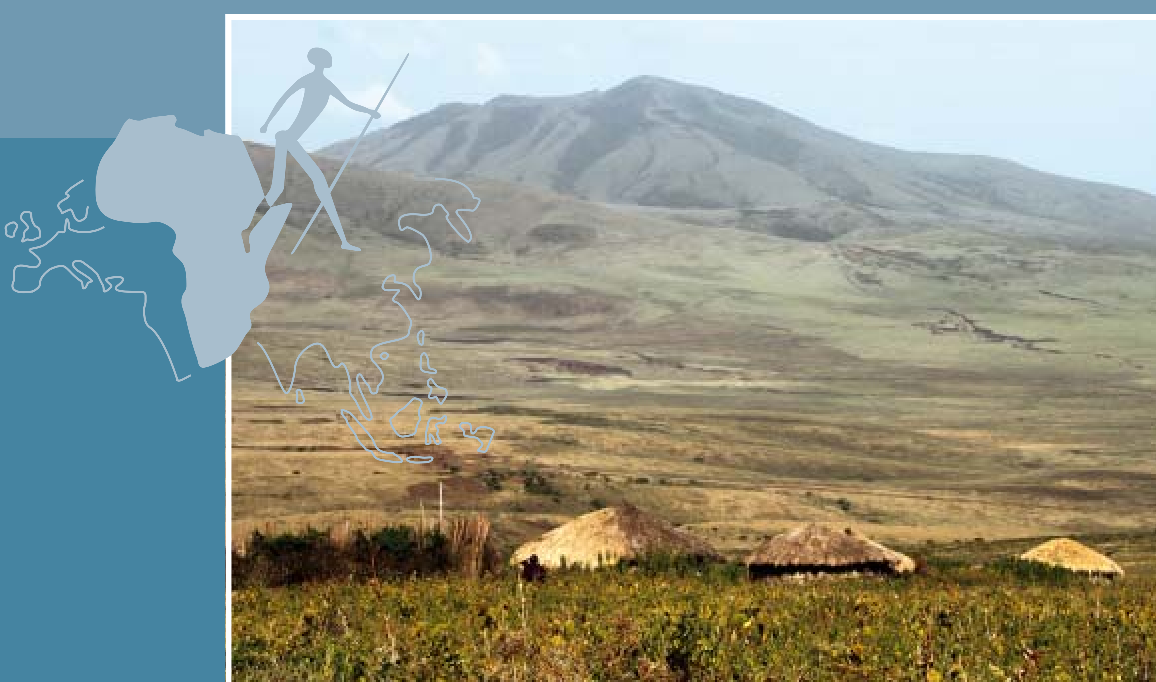
newsletter 10 | 2015

The Role of Culture in Early Expansions of Humans



A segment of human ecospace today: Masai village in Tanzania

HEIDELBERGER AKADEMIE DER WISSENSCHAFTEN
Akademie der Wissenschaften des Landes Baden-Württemberg

THE ROLE OF CULTURE IN EARLY EXPANSIONS OF HUMANS

Editorial

In this expanded tenth issue of the ROCEEH newsletter we discuss the concept of ecospace and its specific relevance for ROCEEH, examine the role of innovation in the Middle Stone Age of southern Africa, report on ongoing field work at Melka Kunture (Ethiopia), summarize the results of our workshop on the Caucasus in Tbilisi (Georgia), and review the 2014 UISPP Congress held in Burgos (Spain).

The ecospace concept in ROCEEH

Traditionally, comparative methods are used to infer dispersals and related range expansions among fossil humans and their precursors. The classical approach rests on anatomical comparisons of hominin fossils and the distinction of species and higher taxonomic units. The spatiotemporal distribution pattern of species reveals range expansions. Although recent improvements of the procedures, for instance by 3D-morphometrics, has expanded the potential of quantitative comparisons, the basic structure of the argument remains unchanged. In addition, paleogenetics and human population genetics trace the effects of historical and prehistorical exchange among early human populations. These innovations push the resolution of the reconstruction of migration patterns to a new level. As is the case in paleoanthropology, paleogenetic studies of range expansions rely on a comparative approach, although the comparison of DNA sequences follows a more standardized protocol. Both types of studies provide basic scenarios for distribution patterns of early humans and their precursors and characterize putative range expansions.

For ROCEEH such basic information represents only the starting point for an entire universe of questions: Which routes did early hominins follow? Are there potential corridors, and can we identify barriers preventing expansions at an earlier point in time? What are the prerequisites, constraints and circumstances of the expansion events identified? Which factors drove hominins out of particular environments, and which factors attracted them to settle in new places? Furthermore, our hypotheses on range expansions resulting from paleoanthropological and paleogenetic studies need to be buttressed with ecological requirements and the behavioral performances of particular hominin groups. In this brief article, we focus on the ecological prerequisites for hominin presence in specific environments. In order to accomplish this task, we require a concept that allows us to compare hominin living spaces in various regions and over extensive periods of time.

