

Original Study

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The Various Ways of Being Mobile: Habitual Knowledge, Life-Strategies and the Ancient Route Networks on the Eastern Marmarica-Plateau (Northern Libyan Desert)

DOI 10.1515/opar-2017-0003

Received April 18, 2016; accepted March 8, 2017

Abstract: Mobility, from a historical perspective, comprises a broad variety of movements of people. This paper focuses on the mobility of multisited groups, based on the preconditions that an arid environment imposes on mobility. The Eastern Marmarica-Plateau in NW-Egypt in Graeco-Roman times (5th century BCE to 4th century CE) serves as case study of the various ways in which people in such landscapes were mobile, and what we can infer from the aspect of mobility about their social practices. In order to elucidate these issues, the discussion centres on archaeological-historical methodology and theoretical implications of mobility and the wayfaring of inhabitants of arid lands. Moreover, the question is pursued of how routes emerged and how habitual knowledge was cemented in order to establish the trails used by generations to follow. The paper shows the interconnection and similarities between the mobility of multisited communities and the seemingly so different mobility of crop-growing groups, according to the exploitation, availability and exchange of resources and goods. As a general concern, the alleged dichotomy of sedentary and nomadic mobility is challenged and replaced by a more open concept of space and place. Mobility, the complexity of interactions and hence the routes themselves are not so much shaped by fixed socio-cultural ascriptions of life-strategies to certain agents, rather by implicit knowledge, varying social practices, and economic drivers.

Keywords: archaeology of mobility, arid environments, multisited communities, Libyan Desert, Marmarica-Plateau, Graeco-Roman antiquity, cognitive mapping, route and water supply systems, marginal environments

1 Introduction: Saltatory Movements and Archaeology

It is a methodological challenge for archaeological disciplines to reconstruct the mobility of past people as archaeologies work with located artefacts and immobile structures. More or less, we find “frozen” contexts that reflect former societies’ and peoples’ practices, but from the frozen status of the contexts we have to infer the processes lying behind their formation. As to mobility practices, this means that all inferences, interpretations and reconstructions are built on two assumptions; firstly, that objects or structures represent

Article note: This article is a part of Topical Issue on Uncovering Historical Routes for Sustainable Mobility: Methods, Tools and Case Studies

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people – which generally is the base of any archaeological reasoning; and secondly, that the distribution and spread of objects and structures represent movement patterns (see recently Frachetti 2008, 9, 71).

That is why the mobility of past people is usually studied by the distribution of artefacts – resulting in “dots on a map”. This is of course true to a certain extent, so that pieces of stone, pottery, architectural structures or metal objects from personal belongings become markers for the distribution of goods and ideas, and for the networks of people through which they move.

How did people and groups move, who exactly moved, where to, and in what intervals? How did they know what routes to take? Only by knowing these parameters, representing a complex practice, we are able to assess the various material finds, be it a piece of ceramics or a stone marker along the route. All our inferences about technologies transferred from one part of the world to another, and about conflicting groups or economic exchanges are based on this material. Hence, the crucial step that must come before the interpretation of spread and distribution, is to establish the possibilities of movement and knowledge about routes and passages.

A conceptual problem when studying mobility is inherent in the fact that there are many different kinds of mobility. Is it a mobile society, a multisited society (Bernbeck 2008) that moves on a regular or periodical basis and with the entire or specific parts of the group between a certain set of habitational sites (see Ingold 2007, 45-52 on wayfaring as a way of inhabiting the world)? Is it merchants or caravans of traders moving around, dependent on supply and demand, and on central places where to buy or sell commodities, so that their routes are determined by places of production or resource availability as well as places of consumption and exchange? Or are military detachments on the move between two deployments? Or rather wandering craftsmen or farmers travelling to market places? These different kinds of mobility generate different route layouts, sections of use, and services to be found along them. As far as archaeology is concerned, various questions are attached to these different kinds of mobility: questions of what and where material finds can be expected and how they might be interpreted.

2 Problems, Methods and Constraints of the Study of Mobility in Archaeology

Archaeology can only deal with long-lasting and located objects and structures representing past human activities, while mobility is characterised by fluidity. Hence, it is paradoxical in any study of ancient mobility that we examine only the traces left behind by a person on the move, or the objects moving along with a person or an animal, once they have passed-by a certain point. The traces, objects or materials that are left behind then become representatives of time and render the act of moving visible or perceivable. However, many paths in an individual’s life or a group’s existence are used more than once and follow natural surface characteristics and supply possibilities, or connect frequently visited places (e.g. fields, pastures, markets), so that tracks can become established.

A single human being walking through the landscape at any point in time is normally untraceable. Continuous, perpetuated, or periodical movements, on the other hand, leave evidence in form of agglomerations of material that can be perceived, amongst others, as a place of rest or a frequented path. Therefore, periodical or repeated movements by larger numbers of people become visible as material remains of this past human activity, which can be analysed with archaeological methodologies.

A number of methods, partly adopted from anthropology and prehistory, have been developed to analyse periodical movements and the frequentation of places. Climatic, environmental, and geomorphic parameters have to be documented and pedological and micro-morphological analyses have to be applied in order to investigate the periodical or long-term frequentation of places. Apart from this, the archaeological examination of finds and their fabric, of their form and function as well as of the chronology of structures and objects provides insights into the use of places and paths. Availability of resources and application of technologies have to be taken into account to understand topographical connectivity and socio-cultural relationships. For historical periods, written sources have to be considered in order to learn about life-strategies and their economic basis, and about connections between areas and people. The study of historical cartographic documents offers a take on the changes or continuities of tracks and stopovers,

and makes use of the often long-standing courses of routes due to environmental conditions. Even though this approach enters the field of ethno-archaeological or historical anthropological comparison, it offers access to the study of mobility (e.g. Vetter et al. 2013, 460-463; Tucker 2009). The comparison of the manifestations and practices of later societies and groups living in the same environment can mislead our preconceptions of the conditions and processes in antiquity, and hence our interpretations, presupposing a historical continuity (Bernbeck 2008; Näser 2005; Gosselain 2016 for a criticism of this methodology). When comparisons regarding the generation of paths dependent on environmental parameters are vigilantly applied to the reconstruction of past societal systems, they can add to the descriptive and analytical methods of studying the frequentation of places, their connectivity, and the movements of past people. From this, an understanding of habitual strategies of living and moving can emerge.

3 The Case Study: The Eastern Marmarica-Plateau in Graeco-Roman Times

In this specific case study, the special parameters of arid environments have to be taken into consideration – and consequently, the archaeological preconditions of mobile life-strategies that are predominant in this arid environment, which are also intertwined with sedentary ones. Life-strategies are not distributed according to groups in a circumscribed manner, and the splitting of people into sedentary groups in the north of the Plateau and nomads in the south does not account for the interlinked ways of life, the temporal changes and the socio-cultural dynamics (Bernbeck 2008). Rather, the multisited communities based in this region embraced the sites of an agriculturally determined way of life, as much as they made use of the drylands for pasture. In how far there is a distinction between dwellers on the Marmarica-Plateau and in the oases of Siropion (Qara) or Ammon (Siwa), depends also very much on what criteria are used and what period one engages with (fig. 1). Yet, the sources for Pharaonic and Graeco-Roman period provide insights into rather symbiotic and non-distant, if not interchangeable, ways of life (cf. Colin 2000, 117-118; Kuhlmann 2002 [concentrating on the Graeco-Roman period]; Boozer 2015 [account from Pharaonic times onwards]; Hope 2007 [focus on Old Kingdom]; Hubschmann 2010 [focus on Third Intermediate Period]), with changing ascriptions to a group identity shaped through life-strategy, language, profession, property, etc. (cf. in general Brubaker, Cooper 2000).

