



The Role of Culture in Early Expansions of Humans (Frankfurt and Tübingen)

Annual Report for 2011

In the last 2 million years, the genus *Homo* spread from Africa to Asia and Europe in several waves of migration. While the habitat for australopithecines, early humans and other animals was limited by natural conditions, cultural achievements over the course of humanization permitted new ways of adapting to the environment. The Research Center "The Role of Culture in Early Expansions of Humans" (ROCEEH) asks the pivotal question: When, where, and in what form did the interplay of changing environmental conditions, biological evolution and cultural development allow the genus *Homo* to move beyond the behavioral niche of a large African ape? How did *Homo* succeed in expanding not only culturally, but also into ecologically defined niches beyond Africa? The project aims to reconstruct the spatio-temporal and phylogenetic expansion of the various hominin species, the expansion of ecological environment as well as the expansion of cultural capacities between 3 million and 20,000 years before present, while shedding light on their causal relationship. Particular attention is paid to the development of human capacities for cultural activities, their backgrounds and actual occurrences. Archaeological excavations in Africa, Asia and Europe deliver this important information. At the core of the project is the interdisciplinary, web-based database known as ROAD (**ROCEEH Out of Africa Database**) with complete GIS functionality. ROAD unifies geographical data about localities with information on the stratigraphical structure of layers and the archaeology contained therein. In addition, information on human fossil history, climate, as well as flora and fauna, is assimilated and then used to model early human habitats. The results are integrated into a digital atlas detailing the development of humans and environment on the basis of geographical information systems (GIS).

Started in 2008 and projected to run for 20 years, ROCEEH is an interdisciplinary research project at the interface between natural and cultural sciences. This extensive, international, scientific research is carried out by a team of archaeologists, paleoanthropologists, paleobiologists, geographers and database specialists situated at the Senckenberg Research Institute in Frankfurt and the University of Tübingen.

Members of the Scientific Commission: members of the Academy, Karl Fuchs, Lothar Ledderose, Joseph Maran, Ekkehard Ramm, Volker Sellin (Chairman); external members, Prof. Dr. Ofer Bar-Yosef (Cambridge, USA), Prof. Dr. Manfred Ehlers (Osnabrück), Prof. Dr. Bernhard Eitel (Heidelberg), Prof. Dr. Wulf Schiefelhövel (Andechs), Prof. Dr. Mark Stoneking (Leipzig), Prof. Dr. Elisabeth Vrba (New Haven), Prof. Dr. Zvi Ben-Avraham (Tel Aviv).

Heads of the Research Center: in Frankfurt, Volker Mosbrugger, Prof. Dr. Friedemann Schrenk; in Tübingen, Nicholas Conard, Prof. Dr. Volker Hochschild.

Staff: in Frankfurt, Dorothee Bauer (through 30 Sept. 2011), Priv.-Doc. Dr. Angela Bruch, Claudia Groth (since 1 Sept. 2011), Priv.-Doc. Dr. Miriam Haidle (Project coordinator), Dr. Christine Hertler, Dipl.-Biol. Chidi Nwokeji, Patrick Schmidt M.A. (through 31 Dec. 2011), Dipl.-Biol. Rebekka Volmer; in Tübingen, Prof. Dr. Michael Bolus, Dipl.-Inf. Zara Kanaeva, Dr. Andrew Kandel, Maria Malina, Dr. Michael Märker, Dipl.-Geol. Geraldine Quénéhervé.

Guests of the Research Center in 2011: Prof. Paul Goldberg Ph.D. (Boston, USA; summer semester), Prof. Raymond Bernor Ph.D. (Washington DC, USA), Yayeh Desalegn B.A. (Addis Ababa, Ethiopia), Dr. Hannah O'Regan (Liverpool, GB), Dr. Sally Reynolds (Johannesburg, South Africa), Elena Vassio M.A. (Turin, Italy).

Focus topic

In its fourth year the Research Center focused mainly on the concept of ‘culture’ under the direction of Miriam Haidle. The social and cultural sciences use multiple definitions when referring to cultural expressions of modern human societies. Additional definitions are used to trace animal culture and emphasize the social transmission of information in contrast to its genetic inheritance. Both the culturalist and the naturalist approaches apply to living organisms and the state of their directly observable behavior. However, the sources of data for paleolithic archaeology and paleoanthropology are entirely different. Therefore, ROCEEH is not only interested in the static expression of cultural behavior at a given time. Rather, these scientific disciplines examine the development of culture over long time spans, as well as the evolutionary and other processes involved. Several attempts have been made in the last decade to approach the concept of culture from a more integrative point of view, but all attempts lacked two elements:

