

Fig. 8. 1 — Thiessen-polygons, XTENT and Cost surface analysis of the MB III sites from the Carei-Plain and the Eriu Rivers Valley; 2 — Thiessen-polygons, visibility and Cost surface analysis of the MB I sites from the Carei-Plain and the Eriu Rivers Valley; drawn by Authors

Sălacea-Dealul Vida in Otomani phase II consisted of a tell⁸⁷, two single-layer open settlements⁸⁸, three multi-layer fortified settlements⁸⁹, six settlements known only from literature⁹⁰ and four multi-layer sites for which we have no information whether they were fortified (Fig. 7:2)⁹¹. In Otomani phase III there were in the same area three multi-layer open settlements⁹², two multi-layer fortified ones⁹³, and three others known only from bibliography⁹⁴. Finally, there were three multi-layer sites, their status — fortified or open — unknown due to the deficiency of archaeological research (Fig. 8:1)⁹⁵.

Few sites are identified in the influence area of Săcuieni-Cetatea Boului⁹⁶, although the size of its territory is close to that of Sălacea tell. In Otomani phase II this micro-region contained two single-layer open settlements⁹⁷ and two multi-layer fortified settlements⁹⁸, three others known only from literature⁹⁹, and a single-layer site without a record of its fortified/open status (Fig. 7:2)¹⁰⁰. Tiberius Bader claimed that Săcuieni-Cetatea Boului was one of the settlements abandoned at the beginning of Otomani phase III (Bader 1978, 36), presumably in a process similar to the one known from Sălacea-Dealul Vida¹⁰¹. In this part of Eriu Valley we are aware of only one multi-layer fortified settlement¹⁰² and three other settlements, known only from publications (Fig. 8:1)¹⁰³.

It is notable that in Otomani phase II the number of settlements increased both in the Carei Plain and the Eriu Valley, which may be linked to the spa-

⁸⁷ The dominance area of Otomani-Cetățuie tell is small. The site lies in the immediate vicinity of Sălacea tell. It cannot be discounted that its territory was gradually incorporated by the Sălacea centre. The same process could have happened for Tiream and Carei-Bobald.

⁸⁸ Cehăluț-Fântâna tătarilor (no. 22), Șimian-Locul grădinilor (no. 61).

⁸⁹ Andrid-Dealul taurilor (no. 1), Andrid-Curtea CAP (no. 2), Dindești-Cetate (no. 30).

⁹⁰ Andrid-Sub holmul mare (no. 3), Galoșpetreu-La podul cu cinci găuri (no. 36), Vășad (no. 76), Galoșpetreu-Pădurea Frater (no. 34), Tarcea-Dealul Mare (no. 62), Tarcea-Dealul de Mijloc (no. 63).

⁹¹ Galoșpetreu-Pe malul drept al Ganașului (no. 37), Pir-Cetate (no. 48), Pișcolt-Ógát (no. 52), Vășad-Dealul Viilor (no. 77).

⁹² Pir-Cetate (no. 48), Vășad-Dealul Viilor (no. 77), Vășad-Cartierul Țiganilor (no. 78).

⁹³ Andrid-Curtea CAP (no. 2), Dindești-Cetate (no. 30).

⁹⁴ Andrid-Sub holmul mare (no. 3), Valea lui Mihai-Groapa cu lut (no. 71), Pir-Várgánc (no. 49).

⁹⁵ Pișcolt-Curtea bisericii reformate (no. 51).

⁹⁶ The small number of settlements in the influence area of the Săcuieni tell can also be explained by the little research undertaken in this area. Another obvious explanation would be that this was an underpopulated territory.

⁹⁷ Cadea-Dealul Chel (no. 13), Mihai Bravu (no. 39).

⁹⁸ Roșiori-Cetatea de pământ (no. 54), Silindru-Füzék (no. 60).

⁹⁹ Cresturi-Cetate (no. 28), Diosig-Cartierul Țiganilor (no. 31), Sânicolaul de Munte-Dealul Bătrânilor (no. 59).

¹⁰⁰ Cheșereu-Dealul Episcopului (no. 23).

¹⁰¹ The analysis of finds held by the museum in Săcuieni revealed that Otomani phase III pottery appeared in the uppermost layer.

¹⁰² Roșiori-Cetatea de pământ (no. 54).

¹⁰³ Adoni-Cetatea de pe insulă (no. 5), Mihai Bravu (no. 39), Sânicolaul de Munte-Dealul Bătrânilor (no. 59).

tial dynamics of settlements or to demographic change. The size of the territories controlled by three power centres named earlier was approximately similar.

In Otomani phase III some of the settlements were gradually abandoned by the Otomani communities, especially those in the Eriu Valley. This was due probably to the climatic and environmental change, and economic factors as well. We cannot exclude the fact that the settlement at Otomani-Cetatea de pământ may have taken over the central role held earlier by the tell settlements at Sălacea and Săcuieni¹⁰⁴. Despite this fact in MB III the real centre of power in the Carei Plain and the Eriu Valley apparently was the tell at Carei-Bobald.

Areas of influence in the Carei Plain and Eriu Valley of Middle Bronze Age date identified using cost surface analysis and Thiessen polygons contain the same settlements, with only a minimal difference, as areas defined using XTENT (Fig. 7:1–2; 8:1). This concurrence of different methods would confirm that the view afforded by modelling is close to the situation as it was during prehistory even if does not fully overlap.

In the basin of Someșul Mic River there is a significant number of archaeological sites attributed to the Wietenberg culture. The 53 open settlements and necropolises mapped are located in valleys and on terraces (Fig. 14:1–2). Thirteen smaller fortifications of Bronze Age date were identified on from promontories with steep slopes connected by natural access paths (Fig. 15:1)¹⁰⁵.

The density of settlements dated to the end of Middle Bronze Age in the area of various settlements (Cluj-Napoca-Florești-Gilău or Gherla) is probably connected to the dynamics of settlements determined by economic factors (Fig. 18:1)¹⁰⁶. During field research only the supposed surface of the settlements was measured, indicated by pottery distribution. In the absence of more regular research, for the fortifications the natural limits of the settlements were measured, with the surface protected by elements of fortification. The size and form of fortifications varies according to geographic conditions. Although the elements of fortification were adapted to field conditions, certain changes across

¹⁰⁴ Archaeological finds dated to MB phase III only appear sporadically. We know from the research of I. Ordentlich that in the late phase II and early phase III of Otomani culture the population of the tell moved to the nearby island (Otomani-Cetățuiea de pământ).

¹⁰⁵ The problem of Wietenberg culture fortifications has been discussed by researchers in the past: Chidioșan 1980, 81; Boroffka 1994, 100. The attribution of various fortifications to Wietenberg culture on the basis of surface observations is controversial (Rotea 1993, 36; Rotea 1998, 24).

¹⁰⁶ These are mostly settlements dated to Wietenberg phase III (Rotea 1998, 23). The economic factors taken into consideration in the area of interest are: the extensive use of fields and rich salt resources (Rotea 1993, 34). Field research results show that in Someșul Mic Valley most sites are small, scantily organized agricultural settlements. Where archaeological investigation was made in the past the archaeological complexes show no indication of any well-defined social division.

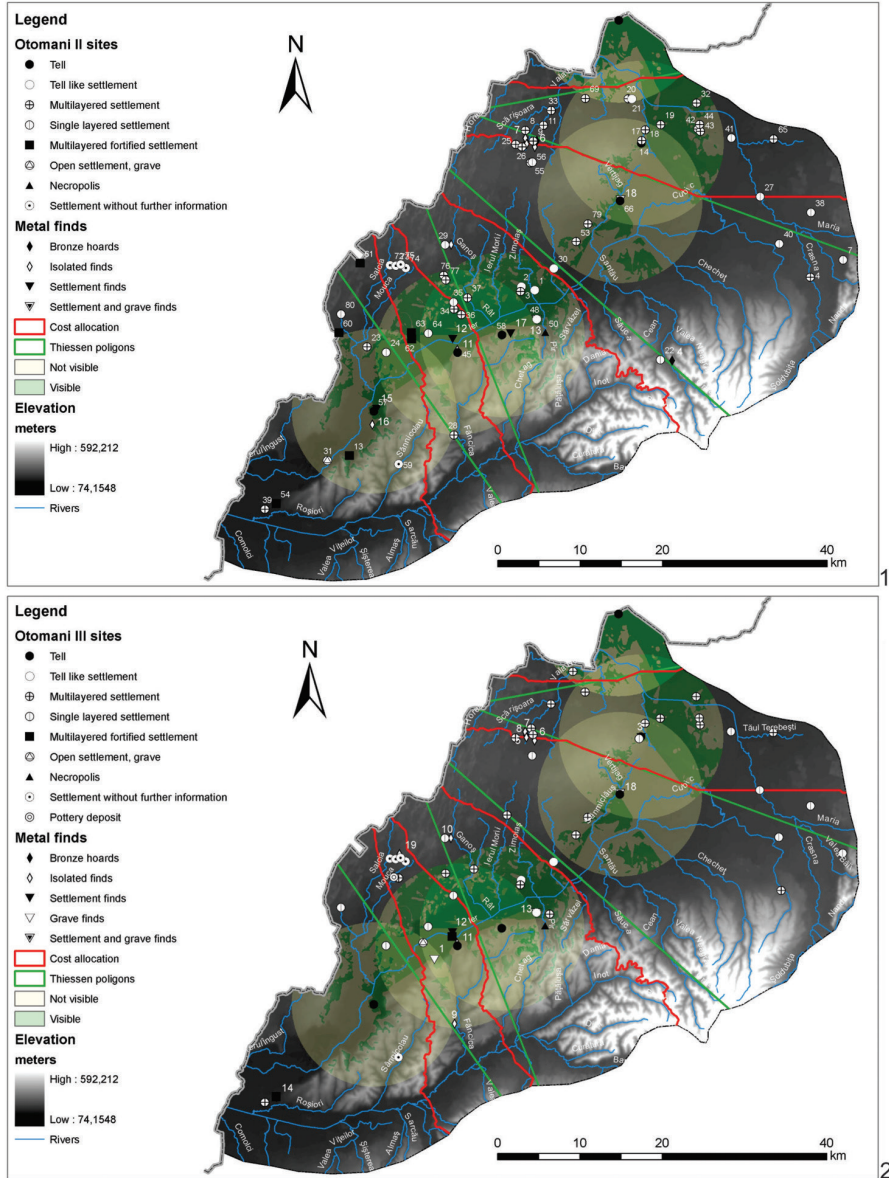


Fig. 9. 1 — Thiessen-polygons, visibility and Cost surface analysis of the MB II sites from the Carei-Plain and the Eriu Rivers Valley; 2 — Thiessen-polygons, visibility and Cost surface analysis of the MB III sites from the Carei-Plain and the Eriu Rivers Valley; drawn by Authors

