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Notes for a Political Ecology of Non-Sedentary People

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Notes for a Political Ecology of Non-Sedentary People

The research group *Political Ecology of Non-Sedentary Communities* encompasses three research projects examining archaeological remains from various time periods in the Nile Delta, the foothills of the Kopet Dag and in the steppe region of western Eurasia; a fourth project in the group consists of climate and ecological modeling for Europe over the past 6000 years. The researchers in this group are investigating processes and dynamics which played out in different geographic spaces and different chronological periods between 9000 and 300 BCE. We propose a triad of three terms, *Umgebung*, *Umwelt*, and *Mitwelt* to serve as a conceptual basis for all of these projects, which vary greatly in terms of the chronological period, location and the way of life of the populations under study, as well as with respect to the archaeological database. The projects can be described on the basis of evidence of multifaceted practical actions. These actions on the part of the populations under study, revealed only fragmentarily in the archaeological record, are being investigated using the research strategies presented here. The strategies have been developed from the discussion on political ecology associated with discourses in the social sciences and humanities.

Political ecology; mobility; environment; climate; landscape; hunter-gatherers.

Our research group *Political Ecology of Non-Sedentary Communities*¹ investigates the relationships between ancient cultures and nature(s) and changes in those relationships that can be ascertained through historical and archaeological research. Rather than limiting ourselves to the adoption of established concepts, we engage with ideas that have emerged in discussions in recent years in the social sciences and geosciences and adapt them so as to render them productive for the two main interests of the Excellence Cluster Topoi, ‘space’ and ‘knowledge’. The fundamental methodological and theoretical question explored by our research group is a challenging one, especially for the prehistoric and early historic periods that are at the center of most of the individual projects combined here.

We ask, what were ecological concepts that were linked to practices in the past? Practices can be reconstructed, if only rudimentarily, by examining the traces left in burials, semi-sedentary life in villages and mobility patterns. But what about ideas associated with such practices? In methodological terms, the question becomes how can the reconstruction of everyday as well as unusual activities be used to arrive at an understanding of the ecological knowledge of ancient times, perhaps even of an ‘environmental awareness’? We acknowledge – unapologetically – that concerns about the systematic destruction of resources on a global scale in the post-industrial age underlie this research problem. Any meaningful attempt to address these issues necessarily entails theoretical groundwork consisting of a critical analysis of our own theoretical standpoint, which, of course, is historically and epistemologically specific.

1 Individual projects are pursued within the framework of the Excellence Cluster 264 Topoi, Berlin.

Far-reaching questions demand broad contexts, and the research on political ecology and mobility conducted by the members of our research group is explicitly wide-ranging spatially and chronologically. Geographically, the region under study stretches from Egypt in the south to the Eurasian steppe in the north, from Ukraine in the west to Turkmenistan in the east. Chronologically, the projects span a period from the Epipalaeolithic to the Iron Age, 9000–300 BCE.

This paper first discusses the history of political ecology and our conceptual approach to it. In a second part, we present three research strategies and concrete examples that explore the nexus of mobility and political ecology.

1 Political ecology: an overview

Promoted by scholars representing a wide range of interests and academic disciplines, political ecology is a form of research that has evolved into an ever more diverse scientific field. Geography and cultural anthropology have made major contributions to political ecology: we touch briefly on them below. To understand how creative impulses for research on prehistoric times can be derived from a branch of scholarship that emerged in the context of an occasionally severe criticism of capitalist ideologies of growth, one must first make a brief detour through the intellectual and conceptual history of political ecology.

The field of political ecology first took shape in the 1980s, led by scholars in geography whose interests centered around questions of ecosystems and the adaptive capacities of cultures and societies. Underlying these issues was work in cybernetics, systems theory, questions of homeostasis and the notion that relationships between people and their environment (*Umgebung*) can be depicted in terms of flows of energy, information and materials. The ‘reduction of complexity’ to measurable parameters often led to the construction of flowcharts. A penchant for quantification, and later also for simulating processes in nature, can still be found in some areas such as meteorology, and these approaches play a role in this research group as well. A typical example of this school of thought today can be found in the Santa Fe Institute, the declared aim of which is to “discover, comprehend and communicate the common fundamental principles in complex physical, computational, biological, and social systems...”. This notion positions itself within a paradigm in which human beings and nature are viewed as being bound up within a single system, implying that the complexity of that system can be grasped through ever more complex quantification techniques.²

The development of political ecology was also influenced to a degree by cultural ecology as formulated by Julian Steward,³ a field which had one of its main academic bases at the University of Michigan. Roy Rappaport,⁴ a Michigan proponent of cultural ecology, distinguished between “cognized models” of the environment and “operational models” thereof, with the former referring to the “emic”, non-scientific understanding that human societies have of their natural environment and the latter to ethnographically observed connections of system and practice in the nature–culture relationship. As a result of the collaboration between Rappaport and Kent Flannery, but also due to Lewis Binford’s⁵ adoption of the main theses of Leslie White,⁶ cultural ecology gained a firm foothold in

2 <http://www.santafe.edu/about/mission-and-vision/>, (visited on 18/02/2016).

3 Steward 1972.

4 Major work: Rappaport 1978. For a critique of Rappaport’s approach see Wolf 1999.

5 Binford defines culture as humans’ “extrasomatic means of adaptation”: Binford 1962, 217–218.

6 All at the time from the University of Michigan.

processual archaeology and became a dominant paradigm in archaeology in the United States for several decades.⁷

Cultural ecology gave way to political ecology when people began investigating the reasons for inequality and hierarchization – found in a great many societies – in the relationships of people to the natural environment. Behind this shift in research questions was the influence of the Marxist version of political economy, as articulated in the works of Eric Wolf and Sidney Mintz. Essential to this newer approach is the understanding that today's societies, wherever they may be located, are part and parcel of a capitalist world system entailing radically different levels of access to natural resources. The inclusion and the focus on the unequal distribution of natural resources appears primarily in the later works of Eric Wolf, but the approach has continued to be developed and now finds its most distinct expression in the *Journal of Political Ecology*.⁸

In this context, forms of the appropriation of nature are usually conceptualized as maladaptations, as processes associated with the industrial use of natural resources that are capable of rendering whole swathes of land uninhabitable, thereby triggering migration and severe economic and social hardship. Humans' problems with nature take center stage. One can distinguish two variants of this approach in political ecology. One analyzes disasters brought about by humans, such as in Bhopal, through fracking or the salinization of whole landscapes; the other focuses on natural catastrophes, e.g., tsunamis, and their consequences. To take a concrete example, it may be impossible to determine to which category Hurricane Katrina belongs, but the question itself falls within the domain of political ecology. A review of the literature in the field of political ecology reveals an overall trend toward concentration on anthropogenic catastrophes and processes, with the aim of drawing conclusions from such experiences that might be of value in the future. Most sustainability studies and environmental anthropology fall within this branch of the field that researches the causes of environmental problems.

