TECHNISCHE UNIVERSITÄT DRESDEN

INTERNATIONAL MEETING
GEOARCHAEOLOGY IN CENTRAL EUROPE

PROGRAM AND ABSTRACTS

April 30th to May 2nd, 2009, in Dresden

Institut für Geographie
Fachgruppe
Physische Geographie

AK Geoarchäologie

Sächsisches Landesamt
für Archäologie

INTERNATIONAL MEETING GEOARCHAEOLOGY IN CENTRAL EUROPE

FROM APRIL 30TH TO MAY 2ND, 2009
DRESDEN; JAPANESE PALACE

Organized by:

Institut für Geographie/Fachgruppe Physische Geographie
AK Geoarchäologie
Sächsisches Landesamt für Archäologie

CONTENT

PROGRAM

Thursday, April 30th, 2009

16.00 -17.30	**Arrival and registration** AT THE JAPANESE PALACE IN DRESDEN
17.30 - 18.15	**Evening lecture** **Zur Rekonstruktion neolithischer Siedlungsoberflächen: Gräber und Häuser** PROF. DR. J. LÜNING (Frankfurt a. M.)
19.30	**Ice-breaker party** JAPANESE PALACE IN DRESDEN

Friday, May 1st, 2009

Part 1 "Methods"

08.30 - 09.00	**Introduction and welcome**
09.00 - 09.30	**From the past to the future – System based deciphering of the complexity of coupled human and natural systems and their potential for future research and application** Dotterweich, M.
09.30 - 10.00	**Archaeological Investigations supported by Geographic Information System** Göbel, K.
10.00 - 10.30	**Magnetic dating in Quaternary sciences and geoarchaeology** Hambach, U., E. Schnepp & Ch. Rolf
10.30 - 11.00	**Coffee break**

Part 2 "Mediterranean"

11.00 - 11.30	**The ancient city of Pheia, western Peloponnesus, Greece, and the mystery of its sudden submergence** Vött, A., H. Brückner, G. Bareth, S. M. May & H. Hadler
11.30 - 12.00	**Reconstruction of the A.D. 79 Paleo-surface of the Sarno River Basin using Data Mining Technologies and Classification and Regression Methods** Vogel, S. & M. Märker
12.00 - 12.30	**Mediterranean karst depressions as geoarchaeological archives: Reconstructing the palaeoenvironmental history of Mount Ida (Crete) by geophysical prospection, geomorphologic investigations and mineralogical analysis** Siart, Ch., B. Eitel, S. Hecht, O. Bubenzer, I. Holzhauer & G. Schukraft
12.30 - 14.00	**Lunch break**

Part 3 "Central Europe"

14.00 - 14.30	**Late Pleistocene to Holocene Landscape History and Geoarchaeology at the Southern Foreland of the Harz Mountains, Germany** Bebermeier, W., Ph. Hoelzmann, M. Meyer & B. Schütt
14.30 - 15.00	**Chronostratigraphic Investigations of Colluvial and Alluvial Sediments to Reconstruct Holocene Soil Erosion: A case study from a Meso-Scale Catchment in Franconia, Germany.** Fuchs, M., M. Will & E. Kunert
15.00 - 15.30	**Not only Erosion: Causes of anthropogenic soil disturbances and degradation of archaeological sites in the agrarian loess landscape (Germany, Rhineland)** Gerlach, R. & I. Herzog
15.30 - 16.00	**Studies on human-landscape interrelationships in the prehistoric settlement area Regensburg-Burgweinting** Raab, A., J. Völkel, W. Brützke, S. Kunz, A. Stiglmeier, Cl. Hartl & D. Christophel
16.00 - 16.30	**Coffee break**

Part 4

16.30 - 17.00	**Agriculture and Archaeology in the middle Saxon Loess-hill region. Perspectives and problems of the conservation of archaeological sites in an intensively used agricultural landscape** Strobel, M., R. Vogt & Th. Westphalen
17.00 - 18.30	**Meeting of members / Mitgliederversammlung**
20.00	**Conference dinner** Wenzel Prager Bierstuben Königstr. 1, 01097 Dresden

Part 5 "Short contributions"

08.30 - 08.45	**Applying new analytical methods to Paleolithic survey data in a differentiated geomorphological environment in western Syria** Bretzke, K., A. W. Kandel, M. Masri & N. J. Conard
08.45 - 09.00	**New Satellite Data and Ground Truth Data as Base for a Reconstruction of Ancient Caravan Routes - Examples from the Western Desert of Egypt** Bubenzer, O. & A. Bolten
09.00 - 09.15	**Geoarchaeological investigations contributing to the Holocene environmental history of the Mulde-Loesshügelland in Saxony** Tinapp, Chr., M. Knipping & C. Steinmann
09.15 - 09.30	**Stone raw material of early medieval stronghold - examples from the Ostrów Tumski (Wrocław- Lower Silesia, Poland)** Lisowska, E. & P. Gunia
09.30 - 09.45	**Scenarios of landscape change in the environs of the Poseidon Sanctuary of Akovitika (SW Peleponnese, Greece)** Engel, M., H. Brückner, M. Kiderlen, J. C. Kraft & M. Knipping
09.45 - 10.00	**Petrographic investigations and provenance analyses of grindstones from different localities southeast of Leipzig (Saxony, Germany)** Richter, A., J.-M. Lange, H. Stäuble & C. Steinmann
10.00 - 10.15	**Interdisciplinary research with the participation of geoarchaeology and history on Slavonic settlement at the lower Central Elbe River** Goßler, N., Th. Kinkeldey, Th. Schatz & J. Schneeweiß
10.15 - 10.30	**The geography of Taman Peninsula (SW Russia) during antiquity – evidence for a second Bosphorus and re-interpretation of Strabos' geographical description** Kelterbaum, D., H. Brückner, S.Gerhard, A. Melikyan, A. Porotov, U. Schlotzhauer & D. Zhuravlev
10.30 - 11.00	**Coffee break**

Part 6 "Eastern Europe"

11.00 - 11.30	**Physico-chemical features of Late-medieval building ceramics from Szewska street in Wrocław (Lower Silesia –Poland)** Chudziak, J. & P. Gunia
11.30 - 12.00	**Prospects of geoarchaeological interpretations of medieval dwelling-houses and farm-out buildings, case study from the archaeological research in Brno, Czech Republic** Lisá, L., D. Merta & M. Peška
12.00 - 12.30	**Holocene development of the lower Danube flood plain at the tell settlement Pietrele, Southern Romania** Wunderlich, J.
12.30 - 14.00	**Lunch break**

Postersession

14.00 - 16.00	**Postersession**

Part 7 "VARIO"

16.00 - 16.30	**Development of a spacious (pre- and proto) historic inland dune landscape in Lower Bavaria, Germany** VÖLKEL, J., S. DÖTTERL, A. SCHNEIDER, K. HÜRKAMP, A. HILGERS & M. LEOPOLD
16.30 - 17.00	**Geoarchaeological studies to reconstruct human caused environmental changes at the western border of the "Nördlinger Ries" (South Germany)** MAILÄNDER, S., J. EBERLE & W. D. BLÜMEL
17.00 - 17.30	**Micromorphology and Site Formation Processes of the Paleolithic Caves of Swabia, SW Germany** MILLER, CH., E. MILLER, P. GOLDBERG & N. J. CONARD
17.30 - 18.00	**The evolution of Saharan dust input in Lanzarote (Canary Islands): Lower Holocene triggering by human activity in the northwest Sahara?** SUCHODOLETZ, H. V., H. OBERHÄNSLI, D. FAUST, L. ZÖLLER, U. HAMBACH & M. FUCHS
20.00	**Concert** DRESDENER KAPELLSOLISTEN

Sunday, May 3th, 2009

EXCURSION

	Field trip ARCHAEOLOGICAL SITES AND BLACK SOILS/BLACK SEDIMENTS

ABSTRACTS

ORAL PRESENTATION

FRIDAY, MAY 1ST, 2009

PART 1 METHODS

FROM THE PAST TO THE FUTURE – SYSTEM BASED DECIPHERING OF THE COMPLEXITY OF COUPLED HUMAN AND NATURAL SYSTEMS AND THEIR POTENTIAL FOR FUTURE RESEARCH AND APPLICATION

Markus Dotterweich

Institut für Umweltwissenschaften, Fortstraße 7, 76829 Landau
mail@markus-dotterweich.de

In the last decades, many research projects were very successfully conducted which reconstruct past human-environment interactions. Most of these studies focused on the dynamics and processes on landscape development like soil development, soil degradation, hillslope erosion, sedimentation, river system transformation, or coastal changes as an effect of land-use impact, climate changes, and geo-logical processes. However, only a few studies address the feedback mechanisms of these processes to land-use change, culture, and socioeconomic processes. One reason might be the very high complexity and the lack of data in this research field. On the other hand, in the last years new system theory based concepts were developed in order to better understand the complexity of thresholds, correlations, cau-salities, impacts, and responses. In contrast to the USA and the UK, in central Europe this concept of system based 'ecological archaeology' is not very well established.

The main questions of this concept focus on the processes of i) culture changes and environment, ii) climate change and cultural adaptation, iii) extreme events and sudden changes, iv) overcoming and management of collapses and crisis, v) sustainability and exhaustive cultivation, and vi) management of energy and matter fluxes.

Methodically, the central concept of the Resilience Theory provides and improves this theoretical framework for heuristic analysis of human-environment or socio-ecological interactions over decadal to millennial timescales. It identifies landscape system behavior through analysis of different proxy records of human and natural systems. In part, the concept of Adaptive Cycles and Panarchy reveal couplings between human and natural systems vary across space, time, and organizational units. These emerge in new and complex patterns and processes not evident when studied by social or natural sci-entists separately. They also exhibit nonlinear dynamics with thresholds, reciprocal feedback loops, time lags, resilience, heterogeneity, and surprises. These past couplings have legacy effects on present conditions and future possibilities. Therefore, the 'historical profiling' of ancient and modern land-scapes offers a new dimension for hypothesis testing, for the development and testing of simulation models, and for the creation of appropriate or sustainable management strategies.

In this paper I will present the basic concept and discuss current studies in Resilience Theory in Geoarchaeology and their potential for future research and application.

ARCHAEOLOGICAL INVESTIGATIONS SUPPORTED BY GEOGRAPHIC INFORMATION SYSTEMS: NYDAM – NEUDORF-BORNSTEIN – THORSBERG, THREE ARCHAEOLOGICAL SITES OF THE ROMAN IRON AGE

Karin Göbel

Zentrum für baltische und skandinavische Archäologie in der Stiftung Schleswig-Holsteinische Landesmuseen, Schloß Gottorf Schloßinsel, 24837 Schleswig
goebel@schloss-gottorf.de

A Geographic-Information-System (GIS) combines spatial information with other data and offers a lot of possibilities for analysation and visualisation. Most of the archaeological data have a spatial background and so it is not surprising that in the last years GIS has become a common tool in archaeology.

The excavations in Nydam/ Denmark during the years from 1989 to 1999 are a good example of how helpful the utilization of a GIS could be. The excavation area was only about 500m², but the documentation includes 134 different excavation plans with more than 10.000 objects, a database with 13.387 items and countless photos and drawings. GIS gathers all this information in one single system. This provides a comprehensive overview. The fact, that one is able to show how the different features are arranged, for example in a 3D animation, is a considerable support for the analysation of the historical events.

The rich burials in Neudorf-Bornstein in Schleswig-Holstein/ Germany are another good example, how one can use a GIS. In September 1967 during gravel quarrying inhumation graves from the late Roman Iron Age were discovered and the remains of two of them are documented in 24 excavation plans in different levels. The grave chambers were poorly preserved. The wooden parts of the chamber were practically all lost, except for the wooden ridge beam. The colouration of the soil and the position of the stones were the only indicator as to the different parts of the grave. It was their selective display in 3D which made the reconstruction of the burial site possible.

Occasionally GIS helps to locate old excavation areas. The old sketch-maps C. Engelhardt created in the year 1859, while excavating the important finds of the bog offerings in Thorsberg in Schleswig-Holstein/ Germany were without coordinates. It took old fashioned detective work to uncover the real location and again in this case the use of GIS simplified the comparison of the old maps and the information from the old site notebook by C. Engelhardt with current information of the region.

MAGNETIC DATING IN QUATERNARY SCIENCES AND GEOARCHAEOLOGY

Ulrich Hambach[1*], Elisabeth Schnepp[2], Christian Rolf[3]

[1] Chair of Geomorphology, Laboratory for Palaeo- and Enviro-Magnetism (PUM), University of Bayreuth, 94450 Bayreuth, Germany;
[2] Leibniz Institute for Applied Geosciences (LIAG), Stilleweg 2, 30655 Hannover, Germany
[3] Chair of Geophysics, University of Leoben, Gams 45, 8130 Frohnleiten, Austria
[*] ulrich.hambach@uni-bayreuth.de

Magnetic dating includes all approaches dealing with the temporal variation of the Earth's magnetic field (EMF) as well as with the application of climate dependent variations of rock magnetic properties of sedimentary sequences and their correlation to independently dated palaeoclimatic archives.

Palaeomagnetism has an outstanding impact on geosciences in general and especially on Quaternary chronology and palaeoclimate research. Palaeomagnetic dating employs the temporal variation of the direction as well as the intensity of the EMF on time scales from 102 to 107 years. Magnetic properties (e.g. magnetic susceptibility) of sediments and soils are nowadays widely used in Quaternary palaeoclimatic, as well as in geoarchaeological research to characterise the palaeoenvironment and to indirectly date sedimentary sequences. Magnetic property variations with depth/time in sedimentary sequences are mainly climatically controlled and therefore can serve as relative dating tools if the timing of palaeoclimatic variations is known independently.

The well-known temporal pattern of reversals of the EMF on time scales from 104 to 107 years and the shorter secular variation (SV; amplitude 10-30°, time scale 1 to 103 years) provide an excellent tool for stratigraphic subdivisions. Short-lived changes of the EMF (in the order of 103 years) in direction and intensity are called geomagnetic excursions. If their chronology is known, they are perfect time markers. Historic measurements of SV go back in time only 400 years, whereas archaeomagnetic data on SV cover generally the past two or three millennia but go back about 8000 years for a few places, i.e. Bulgaria, providing useful SV master curves. Well-defined archaeomagnetic SV curves have time resolutions in the order of 50-100 years. Records of the intensity variations of the EMF retrieved from sediments (relative palaeointensity), volcanic rocks and archaeological items (absolute palaeointensity) may also serve as dating tools and their application in stratigraphic studies is continuously increasing.

In geoarchaeology, palaeomagnetic dating employing SV for time scales of a few millennia has a largely underdeveloped potential. Moreover, the use of geomagnetic excursions as time markers in the Upper Pleistocene, in combination with relative palaeointensity records derived from the same archives, will open a new perspective for dating of sequences which are hardly datable by other methods. Magnetic stratigraphy of sedimentary sequences by means of rock magnetic parameters as function of depth/time is increasingly applied for inter-site correlation and indirect dating.

Examples from case studies will be presented and pros and cons of the method will be discussed.

References

Hambach, U., R olf, C. & Schnepp, E. (2008): Magnetic dating of Quaternary sediments, volcanites and archaeological materials: an overview.- Eiszeitalter und Gegenwart, Quaternary Science Journal, 57/1–2, 25–51.

PART 2 MEDITERRANEAN

THE ANCIENT CITY OF PHEIA, WESTERN PELOPONNESUS, GREECE, AND THE MYSTERY OF ITS SUDDEN SUBMERGENCE

M A. Vött[1*], H. Brückner[2], G. Bareth[1], S.M. May[1], H. Hadler[1]

[1] Department of Geography, Universität zu Köln, Albertus-Magnus-Platz, D – 50923 Köln/Cologne
[2] Faculty of Geography, Philipps-Universität Marburg, Deutschhausstr. 10, D – 35032 Marburg
[*] andreas.voett@uni-koeln.de

Ancient Pheia is located in the Bay of Aghios Andreas, western Peloponnesus. In antiquity, it was used as sea harbor for Olympia situated some 28 km further east. The archaeological remains of Pheia are almost completely submerged and lie in water depths down to 5 m below present sea level. The harbor is said to have been destroyed by earthquakes in the 6th century AD, most probably in 521 AD and/or 551 AD. The modern beach of Aghios Andreas is characterized by thick beachrock layers. Within former studies, this beachrock was used as sea level indicator thus explaining the submergence of ancient Pheia by a complex sequence of strong subsidence and following minor uplift, independent of earthquakes which might later have destroyed the site.

We carried out geomorphological, sedimentological and geoarchaeological studies and found that the beachrock is clearly laminated and consists of mostly fine sand from the littoral zone. However, there are numerous sections with abundant gravel, marine shell debris, and ceramic fragments inferring high-energy influence. In some areas, even large ashlars are incorporated. Strikingly, these blocks do not show any signs of being moved in the littoral zone; one block is still coated by plaster. Ceramic fragments and blocks are pre-dating the end of the 6th century AD. Associated to the beachrock, an adjacent cliff profile reveals a mixed layer out of sand, gravel, ceramic fragments, and marine shell debris. Parts of this layer subsequently weathered and formed a palaeosol indicating only short-time interference of the environment. Geomorphological studies at the nearby Cape Katakolo and Tigani Island further revealed numerous dislocated blocks lying up to 40 m distant from the present shore.

Based on our results, the beachrock sequence at Aghios Andreas clearly represents a high-energy event deposit, most probably a tsunamite. We suggest that ancient Pheia was hit by an extreme event associated to one of the strong earthquakes reported for the 6th century AD. Submergence seems to be of co-seismic nature such as observed during the southeast Asia tsunami in 2004.

RECONSTRUCTION OF THE A.D. 79 PALEO-SURFACE OF THE SARNO RIVER BASIN USING DATA MINING TECHNOLOGIES AND CLASSIFICATION AND REGRESSION METHODS

Sebastian Vogel[1*], Michael Märker[2]

[1] German Archaeological Institute, Germany. Podbielskiallee 69-71, D-14195 Berlin
[2] Heidelberg Academy of Sciences and Humanities c/o University of Tübingen, Germany. Rümelinstr 19-23, D 72070 Tübingen
[*] sv@dainst.de

Within the geoarchaeological research project „Reconstruction of the Ancient Cultural Landscape of the Sarno River Basin" which is undertaken by the German Archaeological Institute and the Heidelberg Academy of Sciences and Humanities/University of Tübingen we developed a methodology to reconstruct the pre-eruption paleo-topography of A.D. 79 of the Sarno River basin. Therefore, existing topographic input data such as topographic maps, topographic points and contour lines were gathered and georeferenced. Furthermore, more than 1.100 stratigraphic drillings that were conducted in the Sarno River basin were collected, localized and digitized. Besides other stratigraphic data the depth of the A.D. 79 paleo-surface was identified from the available drilling documentations.

Using the topographic points and contour lines a digital elevation models of the present-day surface was created. Subsequently data mining technologies were applied to deduce derivatives of the present-day topography. In this study 15 different primary and secondary topographic indices were derived. Together with other physiographic data such as hydrology, geology and land use and the stratigraphical information from the drilling data a model was generated to predict the A.D. 79 paleo-surface. The model is based on the combination of the topographic indices and the other physiographic data that were calibrated with the measured depth of the A.D. 79 paleo-surface taken from the drilling documentations. To the knowledge of the authors it is the first time the methodology of classification and regression trees is systematically used in the reconstruction of paleo-surfaces.

