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MAXIMUM ENTROPY MODELLING FOR PREDICTIVE ARCHAEOLOGY: MAPPING 8TH–11TH CENTURY SETTLEMENTS IN ILFOV COUNTY

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Keywords: MaxEnt, predictive map, Ilfov County, 8th–11th century, habitation

Abstract: This study employs advanced statistical methods, specifically Maximum Entropy (MaxEnt) modelling, to predict archaeological settlement locations from the 8th to the 11th centuries in the Bucharest and Ilfov regions, focusing on the Dridu culture. Using 107 known sites, the analysis integrates environmental variables (elevation, topographic position index, slope orientation, slope steepness, and distance to water) to generate a predictive map. Data preparation involved QGIS for spatial mapping and R for statistical analysis. The model, trained on 107 presence points (one point was excluded due to NA values) and 9779 absence points, achieved an AUC of 0.821, indicating strong predictive accuracy. Distance to water (73.96% contribution) and slope (25.02%) emerged as dominant factors, with high-probability zones aligning with areas near water and on moderate slopes.

Cuvinte-cheie: MaxEnt, hartă predictivă, regiunea Ilfov, secolele VIII–XI, habitat

Rezumat: Acest studiu folosește metode statistice avansate, în special modelizarea prin entropie maximală (MaxEnt), în scopul de a prevedea amplasarea siturilor arheologice între secolele VIII și XI în regiunea București-Ilfov, punând accent pe cultura Dridu. Pornind de la 107 situri cunoscute, analiza integrează variabile de mediu – altitudine, poziția topografică, orientarea pantei, diferența de nivel și distanța față de o apă curgătoare – pentru realizarea unei hărți predictive. Pregătirea datelor a implicat folosirea QGIS pentru cartografierea spațială și R pentru analiza statistică. Modelul, făcut pe 107 puncte de prezență (un punct a fost exclus din cauza valorilor lipsă) și 9 779 puncte de absență, a atins o AUC de 0,821, indicând o precizie predictivă foarte puternică. Distanța față de o apă curgătoare (73,96%) și panta (25,02%) s-au dovedit a fi factorii dominanți, zonele cu probabilitate ridicată corespunzând regiunilor apropiate de apă și situate pe pante moderate.

INTRODUCTION

New statistical analyses have transformed the study of history, particularly in archaeology, providing efficient tools for interpreting data and reconstructing the past with striking precision. These methods, such as Bayesian analysis, spatial modelling, and maximum entropy (MaxEnt) techniques¹, allow archaeologists to extract insights from incomplete or imprecise data, test hypotheses, and make robust predictions about ancient behaviours and environments. Bayesian analysis, for example, is essential in radiocarbon dating. It integrates a priori information (such as site stratigraphy) with measured data to refine time intervals. Bronk Ramsey² demonstrates how Bayesian models reduce uncertainty in archaeological chronologies, allowing a more precise correlation of historical events. The MaxEnt techniques described by Frieden³ are used to model the distribution of species⁴ as a function of environmental variables, even with limited data. Maximum Entropy is a statistical method. It is used to determine the most likely distribution of a variable when the available information is incomplete. The idea behind this is to choose the distribution that increases uncertainty or disorder

while still respecting known limits, such as observed data or physical properties (like values that are not negative). MaxEntropy estimates are always unbiased and general⁵. In archaeology, MaxEnt helps to predict the locations of undiscovered sites⁶, optimising prospection campaigns and beyond.

Currently, in Romania, predictive maps for archaeological sites are rarely used. So far, to my knowledge, one study focused on the Buzău County area⁷, where post-Roman sites were considered. Another study focused on the Eneolithic settlements in north-eastern Romania⁸. In addition, the PROSPECT project⁹ (Non-destructive investigations in complex archaeological sites. An integrated model of applied research on immovable cultural heritage), led by the Alexandru Ioan Cuza University of Iași, has started such research for an area of 125 square kilometres in the south-western part of the Moldavian Plain. Lastly, a predictive map based on Generalised Linear Models was produced for Bucharest¹⁰, with special regard to the Chilia-Militari culture.

⁵ Jaynes 1982, p. 939–951.

⁶ Yaworsky *et alii* 2020; Rafuse 2021; Wachtel *et alii* 2018, etc.

⁷ Ștefan, Sîrbu 2010.

⁸ Nicu *et alii* 2019.

⁹ <http://arheoinvest.uaic.ro/research/prospect/>, accessed 05.03.2026, http://arheoinvest.uaic.ro/research/prospect/downloads/PROSPECT_RS-2015_RO.pdf, accessed 05.03.2026.

¹⁰ Manea 2022.

¹ Harte, Newman 2014.

² Ramsey 2009.

³ Frieden 1972.

⁴ Phillips, Dudik 2008.

DATA SET¹¹ AND HISTORICAL CONTEXT

The identification of archaeological sites relied on two primary resources. For the Bucharest region, the *Repertoriul arheologic al Municipiului București*¹² was used, while the National Archaeological Repertoire was used for the Ilfov region (Fig. 1). A cartographic analysis was conducted to map all archaeological sites dated to the 8th–11th centuries, resulting in the identification of 107 sites (Fig. 2).

Dridu, an early medieval archaeological culture, is called after the Dridu village in Ialomița County. Archaeologist Ion Nestor¹³ took the initiative in establishing this culture after carefully examining the finds and defining its specific traits¹⁴. Experts have established that the Dridu culture existed from the 8th to the 11th century, peaking in the 10th and 11th centuries. This was a period of substantial colonisation and engagement with the Byzantine and Bulgarian empires¹⁵. There are two main sorts of settlements in this area. Urban habitation was concentrated in the cities along the Roman Limes and in the interior of Dobrogea. On the other hand, rural habitation was more common in Wallachia¹⁶. The culture is an amalgam of Roman and native features that developed throughout time, inspired by Byzantine and Slavic cultures¹⁷. This is visible in the ceramics, which include provincial-Roman, Slavic, and Byzantine¹⁸ elements.

The villages engaged mostly in subsistence farming¹⁹, as well as orcharding, viticulture, gardening, and livestock keeping, with a special emphasis on cattle. Hunting was more prevalent in subcarpathian communities with forested areas. Similarly, the Danube people used fishing²⁰ to increase the community's food supply.

A significant proportion of the archaeological sites excavated were located on the gentle slopes near rivers, with steep terraces being a less popular option²¹. The existence of a water supply is an important²² consideration when deciding the placement of a community. Houses were built in the pit-house or surface-house style, with either ovens or open hearths. Pit-residences account for 62.46%²³ of all dwellings in Wallachia. However, the prevalence of surface homes (25.23%) indicates that this is not an unusual occurrence, but rather a novel way to development²⁴. During this time, fire installations were common, with ovens made of river stones and clay. These are followed by

ovens dug into clay mounds. Finally, open hearths are the least common and are typically linked with surface houses. Once again, I see a pattern resembling the constructional and practical designs popular in previous times²⁵.

