GIS and Geomatics in Ancient History

Geomatic Methods Supporting The Investigation Of Ancient History

Mark Vetter, Boris Dreyer

Agenda

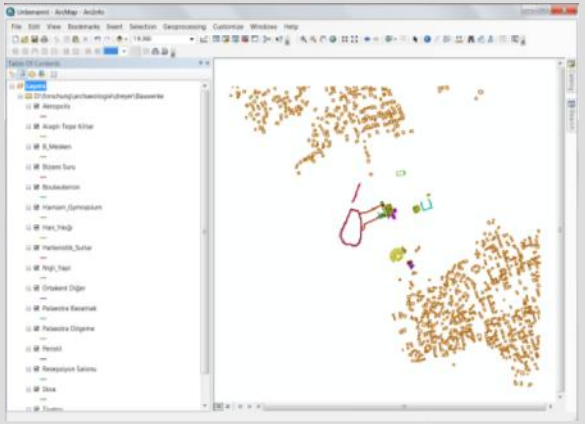
1.) Why geomatics in ancient history sciene?

2.) Aims of the Metropolis project

3.) Aims of the VARUS battle reconstruction

4.) Results VARUS research

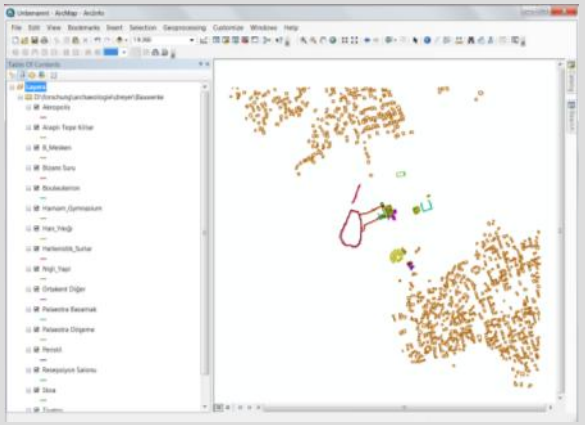
5.) Outlook and desiderata



1.) Introduction - Background

Why geomatics in ancient history?

- Geomatics – the complete process from survey, mapping, manipulation, analysis and presentation of geodata.
- Why using a GIS as a database for historic documents? Because in most cases this data is spatial related
- GIS: a powerful tool for documentation, but as well as analysis of (paleo-) spatial related questions

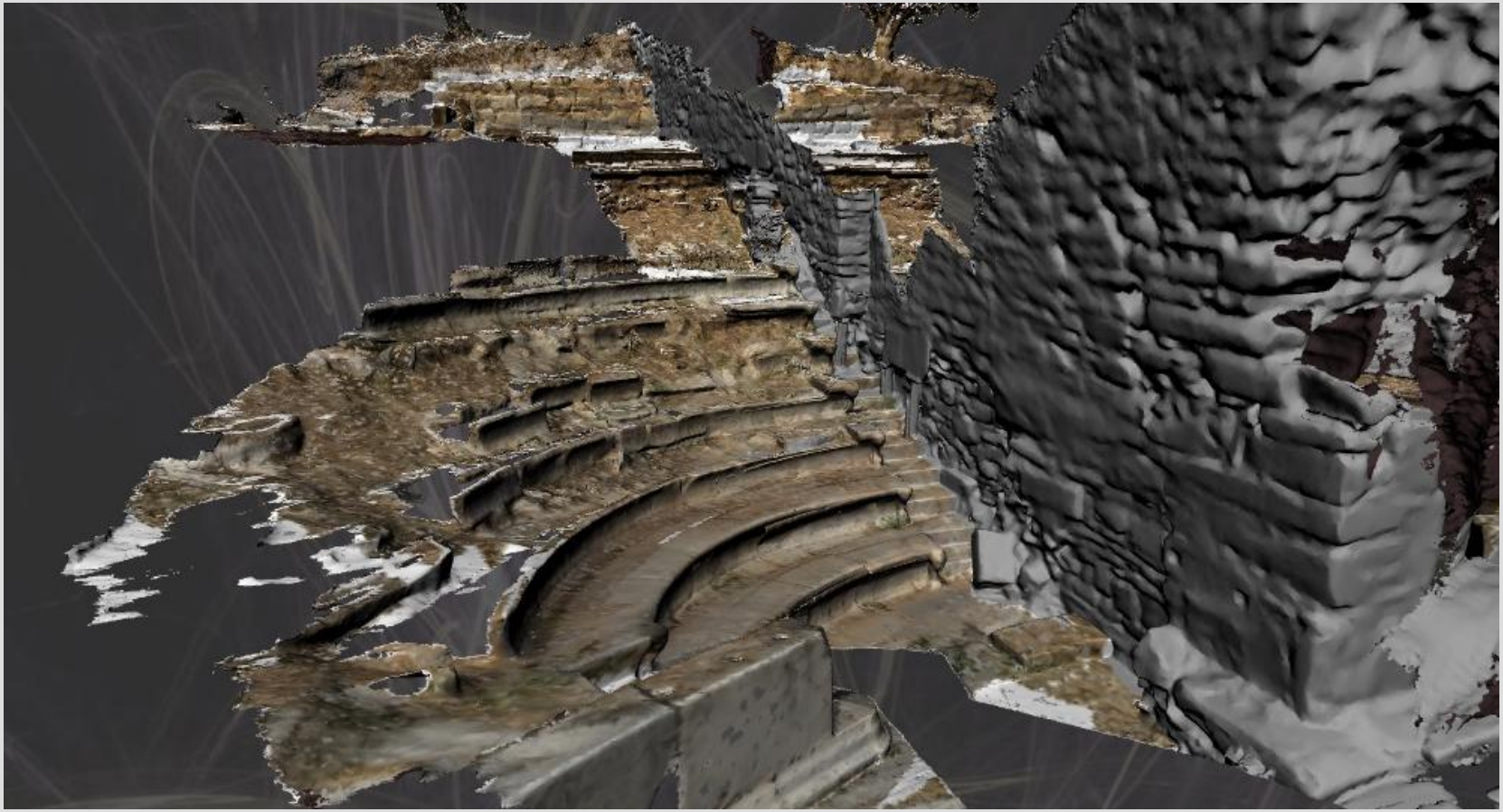


2.) Aims of Metropolis project

- Survey of already existing 3D-spatial structures
- Bringing these structures in a location based, geodatic projection with a GIS
- Thematical categorisation of geodata according time period/importance
- 2D maps of building structures of Metropolis
- Reconstruction and 3D presentation of buildings
- Basics for geoprocessing with the aim of aquisition of scientific knowledge for archeological purposes in order to understand historical structures and conectivities

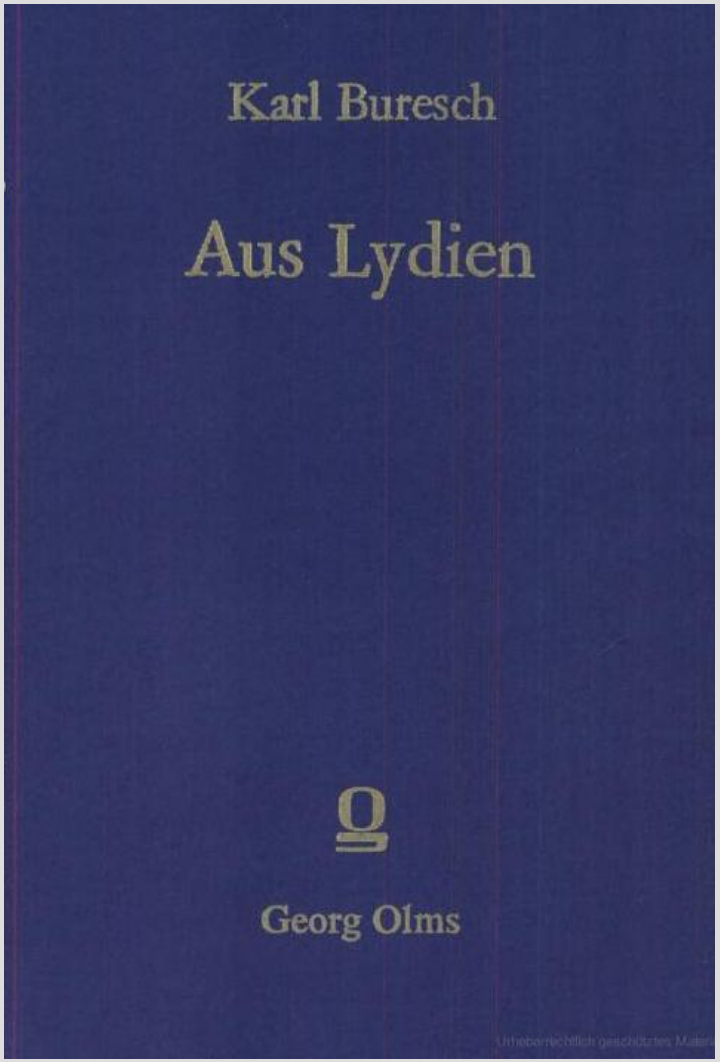
2.) Study area Metropolis / Ionia

- Foundation of city in 725 BD
- Prosperity time in hellenistic epoque in 3th century BD
- Higher level of construction activities in roman time (Stoa, Bath) round Augustus
- Earth quake in 17th century AD witch caused enormous damages
- In byzantine epoque in 14th century AD constructions of fortification walls



