
NOMISMATA: exploring numismatic networks emerging from a source driven database

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Abstract

From the fourth until the fifteenth century AD the Byzantine Empire yielded its political and economical power over the Mediterranean basin. The extent of this power fluctuated greatly over the centuries. This paper aims to study the fluctuation of the economical power of the Byzantine Empire based on a curated dataset of numismatic evidence.

While many studies have underlined the usefulness of coinage as a proxy for power and economic reach, data driven analyses aiming to cover the entirety of Byzantine numismatic evidence have not been realised (Hendy 1985; Morrisson 2020). As Cecile Morrisson has noted in her work *Byzantine Money: Its Production and Circulation*: "we have no synthesis of this abundant and very dispersed literature." (Morrisson 2020, 954).

In order to overcome this hiatus the NOMISMATA project was conceptualised at the University of Trieste by a team of numismatic scholars (<https://byzantine.units.it>). NOMISMATA is a source driven geo- and chrono-referenced database of Byzantine coin finds. Data entered into NOMISMATA is extracted from monographs on numismatic surveys, articles in numismatic and archaeological journals, museum catalogs, manuscripts as well as published and unpublished excavation reports.

NOMISMATA uses *nodegoat* for data creation, data curation, analysis and presentation (van Bree and Kessels 2013). A data model for the project was conceptualised including Object Types for 'Coin', 'Find', 'Mint', 'Source', 'Denomination', 'Issuing Authority', and 'Metal'. Currently the database contains 235.188 objects of coins found in 5.176 finds, and minted in 54 mints. Within the *nodegoat* research environment data selections can be explored as geographical visualisations (see figure 1) as well as network visualisations (see figure 2) (Callegher and Donato 2025).

Before the arrival of NOMISMATA, no possibility existed to explore all this data at once, across geographical space, historical time, and within a social-network structure. This new vantage point allows scholars to see what was not possible to perceive when working with fragmentary sources. Here we offer a few examples that await interpretation by numismatic scholars open to the use of digital tools.

In order to analyse the fluctuation of economic power by using the proxy of numismatic evidence (based on distribution or exploring weighting constraints using attributes available in the graph, e.g. metals), we have created four groups of issuing authorities that each cover

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a distinct period and have a significant presence in NOMISMATA. The geographical distribution of these groups shows the diminishing economic power of the empire. By calculating an average degree centrality per group we can now also quantify this development based on the diachronic analysis of network measures. Our roadmap for further research includes a diachronic analysis of other attributes in the graph, such as metals and denominations.

An ongoing methodological challenge, which we look forward to exploring and discussing further, is the ratio between the coins in the database and the scope of the (incomplete) sources. We look for opportunities and suggestions for additional explorations of this dataset.

References

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Keywords: Numismatics, Byzantine Empire, GIS, Database, source criticism, nodegoat, networks

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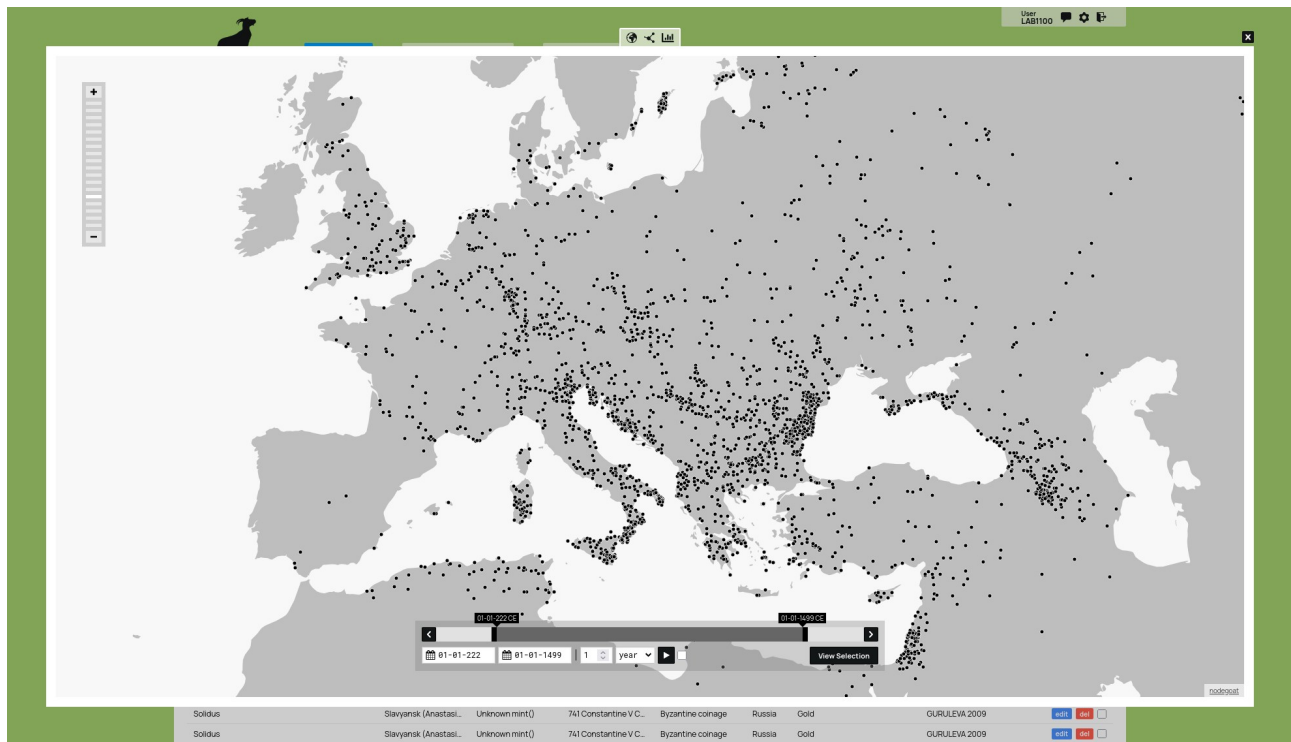


