ELABORATING LATENT AND APPARENT KNOWLEDGE CONFIGURATIONS IN HELLENISTIC-AND ROMAN LANDSCAPE OF CYPRUS

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Abstract

The current paper presents the initial layout and first results of an on-going study, which aims to achieve a holistic approach of the ancient living/cultural landscape of Cyprus, based on the known Hellenistic and Roman network. From an archaeological point of view, Hellenistic but mainly Roman network provides more evidence primarily due to better preserved data. Nielsen's[1] study based in field work, textual studies and contextual approach is considered until today the most reliable source for this network.

The first case study selected is a hilly area in The Troodos Mountain region. The main methodological tools employed in order to further exploit the known roman network of the island in the selected area are the friction surface estimation, and the Least Cost Path Analysis (LCP) through Digital Elevation Models (DEM) available from remote sensing and aerial datasets integrated in a Geographical Information System (GIS). Thereupon, spatial analysis was carried out within the GIS providing a better insight for landscape decoding and usage. Additional analysis was accomplished concerning the interpretation of the LCP results from recently acquired high resolution defined roman network. Different multispectral WorldView-2 images and the already enhancement techniques (such as pan-sharpening of the multi-spectral bands; edge detection etc.) were applied to the remote sensing datasets in order to improve the interpretation of the overall results.

Related future work foresees the calibration of the LCP analysis, which will be elaborated based on additional archaeological evidence, by adding on the known/previous network apart from the necropolis (a study concluded for data up to 2011[2]) a combination of environmental parameters from one side and settlement locations on the other, including amongst others, features such as habitation, workshops, commercial routes, ports. A GIS is foreseen to integrate all possible data providing thus a complete landscape dataset which will facilitate the "reading" and interpretation of ancient landscape.
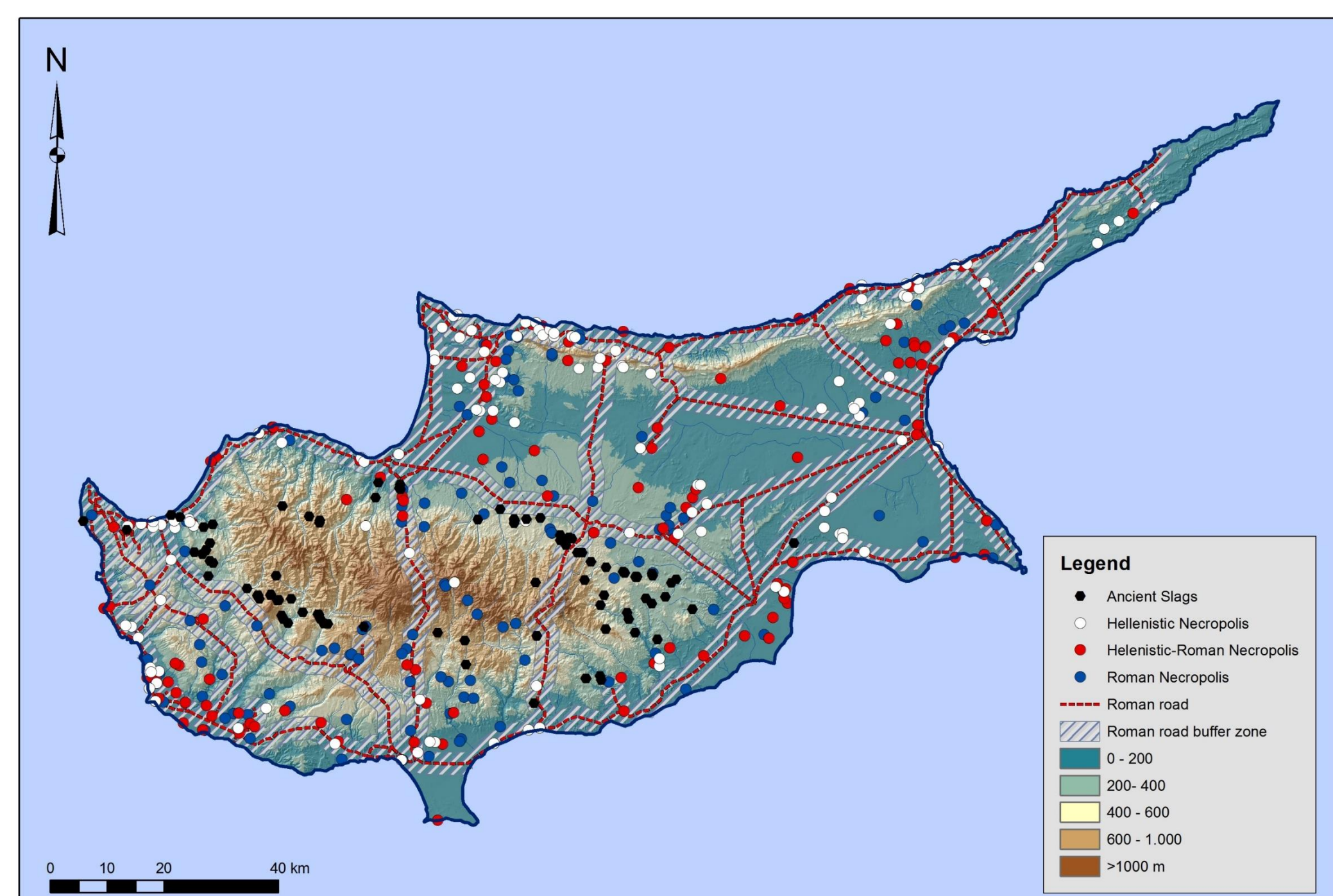
Fig. 1 Necropoleis and buffer zones of roman road network (Lysandrou & Agapiou 2015, fig. 6).