- 1) A concept of culture and cultural evolution that covers not only one comprehensive idea of culture, but also different specificities of culture among, as well as within, species. This view of culture should include several types of mechanisms that determine cultural variability.
- 2) A model of cultural evolution which associates the grades of cultural behavior identified in living animals with cultural changes over the course of human evolution. ROCEEH developed a new concept of culture which combines biological, historical-social and individual dimensions of development with specific environmental interactions. The model provides a good working basis for the specific scope of the Research Center. The evolutionary concept deliberately does not function with the term ‘culture’, since this would impede our view of evolution and development. Instead, the model employs cultural performances and the cultural capacities derived from them. Cultural capacities can be expanded over the course of evolution by different mechanisms. To introduce and examine in detail the model for the expansion of cultural capacities, ROCEEH organized an interdisciplinary conference ‘The Nature of Culture’ funded by the DFG. The conference agreed upon the definition of three levels of cultural capacities which can be observed in humans and certain animal species today: 1) capacities for socially transmitted information; 2) capacities for tradition; and 3) capacities for basic culture. Three further cognitive extensions of cultural capacities were identified which operated over the course of human evolution:

- 4) modular cultural capacities, based on the ability to produce tools with tools;
- 5) composite cultural capacities, based on the ability to combine different objects into single tool units; and
- 6) collective cultural capacities, based on the ability to perceive a group (of agents, objects, persons, things) as an acting entity of interdependent parts.

Haidle & Conard (2011) present a summary of the discussion. The publication of the symposium proceedings together with a revised model is in preparation. In addition Christine Hertler placed the concept of expansion of cultural capacities in the overall framework of the ROCEEH project through theoretical considerations concerning various other types of expansions (in addition to cultural capacity, expansions of geographical, temporal, taxonomic distribution and ecospace). Detailed comments on the other forms of expansions are underway.

Furthermore, the staff of the Research Center engaged in answering various questions concerning expansions in the focal region Africa:

- How does expansion in cultural capacity influence the range expansion and the increasingly flexible landuse strategies of *Homo sapiens* during the Middle Stone Age in southern Africa?

- How do changes in cultural capacity allow early Homo forms to expand beyond subtropical environments after 2 Ma, first in Africa and then beyond Africa?
- Northern Africa without Neanderthals: Which cultural constraints limit spatial expansions in a uniform ecospace such as the Mediterranean region?
- Which new corridors out of Africa open up as cultural capacities expand?

To tackle these questions, the Research Center reviewed different collections, conducted fieldwork, tested new methods of analysis, analyzed existing datasets, and enhanced and queried ROAD. The biannually published newsletter tracks current developments and can be accessed through the webpage of the Research Center (www.roceeh.net).

Fieldwork

In 2011 Research Center staff conducted or participated in 11 projects in the field:

Africa

- South Africa: Sibudu Cave (Angela Bruch, Maria Malina in cooperation with Dr. Lyn Wadley and Dr. Christine Sievers, excavation and review of finds; 6 weeks)
- South Africa: Hoedjiespunt (Andrew Kandel, Maria Malina, excavation; 3 weeks)
- Kenya: Suguta Valley and Northern Kenyan Rift (Christine Hertler in cooperation with Martin Trauth and Annett Junginger in the context of the project “Tectonics, sedimentology, and paleoclimate in the Northern Kenyan Rift” and the Volkswagen Foundation Summer School “The Cradle of Humankind”, survey and review of finds; 24 days).
- Tanzania: Makuyini, Lake Manyara (Michael Märker, Geraldine Quénéhervé, survey and installation of data collecting equipment; 10 days)

Arabia

- United Arab Emirates (Michael Märker in cooperation with Prof. Hans-Peter Uerpmann, survey and stratigraphic analysis; 8 days)

Levant

- Israel: Mt. Carmel (Andrew Kandel, survey of new sites; 10 days)

Caucasus

- Armenia: Aghitu-3 Cave (Andrew Kandel, excavation and review of finds; 3 weeks)
- Armenia: southern Armenia (Angela Bruch, survey and data collection; 17 days)
- Georgia: (Angela Bruch, survey and collection of test samples for the upcoming cooperation project “Early Pleistocene Environmental Changes in Southern Caucasus - Reconstruction of Climate and Vegetation Development in Armenia and Georgia at the Time of Early Human Expansion into Eurasia”;

Europe

- Italy: Mugello (Andrew Kandel, Michael Märker, survey of new sites; 3 days)
- Germany: Hohle Fels (Maria Malina, excavation; 7 weeks)

