

A Cultural Landscape Characterization of the Petraean Hinterland in Nabataean-Roman Times: An Overview

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Researching Petra's rural environs is highly crucial for understanding the complex history and development of the city itself – particularly when considering the geostrategic disadvantageous positioning of Petra.¹ Situated in a steep valley, Petra's location is extremely vulnerable to both devastating flash floods and drought, rendering the control of its water sources and water flow absolutely vital. Surrounded by high mountain ranges, military control of the city and its environs was only possible through use of a well-functioning communication system with its hinterland and organization of the landscape around the city in general. Specifically, the increasing monumentalization of Petra as a capital in the course of the 1st century BCE and the shift from a nomadic lifestyle of the Nabataeans to a more “state-like” organization² required increased technological and infrastructural efforts in order to secure a comfortable and safe living environment not only in Petra itself, but also in the city's hinterland – an aspect that, compared to the extensive archaeological explorations in Petra's urban environs, was so far heavily underresearched.

The aim of this paper is therefore to give a brief summary of the author's recently completed doctoral research which provided an extensive archaeological landscape characterization of Petra's rural environs offering new insights into overall strategies of spatial organization of the city's hinterland. From a diachronic perspective and following a state-of-the-art landscape archaeological approach, a vast amount of archaeological data was investigated in order to discuss various aspects of rural life in Petra's surroundings.³

The core archaeological dataset is based on 14 archaeological surveys that have been carried out in the Petra area since the 1970s – all of varying intensities and geographical extent, but providing important spatial and archaeological information on rural Petra.⁴

Although significantly less data was available than is considered here, recent studies have already synchronized the archaeological data of preselected surveys in the Petra hinterland. However, these concentrate mainly on rural civilian settlements and changes in land use only.⁵ Therefore, an overall in-depth archaeological and culture-historical contextualization of the now almost overwhelming amount of various archaeological sites recorded in the Petra area remains missing.

Methodology

Following P. Kouki's definition of the Petra hinterland, the study area is understood as a 20 km radius around Petra covering a vast geographical area measuring over 1,250 km²

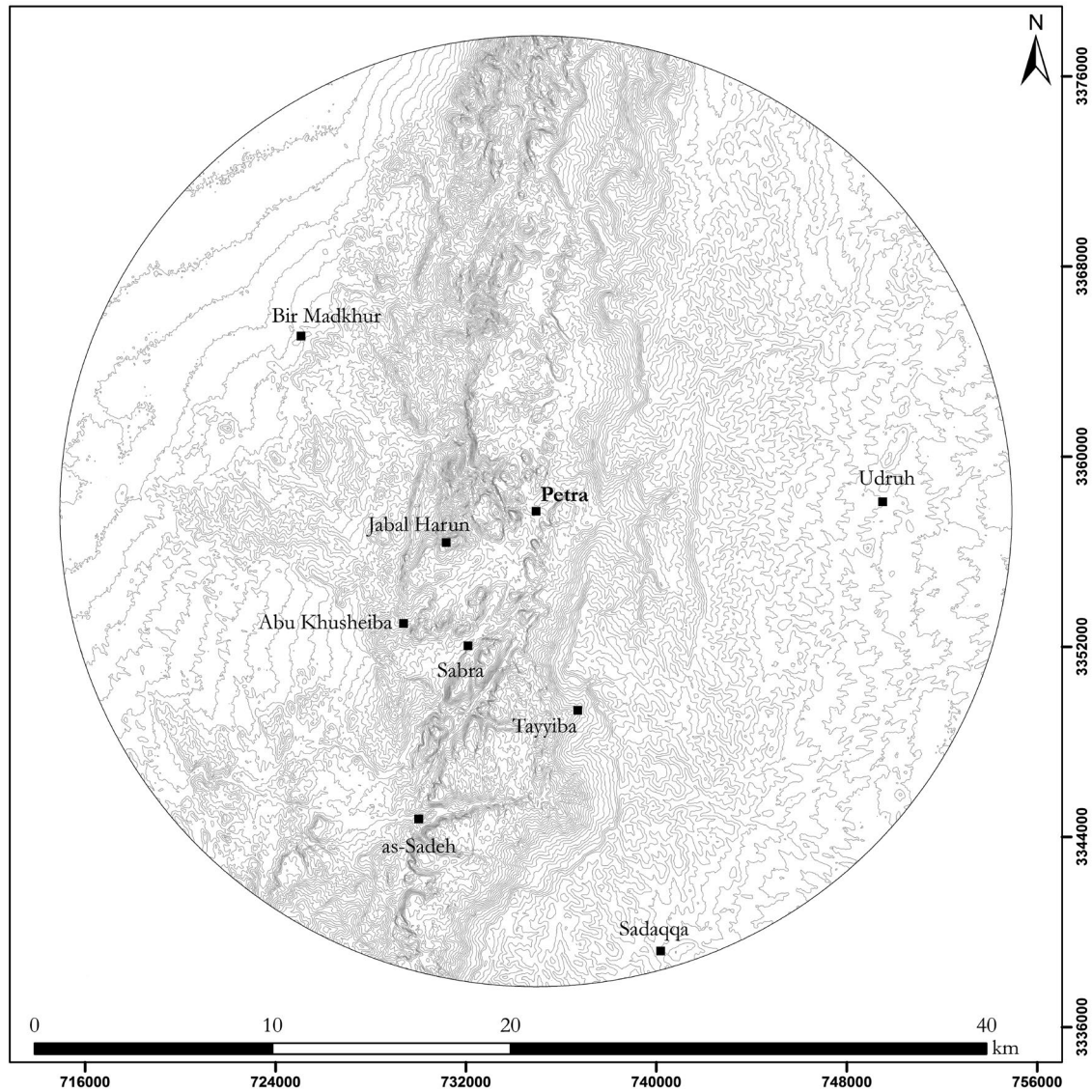


Fig. 1a: Map of study area (20 km around Petra) with major sites in the region.

and featuring all unique topographical and environmental characteristics of the Petra region (fig. 1a and b).⁶ The study area includes an extremely large archaeological dataset of over 1,700 sites.