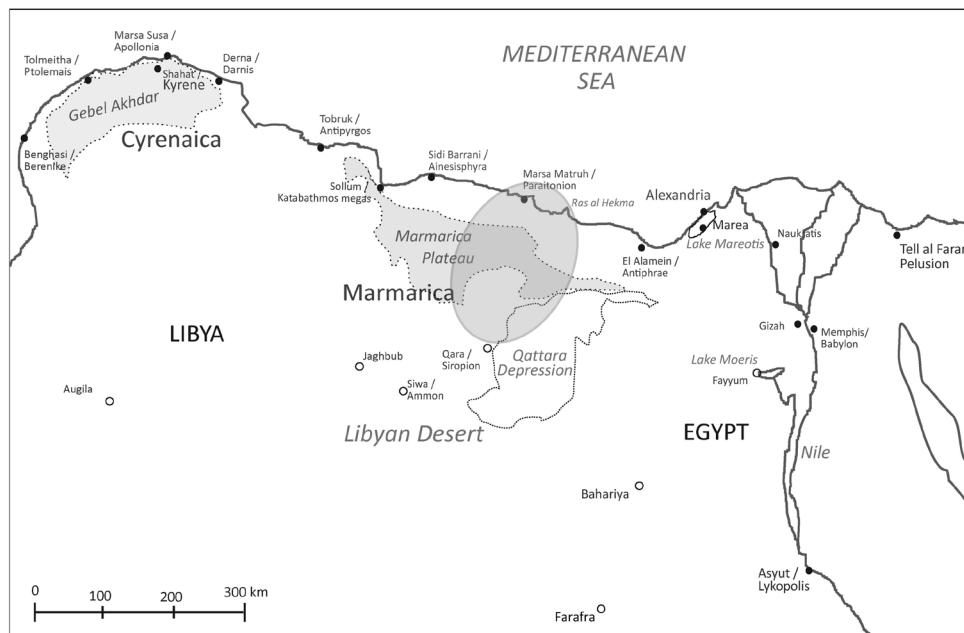


Fig. 1. The Marmarica-Plateau on the northern fringes of the Libyan Desert between Nile Valley, Cyrenaica and Central Sahara (NW-Egypt and NE-Libya). The grey area marks the investigation area. (Anna-Katharina Rieger).

One has to keep in mind the particularity of the evidence that consists mainly of surface finds, since sedimentation rates and depths of soil strata are very limited (Rieger, Möller 2012, 23–25 on the assessment of surface finds). This leads in many cases to a non-stratigraphically built-up body of material. Secondly, multisited communities or nomadically living groups even in historical periods (Graeco-Roman times in this case) do not – compared to prehistoric groups – live with a large quantity of objects, nor with durable structures. Hence, find material is scarce in numbers.

The period of time focused on (roughly the 5th century BCE to 5th century CE) is characterised by a change in land-use patterns and economic exploitation of the region by its inhabitants, which is reflected in a higher find density: from the 5th century BCE onwards, the transfer of goods can be traced between Siwa and the coast, while an extension of the route system and its facilities as well as the intensification of its use is attested to from the 1st and 2nd century CE onwards, and coming to an end – as far as the pottery indicates – with the 5th century CE (Vetter et al. 2014, esp. 476, 480, pre-Roman finds, i.e. finds older than the mid-1st century BCE at Abar el-Kanayis Bir Qatrani, Bir Abu Mukhayat, Bir Quseir cf. fig. 4; Rieger, Möller 2011).

Ancient routes may be visible on the surface, in arid regions as well as in others. However, they might also be invisible depending on surface conditions, age, or frequency of use. How can we possibly follow routes that have not materialised in the form of linear pathways within the landscape – either as an individual in antiquity using them, or as an archaeologist studying them? How do routes appear in arid environments? How do various mobile life-strategies (in mobile as well as in rather sedentary groups) manifest themselves on the same or on different parts of the route network? Economic and subsistence strategies have to be studied in order to understand different mobility patterns. Should it be possible to distinguish these differences, the question may also be asked what features of the route system change, when the one or the other group is predominant.

3.1 Environment, Life-Strategies and Economic Base of Inhabitants of the Eastern Marmarica-Plateau

On the eastern stretch of the Marmarica-Plateau on the northern fringe of the Libyan Desert research was conducted between 2004 and 2011 that allowed for deeper insights into the patterns of economic bases, habitational patterns and route networks in this semi-arid to arid area between the Mediterranean coast and the Qattara Depression in Graeco-Roman times (fig. 1).

The results from this research, covering an area of 100 km (along the coast) x 150 km (south of the coast) with various survey intensity, appear as a complex system of mixed life-strategies, with a surplus-based economy in the coastal zones (Rieger, Möller 2011; Vetter et al. 2009; Vetter et al. 2014) and an extended network of cistern sites, supplying nomadic herders; hence, a multisited society making use of the arid (desert) and semi-arid (steppe) environments of the Marmarica-Plateau (Rieger et al. 2012; Vetter et al. 2013; for results in the western, Libyan parts of the Marmarica see Hulin 2008; id. 2009; id. et al. 2010) (figs. 2–5).

The whole area lies beyond the limit of rain-fed agriculture at 200 mm/a and allows only for dryfarming (Vetter et al. 2014, 42–43 with references; Kröpelin et al. 2008 arguing for a general stability of environmental factors in the Sahara since the 4th millennium BCE) (fig. 2). The vegetation is characteristic for steppe environments on the Northern Tableland – apart from a small strip of Mediterranean climate along the coast. Further south on the Pre-Marmarican plain, vegetation is contracted in favourable places providing enough water, such as depressions (see fig. 4 for the zones). Desert conditions prevail from 90 km south of the coast (fig. 15).

To make a living in the arid and semi-arid environment, people applied specific subsistence strategies and traded the surplus via exchange systems. Both strategies are intertwined and entail elements of mobility.

The water and soil harvesting systems on the Northern Tableland, reaching their largest extent in the period between the 3rd century BCE and 4th century CE, sufficed for subsistence and surplus cropping. The “cash crops”, especially during these centuries, seem to have been grapes, processed into wine and its derivatives like vinegar and syrup. A second area of economic activity was the breeding of small ruminants (Vetter et al. 2009). The water and soil harvesting systems are only manageable with a high understanding of morphology and the fluvial-hydrological conditions in the individual wadi systems (fig. 5). Hence, the people exploiting