MEDITERRANEAN KARST DEPRESSIONS AS GEOARCHAEOLOGICAL ARCHIVES: RECONSTRUCTING THE PALAEOENVIRONMENTAL HISTORY OF MOUNT IDA (CRETE) BY GEOPHYSICAL PROSPECTION, GEOMORPHOLOGIC INVESTIGATIONS AND MINERALOGICAL ANALYSIS

Christoph Siart*, Bernhard Eitel, Stefan Hecht, Olaf Bubenzer, Ingmar Holzhauer, Gerd Schukraft

Geographical Institute, Laboratory for Geomorphology and Geoecology, University of Heidelberg, Germany
* christoph.siart@geog.uni-heidelberg.de

Sediment-filled karst depressions (e.g. dolines) have barely been used as geoarchives since they were regarded as open systems with an unpredictable material flux and storage. Instead, such terrestrial proxy-data sources can yield promising records for the analysis of the Holocene landscape evolution if investigated within an appropriate multi-method approach.

The focus of our studies is on the currently uninhabited Ida Mountains in Central Crete, which - according to the huge archaeological excavation of a villa-type settlement - were densely populated during Minoan times (Neopalatial period, ~1650 B.C). As it is the main objective to reconstruct the Bronze-Age landscape evolution with regard to human-environmental interactions, the general structure of the subsurface karst topography, the amount of overlying sediments, their provenance and their archive function were investigated. The combination of earth resistivity tomographies (ERT) and seismic refraction tomographies (SRT) perfectly qualified for taking a look at the buried karst relief. Colluvial fillings of more than 20 m allowed pinpointing the most promising locations for vibracoring of the sediment archives. Subsequent geomorphologic and mineralogical analyses as well as AMS 14C datings were conducted. Since the heavy mineral analysis (SEM-EDX, EPMA) indicated high concentrations of autochthonous materials, massive neotectonic activity, formerly existing but presently absent klippes of different petrography or aeolian input during the Holocene must be considered as potential influences. These findings are supported by the detection of volcanogenic tephra in the cores, which absolutely correlates to the chemical composition of Santorini rhyodacites (Minoan eruption 3.6 ka). As such material has never been found in altitudes above 1000 m a.s.l. on Crete before, the spatial ash fallout of the Thera eruption needs to be revised. Corresponding minerals were detected in a depth of 10 m below surface and therefore display the geomorphodynamic intensity since the late Bronze-Age, which led to the change of the palaeolandscape. Substantial environmental transformations, particularly massive colluviation, are confirmed by maximum radiocarbon ages of 4991-4770 BC cal at the base of anthropogenically constructed drainage channels next to the Bronze-Age settlement. The polygenetic attributes of the sediments are revealed by XRDstudies and light mineral investigations, which point to significant input of external materials. Our on site studies prove that the Minoan settlement was more extensive than documented by surface artefacts. As demonstrated by an unknown buried building with subsurface wall remains, large parts of the area were filled up with pedo-sediments subsequent to human occupation. Altogether, the results imply that sediment filled karst depressions serve as valuable and suitable geoarchives for palaeoenvironmental reconstructions, especially in coast-distal and mountainous regions without limnic or fluvial deposits.

PART 3 CENTRAL EUROPE

LATE PLEISTOCENE TO HOLOCENE LANDSCAPE HISTORY AND GEOARCHAEOLOGY AT THE SOUTHERN FORELAND OF THE HARZ MOUNTAINS, GERMANY

Bebermeier, W.[1*], Hoelzmann, P.[1], Meyer, M.2, Schütt, B.[1]

[1] Freie Universität Berlin, Institut für Geographische Wissenschaften Malteserstrasse 74-100, 12249 Berlin, Germany
[2] Freie Universität Berlin, Institut für Prähistorische Archäologie, Altensteinstrasse 15, 14195 Berlin, Germany
[*] wbeberm@geog.fu-berlin.de; Tel: +49 30 83870873; Fax: +49 30 83870 755

The goal of this geoarcheological study is to parallelise the palaeoenvironmental conditions with the cultural landscape history in order to determine environmental and social impact on the Holocene landscape development. The investigation area is situated in the south of the Harz Mountains (northern Germany) NE of the town of Nordhausen. The south of the study area belongs to the fertile floodplain of the river Helme, the so-called "Goldene Aue".

We will present results on the natural and cultural landscape history as well as on archaeological data. We focus our research on four prehistoric settlements of the Prezworsk culture (around 2100 a BP), all situated in similar positions on the upper west-exposed slopes of tributaries of the Goldene Aue. These sites were dated by ceramics to the late pre-roman Iron Age (Seidel, 2006).

The following methods were applied: detailed measuring of valley topography with differential GPS, electromagnetic surveying, mapping of geomorphology, analysis of soil phosphorus as indicator of human activity. Furthermore, several drillings were performed in the flood-plains of the tributaries within the near vicinity of the archaeological settlements. These drillings bottom out on the Buntsandstein bedrock and represent the sedimentary history since the late Pleistocene, as shown by a suite of radiocarbon analyses of charcoal and organic matter ranging from c. 18,000 to 400 a BP (c. 20,000 to 300 cal a BP). The sediments show typical sequences of varying facies which represent periods of enhanced activity and phases of stability during the early Holocene (13,200 to >3600 cal a BP). Before 3600 cal a BP formations of bog lime and calcareous tuff as well as sedimentation of alluvial clays - intercalated with colluvial silts – prevailed, indicating stable conditions. After 3600 cal a BP an increasing amount of charcoal, coarser grain sizes and angular pebbles are found in the colluvial deposits. We interpret this section as a consequence of clearing activities of early settlers. The upper 150 cm of the sediments represent phases of enhanced medieval soil erosion (dated to younger than 520 cal a BP) during which severe gully-incision and extensive soil erosion occurred, due to intensified agricultural activities.

Our results show the influence of humans on the natural landscape that started in neolithic times, a long time before the Prezworsk culture appeared. During the time slice of the Prezworsk culture the sedimentary archives show no severe erosional events.

References

Seidel, M. (2006): Das Südharzvorland von der römischen Eisenzeit bis zur Völkerwanderungszeit. Zur Besiedlungsgeschichte einer Altsiedellandschaft im nördlichen Thüringen. – Weimarer Monographien zur Ur- und Frühgeschichte 41.

CHRONOSTRATIGRAPHIC INVESTIGATIONS OF COLLUVIAL AND ALLUVIAL SEDIMENTS TO RECONSTRUCT HOLOCENE SOIL EROSION: A CASE STUDY FROM A MESO-SCALE CATCHMENT IN FRANCONIA, GERMANY.

M. Fuchs[1*], M. Will[2], E. Kunert[1]

[1] Department of Geomorphology, University of Bayreuth, 95440 Bayreuth, Germany
[2] Department of Geography, University of Exeter, EX4 4QJ Exeter, UK
[*] markus.fuchs@uni-bayreuth.de

Since the Mid-Holocene, a period when agriculture was introduced by Neolithic farmers, the landscape of Central Europe is strongly affected by farming. Consequently, the farming activities cause soil erosion which leads to colluviation in foot-slope positions and alluviation within the floodplains of rivers. Therefore, colluvial and alluvial sediments represent important sediment archives to reconstruct human-induced landscape change. However, the interpretation of these sediment archives is not always straightforward and possible differences in the response times of these sediment archives to an erosional event do not necessarily allow a causal explanation. Thus, a better understanding of the sediment paths and its sediment cascades would help to correlate the sediment record with its possible triggers. A first step to better understand the past sediment flux within a catchment is the temporal information about the formation of its sediment archives. This is only possible, if reliable sediment chronologies exist.

In this study we present colluvial and alluvial archives from the meso-scale catchment of the river Aufseß (97 km2) in Upper Franconia, Germany. To reconstruct the erosion and sedimentation history of the catchment in time and space, alluvial sediment samples for OSL dating where taken along the river course (27 km), including colluvial samples from the uppermost part of the catchment. More than 100 optical stimulated luminescence (OSL) ages were calculated and some of these ages were compared with 14C age calculations. In general both age calculations are in good agreement. Based on theses chronostratigraphies, colluvial and alluvial sediment archives show a different onset of sedimentation, with earlier sedimentation of the colluvial archives than alluvial archives downstream. The interpretation of these results will be discussed in this paper.

NOT ONLY EROSION: CAUSES OF ANTHROPOGENIC SOIL DISTURBANCES AND DEGRADATION OF ARCHAEOLOGICAL SITES IN THE AGRARIAN LOESS LANDSCAPE (GERMANY, RHINELAND)

Renate Gerlach[1*], Irmela Herzog[1]

[1] LVR - Amt für Bodendenkmalpflege im Rheinland, Endenicher Str. 133, 52115 Bonn
[*] r.gerlach@lvr.de

It is the aim of the Archaeological Heritage Management, Rhineland to preserve and to document archaeological features before they are destroyed by building activities. Construction work of modern times causes destruction of cultural heritage predominantly in urban areas, and archaeologists and geoscientists are aware of this threat. It is often assumed that the archaeological sites are well preserved in the more or less undisturbed agrarian landscapes. Erosion and plowing are considered to be the main problems in these areas.

But on a standard digital elevation model map (DEM) in an agricultural region in the Rhineland we detected a lot of pits (and some heaps), which were not formed by geological processes. This pits were mostly created by the brickmaking industry and its precursors in the 19th and 20th century. But they were also used for digging sand, gravel and marl (loess with calcium carbonate).

As the pits are often refilled, they are hardly discernible by field-walking. If the soil used for filling the pit contains archaeological finds, the field walker will detect a pseudo-site. Therefore we tries to identify these pits. A geographic information system is built up that lists pits from different sources: Historic and modern maps, soil maps and rectified aerial photographs are explored to locate pits, heaps and traces of former sunken roads. An important tool to detect partly refilled pits and other refilled features (as sunken roads) are DEMs (10 metre grid) and more accurate laser scanning data, with irregularly distributed points at a distance between 1 and 2 meters supplied by the Ordnance Survey institution responsible for the Rhineland.

In some areas, a density of twelve pits per km² can be proven by DEM analysis. It has been shown that more than 16 percent of an rural landscape is affected by this soil disturbances and this is only the portion which can be identified based on our sources, the true amount is definitely larger. That means, that rural landscapes are more deeply affected by direct anthropogenic soil and relief modifications in early modern period as assumed before.

It will be shown that modern pits and heaps changed the surface in three regions of the Rhineland with different geological backgrounds. The problem is not restricted to the Rhineland: In Belgium, the Netherlands, Great Britain, and other European countries the brick industry removed a substantial amount of the soil, and these pits are mostly refilled.

References

Gerlach, R., Herzog, I., von Koblinski, J. (2008): Visualizing DEM: The Significance of Modern Landscape Modifications in the distribution of Archaological Finds.- BAR (British Archaeological Reports, International Series, 1805:66-71).

STUDIES ON HUMAN-LANDSCAPE INTERRELATIONSHIPS IN THE PREHISTORIC SETTLEMENT AREA REGENSBURG-BURGWEINTING

A. Raab[1*], J. Völkel, W. Brützke, S. Kunz, A. Stiglmeier, C. Hartl, D. Christophel

[1] Technische Universität München (TUM), Wissenschaftszentrum Weihenstephan (WZW), Department für Ökologie und Ökosystemmanagement, Am Hochanger 13, D-85354 Freising-Weihenstephan
[*] raab@wzw.tum.de

Peat, colluvial sediments and soils in Regensburg-Burgweinting (Bavaria, Germany) are investigated by multi-proxy analyses to reconstruct past environmental conditions during prehistoric settlement periods and the human impact on the landscape.

The investigation area Regensburg-Burgweinting is situated c. 5 km south-east of the Roman town centre of Regensburg. Thirteen years of archaeological excavation have delivered an excellent insight into the spatio-temporal distribution of prehistoric cultures from the Linear Pottery Culture (Neolithic period) to the Middle Ages. An almost continuous settlement history is documented from Neolithic times onwards. Most important settlement periods are the Urnfield Period (Late Bronze Age, 1300 – 800 a cal BC) with an extended cemetery and buildings and the Roman Empire (15 cal BC – 476 cal AD) with four villae rusticae in direct neighbourhood.

A fen, situated along the Islinger Mühlbach c. 500-1000 m south-west of the excavation site (12°07`E, 48°59`N, c. 344 m a.s.l., c. 5.4 ha large), was chosen as main geoarchive. In the centre of the fen the minerotrophic peat is up to 5.5 m thick. The uppermost 50 cm of the peat are disturbed due to former drainage measures. The minerotrophic peat at the margin of the fen is covered by a colluvium and also contain interbeddings of colluvial sediments. The interbedded colluvial layers are related to anthropogenic soil erosion and provide proof of periods with deforestation and agricultural use. According to radiocarbon dating, peat growth commenced earliest during the Late Pleistocene and lasted during the Holocene.

In total six peat and peat/colluvisol profiles were gained by percussion drilling (peat/colluvisol sequences) and with a Russian peat corer (peat profiles). Based on sediment/peat stratigraphy and radiocarbon ages, four profiles were selected for further investigation. Peat profiles 7038-302 and 7038-305 derive from the centre of the fen and profiles 7038-303 and 7038-306 are peat/colluvial sequences from the margin of the fen. The analyses include geochemical bulk analyses (total contents of CNS, sequential determination of loss-on-ignition, colorimetric humification) to characterise major variations in peat composition. Pollen, plant macro remain and microscopic charcoal analyses are in progress to gain information about local and regional vegetation, land-use and fire history. Supplementary 14C-AMS-age determinations are carried out.

Acknowledgement

The study is carried out within the scope of the DFG-funded research project "Torfe, Kolluvien und Böden als Archive zur Rekonstruktion der Paläoumwelt im Regensburger Altsiedelland (Burgweinting, Stadt Regensburg)" (DFG-Az. RA 1129/2-1) since August 2007.

PART 4

AGRICULTURE AND ARCHAEOLOGY IN THE MIDDLE SAXON LOESS-HILL REGION PERSPECTIVES AND PROBLEMS OF THE CONSERVATION OF ARCHAEOLOGICAL SITES IN AN INTENSIVELY USED AGRICULTURAL LANDSCAPE

Michael Strobel[1*], Richard Vogt[1], Thomas Westphalen[1]

[1] Landesamt für Archäologie, Zur Wetterwarte 7, 01109 Dresden
[*] Michael.Strobel@archsax.smwk.sachsen.de

In Germany the relationship between agriculture and archaeological heritage conservation is marked by a deep mutual distrust. While agricultural use is regarded as one of the main reasons for a lingering destruction of archaeological monuments in rural areas, farmers associate archaeology with a further limiting of their scope of action, financial losses etc. So far there are no approaches which could present a solution for this enmity.

The innovative character of the project therefore involves creating structures of confidence and trust, which follows the tradition of civil commitment, consolidates emotional ties and allows for a high degree of transparency and mutual exchange of information. Another new element is the inclusion of future developments in rural areas considering demographic decline and increased impact as well as structural changes in agriculture, which have positive effects on archaeological monuments. Also so far there is a nationwide lack of efforts to involve objectives of archaeological heritage preservation in the future strategies for sustainability regarding rural areas. In an exemplary way communication, conception, realisation and supervision are to work independently from business structures, biogeographic features, the development of cultural landscape and grant policy conditions and are thus also transferable to other regions and federal states.

This applies especially to the cooperation with agriculture and environment-authorities, the creating of strategic networks, generalizable catalogues of measures, a guideline with recommended courses of action and decision guidance as well as a DV-based agriculture-monument-data-journal.

Only a participative approach can release independence, commitment and responsibility for the cultural heritage beyond legal restrictions and fund policy conditions and confers real sustainability to the project. Thus for the first time the opportunity arises to consistently use structural changes in agriculture and rural areas for future strategies of protection and to reassert the basic concern of archaeological heritage conservation - the preserving of archaeological monuments.

SATURDAY, MAY 2ND, 2009

PART 5 SHORT CONTRIBUTIONS

APPLYING NEW ANALYTICAL METHODS TO PALEOLITHIC SURVEY DATA IN A DIFFERENTIATED GEOMORPHOLOGICAL ENVIRONMENT IN WESTERN SYRIA

Bretzke, K.[1*], Kandel, A.W., Masri, M., Conard, N.J.

[1] University Tübingen, Germany
[*] knut.bretzke@uni-tuebingen.de

The Tübingen Damaskus Ausgrabungs- und Survey Projekt (TDASP) has conducted regional archaeological and geological surveys in Syria since 1999. This work focuses on the region between the towns of Ma'aloula and Yabroud, approximatly 50 km northeast of Damascus. The central survey area is charactarized by a highly diverse landscape and steep gradients of elevation and mean annual precipitation. Such landscape characteristics make studies of the relationships between spatial/climatic parameters and settlement behaviour promising.

During nine seasons the TDASP team has identifed more than 500 Paleolithic sites in an area covering roughly 500 km². This is one of the largest data sets of its kind worldwide and allows us to apply a variety of new techniques to study Paleolithic settlement dynamics. In the present paper we provide results on our study of the interrelationship between environmental parameters and the distribution of lithic artifacts as indicator for settlement acitivity. A diachronic approach is chosen to demonstrate changes in land use from the Lower Paleolithic to the Epipaleolithic.

NEW SATELLITE DATA AND GROUND TRUTH DATA AS BASE FOR A RECONSTRUCTION OF ANCIENT CARAVAN ROUTES – EXAMPLES FROM THE WESTERN DESERT OF EGYPT

Olaf Bubenzer[1*], Andreas Bolten[2#]

[1] Department of Geography, Heidelberg University, Im Neuenheimer Feld 348, 69120 Heidelberg
[2] Department of Geography, University of Cologne, Albertus-Magnus-Platz, 50923 Cologne
[*] olaf.bubenzer@geog.uni-heidelberg.de
[*] andreas.bolten@uni-koeln.de

The ancient caravan routes of the Sahara are legendary. Whereas the routes of the western and central part of this biggest desert on earth are well documented, in the Eastern Sahara only the major routes are well-known and described. Maps of these routes were published mainly after initial scientific expeditions during the time span between the end of the 18th century and 1940. Thus these maps probable provides an incomplete and, from a geodetical point of view, inaccurate picture. Investigations after the Second World War had other questions. However, these researchers documented a lot of observation with more or less exact coordinates.

Thanks to new satellite data (ie provided by the ASTER sensor), which has been freely available in the Cologne Collaborative Research Centre "Arid Climate, Adaptation and Cultural Innovation in Africa" (ACACIA), there has been the possibility for an area-wide examination of the Desert in sufficient detail for a reconstruction of visible routes. Additionally, the stereoscopic Aster data allow to calculate digital elevation models and therefore to evaluate the geomorphological situation. In conjunction with the named historical sources and the GPS-points of the logbooks of the ACACIA project, these data have made it possible for the first time to document and reconstruct the position of the caravan routes in the Western Desert with reasonable accuracy. Examples of caravan routes, which had to surmount the natural barrier in the shape of the Great Sand Sea show that there were links to the south and west despite the inhospitable conditions prevailing in this part of the Western Desert. However, whereas some routes can be precisely seen on the stony ground of the central limestone plateau, surfaces with thick sandy layers, with a few exceptions, do not allow a location of routes in the ASTER satellite image.

Looking at the recent demographic development and the growth of desert tourism it is obvious that more and more roads and tracks being established alongside the old caravan routes. Therefore old caravan routes are being increasingly destroyed together with important archaeological finds. A good reason for further satellite based mappings.

