

Mapping medical infrastructure, mines, and veterans as potential predictors of the worship of Asclepius in Roman Dacia

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Abstract:

The Roman Danubian provinces represent a data-rich environment for spatial and cartographic analysis due to the abundance of epigraphic and archaeological evidence. An example of this trend is a recent study, *The Spread of the Cult of Asclepius in the Context of the Roman Army: A Spatial Proximity Analysis* (Glomb 2021), which demonstrated that epigraphic evidence mentioning Roman physicians spatially positively correlates with material evidence for the healing cult of Asclepius in the Danubian region. However, the province of Dacia stood out as an outlier in this analysis, revealing a high concentration of Latin inscriptions mentioning Asclepius but very little epigraphic evidence for the presence of physicians. Therefore, we revisit the “Dacia” research problem, testing whether the spatial distribution of Latin inscriptions dedicated to Asclepius was potentially impacted by socio-spatial factors such as the presence of veterans, attested mining and medical infrastructure, or their combination. These variables were selected based on their potential relationship to health-related conditions and practices in Roman society. Veterans formed a socially significant and spatially concentrated population that may have required medical care after prolonged military service. Mining regions, particularly those associated with the extraction of precious metals, involved hazardous working conditions, while medical infrastructure, including spa facilities and evidence of special practitioners (e.g., eye doctors stamps, surgical kits), represents direct indicators of healing practices.

The study integrates heterogeneous datasets from multiple sources. Epigraphic evidence documenting both veterans and the cult of Asclepius is derived from the Epigraphic Database Heidelberg (EDH), while spatial information on mining activity is obtained from the Oxford Roman Economy Project. Proxies for medical infrastructure include archaeological records of medical specialists, findings of medical instruments, and geocoded spa locations. All datasets were harmonized, georeferenced, and prepared for spatial analysis within a GIS environment, enabling consistent cartographic representation and comparison across variables.

Methodologically, the paper applies spatial proximity analysis and exploratory spatial statistics to assess relationships between the distribution of inscriptions and the selected predictors. Particularly, the spatial analysis explored the main research question of whether predictor variables, such as mines and veterans, situated in proximity to locations with medical infrastructure spatially co-occur with the attested evidence for the cult of Asclepius more frequently than with other cults, such as those of Apollo, Minerva, and Jupiter. Distances (in meters) between features were computed and used as the basis for evaluating spatial associations. Since the measured distances are not normally distributed (based on Shapiro-Wilk test), correlation analysis using Spearman’s rank correlation coefficient was employed to quantify monotonic relationships between variables without assuming linearity. Special attention is given to cartographic design and visualization techniques that support the interpretation of overlapping and heterogeneous datasets, including multi-layer mapping, symbolization strategies, and the visualization of spatial patterns and densities.

The results indicate varying strengths of association between the worship of Asclepius and the examined factors in connection to the medical infrastructure. The strongest association is observed between the distances from medical infrastructure to the nearest proxies for the cult of Asclepius and veterans with a Spearman correlation coefficient of approximately 0.75 ($p < 0.05$), indicating a strong positive monotonic relationship. A weaker, yet still notable association is identified between the distances from medical infrastructure to Asclepius inscriptions distribution and mining activity, with a coefficient of approximately 0.58 ($p < 0.05$), suggesting a moderate spatial relationship. These findings imply that social factors related to veteran populations in Dacia utilizing medical infrastructure (spa, medical specialists) and, to

a lesser degree, mining environment may have had a more pronounced influence on the spatial distribution of the cult of Asclepius than to other established and widespread cults such as the cult of Apollo, Minerva, and Jupiter.

From a cartographic perspective, the study demonstrates how carefully designed spatial analysis and visualization can facilitate the interpretation of complex historical datasets. The approach contributes to ongoing discussions in cartography and GIScience regarding the representation and analysis of uncertain, heterogeneous, and incomplete data, and highlights the value of spatial methods in the study of ancient religious and cultural phenomena.

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References

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