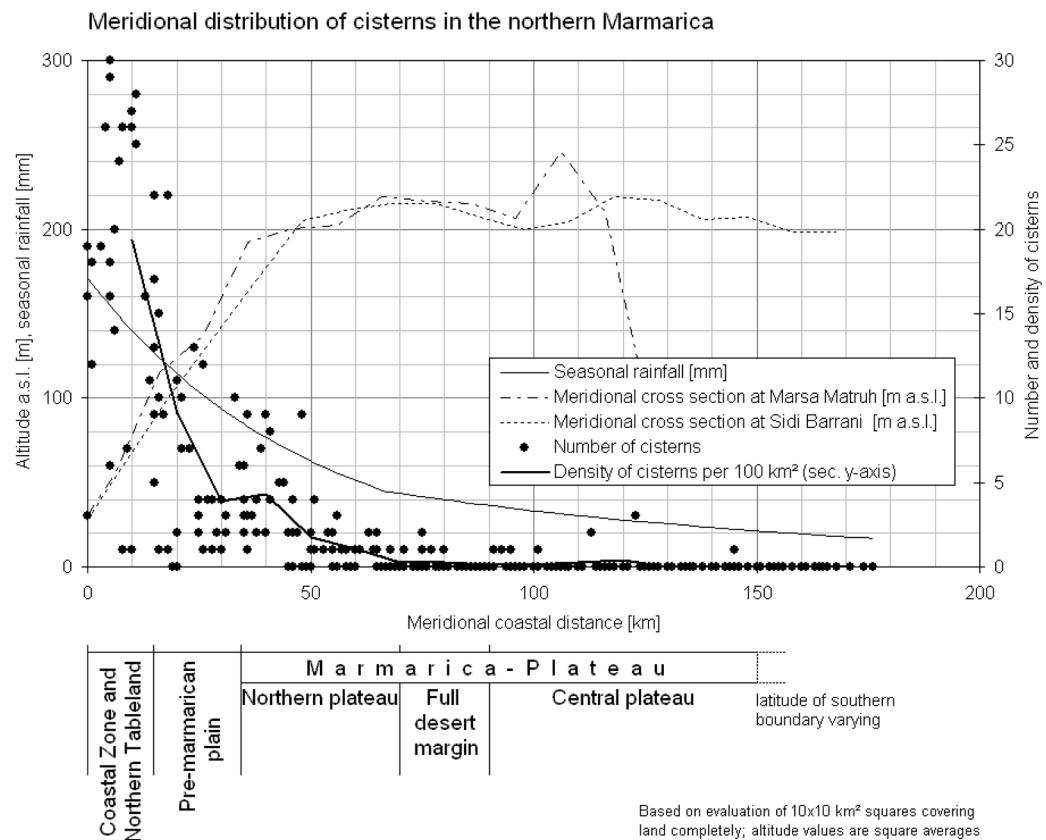


Fig. 2. Distribution of cisterns on the Marmarica-Plateau in relation to annual rainfall and relief. The density of cisterns between the coast and the Central Marmarica-Plateau decreases with the beginning of the Pre-Marmarican plain. (Thomas Vetter).



Fig. 3. The wadi incisions make the terrain of the Northern Tableland difficult to pass through, as here in Wadi Umm el-Ashdan, 25 km west of Marsa Matruh/Paraitonion, with water from winterly precipitations running down to the Mediterranean Sea. (Florian Schill).

the northern coastal zones as well as the tableland had to be equipped with autochthonous experience and knowledge. This means that newcomers acquainted with rain-fed or irrigation agriculture, as applied in the adjoining areas (Greeks or Egyptians from Ptolemaic Egypt, Romans as veterans or administrators, or other settlers from outside the region) could not easily make a living in the drylands of the Marmarica.

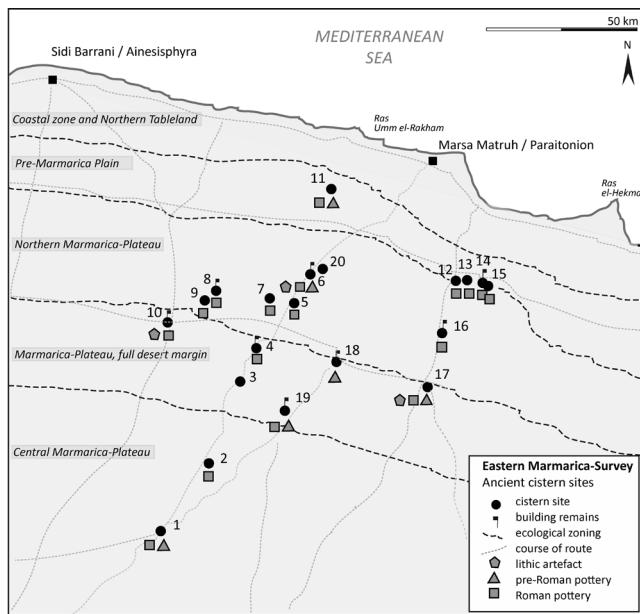


Fig. 4. Cistern sites on the Marmarica-Plateau as surveyed by the “Eastern Marmarica Survey”. 1 Bir el-Nuss, 2 Bir Fuad, 3 Bir Istabl, 4 Bir Hilw, 5 Bir Emtiha, 6 Abar el-Kanayis, 7 Bir el-Awra, 8 Bir Abu el-'Igl, 9 Bir el-Qatir, 10 Bir Qatrani, 11 Abar Abu Imama, 12 Bir Abu Shayit, 13 Bir Abu Batta, 14 Bir Siayim, 15 Bir Abu Kirdu, 16 Bir Khalda, 17 Bir Abu Mukhayat, 18 Bir Quseir, 19 Bir Qasr es-Sirr, 20 Bir el-Naga. (Anna-Katharina Rieger, after Rieger et al. 2012, fig. 2).

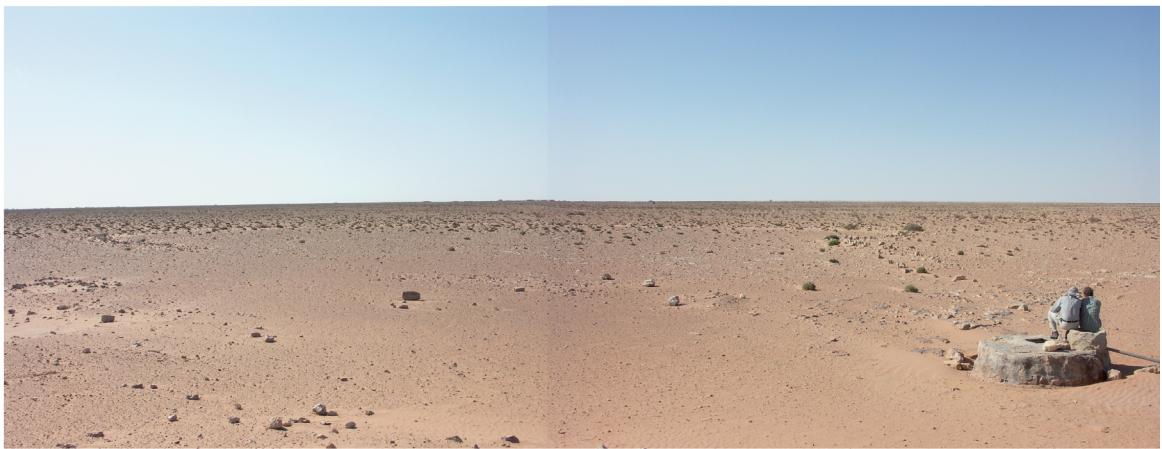


Fig. 5. Surrounding landscape at the cistern of Abar Abu Imama on the Northern Marmarica-Plateau (cf. fig. 4). (Anna-Katharina Rieger).

Yet, a surplus of wine could be generated, as is evident in the high number of pottery production sites and wine presses from Ptolemaic to Roman times in the northern zone of the Eastern Marmarica (Rieger, Möller 2011; Vetter et al. 2009). The number of production sites and their assumed output of vessels corresponds

to the numbers reconstructed for the Mareotis region (Empereur, Picon 1998), while the areas of grape production were analysed preliminarily in Wadi Umm el Ashtan (fig. 7, Rieger, Möller in print; cf. stone mounds in the Negev, Evenari, Shannon, Tadmor 1982, 127-147; and Tripolitania, Barker et al. 1996, 199). These goods were traded, as is attested to by the route network, which was extremely enlarged in Roman times (Vetter et al. 2013). However, this is not the only way of being mobile in ancient Marmarica, as will be shown below.

