

CHRISTIANIZATION OF THE ROMAN EMPIRE

DIFFUSION ON A SETTLEMENT NETWORK

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RESEARCH PROBLEM

At the beginning of the fourth century, Christians already constituted a substantial proportion of population of the Roman Empire, especially in eastern provinces, but also in Italy, north Africa or Spain. With its origins in 1st century Palestine, Christianity reached some locations earlier than others and blossomed in some places better than others. Using network analysis and computational models of the diffusion of innovations, our research project aims to evaluate several factors which could be responsible for the observed temporal and spatial distributions.

In the Graeco-Roman context, an adherence to a religious cult was typically expressed by one's inclusion in a certain social unit (extended family, association etc.), rather than by personal decision and commitment to a set of beliefs. Therefore, christianization, too, can be approached on the level of practices of social groups instead than on the level of decisions of individuals. In that respect, by christianization we mean a twofold process: 1) by horizontal christianization we refer to a process concerning how worldviews and ritual innovations spread from one group to another; 2) by vertical christianization we refer to a process, not a moment, of continuous implementation of these innovations into the social practice of certain social group. At the current state of research, we are focusing more attention on the horizontal aspect (for the vertical aspect see Future directions).

DATA

Travel network: Orbis

Settlement sites:

- Orbis: 632 cities
- Pleiades: 1415 "major settlements"
- Oxford Economy Project: 356 cities with estimated population for each city with population over 5,000 and total population of them 7,388,500 (more than a tenth of the total population of the empire) [6].

Evidence for Christianization:

- *Atlas of the Early Christian World* [7]
 - 55 localized congregations for the end of the first century (Map 1)
 - about a hundred at the turn of the second century
 - few hundreds at the beginning of the fourth century (Map 1)
- *Churches built before 400* (appendix from [8]): a comprehensive list of church buildings from the period of interest, including about a hundred of entities



Map 1: Christian congregations before 304 (281 entries) before 100 (42 entries, yellow) in the East (based on [7] [5]).

PILOT STUDY: 32 CITIES

A pilot study was designed to consider assumed dates of Christianity reaching 31 prominent cities of the Roman Empire (and Jerusalem) to evaluate three hypotheses offered by Rodney Stark [1,2]:

- H1: The closer a city was to Jerusalem, the sooner a city had a Christian congregation.
- H2: Larger cities had Christian congregations sooner than smaller cities.
- H3: Cities with a significant Diasporan community were Christianized sooner than other cities.

Contrary to Stark's data on distances from Jerusalem we used here data on travel expenses derived from Orbis [3], analyzed them in a spatial network gravity model [4] and found statistical correlation supporting only the first hypothesis (pearson correlation: $r = 0.45$, $p = 0.01$). The gravity model also revealed an importance of port cities in general. We also replicated the process in a computational diffusion model (Figure 1).

SUMMARY

We hypothesize that the scarcely evidenced temporal and spatial distribution of Christianity over the Roman Empire can be re-grown in an artificial simulation environment as a diffusion of innovation model on a Roman travelling network of roads and maritime routes, which connects respective settlement sites to one another. We consider only (1) the travel expenses [3], (2) population sizes of reachable destinations [6], and (3) linear growth of Christian number [1,2], while all the other environmental variables can be ignored for the sake of the analysis [contra 1,2].

FUTURE DIRECTIONS

In the case that our model will be successful in being able to re-grow in an artificial environment the target phenomenon of interest (i.e. the temporal and spatial distribution of Christian congregations across the Roman Empire), we can start to seek answers to historical questions of following sort:

- When Paul wrote his letters (from which a collection of seven survived extant), how much copyist effort would it take to let them spread over all Christian communities in the second half of the first century?
- When we consider original recipients of the letters of Ignatius of Antioch from congregations in Asia Minor and elsewhere, what proportion of Christians of his time would be targeted?
- In the middle of the third century, how much time and cost is incurred to get ideas of someone like Cyprian of Carthage to reach a majority of contemporaneous Christians?
- In a network of episcopates of the early fourth century, how long time would it take an innovation to be spread through all bishoprics if it would be transmitted only during a consecration of a new bishop from one of the three bishops from the closest bishoprics?

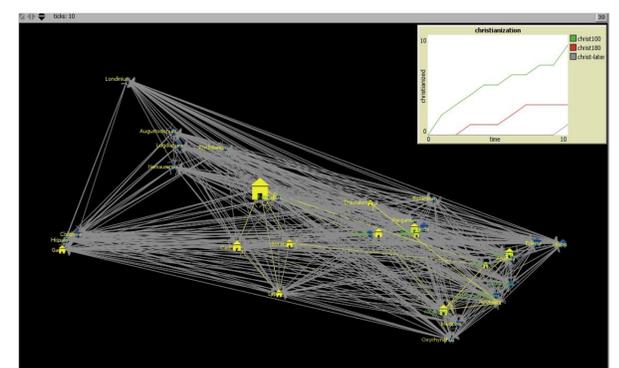


Figure 1: Model in NetLogo of a diffusion from Jerusalem; Network based on Orbis data for 32 cities.

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