„Low-cost approach for a 3D-visualization of historical structures in Metropolis“
Presentation of Sebastian Lemstra on **Thursday 11.00 – 11:15**

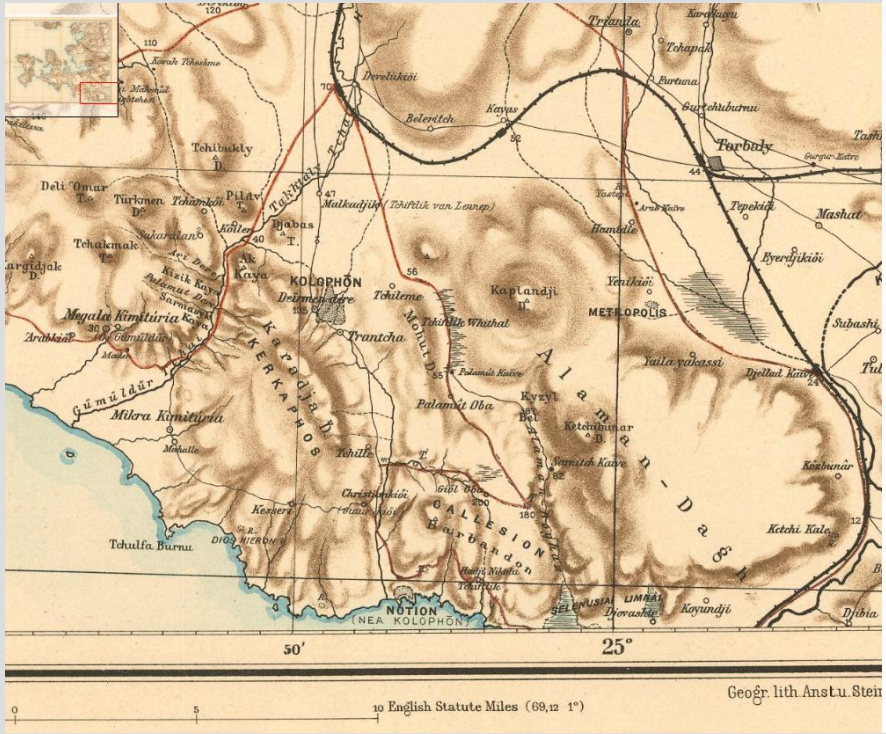
- Unifying different sources of material documents and ancient and recent geodata in a GIS
- KARL BURESCH: Aus Lydien, 1898



- KARL BURESCH: Aus Lydien, 1898

Von hier aus wandte ich mich NNW gegen die oben erwähnte Hügelkette, nach deren Übersteigung ich mich mühsam durch den noch fast überall versumpften westlichen Teil der Kaÿstros-Ebene zu winden hatte. Bei Subaschi, wo der Verwalter der grofsherrlichen Güter seinen Sitz hat, traf ich auf ein grofses, fast fertiges Stück der oben erwähnten neuen Chaussee, welches auf Tepekjöi (grofsherrliches Gutsdorf) und Turbaly zustrebte. Erst am N-Rande von Maschat, wo ich die in einer *Μουσεῖον* 1878 S. 97 n. *σϛξ΄* ungenügend mitgeteilten Grabinschrift**) genannte Ortschaft Chondria (*Χονδριανῶν χώμη*) feststellte, bekam ich wieder festen Boden unter die Füfse.

- Map of KIEPERT (1880)
- Map of MERIC (1985)


KOLOPHON
METROPOLIS
Trantcha
Kaplandji
Yenikôi
Pilav
Tchibukly
Deli Omar
Türkmen
Tchamkôi
Tchakmak
Kôltchi
Djabas
Ak Kaya
Kisik Kaya
Megala Kimitiria
Mikra Kimitiria
Gümüldür
Tchulfa Burnu
Kerkaphos
Kerkaphos D.
Mohu D.
Kyzyl Bel
Palamût Oba
Ketenlimezar D.
Yalla cakassi
Djellud Kaiassi
Subashi
Kayundji
Djubia
Triandia
Tchapak
Kayas
Beleritch
Torbady
Tepekôi
Mashat
Eyerdjikôi
Hamadie
Devlikôi
Malkadjik
Tchiftlik van Leanap
Tchiftlik Whuhal
Palamût Kaiassi
Christodenkôi
Gioul Oba
Kesheri
Ketchi Kale
Kestenbunar
Sigmitch Kaiassi
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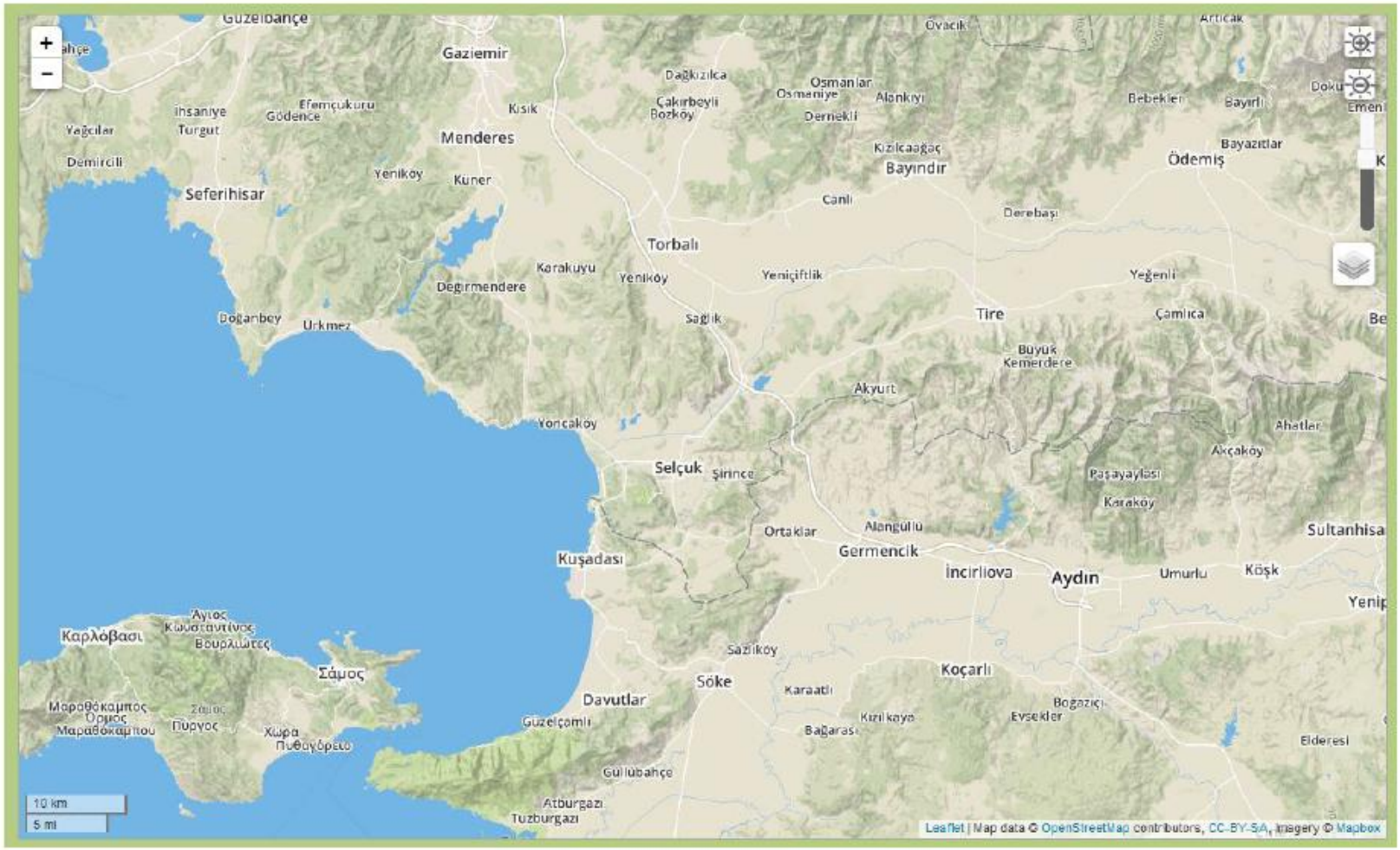
First prototype: Open source ancient history Webmaps/GIS of Ionia