METHODOLOGY

The analysis was conducted on two levels: data modelling in QGIS version 3.34.9 Prizren²⁶ and statistical analysis and creating the MaxEnt model in R. All statistical analyses were performed in R version 4.4.1 (R Core Team, 2024). Environmental predictors were processed and analysed using the packages *raster* v3.6-32²⁷, *terra* v1.8-42²⁸, and *sf* v1.0-16²⁹. Maximum entropy modelling was carried out with the *dismo* package v1.3-14³⁰, using 5-fold cross-validation. The data preparation in QGIS was further divided into two stages. The first stage focused on raster file processing, utilising a Digital Elevation Model (DEM)³¹ to derive additional datasets (Fig. 3), including:

- **Elevation** – measuring the altitude of the terrain.
- **Slope** – measuring the steepness of the terrain.
- **Aspect** – indicating the direction a slope face.
- **Topographic Position Index (TPI)** – evaluating the relative position of a location within the surrounding landscape.
- **Distance to water** – Additionally, a proximity map was generated to calculate distances to water sources, specifically rivers. The base map for our analysis was derived from EU-Hydro River Network Database 2006–2012³², which served as the foundation for spatial referencing.

I switched from raster to vector file generation. Initially, I mapped 107 archaeological sites chronologically dated between the 8th and 11th centuries. Each site was represented by a polygon, for which the centroid function was used to determine a centre point to which values were assigned. Raster data and geographic coordinates were then extracted for these points. Subsequently, I generated 10 000 points in the study area (only within the Ilfov County), ensuring a minimum distance of 100 meters between them. Raster data and coordinates were assigned to these points, and all points with NA values were excluded. The two data sets were assigned a value: 1 for true and 0 for false. The last step was processing the

¹¹ For a clearer understanding of the analysis, both the datasets (presence and absence points) and the R code used were submitted to the editors.

¹² Vintilă et alii 2024.

¹³ Nestor 1958.

¹⁴ Ciupercă, Mirea 2010, p. 116.

¹⁵ Zaharia 1969, p. 118.

¹⁶ Zaharia 1969, p. 118.

¹⁷ Comșa 1978, p. 151.

¹⁸ Comșa 1978, p. 115.

¹⁹ Comșa 1978, p. 144.

²⁰ Comșa 1978, p. 144.

²¹ Mănucu-Adameșteanu 1992, p. 57.

²² Ciupercă 2012, p. 220.

²³ Ciupercă 2012, p. 219.

²⁴ Ciupercă 2012, p. 219.

²⁵ Ciupercă 2012, p. 219.

²⁶ QGIS Development Team 2024. Open Source Geospatial Foundation, <https://qgis.org>

²⁷ Hijmans 2023.

²⁸ Hijmans 2024.

²⁹ Pebesma 2018.

³⁰ Hijmans et alii 2023.

³¹ Provided by the Shuttle Radar Topography Mission (SRTM GL1), with a resolution of 30 m, <https://earthexplorer.usgs.gov/>, accessed 05.03.2024.

³² Available at <https://www.eea.europa.eu/en/datahub/datahubitem-view/2e782ca5-c7b2-4b48-8928-03031b642176>, accessed 05.03.2024.

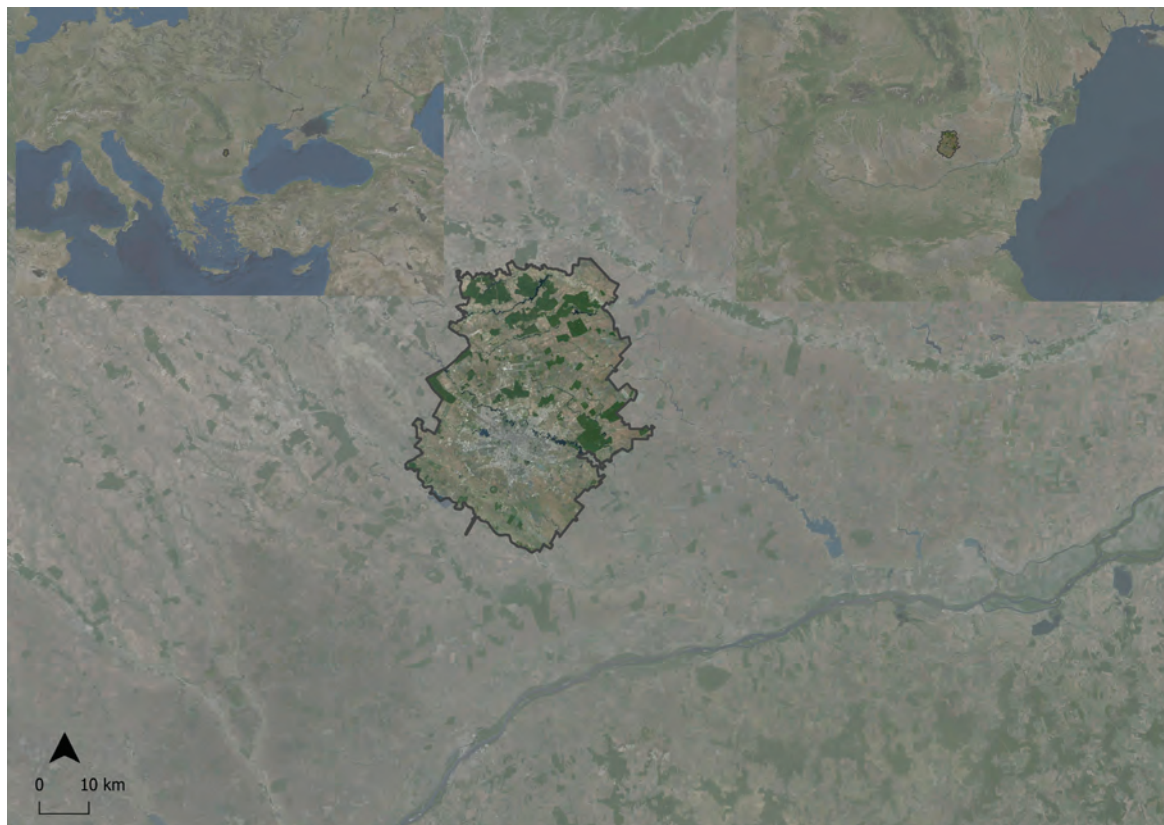


Figure 1. Location of the study area.

