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

The objective of the Research Center “The Role of Culture in Early Expansions of Humans (ROCEEH)” is to seek answers to the following scientific questions: When, where and in which form did the interplay of changing climatic 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 developing not only culturally but also human ecologically defined niches outside of Africa? These niches are notably characterized by a wide spectrum of material and cognitive innovations. The goals of the Research Center are to identify the spatial and temporal patterns of migration in Africa and Eurasia and to reconstruct possible causes of early human expansions starting about three million years ago and continuing up to the last glacial maximum 20,000 years ago. Through the investigation of early migrations in Africa and the subsequent settlement first of subtropical, then warm temperate, and finally cold temperate to polar regions of Eurasia, the project will follow the transformation of the human species from its biologically determined nature to a culturally driven organism. The history of human expansions opens up new perspectives on the temporal and spatial dimensions of the increasing independence of the genus *Homo* from its purely biological limitations.

Members of the Scientific Commission (and Members of the Academy*), Karl Fuchs*, Lothar Ledderose*, Joseph Maran*, Ekkehard Ramm*, Volker Sellin* (Chairman), Prof. Dr. Ofer Bar-Yosef (Cambridge, USA), Prof. Dr. Manfred Ehlers (Osnabrück), Prof. Dr. Bernhard Eitel (Heidelberg), Prof. Dr. Wulf Schiefenhövel (Andechs), Prof. Dr. Mark Stoneking (Leipzig), Prof. Dr. Elisabeth Vrba (New Haven).

Principal Investigators in Frankfurt: Volker Mosbrugger*, Prof. Dr. Friedemann Schrenk. In Tübingen: Prof. Nicholas Conard Ph.D., Prof. Dr. Volker Hochschild.

Staff Members of the Research Center in Frankfurt: Dorothee Bauer, Knut Bretzke M.A. (until 31.7.2009), Dr. Angela Bruch, PD Dr. Miriam Haidle (Project Coordination), Dr. Christine Hertler, Dipl.-Biol. Chidi Nwokeji (since 1.8.2009), Patrick Schmidt M.A. (since 1.4.2009), Dipl.-Biol. Rebekka Volmer. In Tübingen: Prof. Dr. Michael Bolus, Dipl.-Inf. Zara Kanaeva, Dr. Andrew Kandel, Maria Malina, Dr. Michael Märker, Prof. Paul Goldberg Ph.D. (Visiting Professor from Boston University, Jun.-Aug. 2009).
The Research Center’s second year was dedicated primarily to implementing the database created during the prior year. The structure of the database was developed into a fully functional final version. As part of a trial run, data from sites in Southern Africa were entered into the database. The research team also conducted field work in Africa, the Near East and Central Europe and collected data from excavated assemblages housed in museums.

ROCEEH’s network was developed and strengthened through the following sponsored activities: organizing a workshop in Cape Town, South Africa in February entitled “The interaction between environment and human expansions”; participating financially and organizationally in the 2nd Conference of the “African Association of Palaeanthropology and Palaeontology” in August in Arusha, Tansania; organizing a 5-day symposium with workshops on the “Human Expansions and Global Change in the Pleistocene–Methods and Problems” in November in Frankfurt/M. The Senckenberg Research Center and the University of Tübingen formed the working group “Human Evolution and Ecology“ (HEP) to forge increased scientific connections with the Research Center. The first edition of ROCEEH’s biannual newsletter reporting on current research and new results appeared in the autumn of 2009. The intention of the newsletter is to keep existing cooperation partners up to date and awaken the interest of potential research partners. The newsletter can be downloaded on the Research Center’s website accessible through www.roceeh.net.

**ROCEEH Out of Africa Datenbank (ROAD)**

The entity relationship model was further enhanced in 2009 and then implemented using a PostgreSQL database system. Building on the foundation provided by JanusSuite (3Kon, Jena), Zara Kanaeva and Michael Märker refined the ROAD system to accommodate the specific needs of the project. With the help of the ROAD system, they successfully consolidated the PostgreSQL database system, Mapserver and several Web-GIS libraries. The implementation of a graphical user interface facilitates a simple, user friendly management system for both data and users. Data can be visualized analyzed and manipulated through Web-GIS functionalities, and users rights can be allocated. Most important, a backup strategy was developed and implemented for the entire system. The ROAD system is web-capable and accessible to the public (with limited user rights) through the project’s homepage, www.roceeh.net. The team compiled and edited a handbook and user’s manual containing descriptions of the tables contained in the database. The final version will be available on the website in early 2010.
To test the structure of the database, the procedure for data entry and the required analytical steps, the ROCEEH team decided to perform a test run. Through year’s end, geographical, paleoecological, archaeological and bibliographical data for 163 find localities were entered into the database focusing on the Middle Stone Age of Southern Africa between 191,000 and 29,000 years before present (MIS 6-3). Partnerships were established with NEOTOMA, a database covering the paleoecology of the last five million years, and the SFB 806 “Unser Weg nach Europa: Kultur-Umwelt-Interaktion und menschliche Mobilität im Späten Quartär” (Our route to Europe: cultural-environmental interaction and human mobility in the Late Quaternary).