Data collection and analysis

In accordance with the geographical focus, the Research Center collected and analyzed data mainly in Africa:

- Climate quantification on the basis of paleobotanical remains from Sibudu Cave, South Africa (Bruch)
- Ecospace analysis of Middle Stone Age sites in South Africa using paleobotanical data (Bruch)
- Development of ecoprofiles for South and East African sites, Rift Valley sites in particular, using faunal data (Hertler)
- Analysis of tool diversity in the Middle Stone Age of southern Africa (Bolus)
- Landscape reconstruction of the Lake Manyara area using stratigraphic, geophysical, topographic and multispectral data (Märker)
- Development of ecoprofiles for Mediterranean and Southeast Asian sites using faunal data (Hertler)
- Testing and application of geostatistical and stochastic models for the prediction of archaeological sites (Marker)
- Creating pedological, lithological, geomorphological and vegetational maps, as well as digital elevation models using high-resolution, multispectral data (Märker)
- Quantification of the processes of surface water runoff to determine water flow and resulting transport energies (Marker)
- Geographical analysis of Neanderthal sites in Eurasia (Bolus, Märker)
- Evaluation of Aurignacian and Middle Stone Age stone artifacts from Geißenklösterle (Bolus).

In addition, the project staff documented their field work and analyzed the resulting data, as well as inputting site and assemblage data into ROAD.

ROCEEH OUT OF AFRICA DATABASE (ROAD)

The ROAD system combines a PostgreSQL database with Web-GIS libraries to enable full Web-GIS functionality and includes map servers, javascript and php scripts. ROAD is currently available to the public with limited user rights through the project website (www.roceeh.net). At the beginning of the project, the database was designed in German. In 2011 it was translated into English, and all applications and the ROAD Websystem were revised accordingly. To improve user friendliness, an Access-style query of the database was implemented. To standardize and facilitate the input queries, the input and update screens were improved. Great attention was paid to standardization of data entry and quality control, particularly of archaeological data in ROAD. The intensive use of the map in ROAD has shown the need for the dynamic choice of symbols for different layers of a map. A new corresponding map module has been implemented. Furthermore a module with predefined queries was developed for the map and incorporates age to the assemblage. Together with Christine Hertler, Zara

Kanaeva developed a scenario tool for studying range expansions of hominin species. Depending on the taxonomic determination of fossils, the tool allows the comparison of different expansion scenarios. Through year's end geographical, stratigraphical, paleoecological, archaeological and bibliographical data for a total of 610 localities have been entered, mainly in South, East and North Africa.

Project relevant publications by research staff

A total of 31 project relevant publications appeared in 2011 in which the staff of the Research Center played a contributing role:

1. Akkiraz, M.S., Akgün, F., Utescher, T., Bruch, A.A., Mosbrugger, V. 2011. Precipitation gradients during the Miocene in Western and Central Turkey as quantified from pollen data. *Palaeogeography, Palaeoclimatology, Palaeoecology* 304, 276-290.
2. Bolus, M. 2011. The late Middle Paleolithic and the Aurignacian of the Swabian Jura, southwestern Germany. In: A.P. Derevianko & M.V. Shunkov (eds.), *Characteristic Features of the Middle to Upper Paleolithic Transition in Eurasia*. Novosibirsk: Publishing Department of the Institute of Archaeology and Ethnography SB RAS, 3-10.
3. Bolus, M., Conard, N.J. 2011. Die Anfänge der Kultur. *epoc* 3/2011, 30-37.
4. Bolus, M., Conard, N.J. 2011. Les débuts de la culture en Europe. *Pour la Science* 407, 09/2011, 42-46.
5. Bretzke, K., Kandel, A.W., Conard, N.J. 2011. Deducing landuse patterns from archaeological survey data. *Chronique Archéologique en Syrie* 5, 11-18.
6. Bruch, A.A., Utescher, T., Mosbrugger, V. 2011. Precipitation patterns in the Miocene of Central Europe and the development of continentality. *Palaeogeography, Palaeoclimatology, Palaeoecology* 304, 202-211.
7. Conard, N.J., Malina, M. 2011. Neue Eiszeitkunst und weitere Erkenntnisse über das Magdalénien vom Hohle Fels bei Schelklingen. *Archäologische Ausgrabungen Baden-Württemberg* 2010, 56-60.
8. Conard, N. J., Bolus, M., Münzel, S.C. 2011. Middle Paleolithic land use, spatial organization and settlement intensity in the Swabian Jura, southwestern Germany. *Quaternary International* 247, 236-245.
9. Haidle, M.N. 2011. Darwin, Lucy und das missing link. *Evolutionäre Anthropologie im 21. Jahrhundert*. In: Eve-Marie Engels, Oliver Betz, Heinz-R. Köhler & Thomas Potthast (eds.), *Charles Darwin und seine Bedeutung für die Wissenschaften*. Tübingen: Attempto, 203-224.
10. Haidle, M.N. 2011. Wir und die Anderen. Ein kurzer Blick auf die menschliche Evolution. *Geschichte lernen* 142, Friedrich Verlag, Seelze, 20-23.
11. Haidle, M.N. 2011. Macht Euch die Erde untertan: Tierisches und menschliches Werkzeugverhalten. *Jahrbuch der Heidelberger Akademie der Wissenschaften für 2010*, 166-171.