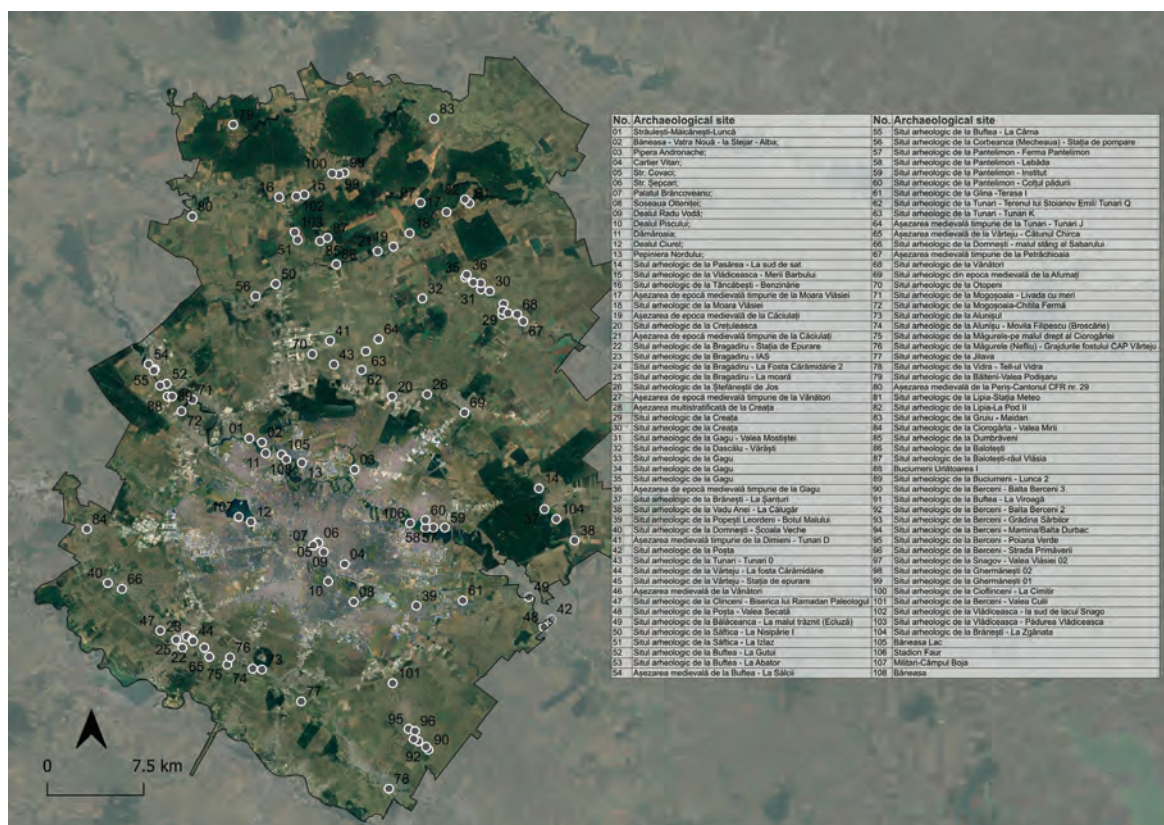


Figure 2. Archaeological sites of the 8th–11th centuries identified in the studied area.

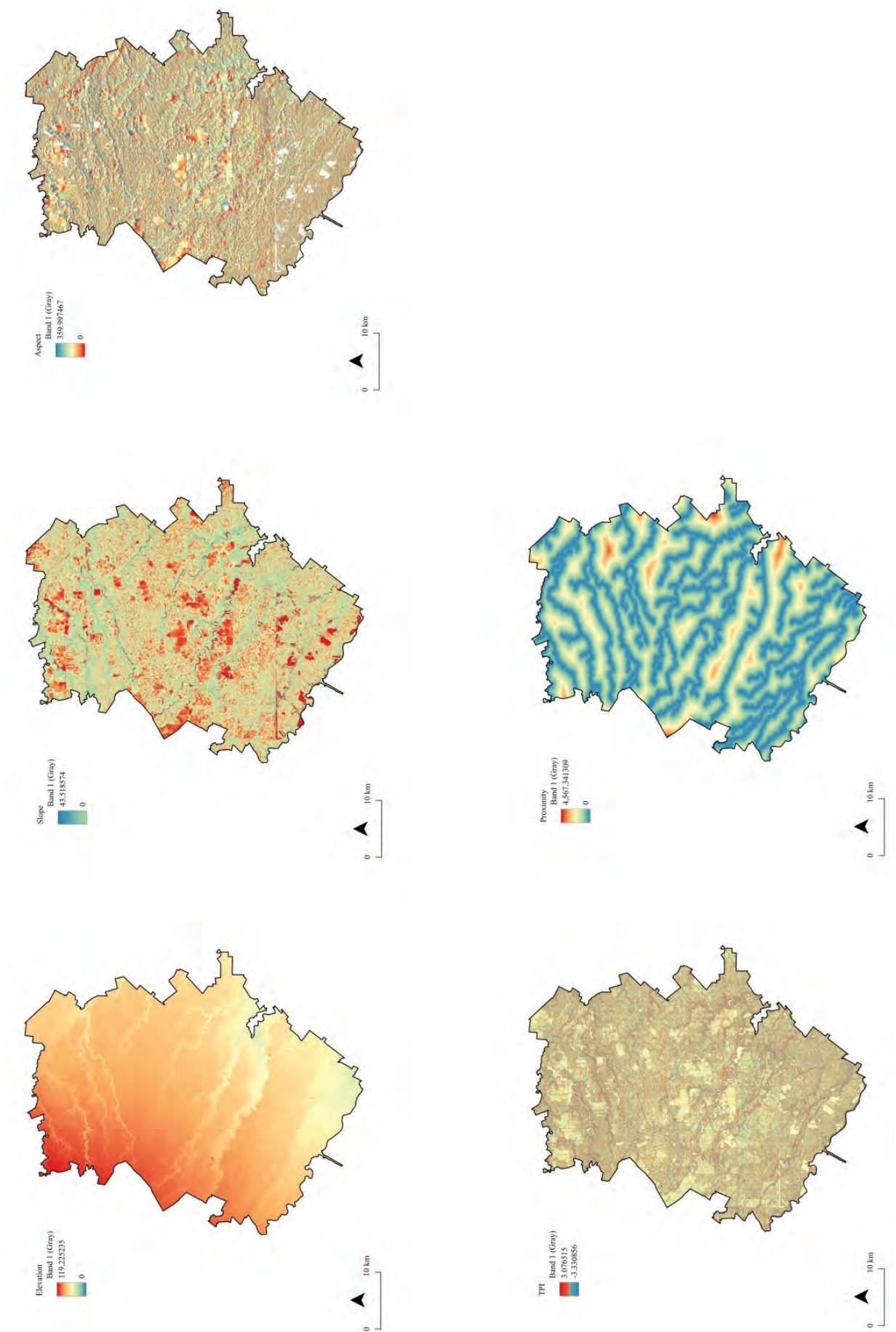


Figure 3. Datasets derived from the Digital Elevation Model.

data in R and finally generating the probability map. The projection CRS 3844 Pulkovo 1942(58) / Stereo70 was used throughout the analysis, and datasets that had a different coordinate system were reprojected.

LIMITATIONS

The model is based on current environmental conditions. If the landscape has changed significantly between the 8th–11th centuries and the present (e.g., diverted rivers, deforestation), predictions may be less accurate. No field verifications or measurements were performed to validate or, where applicable, invalidate the extracted parameters. The primary objective of the study was solely the development of a predictive model that could also contribute to the advancement of new technologies for identifying areas with archaeological potential. I should also note that ecological boundaries were not used; instead, administrative boundaries were applied. This choice undoubtedly weakens the model and does not follow the territorial divisions of the 8th–11th centuries (to the extent that they existed). Nevertheless, I chose to analyse Ilfov County and the Bucharest area because these regions have been relatively well researched archaeologically, resulting in a more robust and high-quality dataset. The 10,000 background points were generated within the study area to characterise the environmental conditions available across Ilfov, rather than to represent the full extent of any river watershed.

ANALYSES

Prior to model calibration, the environmental variables were standardised using z-score transformation (mean = 0, standard deviation = 1) with the *scale ()* function in R. This preprocessing step was necessary to bring predictors with different units and ranges (elevation in metres, slope in degrees, etc.) to a common scale, ensuring equal weighting across variables and improving numerical stability during model fitting.