Other political ecological studies, e.g., the early geographic ones, take a somewhat different position, among which the work of Piers Blaikie deserves mention.⁹ Blaikie focuses on the political evaluation of mid- to long-term processes of geomorphology as detected by the methods of physical geography. The destructive consequences of such processes affect subalterns directly and existentially, while the same does not apply to the elite in capitalist societies, nor, in most cases, to the population in the former colonial centers. A second focus of Blaikie's work is the political nature of the ostensibly neutral knowledge associated with physical geography. For instance, Blaikie and Brookfield write of the necessity "to examine critically the political, social and economic content of seemingly physical and 'apolitical' measures such as the Universal Soil Loss Equation, the 'T' factor and erodibility".¹⁰ These remarks fit with *science studies*, an area of research that coalesced around the same time as political ecology, and related fields in the anthropology of science.¹¹

The 1990s saw a significant shift in the field of political ecology, one that was branded by many as the politicization and de-greening of political ecology.¹² A brief foray into the work of two authors can help elucidate this shift. In her book *What is Nature?*¹³, Kate Soper criticized the "ecological naturalism" of green movements, which, she argues,

7 See Bernbeck 1997, 130–152.

8 Each year the journal publishes the winning article of the 'Eric Wolf Prize' awarded by the *Political Ecology Society*.

9 Blaikie 1985; see also Forsythe 2008.

10 Blaikie and Brookfield 1987, XIX.

11 An illustrative example of research that is related to political ecology is Bruno Latour's chapter on sampling soil in the Amazon forest. Latour 1999, 24–79.

12 Vayda and Walters 1999.

13 Soper 1995.

construe nature as external to and separate from humans who overexploit its resources. However, the critique expressed by the green movements remains within a framework that objectifies nature in the modern capitalist sense; it does not undercut the assumed hierarchy of humans in relation to the nature they appropriate. According to Soper, we need a critique of the discursive construct of ‘nature’ as a coherent, external given. The logical consequence would be a complete abolition of the concept of ‘nature’.

The works of Arturo Escobar lead in a similar direction.¹⁴ Escobar, a cultural anthropologist, was originally interested in the field of development anthropology and engaged in a critique of both development policy and sustainable development. Escobar, like Soper, could be described as a post-structuralist and discourse theorist who engages principally in the critical analysis of concepts and their political effects. Escobar has a different set of foci, however. He criticizes ‘environment’ as a concept that evokes something passive that can be used and appropriated, while the word ‘nature’ denotes an entity endowed with uncontrollable, unpredictable agency. He sees the adoption of certain elements of discourse as a strategy framing ecological phenomena as instrumentalizable, bringing them into the domain of potential capitalist utilization in order to subsequently exploit them in practice. Escobar argues that efforts to preserve biodiversity – the exertion of political pressure in the Amazon region, and in many other places throughout the world – are motivated by an interest in the future commodification and marketing of genetic resources rather than a desire to conserve diversity for its own sake.¹⁵

Observers of the history of political ecology vary in their assessments of the field.¹⁶ At least since the widely accepted proposal of the Geological Society of London to name our epoch the Anthropocene¹⁷, one thing has been clear: the relationship of humans to their environments (whether they are perceived as nature or in some other way) is now a fundamentally political one. The ecological is nowadays always political.

Yet before we decide for a political ecology with a decidedly deconstructive bent à la Soper and Escobar, it is necessary to take into account another direction in which the stream of discourse has moved: the deconstruction of ‘nature.’ But what should take its place? The ‘ontological turn’ heralded in anthropology in the autumn of 2013¹⁸ and increasingly influential in the social sciences, offers important approaches with ramifications for political ecology. Central to these discussions are the writings of Philippe Descola and Viveiros de Castro, both philosophically inclined cultural anthropologists who have worked in the Amazon region.¹⁹ Their works revolve primarily around the categorical distinction of nature and culture or rather its non-existence in other systems of thought.²⁰ Latour has also addressed this issue:²¹ Western thought has assumed that there are many cultures and ‘one nature’, but might there be approaches to understanding the world for which this relationship is inverted, in the sense of “one culture – many natures”?

14 Escobar 1995; Escobar 1999 and others.

15 Escobar 1998.

16 Walker 2005; Davis 2003.

17 Crutzen and Stoermer 2000; see also Zalasiewicz et al. 2008.

18 The phrase used to describe the Executive Session of the 132nd Annual Meeting of the *American Anthropological Association* in Chicago in November 2013 on “The ontological turn in French philosophical anthropology”, with Bruno Latour, Philippe Descola, Kim Fortun, Michael Fischer and Marshall Sahlins.

19 Descola 2013; Viveiros de Castro 1992.

20 The discussion about multiple, culturally specific ontologies produces a break with earlier constructivist paradigms that is seldom treated as problematic or even mentioned. It hinges on the difference between epistemologies and ontologies. In a radical constructivist approach, the distinction would not even be perceived, since it would reject the existence of a reality prior to (construed) knowledge or declare it to be irrelevant. In contrast, a world view designated as ‘realist’ would find the difference between epistemology (the study of types of knowledge) and ontology (the study of possibilities of being) useful, since knowledge would not be equated with the recognizably existent.

21 Latour 2013.

2 Concepts of a political ecology

Descola has developed a classification system that addresses these kinds of questions. He speaks of four types of ontologies, describing them as animistic, totemist, naturalist and analogist. It is probably rarely the case that such ontologies can be identified empirically on the basis of archaeological research, as can be seen in a recent article that adopts Descola's approach to infer ontological elements with respect to features of the imagery from early Neolithic Göbekli Tepe.²² For sites with a less spectacular state of preservation, the potential for interpretation is far more restricted. Nonetheless, the insistence on the potential multiplicity of ontologies is of fundamental importance for any political ecology. The environment, which we nowadays usually objectivize as nature, used to be envisioned, at least in many ancient western Asian societies, as heterogeneous forces with the ability to influence people in ways both malevolent and beneficent. Along with animals, storms, thunder and celestial bodies, there were also hybrid creatures, some known to us by their names²³ and others that have been transmitted to us through images. Descola raises the fundamental question of the extent to which we are entitled to consider our Western ontology, which he categorizes as "naturalist" and which is ruled by scientific thought, as 'more rational' or even 'better' than other ontologies – particularly given that ours is distinguished by the fact that we may well completely destroy our conditions of existence.²⁴

2.1 Concepts and terms

Just how do these issues influence our research group in a systematic way? First, we believe that it would be inappropriate to adopt a purely idealist/metaphysical approach to political ecology, oriented towards the bridging of ontological differences. With such an approach we would be likely to lose track of both the political and the ecological. The recent fascination with multiple ontologies speaks at least as much to our times as it does to how other societies understand the world. We adhere to the original materialism of the schools of political ecology and retain their "shifting dialectics",²⁵ but not, as in the work of Blaikie and Brookfield, dialectics that shift between social groups and terrestrial resources. The field under study is far more complex than that of the early political ecology.

First, societies not only have variable ontologies, they also influence the world through their actions. In certain circles, it would seem that scholars have nearly lost sight of the material basis of existence in the heat of discussions surrounding the 'ontological turn'. This tendency can also be observed in the field of Human-Animal Studies, which is gradually gaining ground in archaeozoology.²⁶ To make clear the difference between ontologies and spheres of action, we begin with a triad of concepts. Following Jakob von Uexküll, we draw a distinction between *Umgebung* and *Umwelt*.²⁷ *Umgebung* refers in general to everything belonging to a past society that can be identified through historical research and might have been in that society's surroundings, irrespective of whether or not humans had an impact on it or thought about it.

22 Boric 2013.

23 Referred to by German scholars of the ancient Middle East as *Mischwesen*, see for example Wiggermann and Maria 1994.

24 For instance, in his lecture at the Humboldt-Universität Berlin on May 13, 2014 entitled "Pluralisme anthropologique et pluralisme philosophique".

25 Blaikie and Brookfield 1987, 17, cited in Walker 2005, 74.

26 An excellent paper from this perspective is Overton and Hamilakis 2013; see also Lau and Gamerschlag 2015 for an assessment in the field of Near Eastern archaeology.

