Geo-Spatial Mining of Historical Maps and Texts:
Comparing 16th c. Ottoman military logistics
with 19th c. transport infrastructure in
Southeast Europe

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M. Erdem KABADAYI, Piet GERRITS, Grigor BOYKOV

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Outline

- What is Historical Geographical Information Systems/Science?
- Why HGIS?
- Why and how are we conducting digital research?
- Case Study: Ottoman logistics & transport infrastructure, 16th-19th c.
- Main Aim: A multi-modal historical transport network with freight and passengers costs for the Ottoman Empire, 1840s
- Potentials and risks of digital humanities / (HGIS)?

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Digital Humanities / HGIS?

- DH: 'An academic field concerned with the application of computational tools and methods to traditional humanities disciplines such as literature, history, and philosophy.' Oxford Dictionaries. Web. 8th November 2017

- 'Historical GIS (HGIS) is an interdisciplinary field that integrates the tools and methods of geographic information Science (GIS) into historical research. HGIS projects and studies emphasize the role of spatial context and relationships in understanding the emergence, development, and consequences of historical events.' Oxford Bibliographies. Web. 27th June 2017

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Why HGIS?

- Revisiting textual sources and historical maps
- Mapping historical sources
  - Geo-locating places
  - A geo-spatial turn in history?
- Revisiting old research questions
  - RQ1: Did Ottoman armies rely on wheeled vehicles?
- Formulating new research questions
  - RQ2: How much did the transport infrastructure in Southeast Europe change between 16th-19th c.?
- Devising a multi-modal transport network with costs
  - Distance, time-distance, slope, road conditions, seasonality

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This research is part of a larger ERC funded research conducted at Koç University, Istanbul.

The aim: bringing Ottoman/Turkish history into the newly emerging field of digital humanities revisiting archival documents and historical maps.

Partners

Industrialisation and Urban Growth from the mid-nineteenth century Ottoman Empire to Contemporary Turkey in a Comparative Perspective, 1850-2000

This project aims to overcome historiographical and disciplinary limitations in social and economic history, historical geography and urban studies for the Ottoman Empire and the Republic of Turkey. The chosen long-term Ottoman/Turkish perspective is intended to facilitate comparative approaches so as to overcome the limitations of national historiographies. By extending the analysis up to 2000 the project also challenges the disciplinary divide between economic history, economics and urban studies in research on Turkey. To pursue these multiple goals the project will adopt both an interdisciplinary approach and a comparative perspective. Throughout the project the focus will be on the dynamics of industrialisation, urbanisation and
Research question 1: Did Ottoman armies rely on wheeled transport for military logistics?

- What is the consequence if they did?
- A necessary road infrastructure was intact

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Ottoman logistics & transport infrastructure, 16th-19th c.

- **Research question 2**: How much did the transport infrastructure in Southeast Europe change between 16th-19th c.?
  
  - Continuity and/or rupture in historical transport capabilities
  
  - Long-term continuity?
  
  - Conditions of road infrastructure in the long run?

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RQ1: Pack animals versus wheeled vehicles, or both?

Source: L. Marsigli. *Stato militare dell' imperio Ottomano*, 1732

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Köszeg Campaign Itinerary, 1532
in previous studies

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Use of the Tobler Hiking function to determine Least Cost Path analyses between Ottoman Army stops.

Übersicht zur Generalkarte ZENTRALEUROPA (1:200 000) Index sheet of the general map of Central Europe (1:200 000)
Durch klicken auf den Grafiklink versieht die die jeweilige Karte auf Eingabe im Index ist (1:200 000)
Aufnahmen wurden diese Karten erstellt 1870 The original sheets were published about 1870
Verfügbar sind 254 Kartenblätter. Currently 254 sheets are available. (1:200 000)

Die Blätter werden durch Angabe der geographischen Länge und Breite und des Blattnamens, z.B. 34° 46' Wien, bezeichnet.

Auf den Karten
35° 48' Valona, 38° 41' Elbaun,
38° 48' Karls, 38° 42' Prizren
fällt das albanische Gebiet leer aus.

Inserierter Hinweis enthält die von Topographischen Institut rurvorindien Kartenblättern (1:200000)
- 3rd Military Mapping Survey of Austria-Hungary, 1880s-1910s
- Plovdiv, Bulgaria
- One of the earliest modern maps surveying Eastern Europe with minute and accurate detail on transport
3rd Military Mapping Survey of Austria-Hungary (1880s-1910s)

- Eisenbahn_im_Bau
- Erhaltener_Fahrweg
- Fahrbare_Wegspuren
- Fußweg
- Hauptstraße
- Karrenweg
- Kommunikationen_Eingeschnittene
- Landstraße
- Nicht Erhaltener_Fahrweg
- Normal spurige Eisenbahn_eingleisig
- Normal spurige Eisenbahn_zwei- oder mehr-gleisig
- Saumweg
- Schmalspurbahn
- Straße_in_Bau
- Straßenbahn_auf der Kommunikation
- Streckenweise_Saumweg
- Verfallene_Straße
Following the route paths over a weighted 6\% (Cart road) and 12\% (Bridle Path) slope gradient, we can see the preference of the army's route.
Geo-Spatial Mining of Historical Maps and Texts: ...
RQs: Conclusions
Ottoman logistics, 16th-19th c.

- Ottoman armies relied on **wheeled transport** for military logistics
- Necessary **road infrastructure** should have been intact, 16th-19th c.
- There should have been a long-term **continuity of logistic infrastructure**, Generalkarte_1900 **suitability** for the 1840s
- HGIS can allow us to build a **historical multi-modal transport** network incorporating costs
  - distance in kilometres / time-distance
  - slope
  - road conditions
  - seasonality

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Risks & Potentials

- Using HGIS and other techniques with **unsuitable** or not **curated** historical data
  - Over-analysing
  - Mis-mapping
  - Misleading conclusions
- Integrating multiple and connected research questions within a **generative** digital research infrastructure

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Thank you for your attention

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