GEOARCHAEOLOGICAL INVESTIGATIONS CONTRIBUTING TO THE HOLOCENE ENVIRONMENTAL HISTORY OF THE MULDE-LOESSHÜGELLAND IN SAXONY

C. Tinapp[1,*], M. Knipping[2], C. Steinmann[3]

[1] Dr. Christian Tinapp, Hohe Str. 27b, 04107 Leipzig
[2] Institut für Botanik, Universität Hohenheim, 70593 Stuttgart
[3] Landesamt für Archäologie Sachsen, Zur Wetterwarte 7, 01109 Dresden
[*] Ctinapp@t-online.de

Very little has been known about the pre- and protohistoric development of the Mulde-Loesshügelland in Saxony until a few years ago. Excavations preceding the motorway constructions of the A 72 between Leipzig and Chemnitz demonstrated a settlement history in that region of more than 7.000 years. Settlement phases alternated with reforestation throughout time. Trenches specifically placed in valleys during the A 72 excavations provide now the chance to monitor correlate deposits which help to reconstruct parts of the environmental history.

Archaeological investigations in the 14 km north of Penig at the river Mulde itself resulted in the excavation of four major archaeological sites in 2007 and 2008. The main settlement phases date to the Early Neolithic (around 5.200 BC and 4.800 BC) and to the Middle Neolithic (around 4.000 BC). Several house features and more than 200 grind stones demonstrate enduring settling and agricultural activities of the prehistoric societies. At the site of Geithain, for example, house features date to both Early Neolithic periods of Linearbandkeramik (around 5.150 BC) and Stichbandkeramik (around 4.800 BC).

The valley of the Salzbachtal is located immediately east of the Early Neolithic settlement of Geithain. The valley deposits in four 20 to 40 m long trenches have been comprised, described and samples have been taken. Palynological investigations and C-14 dating of charcoal samples followed.

Two meter modern sediment layers covered one meter of prehistoric and medieval kolluvial deposits. This kolluvium itself is above a fossil Ah-horizon of loess (14C: 2150 – 1900 BC) and merges higher up with a further fossil Ah-horizon dating to the early modern period (1430 – 1640 AD).

Beech (fagus) dominates in varying proportions the strong locally influenced pollen profile from the prehistoric to medieval deposits. The local occurrence of beech is proved additionally by macro remains. The percentages of hornbeam (carpinus) and fir (abies) rise towards modern periods, both having had an appearance in close vicinity too. Settlement indicators like ribwort (plantago lanceolata) as well as changing proportions of charred plant remains occur in the whole section. Cereal pollen grains appear in the upper half of the section only, possibly because of the low pollen density of the sediment.

Until the Late Neolithic the Salzbachtal valley remained unaffected by kolluvial deposits and by the Neolithic land use. It is not until the beginning of the Bronze Age that the landscape changes through the accumulation of kolluvial deposits in valleys.

STONE RAW MATERIAL OF EARLY MEDIEVAL STRONGHOLD - EXAMPLES FROM THE OSTRÓW TUMSKI (WROCŁAW- LOWER SILESIA, POLAND)

Ewa Lisowska[1*], Piotr Gunia

[1] University of Wrocław, Institute of Archaeology, Poland
[*] ewaliskamail@gmail.com

Early medieval times used to be identified with increase and development in using stone raw material on a very large scale. The process of stone exploitation and distribution is widely observed in the area of the Lower Silesia. At the archaeological site – stronghold in Wrocław Ostrów Tumski dated back to 10-13th century the largest collection of stone artifacts among early medieval archaeological sites in Lower Silesia has been found. On the basis of the analysis it seems that different stone items were produced using specific groups of rocks.

It is observed that people collected stone raw material in different regions of the Sudety Mountains and the Sudety foothills. These areas are located at least 40 kilometers from the stronghold. Moreover, there are some outcrops from where stone raw material was transported more than 100 kilometers from the site. Stone was used for production of rotary quernstones, whetstones, spindle whorls, beads and other items of everyday use. Variety of rocks at this site seems to be connected with ancient trade routes which run in north-south and east-west directions. So, the stronghold in Ostrów Tumski located on a river island was the main connection point in the Lower Silesia. It was probably related to crossing the Odra river.

The stone workshop was highly qualified and specialized what can be observed in detailed finishing of artifacts and using special (specific) groups of rock to produce different types of objects (items). For example the rotary quernstones were made mostly from granite, whetstones from different types schists, spinnels from soft sedimentary rocks like limestone.

The obtained results of detailed petrographic studies of 10 spinnels allow to recognize of two varieties of their raw material. One is representing of medium grained sandstones, lithic-wackes, with framework composed of poorly-rounded quartz grains and fragments of acidic magmatic or metamorphic rocks. In the matrix the kaolinized tables of feldspars and muscovite flakes were also noted. All of them vary in size and locally are strongly crushed and shattered. The background consist mostly clays, occasionally with single small fragments of carbonates. Other raw were fine-grained calcareous marbles (biomicrite) which contain many well-preserved organic remnants. They are represented of cone-shaped, or multi-plane cross-sections of Foraminifera , curved fragments of shells (Molusca) or unknown fauna species resembling probably Brachiopoda.

Based on petrography results, the most plausible source of stony raw carbonate material are Upper Cretaceous limestones from Silesian Opole Region, whilst in the case of studied sandstones determination of their provenience is difficult. The similar petrographic features are characteric for Carboniferous (Culmian) sandstones as well as Permian (Rotlliegende) clastic rocks from the Sudetes Mts..

In conclusion it has to be said that the petrographic determination of artifacts from the site Wrocław Ostrów Tumski is crucial to examine the early medieval economy at the matter of stone exploitation and distribution in the Lower Silesia. Because of a great variety of this collection many areas in the Sudety Mountains and foothills can be indicated as places of ancient rock acquisition. The usage of stone shows us the well-developed geological knowlegde of medieval inhabitants in the Lower Silesia.

Keywords: archaeology, petrography, stronghold, stone artifacts, Wrocław, early medieval times

SCENARIOS OF LANDSCAPE CHANGE IN THE ENVIRONS OF THE POSEIDON SANCTUARY OF AKOVITIKA (SW PELOPONNESE, GREECE)

Max Engel[1*], Helmut Brückner[1], Moritz Kiderlen[2], John C. Kraft[3], Maria Knipping[4]

[1] Faculty of Geography, Philipps-Universität Marburg, Deutschhausstr. 10, D-35032 Marburg, Germany
[2] Institute of Archaeology, Albert Ludwigs-Universität Freiburg, Fahnenbergplatz, D-79085 Freiburg, Germany
[3] Department of Geology, University of Delaware, Newark, DE 19716, USA
[4] Institute of Botany, Universität Hohenheim, Garbenstr. 30, D-70599 Stuttgart, Germany
[*] max.engel@staff.uni-marburg.de

In the southeastern part of the lower Messenian plain (southwestern Peloponnese, Greece) detailed investigations on the Holocene stratigraphy indicate significant shoreline fluctuations during Holocene times. Sedimentologic, geochemical, mineralogic, and microfossil analyses of 18 vibracores proved a maximum landward shoreline displacement around 3000 BC (Brückner et al. 2007, Engel et al. 2006); beaches migrated more than 3 km in the central delta plain (Kraft et al. 1975). Subsequently, aggradational processes started to form a prominent beach ridge in the late 3rd millennium BC. This is the substratum on which the Poseidon Sanctuary of Akovitika was founded when the coast had already shifted southward.

Ceramic findings seem to imply frequentation of the sanctuary site since Early Bronze Age (EH II). They continue without interruption through Middle and Late Bronze Age until Protogeometric Iron Age (DA I, II and III). Clearly defined votive findings imply cult activity at least since around 900 or 850 BC, but obviously the cult already began during Late Bronze Age, as indicated by a series of drinking vessels found in the alluvium burying the ruins today (Kiderlen in press).

Palaeogeographic reconstructions of the sanctuary surroundings indicated the successive extension of the adjacent marshland and a gradual surface levelling due to seasonal inundations and intense alluvial morphodynamics. This obviously caused the abandonment of the ceremonial place around 380-350 BC.

Palynological studies of the vegetational changes provide evidence for early land use and well reflect regional settlement activities. Initial degradation and burning of woodland during Late Neolithic times as well as significantly reduced human impact during the Protogeometric Dark Ages are proven. The occurrence pattern of algae spore colonies and wetland pollen also supports the palaeogeographic interpretations.

Additionally, we generated evidence for local RSL (relative sea level) change since 5000 BC based on 14C dated paralic peats. Since these findings are in obvious disagreement with the local and regional sea-level curves of Kraft et al. (1975) and Kelletat (2005) further research on this topic is required.

References

Brückner, H., Engel, M. & M. Kiderlen (2007): Geoarchäologische Studie über das Poseidon-Heiligtum von Akovitika in Messenien. – Archäologischer Anzeiger 2006/1: 189-202.

Engel, M., Brückner, H., Kiderlen, M. & J.C. Kraft (2006): Built near the sea, buried by the river: the Poseidon Sanctuary of Akovitika. – Forschungszentrum Terramare Berichte 16: 83-86.

Kelletat, D. (2005): A Holocene sea level curve for the Eastern Mediterranean from multiple indicators. – Zeitschrift für Geomorphologie N. F., Suppl.-Vol. 137: 1-9.

Kiderlen, M. (ed.) (in press): Untersuchungen zu Struktur und Entwicklungszusammenhang des Poseidonheiligtums von Akovitika. Notgrabung 1969 und Prospektion 2005. – Reichert, Wiesbaden.

Kraft J.C., Rapp Jr., G. & S.E. Aschenbrenner (1975): Late Holocene palaeogeography of the coastal plain of the Gulf of Messenia, Greece, and its relationships to archaeological settings and coastal change. – Geological Society of America Bulletin 86: 1191-1208.

PETROGRAPHIC INVESTIGATIONS AND PROVENANCE ANALYSES OF GRINDSTONES FROM DIFFERENT LOCALITIES SOUTHEAST OF LEIPZIG (SAXONY, GERMANY)

Anja Richter[1,2,*], Jan-Michael Lange[2], Harald Stäuble[3], Christoph Steinmann[3]

[1] Technische Universität Dresden, Institut für Geographie, Helmholtzstraße 10, D-01069 Dresden
[2] Senckenberg Naturhistorische Sammlungen Dresden, Sektion Petrographie, Königsbrücker Landstraße 159, D-01109 Dresden
[3] Landesamt für Archäologie, Zur Wetterwarte 7, D-01109 Dresden
[*] Anja.Richter2710@web.de

Due to works for the highway number 72 between Leipzig and Chemnitz (West Saxony) three localities with occurrences of various Neolithic (5,250–2,300 years B.P.) grindstones and whetstones were excavated by the Landesamt für Archäologie Sachsen (Saxon State Office of Archaeology). These artefacts were analysed, compared and assigned to possible local source areas. The aim of the petrographical investigations is to declare the spectrum of different stones used by the Neolithic people for the production of their tools. Based on these analyses it is possible to decide on potential source areas of the stone tools.

The area of interest is situated between two geological complexes: the Sächsisches Granulitgebirge to the south and the Nordwestsächsischer Vulkanitkomplex (North-West Saxon Volcanic Complex) to the north. The Granulitgebirge has a high-pressure and high-temperature metamorphic crystalline core of granulite surrounded by a less metamorphic mantle of schist and slate. The Nordwestsächsischer Vulkanitkomplex is located in the north of the Granulitgebirge. It consists of Lower Permian (Rotliegend) volcanic rocks. Acid extrusive rocks, ignimbrite and tuffs (e.g. Rochlitzer Rhyolithtuff) are dominant.

The first step is to specify the rock by macroscopically analyses. To find comparable specimens, the artefacts were compared with material store in the petrographic collection of the Senckenberg Naturhistorische Sammlungen Dresden. Possible source areas of the material of Neolithic artefacts were selected. Additional rock samples were collected in the surrounding of the Neolithic sites. Thin sections of selected artefacts and rock samples were investigated regarding their petrographical structure and mineralogical-chemical composition using a polarisation microscope and SEM/EDX.

The largest part of the artefacts turned out to be rhyolites, rhyolitic tuff or sandstones. The macroscopical analyses of the rock samples indicate that the potential source areas for the material of the grindstones are near to the three Neolithic localities in West Saxony. Most of the artefacts can be clearly assigned to occurrences either in the Granulitgebirge or in the Nordwestsächsischer Vulkanitkomplex.

The archaeological implications are twofold: rock sources of similar characteristics have been repeatedly used for grindstones during the Neolithic, and these sources can be found in the vicinity of the archaeological sites under focus.

INTERDISCIPLINARY RESEARCH WITH THE PARTICIPATION OF GEOARCHAEOLOGY AND HISTORY ON SLAVONIC SETTLEMENT AT THE LOWER CENTRAL ELBE RIVER

Norbert Goßler*, Thomas Kinkeldey, Thomas Schatz, Jens Schneeweiß

[1] Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum
* n_gossler@hotmail.com

The Slavonic history of landscape and settlement (8th - 12th cent. AD) of the lower Central Elbe River area is investigated in research funded by the German Research Foundation (DfG) since 2004. Left of the river in Lower Saxony a focus is on the region around the Höhbeck and the Gartow fens, while right of the river in Brandenburg the Lenzen region is scrutinized. Participants in the research project come from archaeology, soil sciences, geophysics, archaeobotany and archaeozoology.

So far archaeology and history paid special attention to the lower Central Elbe due to excellent written evidence. From 9th to 10th centuries spheres of political influence collide in this area: on the one hand the Carolingian empire and its successors, on the other side Slavonic tribes. Because of this it was assumed that the process of settlement was substantially influenced by the trade political events.

The current research of our project – in a close association of archaeology and the natural sciences - centres on the relationship between changes in natural environment, landscape development and the history of Slavonic settlement. Our main interest is the human adaptation to difficult environmental conditions due to significant shifts in the course and the altitude of the river and the subsequent human interventions in the environment.

Already the first results clearly show that the history of Slavonic settlement was influenced more heavily than previously thought by the confrontation with an environment which was already intensively shape by man. Studies on soils from fortified sites and settlements and wood analysis display clear evidence for extreme floods in the 10th century which surely made considerable impact on the Slavonic settlers. In addition, the influence of an aeolian dynamics is detectable from the documented depositions. A reconstruction of the landscape in the Slavonic period and of the resulting settlement topography would be untenable without complementary archaeological and geoscientific activities and interpretations. Besides the analysis in the immediate area of archaeological sites studies of former river beds through profiles, geophysics and laserscan-based prospecting have proved to be particularly useful and important. The first results of the projects already clearly demonstrate the enormous potential for the comprehensive exploration of natural and cultural landscape development which can be reached by a consistent geoarchaeological approach involving both disciplines in a close dialogue.

THE GEOGRAPHY OF TAMAN PENINSULA (SW RUSSIA) DURING ANTIQUITY – EVIDENCE FOR A SECOND BOSPHORUS AND RE-INTERPRETATION OF STRABOS' GEOGRAPHICAL DESCRIPTION

Kelterbaum, D.[1*], Brückner, H.[1], Gerhard, S.[1], Melikyan, A.[1], Porotov, A.[2], Schlotzhauer, U.[3], D. Zhuravlev[4]

[1] Faculty of Geography, Philipps-Universität Marburg, Deutschhausstraße 10, D-35032 Marburg, Germany
[2] Faculty of Geography, Lomonosov Moscow State University, Leninskie Gory, Moscow, RUS-119992, Russian Federation
[3] Deutsches Archäologisches Institut, Eurasien-Abteilung, Im Dol 2-6, Haus II, D-14195 Berlin, Germany
[4] State Historical Museum, Red Square 1, Building 2, Moscow, RUS-109012, Russian Federation
[*] daniel.kelterbaum@staff.uni-marburg.de

The Taman Peninsula devides the Black Sea from the Sea of Azov. During antiquity, under the umbrella of the Bosporan Kingdom, this area was a bottleneck for trade, transport and commerce which is well documented in written sources. The possessions of the Bosporan Kings occupied both sides of the Kimmerian Bosphorus, the present Strait of Kerch.

Although the leadership of the Bosporan Kings is well documented, controversial accounts about the paleo-landscape are given by ancient writers, e.g. Strabo, pseudo-Scymnos and Scylax. Their descriptions vary in size and length specifications of the landscape.

To enlighten the discussion about the landscape evolution of Taman Peninsula during the late Holocene several drillings were carried out in geo-archives like the lower delta plain of the Kuban river, the northern and southern sand spit systems of Golubitskaja and Anapa, and in the Soleni liman in the central part of Taman Peninsula. The focus of this presentation is the vicinity of Soleni and Cennoi (ancient Kepoi). The sediment cores were examined by geochemical, sedimentological and macro- and microfaunal techniques (research design in Brückner & Gerlach 2007; see also Handl et al. 1999).

Based on these results, the hypothesis of several former Kuban branches which meandered through the synclinal structures of Taman peninsula can be rejected and a re-interpretation of Strabo's geographical description can be given. The synopsis of all datasets is that an archipelago existed during antiquity which was strongly influenced by coastal longshore drift, coastal erosion and the high sediment input by the Kuban river.

Based on 14C-AMS dating results of sea level indicators, the local sea level evolution in the Taman area and a chronostratigraphy of the sedimentary process can be presented. This gives also hints for the delta progradation and the coastal evolution of the middle and eastern Taman Peninsula (Brückner et al. 2009). With these results it is possible to reconstruct a second Bosphorus between the Tamanian archipelago and the Russian (Scythian) mainland which persisted during the time of the Greek occupation (750 – 300 BC).

References

Brückner, H. & R. Gerlach (2007): Geoarchäologie. – In: Gebhardt, H., Glaser, R., Radtke, U. & P. Reuber (Hrsg.): Geographie - Physische Geographie und Humangeographie: 513-516; München.

Brückner, H., Kelterbaum, D., Marunchak, O., Porotov, A. & A. Vött (2009): The Holocene sea level story since 7500 BP - lessons from the Mediterranean, the Black and the Azov Seas. – Quaternary International (in press).

Handl, M., Mostafawi, N. & H. Brückner (1999): Ostracodenforschung als Werkzeug der Paläogeographie. – In: Brückner, H. (Hrsg.): Dynamik, Datierung, Ökologie und Management von Küsten. Beiträge der 16. Jahrestagung des Arbeitskreises „Geographie der Meere und Küsten", 21.-23. Mai 1998 in Marburg. – Marburger Geographische Schriften, 134: 116-153; Marburg.

PART 6 EASTERN EUROPE

PHYSICO-CHEMICAL FEATURES OF LATE-MEDIEVAL BUILDING CERAMICS FROM SZEWSKA STREET IN WROCŁAW (LOWER SILESIA –POLAND)

Joanna Chudziak*, Piotr Gunia

* joannachudziak@wp.pl

Medieval building ceramics isn't often a subject of a physico-chemical analyses on the contrary to a vessel pottery (Michnikiewicz 2005). Very often the building ceramics is examined only by architects, who collaborate with archeologists (Małachowicz 2005). The composition and properties of the ceramic building material is rare described (Kociszewski, Kruppé 1965; Stoksik 2005, 2007). The purpose of this paper is to reconstruct a ceramic paste recipe and technology of producing a bricks and tiles of various kind. The aim of this paper is also attempt finding difference of recipe of ceramic paste result from disparate function of this ceramic elements. The archeological artifacts come from Szewska and Widok Street rescue excavation in 2005-2006. Unfortunately, the ceramic materials comes from archeological layers without an architectural context. Selected archeological artifacts are dated based on their stratigraphy and concurrent vessel pottery. To the macro- and microscopic and the physico-chemical analyses, four following artifacts has been chosen:

1. A fragment of tile with dark brown glaze (15th cent.)
2. A fragment of floor tile with trace of colourless glaze (13 – early 14th cent.)
3. A fragment of brick (13 – early 14th cent.)
4. A fragment of roof tile (ridge-tile) (early 14th cent.)