We turned to a concept suggested by Richard K. Bambach and colleagues during the last decade, namely the concept of ecospace. Initially, the ecospace concept was introduced in order to infer properties about habitat from the composition of animal communities and their ecological requirements with regard to their environment. Bambach and colleagues classified diet, nutrition, locomotion type and body mass of all vertebrate species occurring in a particular community. Their main purpose to develop such a classification was to create a standardized method to describe and compare such communities. They studied the ecological diversity of communities, for instance, among terrestrial vertebrates. In this way they were able to trace and characterize developments in the ecological diversity of such communities over vast geological periods. However, they did not attempt to compare habitats of diverse hominin species. The resolution of the ecospace concept in its initial form is too low to allow for comparisons on the species level. Moreover, Bambach and his colleagues did not attempt to provide characterizations of environments on a quantitative scale. Finally, their inferences on various ecospaces were based on a single proxy, namely vertebrates. The ecospace concept required the clear definition of expansion itself in order to apply to the reconstruction of early hominin expansions.

Fig. 1 illustrates the ecospace concept developed by ROCEEH. By "ecospace" we mean a concept which:

- Applies to the characterization of early hominin habitats, but which needed an improved resolution
- Permits us to quantitatively characterize the environment, a necessity for testing and comparing by means of statistics
- Integrates many different proxies for the characterization of hominin environments, thus improving the robustness of our reconstructions.

With this improved understanding, we now understand hominin ecospace to consist of an open-ended list of components, for instance, climate, vegetation, fauna and landscape forms. Each component can be characterized by different sets of parameters. Climate for instance may be characterized by temperature, precipitation and diverse indices for aridity and seasonality. Each of these parameters is defined in an unequivocal way. The ecospace concept offers new perspectives for standardized descriptions of environments in different places, at different times and of diverse hominin taxa. Because the parameters are independent of hominin presence, we can compare environments selected by hominins with environments they avoided or abandoned.

The list of the parameters is open, and new parameters can be introduced, as long as their definitions follow given scientific standards. Likewise, in order to characterize the ecospace of a particular group of hominins, any combination of parameters can be selected from the list. Every parameter contributes to the picture, but if a reconstruction is based on only a few parameters, the resulting picture will be coarse. Still, it is always possible to add further information at any time.

Another important feature in the parameter list is that the parameters are not independent of one another. Temperature and precipitation, for instance, determine vegetation density and the ecological diversity of fauna, as well as the relief and surface of a particular landscape through weathering, erosion, transport and depositional processes. In some cases we successfully demonstrated correlations among various parameters on a quantitative scale. In tropical environments, the ecological diversity and specific composition of the specialized herbivore community correlates with vegetation density. We can make use of such correlations to predict features of vegetation, even in the absence of fossil evidence for plants. Similarly, the composition of plant and animal communities permits the reconstruction of climatic features. Even if primary fossil evidence is lacking for a particular parameter of hominin ecospace, we may still be able to reconstruct some of its specific features.

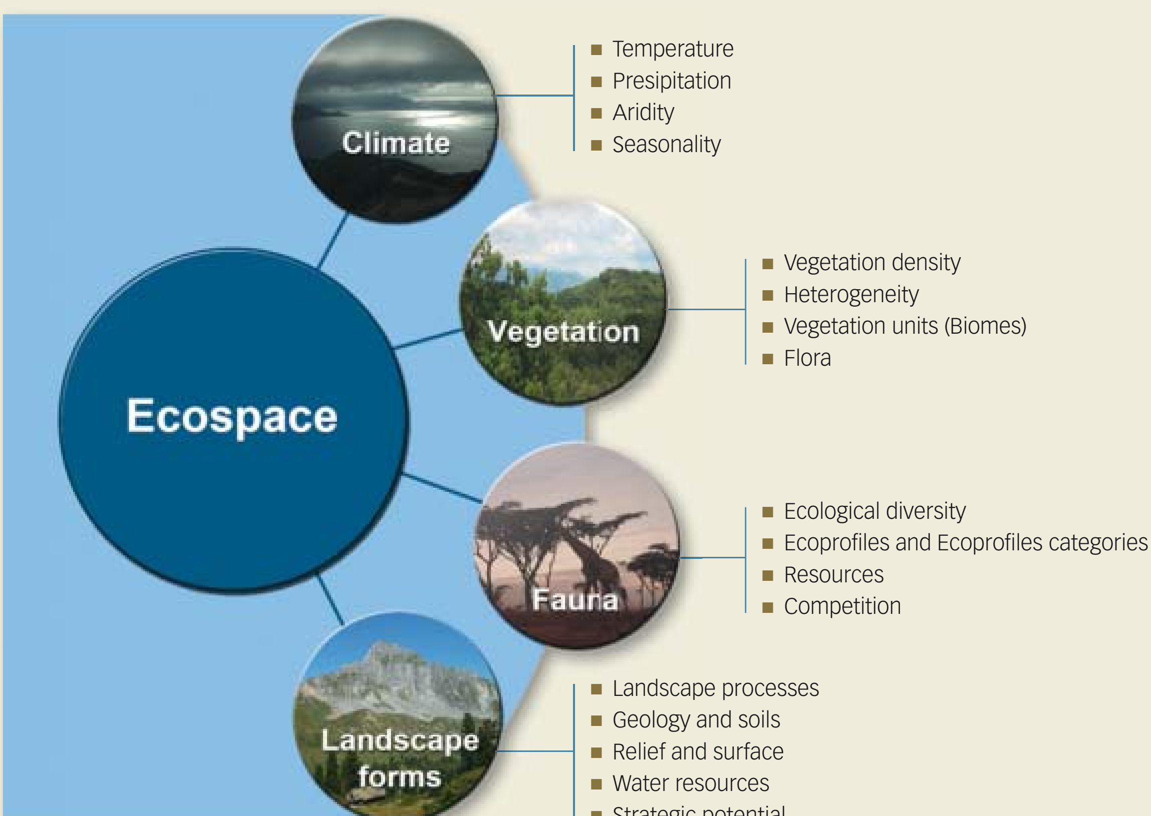


Fig. 1 Various components of the ecospace and examples of proxies which can be used to characterize each of the components.