Data Collection and Field Work
In addition to advancing the state of the database and extracting data from literature about Southern African localities, the scientists at the Research Center also performed supporting activities based on field work and research in museum collections. In South Africa, Andrew Kandel concluded the analysis of artifacts from Anyskop Blowout and Geelbek Dunes and began preparing a monograph about these localities. At the Iziko South African Museum, Christine Hertler examined the paleontological assemblages from Anyskop Blowout, Geelbek Dunes, Sea Harvest, Die Kelders and Swartklip. These localities will form the basis for paleoecological analysis using the eco-profiling method. Angela Bruch, together with Marion Bamford of the University of the Witwatersrand, Johannesburg, began an investigation of the macro-botanical remains from Sibudu Cave, KwaZulu-Natal. Prof. Paul Goldberg and Chris Miller supported the Research Center with geo-micromorphological investigations at Sibudu Cave and Diepkloof Rockshelter. With assistance from Angela Bruch the Working Group on African Past Vegetation (WAVE) was formed.

ROCEEH activities in East Africa included Christine Hertler’s review of collections in the National Museum of Tanzania in Dar es Salaam. In cooperation with Prof. Anthony Marks of Southern Methodist University in Dallas, Andrew Kandel evaluated stone and ostrich eggshell artifacts from Mumba Rockshelter. The Universities of Frankfurt and Dar es Salaam organized a three-week field school near the archaeological and hominin localities of Makuyuni, Tanzania. Together with Prof. Dr. Charles Sanaane of the Universtiy of Dar es Salaam, Liane Giemsch and PD Dr. Ralf Schmitz from the LVR State Museum in Bonn led archaeological excavations in the Lower Manyara Beds. Christine Hertler and Friedemann Schrenk conducted surveys, as well as taphonomical and ecological studies, around Lake
Manyara. Together with Prof. Dr. Heinrich Thiemeyer and Prof. Dr. Andreas Junge of the University of Frankfurt, Michael Märker tested the application of geomagnetic and electrical resistance to the prospection of artifacts, mapped paleosols and undertook comparative studies using remote sensing maps.

In Armenia, Andrew Kandel and Dr. Boris Gasparyan of the National Academy of Sciences in Yerevan conducted a survey around Paleolake Vorotan. Additionally, they excavated for 12 days at Aghitu-3, the first cave site in Armenia with an Upper Paleolithic stratigraphy and well preserved organic remains, and completed the analysis of the finds. Angela Bruch continued paleobotanical studies in Armenia and Georgia within the framework of the Caucasus Project “Die Umwelt des frühen Menschen in Armenien–Klima- und Vegetationsrekonstruktion für das frühe Pleistozän” (The environment of early humans in Armenia–climate and vegetation reconstruction of the early Pleistocene) funded by the Volkswagen Foundation. The field work in Armenia fills existing gaps in data and profile entry, adds new dating results and opens new avenues for research. The first discovery in Armenia of a large mammalian fossil at least one million year old establishes new prospects for future research in Armenia. These results were presented in a workshop in Yerevan and will be documented in joint publications. Discussion, literature research and a 2-day field reconnaissance in Southern Georgia lay the foundation for a joint project with Armenian and Georgian colleagues about environmental reconstruction of early human landscapes with respect to paleoflora and paleofauna. Through meetings, reviewing collections of the Geological Survey of Iran and field trips, Angela Bruch discussed the possibility of expanding the research in Iran into the regions of Teheran and Tabriz. Dorothee Bauer treated and prepared the pollen samples collected from Armenia, Georgia and Iran. In Iran, the Research Center was supported by test excavations and surveys conducted by Nicholas Conard and Mohsen Zeidi in Ilam Province of western Iran, as well as Elham Ghasidian’s analysis of the Upper Paleolithic site Ghar-e Boof. Saman Heydari and Michael Märker evaluated data from Paleolithic surveys in the southern Zagros Mountains. Using GIS they created a model to improve prospection methods with the aim to locate new sites. In Syria the 2009 campaign focused mainly on the analysis of survey finds collected in the region of Ma’aloula. Andrew Kandel, Knut Bretzke and Nicholas Conard continued to expand the survey and prepared for an intensive field season in 2010.
Michael Bolus continued the analysis of the Middle Paleolithic and Aurignacian lithic artifacts from Geißenklösterle and furthered data collection from the cave sites of the Swabian Alb. Maria Malina digitalized profiles and other excavation data from the excavations at Hohle Fels near Schelklingen and analyzed data using GoCAD. She also coordinated the continuing excavations at Vogelherd and organized the wet screening and sorting of finds, led an 8-week excavation campaign at Hohle Fels, and completed technical and documentary work through the end of the year. A new cooperation project funded by the DFG began at the Lower Paleolithic site Schöningen in Lower Saxony.