Centres of commerce with a sedentary, even urban, life-style include Paraitonion (Marsa Matruh) on the Mediterranean coast, Katabathmos Megas (Sollum) and El-Alamein as well as Alexandria further to the east (and of course the Nile Valley) (fig. 1). To the south, the Oasis of Siwa and the smaller Siropon (Qara) form hubs and centres in the Libyan Desert (fig. 1).

As far as political affiliations of the Marmarica in antiquity are concerned, it had changing relations with other areas, and, as a marginal region, remains rather independent throughout most of its history. During the New Kingdom and Persian times, the Marmarica and its people pursued an independent life between the better-known and economically powerful regions to the east and west. Control and exertion of influence was tentatively imposed under Ramesses II with the fortress of Zawiyet Umm el-Rakham close to the later Paraitonion, but never with a long-lasting success (Snape, Wilson 2007; Rieger in print; on difficulties and academic distortion of a “Libyan identity” cf. Colin 2000; Hubschmann 2010 for Dakhla). Only in the harbour of later Paraitonion is it possible to detect connections to the Mediterranean during Late Bronze Age, reflected in Cypriot, Aegaen and Canaanite pottery found on an island in the lagoon. The steppe and the arid land to the south of the coast and the way of life of their inhabitants were much too different to allow for long-lasting impacts from the Mediterranean (White 2002). Later, from the 3rd century BCE onwards, we know that the Marmarica was administratively under Ptolemaic rule, to become during the 1st century CE a province of the Roman Empire. While in Siwa hieroglyphs were used, beginning with the 6th century BCE, to name their Libyan rulers, the plateau and its inhabitants seem to be likewise connected to the Nile Valley as well as to the Cyrenaica and to southern destinations (Kuhlmann 2013, 147-160).

3.2 Hubs in an Arid Environment

In this environment, mobility played a different role compared to the mobility employed by urban populations or people based in the Nile Valley. There were large hubs, used by various groups of inhabitants, among these are the markets and centres of Siwa and Paraitonion. They controlled a major part of all movements coming from and going in their directions.

Other hubs were Cyrene (Jebel Akhdar, the “Green Mountain”) and Alexandria or sites in the Nile Valley from which routes departed to Western Desert destinations (e.g. at today’s Assuan, Minya, Asyut), while the oases of Jarabub and Augila to the west connected the north-eastern Libyan Desert with the central parts of the Sahara, with Kufra representing the nearest point of reference. Further to the west lies the Fezzan with the important sites of Murzuk and Ghat (Wilson 2012, fig. 1; Kuhlmann 2013). These connecting hubs made the “short-distance trade network” traced through the Eastern Marmarica, a part of the “long-distance trade networks” across the Central Sahara with its far distant destinations studied by Wilson (2012) (researching routes in the western part was only possible with the help of published maps and studies, since Hulin 2008; id. 2009; id. et al. 2010 did not focus on inland routes).

The hubs of Paraitonion and Siwa played a major role within medium-range networks. From this perspective and on this scale, the Marmarica-Plateau becomes the central area where these connections between groups and goods were situated, interlocked with the large-distance network (“interlocking subsystems” Wilson 2012, 413; cf. also intra- and interregional economic relations and regions, Rieger, Möller in print). Across the Marmarica-Plateau and in between the aforementioned hubs, travel time was measurable in days (instead of several weeks), while risks became more calculable, since water supply points were well organised along the routes (fig. 1, 4, 16).

The hubs were used by groups with multiple interests as is reflected in the material finds at the site of Abar el-Kanayis (fig. 9). Whereas at the two cisterns, a rest house with a large courtyard and adjoining rooms was in use between the 3rd and the 6th century CE, providing shelter and supplies for traders, as is

reflected in the numerous, locally produced amphoras (as *Amphores Égyptiennes*, mainly AE 3), cooking ware (local or regional wares, but also imported), common ware (as vessels for food preparation) and table ware (locally produced and imported bowls and plates), a large area to the south and east was covered by camp sites and fire places, where people used the common wheel-turned pottery as well as the hand-made Northern Libyan Desert Ware (fig. 8. 10 [with NLDW from Bir Abu Mukhayat]). Fragments of autochthonous pottery were also present in the destruction layers of the rest house (Rieger et al. 2012). If we consider the pottery not so much a reflection of ethnically distinct groups, but as representatives of different ways of life, as practiced by different individuals and groups that live on or pass along the Marmarica-Plateau, we can see the intertwining of ways of life and various levels of interaction at a site like Abar el-Kanayis.

This is an argument in favour of a less dichotomised view on the people inhabiting this landscape. The Northern Libyan Desert Ware is spread throughout the entire surveyed area, and not only in the south where one would commonly expect to find it (in the dichotomous view of the world) together with nomadically living people. Surface conglomerations can contain both, the Northern Libyan Desert Ware as well as the common Ptolemaic and Roman forms of local or regional pottery production (most typically the AE 3, but also cooking and table ware, cf. Rieger, Möller 2011). Especially in the case of sites that have been used only once (drop sites) the associated finds reflect that the same group of people had access to different technologies of pottery production (Rieger, Möller 2012). Considering shorter distances, these water supply points are important hubs; they are stopover points between bouts of movements. The network of cistern sites (or, in some cases, open air reservoirs) is quite dense in the north, but the number of cisterns decreases continuously and exponentially toward the south (fig. 2). This is different to the results regarding the distribution of cisterns from a study conducted in a similar environment, in Tripolitania's pre-desert, but differs to the (Eastern) Marmarica in micromorphological characteristics (Vetter et al. 2014, 42). There, cisterns do not thin out toward the south. However, as Barker et al. (1996, 169-170, fig. 6.11) admit, the clustering of cisterns and other finds in certain areas might be "an index of survey intensity" (quote p. 169 and fig. 6.11). Cistern sites were and still are magnetic to people and animals (such as small ruminants or camels), coming towards them along routes or tracks that came together and focused on these supply points. These saltatory movements, i.e. repeated movements interrupted by stops (Russel et al. 1992, 139) result in accumulations of material at the stopover points, from fire places to accumulations of pottery fragments and from campsites to architecturally structured rest houses (Rieger et al. 2012) (fig. 4. 8. 10).

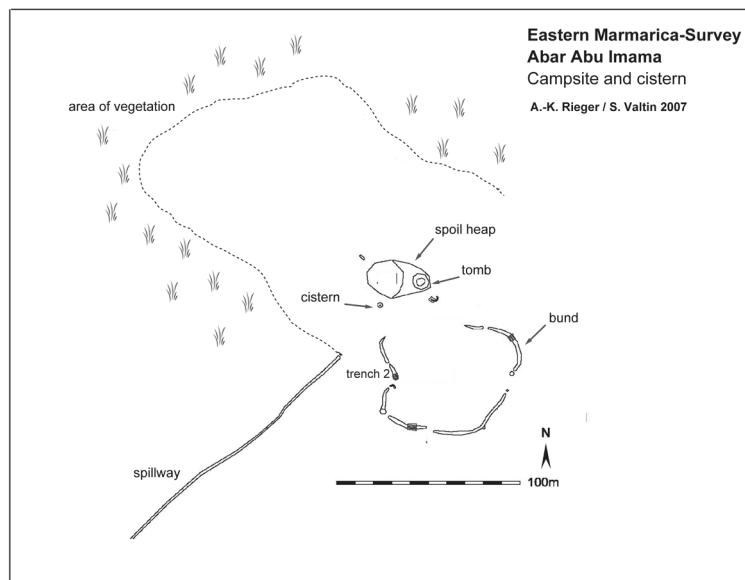


Fig. 6. Map of the cistern site of Abar Abu Imama, showing an embanked area where a dense concentration of Roman pottery fragments points to human frequentation. (Anna-Katharina Rieger, Stephanie Valtin).