The practical perspectives of our concept of hominin ecospace are enormous. Characterizing hominin ecospaces in Africa and Eurasia between 2.8 million years and 20,000 years comprises a comprehensive research program to which ROCEEH has contributed basic terms, concepts, methods and definitions. ROCEEH's concept for ecospace provides basic information about the environments inhabited by hominins. Moreover, it constitutes a standardized framework for comparing the ecospaces of different regions at various geographical scales among various hominin species and populations. In addition, we can trace shifts in hominin ecospace over time and examine expansions in hominin ecospace, as implied by Fig. 2.

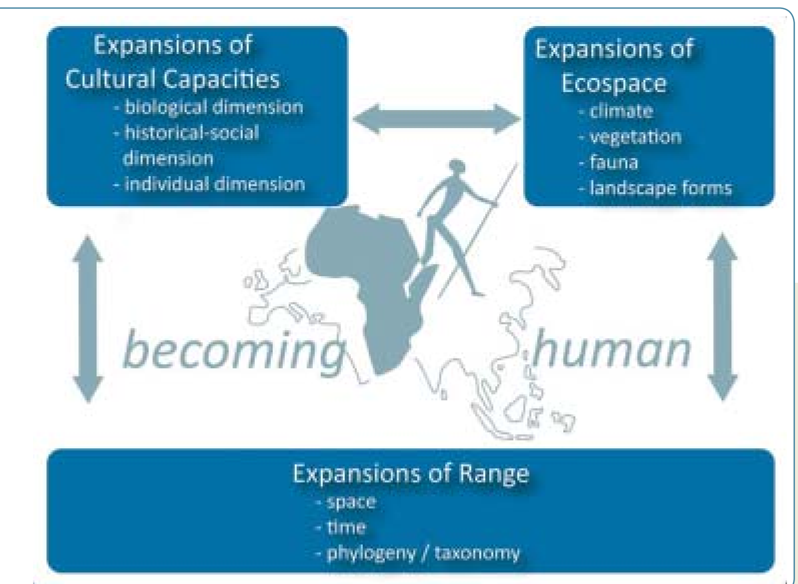


Fig. 2 Expansions scheme highlighting the theme "becoming human".

At the same time, we must remain aware that characterizations of hominin ecospaces constitute only the first step in a series of further questions regarding the study of hominin expansions. Correlations between hominins and their environments contribute to hypotheses about specific expansion events. Hominin distribution and dispersal are substantially driven by the spatial distribution and temporally variable availability of resources. We do not limit the term "resource" to nutrition, although food resources constitute a major component of hominin resource space. Resources include additional features found within the surroundings of hominins that determine the attractiveness of a particular habitat, for instance distance and availability of sources of drinking water, the strategic potential of a particular landscape for cover and shelter, or the availability of raw material for the production of tools and other artifacts. The general concept for ecospace thus requires supplementation and expansion to achieve an overall concept for hominin resource space.

Christine Hertler, Angela Bruch and Michael Märker

Innovations in the spotlight: what's really new about the Middle Stone Age of Southern Africa?

The study of innovations is essential to Paleolithic research. By identifying and interpreting innovations in material remains, we better understand developments during the cultural evolution of mankind. This article focuses on the origins of human creativity. Innovations are often interpreted in terms of progress in cultural change. Many studies focus on the question of when and how humans began to show cognitive abilities similar to those we know today. Innovations are important in this line of research because a significant innovativeness is generally thought to be a defining characteristic of *Homo sapiens.* Here we pose the question, is every innovation the same, involving an equal amount of innovativeness? Further, does every innovation have an impact on further innovations?

Although many innovations are identified through new types of artifacts and connected to social or cultural issues, a systematic qualitative and quantitative study of changes in the behavior underlying them is thus far missing from current archaeological research. Only an approach that incorporates a fundamental specification and differentiation of innovations can enable a more precise evaluation of newly developed elements, and therefore, of cultural change. In this way, we can also start to comprehend the processes of innovation. Such an approach is of special significance for Paleolithic research because of the limited data sources that are available.

A German Research Foundation (DFG) project associated with ROCEEH currently aims to fill this gap by performing a quantitative and qualitative assessment of innovative behavior, with a focus on differences in the Middle Stone Age (MSA) techno-complexes of southern Africa. Over the last years we have all been amazed by exciting new finds attesting to special behavioral patterns: engraved ocher pieces and ostrich eggshell, early bone tools and shell beads (Fig. 3), ocher workshops, bow-and-arrow and snare technologies, compound adhesives, burnt bedding and heat treatment of silcrete. These finds are fascinating because they allow us to gain a view into previously unseen spheres of prehistoric behavior; but besides being new to us, to what degree were they innovative in the MSA?