Methodologically, the vast amount of archaeological data validates the substantial use of complex and quantitative spatial methodologies including GIS-based cost-surface and visibility analyses as well as the spatial statistical method of *point pattern analysis* that objectively delineates, characterizes and evaluates explicit processes that may have caused particular spatial distributions of archaeological sites. This includes density-based approaches such as *kernel density estimations* or

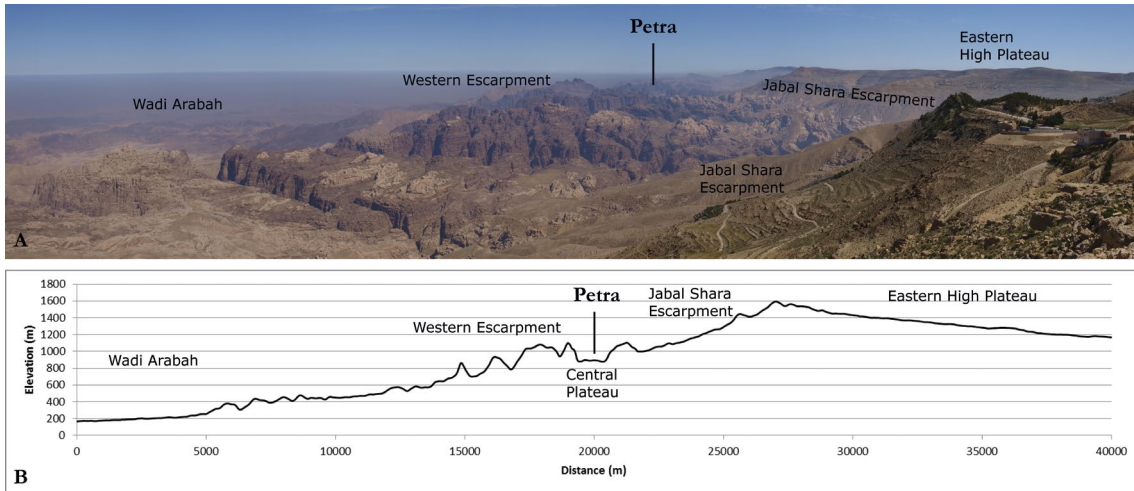


Fig. 1b: Overview of the Petra region with E-W elevation profile.

the statistical *Pearson correlation test* as well as distance-based evaluations in order to discern conspicuous point clusters.⁷

These landscape archaeological analyses were employed critically as useful quantitative tools for investigating intricate spatial characteristics of the available archaeological dataset and for studying the relationship between the various archaeological sites and the natural landscape in order to supplement farther-reaching archaeological and culture-historical discussions.

Before being able to conduct the aforementioned analyses, however, it was necessary to address two major methodological challenges. Specifically, these were the differing archaeological site typologies as well as the chronological uncertainties inherent to the original survey data.⁸ The clarification of these core methodological issues was crucially important for assessing the interpretative and argumentative basis of the study.

Concerning the differing site typologies, the detailed evaluation of the original survey data has shown that even from the few surveys that do offer at least some indication of their defined site classes, almost 800 differing site types (nearly half of this study’s entire dataset) were worked out. Of these, there is no indication whether they were recorded as the same site type following comparable definitions or not. In consequence, the original site typological information provided by the various surveys were largely unsuitable for a comparative approach and necessitated a critical reassessment of all available archaeological information for each recorded site. Moreover, and more importantly, this called for the establishment of a new, rigid and strictly structured site classification system based on generally acknowledged site typological definitions fitted to the archaeological particularities of the Petra region.

It then also became apparent that the original dating of archaeological sites do not follow a coherent and standardized chronological system. While there is a general

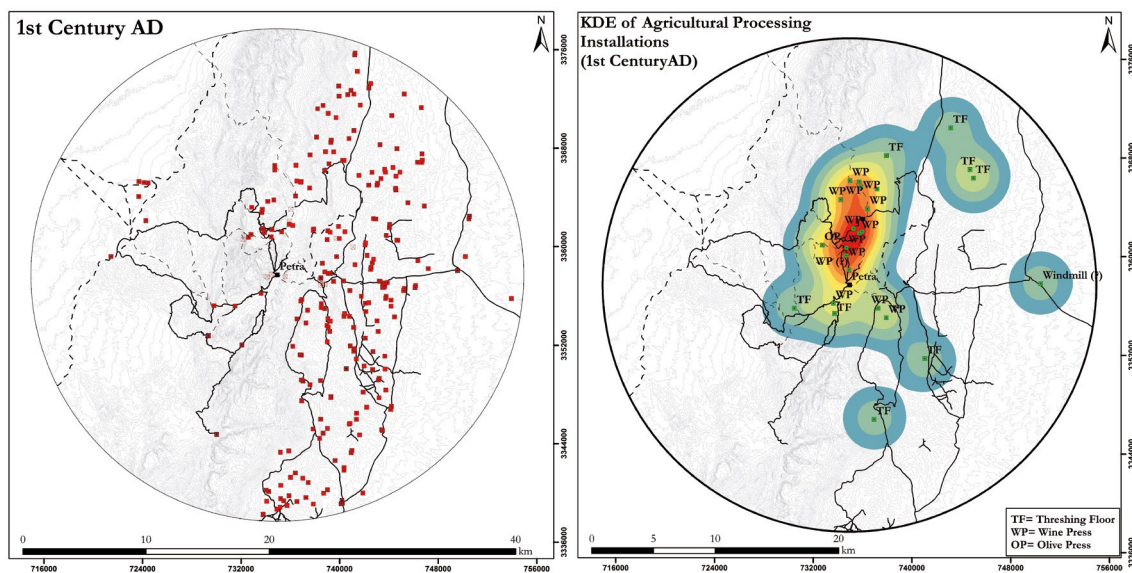


Fig. 2: Left: Distribution maps of rural civilian settlements dating to the 1st century CE. Right: Cluster analysis (kernel density estimation) of agricultural processing installations evidenced in the Petra hinterland for the 1st century CE.