12. Haidle, M.N. 2011. Archaeological approaches to cognitive evolution. In: David B. Kronenfeld, Giovanni Bennardo, Victor C. De Munck & Michael Fischer (eds.), *A companion to cognitive anthropology*. Oxford: Wiley-Blackwell, 450-467.
13. Haidle, M.N. 2011. Vielseitig, flexibel und erfinderisch. *epoc* 3/2011, 18-24.
14. Haidle, M.N. 2011. Genetik des Denkens. *epoc* 3/2011, 25-26.
15. Haidle, M.N., Bräuer, J. 2011. Special Issue: Innovation and the Evolution of Human Behavior. From brainwave to tradition—How to detect innovations in tool behaviour. *PaleoAnthropology* 2011, 144-153.
16. Haidle, M.N., Conard, N.J. 2011. The Nature of Culture—Summary report on an interdisciplinary symposium held in Tübingen, Germany, 15-18 June 2011. *Mitteilungen der Gesellschaft für Urgeschichte* 20, 65-78.
17. Kandel, A.W., Conard, N.J. 2011. Settlement patterns during the Earlier and Middle Stone Age around Langebaan Lagoon, Western Cape (South Africa). *Quaternary International*: doi.org/10.1016/j.quaint.2011.06.038.
18. Kandel, A.W., Conard, N.J., Masri, M. 2011. The Settlement of Southwestern Syria: Results from the Tübingen Damascus Excavation and Survey Project (1999-2008). In: A. Abdurahman (ed.), *The History and Antiquities of al-Golan: International Conference*, 57-70. Damascus: Directorate General of Antiquities and Museums.
19. Kern, A., Harzhauser, M., Mandic, O., Roetzel, R., Ćorić, S., Bruch, A.A., Zuschin, M. 2011. Millennial-scale vegetation dynamics in an estuary at the onset of the Miocene Climate Optimum. *Palaeogeography, Palaeoclimatology, Palaeoecology* 304, 247-261.
20. Märker, M., Bolus, M., Kanaeva, Z. 2011. Spatial assessment of early human expansions using GIS and Database Techniques: Examples from Southern Africa and Eurasia. In: R. Macchiarelli & G.-C. Weniger (eds.), *Pleistocene Databases: Acquisition, Storing, Sharing*. Wissenschaftliche Schriften des Neanderthal Museums 4. Mettmann: Neanderthal Museum, 69-75.
21. Märker, M., Hertler C. 2011. Archaeological site prediction and landscape reconstruction in the Lake Manyara area, Northern Tanzania. *Revive the Past Proceedings of the XXXXI CAA conference*, Beijing, 156.
22. Märker, M., Pelacani, S., Schröder, B. 2011. A functional entity approach to predict soil erosion processes in a small Plio-Pleistocene Mediterranean catchment in Northern Chianti, Italy. *Geomorphology* 125 (4), 530-540.
23. Micheels, A., Bruch, A.A., Eronen, J., Fortelius, M., Harzhauser, M., Utescher, T., Mosbrugger, V. 2011. Analysis of heat transport mechanisms from a Late Miocene model experiment with a fully-coupled atmosphere–ocean general circulation model. *Palaeogeography, Palaeoclimatology, Palaeoecology* 304, 337-350.
24. Paudyal, K.N., Panthee, S., Hertler, C. 2011. A bovid specimen from Late Pleistocene deposits in the Kathmandu Basin, Nepal. *Journal of Stratigraphic Association of Nepal* 7, 9-14.