The MSA (ca. 300,000-20,000) of Southern Africa is particularly suitable for studying innovations because this period is characterized by a solid archaeological research base with multifaceted assemblages of artifacts. Furthermore these cultural remains were uncovered by recent excavations and analyzed in archaeological studies using modern methods, including dating studies. This offers us the opportunity to work with comparatively well dated materials, a crucial need for the study of innovations. The data pool consists of artifacts (stone tools, organic artifacts, ornaments and others) within the archaeological assemblages of a chosen geochronological space, as provided by ROCEEH's database called ROAD (ROCEEH Out of Africa Database).

By conducting research on the innovations of the Middle Stone Age of southern Africa, we aim to identify cultural change in this region during the MSA, gain insight into various innovation processes, and reconstruct and analyze past human behavior. The main goal of the project is to further develop a systematic and universally applicable approach to analyze spectra of artifacts in the context of their capacity for innovation, as accessible through material remains.

The approach is based on the fundamental premise that innovations are not restricted to new artifact categories and concepts, and are seldom completely new solutions. It seems more likely that innovations affect diverse parts of object behavior. The approach includes the quantitative and qualitative characterization of object behavior considering: 1) typological aspects, 2) technological attributes such as material, form and function, and to a certain extent, 3) mental aspects. Based on these assumptions, the goal is to identify innovations in different aspects of object behavior and evaluate behavioral complexity. In this regard it is necessary to reconstruct and compare past behavior.

To achieve this, two qualitative methods, cognigrams and effective chains, are applied. The use of these methods systematizes the reconstruction of tool behavior and the underlying actions and perception of foci. While cognigrams and effective chains are both methods for coding tool use schematically, they are used to analyze behavior on different scales. They code not only the complete reconstructed action sequence similar to *chaînes opératoires*, but also the underlying attention foci of the acting individual. Thus the method incorporates all of the active, passive and notional elements of tool behavior, as well as the various effects the different elements have on each other. Based on the coding of reconstructed tool behavior in cognigrams and effective chains, differences are identified and evaluated in terms of their innovativeness, by comparative analyses on a larger chronological scale.

We focused on the MSA of South Africa and Lesotho and grouped the artifacts into three broad categories: stone tools, bone artifacts and special behavioral patterns, such as heat treatment or the production and use of shell beads. The study of the bone artifacts is already complete and the stone tools are currently under analysis, while the special behavioral patterns have yet to be studied in detail.

Stone artifacts comprise the largest of these three group. So far 91 different types were identified, including tools such as backed blades, bifacial points (Fig. 4), unifacial and serrated points, various types of scrapers, burins, perforators, segments, truncated tools and microliths in the form of trapezes and triangles. Furthermore there are also different core forms, blanks and other artifacts including hammerstones and anvils. The first quantitative analyses show that various tool types appear over the course of the MSA of southern Africa for the first time, and can be interpreted as possible innovations, for example, triangles and truncations during the Howieson's Poort (ca. 65,000-60,000). It has to be stressed that, with the possible exception of the Howieson's Poort, we do not see times with significantly more innovations with regard to stone tool types. But there may be some bias involved, since the Howieson's Poort is by far the best researched cultural unit of the South African MSA.

Fig. 3 Blombos Cave marine shell beads.
(Photo: by Marian Vanhaeren & Christopher S. Henshilwood – Own work. Licensed under CC BY-SA 3.0 via Wikimedia Commons – https://commons.wikimedia.org/wiki/File:Blombos_Cave_marine_shell_beads.jpg#/media/File:Blombos_Cave_marine_shell_beads.jpg)

Fig. 4 Blombos Cave bifacial points.
(Photo: by Magnus Haaland – Photo taken by author. Licensed under CC BY-SA 3.0 via Wikimedia Commons – https://commons.wikimedia.org/wiki/File:Blombos_Cave_bifacial_points.jpg#/media/File:Blombos_Cave_bifacial_points.jpg).

Until the early 1990s, researchers assumed that complex bone tools were solely associated with the European Upper Paleolithic after about 40,000 years ago. In Africa it seemed bone tools appeared much later during the Later Stone Age after ca. 25,000. However, this view has changed as more bone tools were found at MSA sites, and further discoveries of Eurasian bone tools older than 40,000 were associated with Neanderthals.

For now 59 generally recognized and chronologically classified bone tools have been published from three South African sites, Klasies River (Eastern Cape), Sibudu (KwaZulu-Natal) and Blombos (Western Cape). There are several possible explanations for the low number of bone tools during the MSA: one is taphonomy, with poor preservation of bones at some sites, and another is sampling bias, as faunal remains were not equally recovered (and rather discarded) at some older excavations. Furthermore, it may be that bone artifacts were not detected among faunal remains because nobody was looking for them, assuming that they were restricted to the European Upper Paleolithic and younger time periods. In fact ongoing examinations of faunal material from modern excavations indicate that the number of bone tools might be considerably higher than currently known.