Figure 1. Geographic visualisation of the find locations of 183.679 coins of Byzantine coinage.

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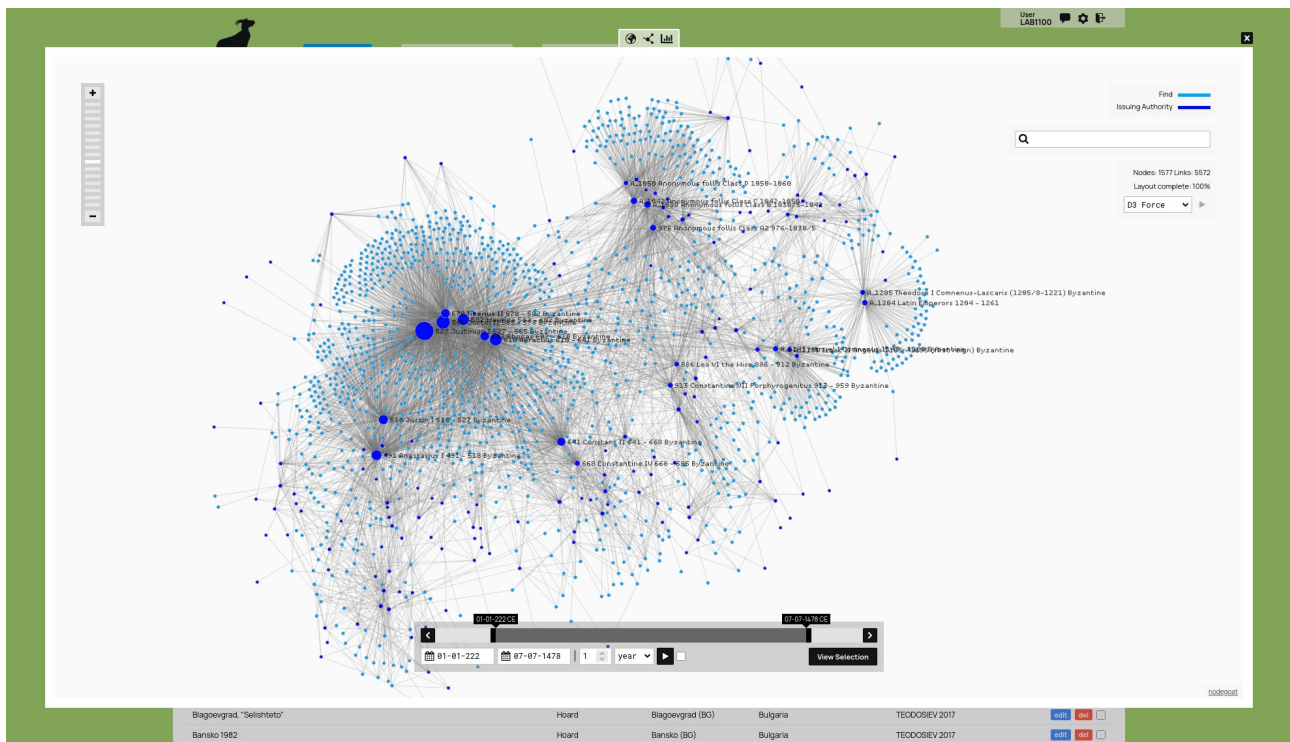


Figure 2. Social network graph using a force layout of 1.383 finds, 91.072 coins and 194 issuing authorities. This multi-modal graph has been reduced to a bi-modal graph by collapsing the objects of coins into edges. Size of nodes is based on degree centrality. This network graph allows for the identification of clusters of issuing authorities based on co-occurrence in finds as well visual feedback regarding the amounts of finds per issuing authority.