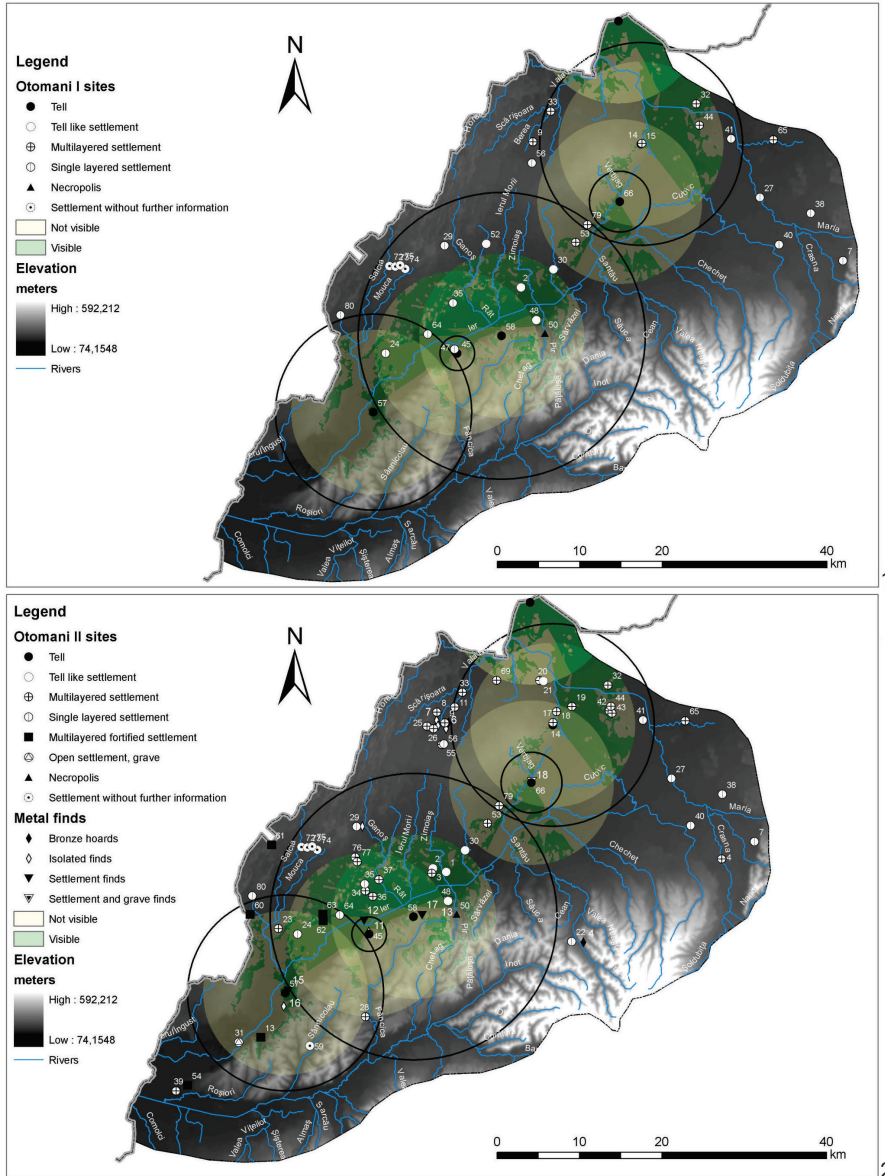


Fig. 10. 1 — XTENT and visibility analysis of the MB I sites from the Carei-Plain and the Eriu Rivers Valley; 2 — XTENT and visibility analysis of the MB II sites from the Carei-Plain and the Eriu Rivers Valley; drawn by Authors.

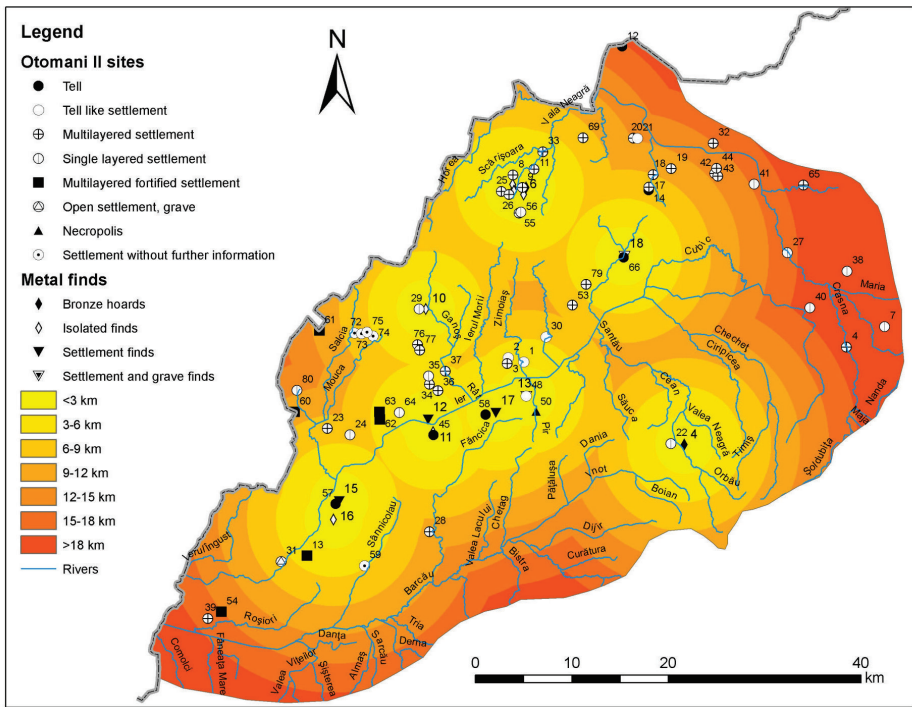
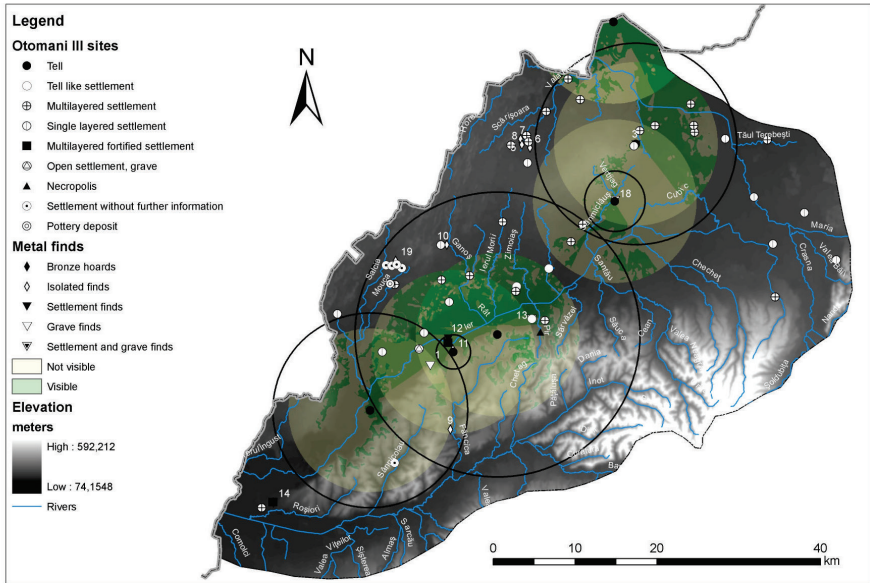


Fig. 11. 1 — XTENT and visibility analysis of the MB III sites from the Carei-Plain and the Eriu Rivers Valley; 2 — The contingency of the MB II sites and the bronze objects discovered in the Carei-Plain and the Eriu Rivers Valley; drawn by Authors.

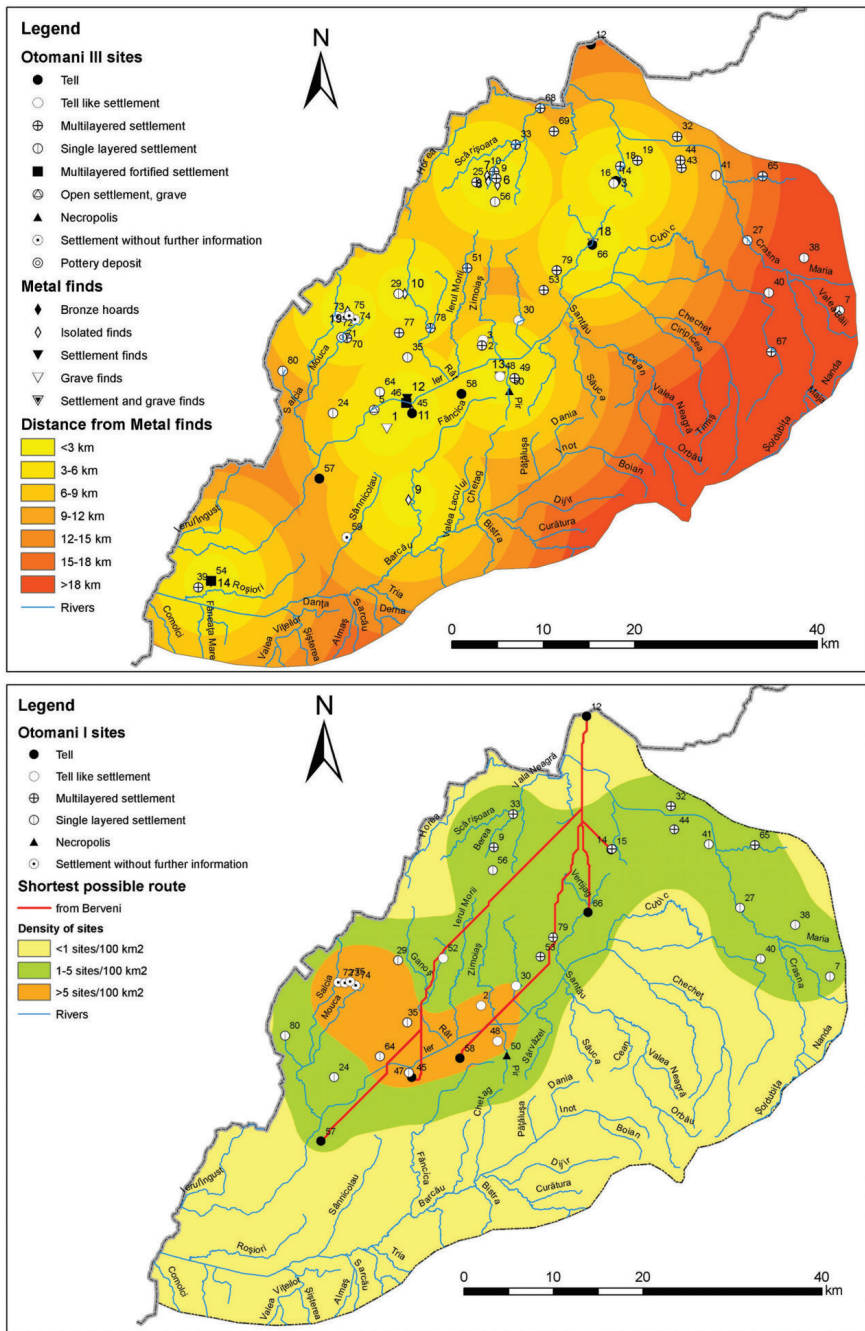


Fig. 12. 1 — The contingency of the MB III sites and the bronze objects discovered in the Carei-Plain and the Eriu Rivers Valley; 2 — Density of MB I sites and shortest possible route analysis in the Carei-Plain and the Eriu Rivers Valley; drawn by Authors.