Among the sample we identified nine bone artifact types: awls, points (Fig. 5), notched bones, scaled pieces, smoothers, pressure flakers, pins, wedges and one retoucher. The most common tool type is the awl. Bone implements first appear around 130,000 years ago, during the Pre-Still Bay, and are represented in nearly all of the subsequent chronological subdivisions of the southern African MSA. Quantitative analyses revealed that the bone implements show a marked diversity with regard to tool types and production techniques. They were produced using eleven methods, including scraping, grinding, retouching, polishing or combined techniques. The most common way to modify bone during the MSA was scraping. These results highlight that MSA people in southern Africa were using bone in a flexible and variable way. Thus it seems that these tool forms can indeed be considered as innovations of the southern African MSA.

Fig. 5 Blombos Cave bone points modified by scraping and polishing (Photo: „Blombos Cave bone tools" by Christopher S. Henshilwood – Own work. Licensed under CC BY-SA 3.0 via Wikimedia Commons – https://commons.wikimedia.org/wiki/File:Blombos_Cave_bone_tools.jpg#/media/File:Blombos_Cave_bone_tools.jpg).

The qualitative assessment of all MSA bone artifacts shows that many of the behaviors in which bone tools were used are quite simple and do not show a high degree of innovativeness. The production and use of a bone retoucher, used for modifying a stone tool, is comparable to already known behaviors using just stone tools. This case introduces a new element; not only is the intended tool (retouched stone artifact) modified, so is the tool used to do the modification (the retoucher). This is an additional step in tool production that makes the process more complex and opens up the possibility for new ways to produce tools. Therefore, the use of bone tools enables further innovations. Other behaviors show additional elements, for example, new functions in the piercing of shells to produce personal ornaments (Fig. 1) or a higher degree of behavioral complexity, as shown in the production and use of bow-and-arrow sets. The bow-and-arrow is probably one of the most important innovations of the MSA.

There are many new aspects in the behavioral repertoire of the southern African MSA, such as new tool types, raw materials, production techniques and functions. Still it is also important to stress that even with behaviors that make use of new tool forms, most of the behavioral aspects are probably longstanding traditions and therefore not innovations. Therefore, we must analyze which aspects were old, and then transferred to a new context or applied on new materials. The identified innovations shed some light on the variability and flexibility of cultural expression and cultural capacity during the MSA. This ongoing research allows us to gain deeper insights into the innovativeness of MSA people and will help answer the question: what's really new about the southern African MSA?

Regine Stolarczyk

Field campaign at Melka Kunture, Ethiopia

The area of Melka Kunture in the Oromia region of central Ethiopia contains one of the most important concentrations of Paleolithic sites in East Africa. The archaeological record spans over 1.7 million years, containing stratified occurrences of Oldowan, Acheulean, Middle Stone Age and Later Stone Age lithic industries, together with faunal remains and human fossils. Recently, an archaeological park covering more than 100 km^2 and including the main find locations was nominated to the UNESCO World Heritage List.

However, little is known about landscape processes such as flooding, soil erosion, sediment transport and deposi-

Fig. 6 Large gully system of Tefki area with a depth of 10 m and width of 15 m bearing accumulations of artifacts and fossils.

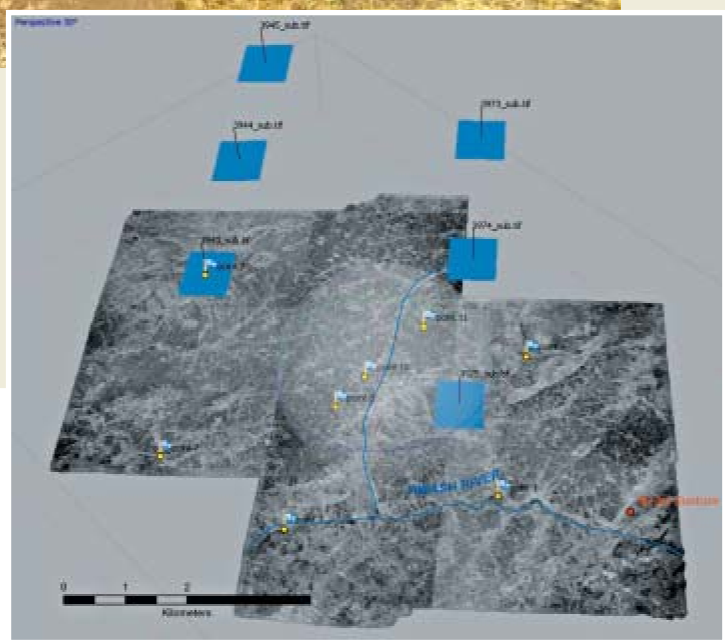


Fig. 7. Digital elevation model with 2 m resolution derived from stereo aerial photography using a structure from motion algorithm (AgiSoft).

tion, as well as volcanism and tectonics, which affected the archaeological sites in the past. By characterizing these factors we gain a better understanding of the specific context of the find locations and can evaluate conditions that might endanger these valuable archaeological sites in the future. To understand the landscape evolution of the broader area, we studied the area around the Melka Kunture archaeological area and the entire Upper Awash River which drains the area. Together with the University of Rome "la Sapienza" (Margherita Mussi) we screened the area using detailed remote sensing and terrain analysis and conducted field work for validation purposes to gain a better understanding of the dominant landscape processes and controlling factors.