agreement on culturally defined time periods, the chronological definition of these periods by the different surveys can vary significantly – if they are defined at all. This is a methodological issue that renders any diachronic analysis highly problematic if not approached from the beginning. By means of statistical calculations, it was therefore necessary to establish a quantifiable chronological system respecting the differing datings of sites. The dating uncertainties inherent to the original survey reports were thus made transparent and, on this basis, it was possible to further investigate the data recorded in the Petra hinterland by century-based intervals.

Concluding this brief methodological prelude, the following presents the most significant insights gained into the landscape organization of the Petra hinterland during the Nabataean period.

Economy, Infrastructure and Trade

Concerning the pattern of rural settlements, an overall increase was observed from the 10th century BCE onwards that may correspond to the rising Edomite kingdom, with settlements concentrating along the Jabal Shara escarpment and eastern high plateau. However, by the 5th century BCE an extremely dramatic decrease of settlements is noted that possibly reflects the political vacuum and overall instability of the area after the collapse of the Edomite kingdom.

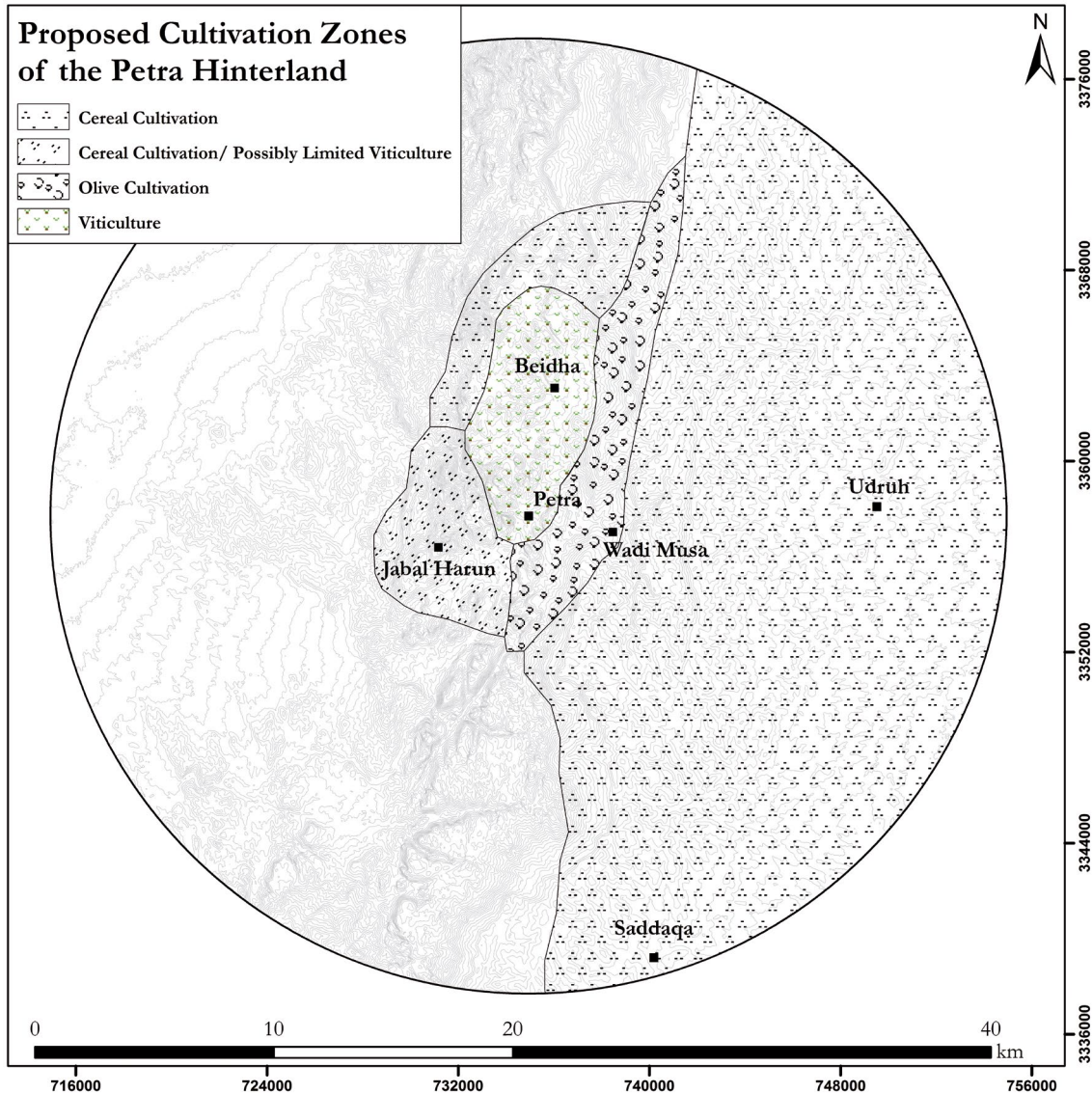


Fig. 3: Suggestive cultivation zones of the Petra hinterland.