The tile was made in matrix. The ceramic paste is mixed well, the clay contains purposeful admixtures (quartz with small sized grains). The brown glaze is partly rub off the external surface. The colour of uncovered of glaze surface is cream-orange, the internal surface is gray, the colour of section is similar to colour of external surface. On the surface are observed very small porosity. In thin section a very tight pot-sherd occur, composed of coarser well rounded quartz grains surrounded by many sharp-edged smaller quartz fragments. It can to indicate, that primary quartz material, most probably of river sand was crushed and sieved for preparing of smaller quartz fraction. The floor tile was probably made in matrix, on priming of finely grained substance (quartz with small sized grains). The texture of surface is smooth. On the one site of edge are observed a trace of colourless glaze. The paste is carelessly mixed with a loamy lumps and quartz with different size grains. The colour of surface and section is bright orange. On the surface are observed numerous and multidirectional pores. After petrographic studies we can conclude that primary ceramic mass was mixed irregularly. It is documented by presence of single assemblages of unheated clays in the background as well as mixed: granitic (gneiss) fragments or larger irregularly-shaped quartz grains in the background. The brick was made also in matrix, on priming of finely grained quartz. The upper surface is rough and (fingers' traces), the colour of section is a little bit brighter (1,5 mm). The surface has the colour of dark orange with black spots. The paste is also slapdash mixed with dark lumps of loam and quartz with small size grains. Sporadically it is found a quartz of bigger size grains. The surface is slightly porous. Under microscope the sharp-edged fragments of ancient bricks are well visible. The small fragments of acidic magmatic rocks as well as two-sized poorly rounded quartz fragments were also ascertained. Ridge tile was produced in matrix on priming of quartz with big grains (1 mm). The internal surface is smooth with fingers' traces. On external surface are remains of quartz' priming. The clay contain purposeful admixtures (quartz with middle and bigger sized grains, up to 2 mm). The colour of surface is grey-brown, but the colour of section is clearly diverse: on the edge of the section is this same as on surface and inside section is red. On the surface are observed numerous and multidirectional pore. Interestingly, in the pot-sherd the vermicular chalcedony? assemblages were common which occur together with larger magmatic rocks fragments (of glacier provenance?) and two-sized irregular quartz individu-als. The small opaque browny translucent spots of haematite were also unorderly distrubuted in the backgrund. The presence of vermicular chalcedony could evidence of secondary? re-heating of primarily formed tile for correction of their water resistivity or machanical properties. All the four artifacts were firing oxidised (with making use of kilns?). Absorptivity of above-mentioned samples amount: for the tile 11%, for the floor tile 13%, for the brick 16% and for the ridge tile only 4%. The first three samples show high finding of absorptivity, the last one show surprising low finding of absorptivity. Probably it is a result of function ridge tile, which is to protect against the rain and dampness.

PROSPECTS OF GEOARCHAEOLOGICAL INTERPRETATIONS OF MEDIEVAL DWELLING-HOUSES AND FARM-OUT BUILDINGS, CASE STUDY FROM THE ARCHAEOLOGICAL RESEARCH IN BRNO, CZECH REPUBLIC

Lenka Lisá[1,*], David Merta and Marek Peška

[1] Geological Institute Academy of Sciences of the Czech Republic, v.v.i
[*] lisa@gli.cas.cz

One of the main interests of medieval urban archaeology is the research of town development. There are unfortunately available only archaeological sources with limited information for the study of beginnings of Moravian towns (13th Century). To divide reliably relicts of dwelling-houses from farming-out buildings is important for the demarcation of the medieval burgher's plots. This demarcation is usually quite problematic, because the oldest buildings are mostly made from timber and earth and the floor plans together with the types of building constructions are usually very similar. The one of the possibilities how to solve this problem seems to be the geoarchaeological study of house infillings.

One of the case studies when the function of houses was interpreted by geoarchaeological approach (especially using the method of micromorphology) is the archaeological research of medieval burgher plot in Brno, Czech Republic. Within this plot, located at the street Bašty 2, were founded objects dated to the 13th and 14th Century. Two objects with laminated floor layers were chosen to be compared. According the microstratigraphical and micromorphological study were those layers interpreted as an infilling of the dwelling house (trampled floor layer) in the first case and as the infilling of the farm-out building (stable) in the second case.

The sedimentary infilling of the farm-out building is composed by the set of layers. Some of them have laminated structure. The base of the object is composed by loess material, secondary influenced by P derived from organic matter deposited above. The material of laminated as well as non-laminated infilling is composed by redeposited loess material and decomposed organic matter. The layering is the relict of preserved in situ stabling, micromorphologically visible as microlaminaes of loessic material pressed together with organic matter, in situ phytoliths and excrements.

The sedimentary infilling of the dwelling house located in close surroundings had also preserved a microlamination. This one was made by the laminaes of microcharcoal and redeposited loessic material. This lamination is the result of the daily house using. The pieces of microcharcoal were redeposited into the house on the soles in dry periods or in time of using the oven. The loess material was redeposited in the rainy periods, when the surrounding of the house was muddier.

Our suggestion for the further research is systematic micromorphological sampling of floor layers. The geoarchaeological approach is the way how to interpret the function of studied objects which seems to be key for more general interpretations of the medieval urban archaeology.

HOLOCENE DEVELOPMENT OF THE LOWER DANUBE FLOOD PLAIN AT THE TELL SETTLEMENT PIETRELE, SOUTHERN ROMANIA

Jürgen Wunderlich

Department of Physical Geography, Goethe University, Frankfurt am Main
j.wunderlich@em.uni-frankfurt.de

In the second half of the 5th millennium BC (Copper Age) a series of tell settlements developed at the lower reaches of the Danube River. One of them is the settlement mound of Măgura Gorgana, located near the village of Pietrele, c. 40 km south of Bucarest. The tell rests on a steplike structure at the lower valley slope, which borders the Danube flood plain to the North. In this area the flood plain is more than 9 km wide with the present course of the Danube running along its southern margin. The flood plain has been completely drained and cultivated since the fifties of the last century. Archaeological excavations by the German Archaeological Institute since 2002 showed that Măgura Gorgana was an important settlement that played a major role in long-distance trade along the Danube valley. Furthermore, the findings indicate that the inhabitants of the settlement used the swampy flood plain for hunting and fishing.

This raises questions on the environmental setting and on the direct acessibility of a navigable branch of the Danube River during the Copper Age. Accordingly, the main objectives of our palaeoecological and fluvio-morphological research are to reconstruct the Holocene flood plain development and the evolution of the fluvial system within the reach of Măgura Gorgana. To achieve these aims, the evaluation of historical topographic maps and satellite images, corings up to 17 meters, sedimentological analyses of taken samples, geoelectric profiling, radiocarbon dating, and pollen analyses were carried out.

As a result of our field work the sedimentary record can be subdivided into two sections: Sands and gravels at the base are covered by fine-grained flood-plain deposits with an average thickness of 8 to 10 meters. Within this upper section different fluvial architectural elements were identified giving evidence for a persisting anastomosing river system with distinct branches close to the tell. Radiocarbon dating of organic matter indicates that the fine-grained deposits started to accumulate not until c. 4000 years cal BC. Thus, when the settlement at Măgura Gorgana existed, the valley floor was at a much lower level and was possibly occupied by a sandy braided fluvial system. Current research focuses on the causes of the marked change to a fine-grained anastomosing fluvial system that may be attributed to altered sediment supply to the river due to increased human impact by intensified land use and clearances in the catchment area.

References

Hansen S., Toderaş, M., Reingruber, A., Gatsov, I., Klimscha, F., Nedelcheva, P., Neef, R., Prange, M., Price, T.D., Wahl, J., Weninger, B., Wrobel, H., Wunderlich, J., Zidarov, P. (2008) Der kupferzeitliche Siedlungshügel Măgura Gorgana bei Pietrele in der Walachei. Ergebnisse der Ausgrabungen im Sommer 2007. Eurasia Antiqua 14 (in press).

Hansen, S., Toderas, M., Reingruber, A., Gatsov, I., Georgescu, C., Görsdorf, J., Hoppe, T., Nedelcheva, P., Prange, M., Wahl, J., Wunderlich, J. & Zidarov, P. (2007): Pietrele. Eine kupferzeitliche Siedlung an der Unteren Donau. Bericht über die Ausgrabung im Sommer 2006. Eurasia Antiqua 13: 43-112.

Hansen, S., Dragoman, A., Reingruber, A., Benecke, N., Gatsov, I., Hoppe, T., Klimscha, F., Nedelcheva, P., Song, B., Wahl, J. & Wunderlich, J. (2006): Pietrele. Eine kupferzeitliche Siedlung an der Unteren Donau. Bericht über die Ausgrabung im Sommer 2005. Eurasia Antiqua 12: 1-62

PART 7 VARIO

DEVELOPMENT OF A SPACIOUS (PRE- AND PROTO) HISTORIC INLAND DUNE LANDSCAPE IN LOWER BAVARIA, GERMANY

Jörg Völkel*, Sebastian Dötterl, Anna Schneider, Kerstin Hürkamp, Alexandra Hilgers, Matthias Leopold

* geo@wzw.tum.de

The dune fields in Bavaria are generally supposed to have been developed during the last glacial maximum (LGM). Derived from our research project new results show, that developing a real dune landscape Holocene and anthropogenic influences have been more important. Based on the geological field mapping of Bavaria, there are several areas of sanddrift and inland dune fields known all over the country, especially from Franconia. In the context of geo-archaeologic excavations on neolithic flintstone mining nearby in Arnhofen, the phenomena of glacial period aeolian sand accumulations got into the focus of geoscientific research into the region again. In 2005 detailed geomorphologic research on the dune bodies were started. The basics of the stratigraphic composition of the dunes, the transition from dune bodies into thinner areas of sanddrift, a description of the dune basins, the shape of the dunes and their alignment could be compiled. Furthermore several dunes and sanddrift fields could be dated by means of OSL on sediments and radiocarbon dating on charcoals found in fossil soils.

The results show clearly, that the anthropogenic influence as enduring settlement, agriculture and forestry are of major importance for the development of the dune fields and their Holocene phases of mobilization. The sanddrift fields and inland dunes in the vicinity of the cities of Abensberg and Siegenburg (Lower Bavaria) developed in an area of transition from later tertiary delta deposits of the ancient Naab river system and pleistocene, complex structured gravels of the Danube River and the Abens River, which have changed their stream courses several times during the quaternary. Besides alluvial gravels, the sanddrift and dune fields consist of tertiary sands of feldspar with high concentrations of mica from southern parts of Bavaria (Tertiary Hills of Lower Bavaria).

Beginning with the bronze age the dunes got mobilized again during phases of extensive clearing. There is evidence for these processes in form of several buried soils in the dune bodies. The most common dune forms in the region are longitudinal dunes with a great variety in altitude (up to 15 m of maximum height).

Open questions are related to the morphodynamic relevant wind field during times of dune mobilization (glacial and interglacial periods) and the concretization of the exact time of the mobilizations themselves and the causes for them. Based on the works mentioned above, a complete description of the development processes of the dune fields and a characterization of different phases of the landscape evolution between the cities of Abensberg and Siegenburg is aspired. High resolution landscape models have been created, based on field work and laserscanning data. Resulting from geophysical prospections, selected dunes and the surrounding areas of sanddrift are structured according to different times and types of mobilization and characterized sedimentologically.

This project is funded by the Deutsche Forschungsgemeinschaft (DFG), Az. VO 585/13-1

GEOARCHAEOLOGICAL STUDIES TO RECONSTRUCT HUMAN CAUSED ENVIRONMENTAL CHANGES AT THE WESTERN BORDER OF THE "NÖRDLINGER RIES" (SOUTH GERMANY)

Sonja Mailänder*, Joachim Eberle, Wolf Dieter Blümel

* sonja.mailaender@geographie.uni-stuttgart.de

Since 2005 geoarchaeological studies in the framework of the German Research Foundation Priority Programme 1171: "Early Processes of Centralisation and Urbanisation – Studies on the Development of Early Celtic Princely Seats and their Hinterland" (Deutsche Forschungsgemeinschaft (DFG) Schwerpunktprogramm 1171 „Frühe Zentralisierungs- und Urbanisierungsprozesse – Zur Genese und Entwicklung frühkeltischer Fürstensitze und ihres territorialen Umlandes") are carried out by the Institute of Geography, University of Stuttgart (MAILÄNDER ET AL. 2008, 2009). The project includes the survey of colluvial deposits, alluvial sediments and peat bogs at the western border of the impact crater Nördlinger Ries in Southern Germany. Based on various investigations, which involve modern methods of exploration (geophysics), dating (14C-AMS, OSL/IRSL) and of interpretation (GIS), as well as established sedimentological, pedological, archaeobotanical and -zoological analysis, our knowledge of the paleoenvironment and ancient land use in the area immediately surrounding detected Early Celtic settlement places should be improved. This work is closely connected with recent archaeological excavations by the State Office of Baden-Württemberg and the Institute of Archaeological Sciences at the University of Frankfurt on Main.

The main aim of the physical-geographical studies is a reconstruction of the Neoholocene landscape evolution in the investigation area with the highest possible resolution, as well as a correlation of the erosion phases verifiable here with known phases of settlement. Furthermore the results should facilitate an assessment of the anthropogenic influences on the development of soils, vegetation and contour at different periods and permit specific conclusions on the extensive effects of Celtic colonisation, beginning in the Early Iron Age with the constitution of the hillfort on the Ipf. The newest outcomes concerning this are presented

References

Mailänder, S., W. D. Blümel & J. Eberle (2008): Paläoumweltbedingungen und anthropogene Landoberflächenveränderungen im Umfeld des frühkeltischen Fürstensitzes auf dem Ipf am Westrand des Nördlinger Rieses: Erste Geländebefunde und Auswertungen 2005/2006.- In: Krausse, D. L. (Ed.) (2008): Frühe Zentralisierungs- und Urbanisierungsprozesse. Zur Genese und Entwicklung frühkeltischer Fürstensitze und ihres territorialen Umlandes. Kolloquium des DFG-Schwerpunktprogramms 1171 (Blaubeuren, 9.-11. Oktober 2006).- Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg 101.- Stuttgart: 281-298.

Mailänder, S., S. Hecht, E. Eberle & W. D. Blümel (2009, submitted): Exploration and investigation of geoarchives to reconstruct Holocene environmental changes at the western border of the Nördlinger Ries (Southern Germany).- Zeitschrift für Geomorphologie N.F., Supplement Volume.

MICROMORPHOLOGY AND SITE FORMATION PROCESSES OF THE PALEOLITHIC CAVES OF SWABIA, SW GERMANY

Christopher E. Miller[1,*], Paul Goldberg[1,2,3], Nicholas J. Conard[1]

[1] Institut für Ur- und Frühgeschichte und Archäologie des Mittelalters, Abteilung Ältere Urgeschichte und Quartärökologie, Eberhard-Karls-Universität Tübingen, Germany
[2] Department of Archaeology, Simon Fraser University, British Columbia, Canada
[3] Department of Archaeology, Boston University, Boston, USA
[*] christopher.miller@uni-tuebingen.de

Micromorphological study of the caves of Hohle Fels and Geißenklösterle provides good data to enable the reconstruction of natural site formation processes, which include identifying sediment source, sedimentation processes, post-depositional processes, and how these processes have changed over time. Although the two sites are located within the same river valley, the processes that affected the two sites are different.

Despite these differences, micromorphology allows for correlations between the sites and provides useful insights into paleoenvironmental conditions, taphonomy, and the geologic context of important archaeological transitions.

THE EVOLUTION OF SAHARAN DUST INPUT IN LANZAROTE (CANARY ISLANDS): LOWER HOLOCENE TRIGGERING BY HUMAN ACTIVITY IN THE NORTHWEST SAHARA?

Suchodoletz, H. von[1,*], Oberhänsli, H.[2], Faust, D.[3], Zöller, L.[1], Hambach, U. [1], M. Fuchs[1]

[1] Department of Geomorphology, University of Bayreuth, Universitätsstrasse 30, D – 95440 Bayreuth, Germany
[2] Helmholtz-Zentrum Potsdam, Deutsches Geoforschungszentrum Potsdam, Telegrafenberg, D – 14473 Potsdam, Germany
[3] Institute of Geography, Technical University of Dresden, D-01062 Dresden, Germany
[*] Hans.vonSuchodoletz@uni-bayreuth.de

A Holocene increase of Saharan dust input to the area of the Canary islands is accompanied by a strong coarsening of this material during the Early Holocene as recorded in loess-like sediments deposited on Lanzarote. Whereas natural causes can be ruled out for the coarsening that is exceptional during the period of the last 180 ka, it is assumed that anthropogenic activity strongly mobilized dust in an area on the pathway of dust prior to its arrival in Lanzarote comprising parts of Western Sahara and northern Mauritania. Although scarce archaeological data from the coastal area of that region do not point to strong anthropogenic activity during the Early Holocene yet, a high density of unexplored archaeological remains reported from the coastal hinterlands does not exclude this hypothesis. Thus, the results of this study highlight the need of further archaeological investigations in that Saharan region.

ABSTRACTS

POSTER

SURFACE MINING ARCHEOLOGY IN THE OBERLAUSITZ – A CROSS-SECTION IN-PAST COLONISATION AND LANDSCAPE DEVELOPMENT

N. Baumann, J. Janssen, C. Liebermann*, D. Lukaszewska, A. Renno, P. Schöneburg, R. Scholz

* carmen.liebermann@archsax.smwk.sachsen.de

Preface

The archeological supervision of the surface mining projects of Nochten and Reichwalde re-started in November 2007. This supervision is based upon a perennial agreement between the Saxonian State Office for archaeology in Dresden and Vattenfall Europe Mining.

Opencast pit Reichwalde

The opencast pit Reichwalde is situated in the Lausitzer Glacial Valley, which was formed by freshets during the last ice advance of the penultimate glacial (Saale III). The surface was strongly reshaped during the Brandenburg Stadium. The today's landscape is shaped by silted up lakes, ice marginal isles and the broad floodplain of the "Weiße Schöps". North of the opencast pit sprawl the interior-dunes of the "Muskauer Heide".

The linear building projects of the diaphragm wall ("Dichtwand") and several operational roads (combined with a drainage system) cut the run-up area on a length of over 10 km and brought about several archaeological sites. During the archaeological investigations in 2008 a Mesolithic site with several flaking stations was discovered on brought up ice marginal isles. The site measured about 200 square meters. Three Bronze Age settlements, a Germanic smelting site, two Late Middle Age pitch-kiln sites and two post-Medieval settlings were discovered too.

Nochten

The area to be exploited by the lignite open-pit mine of Nochten can be divided into deposits of the Lausitzer Grenzwall and the Lausitzer ice-marginal valley, with peat-bogs and aeolian sediments of lateglacial and holocene age.

