



The politics of placing the dead in Bronze Age Transylvania

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ABSTRACT

Where people bury their dead is a critical part of mortuary rituals. This paper examines the relationship between the placement of the dead within a landscape and the social roles of the dead in the lives of the living. We examine the distribution of mortuary sites in southwest Transylvania during the Early and Middle Bronze Age (2700–1500 BCE), a period of significant socioeconomic transformation. We document a shift in the locations of cemeteries that is linked to the changing roles of the dead within society. During the Early Bronze Age, people placed their dead in highly visible tomb cemeteries in upland landscapes with access to metal and highland pasture. We argue that the living used mortuary practices to contest access to resources. During the Middle Bronze Age, however, people were primarily cremated and buried in flat urn cemeteries in similar contexts as settlements. We argue that this transition signifies changing institutions of metal procurement as well as a shift in the roles of the dead in the lives of the living. The analysis of cemetery placement has significant potential for revealing the organization and evolution of how bodies are used for political purposes in a broad range of geographic and chronological contexts.

1. Introduction

Burial is a political act. The rituals associated with death and burial are often a highly regulated component of ideological institutions, which can be understood as the rules and obligations that structure behavior (North, 1990). Mortuary rituals can be used to justify hierarchy, promote more egalitarian forms of sociopolitical organization, or act as a venue for introducing tensions between lived and performed experiences of power and authority (Quinn and Beck, 2016). For the living, each set of mortuary practices provides an opportunity for people to choose to either follow socially mediated conventions or to transform those conventions by choosing a different way of treating the dead. When the living bury the dead, they are deliberately maintaining or challenging social institutions that establish the roles of the dead in the lives of the living. As a result, archaeologists can use mortuary practices as one means of examining political action in the past.

Where people choose to bury their dead is an important dimension of mortuary politics (Ashmore and Geller, 2005; Beck, 1995; Bloch, 1971; Caswell and Roberts, 2018; Goldstein, 1981; O’Gorman et al., 2020; Rosenswig et al., 2020). The choice to bury the dead in a cemetery, under a house, or not at all, is the product of the dialectic relationship between mortuary institutions and human agency (McAnany et al., 1999; Velasco, 2014). This interplay between place and social

action is a political process (Kosiba and Bauer, 2013; Smith, 2014). Institutions limit choices about where people can place bodies, but each death provides a potential opportunity for the living to rewrite these norms. Monitoring the spatial dimensions of mortuary practices thus allows archaeologists to better understand the choices made by the living when burying the dead, as well as the potential for the continued importance of the dead within the lives of the living.

In this paper, we employ geospatial techniques to explore how the placement of the dead can be part of a political strategy to secure or contest access to resources within cultural landscapes. Specifically, we ask, what are the relationships between the distribution of cemeteries, settlements, and important economic resources in southwest Transylvania, and how did these distributions change over time? We use GIS catchment analyses to examine the distribution of mortuary sites in southwest Transylvania during the Early Bronze Age (2700–2000 BCE) and Middle Bronze Age (2000–1500 BCE); a period of significant socioeconomic transformation both in Transylvania and across Europe (Earle et al., 2015).

2. Mortuary landscapes and contested spaces

Since the emergence of mortuary theory in the 1970s and 1980s, the development of formal cemeteries—spatially bounded places where

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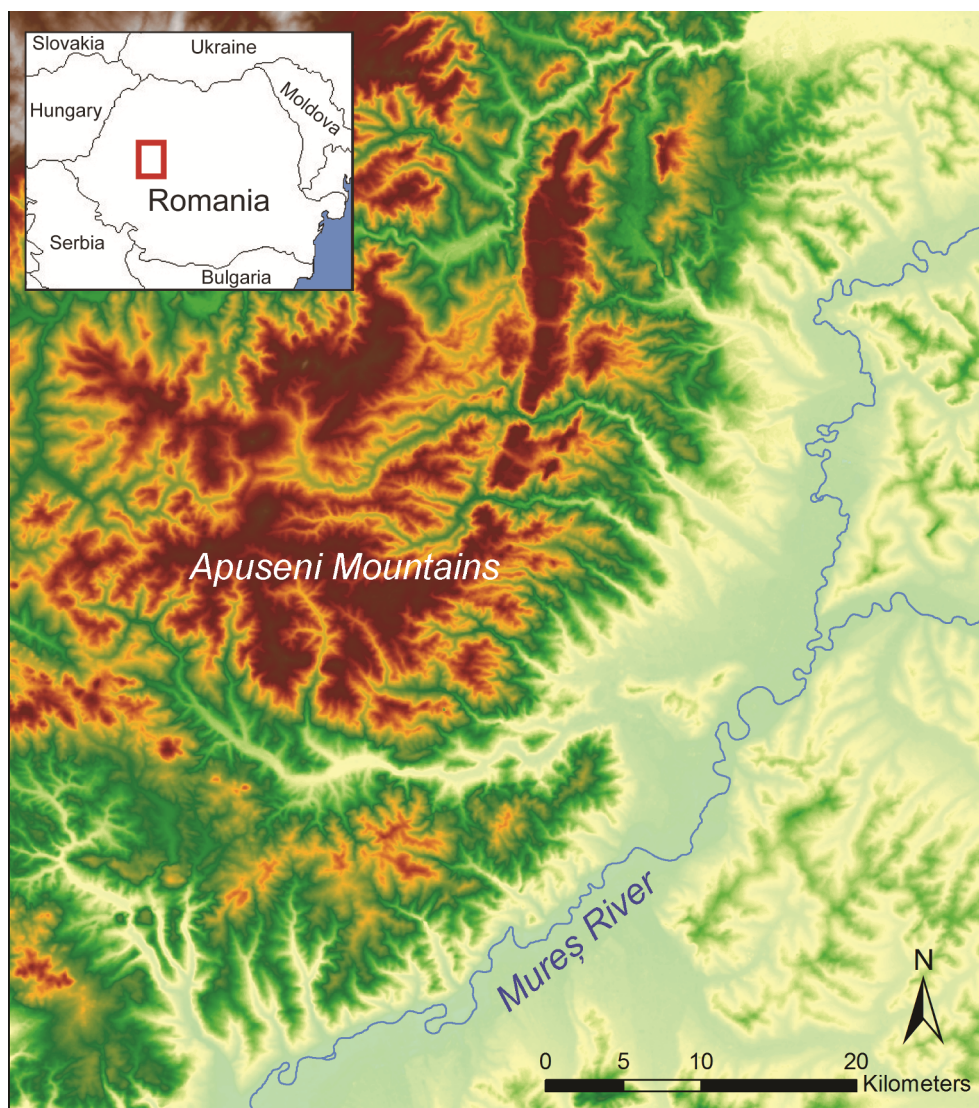


Fig. 1. Map of Southwest Transylvania.

multiple people are buried—has been linked to contesting access to space, resources, and territory. Building on [Saxe's \(1970\)](#) original formulation, [Goldstein \(1981\)](#) provided the first demonstration of this hypothesis using a case study from the lower Illinois River Valley during the Mississippian Period. Since that time, the link between territoriality and mortuary activity has been demonstrated across a wide variety of cultural contexts (see [Beck, 1995](#); [Rosenswig et al., 2020](#)).

Mortuary contexts are an ideal realm in which archaeologists can document the intersection of agency, institutions, and landscapes for three main reasons. First, humans create their landscapes ([Knapp and Ashmore, 1999](#)). Human action establishes what characteristics of landscapes are socially meaningful. For example, cultural context can influence whether people see water as a conduit or a barrier to movement ([O'Shea, 2011](#); [Quinn et al., 2019](#)), whether agricultural land is adequate without intervention or needs an investment of labor to optimize productivity ([Kuijt and Prentiss, 2009](#)), and whether ore deposits are critical economic resources or simply colorful rocks ([Boivin, 2004](#)). Humans build their environments and their decision-making is in part constrained by the landscapes they create.

Second, mortuary practices are less encumbered by environmental characteristics than other socioeconomic institutions. For example, the organization of mining is highly influenced by the natural distribution of ore within a landscape, the location of trade and exchange corridors

is channeled by topography and landscape features, the productivity of agriculture is affected by the quality and quantity of arable land, and settlement locations are influenced by the distribution of fresh water. In contrast, burial locations are selected based largely on decisions concerning the proper ways of situating the dead within the landscape. Since where people choose to bury their dead is a social choice, the spatial distribution of burials can reveal social priorities. Several archaeologists have argued that the development of formal cemeteries co-occurred with the need to establish and mark territory ([Goldstein, 1981](#); [Rosenswig et al., 2020](#); [Saxe, 1970](#)). In contexts where people buried their dead within houses rather than in formal cemeteries, mortuary ritual played an important role in creating and maintaining household identity ([Kuijt, 2001](#); [McAnany, 1995](#); [Overholtzer and De Lucia, 2016](#)). By analyzing the spatial distribution of mortuary sites, archaeologists can reconstruct choices and social conventions of people in the past.