The ROCEEH team led by Michael Märker conducted a field campaign in the Upper Awash Basin from March 16–25, 2015 in collaboration with Gebremichael Mekonnen (UCLA/ Ethiopian Institute for Water Resources (EIWR)), Mamo Kassegn (EIWR) and eight EIWR students. The study area spanned 500 km² between the villages of Tefki, Sebata and Melka, located about 50 km southwest of Addis Ababa. The field activity is focusing on the following research aspects:

1. Assessment of tectonic processes using a Digital Elevation Model (DEM) and river network morphology
2. Characterization of lithology and substrates via multispectral remote sensing
3. Identification and mapping of geomorphological processes using a GIS-based terrain analysis and aerial photo interpretation
4. Creation of a digital geomorphological map
5. Assessment of surface runoff dynamics and related soil erosion processes
6. Identification and interpretation of paleo-landscape features.

Fig. 8 Rain gauge installed at Melka.

Fig. 9 Measurement of hydraulic conductivity of substrates.

The analysis of ASTER and Rapid Eye multispectral data, as well as high-resolution stereo aerial photographs, yielded land use and land cover information and indicated interesting terrain features associated with paleo-landforms. We mapped these features in detail and took GPS information to locate them on cartographic products. We also took surface samples to get information on the characteristics of the soils and substrates. Moreover, we assessed larger gully systems in the Tefki area (Fig. 6) to validate the 2 m resolution DEM based on aerial photographs (Fig. 7) and investigate the stratigraphy associated with the artifacts and fossils. Furthermore, we conducted a detailed analysis of the neo-tectonic processes based on the drainage network features derived from the 2 m DEM.

To assess the hydrological dynamics of the Melka Kunture archaeological area we installed eight soil humidity sensors at different depths, four each at both 50 and 100 cm. The sensors will remain in the field until at least the next rainy season and allow for continuous monitoring of soil humidity. Fig. 8 shows the installed rain gauge which will deliver temporally high-resolution precipitation data. The instruments allow for the continuous monitoring of rainfall, slope humidity, runoff generation dynamics and related soil erosion processes.

Finally, we conducted soil infiltration and hydraulic conductivity measurements using a constant head permeameter and a modified tension (Hood) infiltrometer (Fig. 9). The students of the EIWR will continue to collect data over the next months within and outside of the Melka Kunture archaeological area. These soil hydrological measurements will yield infiltration and hydraulic conductivity maps. The parameters are a prerequisite to establish a detailed storm flow model at 2 to 5 m resolution, a subsequent soil erosion module, and a model for gully evolution. In cooperation with the Ethiopian partners and the University of Rome "la Sapienza" these investigations will provide valuable information for the interpretation of the landscape evolution pattern in the vicinity of the Melka Kunture archaeological area.

Michael Märker

Workshop report – "The role of the Southern Caucasus on early human evolution and expansion – refuge, hub or source area?"

With its 1.8 million year old evidence of human presence documented at the famous fossil site of Dmanisi in the Republic of Georgia, the Southern Caucasus is a key area for studying early human evolution and expansion out of Africa and onto the Eurasian continent. In addition, the area provides a long record of human presence throughout the Paleolithic. However, the pace and causes of early human colonization, in one or several migratory waves from Africa into new environments of Eurasia during the Early Pleistocene, as well as the later expansions of Neanderthals and anatomically modern humans, are still a matter of debate. Climate change is considered as a major factor driving hominin evolution and dispersal patterns, because climate modulates the availability of resources directly or indirectly through its influence on vegetation, landscape physiography and animal distribution.

To understand the influence of environmental factors on early humans, ROCEEH organized an international workshop at the National Museum of Georgia in Tbilisi from October 15-20, 2013. The aim of this meeting was to exchange and discuss the latest scientific results from the Southern Caucasus concerning early human evolution, range expansions and technological developments within the backdrop of environmental changes that occurred over the course of the last two million years. More than 40 researchers (Fig. 10) from different scientific fields, including paleoanthropology, archaeology, paleontology, paleobotany and geology, presented their research in 23 oral and 18 poster contributions spread over three sessions.

The first session was dedicated to the fossil hominin site of **Dmanisi: The first Out of Africa – what do we know? What do we need?** with presentations ranging from stratigraphy and age determination of the site (O. Oms and R. Ferring) to theoretical modelling of dispersal patterns for Out-of-Africa 1 (Tzikaridze et al.). Taphonomic studies on the mammal fauna (M. Tappen), as well as analyses of the lithics (R. Ferring and T. Shelia, M. Nioradze and G. Nioradze) and of tool use (L. Longo), shed light on the behavior of the Dmanisi people. J. Agustí et al. summarized information on the paleoenvironmental context based on all proxies available from the site, while D. Lordkipanidze presented the latest findings of hominin fossils and their taxonomic implications. The publication of those results in *Science* was announced during the meeting, accompanied by the opening of an exhibit in the National Museum on the Dmanisi fossils, and the launch of a new website for the Dmanisi fossil locality (www.dmanisi.ge).

The second part of the meeting focused on **Early Pleistocene environmental changes in the Southern Caucasus** and included oral and poster contributions that presented the results of a project funded by the Volkswagen Foundation. The research focused on three study areas in the Southern Caucasus with the aim to achieve a regional correlation of the environmental setting in time and space.