General objectives

Amongst the objectives of the on going research is to reveal and decode the Hellenistic-Roman landscape of Cyprus based on ancient architectural features. The last could be still standing monuments or remains, testimonies from the resources, excavations reports etc.

The landscape understanding in terms of density and usage during Hellenistic and Roman period is foreseen to be approached by investigating parameters, which usually determine the network development, such as **settlement locations** of various types (habitation, workshops, burial sites etc.) and **environmental factors** (landscape geology, soil, water resources etc.). All this information added in Geographical Information System (GIS), will facilitate the investigation of the relationship between cultural and environmental conditions, aiding the understanding and rationalising the spatial distribution of ancient infrastructure in a specific environment (landscape). Naturally, movable finds could be added in the above described research indicating for example the itinerary of trade objects through manufacturing points and commercial routes.

Innovation

The innovation of the research lies to the fact that apart from the traditional archaeological and literature evidence of the landscape usage in antiquity through its material culture evidence, the fusion of technological achievements will be introduced. Those concern the employment of earth observation datasets (i.e. high resolution multispectral WorldView-2 images) in an effort to unveil sites with low archaeological visibility.

Further more, the insufficiency of traditional archaeological methods for study and interpretation to cover landscape scale will be overwhelmed by the introduction of all information to a GIS environment, integrating a variety of parameters and cognitive aspects of the Hellenistic and Roman landscape.