27 Uexküll 1909; Agamben 2003, 49–53.

Secondly, people have always created conceptualizations that allow them to envision their *Umgebung* in terms of powers that act with varying degrees of agency. Ontologies comprehend portions of an infinite, real *Umgebung*. Mountains appear in the role of potential avengers, hunted animals take on a highly ambivalent dimension of both submission and menace,²⁸ severe storms are interpreted as punishment. We use the word *Mitwelt*, borrowed with intentional imprecision from the philosopher of nature Meyer-Abich,²⁹ to refer to that part of the *Umgebung* envisioned as having some specific degree of agency.

Thirdly, to paraphrase Marx and refer back to Soper and Escobar, people make their own nature but they do not make it as they please. Humans influence a part of their *Umgebung*, whether they envisage that *Umgebung* as active, passive or completely objectified. We call the portion of the *Umgebung* that is subject to practical action the *Umwelt*.

Thus the concept of the *Umgebung* encompasses both *Mitwelt* and *Umwelt*, and the latter two are not necessarily mutually exclusive (Fig. 1). In some societies the overlap between *Mitwelt* and *Umwelt* may be (or have been) very large, in others minimal. This is a question to be clarified as far as possible through empirical research. The industrial and post-industrial societies of the West are characterized by an almost complete exclusion of *Mitwelt* and *Umwelt*. This is primarily due to the dominance of natural sciences and their fundamentally objectifying ontology. Science is not understood as one of many ontologies and severely restricts the scope of the *Mitwelt*, at the same time coming to dominate everyday life.

For sciences with a historical orientation, the conceptual classification and operationalization of such terms is not enough. There are dynamic relationships between *Umwelt*, *Mitwelt* and *Umgebung* that are constantly shifting. Both the relationships and their changes are subjects under study in our research projects.

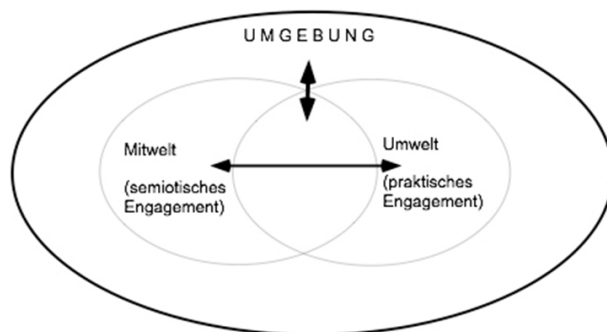


Fig. 1 | Diagram depicting *Mitwelt*, *Umwelt* and *Umgebung* relationship.

As we noted above, one important field concerns the relations between *Mitwelt* und *Umwelt*. That which is perceived as an entity with the power of agency in a society's *Umgebung* need not constitute part of the society's practical, instrumental actions. Thunder and lightning, the cold, individual plants, etc. might function as agents but have no ramifications for the practical world. However, every sacrifice to a weather god, for instance, involves an intertwining of *Mitwelt* and *Umwelt*: the semiotic engagement with 'nature' and the bestowing of power and agency on transcendental entities results in a practical engagement with one world. *Mitwelten* have a relation to practice, just as *Umwelten* have a relation to interpretation.

28 Ingold 2000.

29 Meyer-Abich 1990.

Ontologies and actions in an *Umgebung* are related to one another dialectically, in a way that need not have been unfamiliar to those living in such a world. Another level of dialectic relations is opened by their scholarly study. What we designate as *Umgebung* is a phenomenon that depends on our own ontological premises. The inclusion of palaeoclimate simulations, for instance, is a procedure that appears to objectively frame the conditions in which members of ancient societies lived. However, climate simulations ultimately represent a *Mitwelt* grounded in present-day concepts.

3 Political ecology and non-sedentary ways of life

In the present day mobility represents a way of life that has been marginalized for reasons of political control, one that necessarily brings with it a fundamentally different relation to the *Umgebung* than that associated with medium- to long-term sedentariness. In our research we are attempting to investigate approaches to the *Umgebung* in a differentiated manner, by comparing prehistoric societies with their own distinct degrees and patterns of mobility. The relative scantiness of material remains associated with such lifestyles and the methodological problems that this entails make the archaeological investigation of these ways of life challenging.

We must first consider the question of whether non-sedentariness and sedentariness are actually opposites (the words themselves certainly suggest that they are) or whether this might be another instance, like the concepts of culture and nature discussed above, of the construction of an exaggerated dichotomy that is not particularly helpful as an analytical approach to the study of prehistoric societies. As Reinhard Bernbeck³⁰ and Steven A. Rosen³¹ have shown, fragmentary archaeological records, historical documents written by sedentary peoples about mobile societies and analogies based on ethnographic and ethnoarchaeological studies have strongly colored the (one-sided) perspective on non-sedentary existence. But we need to reconsider any suggestion implying mutual exclusivity between the sedentary and non-sedentary.

Hunter-gatherer groups and nomadic cattle breeders are seen as leading essentially mobile lives. Both ways of life are characterized by a multiplicity of individual aspects through which they can be described. Robert L. Kelly's statement applies to all forms of non-sedentary existence: "...because we do not understand the relationships between movement and material culture, archaeologists have had difficulty identifying different forms and levels of mobility".³² Seeking a better understanding of these relationships, scholars have proposed various definitions for mobility. These definitions have usually been based on only one non-sedentary way of life, such as that of the hunter-gather communities or nomadic cattle breeders. Both of these tend to be contrasted to sedentary communities, or, in the case of hunter-gatherer groups, as the opposite side of becoming sedentary.³³ When nomadic groups are discussed in the context of contemporaneous sedentary societies, sedentism implies, in the frequently expressed view of many researchers, the end of societies with an appropriative mode of subsistence, regardless of whether this might have been a more difficult option. Kelly describes this notion of a uni-dimensional development as inadequate and deconstructs the opposition between mobile and sedentary life.³⁴ In his view we must understand mobility as multi-dimensional, with there being various forms and degrees of mobility. People do not live completely immobile lives in any human society: it is the ways in which they move that vary. The belief that

30 Bernbeck 2008, 45–49.

31 Rosen 2008, 117–119.

32 Kelley 1992, 60.

33 Khazanov 1984; Rafferty 1985.

34 Kelley 1992, 43.

mobility emerges only through external compulsion, usually attributed to a scarcity of resources such as land (for pastoral groups) or game (for groups specializing in hunting),³⁵ is out of touch with both historical and present-day reality. We therefore begin from the position that mobility should not be viewed as a form of adaptation to an *Umgebung* that is necessitated by scarcity. To phrase it in political ecological terms, mobility should not be understood a priori as driven by the search for food or other resources born out of externally induced situations of necessity. Rather, the ‘social self-embeddedness’ in large regions can be a condition produced by spatiotemporal rhythms of movement, the causes of which lie primarily in the connections with a *Mitwelt*. In such cases, a mobile way of life is frequently preferable to a fully sedentary existence.³⁶

Archaeologically, the remains associated with a mobile lifestyle can be expected to be relatively ephemeral. Sedentism and mobility should be investigated in terms of distinctions of degree and form, although the fragmentary record usually evokes a much more static image of what was actually a dynamic past.³⁷ However, advances in investigative methods based in the natural sciences have opened up the possibility of an approach that is independent of both the “tyranny of ethnography”³⁸ and ethnoarchaeological and ‘common sense’ approaches. We are gradually reaching a point at which it will be possible to use a well balanced set of analytical methods to conduct detailed empirical analyses of rhythms of seasonal migrations and periodically visited sites. We will draw on such methods as far as possible in order to examine the multi-dimensionality of mobile life and to address adequately the diverse categories of non-sedentism that are represented in the various regions of our research projects.