It is only by the 1st century BCE and most dominantly by the 1st century CE (fig. 2) that an explosive increase in the overall count of rural settlements in the Petraean hinterland is evidenced corresponding to the Nabataean sedentarization process and increasing need for agricultural goods to meet the demands of heightened trade activities and a growing urban and rural population.⁹ Particularly the striking increase of farms suggests that the main economic subsistence strategy in Petra’s hinterland was based on agriculture.

A similar trend was also observed for the evidenced agricultural installations: Particularly agricultural terraces, wine and olive presses as well as threshing floors peak during the 1st century CE as well (fig. 2). Not only does this confirm a largely

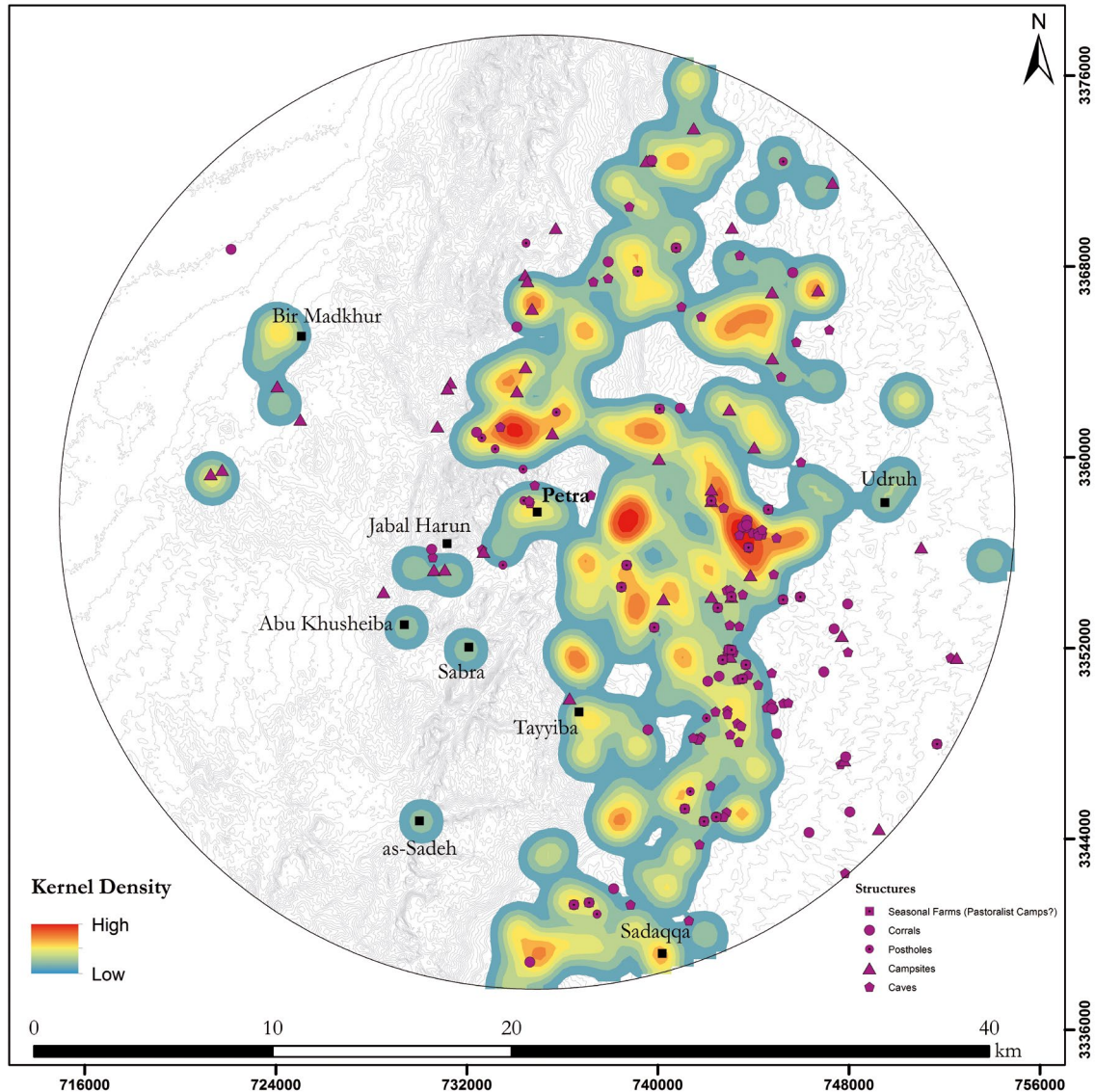


Fig. 4: Distribution map of structures possibly pertaining to a pastoral lifestyle in the Petra hinterland laid over the kernel density estimation of rural civilian settlements dating to the 1st century CE.

agriculture-based rural society, but it could also be shown that, as early as the 1st century BCE, run-off cultivation was predominantly practiced along the slopes of the extended Jabal Harun area, the al-Begh'ah plain in the Beidha area as well as in the ad-Thankia region. There is now a solid argumentative basis for claiming that these regions were mostly used for viticulture as evidenced by the numerous wine presses, while the threshing floors recorded along the eastern high plateau suggest that this area was mainly used for cereal cultivation. Olives were mainly cultivated along the slopes of the