Third, as a result of the recursive relationship between human action and social institutions, mortuary landscapes are always changing. With each action, humans choose to either conform to or deviate from social conventions concerning how landscapes are conceptualized (see [Smith, 2014](#)). When most people follow conventions, their actions will produce recognizable patterns that archaeologists can document through fieldwork and geospatial analyses. The patterned use of past

Table 1
Early Bronze Age cemeteries and their catchments.

ID	Site Name	Land Use	Trade Access	Metal Access
292	Ampoița-Colții Românesii	Pastoral	No	Possible
293	Ampoița-Dealul Doștiorului	Agricultural	No	Possible
294	Ampoița-La Bulz	Pastoral	No	Possible
295	Ampoița-(no name)	Pastoral	No	Possible
296	Ampoița-Peret	Pastoral	No	Possible
297	Ampoița-Vârful Marului	Pastoral	No	Possible
298	Ampoița-Vârful Vârtopului	Pastoral	No	Possible
299	Bărăbanț-(no name)	Pastoral	No	Possible
300	Căpud-Măgura Căpudului	Pastoral	No	No
301	Cetea-La Bai/La Pietri	Pastoral	No	Possible
302	Cheile Aiudului-Dealul Velii	Pastoral	No	Possible
303	Craiva-Piatra Craivii 1	Pastoral	No	Possible
304	Craiva-Piatra Craivii 2	Pastoral	No	Possible
305	Cricău-(no name)	Pastoral	No	Possible
306	Gârbova de Sus-(no name)	Agricultural	No	No
307	Gârbova de Sus-Piatra Danii	Pastoral	No	Possible
308	Geoagiu de Sus-Cuciu	Pastoral	No	Possible
309	Geoagiu de Sus-Geoagiu-Cetea 1	Pastoral	No	Possible
310	Geoagiu de Sus-Geoagiu-Cetea 2	Pastoral	No	Possible
311	Geoagiu de Sus-(no name) 1	Pastoral	No	Possible
312	Geoagiu de Sus-(no name) 2	Pastoral	No	Possible
313	Geoagiu de Sus-(no name) 3	Pastoral	No	Possible
314	Geomal-Măgura 1	Pastoral	No	Possible
315	Geomal-Măgura 2	Pastoral	No	Possible
316	Geomal-Măgura 3	Agricultural	No	No
317	Hăpria-Capu Dosului	Pastoral	No	Possible
318	Hăpria-(no name)	Pastoral	No	Possible
319	Izvoarele-Gruul Roșu	Pastoral	No	Possible
320	Izvoarele-La Cruce	Agricultural	No	Possible
321	Izvoarele-La Furci	Agricultural	No	No
322	Livezile-Baia	Pastoral	No	Possible
323	Livezile-Cărpiniș	Pastoral	No	Possible
324	Livezile-Dealul Sărbului	Pastoral	No	Possible
325	Livezile-Obârșie/Obursi	Pastoral	No	Possible
326	Meteș-La Meteșel	Pastoral	No	Possible
327	Meteș-Pleașa Înaltă	Agricultural	No	Possible
328	Meteș-Toaca	Agricultural	No	Possible
329	Meteș-Zăpode	Pastoral	No	Possible
330	Oiejdea-Bilag 1	Pastoral	No	No
331	Poiana Aiudului-Tăcul Mare	Pastoral	No	Possible
332	Ponor-(no name)	Pastoral	No	Possible
333	Râmeț-Gugului	Pastoral	No	Possible
334	Râmeț-La Cruce	Pastoral	No	Possible
335	Râmeț-(no name) 1	Pastoral	No	Possible
336	Râmeț-(no name) 2	Pastoral	No	Possible
337	Râmeț-(no name) 3	Agricultural	No	Possible
338	Râmeț-(no name) 4	Pastoral	No	Possible
339	Râmeț-(no name) 5	Pastoral	No	Possible
340	Râmeț-Ticera	Pastoral	No	Possible
341	Roșia Montană-Sesul Monului	Pastoral	No	Yes
342	Șard-Bilag	Agricultural	No	Possible
343	Sebeș-(no name)	Agricultural	No	No
344	Straja-Măgura	Agricultural	No	No
345	Stremț-(no name)	Pastoral	No	No
346	Țelna-Dealul Chicerii	Pastoral	No	Possible
347	Țelna-Rupturi	Pastoral	No	Possible
348	Țelna-Sălășele	Pastoral	No	Possible
349	Vălișoara-Gruul Darului	Pastoral	No	Possible
350	Vălișoara-La Strunga	Pastoral	No	Possible
351	Vințu de Jos-Viile Lacranjenilor	Agricultural	No	No
352	Alba Iulia-Părăul Iovului	Agricultural	Yes	No
353	Almașu Mare-La Cruce	Agricultural	No	Possible

landscapes allows archaeologists to identify socially shared institutions that emerge from human agency. These periods of stasis are punctuated by other times when people challenge, modify, and redefine social conventions that guide how landscapes are conceptualized and used. Documenting changes in mortuary landscapes thus allows archaeologists to monitor changes in social, political, and economic

institutions.

Burial placement is one strategy that communities in the past may have used to contest access to particular spaces. Access to particular locations in a landscape will be restricted, defended, and monitored if communities determine it is worth the cost to do so (Earle, 2000; Shennan, 2011). Archaeologists have documented numerous contexts where burial practices provided a way to secure and contest access to fixed resources or ecologically important locations (see Buikstra and Charles, 1999; Charles and Buikstra, 2002; Conolly, 2018; Howey, 2012; Johannsen and Laursen, 2010; Walker, 2019; Webb, 2018; Winter-Livneh et al., 2012). In using mortuary practices to mark or actively negotiate territorial claims, these communities would have been able to augment or replace open conflict between competing social groups. As a result, contesting space using mortuary practices is a dynamic social process.

Bronze Age landscapes were contested spaces. Technological developments and the sociopolitical changes they spurred, especially the expansion of metallurgy and interregional trade, created channelized networks of interaction that articulated different regions across Europe (Earle et al., 2015). Access to metal, and the trade routes through which raw materials and finished objects flowed, would have been particularly critical to Bronze Age societies. While there is significant evidence of direct competition among groups in the form of organized warfare (see Horn and Kristiansen, 2018), communities relied upon other ways of contesting access to resources in daily life. Mortuary practices may have played a role in these social processes. Bronze Age Transylvania provides an example of a context in which people appear to have used mortuary practices as a means of contesting access to particular spaces on the landscape.

3. Southwest Transylvania: A resource procurement landscape

Southwest Transylvania is a geologically, topographically, and environmentally complex landscape (Fig. 1). From the peaks of the Apuseni Mountains to the wide and meandering Mureș River, the diversity of the landscape both placed constraints on behavior and provided opportunities for Bronze Age communities. While the physical landscape likely did not change markedly throughout the Early and Middle Bronze Ages (2700–1500 BCE), archaeological evidence suggests that people's perceptions and experience of this landscape were undergoing pronounced transformations during these periods (Quinn and Ciugudean, 2018; Quinn and Fivenson, 2020; Quinn et al., 2020). The Apuseni Mountains are home to the largest gold deposits in Europe (Ianovici et al., 1976; 1977; Sintimbrean, 1989). Along with large copper outcrops, the landscape was a major source of metal at a time when metal was becoming increasingly integral to people's lives (Ciugudean, 2012; Earle et al., 2015; Radivojević et al., 2019). Beyond metal, the region has major salt deposits, which people exploited during prehistory (Harding and Kavruk, 2010). Southwest Transylvania's status as a major resource procurement zone in Europe during a time of expanding interregional trade networks and resource commodification undoubtedly played a significant role in the lives of the people who lived there.