I trained the model on the 107 presence points using 5-fold cross-validation in MaxEnt (replicatetype = crossvalidate, replicates = 5). The points were randomly split into five folds of roughly the same size. In each of the five runs, I trained the model on four folds (around 86 points) and tested it on the remaining fold of about 21 points. I repeated the whole process five times so that every fold was used once for validation. On average, the training AUC across the five folds was 0.821, while the test AUC came out at 0.809. Because I only had a fairly small number of presence records, I chose not to set aside an independent test set, this would have noticeably weakened the statistical power of the model. Model complexity was controlled by using only linear and quadratic feature classes and setting the regularization multiplier to 1.5. More

complex feature classes (hinge, product, threshold) were disabled to reduce the risk of overfitting, given the relatively small number of presence records ($n = 107$). These settings were chosen manually following recommendations for small sample sizes in MaxEnt modelling³³.

Variable	Dem	TPI	Aspect	Slope	Distance
Dem	1.0000	0.035	-0.024	-0.0610	-0.147
TPI	0.035	1.0000	-0.024	0.422	0.0000
Aspect	-0.024	-0.024	1.0000	0.007	-0.004
Slope	-0.0610	0.422	0.007	1.0000	-0.010
Distance	-0.147	0.0000	-0.004	-0.010	1.0000

Table 1. Correlation Matrix.

For a better understanding of the model results, I first need to see what connections exist between the variables; for this reason, I generated correlation matrices. A multicollinearity test was conducted using Pearson's correlation and the Variance Inflation Factor (VIF) to evaluate dependence among predictor variables and enhance model accuracy and interpretability. Pearson's correlation matrix assesses pairwise relationships between independent variables³⁴. Pearson's method was selected, as it is the standard approach in species distribution modelling for detecting linear relationships between continuous variables. Thus, all absolute correlation coefficients are below 0.7 (the highest being 0.422 between Slope and TPI), which indicates the lack of strong correlations or redundancy between variables. I can observe that Slope and TPI show a moderate positive correlation (0.422), suggesting that steeper slopes tend to occur in areas with higher topographic position (ridges). However, this relationship remains within acceptable limits. All other pairwise correlations are very weak ($|r| < 0.15$), with the strongest negative correlation being -0.147 between DEM and Distance to water. Elevation (DEM), Aspect, and TPI show very weak correlations with the other variables (< 0.07), confirming their relative independence.

The five graphs (Fig. 5) show the influence that each variable holds in the model. Distance to water turned out to be by far the most important variable in the model, explaining almost 74% of the variation. The response curve shows a clear U-shaped pattern: the probability of site presence is high both when settlements are located very close to water and when they are placed at relatively large distances from it. However, around the average distance found in the study area, this probability drops sharply. This suggests that 8th–11th century communities in Ilfov either preferred to stay close to water sources or deliberately

³³ Merow *et alii* 2013, p. 1063.

³⁴ Alin 2010.

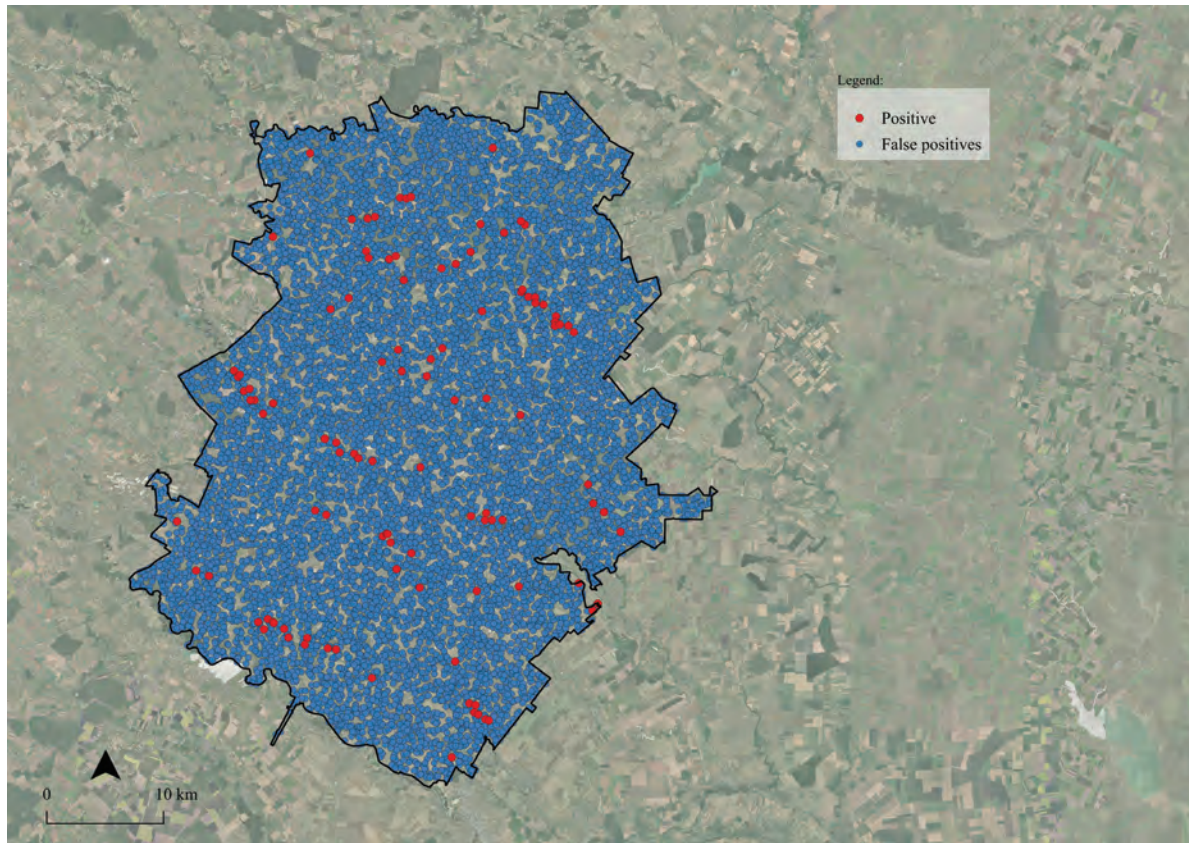


Figure 4. Distribution of positive and false positive points in the studied area.

chose more distant locations (possibly for defensive, strategic, or topographic reasons).

Slope came in as the second most important variable in the model, accounting for 25.02% of the contribution. Looking at the response curve, I can see a very clear pattern: the probability of finding a settlement is quite low on completely flat ground, then rises sharply and peaks on gentle to moderate slopes (around 3–6 degrees), before dropping off again on steeper terrain. This suggests that people in the 8th–11th centuries preferred locations with a bit of slope, probably because these spots were easier to build on, better for farming, and offered better drainage, while avoiding both the very flat areas and the steep slopes. Slope orientation (Aspect) also played a very minor role, contributing only 0.65%. The curve stays almost completely flat across all directions, suggesting that the way the slope faced (north, south, east, or west) had little to no effect on settlement location. The Topographic Position Index (TPI) had almost no influence at all, with a contribution of just 0.02%. Elevation had only a minor contribution (0.36%). The curve shows a weak negative trend, meaning the probability of finding sites was slightly higher at lower elevations and gradually decreased as altitude increased. Overall, height above sea level does not appear to have been an important factor in where people chose to settle.

n presences	107
n absences	9779
Mean Training AUC (5-fold CV)	0.821
Regularized Training Gain	0.626
Unregularized Training Gain	0.712

Table 2. Model evaluation.