For the time being, we resort to a modified definition proposed by Hans Barnard and Willeke Wendrich as a characterization appropriate for all of the projects: “... ‘mobility’ [is] the capacity and/or need for movement from place to place”.³⁹

4 Brief description of the research projects

Our research group encompasses three regionally diverse projects investigating different times and places in the arid belt of the ancient world (see map, Fig. 2). A complementary fourth project is concerned with climate and ecological modeling.

Forms of pastoralism are at the heart of one project researching the Eurasian steppe and forest-steppe zone. The region contains thousands of burial mounds which were erected and extended in prehistoric and early historic times. It is primarily these burial mounds that provide the basis for the reconstruction of a pastoral economy, two periods of which are under investigation (4th to 3rd millennium BCE and 1st millennium BCE). This region is usually thought to be predestined for early forms of cyclical, seasonal mobility, although there is evidence of multiple different uses of the steppe vegetation zone for both of the periods in question.

The second project based on archaeological field research focuses on semi-mobile villages in the foothills of the Kopet Dag in southern Turkmenistan (Fig. 2). This project is investigating complex local relationships in the early prehistoric periods (c. 6000–4000 BCE) within a small settlement area defined by the Meana stream, now a wadi, next to which the eponymous village of Meana is located. Excavations in Monjukli Depe as well as a regional survey and geographic analysis have revealed that the foothills of the Kopet

35 See contributions in Kennett and Winterhalder 2006, for example.

36 Barth 1962.

37 On the juxtaposition of sedentism and nomadism, cf. the discussions and chart in Cribb 1991, 15–20; see also Barnard and Wendrich 2008.

38 Wobst 1978.

39 Barnard and Wendrich 2008, 9.

Dag were a highly dynamic environment, with frequent abandonment and resettlement of sites. The aim of this project is to explore the complementarity and/or contemporaneity of abandonment and resettlement processes at sites in the region.

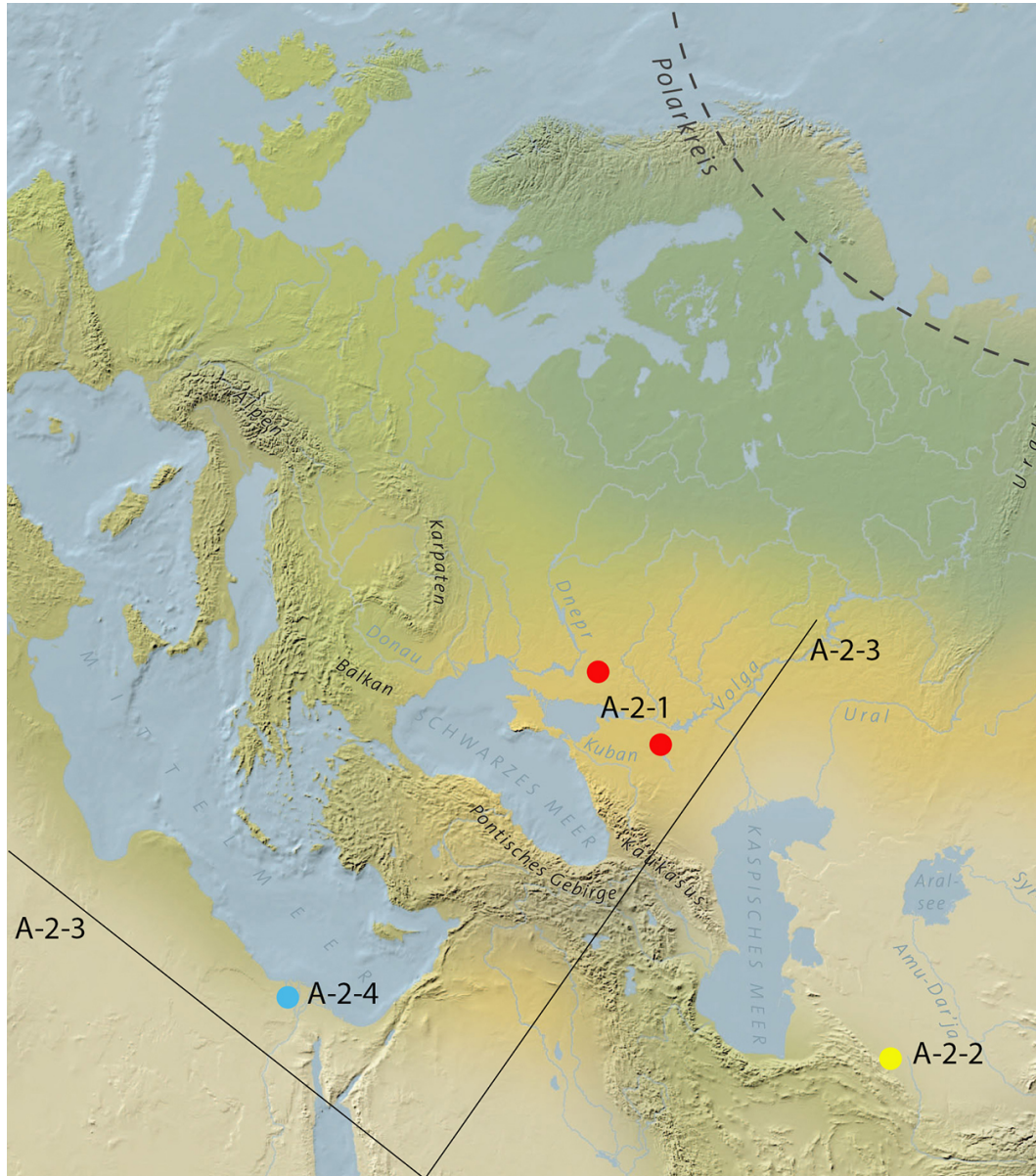


Fig. 2 | Areas under study in the three archeological projects in the research group on *Political ecology of non-sedentary communities*. A-2-1 North Pontic region and Pre-Caucasus; A-2-2 Monjukli Depe in the foothills of the Kopet Dag; A-2-4 Merimde Beni Selam in the Western Nile Delta.

The third project is concerned with how, exactly when, and why settled farming began in the western Nile Delta at c. 5000 BCE, and is also particularly concerned with the relationship with the hunter-gatherer groups of the preceding Epipalaeolithic, who had already been active close to the Neolithic settlement. There are sparse remains along the fringes of the western Nile Delta attesting to human presence already during the Middle Palaeolithic, which is lesser known than, but complementary to, the existing evidence from the Egyptian Nile Valley and western Deserts. However, it is the transition

from fully mobile to sedentary/semi-sedentary groups and the adoption of domesticated species which are at the centre of enquiry. The Epipalaeolithic is very poorly attested in the immediate vicinity of Merimde, although there is evidence further to the south at Abu Ghalib and ongoing survey will be re-visiting the desert fringes specifically to re-investigate remains pre-dating the Neolithic. A closer examination of the lithic tool types and consumption practices of Epipalaeolithic groups in comparison with the lithic packages associated with the settled populations, within the framework of an absolute chronology including new dates, will enable us to have a fresh approach to the questions of: 1) the nature of connections between settled and mobile groups, 2) the timespan over which the transition from mobility to semi-sedentary/primarily sedentary occurred, 3) differences in food preparation and consumption practices of the Epipalaeolithic and Neolithic groups, and 4) the extent to which the 'arrival' of domesticated species genuinely constitutes an adoption of technological and economic strategies from outside of the region, or rather represents a degree of integration with and adaptation of pre-existing lifeways. The five phases of the Merimde settlement show much difference between the earlier and later phases and a re-assessment of the transitional nature of the settlement will also be investigated.