Leaflet realisation based on OSM and Mapbox, coded by MARIUS OSTER

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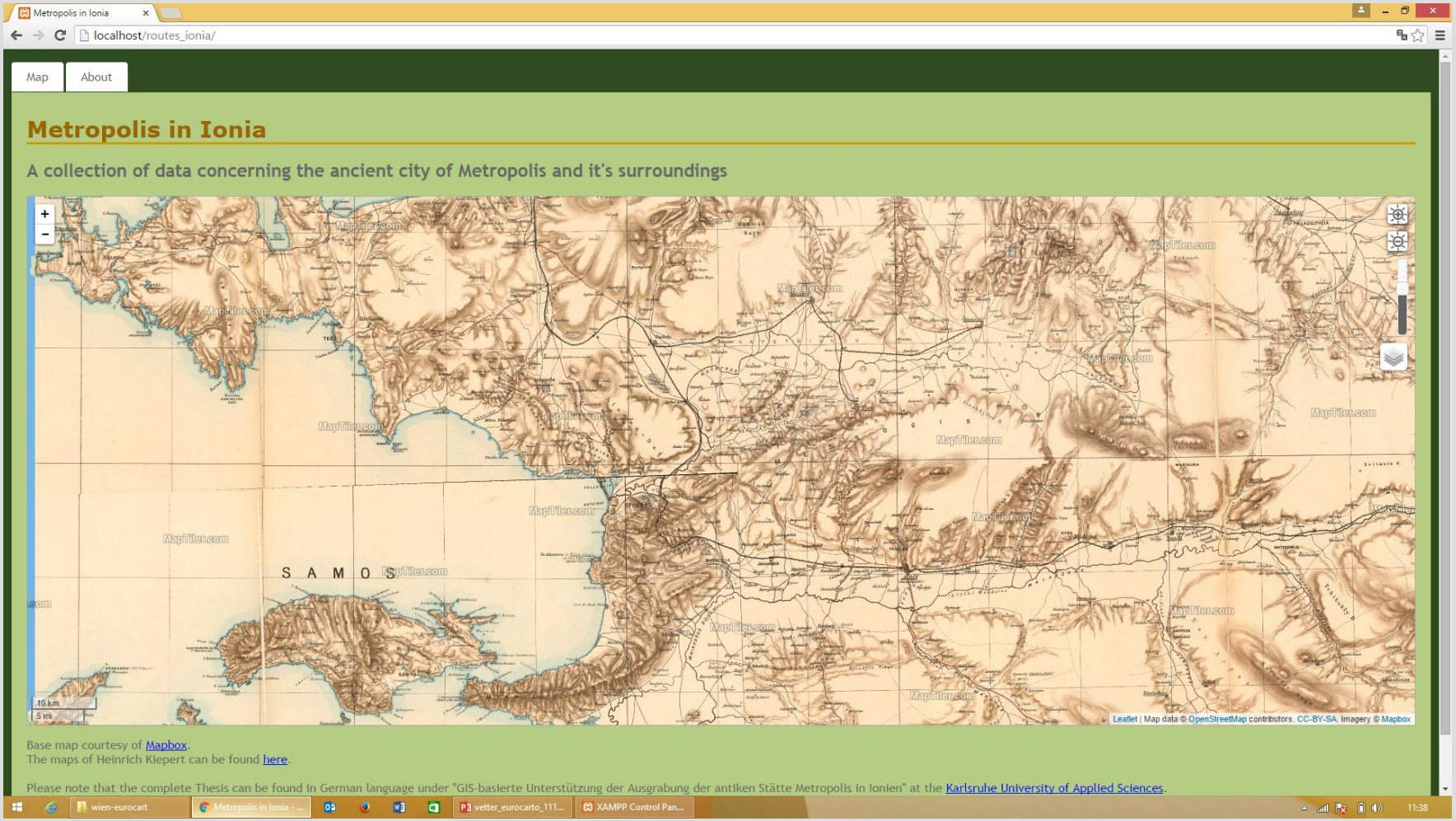

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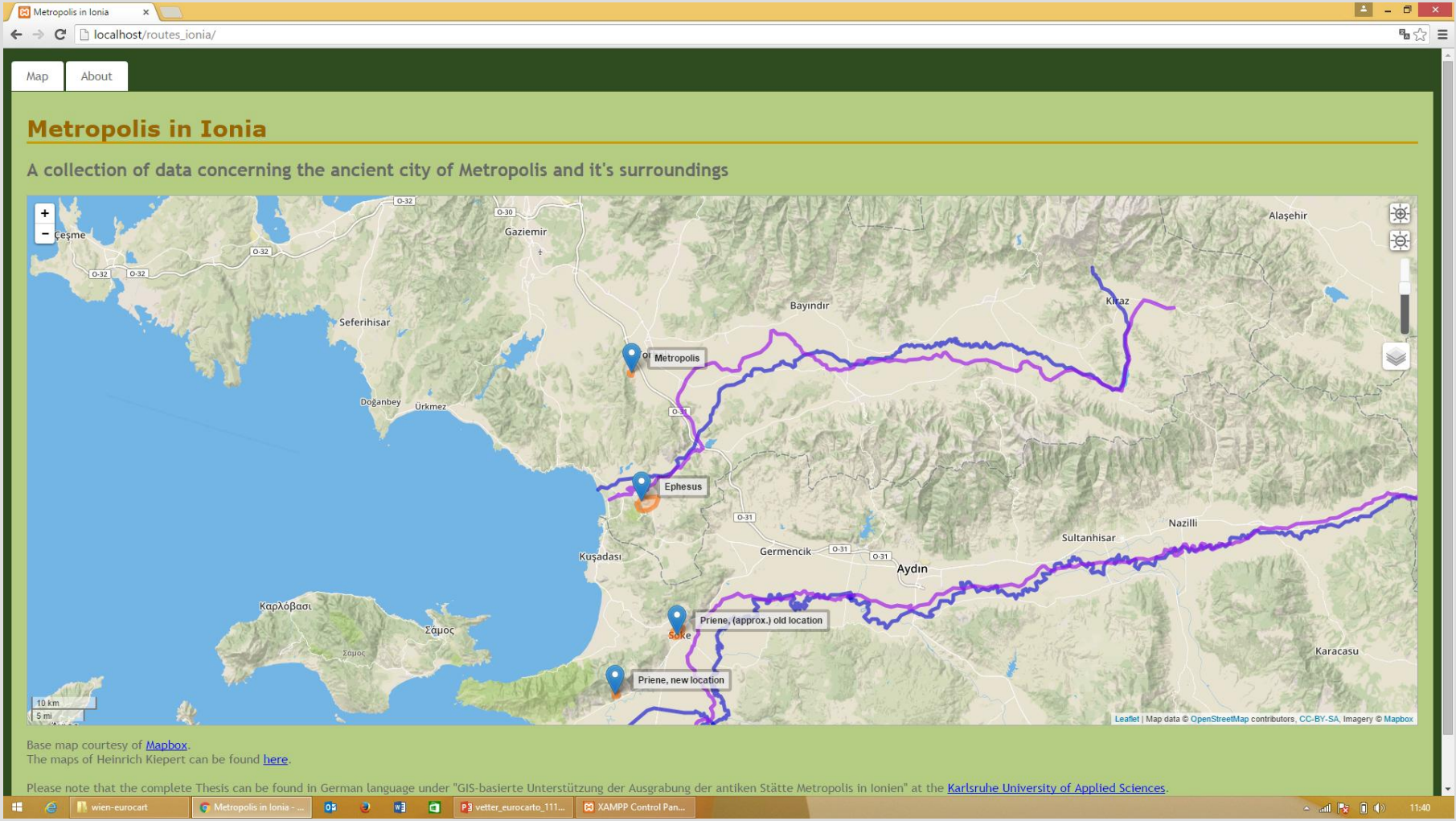