The rich resources of southwest Transylvania are unevenly distributed across the landscape. Most of the available metal is located in the uplands, while salt deposits, rich agricultural land, and the riverine corridors key to interregional movement are found in the lowlands and valley bottoms. In a previous study, we demonstrated that the distribution of resources significantly affected where people placed their settlements (Quinn and Ciugudean, 2018). Our research showed that over the course of the Bronze Age, communities increasingly situated their settlements to have access to interregional trade corridors along the Mureș River. Additionally, Early and Middle Bronze Age communities did not prioritize direct access to metal sources when situating their settlements in the Apuseni Mountains. As a result, there is no evidence in the settlement patterns that indicates that local

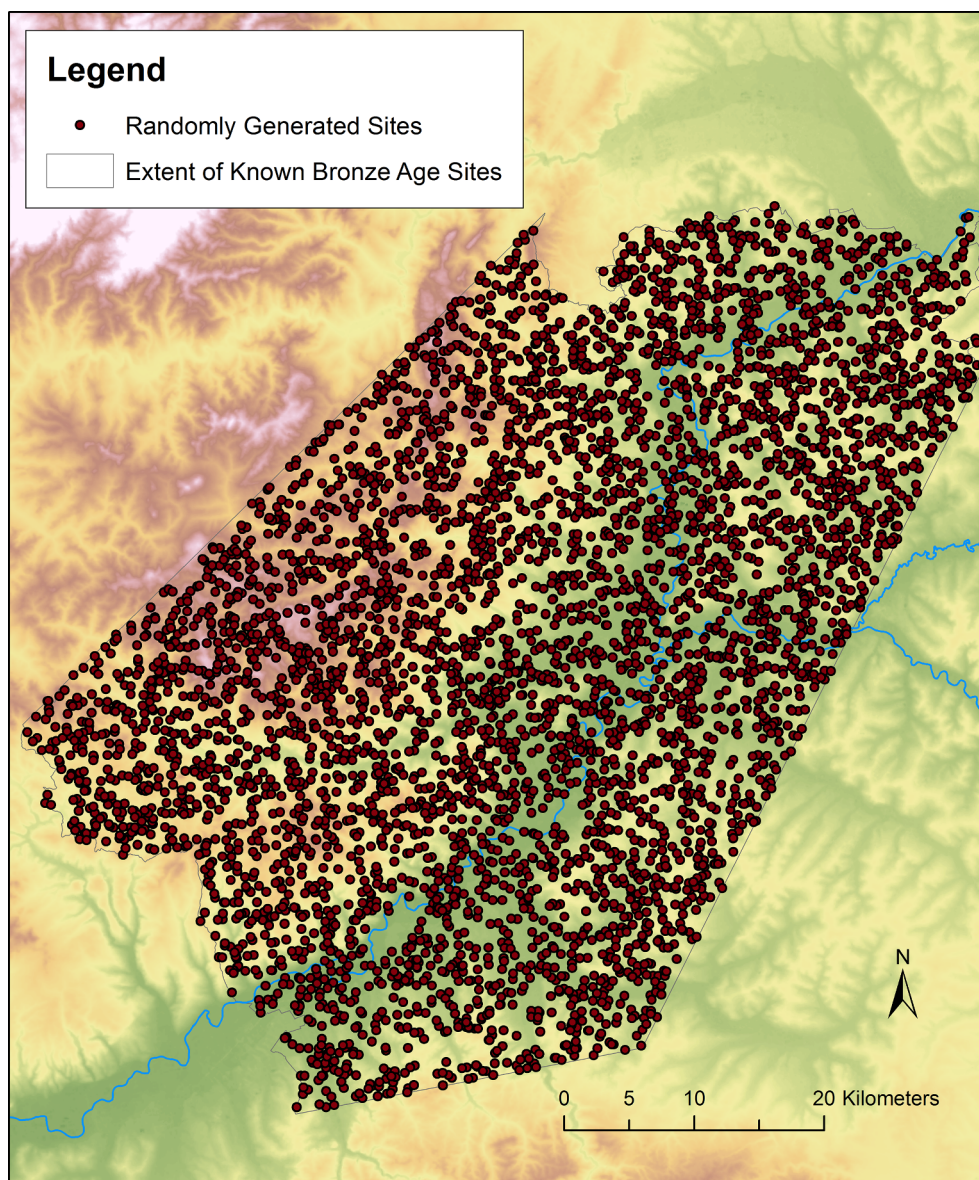


Fig. 2. Random distribution of 5000 points used to characterize regional catchments.

communities and emerging elites exerted control over metal procurement. This study complements our previous analysis of settlement placement by investigating what kinds of landscapes Bronze Age communities prioritized for placing their dead.

4. Bronze Age Transylvanian mortuary practices

Archaeologists have excavated mortuary features in the Transylvanian landscape for over a century (see [Andrițoiu, 1978](#); [Horedt, 1953](#); [Soroceanu and Retegan, 1981](#)). However, after the end of the Communist era and the increased development associated with Romania's acceptance into the EU, the last three decades has seen a rapid increase in the quantity and quality of available mortuary data (see [Berecki, 2016](#); [Ciugudean, 1991, 1995, 1997, 2010](#); [Fântâneau et al., 2017](#); [Paul, 1995](#)). In particular, the construction of highways, pipelines, expansion of mountain roadways, and other infrastructure projects has fueled archaeological fieldwork. This influx of data has allowed archaeologists to gain a greater understanding of the diversity of mortuary practices during the Early and Middle Bronze Age.

There is minimal diversity in burial practices during the majority of the Early Bronze Age. Primary and secondary inhumations in rounded

and mounded tombs are the most common forms of mortuary treatment ([Ciugudean, 1991, 1995, 1996, 1997, 2011](#)). Tombs can be found in isolation, or clustered together to form tomb cemeteries of various sizes. Tomb cemeteries are often placed in highly visible locations, such as along ridges in the Apuseni Mountains and overlooking the Mureș River Valley ([Ciugudean, 2011](#)). The largest known tomb cemetery, Cheile Aiudului, has sixteen tombs. Each tomb typically contains between two and ten individuals ([Ciugudean, 1995, 2011](#)).

During the Early Bronze Age, tombs in the Mureș River Valley lowlands were covered with earth mantles. In the Apuseni Mountain highlands, tombs were covered with both limestone and earth mantles ([Ciugudean, 2011](#)). This upland-lowland division in tomb construction is in part, but not exclusively, influenced by the presence of limestone outcrops in the mountains. In many cases, Early Bronze Age communities in the mountains still had to collect and transport limestone several kilometers to the site of tomb construction. There is only one known example of Early Bronze Age burials found in a context other than a tomb in southwest Transylvania. Inhabitants of the Alba Iulia-Pârâul Iovului site placed four skeletons at the bottom of large storage pits within the settlement ([Beck et al., in press](#)). While this is the only recorded example, archaeologists have not excavated many Early