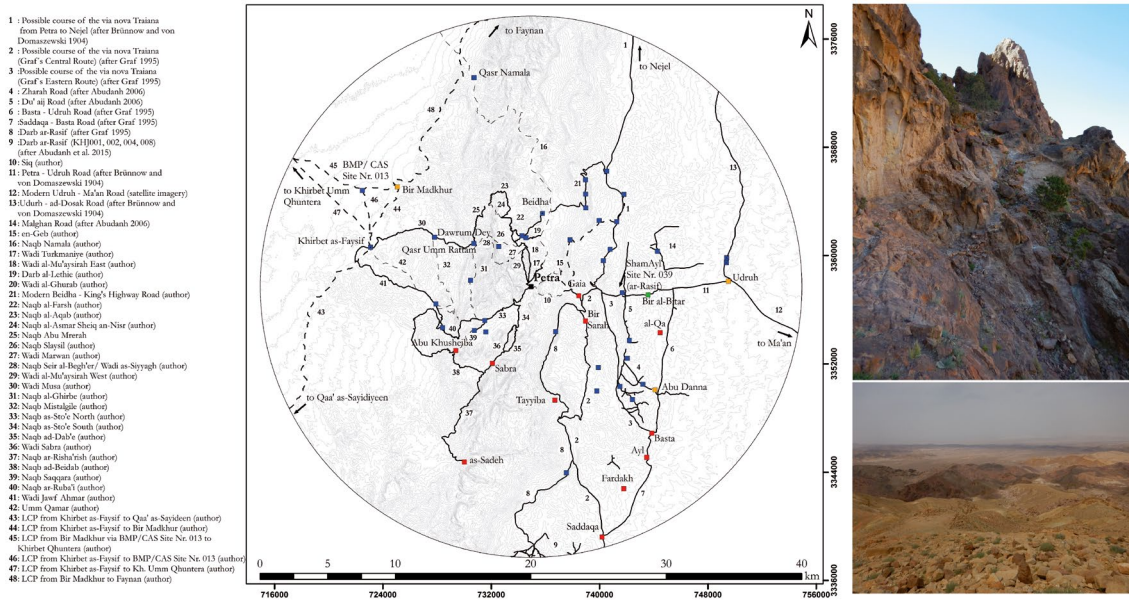


Fig. 5: Left: Overview map of all evidenced roads/routes in the Petra area. Upper right: Detail photo of Naqb Slaysil. Lower right: Detail photo of Naqb ar-Ruba'i.

Jabal Shara escarpment west of modern Wadi Musa/ancient Gaia. On the basis of the distribution of the various agricultural installations evidenced in the Petra hinterland, it was therefore possible to roughly map specific cultivation zones (fig. 3), which seems so far confirmed by recent archaeobotanical evidence from urban Petra as well.¹⁰

While the aforementioned correctly points to a strong sedentary agriculture-based society, it is also crucially important to highlight first, direct archaeological evidence from within the Petra hinterland that a *pastorally* organized rural population constituted a significant part of the study area as well.¹¹ For example, the evidenced camp sites and corrals (fig. 4) clearly indicate that pastoralism was a vital subsistence strategy in addition to farming, which is not only a major economic factor to consider, but which also carries important social implications.

Finally, one major contribution of this study were the insights gained into rural Petra's route network (fig. 5): It was established that the routes for larger *camel caravans* avoided steep slopes and circumvented the difficult volcanic *al-Somrah* stone when possible in order to avoid injury to the soft feet of the camels.¹² Such camel routes were classified as Class A routes. Other routes, which only allowed pedestrian, donkey and/or mule travel, cross more difficult terrain and can pass through volcanic stone more frequently than Class A routes. Such routes were defined as Class B routes. This shall be highlighted by elaborating briefly on two routes – Naqb ar-Ruba'i and Naqb Slaysil:

Leading from Petra's immediate southwestern hinterland, Naqb ar-Ruba'i heads towards the important road station of Khirbet as-Faysif in the Wadi Arabah, generally following comparatively easy slopes and circumventing the volcanic *al-Somrah* when