Due to the size of the area destroyed within one year, ca. 110 ha, the team focussed on crucial loci like dunes and former wetlands and their interfaces.

In aeolian sediments knapping areas of the Early Mesolithic were discovered and partly excavated. But also artefacts of the Late Mesolithic, the Neolithic and of younger periods occurred.

At the interface of a peat-bog and underlying fluvial sands lithic artefacts were discovered. At the lower part of these peat deposits wooden objects with traces of fire of potentially anthropogenic character were uncovered. Radiometric and palynological analysis of the sediments as well as the dendrochronological analysis of the wooden pieces are in progress.

GEOARCHAEOLOGICAL APPROACH IN SYSTEMATIC ARCHAEOLOGICAL RESEARCH OF THE STARÁ BOLESLAV EARLY MEDIAEVAL PŘEMYSLED STRONGHOLD (STARÁ BOLESLAV, BOHEMIA, 1988-2008)

Ivana, Boháčová

bohacova@arup.cas.cz

Within the years 1988-2008 the rescue archaeological excavations was conducted by the Institute of the Archaeology of the Czech Academy of the Science, Prague, v.v.i. and the Municipal Museum in Čelákovice. Geoarchaeological approach was used in the process of the archaeological research of the site Stará Boleslav to solve the following problems:

1 Reconstruction of the natural surface of an early mediaeval stronghold settlement area (ca 16 ha) on a promontory of floodplain of the Elbe river.

2 Origin of deposits situated on the base of the settlement stratigraphy.

3 Potential sources of raw material (constructions, tools, pottery production).

4 Verification of the results given by macroscopic study of pottery matrix.

Conclusions:

1 A model of natural surface was created from archaeological documented points and geological archive files; it corresponds to the geological Quaternary structure of the study area.

2 The base of cultural deposits in the north part of promontory was interpreted as a relict of a re-washed A-horizon from the surrounding soil cover.

3 Local sources of raw material was identified.

4 Early mediaeval pottery from the excavated area of Stará Boleslav was divided into three main groups of ceramic, one of those groups was identified as a local ceramic production (the same material was used also for tiles, constructions, etc.)

The further geoarchaeological study will be dedicated to the problems of Holocene floodplain origin, including the meander deposits origin as well as to the study of archaeological settlement deposits and remains founded in the floodplain near the Stará Boleslav settlement area.

ACCESSORY MINERALS AS A KEY FOR PROVENANCE STUDIES OF THE LINEAR BAND POTTERY CULTURE MICA SCHIST TEMPERED VESSELS FROM KOSTOMŁOTY (SW POLAND) – PRELIMINARY RESULTS

Michał Borowski

michal.borowski@ing.uni.wroc.pl

It is certain that mica schist temper ascertained in the Linear Band Pottery Culture vessels from Kostomłoty is not of a local origin, because of the lack of such rocks in the vicinity of the site. Petrographic features indicates that this material was probably obtained in the Niemcza-Kamieniec Metamorphic Unit (Borowski 2008).

Two main petrographic varieties of mica schist temper can be distinguished:

- muscovite schist with accessory biotite and staurolite
- two mica schist with accessory andalusite and staurolite

Preliminary comperative study employing electron microprobe analysis indicates that muscovite schist with Ti-reach staurolite and biotite is similar to the temper ascertained in two chronologically close vessels excavated in the vicinity of Ciepłowody near Niemcza (about 50 km in the south east of Kostomłoty).

Staurolite in the andalusite bearing two-mica schist contains more Mn and less Ti. Comparison with results of petrographic investigation of Józefiak (1998) indicates that this tempering material could be derived in the vicinity of Stolec (the southern part of the Niemcza-Kamieniec Metamorphic Unit), however other locations in the vicinity of Niemcza cannot be excluded.

References

Borowski M. 2008: Petrography of ceramic materials from multicultuaral archaeological site in Kostomłoty (SW Poland) – preliminary results. Petroarchaeology in the Czech Republic and Poland at the beginning of the 21st century. Proceedings of the 4th International Petroarchaeological Symposium in Wrocław, October 2007, 11-13 : 39 – 42

Józefiak D. 1998: Ewolucja metamorficzna łupków łyszczykowych okolic Kamieńca Ząbkowickiego. Doctoral Thesis. Archives of the Institute of Geological Sciences, University of Wrocław

AN EARLY NEOLITHIC PIT WITH REMAINS OF A WOODEN CAISSON IN DRESDEN-COTTA (SAXONY): ARCHAEOLOGICAL AND PALYNOLOGICAL INVESTIGATIONS

Wolfgang Brestrich*, Michèle Dinies, Andreas Kinne

* Wolfgang.Brestrich@archsax.smwk.sachsen.de

In the context of the early Neolithic (Linear Pottery Culture) settlement of Dresden-Cotta suitable sediments offer the opportunity for palynological investigations. For the first time, in the loess-region of the upper Elbe valley such studies were made possible directly within a Neolithic settlement.

The early Neolithic settlement area of Dresden-Cotta, extending over approx. 20 hectares, represents one of about 10 comparable sites in the loess-region of the Elbe valley basin (Dresdener Elbtalweitung). It is directly adjacent to the partially limnic deposits of the so called "Moormergel". The occupation time spans from the second half of the 6th millennium to the beginning of the 5th millennium cal B.C.

The exceptional feature under scrutiny here is a pit with traces of wooden remains dug more than 2 m below the prehistoric land surface. Faint traces of a box-like, wooden installation (ground plan measurement 80x90 cm) could be detected. The original function of this construction is not clear. It might be interpreted as a well.

Discovered at the southern edge of the Bandceramic settlement, this feature belongs to a transitional zone towards the "Moormergel" deposits.

After the loss of its primary function, the shaft of the wooden construction was filled up with black sediment (clay), resembling the documented relicts of a black fossil topsoil. The archaeological finds embedded are: pottery fragments, flint artefacts, stone axes, querns and grindstones; animal bones (cattle, pig, deer, roe deer) and antler beams (deer, roe deer).

The pollen preservation can be stated as good, whereas botanical macro remains are fairly rare.

Pollen spectra of the investigated samples show a wide range of types. Pollen types of synanthropic vegetation dominate, which is typical for a pollen trap within a settlement. The amount of pollen grains of cultivated plants (cereals, flax) is rather low. Yet, the samples show a high frequency of taxa growing on trampling and ruderal localities. Additionally, however less frequent, many different taxa of field, grassland and wood-edge vegetation are found.

Palynological investigations of the pit sediments allow to some extent the reconstruction of plant cover of the settlement itself as well as the surroundings, thus complementing the archaeological reconstructions and the palaeoenvironmental data, achieved from a pollen profil of the nearby "Moormergel".

MID- TO LATE-HOLOCENE COASTAL EVOLUTION OF THE LEFKADA SOUND (NW GREECE) - SIGNIFICANCE AND INTERPRETATION OF SEDIMENTOLOGICAL AND ARCHAEOLOGICAL SEA LEVEL INDICATORS -

Svenja Brockmüller[1,*], Andreas Vött[2], Simon Matthias May[2], Helmut Brückner[3], Franziska Lang[4]

[1] Institute for Natural Sciences and Natural Scientific Education, Geography, Universität Koblenz-Landau, Fortstr. 7, D-76829 Landau, Germany
[2] Department of Geography, Universität zu Köln, Albertus-Magnus-Platz, D-50923 Köln (Cologne), Germany
[3] Faculty of Geography, Philipps-Universität Marburg, Deutschhausstr. 10, D-35037 Marburg, Germany
[4] Department of Classical Archaeology, Technische Universität Darmstadt, El-Lissitzky-Str. 1, D-64287 Darmstadt, Germany
[*] brockmueller@uni-landau.de

Lefkada Island is separated from the Greek mainland by the Lefkada Sound, a shallow lagoonal environment. Ancient accounts report that the Corinthians cut a navigable canal across a former isthmus in the 7th century BC. In ancient times, a nowadays submerged Corinthian mole at the southern end of the sound closed off a protected harbour area.

The main objectives of our studies were to detect environmental changes throughout the Holocene and to reconstruct the paleogeographical evolution of the Lefkada Sound for different points in time based on the analysis of the sedimentary record encountered in various geoarchives. Geomorphological, geochemical, microfaunal, archaeobotanical and geochronological methods as well as earth resistivity measurements were applied.

According to historical tradition, an isthmus between Lefkada Island and the Greek mainland existed until the Classical period and became a "porthmos" (strait) in Hellenistic times. Our vibracores show that the former terrestrial connection is gradually displaced by a limnic and later lagoonal environment. At least twofold high energy impact (most likely tsunamigenic) disturbed the quiescent lagoonal conditions at or after Hellenistic times. Since then, marginal parts of the lagoon have been affected by siltation due to alluvial or anthropogenic deposition.

Fossils from our cores, e.g. plant remains, as well as archaeological findings, e.g. the Corinthian mole, were used as relative sea level indicators. That requires knowledge of the age of each sample and of its presumed position to the particular paleo sea level. In our working area a rapid rise of the relative sea level before ~3000 BC as well as in the last ~2000 years is revealed. The gradient even seems to accelerate in the last centuries.

Several archaeological sea level indicators in the area of the southern sound suggest a development slightly different from the northern sound, where the sea level is traced by sedimentological indicators. As long as our interpretation of the particular indicators is correct, this gap is due to local differences in tectonic movements. The poster will present further details.

Keywords: Lefkada, Greece, paleogeography, geoarchaeology, sea level rise

ALLUVIAL GEOARCHAEOLOGY – CLUSTERING OF NATURAL AND ANTHROPOGENIC SEDIMENTS

Jens Bussmann[1] and Christoph Zielhofer[1,2,*]

[1] Department of Geography, Osnabrück University, Germany
[2] Department of Geography, Dresden University of Technology, Germany
* christoph.zielhofer@tu-dresden.de

The Lower Moulouya floodplain in northeastern Morocco consists of predominantly clayey to silty overbank sediments. Within the Mid- to Late Holocene alluvial record, different flood units can be deduced from changes in color and changes of fining and coarsening up sequences.

Within our alluvial record we can find two types of anthropogenic influenced deposits:

(1) Sediments of an archaeological site embedded in the floodplain sediments

(2) Sediments of former floodplain surfaces.

Our study aims to differentiate these anthropogenic influenced sediments from naturally deposited sediments by grain size analyses and by a multivariate statistical approach.

The naturally deposited sediments are highly variable concerning their grain size distribution.

The granulometric character of former floodplain surfaces ("Laufhorizonte") is predominantly determined by the flood deposits. However, due to their former surface exposure these layers reveal a coarse sand fraction, consisting mostly of snail and bone remains. This coarse sand fraction is characteristic for paleosurface sediments. Moreover, these sediments can be distinguished from pure alluvial strata by using the sedimentary charcoal and the magnetic susceptibility records.

In contrast, the identification of archaeological site sediments seems to be less complex. According to the cumulative grain size plots, the sediments of this type are very similar among each other. This indicates a single depositional process.

Consequently, due to their homogeneous character the sediments from the archaeological site can be identified by their similar grain size distribution. The identification of paleosurfaces is more complex and so requires more detailed data. But in general, granulometric information offers the possibility to distinguish these two types of (potentially) anthropogenic influenced sediments from naturally deposited sediments.

SITE FORMATION PROCESSES IN PALEOLITHIC CAVES AND ROCKSHELTERS OF WESTERN SYRIA

Conard, N. J.*, K. Bretzke, A. W. Kandel, M. Masri, C. Miller, Stahlschmidt, M.

* nicholas.conard@uni-tuebingen.de

Since 1999 the Tübingen Damaskus Ausgrabungs- und Survey Projekt (TDASP) has conducted excavation at four sites in the Damascus Province of Syria. The sites include Baaz Rockshelter, Kaus Kozah Cave, Ain Dabbour Cave and Wadi Mushkuna Rockshelter. Together these sites document a long archaeological sequence covering much of the Middle, Upper and Epipaleolithic. The strata at these sites vary greatly and range from purely geogenic accumulations, such as fluviatile sands, aeolean silts and fallen limestone from the cave walls, to a wide range of anthropogenic deposits. The anthropogenic deposits include several combustion features from the Upper and Middle Paleolithic and constructed house floors, hearths, burials and middens from the Epipaleolithic. Some of these features are in situ, while others have been severely damaged by taphonomic processes. Using macro- and microscopic techniques, we examine the geoarchaeology of these strata with the goal of identifying the cultural and natural processes that led to the formation of the deposits preserved at these caves and rockshelters.

PREHISTORIC LAND USE AND HOLOCENE PALAEOENVIRONMENTAL CHANGES IN THE RIVER VALLEY OF THE RIO SIZANDRO (TORRES VEDRAS, ESTREMADURA, PORTUGAL)

Rainer Dambeck*, Heinrich Thiemeyer

* dambeck@em.uni-frankfurt.de

The Rio Sizandro is located c. 50 km north of Lisbon and drains large parts of the Lusitanian basin to the Atlantic Ocean. When climate warming started at the end of the last glacial the result was eustatic sea level rise, that have changed the palaeogeography of the western Portuguese coast line dramatically. Analogous to the marine transgression the ocean waters invaded into the estuaries and initiated the forming of bays and coastal lagoons. In the lower course of the Rio Sizandro a brackish open water system developed that reached maximum extension at about 6200 cal BP, when the sea level culminated at the highest stage during the Holocene climatic optimum.

The occurrence of early communities (palaeolithic/mesolithic) in the Sizandro valley is proved by some archaeological sites either located in places close to the Atlantic coast or in further inland positions nearby the river channel. Finds of Neolithic cultures are rare. This is in distinct contrast to the situation during later periods, i.e. the Copper Age, when the river valley most likely was populated considerably denser. From that period dates the ancient fortified "castro Zambujal", which was suggested to having been the central place in the region. Due to the relatively dense population living in the river catchment during that times it was proposed that human impact became sensitive in the second half of the 3rd milennia before Christ.

More recent research disproves these assumptions. Obviously, the Sizandro valley was already populated prior to the Copper Age. Palaeoecological data (pollen, botanic macro remains) obtained from fluvial archives in combination with AMS radiocarbon dating indicate the presence of Neolithic agriculture before and around 6650 cal BP. Arable fields existed probably in areas located at the floodplain and the surroundings (e.g. elevated river terraces at the margins of the valley floor). With the invasion of ocean waters, due to marine transgression, early farmers had to give up their fields in flooded areas or had to move into morphological positions protected from sea level rise. In later periods of the Holocene intense soil erosion triggered by man controlled the in-filling of alluvial and colluvial sediments and the raise of the valley floor. In consequence, due to the accumulation of re-deposited material from soil erosion, the Neolithic land surface became buried and protected beneath an up to 20m thick sediment-cover.

However, detection of palaeo-land surfaces and identification of abandoned prehistoric sites on the valley floor of the Rio Sizandro and tributary creeks outlines a perspective for future research and plays a crucial role for the understanding of habitation pattern and interactions between men and nature during Neolithic times in the coastal lowlands of Portugal.

LANDSCAPES THROUGH TIME IN THE TELL LEILAN SURROUNDINGS, NE SYRIA

Katleen Deckers[1,*], Alexandra Hilgers[2] and Dimitri Vandenberghe[3]

[1] University of Tübingen
[2] University of Köln
[3] University of Gent
[*] katleen.deckers@uni-tuebingen.de

Tell Leilan is a well-known settlement hill in the Upper Khabur Basin of NE Syria; with an occupation history dating from ca. 5000 BC till the late second millennium BC. It presently receives an annual rainfall of ca. 440 mm and is located at the confluence of the Wadi Siblah, Jarrah and Qatrani. Hence, the rivers must have played a major role to the location and economy of the site. Therefore, it is important to gain insight into fluvial evolution at the time the site was occupied. Moreover, gaining insight into the evolution of the Wadi Jarrah is also of importance to reconstruct other sites in their environment, since sites within this region have a typical setting nearby rivers.

In 2002 and 2006 fluvial geomorphological fieldwork was undertaken in order to gain insight into the chronology of landscape changes in the Leilan surroundings. Corona satellite images and exaggerated 3D-SRTM data overlain by the corona satellite images, were also used to reconstruct the riverine history. A chronology for the fluvial history is based on radiocarbon dating on shells and OSL dating on sediments.

Within this poster, the riverine history around the site will be detailed. One of the most interesting results is the find of channelisation of the Wadi Siblah that took place, possibly in relation with the construction of the lower town wall ca 2600 BC. However, it may also be a later feature, at the latest date to the final occupation phases of the site ca. 1600 BC.

THE DEVELOPMENT OF THE CULTURAL LANDSCAPE „OBERES ELBTAL“ IN SAXONY (GERMANY): ARCHAEOLOGICAL AND FIRST PALYNOLOGICAL INVESTIGATIONS

Michèle Dinies*, Wolfgang Brestrich

* Michele.Dinies@TU-Berlin.de

The upper Elbe valley in Saxony forms a physical corridor through the low mountain range. From the viewpoint of anthropogeography, it was repeatedly considered a zone of cultural contact in prehistoric Europe, linking the landscapes of the south with Central Germany.

The formation of the upper Elbe valley as a cultural landscape can be traced back to the Neolithic period. A broad spectrum of archaeological records illustrates the phase of early sedentism (Linear Pottery Culture, approx. second half of the 6th millennium cal B.C.). For the preceding times of hunter-gatherers there is an almost complete absence of archaeological evidence. But also the prehistoric periods following the early Neolithic are characterised by considerable fluctuations of the archaeological sources.

Extending our comprehension of the prehistoric landscape „Oberes Elbtal“ beyond the efforts presented here, investigations of related disciplines like physical geography and soil sciences are essential. So far, first palynological investigations of the “Moormergel” in Dresden-Cotta have been carried out. The profile described here was taken at 800 m distance from an early Neolithic settlement.

During the end of the Late Glacial-period, pine, birch, and juniper formed open woodlands, where light-demanding taxa (e. g. Artemisia, Thalictrum, Helianthemum) occurred. Briefly after the beginning of the Holocene, birch increased, possibly reflecting the Preboreal cooling period (Piottino). During Boreal and Atlantic periods nearly no sediments were deposited.

Sedimentation started again during late Atlantic period. Pine pollen is again the most abundant arboreal pollen type. Locally, pine was certainly common, but in part the Pinus-pollen probably derived from pine woodlands on the sandy soils of the Elbe’s eastern riverside. Lime and hazel were present rather frequent, whereas oak values are rather low. In accordance with the missing archaeological evidence in the immediate vicinity anthropogenic indicators occur only erratically. Sediments of the following periods are not suitable for pollen analysis.

The presented pollen diagram is the first pollen record for this fascinating archaeological Loess-region west of the Elbe. It will be complemented by palynological investigations of suitable floodplain sediments.

At the present state of research, it seems to be an appropriate assessment of the available archaeological and palynological data, that the colonisation of the upper Elbe valley as well as the human impact on the palaeoenvironment were subject to varying intensities.

LAND USE AND SOIL EROSION HISTORY IN THE QUEICH VALLEY, PALATINATE FOREST, GERMANY

Markus Dotterweich

Institut für Umweltwissenschaften, Fortstraße 7, 76829 Landau,
mail@markus-dotterweich.de

Spatial and temporal surface changes during the Holocene are strongly correlated to land use, climate variability, and extreme weather events. This can be shown in two small 0-order catchments situated in Queich valley of the Palatinate forest, Germany. The landscape is very hilly and Early Triassic sandstones are dominate. Remnants of a sandy to loamy solifluction layer can be found. Most of the current soils are poorly developed and difficult to farm.