I evaluated the model, which showed good predictive performance with a mean training AUC of 0.821 (SD = 0.008) across the 5-fold cross-validation. The regularised training gain was 0.626 and the unregularised training gain was 0.712. The binary map (Fig. 6.1) reflects this performance by reasonably aligning red dots with green areas. The threshold of 0.21 (corresponding to the 10th percentile of training presence) was used to generate the binary suitability map. This conservative threshold maximises the balance between sensitivity and specificity while minimising omission of known sites. The mean Training AUC across the 5-fold cross-validation was 0.821, while the mean Test AUC was 0.809. The small difference between training and test performance indicates good generalisation and limited overfitting. The regularised training gain of 0.626 is reasonable, and the difference from the unregularised training gain (0.712) confirms that the regularization multiplier of 1.5 effectively controlled model complexity without compromising predictive power.

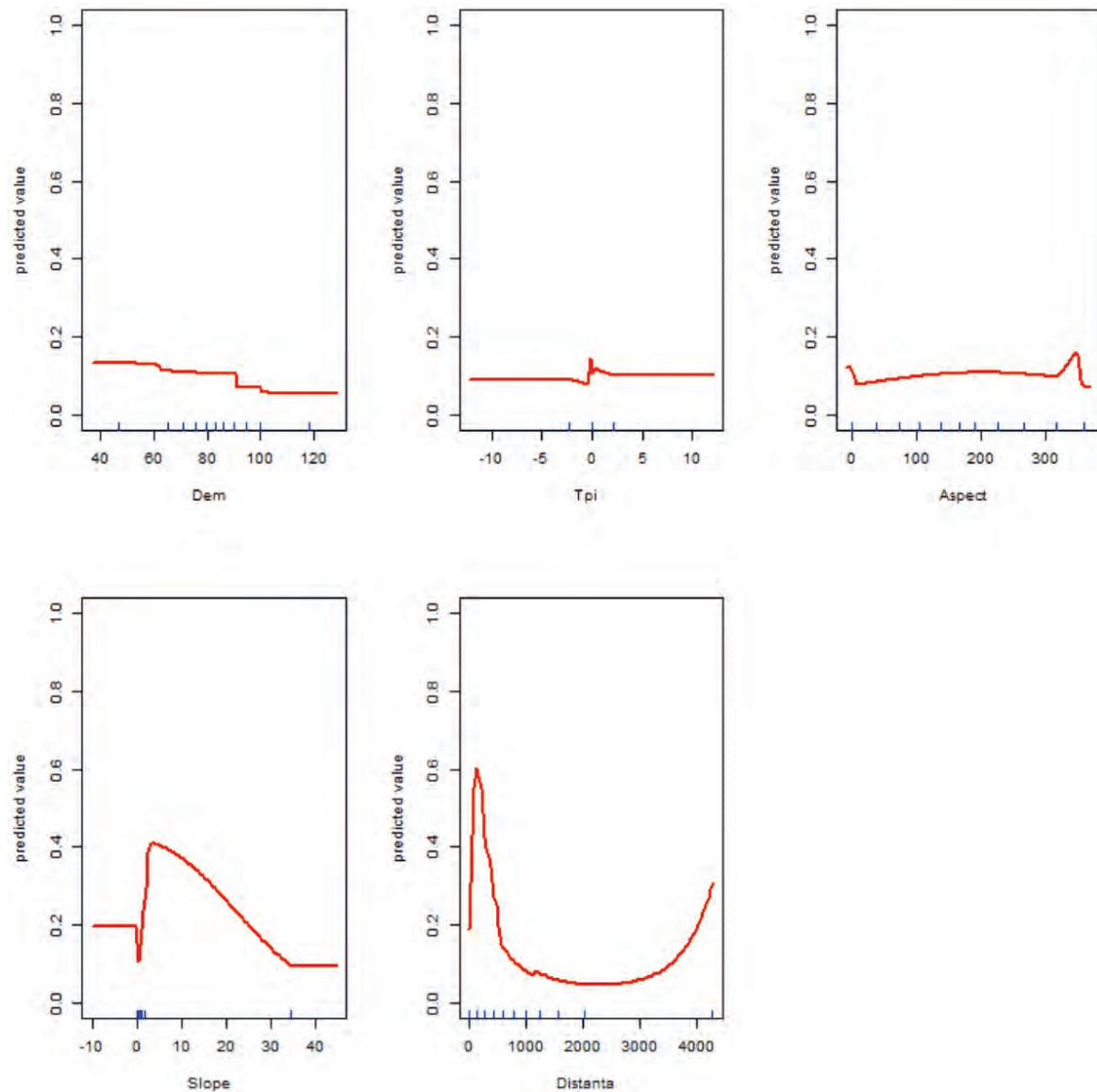


Figure 5. Influence of each variable in the proposed model.

Metric	Mean Value	SD
Number of presence points	107	-
Number of background points	9.779	-
Training AUC	0.821	0.007
Test AUC	0.809	0.035
Regularized Training Gain	0.626	0.038
Unregularized Training Gain	0.712	0.033
Iterations (mean)	160	24.5
Variable contribution (%)		
Distance to water	73.96	2.68
Slope	25.02	3.12

Metric	Mean Value	SD
DEM	0.36	0.48
Aspect	0.65	0.42
TPI	0.02	0.03
Permutation Importance (%)		
Distance to water	72.72	4.85
Slope	26.09	4.12
Thresholds used		
10 th percentile training presence	0.2	-
Minimum training presence	0.078	-
Equal training sensitivity + specificity	0.412	-

Table 3. Detailed results of the model.