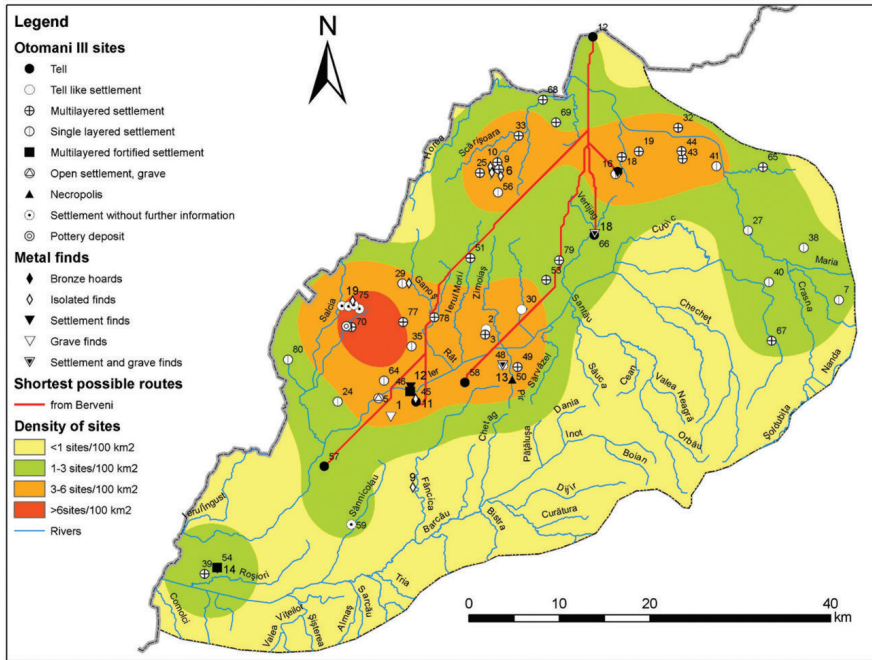
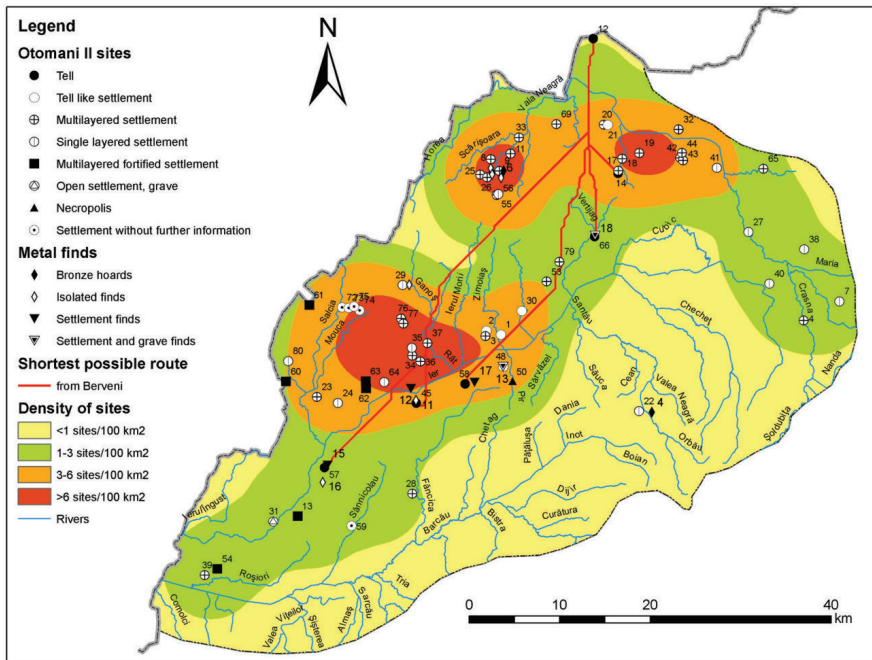


Fig. 13. 1 — Density of MB II sites and shortest possible route analysis in the Carei-Plain and the Eriu Rivers Valley; 2 — Density of MB III sites and shortest possible route analysis in the Carei-Plain and the Eriu Rivers Valley; drawn by Authors.

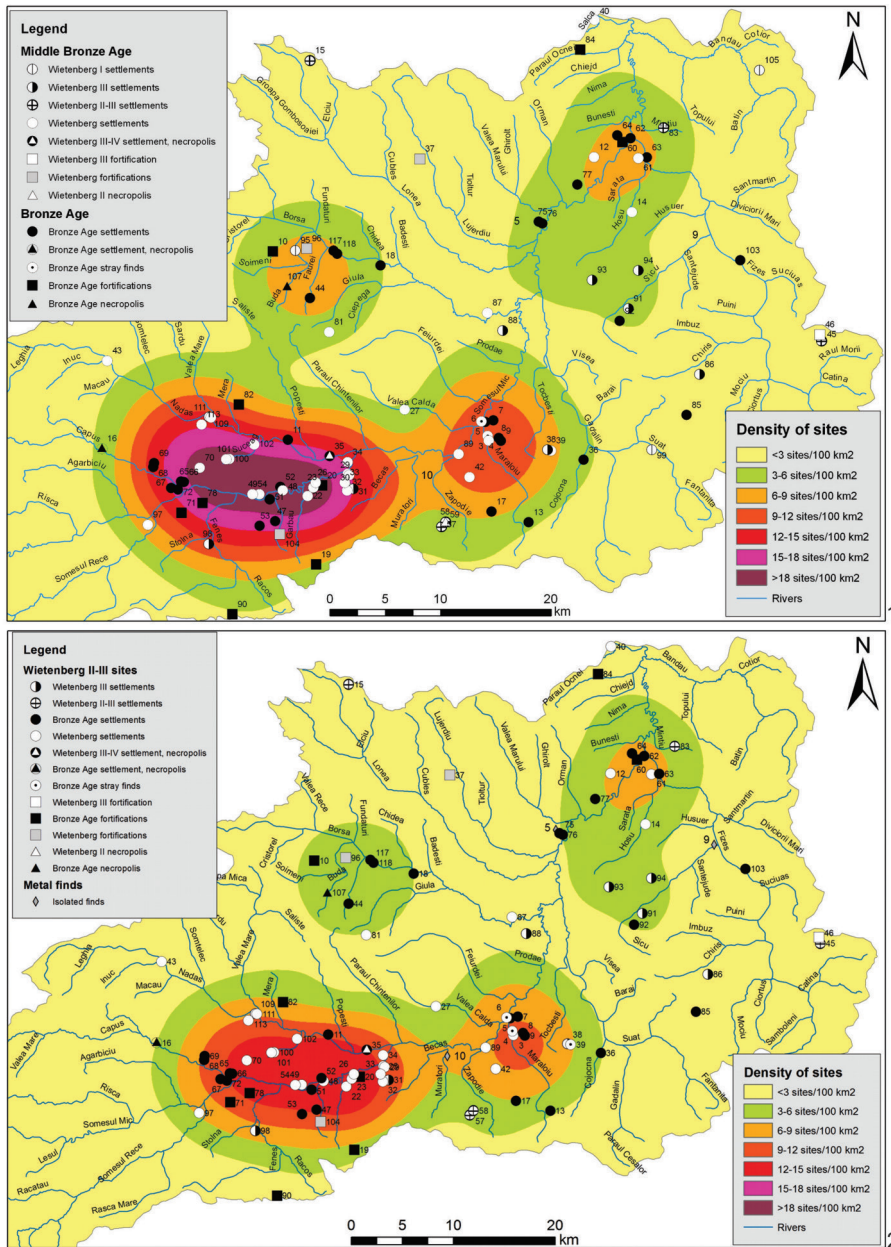


Fig. 14. 1 — Density of MBA sites in the Someșul Mic Basin; 2 — Density of MB II–III sites in the Someșul Mic Basin; drawn by Authors.

historical periods can be observed nevertheless¹⁰⁷. During the Bronze Age most settlements were small in size and situated on hilltops¹⁰⁸.

The map of settlements site clusters on the Upper Someșul Mic shows a supercluster formed of four settlement clusters¹⁰⁹ and three other separate settlement clusters (Fig. 14:1–2)¹¹⁰. These may be regarded as the social-economic integrative units of the examined territory.

The majority of Bronze Age open settlements¹¹¹ are small or medium in size (63% between 0.2 and 3 ha) and were occupied for a relatively short period of time (Rotea 2009, 54). In the size hierarchy there is a gap between settlements smaller and larger in size than 2 ha. Open sites smaller than 0.5 ha are frequent, but there are only a small number of settlements with area of 3 ha (11%) (Chart 5). In the Bronze Age several small and one or two medium-sized open sites form a separate settlement cluster¹¹².

¹⁰⁷ Most of these fortifications are situated on 300–400 m and 600–700 m high promontories.

¹⁰⁸ E.g. Tăuți-La Mănăstire (no. 104), Băbuțiu-Grecea (no. 10), Săvădisla-Cetatea Păuca (no. 90), Mera-Dealul Cetății (no. 82), Cornești-Dealul Cetate (no. 37), Cluj-Napoca-Vârful Peana (no. 19), Ocna Dejului-Cetatea Jidovilor (no. 84).

¹⁰⁹ The supercluster on Mera-Gilău-Florești-Cluj-Napoca axis contains four large settlement clusters: 1. Mera-Suceagu-Viștea area, with the centre at the fortified settlement of Mera-Dealul Cetății (no. 82); 2. Gilău-Luna de Sus area, with centres at the fortified settlements of Gilău-Dâmbul Țiganilor (no. 71) and Luna de Sus-Râpa Dracului (no. 78); 3. Florești-Tăuți area with the centre at the fortified settlement of Tăuți-La Mănăstire (no. 104); 4. Cluj-Napoca, with the centre at Cluj-Dealul Calvaria fortified settlement (no. 20).

¹¹⁰ 1. On the middle course of Someșul Mic in the area of Apahida-Corpadea-Cojocna-Dezmir; 2. on the upper course of Someșul Mic in the area of Sic, with the centre at Sic-Dealul Cetății fortified/hilltop settlement; 3. on the upper course of Someșul Mic in the area of Gherla-Băița-Bonț, with the centre at the fortified settlement of Gherla-Coasta Gherlii; 4. in the valley of Borșa stream the area of Băbuțiu-Șoimeni, with centres at the fortified settlements of Băbuțiu-Grecea (no. 10) and Șoimeni-Piatra Șoimilor (no. 96).

¹¹¹ Bronze Age settlements: Suatu-Fâneța de Jos (no. 99), 12 ha; (Rotea 1998, 23). The Vlaha-Pad site was the only one fully investigated in the valley of Someșul Mic River.

¹¹² For instance, in middle Nadăș Valley, on the right bank terrace close to Viștea village there is a group of 3 smaller Wietenberg settlements (Groapa Fântâniei de Piatră, no. 113; Gherce, no. 111) and a larger Wietenberg III settlement (Păluta, no. 109). Scattered across 4.5 km in Suceag Valley, there are two smaller Wietenberg settlements (Suceagu-Șarga and Cepegheu, no. 100, 101), and a larger one at a distance of 2.5 km (Suceagu-Pad, no. 102). On the lower course of the Nadăș there are only two medium-sized settlements, one at a distance of 3–4 km from Baciu, and the other in Cluj, Banatului Street (no. 35). In Căpuș Valley two smaller groups of sites can be delimited. At the confluence of Someșul Mic and Căpuș stream, there is a group of Bronze Age settlements, two smaller settlements (Gilău-Coasta Cimitirului, no. 65–66; Dealul Cetății, no. 67) and a larger settlement located at 140 m distance (at the Reformed Church, no. 72). At a 3 km distance from these, on the upper course of the stream, 370 m away are two Bronze Age settlements (Gilău-Budulău și Cuptoarele de Var, no. 68–69). At Florești, on the high terrace on the left bank of Someșul Mic, there is a group of small-size open settlements, two Wietenberg settlements 600 m away (Dealul de Sus and Dealul de Jos, no. 54, 49), and at 2 km from these two others at a distance of 375 m (Pârâul Bongar and Labu, no. 52, 48). Opposite to these, there is another group formed of the Bronze Age open settlement at Cartierul Fetei (no. 47) and the Wietenberg fortification at Tăuți-La Mănăstire (no. 104). On entering Cluj-Napoca, on the right terrace of Someșul Mic there are 4 open Wietenberg settlements grouped at Dealul Gol (no. 22), Mănăștur Nord, Stăvilari (no. 23–26), and the promontory of Calvaria (no. 20). On the terraces of the Someș

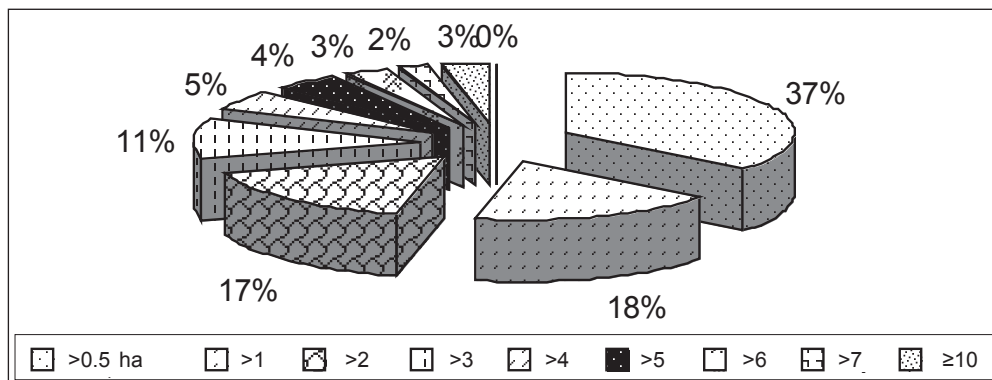


Chart 5. Size of Bronze Age and Middle Bronze Age settlements in Someșul Mic basin.