The selected investigation sites are characterised by well preserved geoarchives: deposition areas on concave hill slopes, in gullies, and small valleys. The methods include geomorphic analyses of soils and sediments. Additionally, pollen analyses, historical, and archaeological data were analyzed for information about land use, weather, and climate events.

The first results show, that the oldest sediments were deposited during the Late Glacial in the Bøl-ling/ Allerød period. In the following millennia until the early modern Times no traces of soil erosion were detected. This situation changes in the early Middle Ages. First, ongoing slash and burning prac-tices and the later establishment of charcoal kilns led to widespread clear cuts. During heavy rainfalls hillslope erosion and gullying took place on the bare surfaces. Parts of the eroded sediments were de-posited as fans in the river system blocking the natural runoff of the river. As a consequence, small ponds up to 2 m in depth developed in front of the fans. During the last centuries the ponds changed into peat-wetlands. Today, most of the investigated area is under forest and no soil erosion has oc-curred in the last 150 years.

THE TAYMA SITE (NW SAUDI ARABIA): RECONSTRUCTING THE AGE OF THE WESTERN OUTER CITY WALL

Max Engel[1,*], Nicole Klasen[1,*], Helmut Brückner[1], Ricardo Eichmann[+], Arnulf Hausleiter[2], Mohammed H. al-Najem[3], Said F. al-Said[4], Peter I. Schneider[5]

[1] Faculty of Geography, Philipps-Universität Marburg, Deutschhausstr. 10, 35032 Marburg, Germany
[2] Orient Department, German Archaeological Institute, Podbielskiallee 69-71, 14195 Berlin, Germany
[3] Museum of Archaeology and Ethnography, Tayma (Tabuk Province), Kingdom of Saudi Arabia
[4] College of Tourism and Archaeology, King Saud University, P.O. Box 2627, Riyadh 12372, Kingdom of Saudi Arabia
[5] Department of Architecture, German Archaeological Institute, Podbielskiallee 69-71, 14195 Berlin, Germany
[*] max.engel@staff.uni-marburg.de, nicole.klasen@staff.uni-marburg.de

Since autumn 2006 the archaeological cooperation project on the ancient site of Tayma (NW Saudi Arabia) carried out by the German Archaeological Institute Berlin (DAI), the General Commission for Tourism and Antiquities, Kingdom of Saudi Arabia, and the Department of Archaeology and Epigraphy, King Saud University Riyadh integrates geoarchaeological methods to decipher the physical environment of former settlement periods. The archaeological excavation mainly focuses on the mound of Qraya, where "detailed information is still rather scarce" and a locally-based independent chronology still has to be elaborated (Eichmann et al. 2006a: 92). Thus, the age of the prominent city wall system stretching 15 km around the Tayma oasis remains uncertain.

According to silex and carnelian fragments included in its mud bricks and a 14C age of charcoal remains, an initial construction date of the wall between the late 3rd and the early 2nd millennium BC is very likely. Due to Eichmann et al. (2006b: 165), the latest possible construction date for the external mud-brick wall is the late 2nd millennium BC.

At the excavated western outer city wall a new systematic dating approach – combining the optically stimulated luminescence (OSL) and 14C methods – has been applied to generate a reliable age for the oldest branch of the wall system nowadays covered by aeolian sand. The dune deposit is genetically related to the existence of the wall and, therefore, dating its accumulation provides termini ante quem for the construction of the wall.

Due to inappropriate luminescence behaviour of the silt sediment underlying the wall only five OSL dates could be generated. Additionally, two radiocarbon ages were conducted, also contributing to the consistency of the dating sequence. By combining the results with sedimentary evidence we draw the following conclusions:

- Initial settlement activities at Qraya were accompanied by a regulation of wadi dynamics and the construction of the outer city wall.
- Prevailing west windsand absent wadi dynamics in the area of the western outer city wall after flood prevention measures resulted in the quick accumulation of sand outside the outer city wall. According to the OSL and 14C dating results produced on this deposit, the wall section at C1 dates back to the middle of the 3rd millennium BC or even earlier. Furthermore, the burying of this part of the city wall by sand was already completed in the first half of the 2nd millennium BC.

References

Eichmann, R., Hausleiter, A., al-Najem, M.H. & S.F. al-Said (2006a): Tayma – Spring 2004, Report on the Joint Saudi-Arabian-German archaeological project. – ATLAL, Journal of Saudi Arabian Archaeology 19: 91-115.

Eichmann, R., Schaudig, H. & A. Hausleiter (2006b): Archaeology and epigraphy at Tayma. – Arabian Archaeology and Epigraphy 17: 163-176.

PALEOENVIRONMENTAL RECONSTRUCTIONS FROM LACUSTRINE ARCHIVES: HUMAN IMPACT AND LANDSCAPE CHANGES RECORDED IN SEDIMENTS OF SACROWER SEE, GERMANY

D. Enters[1,2,*], S. Jahns[3], T. Kersting[3], E. Kirilova[4], A. Lotter[4], A. Lücke[5], B. Zolitschka[1]

[1] GEOPOLAR, University of Bremen, 28359 Bremen
[2] Lower Saxony Institute for Historical Coastal Research (NIhK), 26360 Wilhelmshaven
[3] Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum, 15806 Zossen
[4] Institute of Environmental Biology, Utrecht University, 3584 CD Utrecht
[5] Research Centre Jülich, 52425 Jülich
[*] enters@nihk.de

A well-dated lacustrine sediment record from Sacrower See close to Potsdam (Brandenburg, Germany) shows conspicuous peaks in K, Si and Ti contents at 3200, 2800 and 1100 cal. BP (1250 BC, 850 BC and 750 AD). The elevated concentrations of these predominantly terrigenic elements are interpreted as results of increased soil erosion due to forest clearing during the late Bronze Age and in Medieval Times. However, there is no indication of such events for the Iron Age and for Slavic Times. The presumed settlement activities and opening of the forest cover is confirmed by the occurrence of anthropogenic indicators such as Plantago and Rumex in the pollen spectra. Synchronous with human impact during the Bronze Age, first evidence of increasing phosphorus concentrations in the lake water have been reconstructed from subfossil diatom assemblages. Since the Bronze Age, generally much higher variabilities of most sedimentological and geochemical parameters indicate repeated disturbance and recovery cycles of the lake system, whereas prior to human impact relatively stable environmental conditions prevailed. Although there are no archaeological findings in the immediate vicinity of Sacrower See, the interpretation of this natural archive fits well with the regional archaeological data. The distribution of archaeological sites suggests an increasing population density during the Late Bronze Age, whereas during the subsequent Iron Age less frequent discoveries have been made. This study demonstrates that paleolimnological archives supplement the archaeological record of human settlement activities and offer a possibility to study in detail the interactions between human occupation and environmental landscapes.

DATING AND QUANTIFYING ANTHROPOGENIC SEDIMENTS AT A NEOLITHIC SITE IN CENTRAL GERMANY (WETTERAU)

Alexander Fülling

Geographisches Institut der Humboldt-Universität zu Berlin, Rudower Chaussee 16, 12489 Berlin
alexander.fuelling@geo.hu-berlin.de

The research area is situated in the northwestern part of the loess-covered Wetterau (Mörlener Bucht, state of Hesse, Germany). Soils suitable for agriculture (today: Luvisols and Phaeozems) as well as the mild and dry climate of the Wetterau Basin favoured the emergence of permanent human settlements at the beginning of the Neolithic about 7500 years ago. However, no archaeological evidence was found for a 3000-year-long period between the Middle Neolithic and the Middle Bronze Age (Saile 1998).

OSL datings of anthropogenic colluvia were carried out, sampled at the foot of the hill slopes within an area covering approximately one square kilometre, including a former settlement of the Linear Pottery culture (Niederweisel). The dating results are in a good agreement with archaeologically proven human activity phases. The probability density distribution of all 38 datings shows peaks within the Middle Ages (0.9 and 1.4 ka before today), the Roman period (1.9 ka), the Bronze Age (3.5 ka), and the Early to Middle Neolithic (7.2 ka). One has to consider, that the peak sizes are dependent both on the sampling mode and on the individual age errors; hence, they doesn't reflect any sediment volumes. However the peak positions are typical for loess-covered landscapes in South Germany (Lang 2003).

In the next step, the OSL dating results are linked with spatial and pedological information. Taking into account the degree of soil truncation and the thickness of the colluvial sediments, it is now possible not only to calculate the total amount of sediment fluxes within the test area, but also to quantify them chronologically differentiated over a time span of about 7500 years.

References

C Lang, A. (2003): Phases of soil erosion-derived colluviation in the loess hills of South Germany. In: Catena, 51: 209 - 221.

Saile, T. (1998): Untersuchungen zur ur- und frühgeschichtlichen Besiedlung der nördlichen Wetterau. In: Materialien zur Vor- und Frühgeschichte von Hessen, 21.

GEOARCHAEOLOGICAL INVESTIGATIONS ON THE USE OF DEEP IRON-AGE PITS NEAR RADEFELD, NORTHWESTERN SAXONY

Yvonne Heine[1], Birgit Schneider[2], Christian Tinapp[3,*]

[1] Landesamt für Archäologie Sachsen, Zur Wetterwarte 7, 01109 Dresden
[2] Institut für Geographie an der Universität Leipzig, Johannisallee 19a, 04103 Leipzig
[3] Dr. Christian Tinapp, Hohe Str. 27b, 04107 Leipzig
[*] ctinapp@t-online.de

Archaeological sediments of prehistoric pits are an important source for the reconstruction of former uses. While the function of features like post holes often is clear, the functions of other features are not so readily discerned. In these cases geoarchaeological investigations provide the chance to determine the kinds of utilization and to infer the living and working conditions during certain prehistoric periods.

During renaturalization work east of the Leipzig/Halle airport between Nov. 2007 and Feb. 2008 in Radefeld, Delitzsch county, parts of a entirely unknown iron age settlement were excavated on an area of 8000 m2. The area lies on a high plain of deposits from the Saale period slightly sloping toward the North. Exactly at the location of the find spot there is the shallow pit source of a small stream draining the area northeastward to the Lober and on to the Mulde.

From the more than 100 pits, many of which turned out to be filled with black loamy clay several meters deep, 13 largely complete and in part richly decorated pots belonging to the second phase of the Billendorfer culture (600 BC) were recovered. Some pits may have served as water stores, others for production purposes, as, for example, for tanning. Further findings – like briquetages, fire dogs and spindle words – confirm the hypothesis that the finds in Radefeld are from the industrial area of an iron age settlement. This is evident also by the total absence of post pits as uses for houses.

Based on these archaeological hints the pit fillings were recorded and sampled sedimentologically in order to determine the utilization of the deeper pits, most of which extend below the ground water level. Judging from the dark coloration and from the enrichment of sulphate, chloride, K- and Stotal contents, initial analysis suggest that alum tanning appears to have been possible. Also the distinctly raised C-contents in comparison to a reference profile indicate that an early form of alum tanning may have played a role.

Natural alum shale is rich in pyrite or marcasite, therefore high Al- and Fe-contents are to be expected. However, as Al and Fe naturally occur in high concentration in the soil, anthropogenic enrichments as, e.g., causes by the alum tanning processes are difficult to prove with certainty even with contents of these ions 30% above those of the reference profile.

GEOARCHAEOLOGICAL PREDICTIVE MODELS FOR PALEOLITHIC SITES IN THE ZAGROS MOUNTAINS OF IRAN

Saman Heydari-Guran[1,*], Michael Märker[2] and Nicholas J. Conard[1]

[1] Institut für Ur-und Frühgeschichte und Archäologie des Mittelalters; Abteilung Ältere Urgeschichte und Quartärökologie Schloss Hohentübingen D-72070 Tübingen
[2] Heidelberger Akademie der Wissenschaften Forschungsstelle: The role of culture in the early expansions of humans. Geographisches Institut der Eberhard Karls Universität Tübingen.
[*] saman.heydari@uni-tuebingen.de

We have developed a geoarchaeological predictive model for Paleolithic sites in the Zagros Mountains of Iran, based on topographical and geological data. The structure of the system is aimed at exchanging information and provides a platform to add information and discuss results and research on the Paleolithic of the study region. We analyse topographic indices and conduct analyses on a 90 m resolution based on Shuttle Radar Topography Mission (SRTM) elevation data. These topographic indices deliver, information of geomorphological process; water availability and site specific characteristics including aspect, radiation, elevation, lines of sight etc. We show that the distribution of the archaeological sites is strongly related to this parameters and proxies of ancient and current geomorphological structures and hydrological processes. This study allows us to estimate the potential of Paleolithic archaeological habitat-zones and sites of newly discovered and uninvestigated regions by machine learning technologies. The application of the model on a test sample shows the potential of the methodology.

VALLEY SEDIMENTS OF THE PARTHE RIVER ON THE OUTSKIRTS OF THE HISTORIC TOWN OF LEIPZIG – GEOARCHAEOLOGICAL INVESTIGATIONS DURING THE CONSTRUCTION OF THE SUBWAY STOP „HAUPTBAHNHOF“ OF THE CITY TUNNEL

P. Hiptmair[1], M. Knipping[2], C. Tinapp[3,*]

[1] Landesamt für Archäologie Sachsen, Zur Wetterwarte 7, 01109 Dresden
[2] Institut für Botanik, Universität Hohenheim, 70593 Stuttgart
[3] Dr. Christian Tinapp, Hohe Str. 27b, 04107 Leipzig
[*] ctinapp@t-online.de

For more than two years the archaeologists at Saxony's 'Landesamt für Archäologie' accompanied the construction work on the city tunnel of Leipzig. The archaeological investigations focused on the three planned subway stops "Leuschnerplatz", "Markt" and "Hauptbahnhof".

The excavations in the area of the "Hauptbahnhof" (main station) turned out to be a particular archaeological challenge, as the usual excavation methods could not be applied because of the subterranean nature of the construction work. In addition to the remains of modern development and the former tanning district the investigation was intended to find cues as to the former course of the riverbed of the Parthe. The Parthe floodplain extends along the northern outskirts of the medieval city of Leipzig.

The archaeological works in this section of the construction were confined to an accompanying investigation and documentation of a north-south cross-section. Along a 60 Meter long and 6 meter high profile, loess derivates lay above Pleistocene gravel and sands with a fossil holocene soil covered by peat. The layers were documented sedimentologically, investigated palynologically and dated at three points by 14C-analysis.

The peat turned out to have been formed only around 400 AD and to have persisted at least into the later middle ages. This was supported by pollen analysis, according to which the peat was formed during the subatlanticum. There are few settlement indicators, but the spectrum of woody plants suggests sun-exposed areas. Utilization of the investigated area as pasture land is likely, whereas, as to be expected for wetland, there were no indicators for agricultural usage in the closer vicinity.

Archaeological finds and findings were restricted to the upper layers of the profile. Particularly in the north a well developed layer of mud was found which contained many horn bases. For this area north of the town tanneries have been mentioned to have existed. The findings consist of extensive refuse layers of this trade.

The geoarchaeological investigations prove that the bottom of the Parthe valley was a wetland at the northeastern outskirts of the medieval city. It is not known what caused the peat to begin forming in the early middle ages. As the lowest layer of the peat dates to the beginning of the epoch of migrating tribes and thus to a period of low anthropogenic influence, natural causes of the wetting of the valley bottom are likely.

HUMAN AND ENVIRONMENTAL HISTORY IN NORTHEAST MOROCCO

Hanoun Ibouhouten[1,2], Christoph Zielhofer[2,3,*], Rachida Mahjoubi[1], Said Kamel[1], Jörg Linstädter[4], Jens Bussmann[2], Abdeslam Mikdad[5], Joachim, W. Härtling[2], Kartin Fenech[6]

[1] Faculty of Sciences, Moulay Ismaïl University, Meknès, Morocco
[2] Department of Geography, Osnabrück University, Université d'Osnabrück, Germany
[3] Department of Geography, Dresden University of Technology, Germany
[4] Institut of Pre- and Early History, Cologne University, Germany
[5] Institute National des Sciences de l'Archéologie et du Patrimoine, Rabat, Morocco
[6] Laboratory of Environment and Archaeology, Bonn, Germany
[*] christoph.zielhofer@tu-dresden.de

The Lower Moulouya alluvial archives reveal well-bedded overbank sediments with buried archaeological sites which offer the possibility to study the human and environmental history of the Mid- and Late Holocene period in Northeast Morocco.

The floodplain sediments can be subdivided into three sedimentation series: Series I is dated 9.9 – 6.5 ka cal BP and consists of sandy and silty sediment. Series II is dated 4.4 – 3.2 ka cal BP and series III 3.2 – 1.4 ka cal BP. The last two groups show thin laminae of silty to clayey sediments which are subdivided by charcoal-rich layers. These layers indicate the impact of fire at the former flood plain surfaces.

The values of magnetic susceptibility and the abundance of charcoal particles show a high correlation. Increasing values of magnetic susceptibility and charcoal particles towards the higher positions of the flood plain record indicate higher fire densities in the Late Holocene.

Archeological sites embedded in the alluvial sediments indicate human occupation of the Moulouya floodplain during the Epipaleolithic, Neolithic, Protohistoric and the Medieval. These periods of human activity are also documented from rock shelters, open-air sites and tumuli of the Moulouya hinterlands. A maximum intensity of occupation can be observed for the Early Neolithic, the period which corresponds with the Holocene climatic optimum. During this period the environmental conditions favored human presence.

Alluvial Archaeology, Mediterranean drylands, sedimentary charcoal record, Holocene flood plain.

GEOARCHAEOLOGICAL INVESTIGATIONS AT AN EARLY BRONZE AGE SETTLEMENT IN VRÁBLE, SLOVAKIA

Antonia Koch*, Gerd Schukraft, Stefan Hecht, Bernhard Eitel, Olaf Bubenzer

Department of Geography – Laboratory for Geomorphology and Geoecology, University of Heidelberg
* antonia.koch@geog.uni-heidelberg.de

In Vráble, southwestern Slovakia, the remains of an Early Bronze Age settlement mound are buried on a terrace above the floodplain of the river Žitava. This settlement was of great importance during its time due to its size, its access to the metal deposits of the Slovak Ore Mountains and as a melting pot of different cultures. Within the framework of interdisciplinary, geoarchaeological collaboration, the evolution of the landscape surrounding this extraordinary settlement area is to be investigated. The goal is to reconstruct the environmental conditions and changes both during as well as long before the time of settlement for better understanding of the site.

A wide array of methods, ranging from geoelectrical tomography to percussion core drilling to elaborate laboratory analytics, was employed to explore the evidence of Early settlement activity as well as Holocene and Quaternary landscape development. The resistivity tomography gave a first insight into the inner differentiation of the settlement mound and its underlying sediments. In addition to a horizontal stratification into the archaeologically relevant settlement layers and the Quaternary sediments, three trenches as well as vertical structures as possible remains of building foundations could be detected. These first results were confirmed through several core drillings that were driven into the ground up to eleven meters deep at different positions across the mound. The profiles thereby recovered showed the same differentiation as the geoelectrical measurements. The top levels are composed of multiphase Early Bronze Age culture layers, characterized by ashy horizons, ceramic finds, burnt clay and animal bones. Below follow thick loess sediments, palaeo soil formations and fluvial gravel deposits. A subsequent physical and chemical analysis of the sediment cores completed the picture and traced the stratigraphy. Thus, for example, concentrations of phosphor as an anthropogenic indicator display a differentiated distribution and distinct peaks within the settlement layers. Furthermore, the analyses of copper, zinc and other heavy metal contents provide a first indication of metal processing in the settlement area.