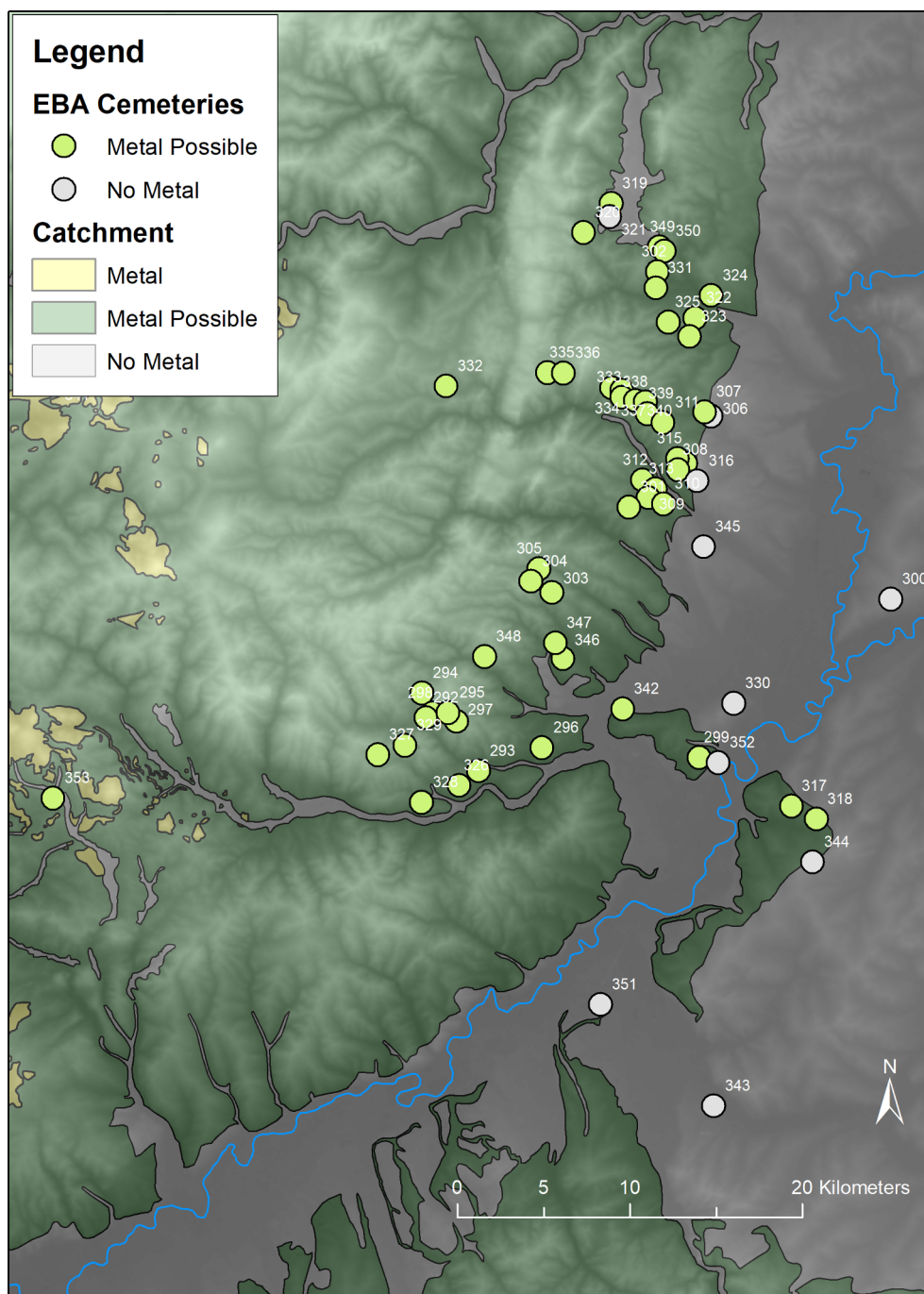


Fig. 3. Early Bronze Age cemetery locations and access to metal.

Bronze Age settlements. Given the number of tombs and number of burials within tombs, it is also important to note that there was likely a sizeable segment of society that was not buried in these contexts. For those buried in tombs, however, the locations of their bodies would have been visible to the living.

In contrast to the relatively constrained range of funerary practices that characterized the Early Bronze Age, Middle Bronze Age (2000–1500 BCE) communities buried their dead in a wide range of mortuary contexts using a more variable range of body treatments. Archaeologists have named the local Transylvanian cultural group during the Middle Bronze Age the Wietenberg Culture (Boroffka, 1994; Quinn et al., 2020). The most common ritual pathway followed by Middle Bronze Age bodies was cremation and burial in flat urn cemeteries (Boroffka, 1994; Motzoi-Chicideanu, 2011; Palincaş, 2014). Some

of the largest known cremation cemeteries, such as Sebeş-Între Răstoace, have over 60 distinct burials (Bălan et al., 2018; Fântâneanu et al., 2013; 2017). In many of the same cemeteries, such as Şibişeni-Deaspura Satului, Wietenberg communities interred primary inhumations as well as cremations (Paul, 1995; Palincaş, 2014). Beyond cemeteries, these communities also placed human remains in several other contexts. Archaeologists have found inhumation burials in pits at several sites, including Miceşti-Ciğaş (Bălan, 2014a, 2014b). Middle Bronze Age communities also placed cremated remains and vessels into the mantles of several Early Bronze Age tombs, such as at Ampoiţa-Dealul Doştiorului, Cetea, and Cheile Aiudului (Ciugudean, 1996).

As with the Early Bronze Age, is likely that not all Middle Bronze Age bodies were given mortuary treatments that were materialized in the archaeological record. While bodies were found in a wider range of

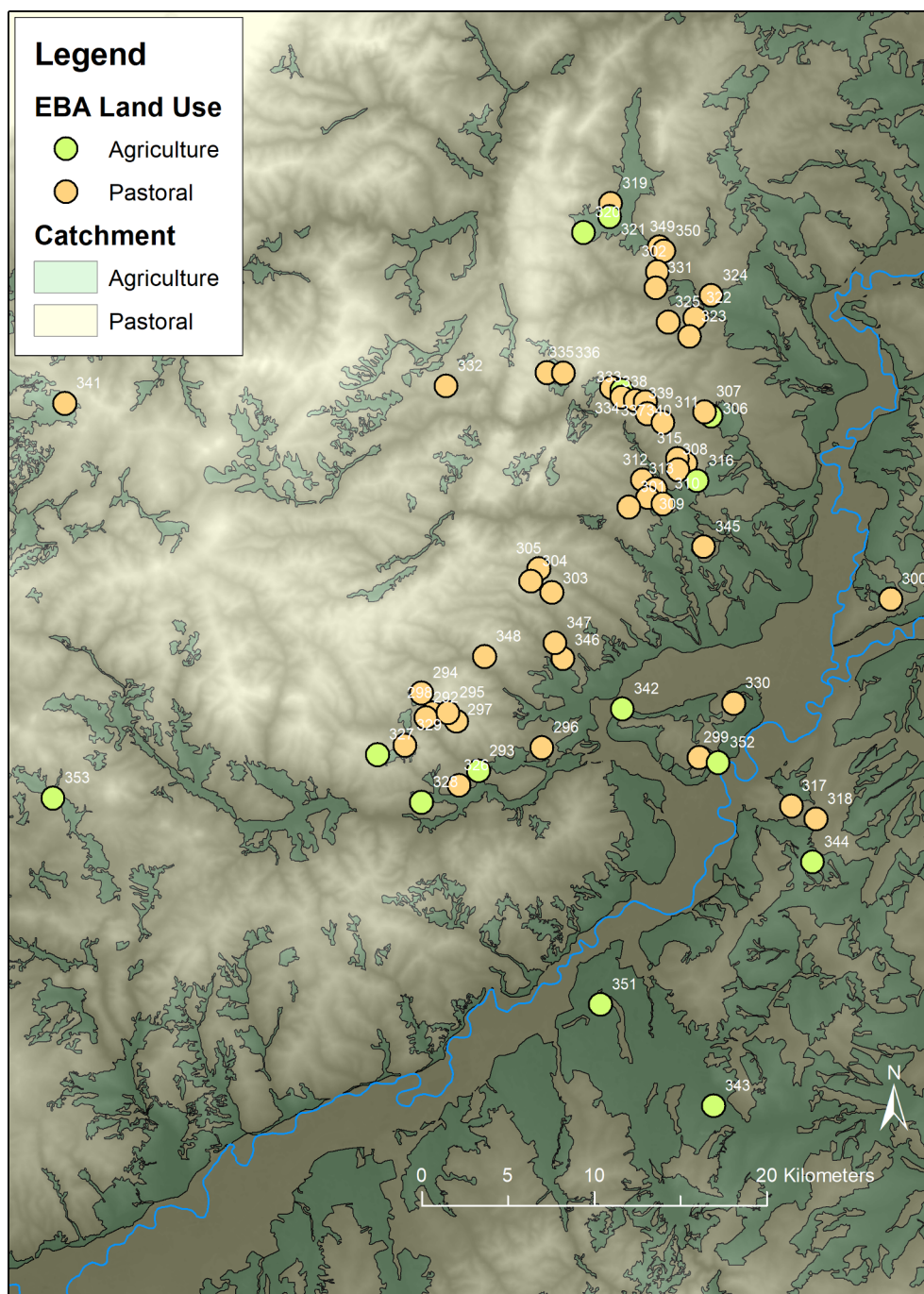


Fig. 4. Early Bronze Age cemetery locations and access to agricultural and pastoral land.

mortuary contexts, there is no evidence that Middle Bronze Age communities constructed mortuary monuments. In light of their lack of monumentality, Middle Bronze Age burial locations would have been less visible than Early Bronze Age tombs, especially at a distance. Cremation events would have been highly visible for the people living nearby, but this visibility did not last beyond the duration of the cremation ritual itself (Quinn et al., 2014).

The changes in mortuary practices that began around 2000 BCE both reflected and structured shifts in the roles of the dead in the lives of the living. This pronounced mortuary transformation makes southwest Transylvania an ideal case study with which to examine the potential roles of mortuary rituals in contesting access to resources in this diverse environment.