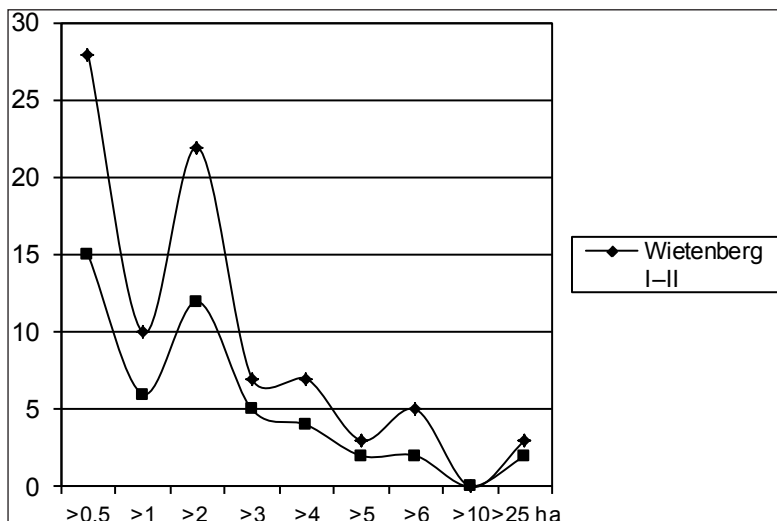


Chart 6. Size evolution of Wietenberg settlements, phases I-II and II/III-IV; drawn by Authors.

on the territory of Cluj there are four other Wietenberg settlements (Casa Bocskai, Unirii Square, Victor Babeș Street, Cireșilor Street, no. 25, 29, 33, 32). Also in Cluj there are two other settlements: Grădina Botanică-Sere (early Wietenberg, no. 30) and Cimitirul Central (Wietenberg III, no. 31). At Apahida there is a group of 4 open settlement (the right bank of Someș, Platoul Chibaia, Lacul Cocor, Tău Măerului, no. 7-9), with other isolated finds from the Bronze Age. Scattered at various distances from this centre, there are 4 Wietenberg settlements at the intersection of Apahida-Gherla-Mociu, Sânnicoară-Lab (no. 89) and Dezmir-Tăușor (no. 42), Corpadea-Ciungu (no. 38), and 3 Bronze Age settlements (Cara-După Pădure, Boju, Cojocna-Cetate, no. 17, 13, 36). In the neighbourhood of Gherla town there is a group of 3 open settlements (Gherla-house, no. 356, Lunca, Dealul Coper, no. 64, 62, 63) and a small Bronze Age fortification (Gherla-Coasta Gherlii). In the perimeter of this group there are 3 Wietenberg settlements (Băița-Dealul Sărăzaia, Gherla-Pietriș, Mintiu Gherlii-Ciuleneș, no. 12, 61, 83), and in the area of Iclod there are 2 Bronze Age open settlements (Școala, Moara FCN, no. 75-76). In Borșa Valley 4 open settlements are grouped (Ciumăfaia-the Reformed church, Vultureni-Ambrozie, -Știubei, Făureni, no. 18, 117-118, 44), with a Bronze Age cemetery (Vechea-Ciutaia, no. 106) and two Wietenberg settlements (Șoimeni-La Cruce, Măcicașu-Pocornea, no. 95, 81) dispersed in the area.

The topographic setting, surface area, duration, function and character of the settlements are influenced by a great many geographic, economic and strategic factors (Rotea 1993, 34). Looking at the geographic distribution of Middle Bronze Age settlements (Chart 7) we may find that they are predominantly located on the first river terraces (36%) or in higher parts of valleys (32%)¹¹³, on hill slopes (30%) and, less frequently, on hilltops¹¹⁴. Only a few open settlements were established on alluvial areas or other more elevated forms of relief of the riverside¹¹⁵.

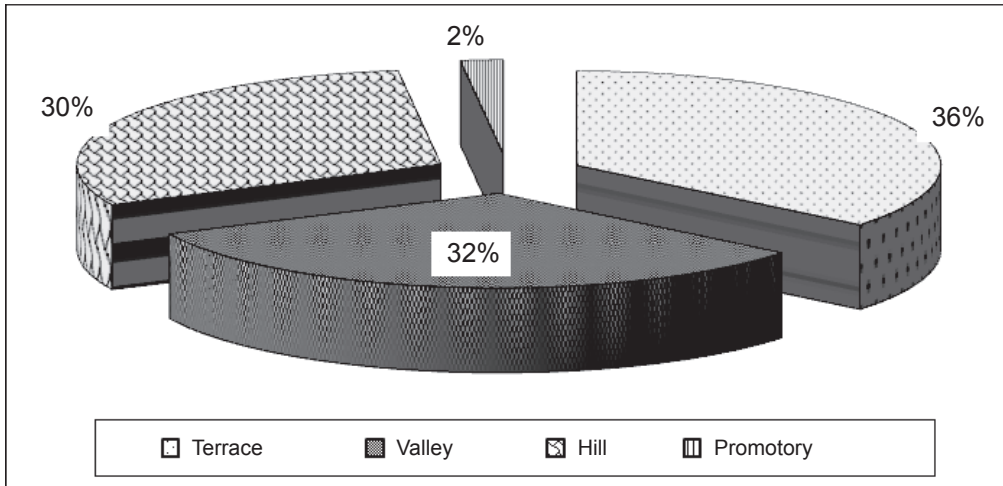


Chart 7. Geographic distribution of Middle Bronze Age settlements in Someșul Mic basin; drawn by Authors.

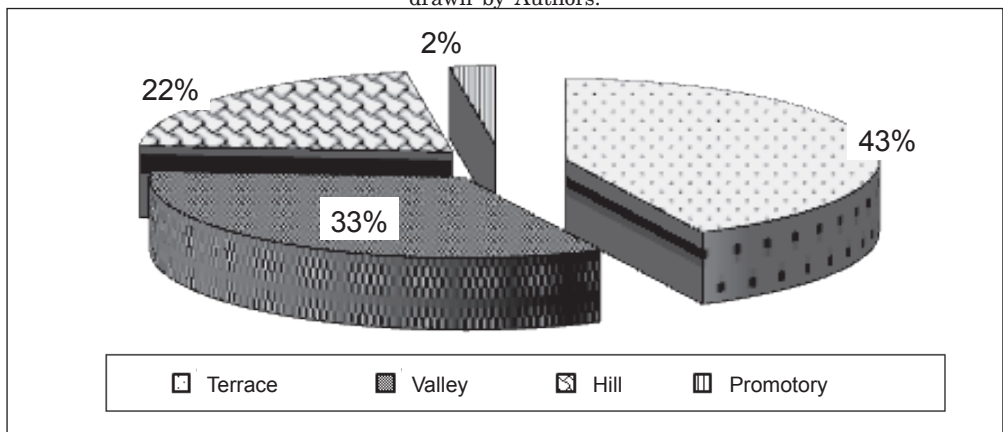


Chart 8. Geographic distribution of settlements in Wietenberg culture, phases II-III/IV; drawn by Authors.

¹¹³ Rotea 1993, 36. E.g.: Cluj-Banatului Street (no. 35), Pălatca-Togul lui Mândrușcă (no. 86).

¹¹⁴ Kovács 1913, 1ff.; Rotea 1998, 25. E.g.: Pălatca-Sub Pădure, Corpadea-Csungu.

¹¹⁵ Nagy 2011, 276. E.g.: Sânnicoară-Lab (no. 89); Iclod-Școală (no. 75) and Iclod-Moara FCN (no. 76).

As regards their elevation most of the Middle Bronze Age settlements are situated on the contour line of 300–350, 350–400 and 400–450 m on the terraces of Someșul Mic River and on the valley slopes of its tributaries. A relatively high elevation can be observed in the case of fortifications positioned on dominant forms of relief, especially hilltops or promontories. Their siting on relatively high, naturally defensible areas suggests the preoccupation with strategic placement from where it would be possible to command the trade and communication routes down in the valleys. The low values correspond to open settlements on lower lying ground, indicating their location close to the watercourses, and also, the deliberate avoidance of areas with a high flood risk. In choosing the location of central settlements, it could have been an important viewpoint to place them on the banks of larger rivers, functioning as potential traffic and communications corridors throughout the year. For both micro-regions examined it may be observed that they occupied strategic points in their area, mostly on the dominant heights. A common feature is that many settlements were founded at the mouth of tributaries or on a confluence of streams. In Middle Bronze Age the majority of sites were located on low plain areas, near to the watercourses, at a relative elevation of 0–20 m, with a smaller number sited on higher terraces and at the foot of hills (Chart 9).

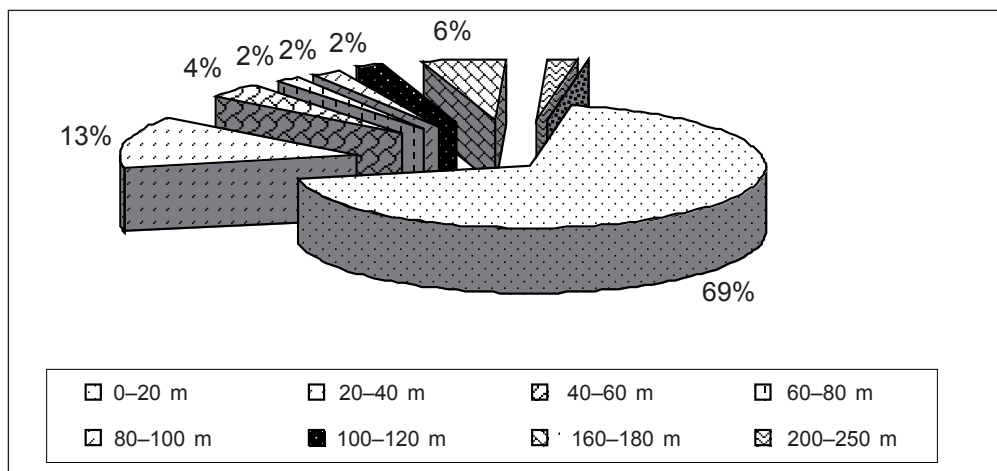


Chart 9. Relative distribution of Middle Bronze Age settlements; drawn by Authors.

The statistical analysis of distance to the watercourses shows that the majority of settlements found near larger Middle Bronze Age settlements established on larger rivers are located in the valleys of the tributaries of these rivers. Thus, we know about 13 sites in Someșul Mic Valley, and 40 sites along its tributaries. In the case of 13% of sites, the closest watercourse is less than 100 m away, while in the case of the majority, water is more than 600 m away (Chart 10).

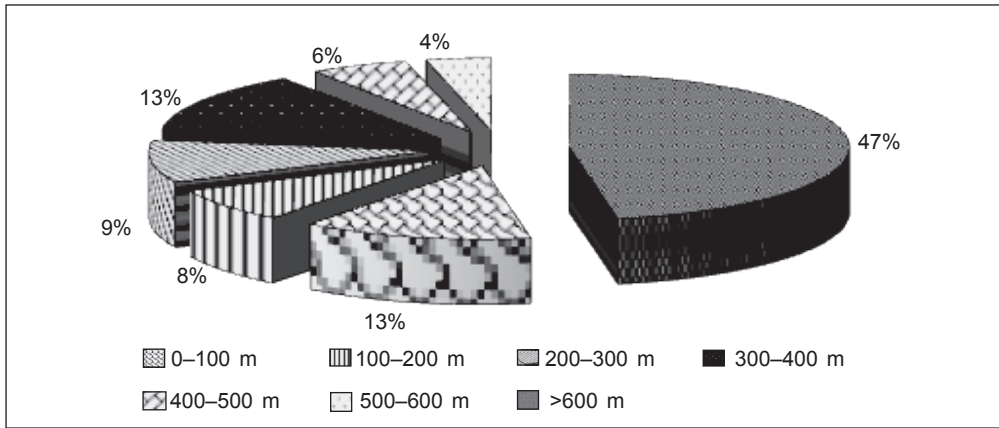


Chart 10. Distribution of Middle Bronze Age settlements in relation to a watercourse; drawn by Authors.