25. Pinhasi, R., Gasparian, B., Wilkinson, K., Nahapetyan, S., Bar-Oz, G., Bruch, A.A., Hovsepyan, R., Weissobrod, L. 2011. Middle Palaeolithic human occupation of high altitudes: a case study of Hovk 1 Cave, Armenia. *Quaternary Science Reviews* 30, 3846-3857.
26. Schwartz, H., Renne, P.R., Morgan, L.E., Wildgoose, M.M., Lippert, P.C., Frost, S.R., Harvati, K., Schrenk, F., Saanane, C. 2012. Geochronology of the Manyara Beds, northern Tanzania: New tephrostratigraphy, magnetostratigraphy and $^{40}\text{Ar}/^{39}\text{Ar}$ ages. *Quaternary Geochronology* 7, 48-66 (available online 5. September 2011).
27. Soto Bäuerle, M.V., Arriagada González, J., Castro Correa, C.P., Märker, M., Rodolfi G. 2011. Relación entre el cambio de uso del suelo en la cuenca del Aconcagua y su litoral arenoso correlativo. Chile central. *Revista de Geografía Norte Grande* 50, 187-202.
28. Utescher, T., Bruch, A.A., Micheels, A., Mosbrugger, V., Popova, S. 2011. Cenozoic climate gradients in Eurasia—a palaeo-perspective on future climate change? *Palaeogeography, Palaeoclimatology, Palaeoecology* 304, 351-358.
29. Vogel, S., Märker, M. 2011. Characterization of the pre-AD 79 Roman paleosol south of Pompeii (Italy): Correlation between soil parameter values and paleo-topography. *Geoderma* 160 (3-4), 548-558.
30. Vogel, S., Märker, M., Seiler, F. 2011. Revised modelling of the post-AD 79 volcanic deposits of Somma-Vesuvius to reconstruct the pre-AD 79 topography of the Sarno River plain (Italy). *Geologica Carpathica* 62 (1), 5-16.
31. Yao, Y.-F., Bruch, A.A., Mosbrugger, V., Li, C.-S. 2011. Quantitative reconstruction of Miocene climate patterns and evolution in Southern China based on plant fossils. *Palaeogeography, Palaeoclimatology, Palaeoecology* 304, 291-307.

List of papers accepted, in press, or published in 2012

1. Akkiraz, M.S., Akgün, F., Utescher, T., Wilde, V., Bruch, A.A., Mosbrugger, V. 2012. Palaeoflora and climate of lignite-bearing Middle Miocene sediments in Seyitömer and Tunçbilek basins, Kütahya Province, NW Turkey. *Turkish Journal of Earth Sciences* 21(2), 213-235.
2. Bolus, M. 2012. Flake production in the Aurignacian of southwestern Germany: some examples from the Swabian Jura. In: A. Pastoors und M. Peresani (Hrsg.), *Flakes Not Blades: The Role of Flake Production at the Onset of the Upper Palaeolithic in Europe*. *Wissenschaftliche Schriften des Neanderthal Museums* 5. Mettmann: Neanderthal Museum, 153-164.
3. Bolus, M., Hertler, C. (in press). Frühe Expansionen der Menschheit. *Archäologie in Deutschland*.
4. Conard, N.J., Bretzke, K., Deckers, K., Masri, M., Napierala, H., Riehl, S., Stahlschmidt, M., Kandel, A.W. (accepted). Natufian lifeways in the eastern foothills of the Anti-Lebanon Mountains. *Conference Proceedings from the Natufian Meeting*, Paris, June 2010.
5. Haidle, M.N. 2012. Genética de la cognición. *Investigación y Ciencia* 2-2012, 66-67.