Preliminary results

Having as a starting point the mass information retrieved by the mapping of the Hellenistic and Roman ancient cemeteries and the documented road network of Cyprus during these periods (fig. 1) further analysis was carried out in the GIS environment to rationalize the areas in which those reenter in terms of environmental terms such as soil, geology and topographic terms such as elevation and slope (fig. 2 a-d). First observations permit the classification of tombs on Troodos mountainous area almost exclusively in a specific soil type (eutric-GAMBISOLS & eutric-anthropic REGOSOLS) (fig. 2c), while the prevailing geological formations that the tombs are hewn out is gabbro and diabase (fig. 2a).
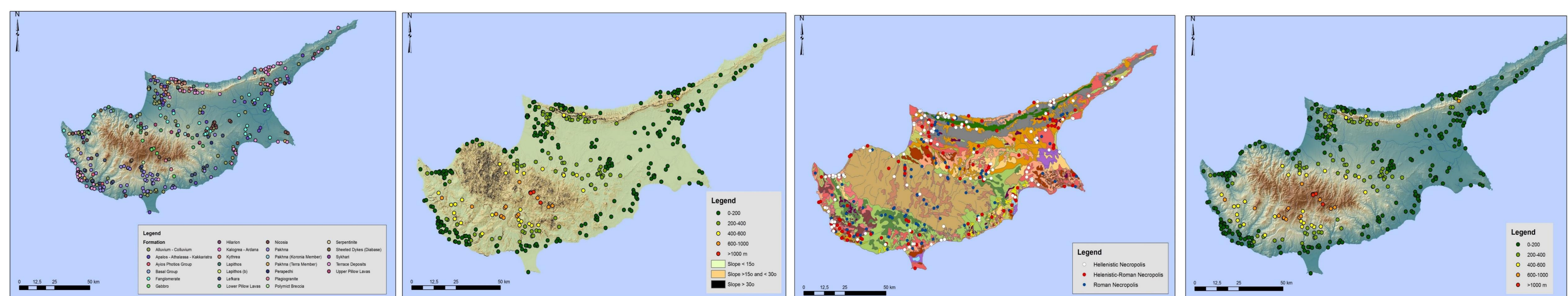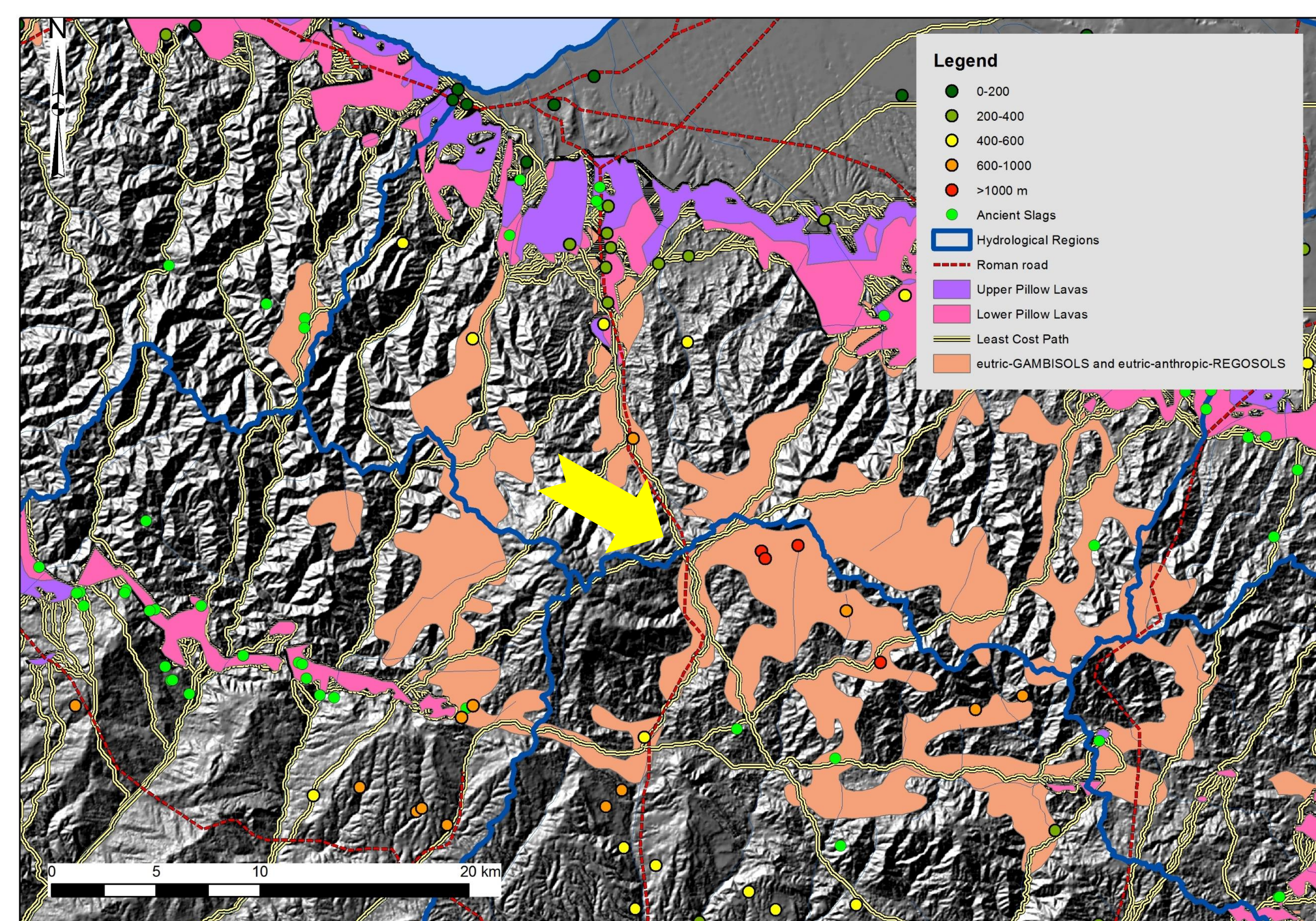

Fig. 2 Various analysis concerning environmental parameters (a) geology map (b) slope map (c) soil map (d) elevation map.