To summarize the investigations and findings to date, a first model of geomorphological landscape evolution was developed, illustrating the structural buildup of the settlement mound. Thereby glacial terrace gravel deposits of a periglacial river constitute the foundation of the landscape development. These fluvial sediments are overlain by an interglacial soil formation and a thick layer of loess, interspersed with interstadial pedological phases, above which lie Holocene soil and, most notably, the layers of Early Bronze Age settlement.

„LANDSCAPE DEVELOPMENT DURING MEDIEVAL AND MODERN TIMES UNDER HUMAN INFLUENCE“ -A CASE STUDY FROM THE LOW-MOUNTAIN-RANGE SPESSART

Annegret Kranz* and Hans-Rudolf Bork[1]

[1] Ecology-Centre of Christian-Albrechts-Universität zu Kiel, Olshausenstraße 75, 24118 Kiel
* akranz@ecology.uni-kiel.de

The landscape development under human influence since High Medieval Times is investigated by using the "Landscape system analysis" (BORK, 2006, p.18). As a research area the catchment of Kirschgraben – gully system, located in the southwest of the Spessart mountains in Lower Franconia was chosen.

A first step of the PhD-project is the development of an integrative, detailed and dated stratigraphy for all sites under investigation. Therefore key sediment layers, soil horizons and human structures are investigated. Extreme weather, runoff and erosion events were identified; their approximate age was determined. One challenge of the project appears on the slopes of the catchment: the distinction of complex sequences of geli-solifluction layers and colluvial layers which were deposited during late Holocene and consist of comparable material. High concentration of charcoal was found in a sediment buffer of Kirschgraben and in the upper layers of its fan. Using anthracological methods a detailed and exact chronological and spatial reconstruction of the land use history of the area is possible. The geoecological, geomorphological and archeological information from an excavation located in the catchment will be consolidated to gain a better insight in the human impact on landscapes and vice versa.

References

Bork, H.-R. (2006): Landschaften der Erde unter dem Einfluss des Menschen. Darmstadt: WBG.

HUMAN IMPACT ON AEOLIAN ACTIVITY. RECONSTRUCTION AND VISUALIZATION OF A DUNE DEVELOPMENT IN NORTHERN GERMANY

Lungershausen, U.[1,*], Duttmann, R. [1], Bork, H.-R. [2]

[1] Department of Geography, University of Kiel, Ludewig-Meyn-Str.14, 24098 Kiel
[2] Ecology-Centre, University of Kiel, Olshausenstr. 75, 24118 Kiel
[*] ulungershausen@gshdl.uni-kiel.de

The main objective of this PhD-project is a spatiotemporal reconstruction of a dune development in northern Germany. The investigation area is situated in the vicinity of Joldelund, Schleswig-Holstein. This region belongs to the Weichselian outwash plain and is partly covered by inland dunes. As a consequence of profound landscape transformations since early medieval times a reactivation of the aeolian dynamic occurred.

The landscape system analysis is the basic method to develop an integrative high-resolution stratigraphy. Therefore, the identification, age determination and correlation of key sediment layers representing former surfaces are essential to reconstruct different phases of aeolian activity and stability. In addition, dimension of wind erosion reflected by land surface changes will be analysed, quantified and interpreted. A model of fossil soil surfaces and a visual reconstruction of the dune development since Late Roman Age will be realised by using GIS and 3D visualization techniques.

BLACK SOILS AND/OR SEDIMENTS AT THE WESTERN BORDER OF THE NÖRDLINGER RIES (SOUTH GERMANY)

Sonja Mailänder*, Joachim Eberle, Wolf Dieter Blümel

* sonja.mailaender@geographie.uni-stuttgart.de

In the framework of a geoarchaeological research project by the Institute of Geography, University of Stuttgart, in the year 2006 the construction of a kerosene pipeline trench was monitored at the western border of the impact crater Nördlinger Ries in Southern Germany (MAILÄNDER ET AL. 2008). Thereby black horizons were recognized at several places. They occured predominantly in depressions and were covered by Holocene colluvial sediments, but rested on different bedrocks which include mud- and sandstones as well as lime. The most of these horizons seemed to be rich in humic material and clay.

By means of various studies, which involve sedimentological, pedological, archaeobotanical and -zoological analysis as well as 14C-(AMS)-datings, the periods and circumstances of the development of these black horizons are explored. The poster presents the itemised research methods and their first results. Particularly micromorphological and mollusc analysis turned out to be very valuable to reconstruct the palaeoenvironmental conditions during their formation and subsequent modifications. First datings of bulk samples and charcoal pieces refer to the Atlantic period, but the measured ages distribute to a long time space from about cal a BC 5200 to cal a BC 4000.

The outcomes of this investigation should facilitate a comparison with similar horizons, which are recovered in several Central European sediment profiles, for example in the Amöneburger Becken near Marburg in Hessen (RITTWEGER 2000). Also their composition will be contrasted with samples from archaeological findings in the surrounding and the possibility of an anthropogenic influence on their development will be checked.

References

Mailänder, S., W. D. Blümel & J. Eberle (2008): Paläoumweltbedingungen und anthropogene Landoberflächenveränderungen im Umfeld des frühkeltischen Fürstensitzes auf dem Ipf am Westrand des Nördlinger Rieses: Erste Geländebefunde und Auswertungen 2005/2006.- In: Krausse, D. L. (Ed.) (2008): Frühe Zentralisierungs- und Urbanisierungsprozesse. Zur Genese und Entwicklung frühkeltischer Fürstensitze und ihres territorialen Umlandes. Kolloquium des DFG-Schwerpunktprogramms 1171 (Blaubeuren, 9.-11. Oktober 2006).- Forschungen und Berichte zur Vor- und Frühgeschichte in Baden-Württemberg 101.- Stuttgart: 281-298.

Rittweger, H. (2000): The "Black Floodplain Soil" in the Amöneburger Becken, Germany: a lower Holocene marker horizon and indicator of an upper Atlantic to Subboreal dry period in Central Europe?.- Catena 41: 143-164.

GEOARCHAEOLOGICAL STUDIES IN THE ENVIRONS OF THE ANCIENT DAM OF GLOSSES, AKARNANIA, NW GREECE

May, S.M.[1*], Vött, A.[1], Brückner, H.[2], Herd, R.[3], Lang, F.[4]

[1] Department of Geography, Universität zu Köln, Albertus-Magnus-Platz, D – 50923 Köln (Cologne), Germany
[2] Faculty of Geography, Philipps-Universität Marburg, Deutschhausstr. 10, D – 35032 Marburg/Lahn, Germany
[3] Faculty of Environmental Sciences and Process Engineering, Brandenburgische Technische Universität Cottbus, Karl-Marx-Str. 17, D – 03013 Cottbus
[*] matthias.may@uni-koeln.de

The Glosses dam (Akarnania, NW Greece) is one of the best preserved ancient dams in Greece. In order to decipher environmental changes through time, detailed geoarchaeological research was carried out in fluvial geological archives in the vicinity of the dam comprising geomorphological and sedimentological analyses of sediment profiles and earth resistivity measurements. Diagnostic ceramic fragments found within the stratigraphic sequence helped to establish a local geochronostratigraphy.

Our results show that low to moderate morphodynamic conditions have prevailed since around 3000 BC. Thick layers of coarse gravel and blocks accumulated during the last 1500 or so years, however, indicate that fluvial energy increased considerably in post Roman times. Earth resistivity tomography revealed that the Glosses dam reservoir was filled up by fine-grained deposits. Several palaeosols, associated with abundant ceramic fragments, were detected in the sediment profiles downstream of the dam all of them indicating periods of morphodynamic stability. For the first time, our results provide evidence for an early to middle Bronze age colonization of the Mytikas coastal plain. This paper also shows that morphodynamic conditions have increased to a maximum during the last 150 years obviously related to anthropogenic deforestation and soil erosion.

DEVELOPING A METHOD FOR GIS-BASED ARCHAEOLOGICAL SITE PREDICITION – RECONSTRUCTING ROMAN LANDSCAPES AND ENVIRONMENTAL CHANGES IN SOUTH-WEST GERMANY

Barbara Neumann*, Andreas Stinsky, Jochen Kubiniok[1]

[1] Physical Geography and Environmental Research, Saarland University, Postfach 15 11 50, D-66041 Saarbrücken
* barbara.neumann@zfu.uni-saarland.de

Since the early Bronce Age, the 'Bliesgau' region in southern Saarland (Germany) and northern Lorraine (France) has encountered a marked increase in population and settlements. The gallo-roman Mediomatrics appreciated much this gentle cuesta landscape with its atlantic climate and fertile soils. So far, quite a few roman archaeological sites have been listed besides the gallo-roman Vicus in Bliesbruck (F) and the roman Villa in Reinheim (D), a regional economic and administrative centre of the Roman Period. Nevertheless, the archaeological heritage of the area has by far not entirely been uncovered yet.

All known roman findings and sites indicate that the land has been used intensively. Recent geo-archaeological investigations have documented that the appearance and geomorphology of the landscape was in parts totally different to its today's situation, especially along the much preferred floodplains and banks of the river Blies. Vice versa, landscape and environmental conditions have been altered through human settlement activities, intensification of land use and through climatic changes, which in turn had an influence on the settlement behaviour of the gallo-roman population. The choice of suitable settlement areas is probably strongly related to natural and social-economic parameters.

A method to predict likely archaeological sites will be developed based on GIS routines and geo-archaeological field investigations with regard to Holocene environmental changes in the Bliesgau region. A transfrontier georeferentiated database of archaeological sites coupled with a GIS-based assessment of spatial and environmental data form the basis of this predictive model. Criteria and regularities that determine the distribution of settlements will be identified and integrated in the model. Besides natural / environmental and socio-geographic criteria, Holocene landscape changes such as changes in soil quality, river discharge, and micro- / macro-climate will be taken into consideration, too. These processes have modified the environmental quality considerably.

The focus study area is the Blies valley around the 'European Cultural Park Bliesbrück-Reinheim'. Comprehensive geo-archaeological data from long-time research allow for a reconstruction of the Holocene landscape here. Building upon these preceding activities, suitable sites for field investigations, soil and sediment analyses will be identified and the roman environmental conditions be reconstructed. The later upscaling of the analysed landscape changes and patterns from the focus study area to the whole of the Bliesgau region will be supported by GIS routines and integrated in the predictive model. In order to verify the archaeological predictive model, geo-statistical methods will be applied, using also LIDAR data (Light Detection And Ranging), aerial images and geophysical field inspections.

MICROBIAL CHARACTERISTICS OF SOILS FROM THE ARCHAEOLOGICAL SITE KABARDINKA 2 IN THE KISLOVODSK BASIN (NORTH CAUCASUS, RUSSIA)

Swetlana Peters

University of Applied Sciences, Fachhochschule Osnabrück, Fakultät Agrarwissenschaften und Landschaftsarchitektur, Abt. Bodenwissenschaften, Oldenburger Landstr. 24, D-49049 Osnabrück
sweta_p@web.de

The understanding of cultural practises and the economy of prehistoric people includes meanwhile a wide-ranged spectrum of interdisciplinary research strategies. During the last years, biological indicators in cultural layers have become a very informative sector in geo-archaeology. The microbial characteristics of soils can be used as indicators of anthropo-genic influence, and help revealing areas of different activities in a settlement.

The systematic analysis of microbial indicators for human activities was successfully applied at several archaeological sites in the North Caucasian piedmont zone. The settlements of the Late Bronze/Early Iron Age Koban culture (13th – 9th century BC) are unique for their sym-metric layout with a large, central place. They were discovered first in 2004 and since 2006 investigated with a broad spectrum of prospection methods by a joint project of the Russian Academy of Sciences (D.S. Korobov), the German Archaeological Institute (S. Reinhold) and the local department of antiquities 'Nasledie' (A.B. Belinskij).

At the site Kabardinka 2 in particular mycological characteristics of cultural layers were inves-tigated. Samples were collected systematically in several areas up to 40x40m as well as unsystematically in houses and courtyards. Tanks to the fact that the investigated microbes are able to adapt to bad living conditions, e.g. with changes in their cell structure, it is possi-ble to reactivate them after a long period of time. Using microbiological analysis methods like SIR and luminescence microscopy the complete and active microbial biomass of the cultural layers was recorded. According to the different areas in the settlement the microbial biomass varies and allow to differentiate especially the input of organic material, e.g. garbage, in the ground. Within the analysis of microbes the quantity of biomass of micro-fungi mycelia was the most informative. This is clearly higher in areas with an intensive use. Further, the pres-ence of keratinophiliac micro-fungi in the different areas of the settlement was systematically investigated. The mycelia of these micro-fungi, which usually exist in the hair and hoof of animals, were discovered at parts of the settlements, which could have been areas for stock-keeping. The quantity of mycelia of micro-fungi varies in the different rooms of the investi-gated houses. In these outer rooms the quantity of mycelia is higher, than in the inner rooms due to a more active use of this rooms and possibly because animals were kept here. With the help of these analyses the intensity of domestic activities and functional areas in the set-tlement could be pointed out. It was proofed, that the microbial characteristics of soils in set-tlements differs according to the human activities performed there. Thus they have a high potential to determine not only functional areas but also modes of production e.g. of food.

QUATERNARY GEOLOGY AND LANDSCAPE EVOLUTION: FIRST RESULTS OF FIELD INVESTIGATION IN THE NOCHTEN AREA, UPPER LUSATIA, SAXONY, GERMANY

Andrea Renno

Archaeological Heritage Service and State Museum of Prehistory, Saxony, Zur Wetterwarte 7, D-01109 Dresden, Germany
andrea.renno@archsax.smwk.sachsen.de

Since October 2007 the archaeological prospections and excavations in the vicinities of the lignite open-pits Nochten and Reichwalde run by Vattenfall Europe are continued.

Geoarchaeological investigations form an integral part of these cooperative project.

Goals of my investigation are the reconstruction of the settlement history and the landscape evolution from the Lateglacial to Holocene. Geoarchaeological findings like palaeosoils and fossil land surfaces, provide a basis for an effective and promising archaeological prospection.

The sediments studied are part of a bigger Tertiary and Quaternary sequence, deposited at a geomorphologically effective transition from the Central German landmass in the south to the North German Basin in the north. The area of interest partly covers the 'Lausitz' ice-marginal-valley in the south and the 'Lausitzer Grenzwall' (mostly till deposits) in the north. Due to the constraints by the progress of the open-pit, the main focus of the first field investigation laid on the southern part.

Several units of fluvial and fluvial aeolian sediments were formed during the Holocene and Lateglacial. The fluvial sequences are dominated by sands with intercalated soils, peats and silts. Aeolian material is increasing in the younger units with linear and parabolic dunes dominating the youngest unit (probably Younger Dryas).

Intercalations of organic-rich material and fluvial or aeolian sediments are the most promising areas for archaeological features and artefacts. Several examples of such features will be shown and interpreted.

HUMAN IMPACT ON LANDSCAPES - SOIL DEGRADATION AND GULLY EROSION PROCESSES AS INDICATORS FOR A STRONG ANTHROPOGENIC INFLUENCE - A CASE STUDY FROM MAŁOPOLSKA, SE POLAND

R. Schmidt[1,*], J. Heinrich[1]

[1] Institute of Geography, University of Leipzig, Johannisallee 19a, 04103 Leipzig
[*] ronny.schmidt@uni-leipzig.de

The human impact on landscape evolution in modern history could be documented in detail for a loess area northeast of Kraków (Grab Wodzislawski). This study focuses on two gully systems in the area surrounding Słaboszów.

Many investigations show that the occurrence of alluvial and colluvial sediments can be correlated with periods of intensive land use, agriculture or settlement activities. Within the research area investigations about the modern soil degradation and gully erosion processes indicate the strong influence of human activities. The increase of population during the last two centuries in combination with extensive land use changes and the subsequent loss of forest induced a rise in erodibility. Several soil erosion events could be identified and the sediment loss was quantified. The results show that the gullies are not formed because of a single erosion event. Rather many small events during a period of intensive land use and suitable weather conditions formed these kinds of gullies. Assuming that the recent geomorphological processes are quite similar to those of the Middle Ages and early history, the reconstruction of landscape evolution for the entire period of human activity in this region can be completed by the following investigations. The possibility of geoarchaeological investigations is offered by the availability of different geomorphological structures like gullies, alluvial fans, eroded soil profiles and the appropriated alluvial and colluvial sediments on slopes and valley floors with archaeological findings.

The aim of the future studies will be a comprehensive reconstruction of landscape evolution and to determine the human impact on landscapes in different times. Thus, the methodological approaches base upon pedological and geomorphological as well as archaeological investigations. To increase the gain of knowledge a methodological change from qualitative to quantitative analysis is necessary. Physical (14C, TL) and archaeological dating as well as dendrochronology afford the possibility to develop a chronology of erosion and accumulation processes in the research area since the Neolithic Age. Regional tendencies may be compared with other results from Poland or Central Europe.

EXPERIMENTAL PEDOLOGY IN CENTRAL EUROPE. TEN YEARS OF THE FORCHTENBERG-EXPERIMENT

E. Schulz*, A. Bogenrieder, O. Ehrmann, M. Hall, L. Herrmann, M. Rösch, W. Schier

* erhard.schulz@mail.uni-wuerzburg.de

A multidisciplinary project is to retrace the first development stages of the cultural landscape in Central Europe. Slash and burn and cultivation is practised in a beech, maple, ash and oak forest in Hohenlohe / SW Germany in order to estimate the possible yields under different types of cultivation. The regeneration of vegetation and soil surfaces is continuously mapped and documented. Soil regeneration shows the transformation of original forest soil cover into dense and asphyxiating grass felts on crumbly surfaces. Charcoal may sterilise a surface up to half a year. A new formation of Ol/Of-covers already starts in the fourth year after clearing depending on the size of resprouting trees. The development of soil cover was sufficient enough to allow a first reclearing within a decade. In all there are two different ways of colonisation. For the first the "forest way" as described above and for the second the "ruderal way". It started at that time, when the cleared surface was large enough to allow tall herbs like Cirsium to settle and to colonise all the following clearing plots impeding the development of tree seedlings or saplings. Moreover covered soil structures from the first cultivation mosaic manifests by different settling of tall herbs on a re-cleared plot ten years after the first clearing.

DIGITAL GEOARCHAEOLOGY AND THE SPATIAL ANALYSIS OF MEDITERRANEAN PALAEOENVIRONMENTS: UNRAVELLING THE MINOAN LANDSCAPE OF CENTRAL CRETE BY REMOTE SENSING AND GIS

Christoph Siart[1*], Bernhard Eitel[1], Diamantis Panagiotopoulos[2]

[1] Geographical Institute – Laboratory for Geomorphology and Geoecology, University of Heidelberg, Germany
[2] Institute of Classical Archaeology, University of Heidelberg, Germany
[*] christoph.siart@geog.uni-heidelberg.de

Remote sensing and GIS-based studies are increasingly being applied for archaeological purposes while reconstructions of ancient landscapes or detection of anthropogenic remains attract the most interest. However, in many cases only few environmental variables are incorporated in the investigations because the development of useful geodata is very time consuming and costly. The growing demand for detailed knowledge about the environment poses a future challenge since a better understanding of space and an enhanced analysis with supplementary environmental data input will offer more precise results.