5. Materials, methods, and models

The data for this study are from Early and Middle Bronze Age sites in southwest Transylvania (Alba County, Romania). Site locations were recorded through pedestrian survey as part of the Bronze Age Transylvania Survey (BATS) Project as well as from published and grey literature (see Quinn, 2017). There are more recorded Early Bronze Age cemeteries than Middle Bronze Age cemeteries due to differences in visibility on the surface. Recent highway construction projects in the region have increased our knowledge of Middle Bronze Age cemeteries (e.g., Fântâneanu et al., 2017), but the quantity of known sites remains small. Infrastructural projects, while adding significant detail to our understanding of individual cemeteries, have contributed only a handful of new site locations ($n = 3$) to this database. In total, there are

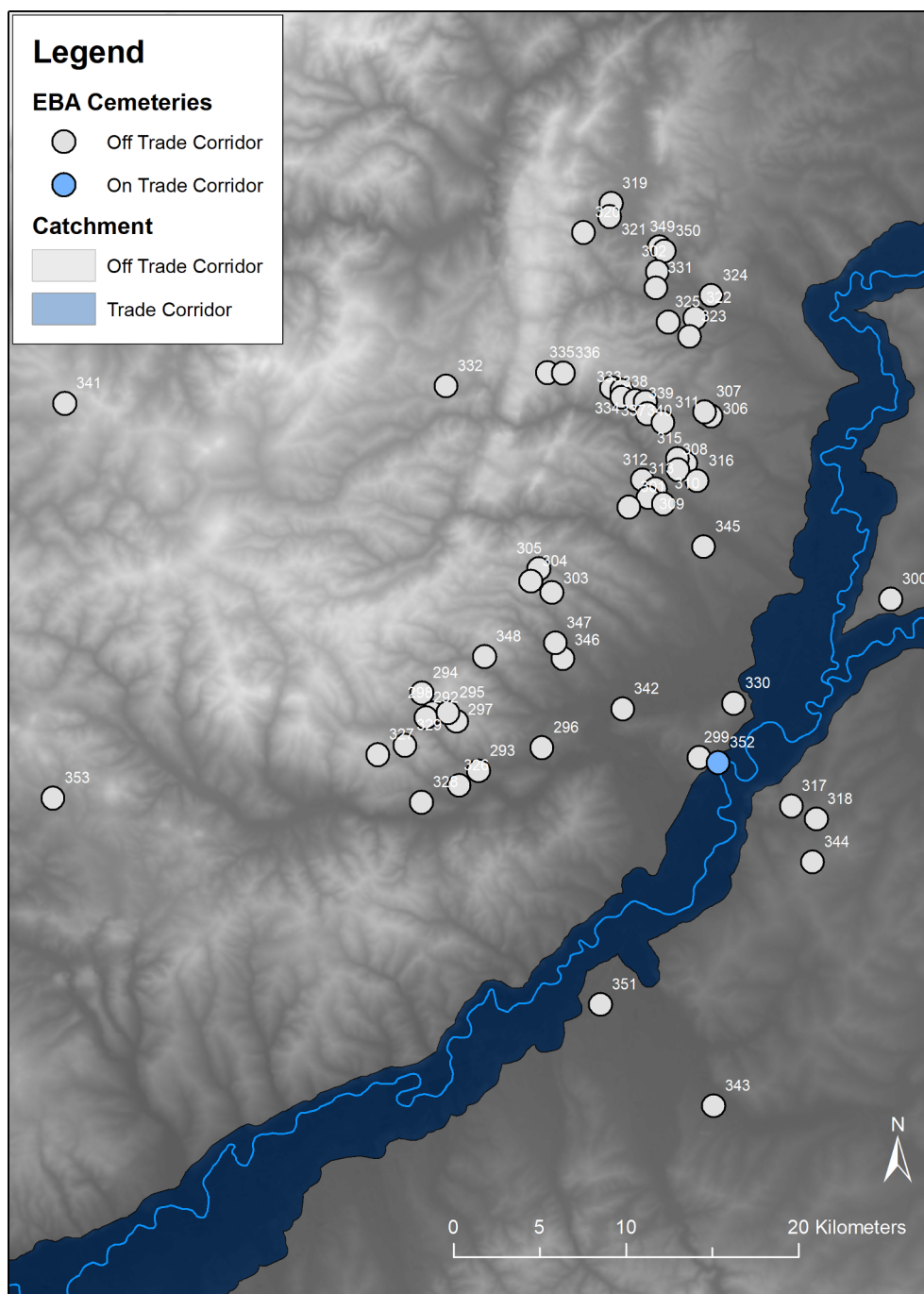


Fig. 5. Early Bronze Age cemetery locations and access to interregional trade routes.

62 Early Bronze Age and 12 Middle Bronze Age (Wietenberg Culture) mortuary sites included in this analysis.

The method employed in this study was previously developed and applied to settlement locations to examine how access to resources influenced the placement of Bronze Age residential sites in southwest Transylvania (see Quinn and Ciugudean, 2018). We defined catchments based on (1) access to metal, (2) access to interregional trade routes, and (3) their potential use as agricultural or pastoral land (Table 1). The potential for land to have access to metal deposits was derived from Romanian geological maps. The Apuseni Mountains in the western part of the study region have the highest availability of metal sources. The interregional trade corridor was defined as the area within 500 m of the Mureş and Târnâva River flood plains. Communities farther than 500 m from these riverine corridors would not have been able to efficiently

monitor and engage with people along the trade route. We use topography and hydrology to distinguish between land that would be suitable for agriculture and land that would be more suitable for pasture. We analyze slope using an ASTER Digital Elevation Model. We classify land that has a slope of less than six degrees and is out of the flood plain of the Mureş and Târnâva Rivers as suitable for agriculture. All other land is classified as more suitable for pasture.

Catchment analyses provide a way of quantifying the relationships between cemeteries and different socioeconomic resources embedded in the landscape. In the heterogeneous landscape of southwest Transylvania, the location of cemeteries within specific types of landscapes can reveal some of the social, economic, and political roles played by mortuary rituals. To identify which environmental settings Bronze Age communities either sought out or avoided as appropriate

Table 2

Distribution of cemeteries and settlements within catchments by Bronze Age phase (plus 5000 randomly placed sites) in southwest Transylvania.

	Random (n = 5000)	Early Bronze Age		Middle Bronze Age (Wietenberg Culture)	
		Mortuary Sites (n = 62)	Settlements (n = 39)	Mortuary Sites (n = 12)	Settlements (n = 44)
Metal Access					
Yes	32 (0.6%)	1 (1.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Possible	2196 (43.9%)	51 (82.3%)	16 (41.0%)	4 (33.3%)	17 (38.6%)
No	2772 (55.4%)	10 (16.1%)	23 (59.0%)	8 (66.7%)	27 (61.4%)
Trade Access					
Yes	590 (11.8%)	1 (1.6%)	14 (35.9%)	5 (41.7%)	14 (31.8%)
No	4410 (88.2%)	61 (98.4%)	25 (64.1%)	7 (58.3%)	30 (68.2%)
Land Use					
Agricultural	1619 (32.4%)	14 (22.6%)	20 (51.3%)	7 (58.3%)	27 (61.4%)
Pastoral	3381 (67.6%)	48 (77.4%)	19 (48.7%)	5 (41.7%)	17 (38.6%)

Table 3

Middle Bronze Age (Wietenberg Culture) mortuary sites and their catchments.

ID	Site Name	Land Use	Trade Access	Metal Access
161	Micești-Cigaș	Agricultural	No	No
170	Obreja-Cânepi	Agricultural	Yes	No
251	Uioara de Jos-Îtardeu/La Pârloage	Agricultural	No	No
266	Sibișeni-Deaspura Satului	Pastoral	Yes	No
273	Sebeș-Între Răstoace	Agricultural	No	No
280	Oiejea-Bilag 1	Agricultural	No	No
293	Ampoița-Dealul Doștiorului	Agricultural	No	Possible
301	Cetea-La Băi/La Pietri	Pastoral	No	Possible
302	Cheile Aiudului-Dealul Velii	Pastoral	No	Possible
354	Băcăinți-Obreje	Pastoral	Yes	No
355	Galda de Jos-No name	Pastoral	Yes	No
356	Limba/Oarda de Jos-Șeșul Orzii	Agricultural	Yes	Possible

places in which to bury their dead, we must first quantify the abundance of each kind of context within the broader landscape.

We generated 5000 random points within the 3000 km² portion of Alba County where archaeologists have found evidence of Bronze Age settlements and cemeteries (Fig. 2). We use Fisher's exact tests to compare the statistical relationship between the random point distribution and the distribution of Early Bronze Age and Wietenberg cemeteries. If communities differentially preferred certain types of landscapes for placing their dead, we expect the cemetery catchments to deviate from the random distribution. By extension, these analyses can reveal if Bronze Age communities preferentially placed cemeteries close to particular economic resources within the landscape. If cemetery catchments match the random site distributions, however, it is likely because communities did not target specific features of the landscape when placing their dead.

We also compare the distributions of cemeteries to the distribution of settlements from each phase. Early Bronze Age and Wietenberg communities placed their settlements in locations that reflected and shaped socioeconomic organization (Quinn and Ciugudean, 2018). If cemeteries were used to contest access to resources that communities could not secure from their settlements, we expect the distribution of cemeteries and settlements to be different. If contesting access to resources using the placement of human remains was not a component of mortuary politics, we expect the distribution of human remains to more closely match the distribution of settlements within the landscape. These analyses provide a means of monitoring the institutional rules that governed burial rites which provide insight into the roles of the dead within the lives of the living in Bronze Age Transylvania.