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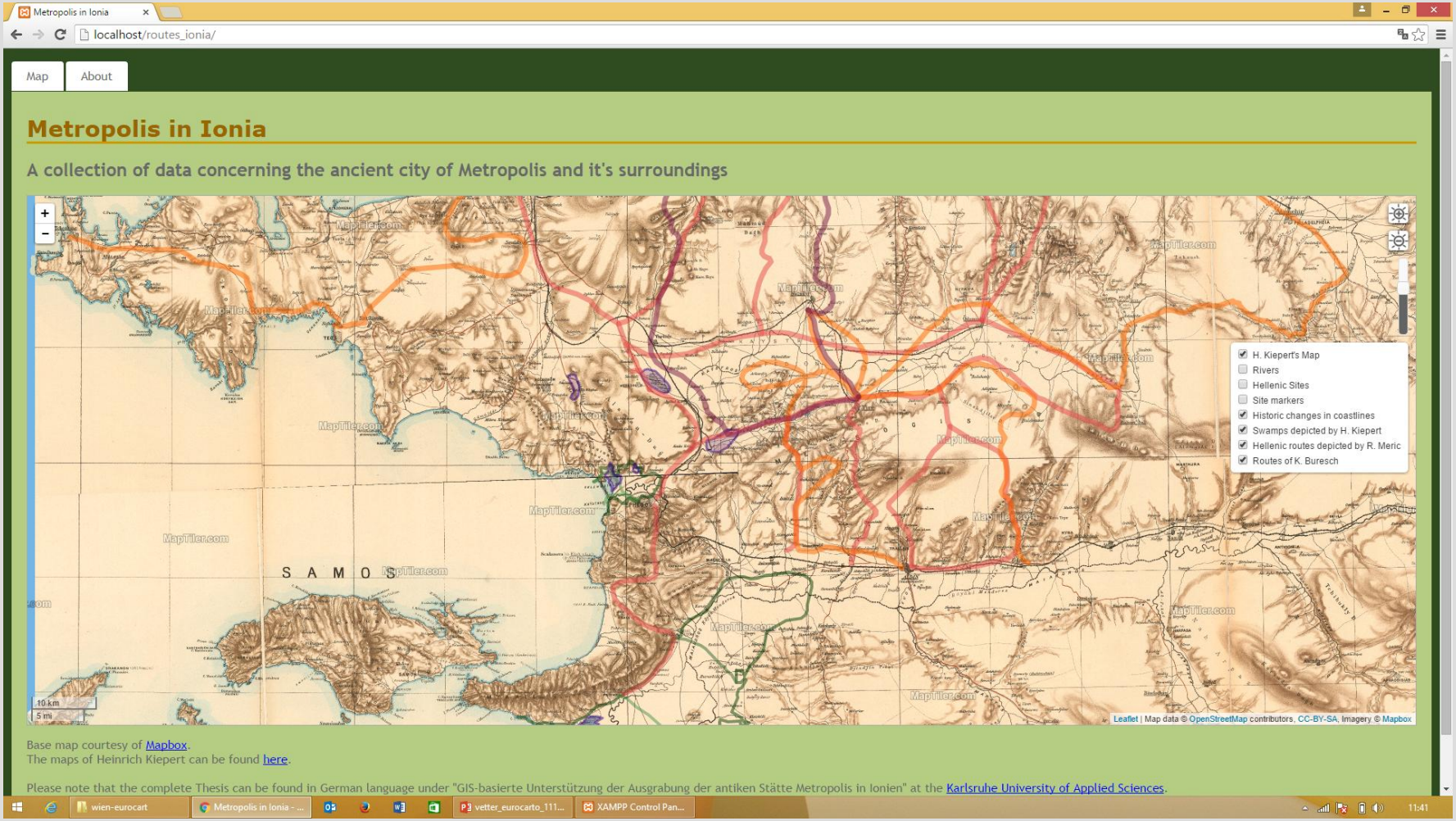

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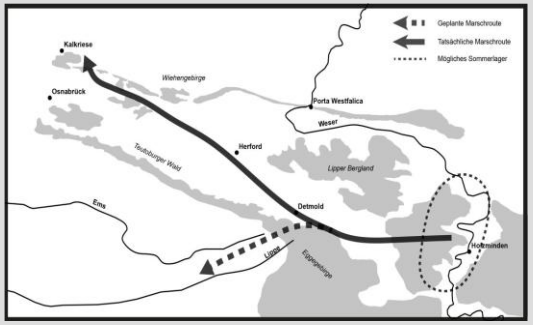
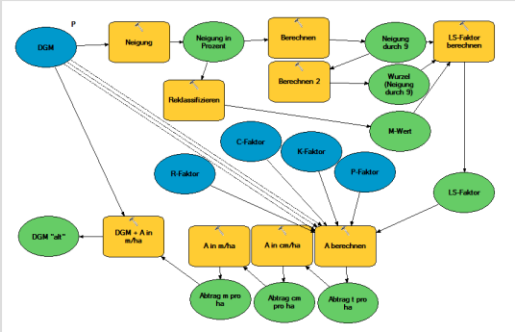
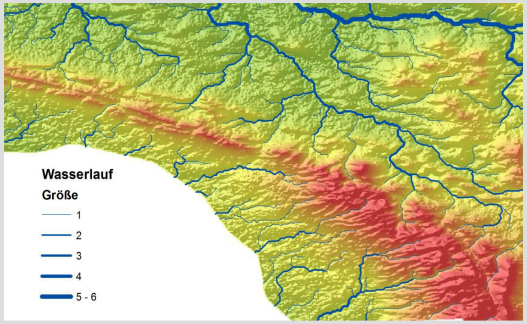
2.) Aims of VARUS battle reconstruction project

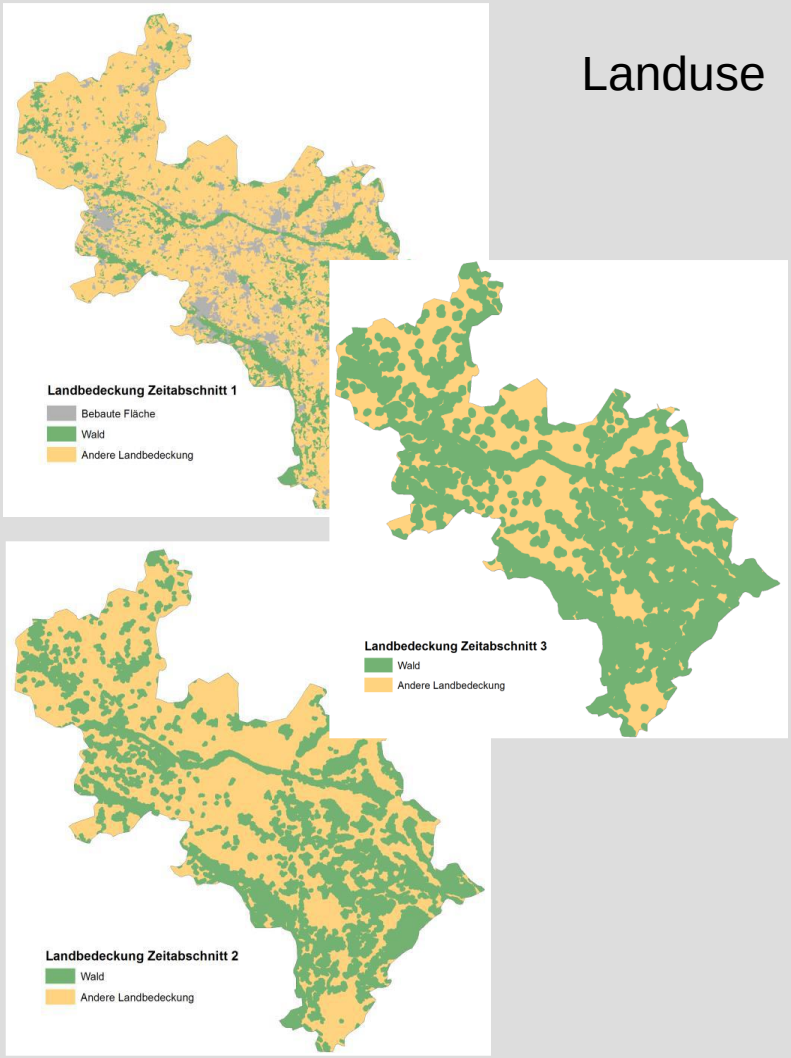
- Development of a GIS-Work-Flows in order to clarify the development of and ancient historic event, like the VARUS battle
- What is the best probability for the route the VARUS tooked?
- Calculated possible old land surfaces in GIS in order to get knowledge about the alterations in the last 2000 years (like changes of fluvial courses, relief, changes of wetlands, etc.)
- Calculation of cost path analisis for possible movements of the VARUS with its troops 9 AD.
- Over all aim is to give the ancient historians new possible locations to search with tradtional methods for material evidences