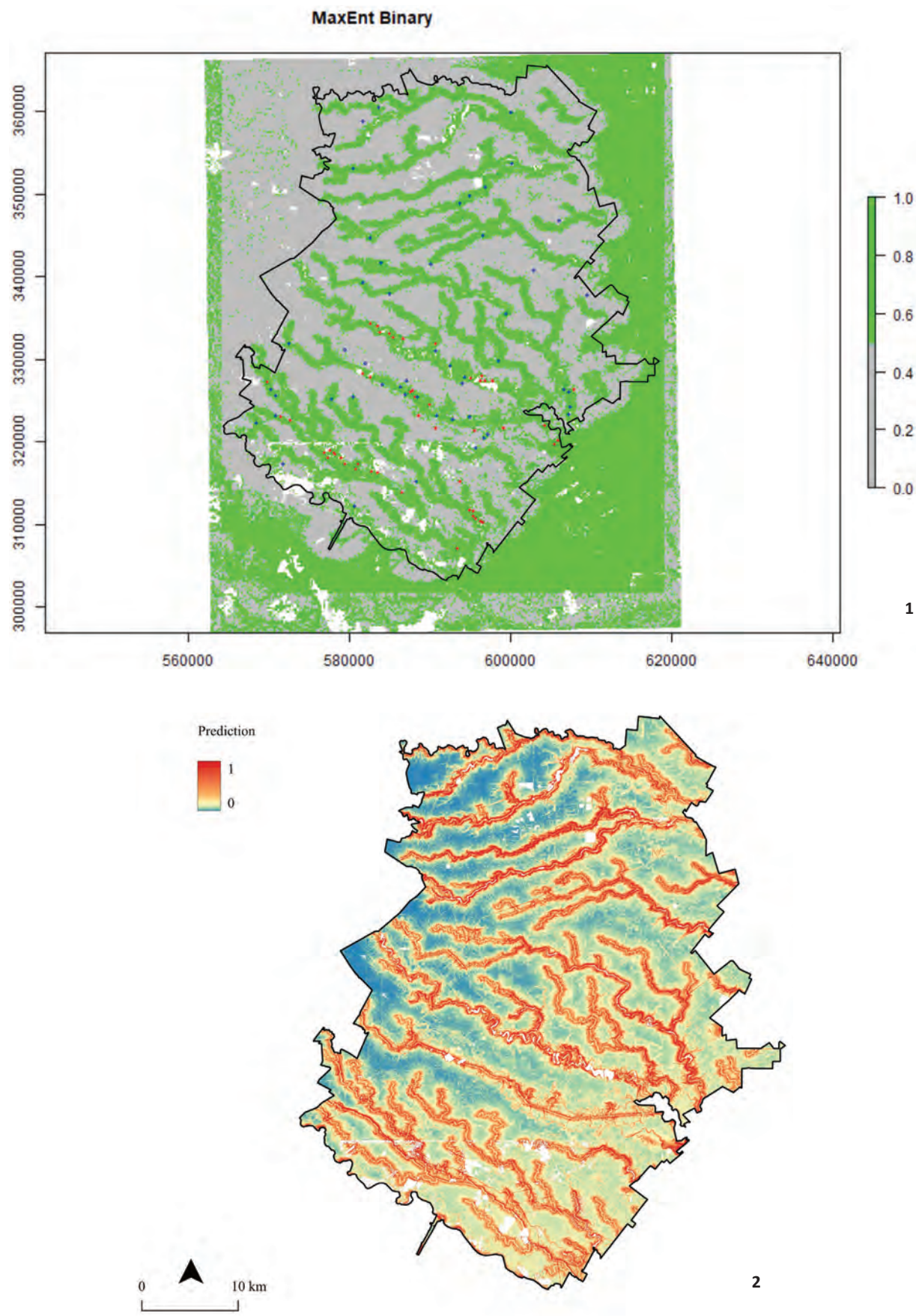


Figure 6. Binary map of the predictive model of 8th–11th century settlements (1); Predictive map of 8th–11th century settlements (2).

DISCUSSIONS AND CONCLUSION

Taking into account the results of the analysis and the generated map, I can state that distance to water and slope are the most important variables for 8th–11th century settlements. The map uses a colour scale from green (probability 0) to red (probability 1) (Fig. 6.2). The high probability areas (red and orange, 0.6–1.0) are concentrated along the water in the low hills, while the low probability areas (green, 0–0.2) dominate the north and western parts.

Distance to water was the most important factor in the model, contributing 73.96%. Looking at the response curve, I see a clear U-shaped pattern. This suggests that people in the 8th–11th centuries either preferred to settle right next to water sources, probably for practical reasons like farming, drinking water, and daily life or deliberately chose more distant locations, perhaps for defensive or strategic reasons.

Slope came second in importance; the response curve could suggest that 8th–11th century communities preferred moderately sloping land, likely because these areas were easier to build on, offered better drainage, and were more suitable for agriculture. The other three variables (elevation, TPI, and aspect) had very small contributions (all under 1%). Their response curves are almost flat, meaning these factors had little to no real influence on where settlements were established during this period.

Slope appears to be relevant to the distribution of archaeological sites, as it is evident from the data for this area that the majority of sites are located on predominantly flat terrain with minimal slope, i.e. a slope of up to 3 degrees.³⁵ In terms of how they procured their food, a flatter slope was beneficial for raising livestock and practising agriculture. Even if hunting was no longer the main way of foraging at this time, flat slopes could help achieve a higher success rate with less effort. In a previous analysis of the specific geographic conditions for this type of habitation³⁶, I concluded that the communities preferred altitudes between 70–100 m (80 sites), flat terrain (44 sites), with southern exposure (25 sites). Another obvious observation is the preference for locations found near water sources (71 sites) and, most noticeably, in the lowland areas of Otopeni (21 sites), Moviliței (20 sites) and Snagov (19 sites). At the same time, the increased density of settlements in the north and south could also be related to the pendulum theory of these communities. As expected, the most favourable areas for the development of 8th–11th century habitation are those in the proximity to water sources. If I look at the map, I observe that in the southern part of the surveyed area in the area of rivers Câlânu, Sabăr, Ciorogârla, Argeș (in the Argeș-Sabăr meadow and Cotroceni Plain) I have quite large areas with high probability of occurrence of Dridu type habitats,

the same in the eastern area towards the centre of Ilfov County. For the western area, I have the least chances to find archaeological sites.

In conclusion, the predictive model MaxEnt has allowed us to begin to identify key factors of the geographic landscape that are essential for decisions making in establishing new 8th–11th century communities in the Ilfov area. The model does not show areas where there would be certainty of archaeological sites, but areas that fulfil all the requirements for Dridu culture habitation.

*** This paper is accompanied by supplementary material, made available by the author, based on FAIR criteria. You can access the supplementary material in the dedicated section on the journal's website, within the Archive, under the *Supplementary Material* heading.

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³⁵ Manea 2023, p. 49.

³⁶ Manea 2023, p. 50.

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ABREVIERI / ABRÉVIATIONS / ABBREVIATIONS