6. Results

The majority of the 62 cemeteries in the Early Bronze Age were

placed in the uplands, along the ridges of the Apuseni Mountains (Table 1). As a result, most cemeteries were situated in land with either direct (1 of 62; 1.6%) or potential access to metal through local hydrothermal vents (51 of 62; 82.3%) (Fig. 3). Only one Early Bronze Age mortuary site was within the Mureș trade corridor, while the rest (61 of 62; 98.4%) were positioned more than 500 m from the Mureș River flood plain (Fig. 4). Early Bronze Age cemeteries were predominantly placed in pastoral land (48 of 62; 77.4%) (Fig. 5).

There are significantly more Early Bronze Age cemeteries in locations where metal may be locally available than would be expected if cemeteries were randomly placed in the landscape ($p < 0.0001$) (Table 2). There are significantly fewer mortuary sites with direct access to the Mureș trade corridor than expected ($p = .0082$). There is no significant difference in land use between the random distribution of catchments in Transylvania and mortuary sites in the Early Bronze Age ($p = .1317$).

Middle Bronze Age Wietenberg communities placed their dead in different locations in the landscape than Early Bronze Age communities (Table 3). Of the 12 locales with human remains, a slight majority are in land that could be used for agriculture (7 of 12; 58.3%) (Fig. 6). Unlike the Early Bronze Age when burial within the Mureș trade corridor was rare, five of the twelve mortuary locations (42.7%) had access to this critical trade route (Fig. 7). Only four of the twelve mortuary sites (33.3%) were in catchments that may have had access to metal through local hydrothermal vents (Fig. 8).

In contrast to the Early Bronze Age, there is no significant difference in the access to metal between the distribution of Wietenberg mortuary sites and the random distribution ($p = 0.5656$). Additionally distinct from the Early Bronze Age, there are significantly more mortuary sites with direct access to the trade corridor than expected ($p = 0.0090$). There are also more Wietenberg mortuary sites located in areas with higher potential as agricultural land than pastoral land. While this is the inverse pattern from the random site distribution, the difference is not quite statistically significant ($p = 0.0667$).

The results of the catchment analysis indicate that there was a shift in the choices people made concerning where to place their dead from the Early to the Middle Bronze Age. Early Bronze Age communities buried their dead near metal sources and away from interregional trade routes. By the Middle Bronze Age, landscape preferences had flipped, with more dead buried near trade routes than near metal sources.

While Early Bronze Age communities prioritized placing their dead in metal-rich landscapes and away from trade routes, that is not where they placed their settlements (Fig. 9). Of the 39 settlements, 20 were in agricultural land, 14 were near the interregional trade route, and 16 had potential local access to metal sources (see Table 2). For their daily lives, Early Bronze Age communities prioritized catchments with sufficient agricultural productivity and access to interregional trade routes. The differences between the distributions of settlements and cemeteries are statistically significant for all catchments: there are more cemeteries near metal ($p < .0001$), more settlements near trade routes

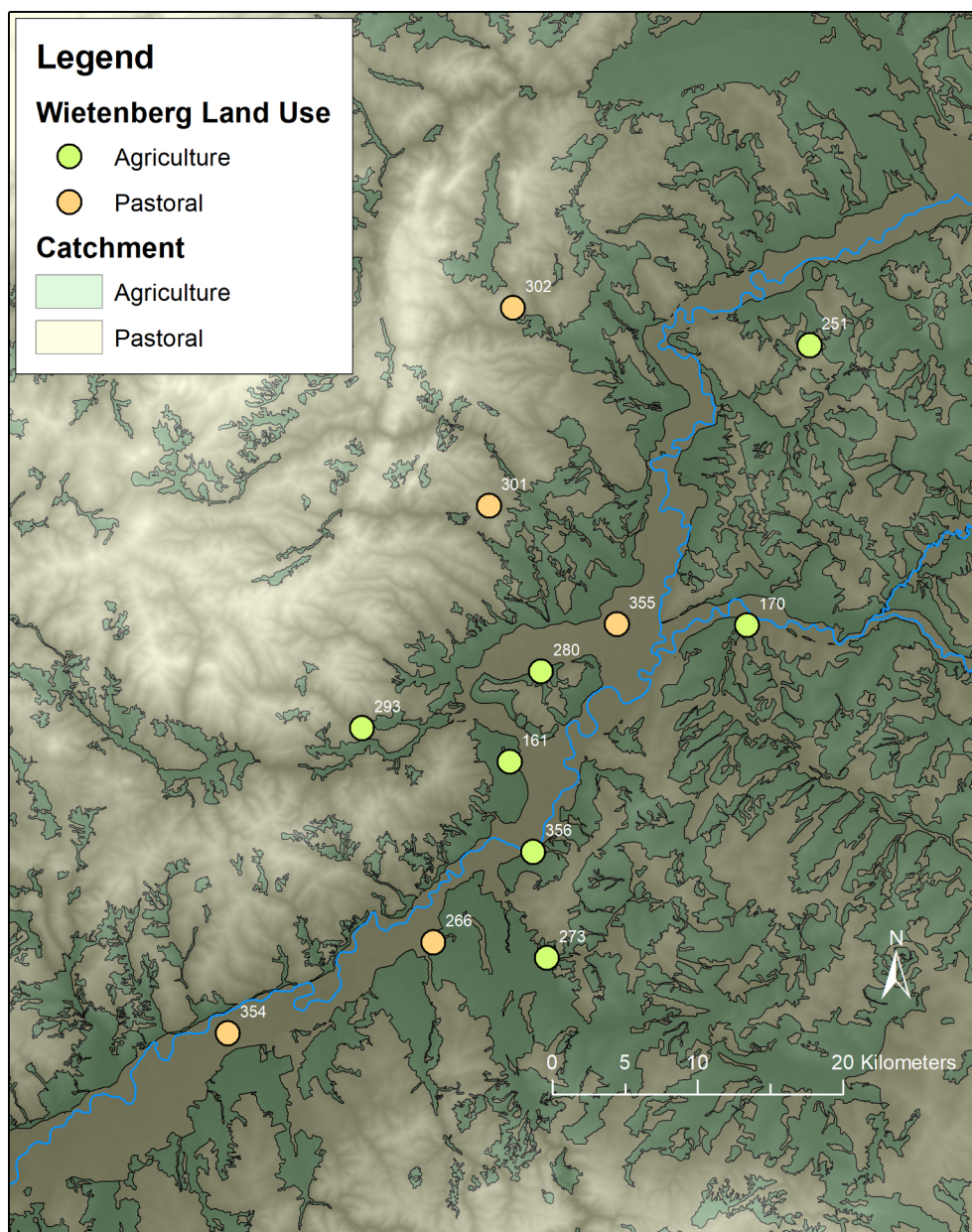


Fig. 6. Middle Bronze Age mortuary site locations and access to agricultural and pastoral land.

($p < .0001$), and more settlements in land with higher agricultural potential ($p = .0047$). Our results show a clear segmentation between upland, metal-rich mortuary landscapes and lowland settlement landscapes during the Early Bronze Age.

By the Middle Bronze Age, the differences between mortuary landscapes and settlement landscapes were gone (see Fig. 9). Of the 44 Wietenberg settlements, 27 were in agricultural land, 14 were within the Mureş River trade corridor, and 17 had potential access to metal (see Table 2). Middle Bronze Age communities prioritized access to good agricultural land and access to trade routes when placing their settlements, as well as when placing their dead. There is no significant difference between the distribution of Middle Bronze Age settlements and cemeteries for access to metal ($p = 1.000$), access to trade routes ($p = .5161$), or land use ($p = 1.000$). Wietenberg communities lived and buried their dead in landscapes with similar environmental characteristics.

7. Discussion

The decisions people made about where to bury their dead in southwest Transylvania shed light on the broader social, economic, and political institutions that structured Bronze Age resource procurement landscapes. During the Early Bronze Age, communities chose to place their dead in catchments that had access to metal but were far away from agricultural fields and interregional trade routes. In the Middle Bronze Age, Wietenberg communities buried their dead in a wider range of contexts, but they did not prioritize a particular type of landscape for depositing remains.