In the Vorotan Basin of Southern Armenia, previous work to date the geological section allowed the results to be placed into a well constrained stratigraphic context. The presentations gave an overview on the geomorphology (M. Märker et al.) and geology (D. Arakelyan et al.) of the basin, fossil macro and microflora (I. Gabrielyan, S. Scharrer et al.), fauna and insects (M. Marjanyan et al.), fishes (S. Pipoyan and D. Vasilyan), mollusks (L. Harutyunova), and climate quantifications based on plant fossils (A. Bruch et al.). The investigation of modern oak pollen by A. Hayrapetyan will help achieve a higher taxonomic resolution of paleo-palynological analyses in the region.

Due to the precise age controls in the Vorotan Basin, the results serve as a reference section for correlation with the other two regions where investigations have only recently begun. In Western Georgia the stratigraphic correlation and age determination is ongoing. U. Kirscher et al. provided their first results, I. Shatilova gave an overview of the vegetational history during the Pleistocene, and T. Rutz et al. presented preliminary data on climate quantification.

Paleoenvironmental information on the third study area in Southern Georgia, the Javakhetian highland, is mainly represented by the large mammal fauna of Akhalkalaki (M. Bukhsianidze and C. Hertler, R. Chagelishvili and M. Bukhsianidze, A. Vekua et al.). A quantitative ecological analysis based on eco-profiles of large herbivores (C. Hertler and M. Bukhsianidze) showed the potential of the method and of correlation with palynological data from the area (Kvavadze et al., I. Martkoplishvili et al.), as well as with the large mammal fauna of Dmanisi in the future.

The third session was dedicated to the **Southern Caucasus Paleolithic: occurrence or co-occurrence of Neanderthals and the first anatomically modern humans? Environmental constrains of the Southern Caucasus Paleolithic**. After an overview by B. Gasparyan on the history of Paleolithic archaeology in Armenia, researchers introduced the most important sites in the study of Middle and Late Pleistocene human history in the Southern Caucasus. In northern Armenia, these localities include the late Lower Paleolithic to early Middle Paleolithic sites of Bagratashen and Ptghavan in the Debed River valley of Lori (C. Egeland et al.) and

Fig. 10 Participants at the workshop in Tbilisi, Georgia.

Nor Geghi in the Hrazdan River valley (D. Adler et al.). At Barozh in the Ararat depression, P. Glauberman et al. documented a new Middle Paleolithic open-air site. In southern Armenia, A. Kandel and B. Gasparyan presented evidence for clothing from the Upper Paleolithic of Aghitu Cave to complement environmental studies about the depositional history and climate of the Vorotan Basin. Based on the caves of Dzudzuana, Ortvale Klde and Kotias Klde in Western Georgia, Bar-Yosef et al. provided a detailed chronology of Upper Paleolithic settlement in the region.

The talks and posters presented in the third session represent a growing body of work documenting the trajectory of cultural development in the Southern Caucasus. Especially important is continued research into the timing of the transition from the Middle to Upper Paleolithic, when modern humans replaced Neanderthals. This session documented the vast evidence of human occupation during the Middle and Upper Paleolithic in the Southern Caucasus and its high potential for future research. Benchmark studies of environmental parameters were presented on a local scale by E. Allué who reconstructed vegetation based on charcoal from Azokh Cave (T. King et al.), as well as on a broader scale, with regional environmental models based on large and small mammals from several of the archaeological sites (L. Weissbrod and G. Bar-Oz).

The closing discussion centered on the question of how to achieve a better environmental context for Dmanisi on the one hand, and for the Middle and Upper Paleolithic sites, on the other. The discussants concluded that environmental data are crucial, not only with regard to archaeological sites directly, but also in a more regional context, in order to understand the variability of early human environments in space and time. While new quantitative methods should be applied to available data, especially for onsite reconstructions, additional new proxies are needed in order to expand these studies. In this regard, the relevance of NPPs (non-pollen palynomorphs) was explicitly mentioned. Larger scale analyses should be based on the correlation of well dated materials, taking into account both the diverse landscape of the Southern Caucasus and the high variability of climate during the Pleistocene.

The workshop was rounded off with a one-day excursion to Dmanisi. R. Ferring gave an insightful and enthusiastic tour of several of the excavation sites, adding many captivating details about the site and its background. The meeting was jointly organized by the ROCEEH Research Center (www.roceeh.net), the National Museum of Georgia, and the "Early Pleistocene Environmental Changes in Southern Caucasus" project funded by the Volkswagen Foundation. Abstracts of the conference are available on the ROCEEH website at www.roceeh.net/fileadmin/download/conferences/program_abstract_Tbilisi.pdf.

Angela Bruch, Andrew W. Kandel and David Lordkipanidze

XVII World UISPP Congress (Union International de Sciences Préhistoriques et Protohistoriques)

From September 1-7, 2014 the World Congress of the UISPP took place in Burgos, Spain. With over 1,000 participants from all continents this triannual meeting represents one of the most important opportunities to discuss ROCEEH topics with archaeologists and researchers from related sciences. ROCEEH contributed to this meeting with the organization of several sessions, 23 oral presentations and four posters, thereby providing an overview of the broad scope of approaches developed and applied by the ROCEEH team.