6. Haidle, M.N. 2012. How to think tools? A comparison of cognitive aspects in tool behavior of animals and during human evolution. *Cognitive perspectives in tool behaviour* Vol. 1. http://tobias-lib.uni-tuebingen.de/frontdoor.php?source_opus=6014
7. Haidle, M.N. 2012. Polifacético, flexible e ingenioso. *Investigación y Ciencia* 2-2012, 78-86.
8. Haidle, M.N. (in press). Freiheiten im Kopf – Die Expansion der Kulturfähigkeit. *Archäologie in Deutschland*.
9. Haidle, M.N. (in press). Geschickte Verwandte – Werkzeugverhalten bei Menschenaffen. *Katalog Menschenaffen*. Mettmann: Neanderthal Museum.
10. Haidle, M.N. (in press). Oldowan und andere frühe Geröllgeräte- bzw. Abschlagindustrien. In Floss, H. (ed.), *Artefaktmorphologie*.
11. Haidle, M.N., Richter, J. (in press). Frühe menschliche Expansionen – mehr als räumliche Ausbreitungen. *Archäologie in Deutschland*.
12. Hertler, C., Bruch, A.A., Märker, M. (accepted). The earliest stages of hominid dispersal in Africa and Eurasia. In: Bellwood, P. (ed.): *The Encyclopedia of Global Human Migration*. Blackwell Publishing.
13. Lombard, M., Haidle, M.N. (accepted). Thinking a bow-and-arrow: cognitive implications of Middle Stone Age bow and stone-tipped arrow technology. *Cambridge Journal of Archaeology* 22/2.
14. Kandel, A.W., Conard, N.J. (accepted). Stone Age Economics and Landuse in the Geelbek Dunes. In: A. Jerardino, D. Braun & A Malan (Eds.) *The Archaeology of the West Coast of South Africa*. Johannesburg: Wits University Press.
15. Kandel, A.W., Hertler, C. (in press). Homo sapiens ... „wo noch nie zuvor ein Mensch gewesen ist“. *Archäologie in Deutschland*.
16. Meng, Q., Liu, Z., Bruch, A.A., Liu, R., Hu, F. 2012. Palaeoclimatic Evolution during Eocene and Its Influence on Oil Shale Mineralization, Fushun Basin, China. *Journal of Asian Earth Sciences* 45(2), 95-105. doi: 10.1016/j.jseas.2011.09.021
17. Mosbrugger, V., Haidle, M.N., Hertler, C. (in press). Mensch und Kultur - auf dem Weg zu einem evolutionären Selbstverständnis. *Jahrbuch der Heidelberger Akademie der Wissenschaften für 2011*
18. Napierala, H., Kandel, A.W., Conard, N.J. (accepted). Small game and the shifting subsistence patterns from the Upper Paleolithic to the Natufian at Baaz Rockshelter, Syria. In: Maskour, M. and Beech, M. (Eds.) *Archaeozoology of the Near East IX*. Proceedings of the 9th International Symposium on the Archaeozoology of Southwestern Asia and adjacent areas, Al Ain, U.A.E., Sept. 2008.
19. Napierala, H., Van Neer, W., Conard, N.J., Kandel, A.W., Peters, J., Uerpmann, H.-P. (accepted). Fish in the Desert? The Younger Dryas and its influence on the palaeoenvironment at Baaz Rockshelter, Syria. *Conference Proceedings from the Natufian Meeting*, Paris, June 2010.

20. Popova, S., Utescher, T., Gromyko, D.V., Bruch, A.A., Mosbrugger, V. 2012. Palaeoclimate evolution in the Cenozoic of Siberia – evidence from fruit and seed floras. *Turkish Journal of Earth Sciences*, 21(2), 315-334.
21. Soler, J., Soler, N., Agustí, B., Bolus, M. (accepted). The Gravettian calvaria and related human remains of Mollet III (Serinyà, Catalonia, Spain). *Journal of Human Evolution*.
22. Vorpahl, P., Elsenbeer, H., Märker, M., Schröder, B. 2012. How can statistical models help to determine driving factors of landslides? *Ecological Modelling* doi:10.1016/j.ecolmodel.2011.12.007.

Third Party Funding

A) Research

- DFG: “Reconstruction of the ancient cultural landscape of the Sarno River basin – the Roman villae rusticae“. 3 years: 475 k€, start in 2011. Principal investigators: Märker, M., Seiler, F.
- Volkswagen Foundation: “Frühpleistozäne Umweltveränderungen im Kleinen Kaukasus – Rekonstruktion der Klima- und Vegetationsgeschichte in Armenien und Georgien zur Zeit der frühmenschlichen Ausbreitung nach Eurasien“. 2 years: 100k€, start in 2012. Principle investigators: Bruch, A.A, Kavavadze, E., Gabrielyan, I.G.
- DFG: “Quantitative and qualitative differences in Paleolithic innovative behavior: The example of Middle Stone Age techno-complexes from Southern Africa“. 2 years: 78 k€, start in 2012. Principle investigator: Haidle, M.

B) Qualification of young academics

- Volkswagen Summerschool „The Cradle of Humankind“, 150 k€ in 2010 and 2011. Supervisors: Trauth, M. H., Tiedemann, R., Odada, E.O., Olago, D.O., Zahn, R., Strecker, M.R., Röbber, D., Muchemi, G.G., Schrenk, F., Hertler, C.
- Iranian Government fellowship for Reza Zakerinejad, 4 years. Sediment dynamics assessment for landscape reconstruction in North-eastern Africa, the Mediterranean and the Near East. Supervisor: Märker, M.
- DAAD fellowship for Luigi Lombardo, 6 months. ROCEEH Tanzania Subproject. Supervisor: Märker, M.
- DAAD fellowship for Nathalie Colleho, 6 months. ROCEEH Sicily Subproject. Supervisor: Märker, M.
- ZIAF: foreign students visiting program. Supervisor: Hertler, C.