The dead played a persistent role in how Early Bronze Age communities contested access to space, resources, and territory. The burial mounds would have been visible year-round. Anyone travelling through the mountains would have encountered monuments that contained the remains of ancestors. When communities returned to the same cemetery to bury their dead over centuries, they were maintaining not only their connection to their ancestors, but also reaffirming their connection to

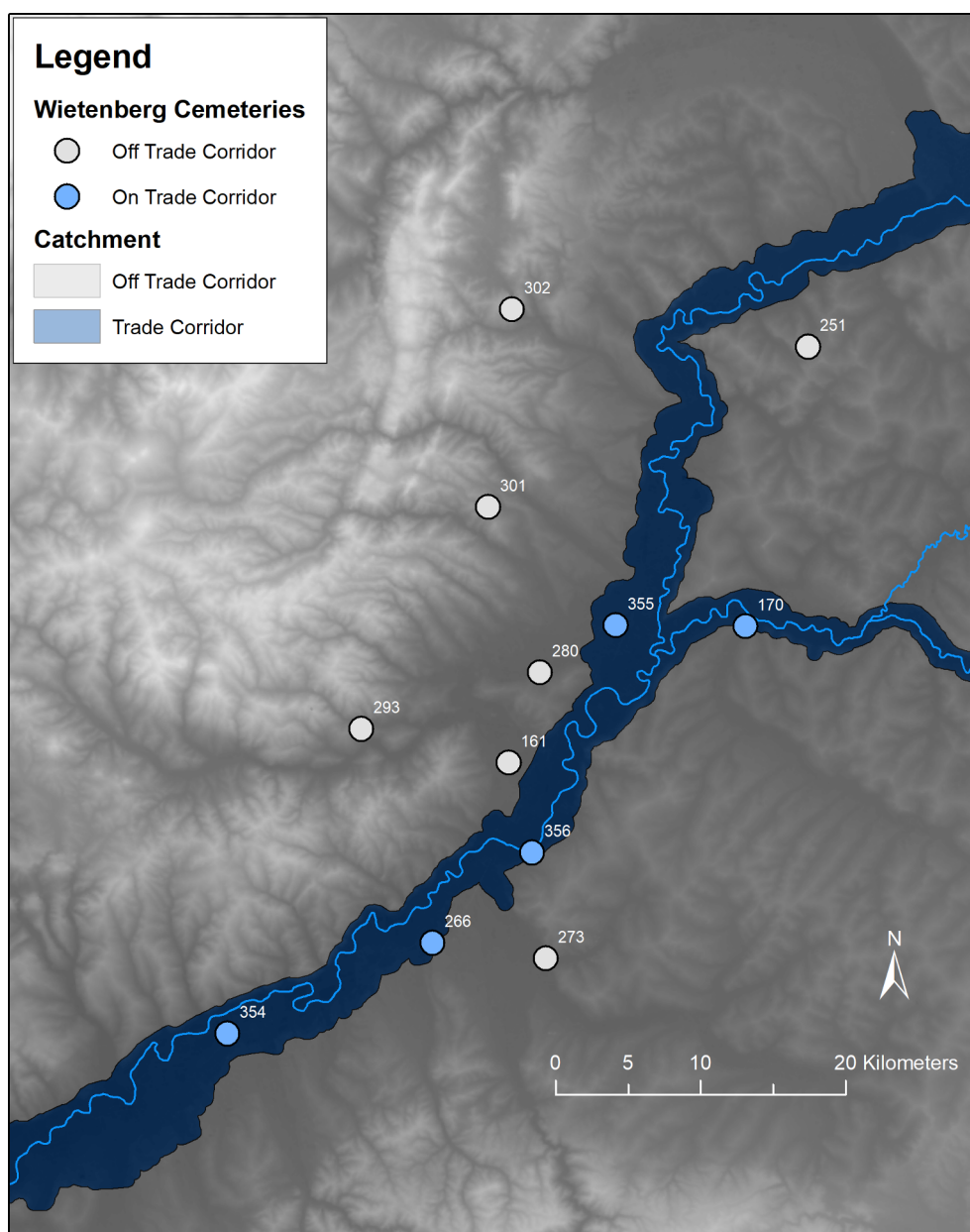


Fig. 7. Middle Bronze Age mortuary site locations and access to interregional trade routes.

the landscape and the resources therein. These monuments would have directed people towards certain places and encouraged them to avoid others.

Tomb cemeteries would have offered a way for Early Bronze Age communities to secure access to upland resources by using ancestors to assert claims to these territories. Copper and gold in the uplands could have been collected in small hydrothermal vents in these landscapes. The ridgelines dotted with tumuli would also have provided paths for roads connecting lowland communities to the richest metal sources in the mountains, especially those in the Metal Mountain range within the Apuseni Mountains (Ciugudean, 2012). Burial mounds can mark routes of economic interaction and social communication, a practice documented elsewhere in Europe (see Johannsen and Laursen, 2010). Beyond metal, the Transylvanian uplands were an important part of seasonal transhumance for herding sheep, goats, and cattle (Gerling and Ciugudean, 2013; Gerling et al., 2012). Transhumant pastoralism began in Transylvania during the Copper Age and was a major component of Early Bronze Age subsistence economies (Ciugudean, 2000; Gerling and

Ciugudean, 2013; Giblin, 2009; Giblin et al., 2013). As people intensified animal husbandry practices during the Bronze Age, they exploited upland mountain landscapes for pasture (Zavodny et al., 2019). The vast majority of Early Bronze Age cemeteries are located in upland pastoral landscapes, which indicates that securing access to pasture may have also been a goal of contesting upland landscapes.

The political roles of mortuary practices changed in the Middle Bronze Age. Instead of persistent visibility, the burial event, including the fiery transformation of the body through cremation, provided a sensory spectacle that would have engaged the broader community (Cerezo-Román et al., 2017; Kuijt et al., 2014). People buried most bodies in places close to where people were living. By placing the dead within and next to settlements, Wietenberg communities lived in closer proximity to their ancestors. As a result, the communities in southwest Transylvania were no longer using the dead to contest access to upland metal resources. The association of settlement and cemetery indicates that mortuary practices played an increasingly significant role in the creation of community identity in increasingly large settlements. The

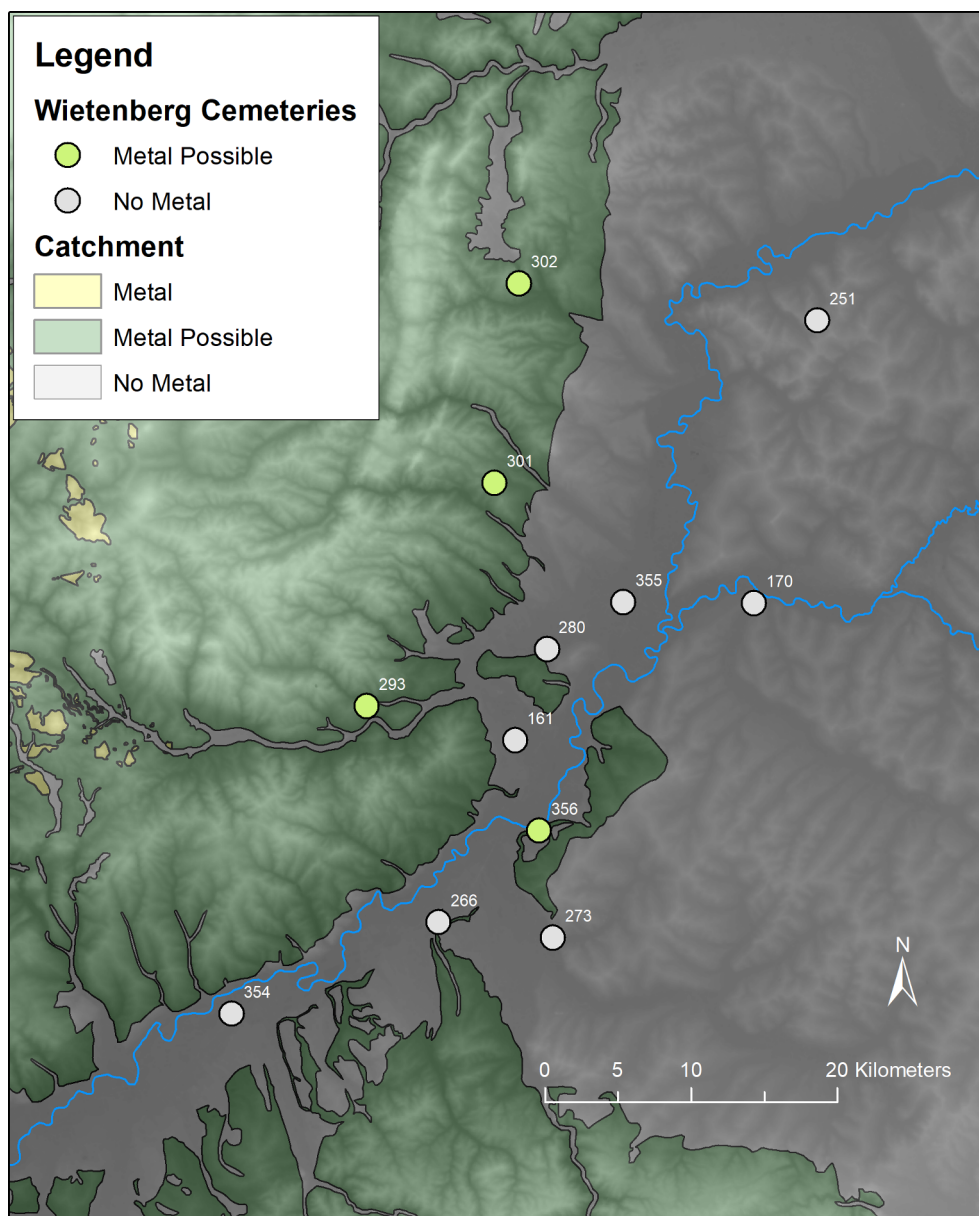


Fig. 8. Middle Bronze Age mortuary site locations and access to metal.