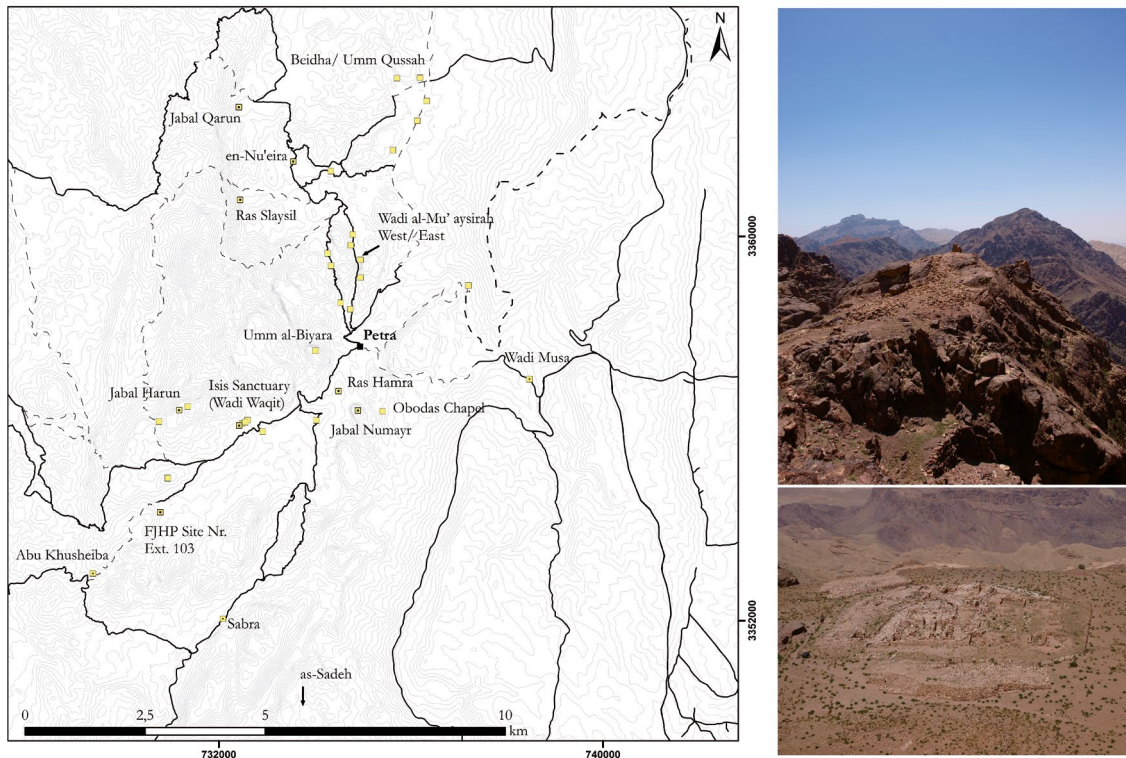


Fig. 6: Left: Distribution map of the evidenced religious structures along the different route types. Upper right: Small sanctuary at ad-Dahune Slaysil. Lower right: Nabataean sanctuary and later Byzantine monastery of Jabal Harun.

possible.¹³ This route provides the environmental prerequisite for a good camel route. In contrast, Naqb Slaysil not only completely crosses the *al-Somrah*, but also descends extremely difficult slopes rendering it impossible for a camel to pass.

These observations not only offer important insights into practical issues of ancient caravan trade in the Petra region, but also explain the location of important Nabataean settlements such as Sabra or Abu Khusheiba, as well as route stations and caravan halts such as Khirbet as-Faysif, Qasr Umm Rattam or Dawrum Dey.¹⁴

Society, Culture and Religion

Investigating rural Petra's religious landscape bears interesting insights not only into specific religious structures – which appear during the 1st century BCE as in urban Petra – but they also imply important indications for the *social* organization of the Petra area.

Interestingly, more publically accessible rural sanctuaries (fig. 6) such as Jabal Harun, Ras Hamra, ad-Dahune Slaysil or Jabal Qarun are situated along Class A routes.¹⁵ In

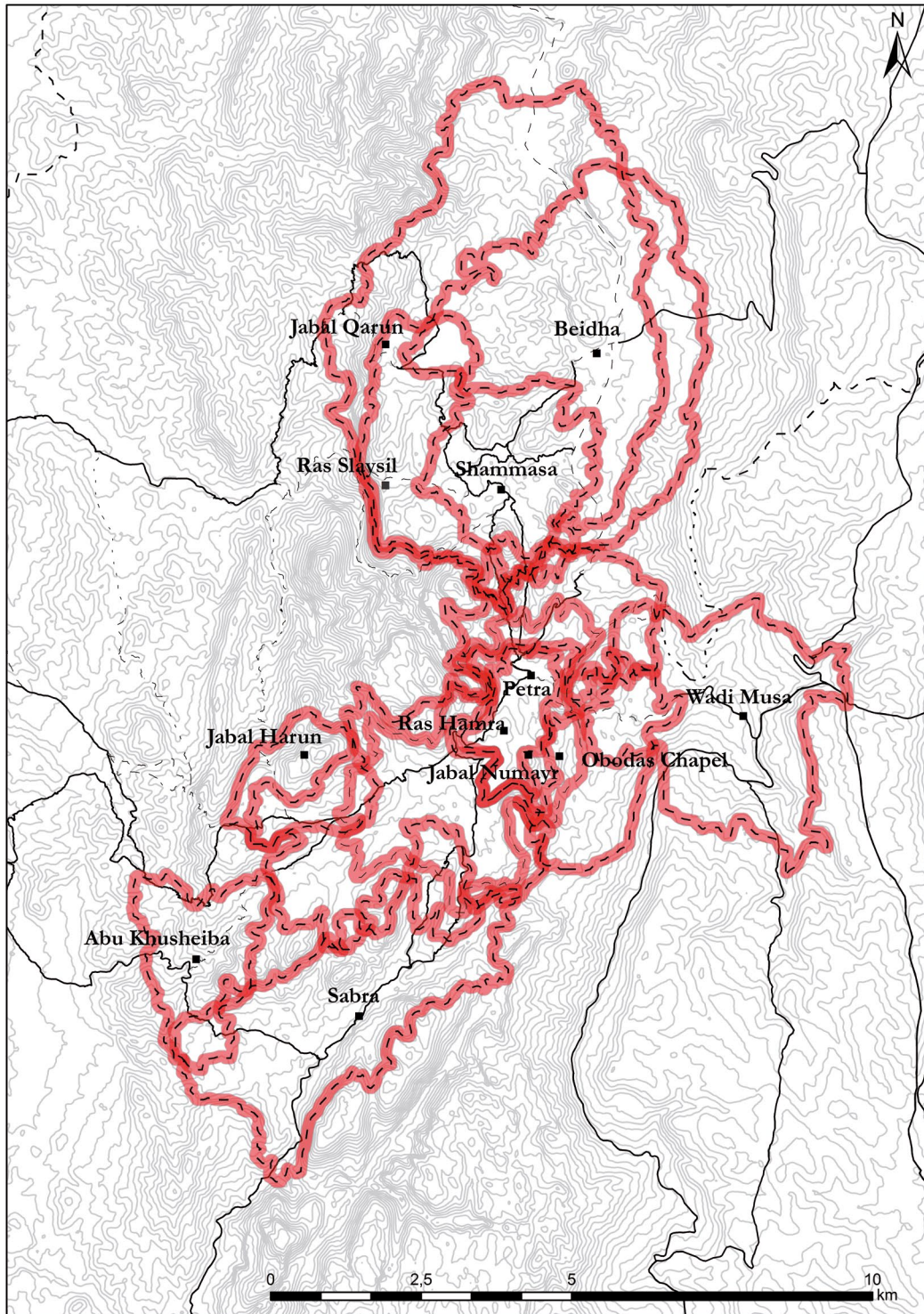


Fig. 7: Suggestive site-catchments of major hubs in the Petra region demarcating hypothetical territories of different social groups.