Climate and ecological modeling will be performed for the Middle and Late Holocene periods in order to place the social, economic and cultural developments of non-sedentary communities in relation to their natural surroundings.

5 Research strategies

One question emerging from the previous discussion of concepts of political ecology is how one can subject these complex sets of relationships to comparative study. Given the considerable chronological and geographical diversity of the individual projects, we identified overarching criteria that allow us to study mobility and the nexus of politics and ecology in ways that will ultimately permit the evaluation of similarities and differences among the individual cases. To that end, we have agreed on three research strategies and have developed correlates for each of them.

Fundamental questions that belong in a political ecology framework are related to the terminologically complex field described in common parlance as 'nature'. This field must be examined with respect to hierarchization. Unlike in a political ecology anchored in the present, these processes of hierarchization do not necessarily involve the exploitation of natural resources and thus the historically specific manifestation of dominance relationships of culture(s) over nature(s). Nor are they necessarily anthropocentric, i.e. directed toward the political order within a society that results from the attitudes and modes of action associated with the *Umgebung*.

It would seem, at first glance, that the existence of such complex starting requirements, involving questions about *Mitwelten* as part of ancient ontologies, would preclude the possibility of empirical investigation in societies that had no writing, let alone in those that were also mobile. However, the sphere of images, which includes hybrid entities, the attributes of gods, the depictions of animals and human beings together, etc., can make elements of ancient ontologies accessible. It should also be safe to assume that a portion of the animal world was subjectivized (totemistically or analogistically) to such a degree that the hierarchies characteristic of human society were extended into the *Umgebung*.

An analysis of the various practical ways of dealing with nature makes use of standard natural science procedures (zooarchaeology, palaeobotany, palaeoclimate research, geomorphology, etc.). However the goal of such analyses must not be conceived as a static, systematic reconstruction of the 'natural conditions', providing a framework within which adaptations took place. Rather, such analyses will be used as an entry point to

interpret the practices of mobile societies as active interventions in their *Umgebung* that were generally situated at the level of ‘practical consciousness’. This awareness emerged from the transitional forms of interactions with the *Umgebung* in those societies, and thus transformed a sector of the *Umwelt* that did not overlap with the *Mitwelt* into an unquestioned and unquestionable sphere that was nonetheless actively manipulated. The ultimate goal is to answer the following questions for specific cases:

- Which aspects of the *Umgebung* are/were included in the *Mitwelt*?
- Which elements constituted the *Umwelt*?

Answers to those questions, however tentative they may be, offer the potential to pursue a third question:

- What were the relationships between *Umwelt* and *Mitwelt*?

We have already noted that the relationship between *Umwelt* and *Mitwelt*, as these categories are distinguished here, is a political one to the extent that the cases under study examine not only the overlap between the two but also the reach of each: a small *Umwelt* together with a large *Mitwelt* have ramifications for a society’s way of life that clearly differ from those associated with the combination of a large *Umwelt* and a small *Mitwelt*. The extent to which the individual projects will be able to investigate *Mitwelt* and *Umwelt* depends to a great degree on the data available.

Identifying which portion of the *Umgebung* functions as *Umwelt* and which as *Mitwelt* will be an even more challenging task. The question of access to an exploitable sector within the entire *Umgebung* of a society is traditionally closely linked to the technologies mobilized for the purpose, but it is also at least as dependent on rhythms of mobility. Comparisons must rely on terminologies that implicitly address commonalities.

The commonalities of the three archaeological projects and the meteorological modeling are drawn together in three fields we refer to as ‘research strategies’. These research strategies augment goals that are specific to the individual projects but that are not relevant to our comparative analysis. For the study of the political ecology of non-sedentary societies, questions about rhythms of mobility, human-animal relations and landscape construction emerged as central. In the following sections, we describe the significance of these three issues in more detail.

5.1 Rhythms of mobility

Since our research projects are investigating different forms of what are for the most part periodically recurring population movements, we are attempting to find a comprehensive way to reconstruct diverse aspects of spatial mobility, including their temporal dimensions. To this end, we use the following comparative parameters: *reach*, which refers both to purely geographic extent and to the reach into the assemblage of *Umgebungen* that are potentially available; and *rhythm*, which is linked with both the temporal measure of movements and embedding in the realm of culture. The frequency of relocation can be determined up to a point using ethnoarchaeological analyses. Relations between mobility and technological diversity, measured in terms of “the number of distinct tool types or classes, T, in the technology”,⁴⁰ are significant primarily for their comparative potential.

40 Shott 1986, 19. The correlation obtained by Shott (Shott 1986, 24) from an ethnographic sample yields the following equation: $D = 19.11 - \ln(MF)^{4.42}$, where D denotes diversity, MF, “mobility frequency”, i.e. the number of relocations to new camps and dwelling sites per year. The technological diversity (in calculations expressed in terms of ‘richness’) can be determined archaeologically, and theoretically it

The project in the Eurasian steppe is characterized in diachronic comparison by three different types of mobility. Studies of 4th millennium BCE assemblages of faunal remains from settlements north of the Black Sea in the Eurasian steppe zone reveal highly variable ratios of domesticated and wild animals.⁴¹ This might be an indication that use of these food sources was specific to particular regions. In the 4th millennium BCE hunting appears to have been an important factor in many settlements while domesticated animals were kept in various proportions in others. At around 3100 BCE there occurred a transition to specialized cattle breeding, and cattle remained a substantial component of the subsistence economy for the following centuries. For a variety of reasons, which will be examined in the project *Pastoralism on the Eurasian Steppes*, scholars have held that this form of livestock breeding specialized in horned cattle could be efficient in the arid vegetation zone of the steppe only when combined with an extensive use of pasturelands.⁴² The interpretations range from fully nomadic to semi-nomadic or transhumant practices⁴³ and take, at least implicitly, historically known societies as a model, for instance, the mounted nomadic Scythians (1st millennium BCE) or the Kalmyk people of the 18th/19th century who lived in various regions of the Eurasian steppe belt. Stepping back from conceptual distinctions like nomadism and transhumance, we examine the movements of humans in the steppe zone in terms of an analysis of rhythms of mobility, an approach better suited for the investigation of these populations, who used the resource of animals in varied ways, and one which makes comparison with other cases, including projects in our group, possible. In the 1st millennium BCE, the appearance of a new element significantly changes the pattern of mobility: horses and the possibility of riding expand the geographic reach of steppe populations considerably.

With respect to mobility, therefore, one can make the following assumptions for the Eurasian steppes. (a) There was an abrupt decrease in interactions with the *Umwelt*, as the *Umwelt* shrank as a result of the concentration on cattle breeding at the turn of the 4th to the 3rd millennium BCE. (b) This decrease, however, was not necessarily accompanied by a decrease in geographic reach; in the 1st millennium BCE, geographic reach actually expands substantially as a result of the introduction of another domesticated animal, the horse, and through the specific relation to it as a saddle horse.