- AAC – Acta Archaeologica Carpatica, Kraków
ACMI – Anuarul Comisiunii Monumentelor Istorice, București
ActaArchHung – Acta Archaeologica Academiae Scientiarum Hungaricae, Budapest
Acta Classica Univ. Scient. Debrecen – Acta Classica Universitatis Scientiarum Debreceniensis, Debrecen, Ungaria
ActaMN – Acta Musei Napocensis, Cluj
ActaMP – Acta Musei Porolissensis, Zalău
ActaPraehistA – Acta praehistorica et archaeologica
AIGR - Anuarul Institutului Geologic al României, București
AIIAC – Anuarul Institutului de Istorie „George Barițiu”, Cluj
AJA – American Journal of Archaeology, Boston
AJPA – American Journal of Physical Anthropology
Alba Regia – Alba Regia. Annales Musei Stephani regis, Székesfehérvár
Anatolia Antiqua – Anatolia Antiqua. Revue internationale d'archéologie anatolienne. Institut Français d'Etudes anatoliennes d'Istanbul
Anatolica – Anatolica. The Netherlands Institute for the Near East in Leiden
AnB – Analele Banatului, Muzeul Banatului, Timișoara
AncNearEastSt – Ancient Near Eastern Studies, Leuven, Belgia
Angustia – Angustia. Arheologie, Etnografie, Sfântu Gheorghe
Anmed – Anmed. Anadolu Akdenizi Arkeoloji Haberleri, Antalya, Turcia
AnSt – Anatolian Studies. British Institute of Ankara
AnUCraiova – Analele Universității din Craiova, Craiova (seria Istorie)
AnUVT – Annales d'Université “Valahia” Târgoviște, Section d'Archéologie et d'Histoire
Apulum – Acta Musei Apulensis. Muzeul Național al Unirii, Alba Iulia
ArchBulg – Archaeologia Bulgarica, Sofia
ArchÉrt – Archaeológiai Értesítő, Budapest
ArchHung – Archaeologia Hungarica, Acta Archaeologica Musei Nationalis Hungarici, Budapest
ArchKorr – Archäologisches Korrespondenzblatt, Mainz
ArchMűh – Archeometriai Műhely
ArchRozhledy – Archeologické Rozhledy, Praha
Argesis – Argesis. Muzeul Județean Argeș. Pitești
Arheologia Medievală. Complexul Muzeal Bistrița-Năsăud, Bistrița
ArheologijaSSSR – Arheologija SSSR. Svod Archeologičeskikh Istočnikov, Moscova
Arheološki vestnik – The Research Center of the Slovenian Academy of Sciences and Arts
ArhMold – Arheologia Moldovei, Iași
AS – Archeologica Slovaca, Bratislava
AST – Eski Eserler ve Müzeler Genel Müdürlüğü, I. Araştırma Sonuçları Toplantısı, Istanbul / General Directorate of Ancient Monuments and Museums
AȘUI – Analele științifice ale Universității Alexandru Ioan Cuza, Iași
BA – Biblioteca de Arheologie, București
BaBesch – Bulletin antieke beschaving. Annual Papers on Classical Archaeology
BAI – Bibliotheca Archaeologica lassiensis, Iași
Baltic-Pontic Studies – Adam Mickiewicz University, Poznań, Institute of Archaeology, Institute of Eastern Studies, Poland
Banatica – Banatica. Muzeul Banatului Montan, Reșița
BarBrSer – British Archaeological Reports. British Series, Oxford
BARIntSer – British Archaeological Reports. International Series, Oxford
BCMI – Buletinul Comisiunii Monumentelor Istorice
Be-Ja – Bulgarian e-Journal of Archaeology
BerRGK – Bericht der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts, Frankfurt am Main
BIAA Monograph – British Institute of Archaeology at Ankara
BiblEphemNap – Bibliotheca Ephemeris Napocensis, Cluj-Napoca
BiblMemAnt – Bibliotheca Memoriae Antiquitatis, Piatra-Neamț
BiblThrac – Bibliotheca Thracologica, București

- BMC – *Coins of the Roman Empire in the British Museum*, Londra; II, *Vespasian to Domitian*, 1930; IV, *Antoninus Pius to Commodus*, 1968; V, *Pertinax to Elagabalus*, 1950 (H. Mattingly)
- BMI – Buletinul Monumentelor Istorice, București
- BMJT – Buletinul Muzeului Județean Teleorman, Alexandria
- BMTAG – Buletinul Muzeului Județean „Teohari Antonescu”, Giurgiu
- BSA – British School at Athens, Athens
- BSNR – Buletinul Societății Numismatice Române, București
- BSPF – Bulletin de la Société Préhistorique Française, Paris
- BSSC – Buletinul Societății de Științe din Cluj
- București-MIM – București. Materiale de Istorie și Muzeografie. Muzeul Municipiului București
- BYZAS – German Archaeological Institute of Istanbul
- CA – Cercetări Arheologice. Muzeul Național de Istorie a României, București
- CAB – Cercetări arheologice în București. Muzeul Municipiului București
- Caiete ARA – Caietele ARA, Revistă de Arhitectură. Restaurare și Arheologie, Asociația ARA, București
- Carpica – Carpica. Complexul Muzeal „Iulian Antonescu” Bacău, Bacău
- CCA – Cronica Cercetărilor Arheologice din România, București
- CCDJ – Cultură și Civilizație la Dunărea de Jos, Călărași
- Cerclst – Cercetări Istorice, Muzeul de Istorie a Moldovei, Iași
- CN – Cercetări numismatice, București
- CollAn – Colloquium Anatolicum. Anadolu Sohbetleri, Institutum Turcicum Scientiae Antiquitatis, Istanbul
- Crisia – Crisia. Muzeul Țării Crișurilor, Oradea
- Cuadernos del Museo Geominero – Museo Geominero, Instituto Geológico y Minero de España, Madrid
- Current Anthropology – Current Anthropology. University of California, Merced
- Dacia – Dacia (Nouvelle Série). Revue d'archéologie et d'histoire ancienne. Académie Roumaine. Institut d'archéologie « V. Pârvan », Bucarest
- Danubius – Danubius, Revista Muzeului de Istorie Galați
- Documenta Praehistorica – Documenta Praehistorica, University of Ljubljana, Faculty of Arts, Department of Archaeology, Ljubljana
- DolgCluj – Dolgozatok az Erdélyi Nemzeti Múzeum Érem- és Régiséggyűjtéséről, Kolozsvár
- DTKFD – Ankara Üniversitesi Dil ve Tarih-Coğrafya Fakültesi Dergisi
- EJA – European Journal of Archaeology
- ERAUL – Études et Recherches archéologiques de l'Université de Liège
- ÉtAlex – Études Alexandrines, Centre d'Études Alexandrines
- ÉtTrav – Etudes et travaux. Studia i prace. Travaux du Centre d'archéologie méditerranéenne de l'Académie Polonaise des Sciences
- EurAnt – Eurasia Antiqua. Deutsche Archäologisches Institut, Berlin
- FrC – Fragmenta Comica
- FolArch – Folia Archaeologica. A Magyar Nemzeti Múzeum Évkönyve. Annales Musei Nationalis Hungarici, Budapest
- FSI – Forensic Science International
- Germania – Germania. Anzeiger der Römisch-Germanischen Kommission des Deutschen Archäologischen Instituts, Frankfurt
- Geoarchaeology – Geoarchaeology. An International Journal
- Hesperia – Hesperia. Journal of the American School of Classical Studies at Athens, Cambridge
- HOMO – HOMO. Journal of Comparative Human Biology, Stuttgart
- Human Evolution – Human Evolution, International Institute for Humankind Studies and University of Florence
- Ialomița – Ialomița. Studii de cercetări de arheologie, istorie, etnografie și muzeologie, Slobozia
- IJO – International Journal of Osteoarchaeology
- Iran – Iran. Journal of the British Institute of Persian Studies
- IstMitt – Istanbul Mitteilungen, Istanbul
- Istros – Istros, Muzeul Brăilei, Brăila
- IzvestijaVarna – Izvestija na Archeologiceskii Institut, Sofia
- JAHA – Journal of Ancient History and Archaeology, Cluj-Napoca
- JAnat – Journal of Anatomy
- JAS – Journal of Archaeological Science
- JAS: Reports - Journal of Archaeological Sciences: Reports
- JDAI.AA – Jahrbuch des Deutschen Archäologischen Instituts, Archäologischer Anzeiger, Berlin
- JFS – Journal of Forensic Sciences