contrast, rural sanctuaries of more ‘private’ nature such as the so-called Obodas Chapel, the Isis sanctuary in the Wadi as-Siyyagh or the *triclinium* on top of Jabal al-Farasha are not as easily accessible.¹⁶

Such private, ritual gathering places were also important social gatherings, where it can be assumed that only specific Nabataean tribes, families or other social groups regularly convened. This exclusive use of such distinct ‘social spaces’ falls within the general community-based, spatial concepts of Nabataean culture and which can be referred to by the Foucauldian term *heterotopias* as these describe “[...] *closed spaces, where only restricted and well-defined people or groups of people are granted access*”.¹⁷

Whether one accepts the term *heterotopias* or not, particularly the secluded and more private religious structures not only reflect upon Nabataean religious practices, but are highly significant for understanding the complex and intricate social structure of Nabataean culture that is deeply rooted in family, clan or tribal traditions.

Based on the situation in urban Petra where different social groups were identified that collectively commemorated a specific deity, and were organized within spatially distinct social “districts”¹⁸, it may be argued that specific religious structures and other “heterotopical” sites may have demarcated specific *social* landscapes within the wider Petra hinterland – therefore comparable to what is assumed for urban Petra.

Certainly, without further in-depth archaeological investigations, such modelled territories as shown in fig. 7 remain entirely hypothetical and suggestive, but they nevertheless visualize the undoubtedly complex and intricate tribal-based social structure of Petra’s immediate rural environs.¹⁹

The Military Disposition

This study has laid forward the first comprehensive overview of all structures with possible military function in the Petra hinterland to date. However, researching these structures has proven to be particularly difficult. While evaluating the archaeological information provided by the various survey reports, it became clear that there is often little, or only inconclusive, archaeological evidence to support the identification of specific sites as military structures. In many survey reports, military terms such as “fortresses” and “forts” were frequently used arbitrarily, without following any pre-defined criteria. No structural or functional distinction between such terms was claimed and the archaeological information was generally quite limited.

In order not to follow a too militaristic view, it was therefore necessary to critically assess the available information, but due to the problematic archaeological identification of military structures, it is difficult to postulate any comprehensive conclusions on the military organization of the Petra hinterland without further research.

Nevertheless, it was shown that while only few military structures are evidenced for the Iron Age Periods, the majority were constructed in the Nabataean Period and

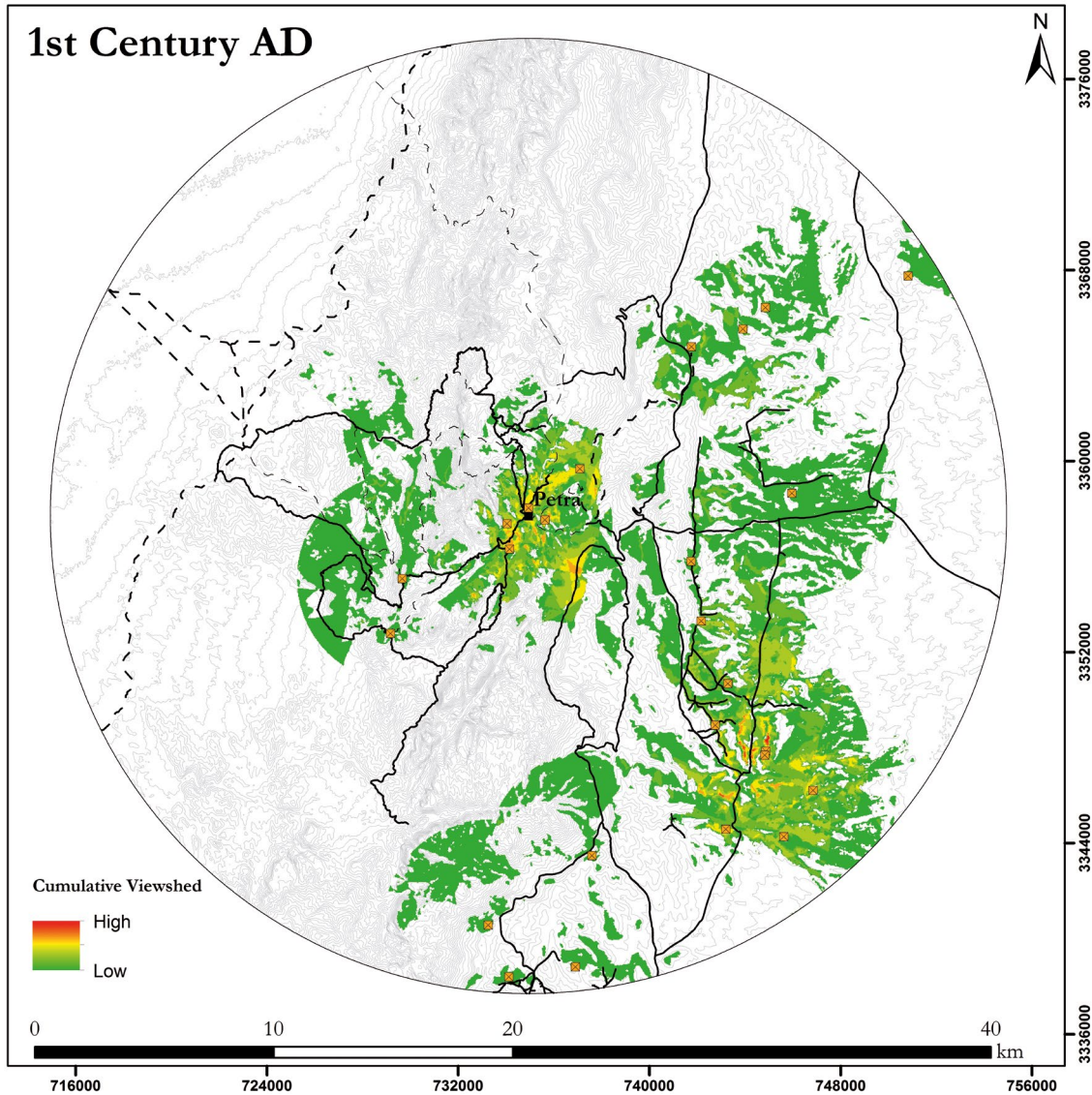


Fig. 8: Cumulative visibility analysis of all evidenced watchtowers dating to the 1st century CE.