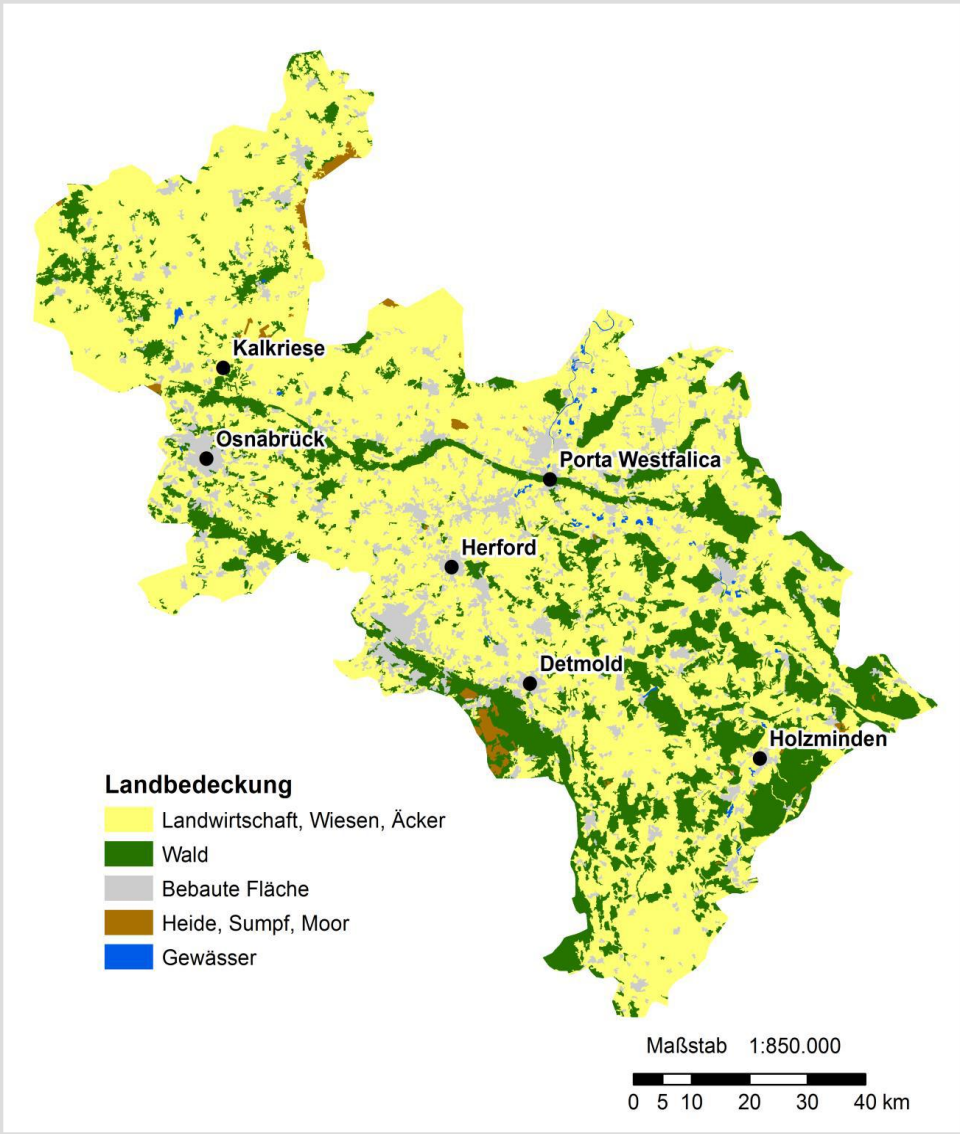






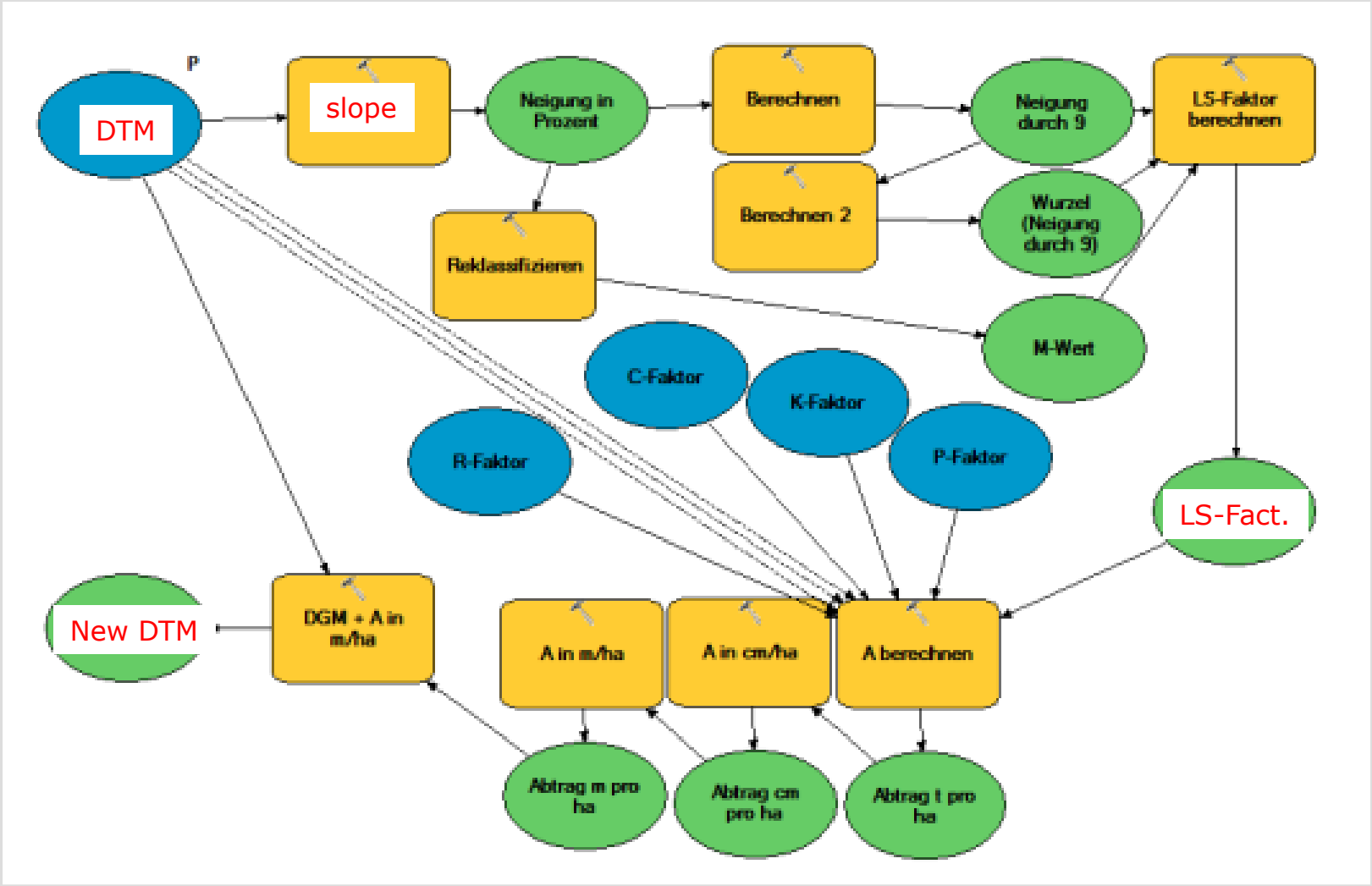
Landuse





Calculations and visualisations by LUKAS SCHABER, HSKA

GIS Work-flow

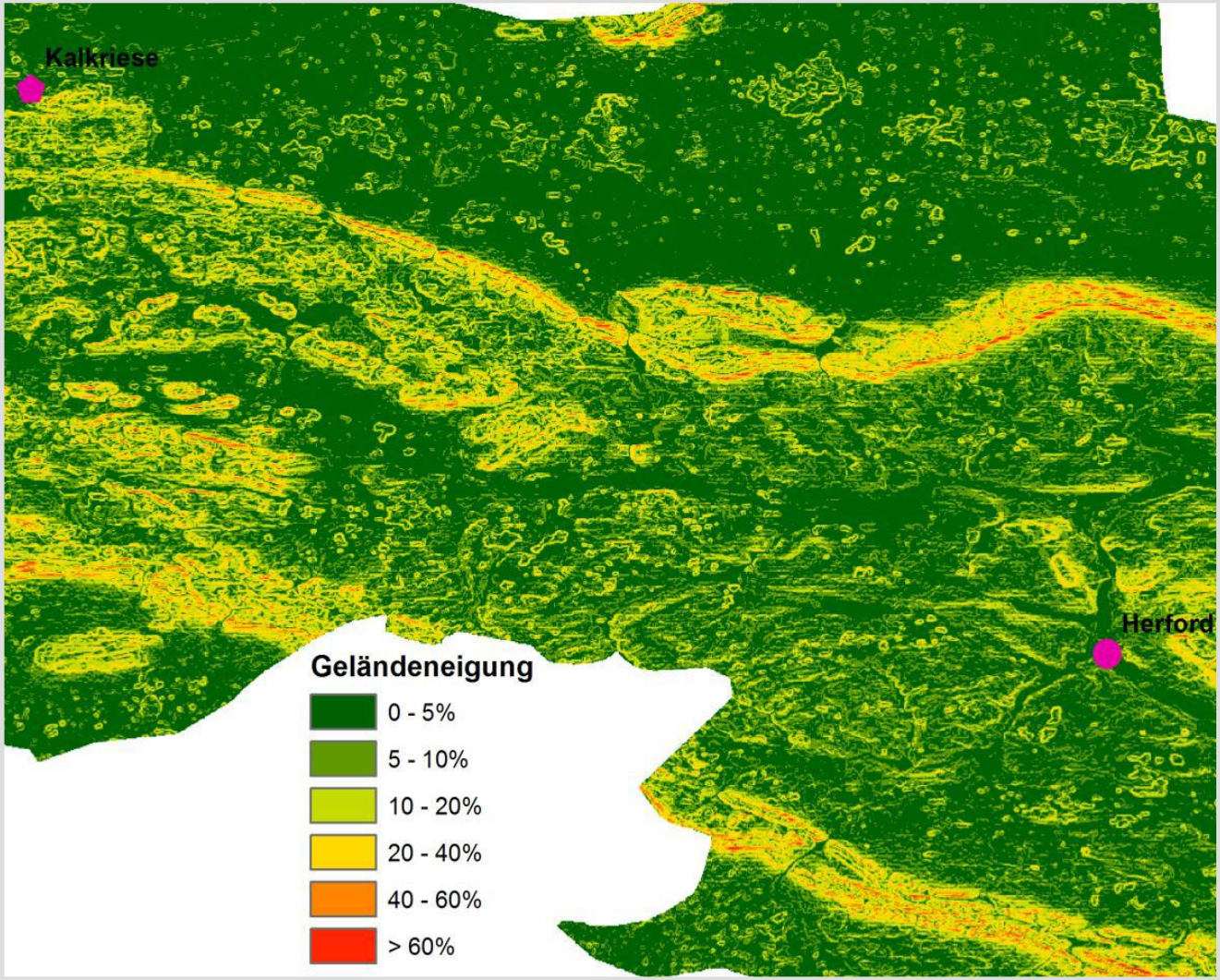


Calculations and visualisations by LUKAS SCHABER, HSKA

