolithic site-complex (Polgár-Csőszhalom: a case study). In: *Leben auf dem Tell als soziale Praxis*, ed. Hansen, Svend (Bonn: Habelt, 2010), 143–163.

## ACKNOWLEDGEMENTS

This study was written as part of the project funded by OTKA Grant no. NK 101024.

We are grateful for the assistance in the magnetometer surveys conducted in 2015 and 2016 provided by the Institute of Archaeology of the Research Centre for the Humanities of the Hungarian Academy of Sciences.

## RECOMMENDED LITERATURE

BÁNFFY, ESZTER – BOGNÁR-KUTZIÁN, IDA

*The Late Neolithic tell settlement at Polgár-Csőszhalom, Hungary. The 1957 excavation.* BAR-IS 1730, Central European Series 4. Oxford: Archeopress, 2007.

CHAPMAN, JOHN

Social Power in the early farming communities of Eastern Hungary – Perspectives from the Upper Tisza region (Társadalmi erőforrás a kelet-magyarországi korai földművelő közösségekben a Felső-Tisza-vidék szemszögéből). *Jósa András Múzeum Évkönyve* 36 (1994), 79–99.

CHILDE, V. GORDON

*The Danube in Prehistory.* Oxford: Oxford University Press, 1929.

HERTELENDI, EDE – SVINGOR, ÉVA – RACZKY, PÁL – HORVÁTH, FERENC – FUTÓ, ISTVÁN, BARTOSIEWICZ, LÁSZLÓ  
Duration of tell settlements at four prehistoric sites in Hungary. *Radiocarbon* 40 (1998)/2, 659–665.

HERZOG, IRMELA

The Potential Limits of Optimal Path Analysis. In: *Computational Approaches to Archaeological Spaces*, ed. Bevan, Andrew – Lake, Mark, 179–211. Walnut Creek, CA: Left Coast Press, 2013.

K. MAGYARI, ENIKŐ – CHAPMAN, JOHN – S. FAIRBAIRN, ANDREW – FRANCIS, MARK – DE GUZMAN, MARGARITA  
Neolithic human impact on the landscapes of North-East Hungary inferred from pollen and settlement records. *Vegetation History and Archaeobotany* 21 (2012), 279–302.

MESTERHÁZY, GÁBOR

Regionális léptékű terepbejárás módszertani lehetőségeinek vizsgálata Magyarországon. *Archaeológiai Értesítő* 138 (2013), 265–279.

PARKINSON, WILLIAM A.

*The Social Organization of Early Copper Age Tribes on the Great Hungarian Plain.* BAR International Series 1573. Oxford: British Archaeological Reports, Archeopress, 2006.

RACZKY, PÁL – ANDERS, ALEXANDRA

Activity loci and data for spatial division at a Late Neolithic site-complex (Polgár-Csőszhalom: a case study). In: *Leben auf dem Tell als soziale Praxis*, ed. Hansen, Svend, 143–163. Bonn: Habelt, 2010.

A. Füzési et al. • *Polgár-Csőszhalom: Results of the new multidisciplinary investigations of a Late Neolithic...*

RACZKY, PÁL – ANDERS, ALEXANDRA – FARAGÓ, NORBERT – MÁRKUS, GÁBOR

[Short report on the excavation in 2014 at Polgár-Csőszhalom.](#) *Dissertationes Archaeologicae ex Instituto Archaeologico Universitatis de Rolando Eötvös Nominatae* Ser. 3 (2014)/2, 363–375. (last accessed 18 August, 2016)

RASSMANN, KNUT – MISCHKA, CARSTEN – FURHOLT, MARTIN – OHLRAU, RENÉ – RADLOFF, KAI – WINKELMANN, KAY – SERLEGI, GÁBOR – MARTON, TIBOR – OSZTÁS, ANETT – OROSS, KRISZTIÁN – BÁNFFY, ESZTER

[Újkőkori lelőhelyek nagyfelületű geomágneses felmérése Magyarországon.](#) *Magyar Régészet* (2015)/Nyár. (last accessed 18 August, 2016)

SÜMEGI, PÁL – CSÖKMEI, BÁLINT – PERSAITS, GERGŐ

The evolution of Polgár island, a loess-covered lag surface and its influences on the subsistence of settling human cultural groups. In: *Environmental Historical Studies from the Late Tertiary and Quaternary of Hungary*, ed. Hum, László – Gulyás, Sándor – Sümege, Pál, 141–164. Szeged: University of Szeged, 2005.

SÜMEGI, PÁL – GULYÁS, PÉTER – PERSAITS, GERGŐ

The Geoarchaeological Evolution of the Loess-covered Alluvial Island of Polgár and its Role in Shaping Human Settlement Strategies. In: *Moments in Time. Papers Presented to Pál Raczky on His 60th Birthday*, ed. Anders, Alexandra – Kulcsár, Gabriella, 901–912. *Ősrégészeti Tanulmányok/Prehistoric Studies* 1. Budapest: L'Harmattan, 2013.

TIMÁR, GÁBOR – SÜMEGI, PÁL – HORVÁTH, FRANK

Late Quaternary dynamics of the Tisza River: Evidence of Climatic and tectonic controls. *Tectonophysics* 410 (2005)/1–4, 97–110.

TOMPA, FERENC

*A szalagdíszes agyagművesség kultúrája Magyarországon. A bükki és a tiszai kultúra* (Die Bandkeramik in Ungarn. Die Bükker- und die Theiss-Kultur). *Archaeologia Hungarica* V–VI. Budapest: Franklin-Társulat Nyomdája, 1929.