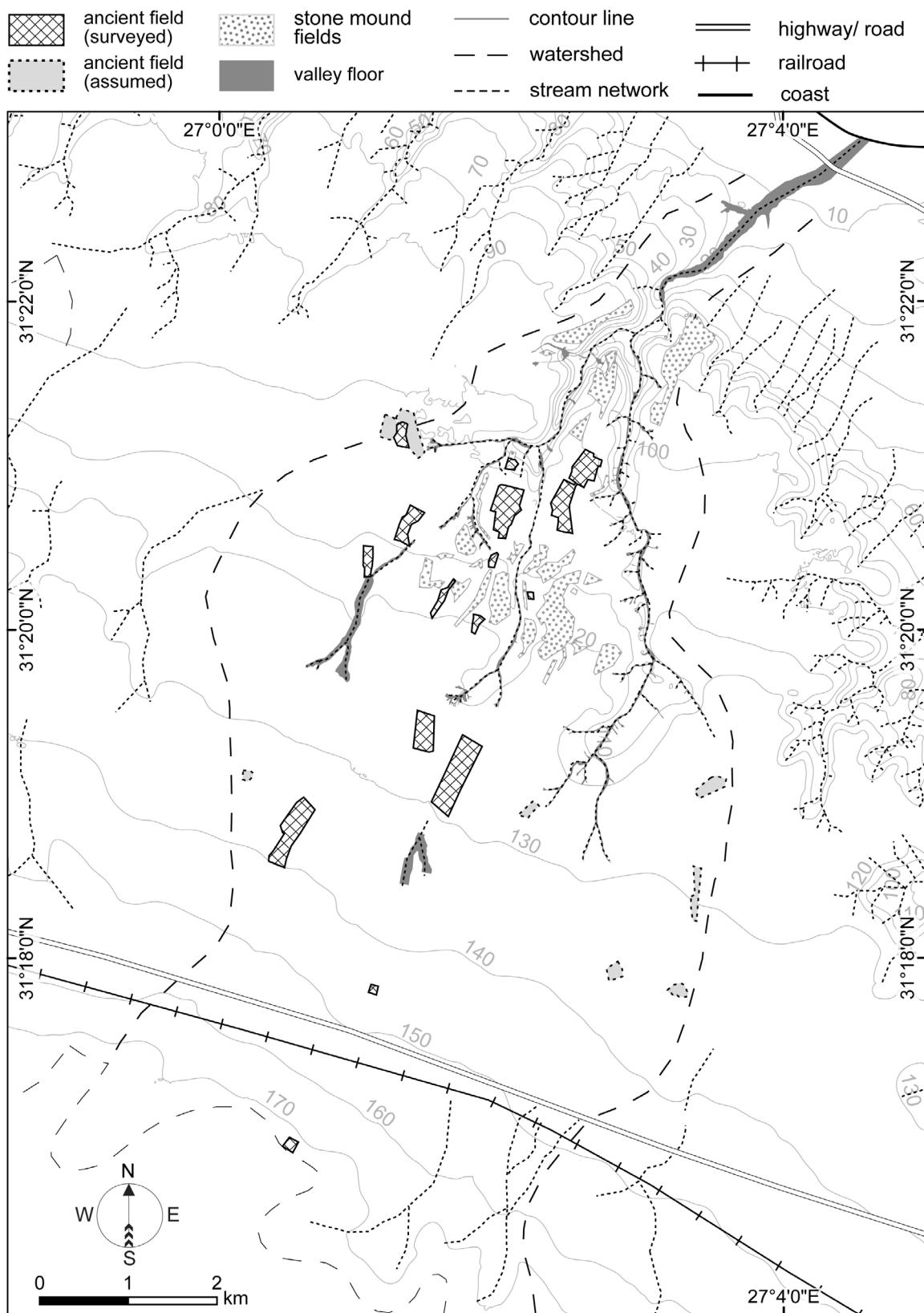


Fig. 7. Ancient water harvesting systems and the agricultural areas in the Wadi Umm el Ashdan catchment on the Northern Tableland. (Alexander Nicolay).

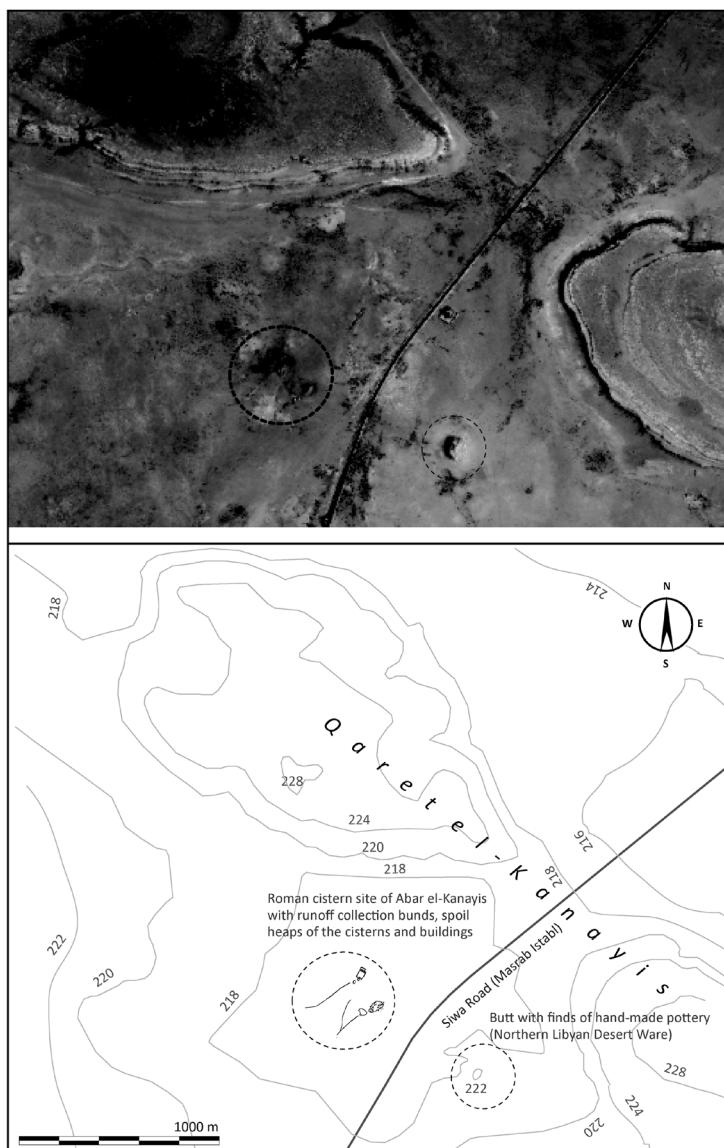


Fig. 8. The cistern site Abar el-Kanayis on the Northern Marmarica-Plateau and its topographical situation. (Anna-Katharina Rieger and Thomas Vetter).

On the Northern Tableland, where the environment is less desert-like and dry, and conditions are suitable for dry-farming agricultural production, mobility is structured differently. A huge number of pottery production sites or wine presses had to be connected, accessible to resource suppliers (fuel, grapes, clay) and made suitable for transport of vessels or processed products (filled amphoras) away from the site (Rieger et al. in press; Rieger, Möller, 2011).