largest Early Bronze Age settlements in the region were approximately 2 to 2.5 ha, while the largest Middle Bronze Age settlements approached 8 ha in size. The burial of ancestors within a shared mortuary space would have facilitated the construction of shared social identities in these growing demographic centers (see Quinn, 2015). By placing cemeteries next to settlements, the link between the communities, both living and dead, would have been part of both daily practice and special ritual events. We do note, however, that the pattern of burying a small amount of cremated remains in the mantle of Early Bronze Age tombs suggests that the tradition of using the placement of the dead as part of a political act to connect to metal-rich landscapes may have continued, albeit in a different form than earlier periods.

The placement of the dead suggests there was a significant change in the organization of metal procurement from the Early to the Middle Bronze Age. Cemeteries in the uplands would have acted as a venue for Early Bronze Age communities to contest access to metal. Given the increased demand and commodification of metal throughout the Bronze Age, it is unlikely that these ore-rich landscapes lost their economic importance. However, our new data on cemetery placement during the

Middle Bronze Age suggests that later communities were no longer primarily using their dead to contest access to metal. It also appears that the living were not actively contesting access to metal during the Middle Bronze Age, as Wietenberg settlements were placed to ensure access to interregional trade routes rather than to control metal extraction points. The lack of evidence for competition over access to metal sources during the Middle Bronze Age suggests that there were strong institutions during this period that facilitated extraction and distribution of Transylvania's metals.

Our results provide a foundation for future research that can examine the nature of Wietenberg metal procurement, as something that was (1) controlled by an unchallenged hegemonic centralized polity, or (2) organized collectively through socioeconomic institutions that promoted cooperation over competition. Many researchers suggest that the Bronze Age was a time when complex regional hierarchical polities with institutional inequality emerged, primarily as emerging elites exerted control of access to metal (Earle and Kristiansen, 2010; Earle et al., 2015; Pare, 2000). If centralized political elite had hegemonic control of mining, then direct competition among local communities for

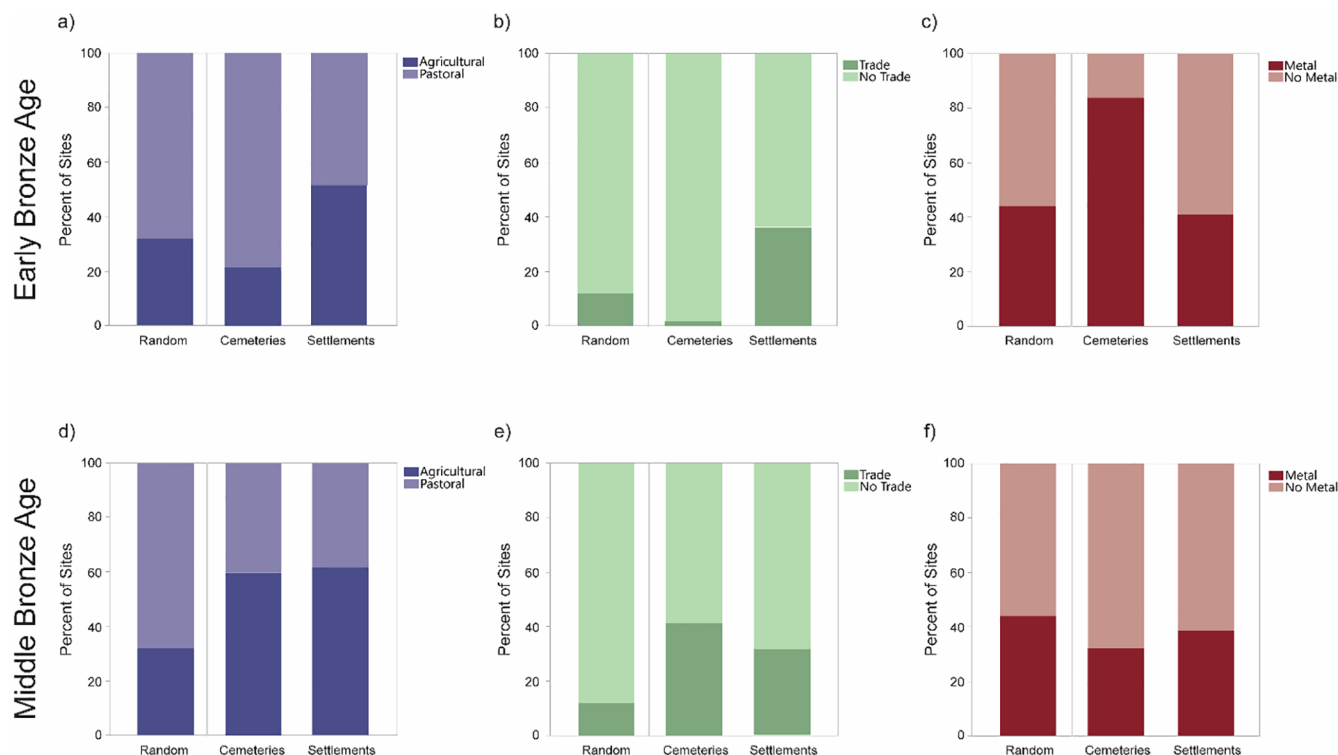


Fig. 9. Comparison of Early Bronze Age settlement and cemetery catchment distributions by (a) land use type, (b) access to trade routes, and (c) access to metal, and Middle Bronze Age settlement and cemetery catchment distributions by (d) land use type, (e) access to trade routes, and (f) access to metal.

access to metal would not have been necessary. The degree of political centralization in the Carpathian Basin and Transylvania is still an open question (Dietrich, 2010; Duffy, 2014; Earle and Kristiansen, 2010; O'Shea et al., 2019; O'Shea and Nicodemus, 2019). Collective action may provide an alternative model to hierarchical political economic control for how these early mining communities organized resource extraction (see Carballo, 2013; DeMarrais and Earle, 2017). Instead of competing with each other, communities in southwest Transylvania may have collectively organized resource procurement to help stabilize the flows of critical resources. Even with collectively organized mining, an emerging elite could have controlled the flow of metal between this major resource procurement zone and other regions across an increasingly interconnected continent (Earle et al., 2015). Non-local metal objects likely flowed through expanding trade networks during the Middle Bronze Age, adding additional layers of complexity to metal procurement. Recent metallurgical analyses of Middle Bronze Age artifacts from Transylvania indicates an Alpine provenance of the copper used in swords and other objects from the famous Apa hoard (Pernicka et al., 2016). While evaluating these models requires new fieldwork and lines of evidence that move beyond cemetery placement, our analysis has demonstrated that mortuary ritual may have played a key role in providing the ideological justification for cooperation and competition among Bronze Age Transylvanian communities.

8. Conclusion

In this study, we have documented a shift in the placement of bodies that is linked to the changing role of the dead within Transylvanian Bronze Age society. During the Early Bronze Age, people buried their dead in highly visible tomb cemeteries in metal-rich upland landscapes. We argue that by doing so, the living used the dead as one means by which to contest access to critical metal resources and pastoral landscapes. During the Middle Bronze Age, however, Wietenberg communities no longer used the dead to contest access to metal resources. Instead, people were primarily cremated and buried in flat urn

cemeteries located in similar contexts as settlements. We argue that this transition signifies a change in the organization of metal procurement as well as a shift in the roles of the dead in the lives of the living. As Wietenberg communities were adjusting to living in larger aggregated settlements, burial in communal cemeteries would have been a performance of shared community identity. The spatial dimensions of mortuary practices in southwest Transylvania underscores that the placement of bodies is a political act, and provides a geospatial method for examining the organization and evolution of mortuary politics in other regions and time periods.

CRediT authorship contribution statement

Colin P. Quinn: Conceptualization, Methodology, Formal analysis, Writing - original draft, Funding acquisition, Visualization, Supervision.
Horia Ciugudean: Resources, Writing - original draft, Supervision.
Jess Beck: Writing - original draft, Visualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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