Slope in %	Cost unit
0-5	1
5-10	2
10-20	4
20-40	6
40-60	8
>60	10

Land-cover	Cost unit
Forest	6
Free terrain	3

Relieve energy



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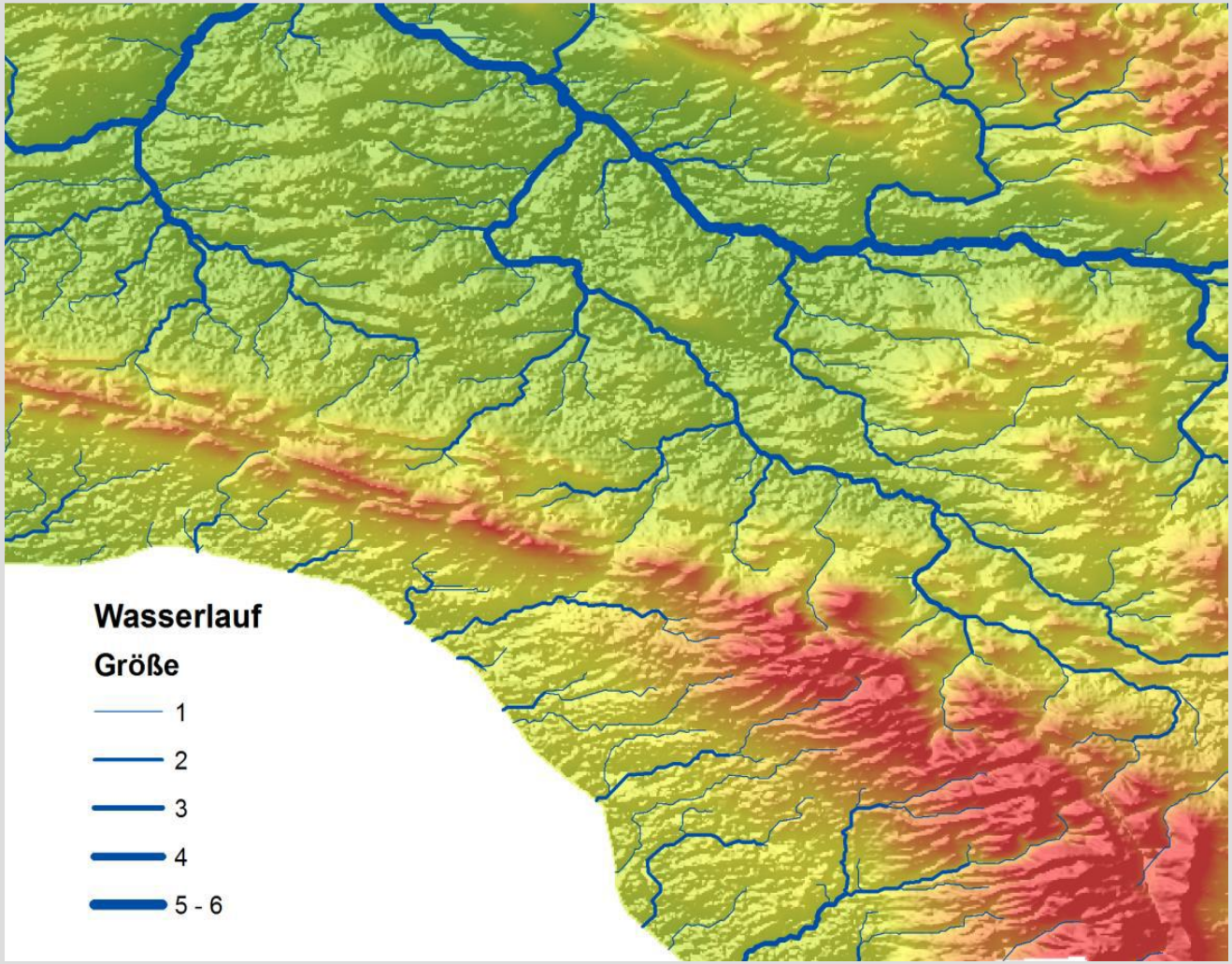
River size	Cost unit
1	5
2	10
3	15
4	25
5	50
6	100