However, while these cistern sites on the plateau are places of supply, they are, at the same time, places of co-presence (Retaillé 2013) that come into being through at least two or more individuals present there at the same point in time (Abar Abu Imama, Abar el-Kanayis, fig. 5. 6. 8. 9). This makes movement so important for any social practice, and with it, the paths used for this purpose. For any perception of space (and the ongoing dichotomous view on space of nomads and of peasants) movement represents an even stronger emphasis on the construction of space: space can be as mobile as people are (Retaillé 2013) and is not bound exclusively to any one life-strategy as we think of them.

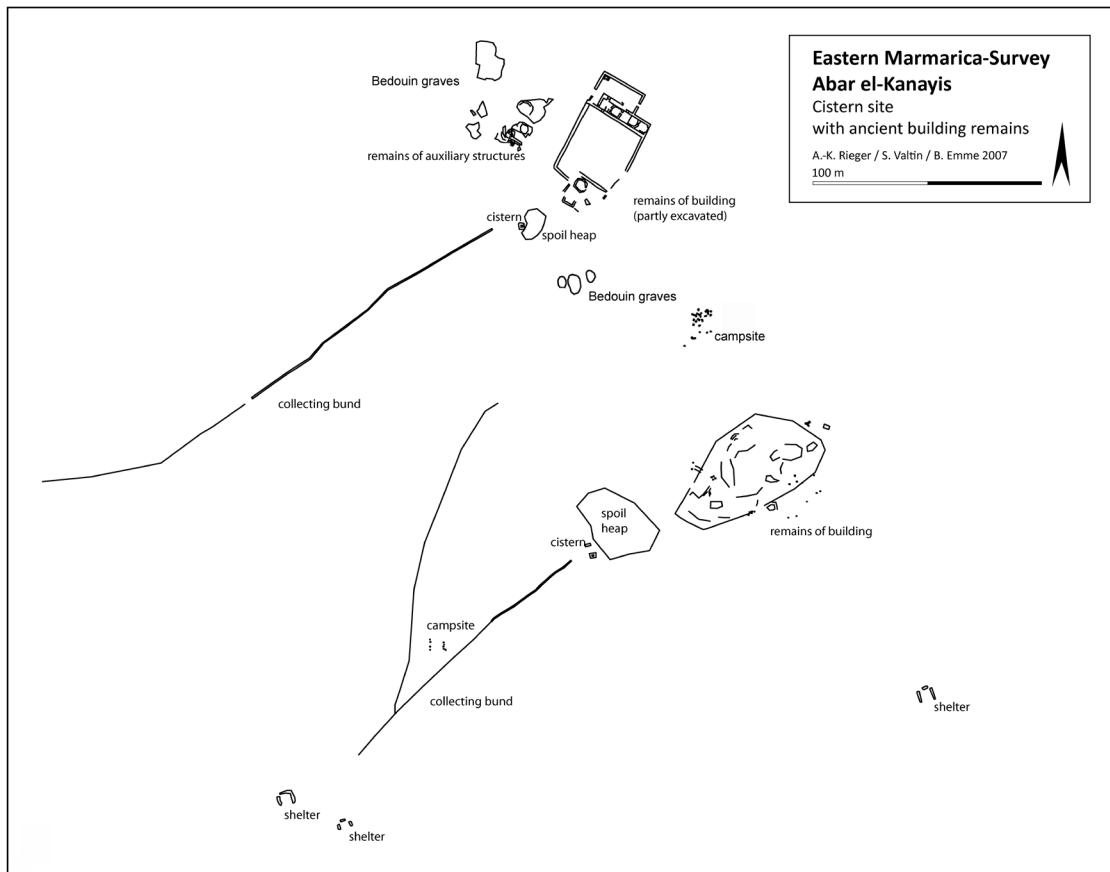


Fig. 9. The cistern site Abar el-Kanayis on the Northern Marmarica-Plateau with the two cisterns and their conducting bunds, and the two buildings of which the northern one was partly excavated.

What counts is not the spatial distances that has to be covered, but the need for watering draught animals (and humans) or livestock carried along as a commodity, since the oases were in constant need of meat and dung (Kuhlmann 2013, 154). The crucial parameter to be established is travel time, counted in days, coinciding with the time one needed to reach the next cistern site. The urgency of being mobile and the measuring of distances not in kilometres but in hours or days, result in itineraries that resemble diaries. The section between Bir el-Nuss and Siwa or vice-versa was the most demanding for anyone roaming the arid lands of the Marmarica-Plateau (fig. 4. 16).

The hubs at the cistern sites are indispensable for covering longer distances either for trade or for the exploitation of grazing grounds in winter. Hence, they are part of the radial mobility relating to the activities of herding or trading surpluses.

3.3 Areas in an Arid Environment: Water Flows and Water Harvesting Underlying Habitational Patterns and Trail Networks

The common perspective is one of hubs spread over the plateau and its dry environment. However, we can conceive of it in a more area-centred way, where mobility still runs along predefined trails, but not in the sense of routes coming together to reach the cisterns as their hubs.

When we think of connectivity within and between the spaces that people inhabit, we have to take into account the availability of water and soil resources as basic requirement for any form of life to thrive at a certain place. Being in the reach of water is essential to survive for plants, animals, and humans. As

described above, the natural wadi incisions form the landscape and influence how people make use of it by installing water harvesting systems and move within it (cf. Barker et al. for Tripolitania with floodwater farming in the large wadi beds; Bruins 2007; Rosen 2008 for the Negev with runoff-farming in the wadi beds and along the slopes; for the particularity of tableland fields in the Marmarica see Vetter et al. 2009 and fig. 7). With these measures, they structure the area and direct the trails running through it.

An underlying grid of pathways exists interdependent with the water harvesting structures, which are artificial and man-made. The trails are determined by the wadi incisions that people avoided crossing due to their steepness and, more rarely, the danger of flash floods (fig. 3).

The water harvesting systems cover large areas on the tableland as well as the slopes and beds of the wadi with artificial dams, terraces, embankments bunds, and retaining walls, which are gradually covered by the accumulating sediment (Vetter et al. 2009, fig. 7.8). They needed to be constructed and maintained, and the constant deposition of soil required heightening the structures periodically (fig. 7). This work was of course part of the daily or periodical activities of their operators, whether engaged in rather sporadic or more continuous agricultural activity depending on annually changing climatic conditions. The various trails used by the inhabitants derive from the necessity to reach fields, embankments, dams, and terraces. The extensive fallow lands (up to 95 %, cf. fig. 7) that still exist today were used as grazing areas for small ruminants.

The settlements situated on the Northern Tableland represent the nodes in this web of trails and paths, crossing the area, connecting fields, grazing areas and cisterns. The settlements are distributed according to the watersheds of the wadi systems, each wadi system sustaining a number of settlements of various sizes, as well as single farmsteads (fig. 7).

The water harvesting systems and livestock breeding activities foster a type of mobility that densely covers the 15 – 20 km wide strip of land south of the coast, depending of micro-catchment conditions (Vetter et al. 2014). The availability of water, measurable in the water harvesting systems and number of cisterns (whose chronology is studied only sporadically), makes life here still feasible, hence the mobile practices can cover larger areas.

3.4 How to Know About Supply Points and How to Know How to Get There: Markers and Orientation on the Eastern Marmarica-Plateau

In contrast to mobility between the large hubs consisting of larger fertile areas and mercantile centres (oases, markets, harbours and cities, depressions with grazing grounds), the mobility governed by the water harvesting systems and cropping areas covers smaller territories. This is still true when moving further south, where camel breeding is still feasible and the animals needed watering places. Depressions provided vegetation for grazing and cistern sites attracted (and still do) herders with their animals. However, the pattern of routes looks increasingly like the spokes of a wheel because of the scarcity of water and grazing areas. After all, cistern sites thin out when moving south (fig. 2), and are not lined up along the wadi incisions as the ones surveyed in Tripolitania (cf. Barker et al. 1996, fig. 6.11). Since the limiting factor of any human movement in arid environments is water (with food coming a close second); the system of routes could only function when offering a system of water supply points.