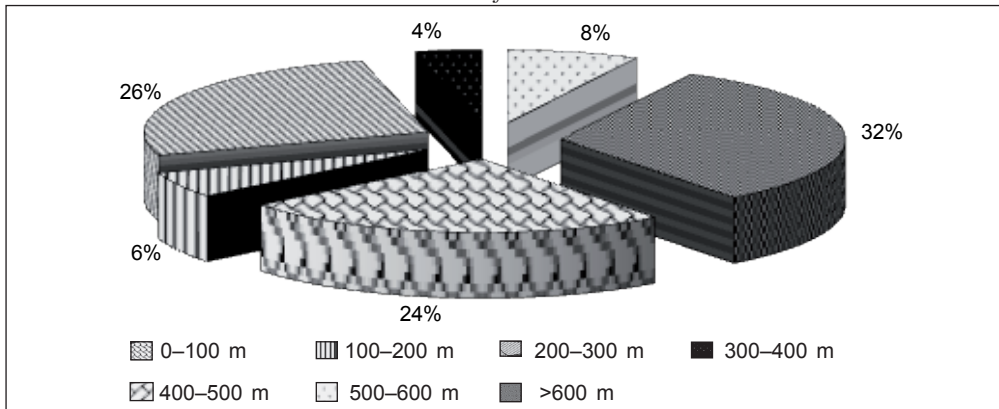


Chart 11. Distribution of Middle Bronze Age settlements in relation to soil type; drawn by Authors.

The distribution of settlements in relation to soil type¹¹⁶ (Chart 11) shows that the majority of Bronze Age sites are placed on cambisols, undeveloped soils¹¹⁷ and mollisols¹¹⁸, excellent for crop farming¹¹⁹, and less frequently on

¹¹⁶ The distribution of settlements according to soil types also indicates the possible ratio of crop farming to cattle breeding in the community's economy.

¹¹⁷ Soils with weakly developed horizons due to the short time of paedogenesis process, not reaching to a dynamic balance with the surrounding environmental conditions.

¹¹⁸ Dark coloured soils, saturated in basis, occupying large surfaces of semi-humid — semi-arid regions (types: Chernozem, light brown soil, grey soils).

¹¹⁹ Settlements rarely occupy areas with cambisol, a soil type of beech forests on high hills and lower parts of mountains (types: brown and acid brown soils), argilluvisols, rich in clay, in the area of oak forests on lower hills, and vertisols, a heavy, clayey soil formed on swelling clay, with clay content >35%, and clayey minerals with 2:1 type network 50%. It swells and shrinks with changing humidity.

argilluvisols and hydromorphic soils¹²⁰. It seems that the economic usefulness of areas chosen for habitation was a primary criterion. Most sites were in areas of fertile soil although there are territorial differences suggesting the knowledge of, and adaptation to, local conditions.

CONCLUSIONS

The mapping of topographic data proved that the Middle Bronze Age communities of central and north-western Transylvania living within the social framework of chiefdom clustered into geographically well delimited complex integrative structural units¹²¹. A comparative analysis of the size and structure of these integrative units reveals temporal changes and spatial differences in the settlement pattern in the analyzed territories.

In the Carei Plain and the Eriu Valley we find a settlement system with four settlement clusters and a smaller unit and two larger settlement clusters. The basic type of settlement chains usually comprises 4–5 fortified or open sites of various size. The settlement chains mostly contain multi-layer settlements, which is the result of the geographic conditions of the micro-region (Fig. 5:2; 6:1–2). On the upper course of Someșul Mic there is a supercluster of four settlement clusters. We may regard it as the focal point of the analyzed territory. The settlement system contains four other settlement clusters on the Middle and the Lower Someșul Mic River. The Middle Bronze Age settlement clusters, easily identified, consist of one or two smaller fortified centres and a chain of adjoining open sites. The basic type of settlement chains in the territory usually comprises 4–5 open sites of various sizes (Fig. 14:1–2). In both cases, the settlement clusters are stable social and economic units held together by corporative power strategies¹²². This proves that the number of sites in a settlement cluster does not change significantly over time, and the number of settlement clusters does not vary. At the current stage of research, MB I is the period during which mostly individual settlements spread across the landscape and the existence of significant structures cannot be proved at the moment (Fig. 5:2; 14:1).

The structural complexity of the settlement clusters in the investigated period is high, two levels of cluster formation can be traced in both territories: the organization of various settlement chains into clusters, and the grouping

¹²⁰ A soil type formed under the influence of ground water found in the soil profile or water coming from precipitations stagnating in the soil profile for a lengthy period of time.

¹²¹ Distribution maps reflect the current state of research which may be expected to change dramatically with input from new research.

¹²² The vast majority of social interactions and daily activities would be on village and household level (Gyucha, Parkinson 2007, 44).

of settlement clusters into superclusters. Two larger territorial units may be outlined on the basis of the number and spatial distribution of Middle Bronze Age sites: the Carei Plain and Eriu Valley. The distribution of sites in north-western Transylvania is uniform, although it seems that the centre of the settlement system is the middle part of Eriu Valley. This is where a supercluster comprising several settlement clusters came into being in MB II, lasting until the end of the Middle Bronze Age (Fig. 6:1). The supercluster of Eriu Valley was still preserved in MB III while the tells considered the power centres of the area were gradually abandoned. In opposition to this, the tells of Carei Plain survived. This hints at a complex situation, which — so it seems — cannot be explained by hierarchical models.

The centre of the settlement system of central Transylvania is on the upper-middle course of Someșul Mic River. The territory on the Lower Someșul Mic Rive has fewer settlements. The size differences between the settlement clusters are greater. The number of settlements of the eight Middle Bronze Age integrative unit settlement clusters did not change significantly (Fig. 14:1–2).

Influence areas determined using the Thiessen polygon method and cost surface analysis of tells and fortifications regarded as territorial centres are similar for both micro-regions. The minor territorial differences seen on the maps are the result of methodological differences of analytic methods applied. Analyses show that there were 6 Bronze Age territorial units of various size in north-western Transylvania and 13 in central Transylvania. Projecting the territorial divisions onto the maps of density clusters of the settlement system we obtain an image which takes into account both the environmental conditions and the patterns of the settlement network consequently, one that is closer to reality (Fig. 5:2; 6:1–2; 17:1–2). As a result of the comparison, the influence areas of the tells Berveni, Carei and Tiream in the Carei Plain and those of Otomani and Sălacea can be merged. The three large units thus formed — on the basis of the sites contained and the viewshed areas — can be equated with the territorial delimitations made using the XTENT method. In the analyzed north-western Transylvanian micro-region there could have been three large chiefdoms each made up of a number of territorial sub-units and medium-sized settlement clusters (Fig. 7:1–2; 8:1).

The Middle Bronze Age territories with the centres at Băbuțiu-Grecea and Șoimeni-Cetatea Șoimilor settlements in the valley of Borșa stream in Someșul Mic Valley can be merged. The influence areas of the fortified settlements of Tăuți-La Mănăstire and Cluj-Napoca-Vârful Peana on the upper course of Someșul Mic can also be assumed to have formed one unit. The neighbourhood of the fortified settlement of Cornești in the valley of Lonea stream contains no other settlement, therefore it cannot be regarded as a territorial centre. The Middle Bronze Age influence areas of Someșul Mic Valley, determined using the cost surface analysis and Thiessen polygons, suggest two patterns of territorial organization. Presumably, there were five chiefdoms during the

Bronze Age,¹²³ of roughly the same size, and with a settlement chain of bimodal (?) distribution which functioned on the principle of *peer-polity interaction* (Fig. 15:1–2; 16:1; 17:1–2)¹²⁴.

At the time of writing neither the comparison made of the siting of cemeteries in the Carei Plain and the Eriu Valley as well as Someșul Mic Valley relative to Bronze Age influence areas nor the study of the correlation between settlements and bronze objects (Fig. 11:2; 12:1; 18:1) have yielded any results¹²⁵.

The analysis of viewshed areas of Bronze Age tells and fortifications offers new data for reconstructing the territorial organization systems of the region. The neighbouring Middle Bronze Age fortified settlements are within seeing

¹²³ The hierarchy of the leaderships or the degree of their autonomy is hard to assess. The leaderships of Someșul Mic Valley may be grouped on the basis of the size of their territories and the number of settlements in their influence area. Cost surface and Thiessen polygon analyses roughly delineate influence areas of the same size. An exception are the smaller micro-regions on the Upper Someșul Mic with centres at Tăuți-La Mănăstire (no. 104) and Luna de Sus-Râpa Dracului (no. 78). This might hint at the less important position that these leaderships had in the power system of the region. Moreover, it cannot be excluded that what we face is only the technical solution deriving from the methodological criteria of the two applied methods of analysis. The analyses were conducted on the fortified centres. In opposition to other parts of the examined territory, there are seven fortifications close to each other on the upper course of Someșul Mic. The earthworks of Tăuți-La Mănăstire and Luna de Sus-Râpa Dracului are surrounded by other fortifications, therefore the influence areas determined by geographic information systems are much smaller due to their delimitations. In the case of leaderships with relatively equal sizes the influence area with the centre Gherla-Coasta Gherlii contains 14 open sites and 18 salt sites; the Cluj-Napoca-Dealul Calvaria (no. 20) centre area 31 settlements and 10 salt sites; the Mera-Dealul Cetății (no. 82) centre area 5 settlements; Băbuțiu-Grecea (no. 10) and Șoimeni-Piatra Șoimilor (no. 96) centre area 6 settlements, 1 cemetery and 1 salt site; the Feldioara-Dealul Cetății (no. 46) centre area 5 settlements and 5 salt sites, etc. The territory with the centre at Gilău-Dâmbul Țiganilor (no. 71) contains 6 settlements, a cemetery and 1 copper site, but its territory extends towards the valley of Someșul Rece not investigated by our project. In smaller influence areas we also find sources of raw materials, as proved by the salt extraction site in the territory with centres at Tăuți-La Mănăstire (no. 104) and Cluj-Napoca-Vârful Peana (no. 19). The smaller influence area centred on Luna de Sus-Râpa Dracului (no. 78) contains just as many open sites (5) as the larger micro-regions. It seems that we have here a loose alliance system of occasionally rivalling leaderships of various sizes, socially independent and exploiting their own resources, functioning on the basis of peer-polity interaction.

¹²⁴ The break between the number of open sites of settlement chains (the influence area with Gherla-Coasta Gherlii centre contains 14 open sites, the Cluj-Napoca-Dealul Calvaria (no. 20) centre area 31 settlements, while the other areas contain 1–5 open sites) suggests bimodal distribution, but it cannot be excluded that bimodality is not an indicator of social differences and only the reflection of the research status in the territory and the strategy of data collection. Of these, based on their territory, inhabitants and resources, emerge the leaderships with the centres of Cluj-Napoca-Dealul Calvaria and Gherla-Coasta Gherlii. The settlement density of the supercluster on the upper course of Someșul Mic, the spatial distribution of earthworks and settlements suggests that there may have been a micro-regional alliance system.

¹²⁵ The maps of the straight line distance of MBA sites from the metal finds show us the majority of the bronzes are discovered near the major settlement blocks. Without making a closer analysis of bronze objects discovered in the study, we only wish to note that the majority of the recorded finds are weapons and ornaments.