Together with Sabine Gaudzinski-Windheuser and Jordi Serangeli, Nicholas Conard organized a session introducing new studies at the locality Schöningen. Presentations provided a detailed look at this interdisciplinary research project and underlined the outstanding importance of this Middle Pleistocene site for the early settlement of Central Europe. Miriam Haidle presented a cognitive analysis of the Schöningen spears by means of the cognigram approach. The conceptual approach was introduced and applied to a wide range of topics, for instance to the use and control of fire in a contribution by Sebastian Scheiffele, member of the ROCEEH graduate network.

Knut Bretzke, alumni fellow in ROCEEH, and Nicholas Conard organized a session on "Movements in and out of Africa" in which numerous contributors compared and discussed Paleolithic evidence originating from the Arabian peninsula, the Levant, Iran, and India for expansions out of the African continent. The discussion centered on the question of how artifacts and technologies should be included in the examination of geographical expansions.

Manuel Will and Regine Stolarczyk, both members of the ROCEEH graduate network, and Patrick Schmidt, alumni fellow in ROCEEH, introduced their studies on South African archaeological assemblages in the framework of a session on "Technological change and behavioral variability in the MSA". This session was organized by Nicholas Conard in collaboration with Anne Delagnes and Guillaume Porraz. Regine Stolarczyk introduced bone artifacts from the MSA of southern Africa (see article in this issue). Manuel Will focused on detailed analyses of MSA lithic technology from Sibudu. Patrick Schmidt examined silcrete heat treatment and introduced the results of his studies.

Michael Märker and Michael Bolus introduced an explorative spatial analysis of Neanderthal sites. This new approach relies on stochastic modelling and reveals criteria which may have been significant for Neanderthals in their selection of sites. Angela Bruch addressed climate parameters as an important component of the ecospace of early hominins in the Caucasus. Moreover, a new approach to explore the broader surroundings of the Melka Kunture prehistoric site was presented (see article in this issue), demonstrating that paleo-landscape features can be derived using a combination of high resolution morphometric analyses and hydrological modeling.

Supported by the INQUA Commission on Humans and the Biosphere (HABCOM), Jesús Rodríguez and Ana Mateos (Burgos) organized a session on "Mathematical approaches for the study of human-fauna interactions in the Pleistocene" to which ROCEEH contributed presentations on hominin ecospaces (Christine Hertler), the application of agent-based modelling (Ericson Hölzchen, member of the ROCEEH graduate network), and competition in carnivore guilds (Rebekka Volmer, alumni fellow in ROCEEH). Applicability and performance of modeling approaches used by ROCEEH were compared with other methods, for instance, environmental niche modelling and network analyses. A high level of interest was shown for the approaches introduced by ROCEEH, particularly in connection with the ROAD database as a basis for complementary studies. Further collaborations will be supported by HABCOM and a follow-up meeting will be held at the EXPANSIONS 2015 conference convened by ROCEEH and taking place in Frankfurt from July 13-17, 2015

Christine Hertler and Michael Märker.

Forthcoming

- International ROCEEH Conference on Human Expansions **(13 – 17 July 2015)** in Frankfurt/Main, Germany. Organized by ROCEEH. (http://www.roceeh.net/home/)
- 5th Conference of the East African Association of Palaeontology and Palaeoanthropology (EAAPP) **(3 – 6 August 2015)** in Dar es Salaam, Tanzania. Session on Makuyuni co-organized by Christine Hertler.
- International Geographical Union Conference **(17 – 21 August 2015)** in Moscow, Russia. Session: Sediment redistribution and exogenic processes dynamics in small river basins, co-organized by Michael Märker. (http://www.igu2015.ru)
- 16th Annual NECLIME Meeting **(14 – 17 October 2015)** in Madrid, Spain. Member of the Organizing Committee: Angela Bruch. (http://www.neclime.de/events.html)
- Interdisciplinary Conference on Digital Cultural Heritage **(28 – 30 October 2015)** in Berlin, Germany. Organized by Horst Kremer and Michael Märker. (http://dch2015.net)

Who's who?

This issue: Claudia Groth

Claudia Groth has worked as a technical assistant in ROCEEH since Sept., 2011 at the Senckenberg Research Institute in Frankfurt am Main. She completed her studies at the Senckenberg between 2007 and 2009 to become a qualified technician at natural history museums and related institutions. Her specialties include the chemical processing of rock and soil samples, and the preparation of fossil and modern pollen, as well as phytoliths. In addition, Claudia is the assistant of ROCEEH's project coordinators and helps keep the team's internet presence up to date.

Sampling Early Pleistocene core material for palynology in Spain.

THE ROLE OF CULTURE IN EARLY EXPANSIONS OF HUMANS

CONTACT

The Role of Culture in Early Expansions of Humans
Heidelberg Academy of Sciences and Humanities

Senckenberg Research Institute Frankfurt/Main
Eberhard Karls University of Tübingen

COORDINATORS

Miriam Haidle (scientific)
Julia Heß (administrative)

Senckenberg Research Institute
Senckenberganlage 25
D-60325 Frankfurt/Main
miriam.haidle@uni-tuebingen.de
julia.hess@senckenberg.de
www.roceeh.net

THE ROLE
OF CULTURE
IN EARLY
EXPANSIONS
OF HUMANS