Local climates and cultural traditions are not the only factors determining the rhythms of migration; animal mobility also plays a role. Animals have their own abilities and preferences with respect to movements in space and they are adapted to life in different landscapes. A highly variable subsistence economy such as that of the 4th millennium BCE in the steppe region north of the Black Sea would certainly have given rise to greater differences in mobility behavior than would the later, more uniform cattle breeding, which in all probability caused an increasing predictability of migrations and thus easier contact to adjacent groups. In the 1st millennium BCE, the organized use of horses as riding animals results in a completely new component of mobility which researchers have thus far tended to interpret from a social perspective or in terms of its relevance for combat and seldom, if ever, with regard to the daily management of herds.

The situation in the project in south Turkmenistan is very different. There, mobility occurs over much longer spans of time, with residential structures of entire villages being abandoned or resettled. If traditional archaeological criteria were applied, one would describe such settlements as village-like and embedded locally, with an assumption of

should be possible to generate at least minimax values for residential movements for our comparative cases. Whether this can actually be valid for groups closely tied to urban societies is a question that would have to be examined.

41 Kaiser 2010, 26 Fig. 1b.

42 Merpert 1974, 11–12; Shilov 1975, 14.

43 Bunyatyan 2003, with an overview of the history of discourse in the field.

long-term sedentism. Yet the site of Monjukli Depe was frequently abandoned, from the Neolithic onward, and judging by preliminary reports from other excavations in the region,⁴⁴ this was not an isolated case. The reasons for such medium-term settlement mobility may well lie in crises in the *Umgebung*, anything from the failure of water to appear in a nearby wadi⁴⁵ to dune formation. The moves appear to have been so integral to the forms of subsistence and social life that a crisis and subsequent departure were not necessarily experienced as a major problem.

Subsistence was based primarily on barley and wheat cultivation⁴⁶ and the raising of medium-size livestock (sheep and goats).⁴⁷ The reach, in the sense of the appropriation of the potential of the *Umgebung*, is considerably more limited than in the case of the three sets of relationships under investigation for the forest steppe in the Black Sea region: more than 80% of the animals identified in the archaeological material are sheep or goat. The sphere of domesticated plants reveals similar concentrations on wheat and barley. Isotope analyses are planned to ascertain the geographic extent of herd mobility: They should potentially yield information relating to whether herds were kept only in the foothill zone or whether the geographic reach stretched into the Kopet Dag valleys with a form of 'Yayla farming'.⁴⁸

Rhythms and scales of migration are determined by multiple factors, including what could be termed society-specific 'dwelling practices'. There is a correlation between the length of occupancy of a dwelling and the effort involved in its construction, between the effort required to erect a tent vs. a house. However, it would be incorrect to suppose that the correlation is simply a linear one. The population in Monjukli Depe lived in quite substantial houses built, at least in the 5th millennium BCE, out of regularly shaped mudbricks. Houses had a use-life of at least a couple of decades, if not more.

Overall, the rhythms of migration in the Kopet Dag area were far slower, and the geographic as well as the resource reach were smaller than those associated with the steppe regions. However, this does not point to a completely sedentary existence, nor does it imply a rigidity of life bordering on the typically assumed peasant inflexibility.

Between c. 6000 and 5000 BCE a change occurred in the economy of the groups living in the desert fringes of the western Nile Delta, transforming from a mobile hunter-gathering Epipalaeolithic lifestyle, with the use of a specific tool-kit of very characteristic lithic types to the first sedentary Neolithic communities to farm domesticated species. Here, the possibility of a transition can be considered, although in other areas of the Nile Valley a hiatus lasting from c. 6000–5500 BCE has been suggested. Re-examining the available data and chronology, Shirai has explored the possibility of a transition in the Fayum depression southwest of modern Cairo, where a closer examination of tool types and new AMS radiocarbon measurements are beginning to suggest that alternatives to a hiatus are worthy of serious consideration.⁴⁹ The question then becomes one of potential continuity between the mobile hunter-gatherer human groups of the Epipalaeolithic and the settled Neolithic communities and of the degree to which we are dealing with at least two distinct groups, or whether there might have been a more gradual development or even sharing and development of ideas than had previously been considered. The extent to which the settled group(s) remained partially mobile, or the degree to which they kept exploiting the surrounding landscape is also at the forefront.

44 Berdiev 1966; Berdiev 1972.

45 Jonas Berking and Brian Beckers in Pollock, Bernbeck, et al. in press.

46 Naomi Miller and Philippa Ryan in Pollock and Bernbeck 2011.

47 See Norbert Benecke in Pollock and Bernbeck 2011.

48 For more on Yayla farming, see Hütteroth 1959. Unfortunately, these valleys lie in the Turkmeno-Iranian border zone and are presently inaccessible.

49 Shirai 2010.

The case study area of Merimde Beni Salama offers a rare opportunity to further investigate this issue. An expanding set of evidence was revealed during archaeological investigations in 2013 and 2014⁵⁰ as well as by colleagues from the Ministry of Antiquities in 2014. Examination of the material remains, including grinding stones,⁵¹ and palettes will allow for a clearer understanding of the changing subsistence strategies and the degree to which climatic changes can be understood as enhancing the possibility for the move to new lifeways. These climatic and environmental changes may have acted as the catalyst necessitating – or enabling – human groups to settle, with a segment of the community continuing to remain mobile not only for additional nutrition, but possibly also to scope the wider area for people, animals and other resources and environments to manipulate and exploit.

5.2 Human–animal relations

The discussion of mobility rhythms shows that some spatial movements are closely related to human-animal relationships. These relationships are central to our focus on the concepts of *Mitwelt* and *Umwelt*.

Particularly for prehistoric communities in the western Eurasian steppe region, research on human-animal interactions has thus far been confined to the use of animals as a food resource. In our investigations of the changing engagement with animals within the framework of subsistence strategies, we intend to investigate the reciprocal relationship of humans and animals rather than limit ourselves to the narrow standpoint of animals as suppliers of primary (meat, hide) and secondary (milk, wool, traction) products.⁵²

The faunal assemblages for the 4th millennium BCE in the northern Black Sea region suggest quite heterogeneous approaches to working and game animals. The settlements from which the osteological materials were collected were inhabited in different periods. As a result, a relatively long period of time can be studied, at least for some of the regions north of the Black Sea. This long-term perspective shows that the specialized cattle breeding which subsequently appeared was in no way the result of a linear evolution, as scholars have frequently suggested.⁵³ On the contrary, one can detect numerous individual developments that did not exclude the possibility of reverting to more traditional practices in animal breeding, as Victor A. Shnirelman has pointed out.⁵⁴ Using isotope studies on human and animal bones⁵⁵ and the analysis of organic residues in pottery from the settlements of the north Pontic region, we attempt to enlarge the available corpus of data in order to permit a better understanding of the multifaceted processes for this part of eastern European prehistory.

The differing use of animals is part of a complex structure that also comprises a range of other components, from the socio-economic, to the ritual, right up to aspects of a community's worldview. In the 3rd and 2nd millennia BCE, a form of cattle-based animal breeding was established; this subsistence certainly entailed, both as a prerequisite and as a result, very close mutual relations between humans and bovids rather than merely an objectifying familiarity with the animals as resources.

We encounter a markedly different situation in the Precaucasian region in the 1st millennium BCE, where the significance of horses increases, especially in their use as mounts for riding. The horse was both a symbol of power and wealth, as well as a part

50 Rowland and Tassie 2015.

51 See Lucarini 2006 for exploitation of wild grasses in Farafra Oasis.

52 Sherratt 1983; Sherratt 2006.

53 Merpert 1978, 57–59.

54 Shnirelman 1980, 241–243.

55 Gerling 2015.

of a combat alliance or a family member, as both mythic traditions, such as the Nart Sagas,⁵⁶ and historical sources⁵⁷ testify. Such a situation could not have failed to have deep ramifications for interpersonal relationships as well.