Knowledge of the location of these cisterns is indispensable for survival. However, it is important to ask how one can find them, and how to navigate along the numerous connecting lines between the indispensable places that provide water, grazing areas and rest. How did people learn about routes and their courses, about the different sections, the available supplies, the dangers or risks, and about other necessary information (changes, affordances)? Habitual knowledge is needed, and to have the relevant familiarity with the environment and pathways is crucial for surviving and exploiting landscapes, for interacting with others and exchanging goods and ideas. Accordingly, orientation is the practical skill of how to pursue a certain track (or a collection of trails) (fig. 11.12).



Fig. 10. Traces of human presence consisting of pottery fragments from Roman times (scale bar is 20 cm) and fire places, and the natural vegetation at Bir Abu Mukhayat (cf. Fig. 4). (Anna-Katharina Rieger).



Fig. 11. Traces of tracks on the stony surface at Bir Qatrani (cf. Fig. 4). (Olaf Klammer).



Fig. 12. Traces of tracks close to Bir Helua (cf. Fig. 4). The line of the track is slightly visible passing between the remains of a camp site (stones on the surface) and the small house. Close to the horizon in the left part of the photograph the spoil heaps of the Bir Helua. (Anna-Katharina Rieger).

Markers along routes are as old as the routes themselves: relief, rock formations and environmental particularities, petroglyphs, stone markers (arab. *alamat*), or other structures like wind huts, stopovers or shrines alongside the trails specify the course of the route, and can still be traced (cf. Iran: Gashimi 2007; Egyptian Eastern Desert: Lankaster 2012, Rieger 2017; Egyptian Western Desert: Förster 2015); not least modern highways follow these markers (Masrab Istabl from coast to Siwa, Vetter et al. 2013). Moreover, stories, descriptions and myths are narrating the course of routes and paths, as well as their nature, appearance, and affordances.

Natural markers on the Eastern Marmarica-Plateau are the two steps in which the limestone shield rises from the sea level at the coast. The first and smaller one runs ca. 10 to 15 km south of the coast between the Northern Tableland and the Pre-Marmarican Plain, while the second, the Pliocene cliff or Marmarica cliff, ca. 35 km south of the coast is a rather manifest line, a scarp in the landscape (fig. 4) (Vetter et al. 2013). Certain passages are evident to offer the easiest way across the steep scarps (arab. *naqab*). In addition to these markers, the Marmarica-Plateau is slightly inclined to the south, at a distance of ca. 150 km from the coast, before it breaks off toward the Qattara Depression. Even when the inclination is not visible and perceivable in terms of walking down- or uphill, the energy consumption of humans and animals is affected – a factor that needs to be accounted for when planning to move along these routes.

Further north, where the sea is in viewing distance, and wadis cut the escarpment in more or less constant south-north direction and drain toward the sea, orientation is still easy.

As a consequence, there are two east-west connections one of which runs along the coastline, where the wadi incisions are not that harsh any more, the other runs along the top of the first escarpment, 10 km to the south, so that people passed south of the upper reaches of the dry river beds (fig. 16, the ancient course of the southern route can only be reconstructed south of Marsa Matruh).

The rest houses as well as the fortified station at Zawiyet el-Agdab might be counted as large man-made markers along the routes, which were established in Roman times (fig. 4. 16; Rieger et al. 2012; Rieger 2015, cf. Gasr Zerzi in Tripolitania, Barker et al. 1996, 113) and constitute part of the changes in how the routes were used, and therefore signify which exchange relations already existed or were strengthened. More to the north, buildings like the so-called Borg el-Qasaba may have functioned as markers (fig. 13), when looking for a starting point for southbound routes. However, it is still more vital to get on the right track further to the south, which entails the way to the next water supply point.

Stone markers (arab. *alamat*) are common signs, set up and maintained by the many passers-by to mark the direction of a trail (Riemer, Förster 2013; Riemer 2013; Förster 2015) (fig. 14). Natural features support orientation and navigation through the landscape. Not only visual aspects, such as the spoil heap of a cistern, the shrubs growing in a depression, or the change of underground from stony to dried or muddy surfaces (fig. 10), enable people to position themselves. Also inclination, wind direction, and smells, e.g. of wet in contrast to dry soils, support orientation. These features restrict or enable movements in the landscape and help people to keep to certain tracks. Appearances of certain animals (desert fox, ostrich, waterbirds) or trees serve as markers to position oneself (fig. 15).



Fig. 13. Orientation along the routes with man-made markers: Borg el Qasaba, a monument on the Northern Tableland, 28 km east of Marsa Matruh from Graeco-Roman times. (Alexander Nicolay).



Fig. 14. Recent stone marker (*alam*) on the Northern Marmarica-Plateau (cf. Fig. 4), 17 km west of the modern road between Siwa and Marsa Matruh. (Olaf Klammer).



Fig. 15. Orientation along the routes with natural markers: Acacia tree at the height of the Oasis Qara (cf. Fig. 7). (Anna-Katharina Rieger).

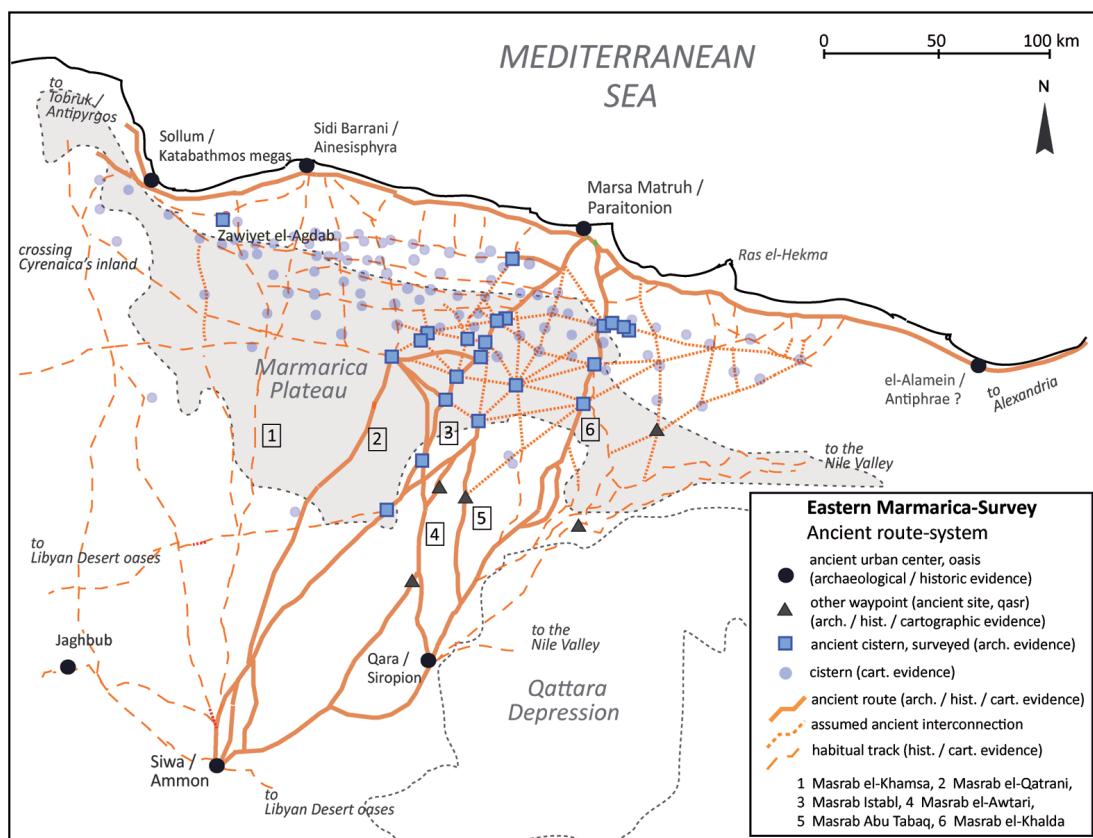


Fig. 16. Map of the route network covering the Marmarica-Plateau in Graeco-Roman times (on base of Rieger, Möller in print Fig. 5).