most of these continued to be used during and immediately after the Roman annexation in the early 2nd century CE. Also, by conducting GIS-based visibility analyses, it was possible to propose a ‘visual hierarchy’ of military structures: Larger structures such as forts and fortlets commanded only limited visual control over the Petra area compared to the evidenced watchtowers, which exerted the most far-reaching visibility over the Petra landscape. Particularly for the Nabataean Period, the cumulative visibility analyses highlight an intervisible network of watchtowers that specifically concentrates around urban Petra as well as large stretches of the eastern high plateau (fig. 8).²⁰

Generally, the evidence suggests that – in contrast to a large, permanently stationed army – policing and controlling the Petra hinterland was one of the key functions of the Nabataean military.²¹ The evidenced military structures are comparatively small with only a minimum of infrastructure suggesting smaller and more mobile military units which were tasked with different duties. These arguably included of local security services for civilian settlements and the protection of local water sources, the monitoring of activities along important roads and routes to guarantee safe commercial traffic as well as the protection against potential bandits.²²

Conclusions

This paper hopefully demonstrated the broad range of different archaeological site types investigated in this study – most of which certainly require more detailed and farther-reaching research. However, as it was not possible to give a full and detailed account of the Petra hinterland in Nabataean-Roman times within the limits of this paper, the aim was instead to offer a brief, but representative overview and critical re-assessment of Petra's socio-political and administrative, military, economic and infrastructural area of influence over its rural surroundings. The issues raised here can only provide a first glimpse into a larger study that provides a unique, modern and up-to-date synthesis of the spatial organization of the Petra hinterland, which will hopefully provide an essential contribution for future research projects aiming at further understanding Petra's rural surroundings.

Notes

¹ Recently discussed e.g. in Kennedy 2016 with further references.

² For a concise overview of the urban development of Petra, see e.g. recently Schmid 2012.

³ The author's doctoral thesis entitled *Terra Petraea. An Archaeological Landscape Characterization of the Petra Hinterland in Nabataean-Roman Times* is currently being prepared for publication, in which rural settlement patterns and subsistence strategies, aspects of rural water management, the extensive infrastructural network, the funerary and religious landscape, the military disposition, as well as the industrial potential of the Petra region are discussed in detail.

⁴ For a complete list of the archaeological surveys conducted in the Petra region to date, see e.g. Kennedy – Hahn 2017, 66–67 pl. 1.

⁵ Most importantly, see the seminal work of Kouki 2012.

⁶ Kouki 2012, 17 based her definition on previous claims expressed by M. Lindner (Lindner 1992, 266), who assumed a similar extent of a 'Greater Petra,' and on the 6th century CE Petra Papyri mentioning that the settlements of Udruh and Saddaqa were still under the jurisdiction of Petra in the Byzantine Period. For a more detailed introduction into the environmental conditions of the Petra region, see e.g. Besançon 2010.

⁷ For an introduction into the method of point pattern analyses including kernel density estimations and Pearson correlation tests, see e.g. Baddeley et al. 2016; Nakoinz – Knitter 2016 and Keron 2015.

⁸ Compare recently Kennedy – Hahn 2017.

⁹ Compare also Kouki 2012, 84–100. Generally on the sedentarization process of the Nabataeans and early settlement activities in Petra, see e.g. Wenning 2013; Graf 2013 or Schmid 2001.

¹⁰ On the archaeobotanical evidence from Petra and its surroundings, see e.g. most recently Bouchaud et al. 2017 as well as Tenhunen 2016 and 2013.

¹¹ More on the non-sedentary lifestyle of rural Petra, see Kennedy in press.

¹² Compare also Kennedy 2016.

¹³ Also see Ben David 2013 and 2012.

¹⁴ Most recently on Sabra: Tholbecq et al. 2016; on Abu Khusheiba: Lindner 2003a; on Khirbet as-Faysif: Hughes 2014 and Smith 2010 and on Qasr Umm Rattam: Lindner 2003b and Lindner et al. 2000.

¹⁵ On Jabal Harun: most recently Fiema et al. 2016; on Ras Hamra: Parcak – Tuttle 2016 and Hübner 2002; on ad-Dahune Slaysil: Lindner – Gunsam 1995 and Jabal Qarun: Lindner 2003a.

¹⁶ On the Obodas Chapel: e.g. Tholbecq – Durand 2013; on the Isis sanctuary in the Wadi as-Siyyagh: Merklein – Wenning 2001 and the triclinium on top of Jabal al-Farasha: Kouki – Silvonen 2013.

¹⁷ Schmid 2013, 251.

¹⁸ Nehmé 2013.

¹⁹ The modelled territories are based on simple site-catchment analyses.

²⁰ For a more detailed elaboration on the analytical basis of the conducted GIS-based visibility analyses and for some preliminary thoughts on Nabataean watchtowers, see Kennedy 2013.

²¹ General remarks on the Nabataean army, see e.g. Graf 1994.

²² On banditry in the Nabataean realm, see Isaac 1984.

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Fig. 1–8: by the author.

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