During a stay in northeastern Spain, Michael Bolus analyzed finds from the site of Reclau Viver at the Museu Arqueològic Comarcal de Banyoles, focusing on the personal ornaments found in all of the archaeological layers. He visited the sites of Serinyà and reviewed the collections of several museums and institutions housing Lower Paleolithic to Magdalenian finds from the region. Under the framework of the VIGONI project “Pliocene-Pleistocene climatic trends on a latitudinal gradient from NW Germany to Central Italy” Angela Bruch completed the entry of climatic data from the Plio-Pleistocene of Northern Italy. Michael Märker and Dr. Florian Seiler of the German Archaeological Institute began a DFG project in July, 2009 about reconstructing the Classical cultural landscape of the Sarno Basin, Italy. This methodological contribution to ROCEEH has direct applications in reconstructing paleogeographical environmental conditions, paleogeomorphology, paleopedology and access to natural resources such as water.

Publications
In 2009 the project team published a total of 25 research papers in which the work of the research center played a significant role:


Conferences and lectures

In 2009, the project team organized a workshop on “The interaction between environment and human expansions” in Cape Town, South Africa and a symposium with workshops on “Human Expansions and Global Change in the Pleistocene–Methods and Problems” in Frankfurt/M., Germany. In addition, the project team participated in 19 additional conferences. In summary, the team organized two conferences, one session, held 30 lectures and presented six posters. Furthermore, the project team introduced the project and components of the project’s work 19 times at various colloquia, lecture series, as part of Tübingen’s Studium generale, and at the Akademientag in Berlin.


Paper Hertler: Routes and timing of mammalian migrations over the Sunda Shelf

- 09.03.2009 Cape Town, South Africa: Seminar of the Department of Archaeology at the University of Cape Town. Paper Hertler: Eco-Profiling: Characterizing Hominin Habitats in Pleistocene Java


- 31.03.-01.04.2009 Chicago/Illinois, USA: Annual Meeting of the Paleoanthropology Society. Paper Hardy, Bolus, Conard: How different were Neanderthals? Stone tool function in Aurignacian and Middle Palaeolithic levels at Hohle Fels, Germany


- 17.4.2009 Heidelberg, Germany: Heidelberger Akademie der Wissenschaften. Paper Hertler: The role of culture in early expansions of humans


- 30.04-02.05.2009 Dresden, Germany: International Meeting on Geoarchaeology in Central Europe. Paper Vogel, Márker: Reconstruction of the pre-AD 79 paleosurface of the Sarno river basin using datamining and classification and regression methods. Poster Heydari, Márker, Conard: Geoarchaeologic predictive model for Paleolithic sites in the Zagros Mountains of Iran

- 7.5.2009 Tübingen, Germany: Studium generale „Evolution: Paradigmen - Provokationen“. Paper Haidle: Die kognitive Voraussetzung für die Ausbreitung der Menschen

- 27.5.2009 Berlin, Germany: Akademientag „In den Netzen der Sprache“. 
  *Posterpräsentation der Forschungsstelle:* Wie der Mensch zur Sprache kam - Sprachentwicklung der frühen Hominiden


  Palaeoenvironmental interpretations on the faunal assemblage of Palaeovorotan river basin (Early Pleistocene, South Armenia). Paper Scharrer, Bruch, Gabrielyan

  Vegetations- und Klimaveränderungen im Kleinen Kaukasus im frühen Pleistozän - Vorläufige Ergebnisse.


- 06.-09.10.2009 Tarragona, Spain: Tagung „The Neanderthal Home: Spatial and Social Behaviours”. Paper Conard, Bolus, Münzel: Middle Paleolithic land use and spatial organization in the Swabian Jura, southwestern Germany


Bruch, Haidle, Kanaeva, Kandel, Märker, Mosbrugger, Schrenk, Conard, Hochschild: The Role of Culture in Early Expansions of Humans – A New Research Center


- 03.11.2009 Berlin, Germany: Gemeinsame Fachtagung des Deutschen Geoforschungszentrums (Potsdam), Alfred-Wegener-Instituts (Bremerhaven) und der Senckenberg Gesellschaft für Naturforschung (Frankfurt/Main). Paper Hertler, Bruch, Schrenk, Mosbrugger: Klimawandel und Evolution der Menschen


the Indo-Pacific area?”. *Organisation of session Haidle & Pawlik, Paper Haidle:*
Introduction – Pleistocene Modernity: An exclusively Afro-European issue?

  Die Anfänge von Kunst und Musik und die Frage der kulturellen Modernität

  Habitatveränderungen und Ernährungssysteme im Pleistozän.
Teaching

In conjunction with their own research activities, the members of the project team strive to communicate the questions and results of their research to undergraduate students and to support the qualifications of graduate candidates:

- Teaching courses at the University of Frankfurt/Main: Christine Hertler
- Teaching courses at the University of Tübingen: Michael Bolus, Michael Märker
- Teaching courses in the framework of the International Erasmus Mundus Master’s Program “Quaternary and Prehistory”: Christine Hertler
- Supervision of Master’s, Diploma and Doctoral Theses: Michael Bolus, Miriam Haidle, Christine Hertler, Andrew Kandel and Michael Märker
- Supervision of archaeotechnical apprentices: Maria Malina

In 2009, Michael Bolus was appointed as an extraordinary professor by the Faculty of Geosciences at the Eberhard Karls University of Tübingen.