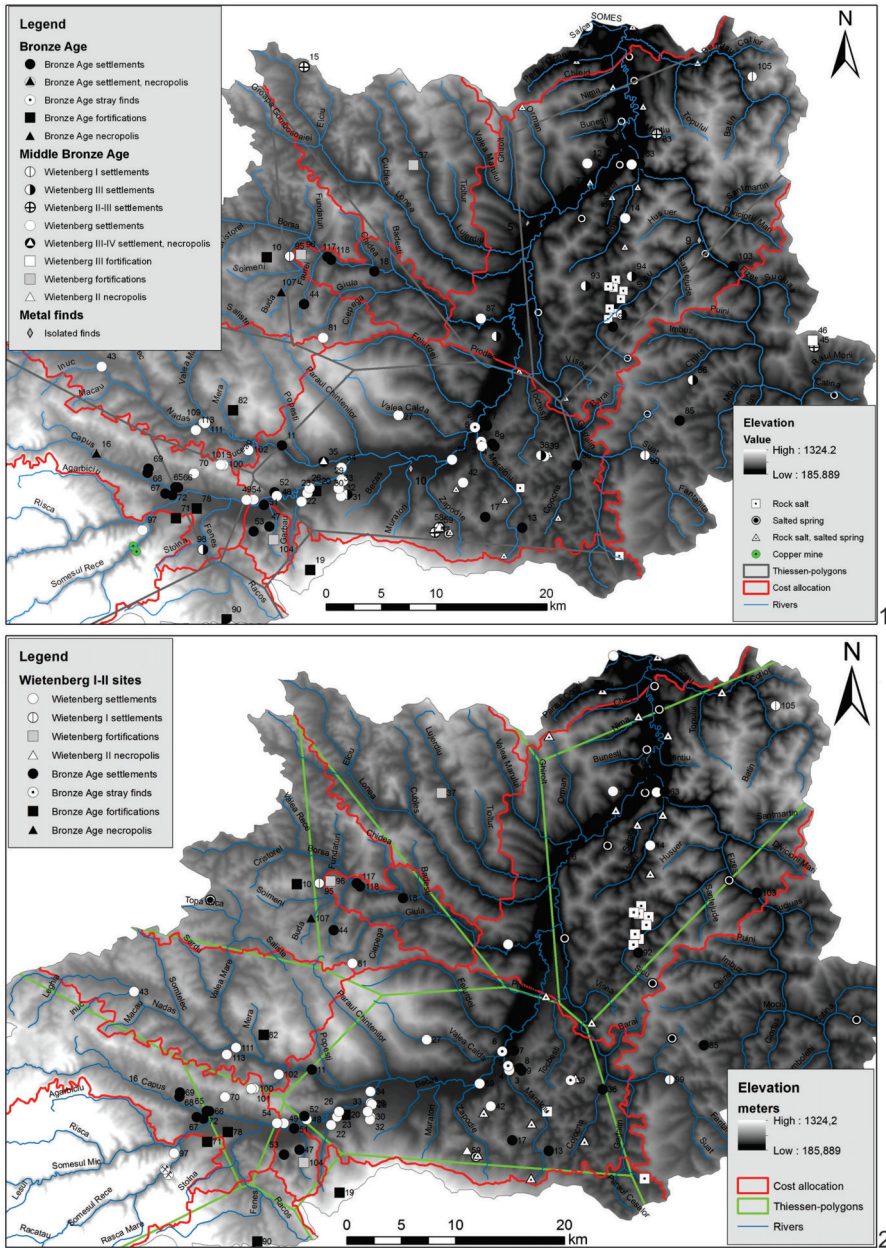


Fig. 15. 1 — Thiessen-polygons and Cost surface analysis of the MBA sites from the Someșul Mic Basin; 2 — Thiessen-polygons and Cost surface analysis of the MB I-II sites from the Someșul Mic Basin; drawn by Authors.

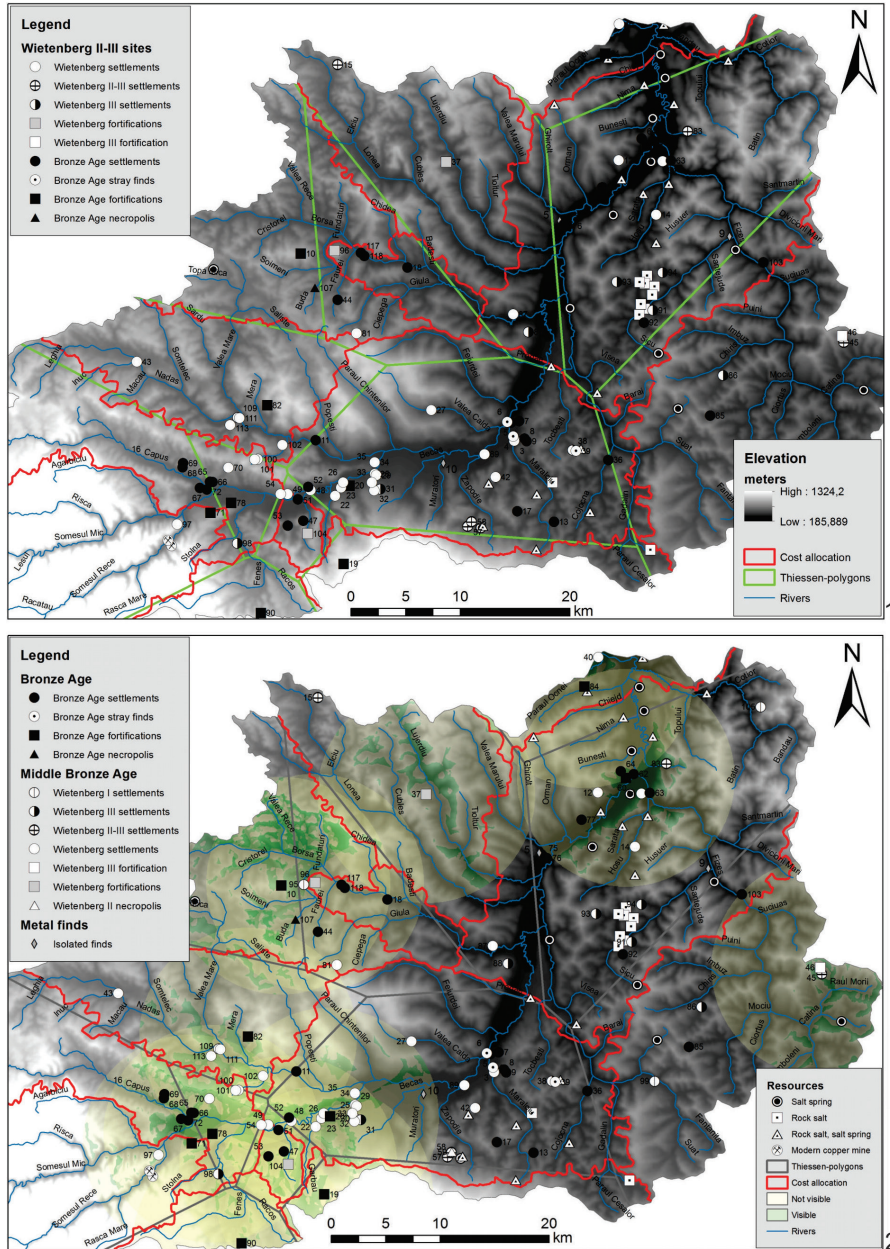


Fig. 16. 1 — Thiessen-polygons and Cost surface analysis of the MB II-III sites from the Someșul Mic Basin; 2 — Thiessen-polygons, visibility and Cost surface analysis of the MBA sites from the Someșul Mic Basin; drawn by Authors.

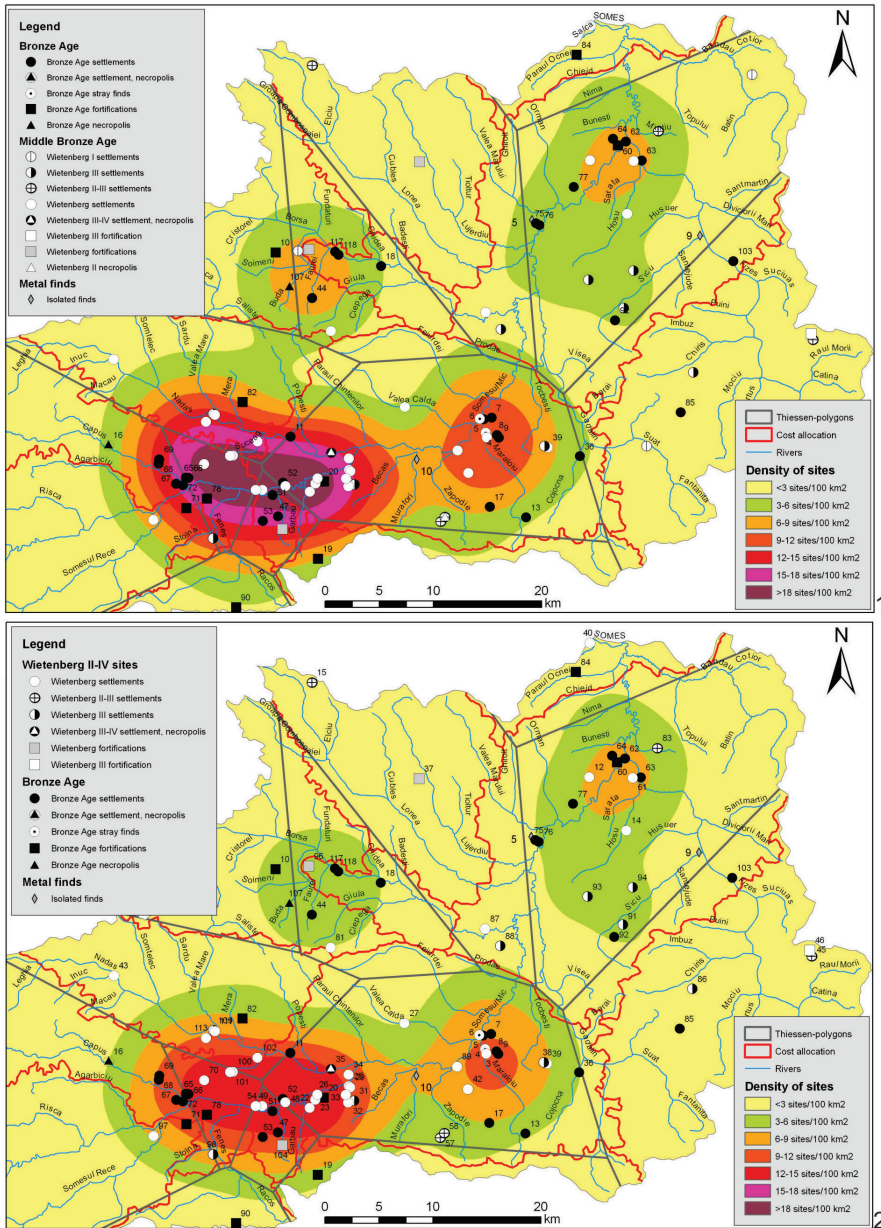


Fig. 17. 1 — Density, Thiessen-polygons and Cost surface analysis of the MBA sites from the Someșul Mic Basin; 2 — Density, Thiessen-polygons and Cost surface analysis of the Wietenberg II-IV sites from the Someșul Mic Basin; drawn by Authors.