C) Conferences

- DFG: “The Nature of Culture“. 18 k€ in 2011. Organizers: Haidle, M., Conard, N., Bolus, M.
- Sino-German Centre for Research Promotion, Peking: “Environment and culture of early humans in China and beyond“. 56,5 k€ in 2012. Organizers: Mosbrugger, V., Li, C.S., Bruch, A.

Project relevant conference contributions and lectures by research staff

From 15–18 June 2011 the Research Center organized an international and interdisciplinary symposium on “The Nature of Culture” at the Eberhard Karls University in Tübingen funded by the DFG. Furthermore, the project staff participated in 16 conferences, hosted two sessions, were contributing authors in 17 lectures and presented nine posters. They also introduced the project or their work seven times at colloquia, lecture series and in the *Studium Generale*.

Organisation of conferences and sessions 2011

12.-16.04.2011

Computer Applications in Archeology (CAA), Session: “*Spatial prediction of archaeological sites and paleoenvironments*” Beijing (Organisation Märker)

15.-18.06.2011

Tübingen: ROCEEH-Symposium ‘The Nature of Culture’ (Organisation Haidle)

20.-27.07.2011

INQUA, Bern, Early Pleistocene landscapes and the colonization of Europe, Session: “Linked effects of climate change, orbital forcing, tectonics and biotic interaction: a research agenda for studying faunal evolution and hominin dispersal patterns.” (Organisation Hertler, Palombo, Kahlke, Kaiser)

Contributions to conferences

03.02.2011

Tübingen, Germany: Colloquium of the Forum Scientiarum
Die Anfänge von Kunst und Musik und die Frage der kulturellen Modernität (Talk Bolus)

05.02.2011

Andechs, Germany: Max-Planck-Institut für Ornithologie (Humanethologie) und Humanwissenschaftliches Zentrum der Ludwig-Maximilians-Universität München “Ethology of Arts”: The evolution of artistic expressions – a view from palaeoanthropology (Talk Haidle)

09.02.2011

Mauer, Germany: Colloquium of the Society „*Homo heidelbergensis* von Mauer“:
Reif für die Insel – *Homo erectus* in Java und seine Umwelt im Pleistozän (Talk Hertler)

17.-18.03.2011

Mettmann, Germany: Workshop of the SFB 806 “Flakes not Blades – Discussing the role of flake production at the onset of the Upper Palaeolithic”
Flake production in the Aurignacian of southwestern Germany: some examples from the Swabian Jura (Talk Bolus)

03.-08.04.2011

Vienna, Austria: EGU
Early Pleistocene climate and environmental change in Armenia – reconstructing temporal corridors of early human expansions. (Poster Bruch, Scharrer, Gabrielyan)

An integrated approach to assess hydrological processes and sediment dynamics in Northern Tanzania.
(Poster Quénéhervé, Märker)

19.04.2011

Cape Town, South Africa: South African Archaeological Society.

Paleolithic Settlement Patterns in the Caucasus: New Research in Armenia: The First Modern (?)
Humans in Armenia. (Talk Kandel)

19.04.2011

Tübingen: Colloquium of the Evolution and Ecology Forum (EvE)

Mensch und Kultur: Meilensteine der kulturellen Evolution (Vortrag Bolus)

20.04.2011

Kassel, Germany: Kolloquium at the Ottonäum

Ab auf die Insel (Talk Hertler)

30.04.-05.05.2011

Jeongok (Korea): 2nd International Symposium of Bifaces of the Lower and Middle Pleistocene of the
World

Where's the Acheulean? Bifacial Technology in Germany (Talk Conard, Bolus, Chang)

11.05.2011

Mainz, Germany, Johannes Gutenberg Universität, Studium generale „Der Mensch und das Feuer:
Natur, Kultur, Technik"

Am Anfang war das Feuer? Zur Urgeschichte eines komplexen Artefakts (Talk Haidle)

16.-18.05.2011

Prague, Czech Republik: International Colloquium on the Late Cenozoic mammals in honor of Prof.
Oldrich Fejfar, Institute of Geology

Island Retreats in the Lower Pleistocene – Environment and Ecology of *Homo erectus* in Java, (Talk
Hertler)

15.-18.06.2011

Tübingen, Germany: ROCEEH-Symposium 'The Nature of Culture'

Exkursion Geißenklösterle (Guided tour Bolus)

Expansions of cultural capacity (Talk Haidle)

Tracing Cultural Identity in Early Upper Paleolithic Stone and Organic Tools (Talk Bolus)

04.-10.07.2011

Denisova Cave, Altai, Sibirien/Russland: International Symposium 'Characteristic Features of the
Middle to Upper Paleolithic Transition in Eurasia: Development of Culture and Evolution of *Homo*
Genus'