River flows



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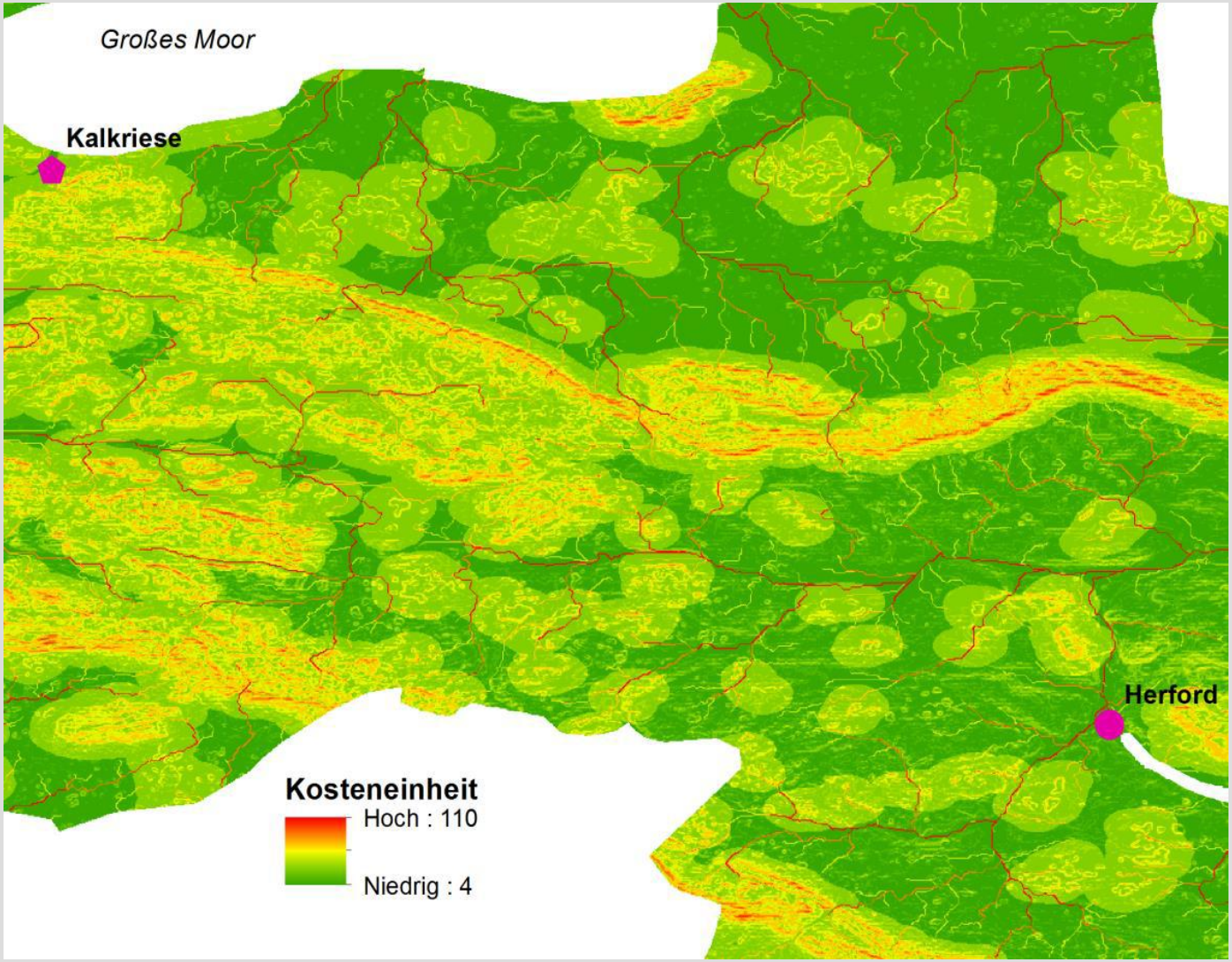
Results



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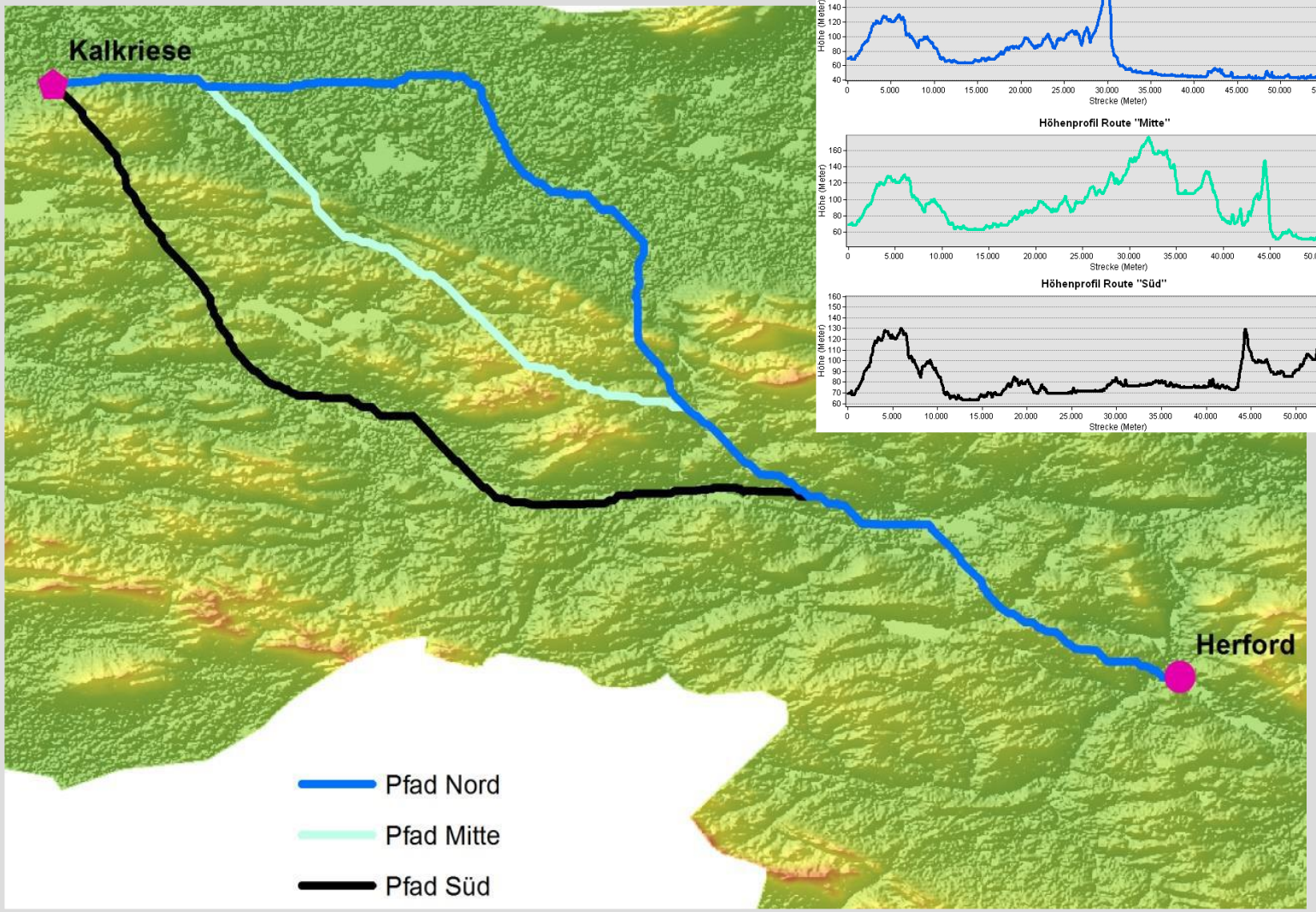