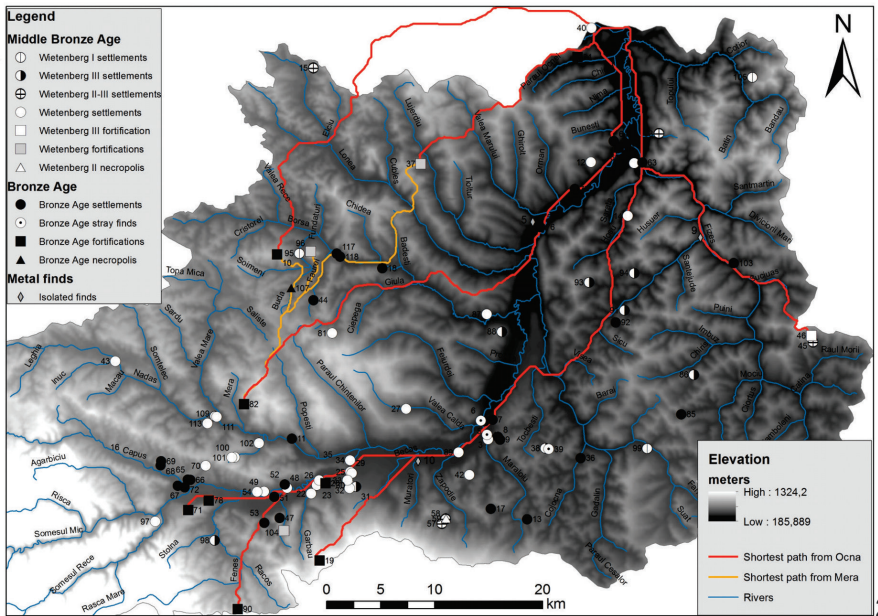
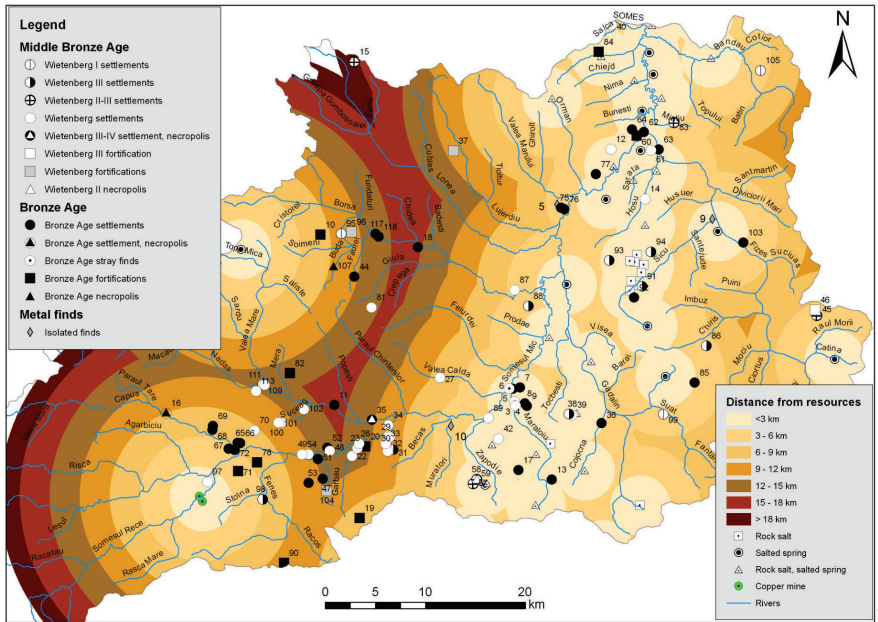


Fig. 18. 1 — The contingency of the MBA sites, natural resources and the bronze objects discovered in the Someșul Mic Basin; 2 — The MBA settlement system and shortest possible route analysis in the Someșul Mic Basin; drawn by Authors.

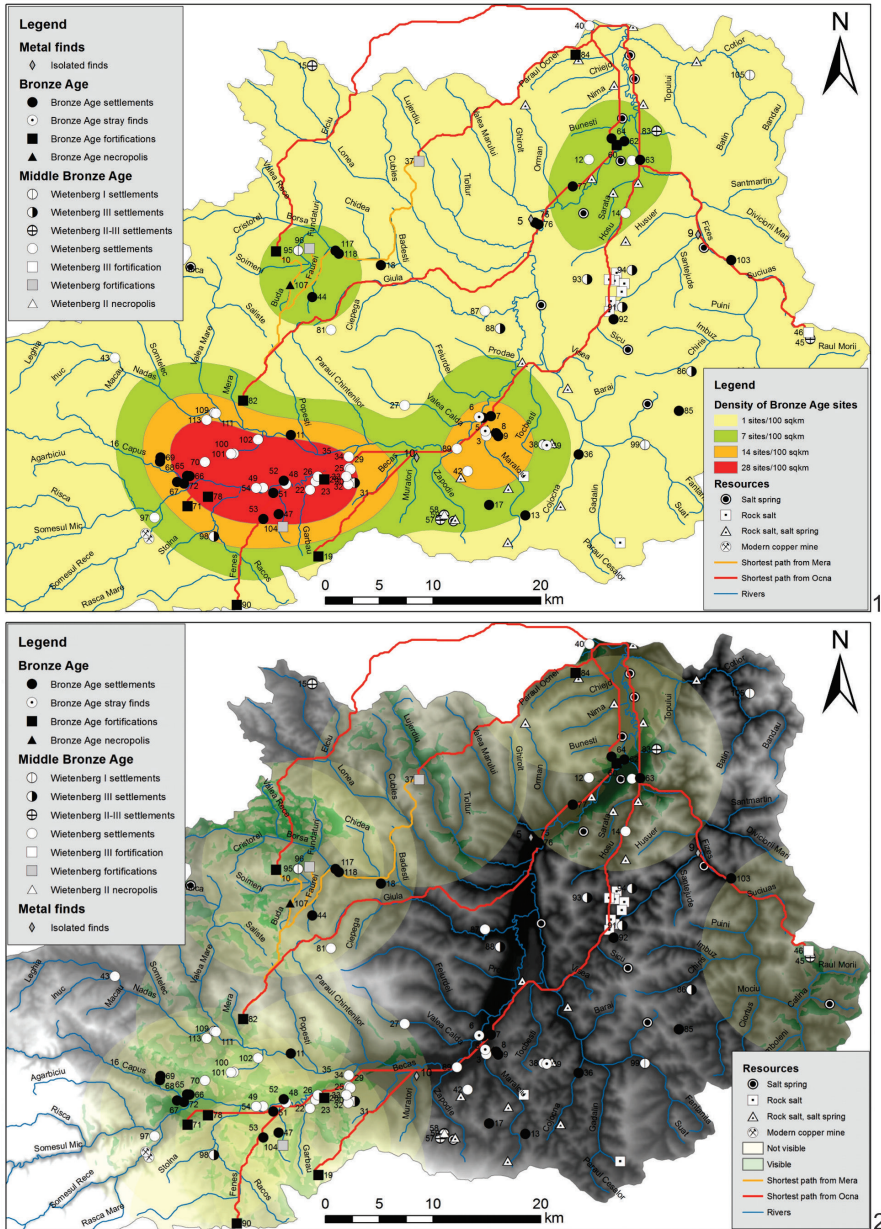


Fig. 19. 1 — Density of MBA sites, natural resources and shortest possible route analysis in the Someșul Mic Basin; 2 — Density of MBA sites, visibility and shortest possible route analysis in the Someșul Mic Basin; drawn by Authors.

distance from each other¹²⁶. They are sited in strategic points in the analyzed territory allowing observation and control over the main routes leading to and crossing the valleys of Eriu, Crasna and Someșul Mic. The entrance areas of side valleys opening into the main routes were also within the viewshed areas, sometimes for several kilometres. The common goal was probably the defense of the Carei Plain and the Eriu Valley¹²⁷ and the Someșul Mic Valley¹²⁸. In both regions the Middle Bronze Age settlement network is visible in its vast majority from one of the fortified centres. To control these was therefore not particularly difficult (Fig. 8:2; 9:1–2; 10:1–2). The operation of the power system of Bronze Age chiefdoms in central Transylvania was aided by the fact that, in addition to larger settlement clusters, the territories rich in subsoil resources were also visible from the fortifications (Fig. 16:2)¹²⁹.

The Bronze Age routes connecting the power centres of the Carei Plain and the Eriu Valley and the valley of the Someșul Mic, generated by GIS on

¹²⁶ There is a similar situation in different territories on the Tisza River. The tells are spaced 5 to 10 kms apart (Fischl, Reményi 2013, 731).

¹²⁷ The viewshed areas of the Săcuieni-Cetatea Boului tell makes it possible to command the lower course of Eriu and parts of the streams of Sălcia and Mouca, flowing from Nyírség region. This route is closed by the fortified settlements of Șilindru-Füzék (no. 60) and Șimian-Locul grădinilor (no. 61). The fortifications of Roșiori-Cetatea de pământ (no. 54), Cadea-Dealul Chel (no. 13) and Săcuieni-Cetatea Boului (no. 57) close down the lower course of Eriu. The viewshed areas of Otomani-Cetățuie and Sălacea-Dealul Vida tells extend not only to Eriu Valley, but also to the side valleys of Ganoș, Ierul Morii, Zimoiaș, Făncica and Sărvăzel streams. Occasionally, the mouths of these tributaries are closed down by fortified settlements (e.g. Dindești-Cetate; no. 30) The Tiream-Holmul cănepii tell (no. 66) controlled the upper course of the Eriu and the area of Cubic, Checheș and Santău streams, flowing from Crasna. The viewshed areas of Carei-Bobald and Berveni-Halmos tells (no. 14 and no. 12 respectively) command the whole valley of the Crasna.

¹²⁸ The viewshed areas of Băbuțiu-Grecea (no. 10) and Șoimeni-Piatra Șoimilor (no. 96) fortifications offer viewshed over the largest part of Borșa Valley and its tributaries. Cornești-Dealul Cetate (no. 37) in the valley of Lonea stream controlled one of the important routes coming from Someșul Mare area towards the Someșul Mic Valley. The Ocna Dejului-Cetatea Jidovilor (no. 84) fortification had the same function, with its viewshed extending over the confluence area of Someșul Mare and Someșul Mic rivers. In its extension lies the viewshed areas of the fortification of Gherla-Coasta Gherlii, covering the lower course of Someșul Mic, rich in minerals. Feldioara-Dealul Cetății (no. 46) settlement controlled the eastern entrance to Someșul Mic Valley, through the valleys of Râul Morii and Catina streams. The upper entrance of Someșul Mic Valley and the mouths of the important tributaries of Someșul Mic (the streams of Nadăș, Căpuș, Feneș, and Gârbău) were visible from the seven earthworks found in this region.

¹²⁹ The settlement clusters of the supercluster along the Gilău-Florești-Cluj-Napoca axis are almost completely visible from one of the seven earthworks of the territory. The majority of salt sites and settlement chains on the lower course of Someșul Mic, as well as lengthy sections of the river valley itself are visible from the Gherla-Coasta Gherlii fortified settlement. An exception are the salt sites and settlements around Apahida-Cojocna which belonged to the leadership centred on Cluj-Napoca-Dealul Calvaria (no. 20), but fell outside the viewshed areas of the central fortified settlement. Salt mining could only be indirectly controlled from there. The four Bronze Age settlements around the nine salt sites in the neighbourhood of Sic formed a closed unit. The settlements belong to the territory of the Gherla-Coasta Gherlii leadership, but fall outside the viewshed areas of the central fortification. In case of settlements with a thin culture deposit surrounding the salt sites it can be assumed that these were temporary settlements connected to salt mining.

the basis of the relief patterns of these territories, have a similar organization system. This is partly due to the methodology applied.

The main route of the Carei Plain and the Eriu Valley runs down the valleys of the Crasna and the Eriu rivers. Its two ends, according to the GIS model, were the Berveni-Halmos and Sălacea-Dealul Vida tells. The model also outlines another alternative route, which connects the Berveni-Halmos and Săcuieni-Cetatea Boului tells crossing the settlement supercluster of Eriu Valley, not crossing other central settlements. The latter runs down the valleys of the Valea Neagră and the Ganaş on the border of the Nyírség region and the Carei Plain, then continues the south following the valley of the Eriu. The relief pattern of the territory makes both routes conceivable although the main route leading through Crasna and Eriu valleys seems more probable. It is a fact however that this route is visible and can be controlled its entire length from the central settlements (Fig. 12:2; 13:1–2). During the Middle Bronze Age the main route of central Transylvania follows the valley of Someşul Mic to its middle course, crosses the most densely populated area of the region's supercluster, crosses the salt sites, and then follows the river valley again. Its two ends are the fortified settlements of Luna de Sus-Râpa Dracului and Ocna Dejului-Cetatea Jidovilor. The existence of two of the three side routes near the main route is probable. Both of them connect the fortified settlement of Mera-Dealul Cetății situated on the edge of the settlement epicentre of Someşul Mic Valley, with the lower course of the river. We may find several settlements and salt sites along the supposed shorter side routes (Fig. 18:2; 19:1–2). At the current stage of research the existence of a route connecting the chiefdom centred on Feldioara-Dealul Cetății with the lower course of Someşul Mic, rich in salt, cannot be proved as yet.