- JHE – Journal of Human Evolution
 JRA – Journal of Roman Archaeology
 JRGZM – Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz, Mainz
 JRS – The Journal of Roman Studies
 KST – T. C. Kültür Bakanlığı, Eski Eserler ve Müzeler Genel Müdürlüğü, I. Kazı Sonuçları Toplantısı, Ankara / Republic of Turkey, General Directorate of Ancient Monuments and Museums, Ankara, Turkey
 LIMC – Lexicon Iconographicum Mythologiae Classicae, Zürich, München, Düsseldorf
 Litua – Litua, Studii și cercetări, Târgu-Jiu
 LRBC – *Late Roman Bronze Coinage A.D. 394-498*, Londra, 1965: I, *The Bronze Coinage of the House of Constantine A.D. 324-346* (P. V. Hill, J. P. C. Kent); II, *Bronze Roman Imperial Coinage of the Later Empire A.D. 346-498* (R. A. G. Carson, J. P. C. Kent).
 Macedoniae Acta Archaeologica – Macedonian Archaeological Society, Skopje, Republic of Macedonia
 MAMA – Monumenta Asiae Minoris antiqua. Publications of the American Society for Archaeological Research in Asia Minor
 Marisia – Marisia. Studii și materiale. Arheologie – Istorie – Etnografie, Târgu Mureș
 Marmatia – Muzeul Județean de Istorie și Arheologie Maramureș, Baia Mare
 MarNero – Il Mar Nero. Annali di archeologia e storia
 MCA – Materiale și Cercetări Arheologice, București
 MDOG – Mitteilungen der Deutschen Orient Gesellschaft
 MemAnt – Memoria Antiquitatis, Piatra Neamț
 MFMÉ – A Móra Ferenc Múzeum Évkönyve, Szeged
 Mousaios – Mousaios. Buletinul Științific al Muzeului Județean Buzău
 MuzNaț – Muzeul Național, București
 NAC – Numismatica e Antichità Classiche, Lugano-Pregassona
 OIP – Oriental Institute Publications, University of Chicago
 OJA – Oxford Journal of Archaeology, Oxford
 Olba – Mersin University Publications of the Research Center of Cilician Archaeology, Mersin, Turkey
 PALMA – Papers on Archaeology of the Leiden Museum of Antiquities, Leiden, Olanda
 PAS – Prähistorische Archäologie in Südosteuropa, München-Berlin
 PBF – Prähistorische Bronzefunde, Münster
 Peuce – Peuce. Studii și cercetări de istorie și arheologie, Institutul de Cercetări Eco-Muzeale, Tulcea
 Phoenix – Phoenix. The Journal of the Classical Association of Canada
 Plural – Journal of the History and Geography Department „Ion Creangă” Pedagogical State University, History, Culture. Society. Seria Archaeologica II, Chișinău
 PMMB – Publicațiile Muzeului Municipiului București
 Pontica – Pontica. Studii și materiale de istorie, arheologie și muzeografie, Muzeul de Istorie Națională și Arheologie Constanța
 PZ – Prähistorische Zeitschrift, Berlin-Mainz
 Quaternary International – Quaternary International. The Journal of the International Union for Quaternary Research
 Quaternary Science Reviews – Quaternary Science Reviews. The International Multidisciplinary Research and Review Journal
 RA – Revue Archéologique, Paris
 RAASI – Revista de Arheologie, Antropologie și Studii Interdisciplinare, Institutul de Cercetări Bioarheologice și Etnoculturale, Republica Moldova
 Radiocarbon – An International Journal of Cosmogenic Isotope Research, Cambridge
 RCAN – Revista de Cercetări Arheologice și Numismatice, Muzeul Municipiului București
 RevBistr – Revista Bistriței. Complexul Muzeal Bistrița-Năsăud, Bistrița
 RevMuz – Revista Muzeelor, București
 RGZM – Römisch-Germanisches Zentralmuseums Mainz, Mainz
 RIC – *The Roman Imperial Coinage*, Londra: I², *From 31 BC to AD 69*, 1984 (C. H. V. Sutherland); II, *Vespasian to Hadrian*, 1926 (H. Mattingly, E. A. Sydenham); II.1, *From AD 69-96. Vespasian to Domitian*, 2007 (I. A. Carradice, T.V. Buttrey); II.3, *From AD 117-138. Hadrian*, 2019 (R. A. Abdy, P. F. Mittag); III, *Antoninus Pius to Commodus*, 1930; IV.1, *Pertinax to Geta*, 1968 (H. Mattingly, E. A. Sydenham); IV.2, *Macrinus to Papien*, 1938; IV.3, *Gordian III – Uranian Antoninus*, 1949 (H. Mattingly, E. A. Sydenham, C. H. V. Sutherland); V.1, 1927 (reimprimat 1968; P. H. Webb); VII, *Constantine and Licinius A.D. 313-337*, 1966 (P. M. Bruun); VIII, *The Family of Constantine I A.D. 337-364*, 1981; X, *The Divided Empire and the Fall of the Western Parts A.D. 395-491*, 1994 (J. P. C. Kent)
 SAA – Studia Antiqua et Archaeologica, Iași
 Sargetia – Sargetia. Acta Musei Devensis. Buletinul Muzeului județean Hunedoara, Deva

SAV – Študijné zvesti Archeologicky ústav SAV, Nitra
Sci Rep – Scientific Reports
SCIV(A) – Studii și Cercetări de Istorie Veche (și Arheologie), București
SCN – Studii și Cercetări de Numismatică, București
Seleucia – Seleucia. Olban Excavations Series
SP – Studii de Preistorie, București
SprawArch – Sprawozdania Archeologiczne, Warsaw
SRMKA – Seramik Araştırmaları Dergisi, The Journal of Ceramic Research
StArchBrno – Studia Archaeologica Brunensia, Masaryk University, Brno
Starinar – Starinar. Arheološki institut Beograd
StComPitești – Studii și Comunicări, Seria Istorie, Muzeul Județean Argeș, Pitești
StudCom Satu Mare – Studii și comunicări Satu Mare
Studia Praehistorica – National Archaeological Institute with Museum of the Bulgarian Academy of Sciences
Syria – Syria. Archéologie, art et histoire. Institut Français du Proche-Orient
Terra Sebus – Terra Sebus. Acta Musei Sabesiensis, Anuarul Muzeului Municipal „Ioan Raica”, Sebeș
Th-D – Thraco-Dacica, București
Thracia – Thracia, Sofia
TIB – *Tabula Imperii Byzantini*, Wien
Transylvanian Review – Transylvanian Review. Centrul de Studii Transilvane, Cluj-Napoca
TÜBA-AR – TÜBA-AR Türkiye Bilimler Akademisi arkeoloji dergisi (TÜBA-AR Turkish Academy of Sciences Journal of Archeology)
UPA – Universitätsforschungen zur Prähistorischen Archäologie, Bonn
VAH – *Varia Archaeologica Hungarica* V. Redigit Csanád Bálint. Publicationes Instituti Archaeologici Academiae Scientiarum Hungaricae, Budapest
Varia Anatolica – *Varia Anatolica*. L’Institut Français d’Études Anatoliennes, Istanbul
Ziridava – Ziridava. Studia Archaeologica, Arad