Here, we are investigating the consequences that human-animal relationships had for society as a whole, rather than looking only for new forms of mobility. The specialization in bovid husbandry presumes a particular kind of herd management that may have resulted in specific forms of human-animal relations. The questions we will investigate are (a) how intensive was the use of ‘primary and secondary’ products and (b) what indications are there for the symbolic value of specific types of animals? Specific relations between humans and animals result in a different perception and valuation of animals. The example of horse sacrifices in elite burials of the Scythians indicates that they construed an imagined ethical relationship, in which horses had developed an individuality that evoked an allegiance that did not end at death.⁵⁸

A wide variety of different human-animal relations can be detected in the case of far less mobile societies such as those of Monjukli Depe in prehistoric Turkmenistan, despite the fact that the first impression might be one of monotony. The zooarchaeologically documented species can be assigned to at least three major categories: wild animals, livestock and pets.⁵⁹ As indicated above, domesticated herd animals primarily included sheep and goats, with cattle taking a secondary position. Dogs constitute the other species of domesticated animal. They were not, however, purely guards of the herds. Paw prints left by at least three dogs in the mud plaster of two different houses reveal that dogs had direct access to the housing area and that their treatment was probably similar to that of pets today. It is also striking that dog bones make up only a very small proportion of the archaeozoological assemblage from Monjukli Depe.

Cattle had a special status among the herd animals. As Jana Eger was able to show through a detailed contextual analysis, articulated remains of cattle bones – primarily vertebrae and a set of nearly complete skulls – were deposited in an open area in the settlement in a way that suggests sacrifices or the holding of public feasts. Finds of horn cores in the corners of houses indicate that they may have been used as wall decorations. It is probable that, as was the case in many other regions of Western Asia, these tame but very large animals had an ambivalent status, representing a danger and a provider of food at the same time. Whether cattle were also used to pull or carry loads is a question that cannot be answered without additional analysis. It appears that cattle are the most frequently represented animals among the collection of small clay animal figurines.

In both Neolithic and Aeneolithic layers, Monjukli Depe features a group of wild animals that, although small in terms of percentage, is highly diverse. It is beyond the scope of this paper to discuss their relations to humans in detail. However, one can define this relationship for the Meana region in prehistoric times in the way that Overton and Hamilakis⁶⁰ did in a European context: as the concentration on one or two domesticated animal species increases, the frequency of encounters between humans and certain other species decreases sharply. This must also have resulted in a change, difficult to ascertain in concrete terms, in interspecies relations (with humans on the one side). It emerges from these few remarks that archaeologically detectable changes occurred even in the

56 Dumézil 1976; Dumézil 1978; Abaev 1989.

57 Haenisch 1948.

58 Samašev 2007; Čugunov, Parzinger, and Nagler 2010 96–11; 310–311.

59 The following depiction is based on information provided by Norbert Benecke in Pollock and Bernbeck 2011 and Jana Eger (personal communication, see also Eger 2013).

60 Overton and Hamilakis 2013.

settlements that Redfield⁶¹ mischaracterized as “little communities” devoid of historical change.

The transition to settled life in the western Delta and the adoption and adaption of domesticated species has often been seen as the result of the introduction of a Neolithic package coming from the Near East. The evidence from past investigations at Merimde shows that the Neolithic community practiced a mixed farming economy, tending wheat, barley, flax and other plants along with cattle, sheep, goats and pigs. Pigs prefer a wooded environment, whereas cattle require open pastureland. Goats are browsers, whereas sheep and cattle are grazers. It is possible to run all three of these species together in arid or semi-arid environments with a high proportion of scrub and tree vegetation, particularly in cases where there are mixed plant communities. In these environments there would be different herbage utilization by the grazing species, with goats browsing more of the scrub and tree components than sheep and cattle, and sheep utilizing more scrub than cattle. As noted earlier for Monjukli Depe, cattle seem to have attained special importance, for along with the anthropomorphic figurines, the highest proportion of the zoomorphic figurines were of cattle.⁶²

Another major research focus has been the issue of why Egypt was so late to adopt this package in comparison with groups in the Levant and other regions. Taking the political-ecological approach, however, a more productive line of questioning with which to engage might be: a) what were the environmental conditions in Egypt at the end of the 6th millennium BCE, b) when and where is there the first evidence for settled farmers using domesticated species in the Nile Delta, c) in what way had the local conditions changed to become suitable for sustaining this new way of life and d) were there any environmental, geographical and economical reasons to delay the introduction of the various elements of the Neolithic package to Egypt. It is important, in order to address this final point, to consider the variable temporal scales of the introduction of various elements associated with the Neolithic package and not necessarily the adoption of the package in any one time.

5.3 Construction of landscapes

Landscape is often reduced to the level of ‘natural space’, which we include within the more extensive concept of *Umgebung*. Our initial aim is to independently describe the *Umgebung* along with the conditions for human perception and intervention. A climate simulation covering the past 6000 years will be developed for large parts of Europe (22–42° east and 42–51° north). In order to approach this issue, a multidisciplinary approach has been adopted in order to record, model and assess climatic and ecological changes in the case study areas from the mid- to late Holocene.

This part of the research addresses the entire *Umgebung* of ancient societies. It is, in the traditional sense, a slice of the ecology that one could refer to as ‘natural processes’.⁶³ However in our research, we intend to take an approach that differs from the notion that climate changes are a neutral exterior framework that lend themselves to description in universalistic terms. Rather, the potential political dimension of climate changes lies in the fact that they did not necessarily affect all members of a society equally, whether in ancient or in modern times. Given a mixed subsistence economy, in which not all households or communities pursue the same strategies, climate change of whatever type will affect

61 Redfield 1953.

62 Tassie 2014.

63 As Descola demonstrates, these are objective processes within the framework of scientific epistemology, and their research contrasts “the dualities of nature and culture... one way among others of tracing the continuities and discontinuities in the fabric of the world” (Descola 2013, 30).

households or communities to a variable extent. Our research on this issue involves the investigation of the degree to which environmental changes might have been connected with the shift from mobile herding to more sedentary lifestyles and back. Therefore, rather than studying global environmental change, we investigate regional socio-environmental changes. Using a transdisciplinary approach, various models of climate changes will be examined and an attempt made to determine how those changes might have influenced choices of subsistence strategies.

Many human activities have an impact on their immediate spatial surroundings and can thereby result in the modification of those surroundings. At the same time, perceptions of the *Umgebung* differ due to variations in people's practices. Pastoral communities, in which the breeding of bovinds is dependent on the provision of sufficient suitable pastureland for the animals, will engender a different way of seeing the landscape than communities that rely to a greater extent on hunting.