A specific map for the mountainous area of Troodos region has been generated (fig. 3 top). In this map the road network alongside the ancient cemeteries are visualised and understood within their environmental, geomorphological and topographic background; specifically, the hydrological regions, the main geological formations and soil types. Elevations and ancient slags remains are also evidencing. In addition, a Least Cost Path analysis was carried out, demonstrating that in most cases the road network as documented through archaeological research[1] was in line to the main routes defined by the LCPs analysis, which principally follows the topographic characteristics of the terrain.
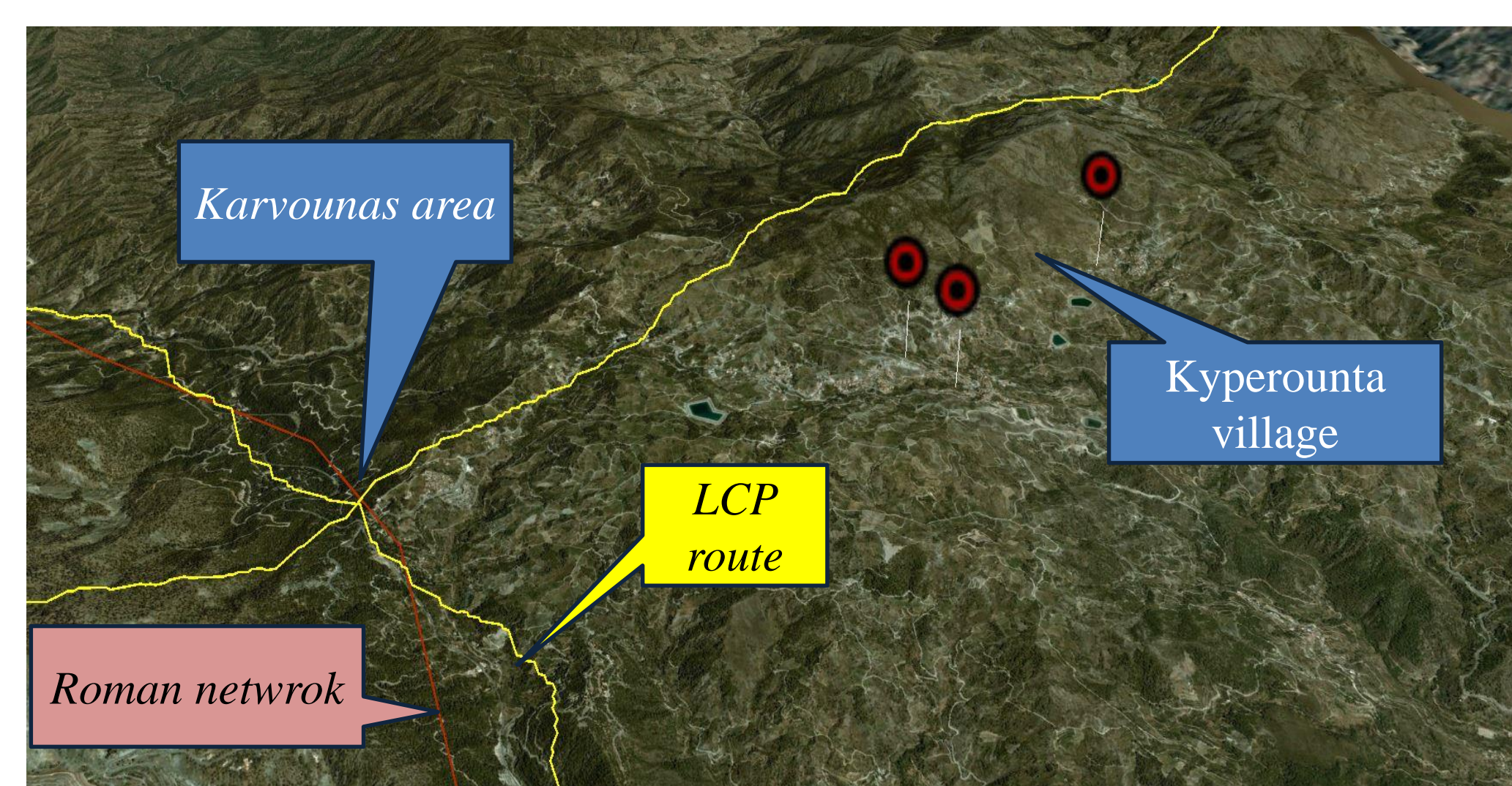

Fig. 3 Troodos region Top: GIS analysis results. Bottom: 3D perspectives from satellite data within Google Earth engine

On those routes are established many of the necropolis, revealing thus the accessibility of those sites in antiquity in a "conformity" manner, especially under the consideration that somewhere close to them a settlement site should be established.

The importance of some sites, such as Kyperounta village and *Karvounas* area (see Figure 3, Bottom) is further highlighted through the present research. Fig. 3 shows a "priority" area where the crossroad leading from Kourion to Polis Chrysochou according to [1] while through the LCP analysis it was set to run from Amathous to Soloi (in direction N/S) is crossed by a route departing from Paphos and resulting to Politiko area (direction E/W), as well as of part of the Limassol hydrologic region.

Nevertheless, a great number of routes as resulted from the LCP analysis in areas where the roman road network is not documented, but still with a number of existing necropolis, opens up the possibility of more connection secondary existed routes. An important issue emerging is the fact that in case of future archaeological surveying of the area, the results of LCP analysis could prioritise the potential investigation areas.

Bibliographic references:
[1] T. Bekker-Nielsen (2004), *The roads of ancient Cyprus*, Copenhagen: Museum Tusculanum Press, University of Copenhagen.
[2] V. Lysandrou and A. Agapiou (2015), "Cities of the dead: approaching the lost landscape of Hellenistic and Roman necropoleis of Cyprus", *Journal of Archaeological and Anthropological Sciences*. Publisher Name Springer Berlin Heidelberg.