Individuals who are not autochthonous or familiar to the area had to make use of guides. A slight reminiscence of how these groups and their cooperation might have been organized is provided a text of the Greek author Diodorus Siculus (*Bibliotheca historica* 17, 50, 3), speaking of *skopoi* (watchers) present at Siwa. Focused on the centre of the oasis, Diodorus describes them in relation to the temple and the citadel. However, they are in duty for the oasis. So we might assume that the *skopoi* functioned as scouts responsible for guiding caravans in the direction from and to Siwa (cf. Kuhlmann 2013, 153. 160).

Wind directions support orientation. A document concerning a region in the coastal strip, the only papyrus from the Marmarica (PMarm, Rieger in print), works with the names of winds to describe directions. *Libos* as south or southwesterly wind refers to the name of the land as used by the Greeks. Therefore, this wind typically came from the southern desert parts of the Marmarica-Plateau (and is still known as *Chamsin* in North Africa or *Scirocco* in the southern Mediterranean) and helped travellers to keep the direction. People familiar with the area command a habitual knowledge that is an indispensable prerequisite of mobility (Mark, Egenhofer 1996). The common-sense spatial knowledge, and the practices derived from it, become manifest in different forms of mobility and lead to an understanding of habitational and land use patterns in the arid lands of the Marmarica-Plateau. In a combination of determining one's own position from features in the environment and deducing the intended direction from it, movement and mobility become possible. Through mind-mapping the movement in a sequential spatial memory, people are able to cross the plateau and exploit its resources as well as to meet fellows at certain places (Cornell, Heath 2004, 196-198).

4 Mobility as an Answer to the Problem of High Variability of Available Resources

Mobility is in most cases driven by the need to cope with or enhance resources and to look for a stable livelihood. Trade and transhumance create even longer-distance mobility in moderate climatic zones. In arid and semi-arid environments, though, the scarcity of resources results in large-distance mobility. Patchy vegetation distribution, suitable for grazing, and sparsely distributed focal points, like water supply and markets, render mobility focused on trails, collections of trails and supply points. Demands and needs of resources exploitation as well as social and economical exchange trigger the movements.

Routes, as a matter of fact, represent not only mobile people, and the animals and goods coming with them, but also social practices. In particular, the practices of social interaction and the practices of the production of space are reflected in mobility. Place making, but also moving places (Retallé 2013) as well as well as complex socio-economic relationships, coincides with the mobility of people (cf. Ingold 1993).

How exactly routes were used, depends on the economic strategies taking place there. Parts of the populace inhabiting the Marmarica-Plateau in antiquity were engaged in herding and pastoralism. Agricultural activity and maintenance work of water management systems in the northern parts of the study area – whether regularly or sporadically depending on the annually changing climatic conditions – had an impact on movements as much as the herding of small ruminants on the Northern Tableland.

On a larger scale guided caravans, consisting of non-locals and local guides, covered the long distances between the hubs in the productive areas in the north, the harbour centres on the coast and the oases in the south. The system becomes arbitrarily complex according to the sections and the composition of groups travelling along the routes (cf. Nielsen 2000 with the example of Andean caravans and their social and spatial impacts reflected in archaeology).

Traces of the route system embrace on the one hand the materiality of the trail itself, or what remains of it in the archaeological record – changes in soil surfaces appearing as lines. On the other hand the stopovers or places of rest along the route are the beads on the string that represents the path. Yet, a route as such is not only the connection between a place A and a place B, but an invisible path, structured by winds, morphology, by passages, hazards and obstacles. Supply and viability are the deciding factors, when, how, and where to go along.

4.1 Overcoming Dichotomous Views and Recognizing the Complexity of Social Interactions

The mobility of the inhabitants is incised into the landscape of the Marmarica-Plateau in tracks, trails and the hubs of various sizes and characteristics. People had various intentions when using the routes; their manner of being mobile differed, but was steered by the life-styles of socio-culturally similar groupings adapted to the semi-arid and arid environment. They were not separated into the sedentary people in the north and the nomads in the south, merely connected by narrow lines of interaction and exchange, but they were a highly interconnected and interrelated populace engaged in resource exploitation through grazing and agricultural activity, through traffic, through maintenance work, and were distributed over the entire Eastern Marmarica-Plateau (Altorki, Cole 1998). Whether they were inhabitants of oases or villagers, whether based on the Marmarica-Plateau or in the wider surroundings of Qara or Siwa – there were always groups among the inhabitants that were engaged in more sedentary, others in a more mobile way of life. The variability of the ecological factors fostered or forced these well-adapted life-strategies. Mobility strategies are an important factor in this system. Notably, as attested on the Eastern Marmarica-Plateau, they allowed people to inhabit, utilize and exploit the ecologically marginal area. The common hierarchical and cemented view of (pastoral-) nomadically living groups as opposed to a sedentary world (Retaille 2013; Rosen 2008), coming as a corollary of the ecological and political marginality, falls short of the complexity of the adapted life-strategies that enable human beings to inhabit the arid environment on the fringe of the Libyan Desert, while making use of the space on a big scale and interacting with a variety of individuals. This perspective goes beyond the model of a symbiotic relationship between nomadic and sedentary groups, but is based on the interwoven network of people's practices and the indispensable knowledge of how to make a living from the arid and semi-arid land by applying subsistence strategies and trading the surplus via exchange systems along intra- and interregional routes. According to their activities, the inhabitants of the Marmarica-Plateau can be divided in rather nomadically living individuals and others whose livelihood is based on agriculture, but they seem to possess the same topographical and spatial knowledge. Hence, rather than socio-cultural ascriptions, their specialized and localized knowledge and highly adapted life-styles kept the various kinds of mobility running.

Acknowledgments: The research on which this contribution is based was conducted under the auspices of the Collaborative Research Center 586 “Nomaden und Sesshafte”, University Halle-Wittenberg and Leipzig, financed by the German Research Foundation 2004-2008. The project continued under the direction of the author as “Eastern Marmarica-Survey” financed again by the German Research Foundation (2008-2011). The Alexander von Humboldt Foundation awarded a Feodor Lynen Fellowship to the author, based at the universities of Rome, La Sapienza, and Trento, to deepen the topics of anthropological and indigenous archaeology of the Libyan Desert. The author would like to thank Jörg Rüpke, Max Weber Centre of Advanced Cultural and Social Studies, University Erfurt, and director of the ERC-project “Lived Ancient Religion”, for releasing me from obligations in this project to conduct research for the fellowship. Thanks are also due to Heike Möller who is the expert for ceramics in the Marmarica, and Iris Newton who proofread the English. And I would like to express my sincere gratitude to the anonymous reviewers who helped to improve the argument with their detailed and very constructive comments.

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