One aspect to be explored in the individual projects is whether the cases under study show that the use of the resources available in the *Umgebung* gradually reshaped it or whether changes in the *Umgebung* were the results of deliberate action. Burial mound necropolises are of interest as ritually constructed landscapes in the projects based in the northern Ciscaucasus. The results of geophysical prospection in the periphery of the tumuli document complex ritual behaviors of bearers of the Scytho-Sakian cultural tradition, including secondary burials, sacrificial sites and the remains of architectural structures. The burial fields exhibit a topographically structured layout in which the larger kurgans are often located in the southeast of such fields. In six of the seven necropolises from the earlier Iron Age studied so far, the use of the space – the construction of one large-scale kurgan and the subsequent extension to a necropolis – is directly comparable. This is evidence not only for the same principles of knowledge and space but also for a deliberate modification of the topography towards an anthropogenic landscape, a manifestation of specific cultic/ritual ideas and practices on the part of the Scythian mounted nomads which can be understood as a ritual canon. The fact that similar practices have been detected throughout the Eurasian steppe suggests the possibility of an extensive network in which similar notions about the *Umwelt* and *Mitwelt* and related knowledge were passed on among the Early Iron Age nomads.

One must ask to what extent this knowledge existed as a discursively anchored construction of space, or rather as a recursive practice which, because of its strong basis in ritual, gave rise to mimetic practices that may not have permitted critical examination. From a methodological perspective, this remains something that can only be investigated in exceptional cases, namely when archaeological evidence points to a breach of the unquestionable societal doxa. This occurs primarily in cases of intercultural contact; which are far more common in mobile than in more sedentary societies.

The case being investigated in Turkmenistan is very different from the western Eurasian examples, including in the construction of landscapes. These were settlements inhabited over the medium-term by populations engaging to an equal degree in cultivation and animal breeding. They fundamentally reshaped their landscapes in at least two respects. One of these was 'living on a tell [depe]', which refers to a practice that gradually emerged in Western and Central Asia from the start of the Neolithic. Continuing to live on the same site for as long as possible and building new houses on the ruins of older ones is a specific cultural practice that resulted in characteristic tell landscapes. These differ from the regions shaped by kurgans only to the extent that the tell settlements are less regular in form because there was no plan involved in their creation.⁶⁴ As inhabited mounds they had the added effect of changing a population's visual and bodily perspective on

64 Hansen and Toderas 2010, 90. – Geographic analyses around Monjukli Depe suggest that a tell landscape existed by at least the 5th millennium BCE, which has since been covered by loess layers of great depth.

the *Umgebung*. People would probably have associated the concept of ‘higher up’ (than the surroundings) with their houses; this is unlikely to have been the case for mobile groups whose dwellings were more ephemeral. Such a change of perspective would also have affected classificatory knowledge: it was possible to visually monitor the settlement’s direct *Umgebung*, and this overview of approaching herds, wild animals or people from nearby settlements could have translated into the development of a feeling of mastery over an *Umwelt*. The idea of manageability of a *visible* and thus more approachable *Umwelt* could have been the result. That, in turn, may have resulted in a more intensive contrast with the unmastered *Umgebung* which, due to limited mobility, was less familiar or completely unknown and as a consequence may have been perceived as increasingly dangerous.

The second way in which people in the Meana-Çaaça region constructed their landscapes hinges on the fact that, at least by the Aeneolithic but probably already in the Neolithic, they no longer saw the course taken by a stream through a valley as a given: they had become accustomed to seeing a water course as something that could be manipulated. Palaeobotanical analyses indicate that people had started to construct small-scale irrigation systems.⁶⁵ Although this may have been done solely for agricultural purposes, one should consider that such systems required efforts at a scale beyond a single household, meaning that agreement at the supra-household level would have been necessary. In this respect, social relationships are a precondition and a result of a landscape-shaping element of the *Umwelt* conditions, to the same extent as these conditions affected social relationships.

The ‘constructed’ and used landscape was already extremely variable during the Middle Palaeolithic in Egypt due to the seasonal and longer-term variability of climatic and local environmental conditions. This, in turn, affected which plant and animal species suitable for exploitation were available. It also affected how people used the landscape and the area suitable for stopping at specific times of year, and over longer timescales subject to climatic change. At the height of the last glacial maximum, c. 22 000 years ago, the Sahara had a cold, arid environment devoid of human habitation. During this period human habitation in Egypt was concentrated along the River Nile. As the world began to warm up, the flora and fauna changed; c. 11 000 years ago the Western Desert of Egypt gradually changed into a savannah full of human occupation. These communities still followed a hunter-gatherer lifestyle, but developing technology, notably ceramics, enabled groups to adopt to new processing and consumption practices. Major global climatic changes occurred at 6200 and 5300 BCE, and the latter of these may well relate to the time of settlement in the western Delta, although targeted climatic investigations are needed to ascertain exactly what the local climate was like at this time, given that wider changes would affect regions in very different ways to greater or lesser extents. The Neolithic groups were increasingly settled, however, also making active use of the surrounding landscape, a landscape that had been formed during and after the Palaeolithic – for examples the terraces that were cut during the Palaeolithic and descend into the modern cultivation and Nile floodplain – even today. Merimde Beni Salama lies adjacent to the mouth of the Wadi Gamal, and this surrounding hinterland would have been attractive to animals, and a place where hunters, it seems, may have camped out in wait for these wild animals. The Wadi el-Gamal is also a source of chert cobbles, cobbles used for production of lithics from the Middle Palaeolithic and into the Neolithic. The nodular chert found on these terraces also benefitted other communities further afield.⁶⁶

The global climatic changes affecting the local environment mentioned above are central to debates regarding changing lifeways during the Epipalaeolithic-Neolithic ‘transition’ in the Nile Delta. Recent investigations suggest that the first farmers settling

65 Miller and Ryan, in Pollock and Bernbeck 2011.

66 E.g. Wilson, Gilbert, and Tassie 2014.

in the area may have lived on the fringes of a body of water northeast of the fan of the Wadi Gamal terrace. The large amount of polished, partially polished and chipped axeheads along with adzes indicate that these Neolithic people were modifying their local environment, shaping it to the needs of a mixed farming economy. The field project funded by the Fritz Thyssen Stiftung has taken environmental cores, and some preliminary observations are possible, including Judith Bunbury's preliminary interpretation that the site was located on a Pleistocene terrace and that a channel running from the west – possibly from the Wadi Gamal – originally cut right through the part of the site, which is currently protected as antiquities land.⁶⁷ It appears that the Neolithic settlement was set on part of the fan of the Wadi Gamal,⁶⁸ and that it occupied a site extending up to a body of water suggested by a clay rich layer. After the end of the Neolithic occupation there is a hiatus of a few hundred years before evidence of a Chalcolithic Maadian cemetery (the settlement having not yet been located) dating to the 4th millennium BCE. The site then seems to have been abandoned for several millennia. It the wider aridification of the Sahara at c. 2200 BCE that was the reason for the lack of communities living in the area, with thick sands deposited across the thus-far investigated area of the Neolithic settlement, and is also apparent in the drill cores.

6 Conclusion

This contribution has a programmatic character. Our aim here is to describe a conceptual framework for a comparative approach to past societies that can be described as variably mobile and closely concerned with issues that are best framed in terms of a political ecology. From an overview of the development of the concept of political ecology in the fields of geography and cultural anthropology and the current debates on the topic, we have constructed a way to systematize present discussions with a view towards applying them to the study of past mobile societies. The result is a concept that we express by means of the triad of terms *Umgebung*, *Umwelt* and *Mitwelt* (Fig. 1). Essential for this concept is the distinction between symbolic aspects of ecology and spheres of practice in the populations attested in the archaeological record. Interrelationships among *Umgebung*, *Umwelt* and *Mitwelt* are dynamic and in constant flux. To analyze these relationships we have formulated multiple research strategies based on three issues: mobility rhythms, human-animal relations and landscape construction.

67 Rowland and Bunbury 2014.

68 Rowland and Bunbury 2014.

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