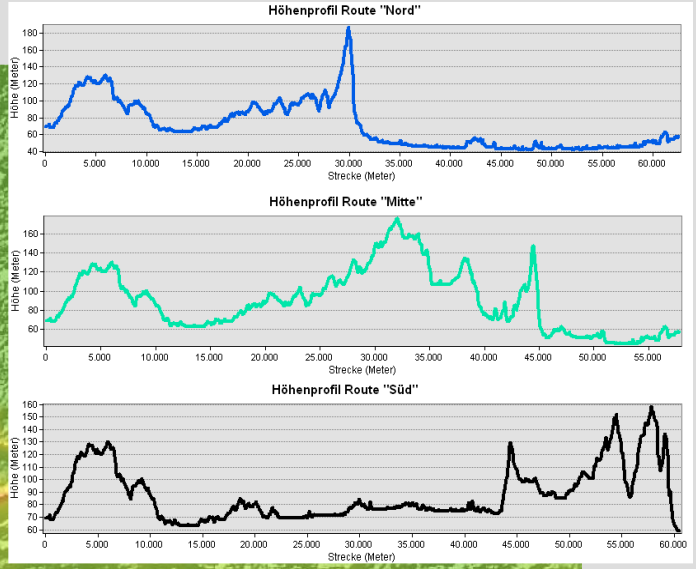

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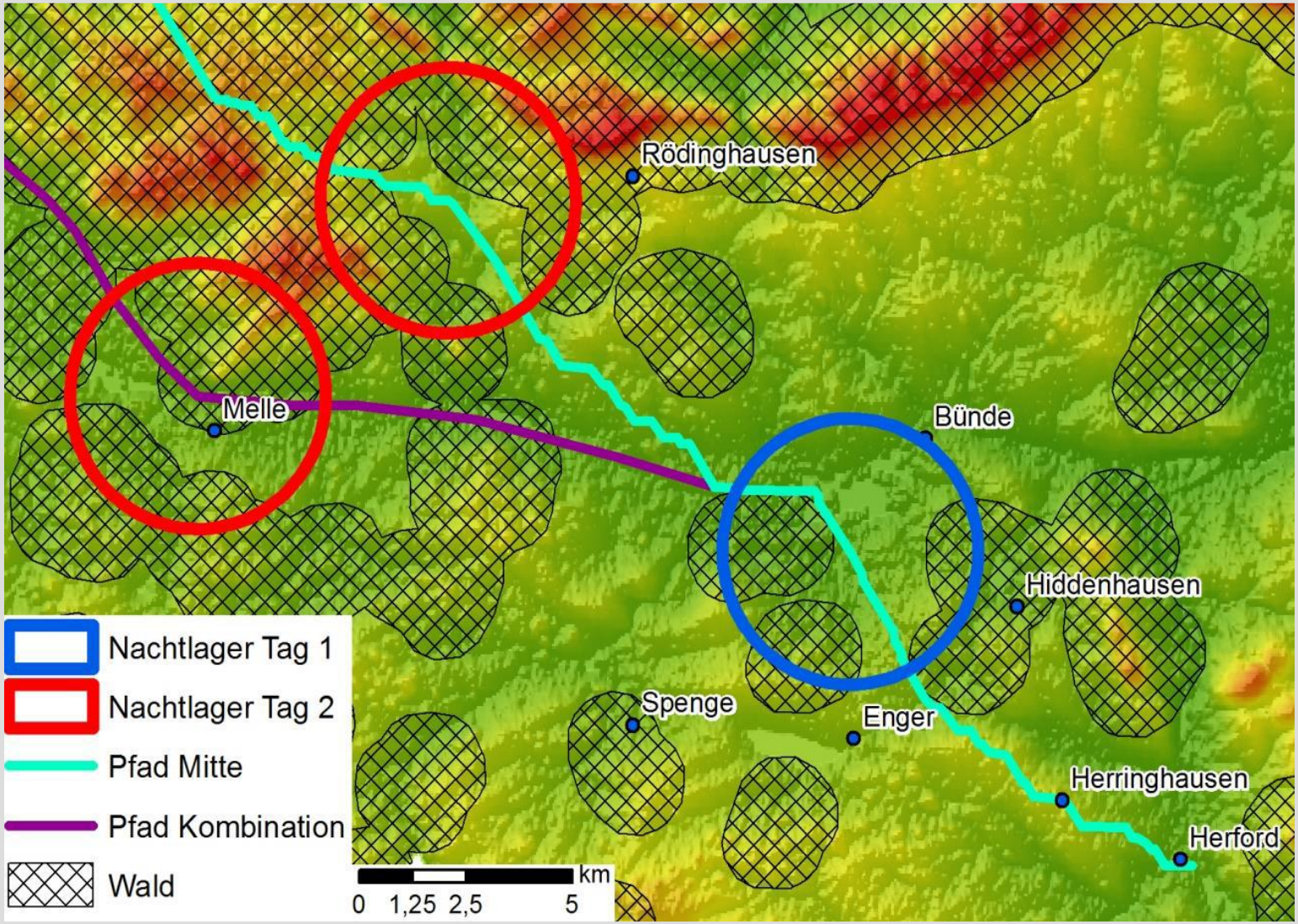

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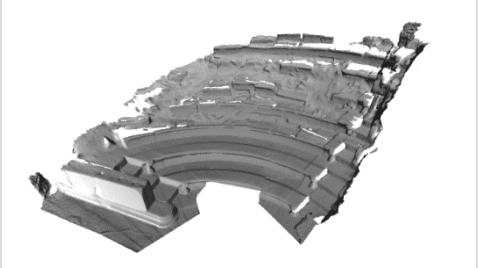
5.) Outlook and Desiderata

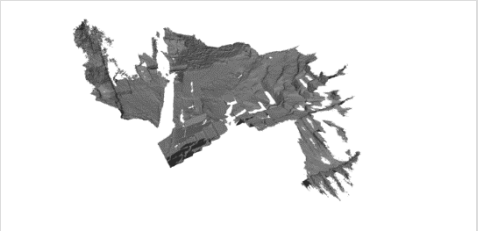
Completion of geodata base

- Especially more and more detailed altitude data necessary to calculate a valuable DTM



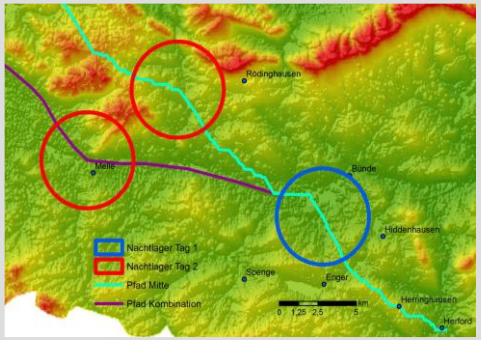
Completion/reconstrucktion of the city structure/3D-Data necessary

- Further Scanning of remains with Laserscanner/Kinect or other photogrammetic methods necessary
- Automatisation of the process
- Validation of geodetic instruments and methods
- Real (Geo-)visualisation (georeferenced) in a 3D-Model integrated in a GIS



More geoprocessing in ancient history with GIS

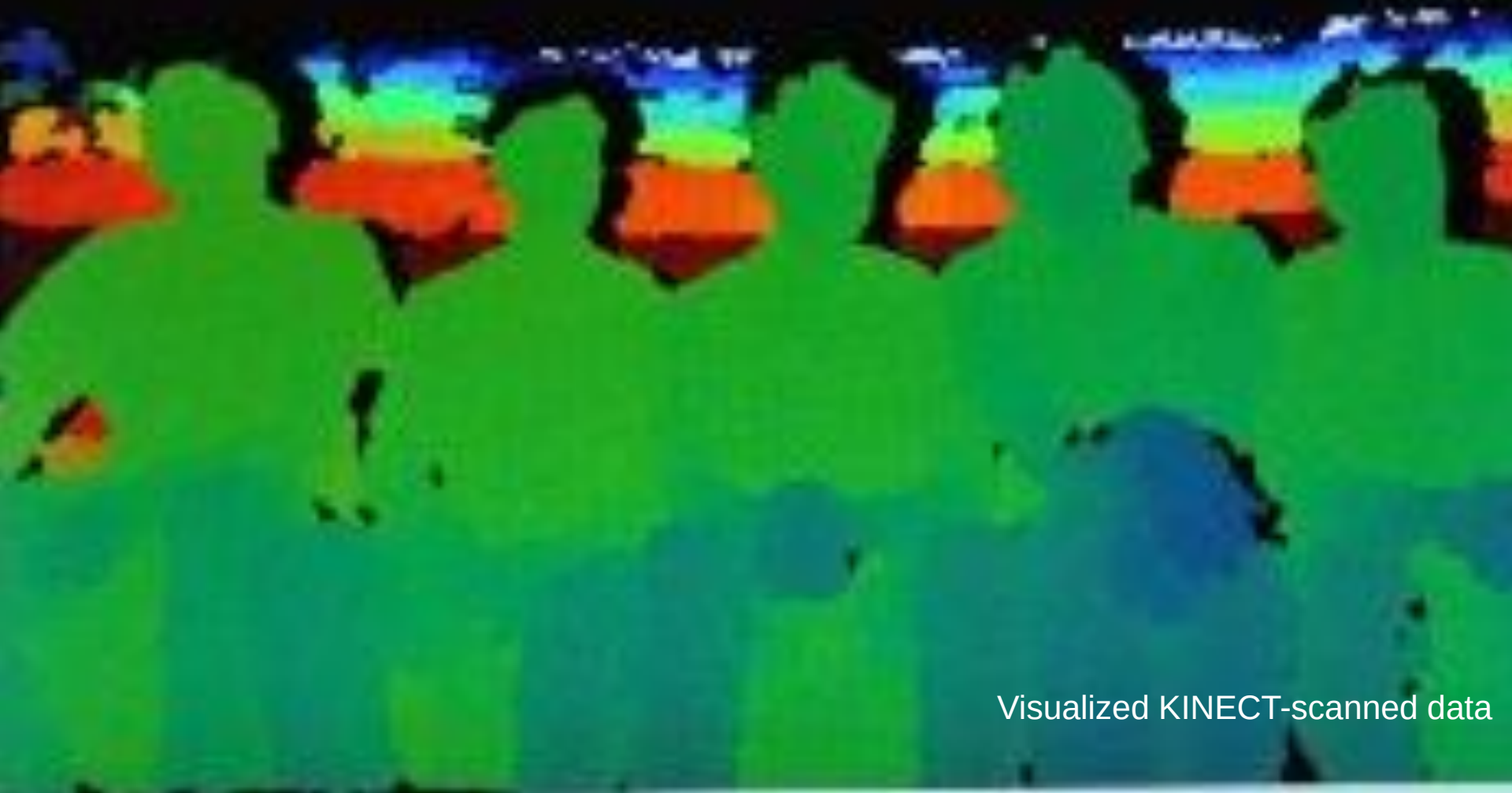
- Networking analysis, best-location, routing reachability, accessability of construction material, water, transport and trade routes,
- All what helps to know more about former living conditions



Giving the Archeologist hints where to search (dig)

Thank you very much for your attention!

mark.vetter@hs-karlsruhe.de



Visualized KINECT-scanned data