The late Middle Paleolithic and the Aurignacian of the Swabian Jura, southwestern Germany (Talk
Bolus)

20.-27.07.2011

INQUA, Bern, Switzerland:

Early Pleistocene landscapes and the colonization of Europe (Talk Bertini, Bruch, Leroy)

Quantifying palaeoclimate from South African MSA sites – Preliminary results using plant fossils from Sibudu Cave, KwaZulu-Natal, South Africa. (Talk Bruch, Sievers, Wadley)

Quantifying Early Pleistocene climate and environmental change in Armenia. (Poster Bruch, Scharrer, Gabrielyan)

Temporal corridors of migration in the Southern Caucasus during late Early Pleistocene. (Poster Bruch, Scharrer, Gabrielyan)

Linked effects of climate change, orbital forcing, tectonics and biotic interaction: a research agenda for studying faunal evolution and hominin dispersal patterns. (Poster Hertler, Palombo)

Landscape reconstruction and palaeontological prediction in the Lake Manyara area, Northern Tanzania. (Poster Märker, Hertler)

8.-12.08.2011

Addis Ababa, Ethiopia: Third biannual conference of the East African Association for Paleoanthropology and Paleontology.

Ecological reconstructions and dispersal of large mammal faunas at Makuyuni, Monduli District (Talk Hertler, Kashaija Domician, Märker, Mhgama, Mutungi, Peter, Quénehervé, Saanane, Schrenk)

27.-30.09.2011

Bucharest, Romania: NECLIME annual meeting

Environmental and climatic evolution in Carpathian Area during Neogene. (Talk Bruch, Iamandei, Iamandei, Paraschiv)

Plio-Pleistocene floras of the Vildštejn Formation, Cheb Basin, NW Bohemia – new reconstructions of vegetation and climate. (Poster Teodoridis, Bruch, Vassio, Kvaček, Martinetto)

Palaeoclimatic record based on the leaf floras in Miocene (Turkey) (Poster Kayseri, Özer, Bruch, Wiilde)

14.10.2011

Frankfurt am Main, Germany: Werkstattgespräch Museum-Migration-Kultur-Integration des Deutschen Museumsbundes, Naturmuseum Senckenberg.

Woher wir kommen und wohin wir gegangen sind. (Talk Hertler)

25.-28.10.2011

Salou, Spain: International Congress on Hominid-Carnivore Interactions.

Competition in Paleoguilds? New methods to assess effects of competition in extant and fossil carnivore guilds". (Talk Hertler)

Structures of Carnivore Guilds and Hominid Carnivory. Hominid-Carnivore Interactions (Poster Volmer, O'Regan, Reynolds, Hertler)

17.11.2011

Cologne, Germany: SFB 806, Workshop "Frauen in GeoArchäologischer Forschung in Deutschland".

Steine, Gruben, Fallstricke - sich als Frau in der Ur- und Frühgeschichte durchsetzen (Talk Haidle)

The Role of Culture in Early Expansions of Humans (Poster Haidle)

21.11.2011

Haifa, Israel: Colloquium of the Zinman Institute.

Settlement patterns in the Central Levant: A view from the other side of the Anti-Lebanon Mountains. (Talk Kandel)

Teaching

In addition to their research activities, the staff strive to impart students with the benefits and results of their work and support graduate and postgraduate students in their qualifications:

- Lectures and seminars at the University of Frankfurt/Main: Christine Hertler, Angela Bruch
- Lectures and seminars at the University of Tübingen: Michael Bolus, Miriam Haidle
- Lectures and seminars at the University of Applied Sciences for Forestry Rottenburg: Michael Märker
- Lectures and seminars in the framework of the International Erasmus Mundus Master's Program "Quaternary and Prehistory" at the Institute Paléontologie Humaine, Paris: Christine Hertler
- Lectures and seminars in the framework of the Volkswagen Foundation Summer School "The Cradle of Humankind" in Kenya: Christine Hertler
- Organization, lectures and seminars in the framework of the DAAD–VIGONI Field school "Remote Sensing and GIS for Landscape Processes Analysis: New Perspectives": Michael Märker
- Supervision of Master's, Diploma and Doctoral theses: Michael Bolus, Angela Bruch, Miriam Haidle, Christine Hertler, Andrew Kandel, Michael Märker
- Supervision of archaeotechnical trainees: Maria Malina

In 2011 Angela Bruch habilitated at the Faculty of Science of the Eberhard Karls University of Tübingen and received the *Venia legendi*, i.e. university teaching credentials in paleontology.