In conclusion it may be said that two kinds of settlement-network models may be traced in central and north-western Transylvania, relatively distinct, not only due to their adaptation to local environmental conditions, but also in their exercise of power and social structures. The settlement system of the peer-polity units of the Carei Plain and the Eriu Valley is more centralized than that of the Someşul Mic Valley although both are built on similar social and economic structures.

LIST OF THE SETTLEMENTS

Carei Plain and the Eriu Rivers Valley (North-western Transylvania)

No.	Site name, toponym	Type of discovery	Date
1	Andrid-Dealul Taurilor (Bikadomb), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II)
2	Andrid-Curtea Grajdurilor CAP (A régi termelőszövetkezet istállóí), județul Satu Mare.	settlement	Middle Bronze Age (Otomani I–III)
3	Andrid,-Sub Holmul Mare (Nagyhalom), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II–III?)
4	Acâș-La moară (Malom), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II-III)
5	Adoni-Cetatea de pe insula (Sziget Vár), județul Bihor.	settlement	Middle Bronze Age (Otomani III)
6	Ardud-Vii (Szőlők), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II?)
7	Beltiug-Teveli (Tevel), județul Satu Mare.	settlement	Middle Bronze Age
8	Berea- Grădina Florilor (Virágkert), județul Satu Mare.	settlement	Middle Bronze Age
9	Berea-Pârâul Turcului (Török folyás), județul Satu Mare.	settlement	Middle Bronze Age
10	Berea-Togul Sf. Gherghe (Szentgyörgy tag), județul Satu Mare.	settlement	Middle Bronze Age
11	Berea-Togul evreului (Zsidó tag), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II)
12	Berveni-Halmos (Halmos), județul Satu Mare.	fortified tell settlement	Middle Bronze Age (Otomani I–III)
13	Cadea-Dealul chel (Kopaszdomb), județul Bihor.	fortified settlement	Middle Bronze Age (Otomani II)
14	Carei-Bobald I (Bobáld I), județul Satu Mare.	fortified tell settlement	Middle Bronze Age (Otomani I–III)
15	Carei-Bobald I lb (Bobáld I lb), județul Satu Mare.	settlement	Middle Bronze Age (Otomani I–II)
16	Carei-Bobald I 2a (Bobáld I 2a), județul Satu Mare.	settlement	Middle Bronze Age (Otomani III)

No.	Site name, toponym	Type of discovery	Date
17	Carei-Bobald II (Bobáld II), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II)
18	Carei-Bobald VI (Bobáld VI), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II–III)
19	Carei-Spitz (Spitz), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II–III)
20	Căpleni-Malul canalului de irigație (Az öntözőkanális partja), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II?)
21	Căpleni-Drumul Căminului (Király földek), județul Satu Mare.	fortified settlement	Middle Bronze Age (Otomani II)
22	Cehăluț-Fântâna tătarilor (Tatár kút), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II?)
23	Cheșereu-Dealul episcopului (Püspökdomb), județul Bihor.	settlement	Middle Bronze Age (Otomani II?)
24	Cheșereu-Borzhalom (Borzhalom), județul Bihor.	settlement	Middle Bronze Age
25	Ciumești-Via Veche (Öregszőlők), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II–III)?
26	Ciumești-Pășunea mare (Nagylapos), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II)
27	Craidorolt, județul Satu Mare.	settlement	Middle Bronze Age?
28	Crestur-Cetățuia (Várhegy), județul Bihor.	settlement	Middle Bronze Age (Otomani II)
29	Curtuiușeni-Dealul ars (Égető hegy), județul Bihor.	settlement	Middle Bronze Age (Otomani II)
30	Dindești-Cetate (Vár), județul Satu Mare.	fortified settlement	Middle Bronze Age (Otomani I–III)
31	Diosig-Lângă colonie (A telep közelében), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II)
32	Domănești-Ferma de porci (Sertésfarm), județul Satu Mare.	settlement	Middle Bronze Age?
33	Foieni-Lângă podul peste canal (A Bere patak hídja mellett), județul Satu Mare.	settlement	Middle Bronze Age?
34	Galospetreu-Pădurea Frater (Fráter erdő), județul Bihor.	settlement	Middle Bronze Age (Otomani II?)

No.	Site name, toponym	Type of discovery	Date
35	Galoşpetreu-La Vii (Szőlők), judeţul Bihor.	settlement	Middle Bronze Age?
36	Galoşpetreu-Podul cu cinci găuri (Az ötlyukú híd), judeţul Bihor.	settlement	Middle Bronze Age (Otomani II)
37	Galoşpetreu-Malul drept al Ganaşului (A Gánás patak jobb partján), judeţul Bihor.	settlement	Middle Bronze Age (Otomani II)
38	Ghirişa-Dâmbul serei (Széra domb), judeţul Satu Mare.	settlement	Middle Bronze Age?
39	Mihai Bravu, judeţul Bihor.	settlement	Middle Bronze Age (Otomani II–III)?
40	Mihăeni-Cetate (Vár), judeţul Satu Mare.	settlement	Middle Bronze Age?
41	Moftinu Mare-Grădina lui Bota (Bota kertje), judeţul Satu Mare.	settlement	Middle Bronze Age?
42	Moftinu Mic-Curtea parohiei reformate (A református parókia udvarán), judeţul Satu Mare.	settlement	Middle Bronze Age (Otomani II)
43	Moftinu Mic-Hanul Messzelátó (Messzelátó csárda), judeţul Satu Mare.	settlement	Middle Bronze Age (Otomani II–III)?
44	Moftinu Mic-Ograda sediului fostei CAP (A mezőgazdasági társulás székhelyének kertje), judeţul Satu Mare.	settlement	Middle Bronze Age?
45	Otomani-Cetăţuie (Várhegy), judeţul Bihor.	fortified tell settlement	Middle Bronze Age (Otomani I–III)
46	Otomani-Cetatea de pământ (Földvár), judeţul Bihor.	fortified settlement	Middle Bronze Age (Otomani III)
47	Otomani-Înainte de insula (Elősziget), judeţul Bihor.	settlement	Middle Bronze Age (Otomani I; III)
48	Pir-Cetate (Vársziget), judeţul Satu Mare.	settlement	
49	Pir-Várgánc (Várgánc), judeţul Satu Mare.	settlement	Middle Bronze Age (Otomani III)
50	Pir-Roszgáz (Roszgáz), judeţul Satu Mare.	fortified settlement	Middle Bronze Age

No.	Site name, toponym	Type of discovery	Date
51	Pișcolt-Lângă biserica reformată (A református templom mellett), județul Satu Mare.	settlement	Middle Bronze Age (Otomani III)
52	Pișcolt-Zónat sau Ógát (Zónat vagy Ógát), județul Satu Mare.	settlement	Middle Bronze Age (Otomani I–II)
53	Portița-Vis-a-vis de cimitir (A temetővel szemben), județul Satu Mare.	settlement	Middle Bronze Age?
54	Roșiori-Cetatea de pământ (Földvár), județul Bihor.	fortified settlement	Middle Bronze Age (Otomani II–III)
55	Sanislău-La hârburi (Cserepes), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II)
56	Sanislău-Lângă Heleşteu (A halastó mellett), județul Satu Mare.	settlement	Middle Bronze Age?
57	Săcuieni-Cetatea Boului (Ökörvár), județul Bihor.	fortified tell settlement	Middle Bronze Age (Otomani I–III)
58	Sălacea-Dealul Vida (Vida domb), județul Bihor.	fortified tell settlement	Middle Bronze Age (Otomani I–III)
59	Sânicolaul de Munte-Dealul Bătrânilor (Öregdomb), județul Bihor.	settlement	Middle Bronze Age (Otomani II–III)?
60	Șilindru-Füzék (Füzék), județul Bihor.	fortified settlement	Middle Bronze Age (Otomani II)
61	Șimian-Locul grădinilor (Kerthelyek), județul Bihor.	fortified settlement	Middle Bronze Age (Otomani II)
62	Tarcea-Dealul mare (Nagydomb), județul Bihor.	settlement	Middle Bronze Age (Otomani II)
63	Tarcea-Dealul de mijloc (Középhegy), județul Bihor.	fortified settlement	Middle Bronze Age (Otomani II)
64	Tarcea-Holmul mare (Nagyhalom), județul Bihor.	settlement	Middle Bronze Age?
65	Terebești, județul Satu Mare.	settlement	Middle Bronze Age?
66	Tiream-Holmul cânepii (Kendereshalom), județul Satu Mare.	tell settlement	Middle Bronze Age (Otomani II–III)
67	Unimăt-Dâlboci (Dalbócs), județul Satu Mare.	settlement	Late Bronze Age I (Cehăluț Group)

No.	Site name, toponym	Type of discovery	Date
68	Urziceni-Vatra satului (A falu területén), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II–III)
69	Urziceni-Drumul Careiului (A nagykárolyi út mentén), județul Satu Mare.	settlement	Middle Bronze Age (Otomani II–III)
70	Valea lui Mihai-Groapa cu lut (Sárgaföldes gödör), județul Bihor.	settlement	Middle Bronze Age?
71	Valea lui Mihai-Groapa cu lut (Sárgaföldes gödör), județul Bihor.	Ceramic deposit	Late Bronze Age I (Cehălu-Group)
72	Valea lui Mihai-Grădina lui Dienes (Dienes kertje), județul Bihor.	settlement	Middle Bronze Age?
73	Valea lui Mihai-La pășune (Legelő), județul Bihor.	settlement	Middle Bronze Age?
74	Valea lui Mihai-La izvoare (Forrás), județul Bihor.	settlement	Middle Bronze Age?
75	Valea lui Mihai-La vii (Szőlők), județul Bihor.	settlement	Middle Bronze Age?
76	Vășad, județul Bihor.	settlement	Middle Bronze Age (Otomani II)
77	Vășad-Dealul viilor (Szőlőhegy), județul Bihor.	settlement	Middle Bronze Age (Otomani II–III)?
78	Vășad-Cartierul țiganilor (Cigánynegyed), județul Bihor.	settlement	Middle Bronze Age (Otomani III)
79	Vezendiu-Broscari (Békás), județul Satu Mare.	settlement	Middle Bronze Age?
80	Voivozi, județul Bihor.	settlement	Late Bronze Age II (pre Gava period)

Someșul Mic-Basin (Central Transylvania)

No.	Site name, toponym	Type of discovery	Date
1	Apahida-Râtul Vițeilor (Bornyúk rétje, Réti Óstelep, Rét), județul Cluj.	settlement, incineration grave	Late Bronze Age (Wietenberg IV/Noua culture), Early Iron Age (Ha B1)
2	Apahida-Râtul Satului, județul Cluj.	settlement, necropolis	Late Bronze Age (Wietenberg/Noua I culture), Early Iron Age
3	Apahida-Intersecția Apahida-Gherla-Mociu, Centru, județul Cluj.	settlement	Bronze Age (Wietenberg culture)
4	Apahida-Școala, județul Cluj.	isolated find	Bronze Age
5	Apahida-Malul Drept al Somesului Mic, județul Cluj.	settlement	Bronze Age?
6	Apahida-Malul Gârlei, județul Cluj.	isolated find	Bronze Age
7	Apahida-Platoul Chibaia, Râtul Satului, județul Cluj.	settlement	Bronze Age, Early Iron Age
8, 9	Apahida-Lacul Cocor (Darvas tó, Tóparti óstelep), Tău Maerului, județul Cluj.	settlement	Bronze Age
10	Băbuțiu-Grecea, județul Cluj.	fortified settlement	Bronze Age
11	Baciu-Centru, Căminul Cultural, județul Cluj.	settlement	Bronze Age, Early Iron Age
12	Băița-Dealul Sărăzaia, județul Cluj.	settlement	Bronze Age (Wietenberg culture), Early Iron Age
13	Boju, județul Cluj.	settlement	Bronze Age
14	Bonț-La Răzor, județul Cluj.	settlement;	Bronze Age (Wietenberg culture)
15	Căprioara-Săliște, județul Cluj.	settlement	Middle Bronze Age (Otomani, Wietenberg II-III)
16	Căpușu Mare-Cânepiște, județul Cluj.	settlement, necropolis;	Bronze Age (MBA to LBA transition)