It is the aim of our studies to show how geoscientific techniques can be adopted for detailed archaeological research using a comprehensive set of environmental parameters that might have influenced Bronze-Age settlement patterns. Contrary to conventional applications based on digital elevation models (DEMs) and their derivatives, additional environmental information (e.g. geological structures, hydrology, land-surface cover) help to specify the results substantially (Siart 2007; Siart and Eitel 2008). Our project focuses on the spatial distribution of Minoan communication paths as well as archaeological sites in Central Crete by applying a multi-method approach (land surface classification with satellite imagery, DEM analysis, least-cost analysis, candidate site detection, predictive modelling, etc.).

As demonstrated by the results, an already presumed but yet imprecise Minoan road network in Central Crete can now be visualised for the first time. With regard to the hidden and remote landscape of the Ida Mountains, which was barely considered in this context so far, the ancient infrastructures reveal new insights in Bronze-Age mobility and land-use. In addition, the detection of potential Minoan candidate sites by remote sensing opens up new perspectives for the archaeological understanding of Mount Ida during the Mid- and the Late Holocene. According to our findings, the region could have been intensively used for agricultural activities (Siart et al. 2008). Explicit former settlement locations can now be pinpointed through the spatial analysis with GIS. Hence, future archaeological work can be significantly facilitated and accelerated by immediately surveying these sites.

Concerning remote sensing and GIS, cooperation between Archaeology and Geosciences is still uncommon, but recent research points to the steadily increasing interest in this topic. In addition to geophysical, geochronological and geomorphologic collaboration, IT-based prospection is surely one of the most promising future tasks among interdisciplinary geoarchaeological research and offers great prospects for landscape and settlement reconstructions.

References

Siart, C. (2007): Digitale Geoarchäologie mit Methoden der Fernerkundung und GIS: Ein Beitrag zur Landschaftsrekonstruktion im Ida-Gebirge, Zentralkreta. In: Mächtle, B., Gebhardt, H., Schmid, H., Siegmund, A. (2007, Hrsg.): Der zirkumpazifische Raum – Risiken und Sicherheit in einer globalisierten Welt. HGG-Journal 21. Heidelberg, 203-215.

Siart, C., Eitel, B. (2008): Geoarchaeological studies in Central Crete based on Remote Sensing and GIS. In: Posluschny, A., Lambers, K., Herzog, I. (eds.), Layers of perception. Proceedings of the 35th International Conference on Computer Applications and Quantitative Methods in Archaeology (CAA), Berlin, Germany, April 2-6, 2007 (Kolloquien zur Vorund Frühgeschichte, vol. 10), Bonn, 299-305.

Siart, C., Eitel, B., Panagiotopoulos, D. (2008): Investigation of past archaeological landscapes using remote sensing and GIS: a multi-method case study from Mount Ida, Crete. Journal of Archaeological Science 35, 2918-2926.

ADZE-BLADE EXCHANGE DURING THE NEOLITHIC

Lars Stebner

Lars.Stebner@uni-hamburg.de

Many adze-blades abound in a high quantity on sites of the LBK-Period. Quantity and different magnitudes vary from site to site but also in one site. The magnitudes diversify from high to miniadzes. Most of them are surface finds and a huge number are fragments. There are also many complete objects, which show reworks and signs of usage. Due to the different phases of production we can distinguish between ingots, semi-finished products, reworks and production waste. The raw material differs from amphibolites to basalt within regions, but also within the same sites.

Quantities of adze-blades in Hessen are made from Aktinolith-Hornblendeschiefer as it was shown by the thesis of B. Ramminger. The raw material was probable from the mining place in Jistebsko, Bohemia, as XRF-Analyses could verify.

A centre zone of the LBK is the area of middle Germany. The states and regions south of Lower Saxony, Saxony-Anhalt, Thuringia, Saxony and the north of Bavaria refer to "middle Germany". The landscape is marked by loessic soils, which was important for the new agricultural people. In different samples of this region the adze-blades will be investigated.

Trade relations and exchange can be noticed on the basis of metric characteristics, analysis of the raw material (macroscopic, microscopic and by XRF) and the phase of production.

This can be recognized on different levels: On the first level there are different sample-regions which will be compared with the quantitative data. On the second level there are different sites (settlements and burial grounds), where the centre of production can be recognized. Every level can give its due to the economy of the LBK.

INTERDISCIPLINARY EXPLORATION OF THE ENVIRONMENT SURROUNDING THE IRON AGE HILLFORT „HUNNENRING“ NEAR OTZENHAUSEN (SAARLAND)

Christian Stolz[1,*], Peter Haupt[2], Sabine Hornung[2]

[1] Geographisches Institut, Universität Mainz, Becherweg 21, D-55099 Mainz
[2] Institut für Vor- und Frühgeschichte, Universität Mainz, Schillerstrasse 11, D-55116 Mainz
[*] c.stolz@geo.uni-mainz.de

In autumn 2008, geomorphological-geoarchaeological investigations of the „Hunnenring“ near Otzenhausen were made, in collaboration with the prehistoric Institute of the Johannes Gutenberg-University Mainz. The „Hunnenring“ is a part of one of the most impressive fortifications in central Europe. Its walls have a length of 2 km, and were built in the so-called „Murus Gallicus“ architecture. The northface of the wall, which had been prone to most attacks, still has a height of up to ten metres. It is made up of lower Devonian quartzite blocks in different sizes. This area has been excavated and prospected since decades.

The main focus of the geomorphological investigation was put on the periglacial coverbeds on the slopes below the ramparts, as well as the area surrounding the hillfort. Several exemplary sites were described for this purpose. The southern slope of the Hochwald Mts. (Hunsrück) solely shows profiles with the periglacial main layer and basic layer over quarzite. The main layer is mainly eroded at the upper slopes, but is overlayed by dark colluvium on the steep middle slopes.Near the footslope, uncut profiles can be found. The soil in the colluviae, which can be partly classified into two parts, is initial. This leads to the conclusion, that the upper deposits are young, and not due to the landuse during the iron age. It is rather a product of intensive pasture and forestry in the modern age.

In order to determine the age of the soil, several charcoal pieces were washed out of soil and were sent to a laboratory for 14C-dating. The results are still outstanding.

Furthermore, two archaeological transections through the hillfort are described pedologically and interpreted. Amongst other things, a type of colluvium, which seemed to be older than the hillfort, was found. Apparently there had been intensive landuse before the fortification was built.

The slopes surrounding the hillfort were mapped, with focus on the microrelief. This contains a local terrace relief, as well as a large amount of periglacial blocks. Blockfree areas were examined in order to find the origin of the rocks used for the building of the hillfort.

References

Felix-Henningsen, E. A. Spies & H. Zakosek (1991): Genese und Stratigraphie periglazialer Deckschichten auf der Hochfläche des Ost-Hunsrücks (Rheinisches Schiefergebirge). – Eiszeitalter und Gegenwart, 41: 56-69. Hannover.

Fritsch, T. (2004): Der Ringwall „Hunnenring“ bei Otzenhausen. = Rheinische Kunststätten, 483. 15 S. Köln.

Hornung, S. (im Druck): Mensch und Umwelt – Besiedlungsgeschichte, Kulturlandschaftsgenese und sozialer Wandel im Umfeld des „Hunnenrings“ von Otzenhausen, Kr. St. Wendel, Saarland. In: Architektur: Funktion und Rekonstruktion. Tagungsband der AG Eisenzeit. Mannheim 2008.KLEBER, A., 1997. Cover-beds as soil-parent materials in midlatitude regions. In: Catena, 30: 197 – 213.

Stolz, C & J. GRUNERT (2006): Historic landuse and gully formation, a case study from the Taunus mountains/southern Rhenish slate massif. In: Z. f. Geomorph., Suppl., 142: 175-194.

Völkel, J., 1995. Periglaziale Deckschichten und Böden im Bayerischen Wald und seinen Randgebieten als geogene Grundlagen landschaftsökologischer Forschung im Bereich naturnaher Waldstandorte. - Z. Geomorph. N.F. Suppl., 96.

Wiegert, M. (2002): Der „Hunnenring“ von Otzenhausen, Lkr. St. Wendel. Die Siedlungsfunde und Bebauungsstrukturen einer spätlatènezeitlichen Höhenbefestigung im Saarland. Rahden/Westf.

FLUVIAL SEDIMENTS IN EASTERN TRANSCAUCASIA AS ARCHIVES OF PALAEO-CLIMATE AND HUMAN INFLUENCE ON LANDSCAPE STABILITY

Suchodoletz, H. von[1,*], D. Faust[2]

[1] Department of Geomorphology, University of Bayreuth, Universitätsstrasse 30, D – 95440 Bayreuth, Germany
[2] Institute of Geography, Technical University of Dresden, D-01062 Dresden, Germany
[*] Hans.vonSuchodoletz@uni-bayreuth.de

Eastern Transcaucasia (eastern Georgia, Aserbaidzhan) is one of the areas of earliest neolithic activity in Eurasia with a neolithic economy from at least 9 ka. In difference to several archaeological work conducted during the last decades, there have been very few attempts to reconstruct the influence of human activity on landscape stability in this semiarid area. At several places, local rivers have cut fluvial sediment sequences that often include palaeosols and partly archaeological remains.

By use of detailed stratigraphic mapping and a sedimentologic-pedologic multiproxy approach including several dating-techniques, it is intended to investigate the fluvial sediment dynamics of the last 20 ka in selected small to medium catchment areas of this region. This should give insights into the palaeoclimatic development as well as on the effects of human influence on landscape stability.

NEOLITHIC CHANGES IN THE CENTRAL ELBE-SAALE-REGION – THE SITE OF ZAUSCHWITZ, LKR. LEIPZIG

Stefanie Thews

sthews@gshdl.uni-kiel.de

The Central Elbe-Saale-Region is considered one of the richest archaeological regions in Central Europe. Surrounded by the Harz Mountains, the Thuringian Forest and the Erz Mountains this region includes several smaller areas characterized by very fertile black soil.

The site of Zauschwitz is located near the river Weiße Elster. It was a preferred location for settling for about 6500 years from Early Neolithic up to the Middle Ages. Nearly every culture known from the Central Elbe-Saale-Region is recorded at Zauschwitz. Here, houses dated to the Linear Pottery Culture, a Bronze Age pit alignment, about 250 graves, thousands of settlement pits and several ring ditches have been investigated.

The archaeological documentation is highly precise thanks to the manual excavation technique. This offers the possibility for detailed mapping of finds and features in the problematic black soil. The excellent conservation conditions of bone material enable radiocarbon dating which is important not only for the dating of features at Zauschwitz but also for a more precise dating of the surrounding sites without bone conservation.

The PhD thesis concentrates on the Neolithic cultures such as Linear and Stroke Ornamented Pottery Culture, Rössen, Gatersleben, Baalberge, Salzmünde and Globular Amphora Culture. The settlement structures of these cultures and their changes are the most important issues of the PhD project. Especially a more precise dating of the Funnel Beaker Cultures like Baalberge or Salzmünde is planned. A further aim is the study of richly ornamented linear and stroke ornamented pottery with a series of unclassified patterns. Their classification in connection with radiocarbon dating will shed light on landscape development in the Central Elbe-Saale-Region.

SETTLEMENT AND LANDSCAPE DEVELOPMENT IN SEUSSLING (OBERFRANKEN) FROM THE MIGRATION PERIOD TO THE PRESENT – RESULTS OF AN INTERDISCIPLINARY STUDY

Lukas Werther

Otto-Friedrich-Universität Bamberg, Institut für Archäologie, Bauforschung und Denkmalpflege, 96045 Bamberg
lukas.werther@gmx.de

Excavations in Seußling, a small village south of Bamberg in Oberfranken, carried out between 1999 and 2001, allow a reconstruction of the development of the surrounding landscape and settlement cluster from the 4th/5th century to present time. Methodology includes an analysis of archaeological, geological and scientific data resulting in a picture of a medieval and post medieval village which is exceptionally detailed in comparison to other sites in the area. The settlement shifted sites several times until the 8th/9th century when it became permanent with the construction of a church and its surrounding cemetery.

Massive erosion during the early middle Ages caused severe damage to the archaeological remains in the slopes down to the Regnitz River. Before its regulation in the 19th century, side erosion of the river washed away huge amounts of archaeological substance. Reconstruction of these event horizons was essential for a critical study of features as well as finds and gave an important lead to questions concerning land use and landscape development.

Stratigraphy, analysis of the finds and radiocarbon as well as dendrochronological dating makes up the chronological framework. Archaeometric examination of metallurgic slag and the archaeozoological analysis of animal bones provided an indication of the economic basis of the inhibitants' life and indirect evidence of specific land use. In a second step the archaeological overall picture was contrasted with historical tradition.

Important results of the study are a chronology of local ceramics from the 4th/5th century to the late middle Ages, including several absolute dated benchmarks, the reconstruction of settlement and landscape development from the Migration Period and the evidence of settlement continuity from the first Germanic settlers in the 4th/5th century without any relevant interruption. Furthermore, there are clear indications of the Frankish occupation of the Regnitz River area along the valley of the Aisch River in the 7th century, of a Slavonic settlement site with specific architectural structures in the late 8th or 9th century, of the development of the local cemetery from the 9th to the 19th century, and of the building stages of the associated church.

Great benefit was derived from the interdisciplinary approach which allowed uncovering the complex interaction between archaeological remains, geoarchaeological processes and historical development.

USING ELEMENT COMPOSITIONS AND CONCENTRATIONS IN OVERBANK DEPOSITS FOR INDIRECT DATING

Carolin Wygasch[1,*], Frank Lehmkuhl[1]

[1] RWTH Aachen, Department of Geography, Templergraben 55, D-52056 Aachen
[*] c.wygasch@geo.rwth-aachen.de

The project ‚New investigations of the alluvial plain in the lower Inde Valley', funded by the ‚Stiftung zur Förderung der Archäologie im rheinischen Braunkohlenrevier', focuses on the sedimentary cycle of flood plains and related slope deposits during the Holocene. The interdisciplinary research engages in both, natural landscape change and human impact on the fluvial systems.

The investigation area is situated in front of the lignite open cast mining Inden in North-Rhine-Westphalia, Germany. The lower Inde valley consists of a 1 km wide asymmetric floodplain orientated in southwest-northeast direction. Since the neolithic ‚Bandkeramik' (about 5.500 B.C.) the landscape has been extremely anthopogenically changed during long periods of settlements and agriculture. As a consequence of the human impact since the Roman period sediments have been contaminated by diverse elements through ore and coal mining respectively related industries.

Main topics are alluvial and colluvial sedimentary archives, which show several stages of development from natural environment to cultural landscape. In the transition zone between floodplain and hill slope, possible coherences are investigated by detailed on-site documentation as well as sedimentary and geochemical studies. In cooperation with archaeologists of the 'Landschaftsverband Rheinland' (LVR), department Titz, archaeological settlement sites are analyzed. In doing so, the sediments are investigated at both on-site and off-site of the earlier settlement areas.

The most important objectives of the projects are the stratification of the sediments by their composites and the identification of the indirect and direct human influences on fluvial systems during two different time slices. Sediment records are investigated by X-Ray in order to obtain heavy metal concentration. Furthermore, we analyzed grain sizes and other geochemical parameters like carbon, nitrogen and sulphur. On the basis of the analysis we receive characteristic sediment layers for different ages. The X-Ray results are compared to historical data to indirectly estimate the age of sediments. A comprehensive chronostratigraphy is also obtained by pollen analyses, dendrochronology, 14C, OSL and CS137.

Besides drawing up a stratigraphy of the sediments by their compositions, we will give a detailed description of two different types of use on the floodplain area. Here, a prehistorically rural land-use is compared with an intensive redesigned area from the medieval ages and the early modern age.

ARCHAEOMAGNETIC DATING OF FLOODPLAIN DEPOSITS FROM THE AUFSESS CATCHMENT (UPPER FRANCONIA, BAVARIA, GERMANY)

Christian Zeeden[1,*], Ulrich Hambach[1], Markus Fuchs[1], Elisabeth Schnepp[2], Mathias Will[1, 3]

[1] Chair of Geomorphology, University of Bayreuth, Germany
[2] Chair of Geophysics, University of Leoben, Austria
[3] now at: Department of Geography, University of Exeter, United Kingdom
[*] christianzeeden@yahoo.de

Alluvial sediments from the Aufsess floodplain (Upper Franconia, Bavaria, Germany) contain valuable information about the timing of the deposition of these geoarchives. The accumulation of floodplain deposits is suggested to reflect the human land use in the Aufsess catchment. We attempt to reconstruct sedimentation rates for the Aufsess floodplain presuming human activity being the controlling factor.

Three excavations in floodplain deposits were sampled for palaeomagnetic studies in 2007 and 2008. We conducted palaeomagnetic remanence measurements to obtain reliable palaeomagnetic data of the directions of the palaeomagnetic field. These directional palaeomagnetic data are compared to the German archaeomagnetic reference curve, and we apply archaeomagnetic dating to these sedimentary geoarchives.

Using this technique, we are able to reconstruct different sedimentation rates for historic time intervals. We relate the varying sedimentation rates to different intensities of human land use in Upper Franconia. Results are presented and advantages as well as issues of applied methods and approaches are discussed.

IN SEARCH FOR THE AMPHIBOLITIC RAW MATERIAL OF STONE TOOLS FROM THREE NEOLITHIC EXCAVATION SITES NEAR GEITHAIN (SAXONY, GERMANY)

Ludwig Zschornack[1,2,*], Jan-Michael Lange[2], Harald Stäuble[3], Christoph Steinmann[3]

[1] Universität Leipzig, Institut für Geophysik und Geologie, Talstraße 35a, D-04103 Leipzig
[2] Senckenberg Naturhistorische Sammlungen Dresden, Sektion Petrographie, Königsbrücker Landstraße 159, D-01109 Dresden
[3] Landesamt für Archäologie, Zur Wetterwarte 7, D-01109 Dresden
[*] ludwig.zschornack@gmx.de

Archaeometric analysis of stone tools is one of the common ways to interpret interactions between Neolithic people and their environment. Previous research for different regions in Germany showed that there is a predominant appearance of stone tools made of amphibolitic or similar raw material during the Neolithic period (e.g. Schwarz-Mackensen & Schneider 1983, 1986). The main problem is that in most cases the provenance of these raw materials is still unknown.

The discovery of the Neolithic quarrying complex in Jistebsko (Czech Republic; Prostředník et al. 2005), the work from Ramminger (2007) and Christensen et al. (2006) seems to have solved problems about the provenance of raw material for artefacts from several neolithic sites in Germany.

However, there is still only a fragmentary knowledge about the provenance of amphibolitic stone tools discovered in Saxony. For this reason we studied 20 stone tools, predominantly polished stone axes, from three Neolithic settlements near Geithain which were excavated in 2006 and 2007. The settlements includes traces of three different Neolithic periods (Early Neoltihic periods of LBK c. 5,200 B.C. and SBK c. 4,800 B.C.; Middle Neolithic Age c. 4,200 B.C. and 3,800 B.C.).

To determine the rock characteristics and the provenance of the raw materials thin sections, SEM/EDX and XRD have been used. As a result a high number of artefacts (95%) were made of amphibolitic rocks. Most of them can be described as variations of a fine-grained hornblende-(actinolithe-) plagioclase-hornfels. The thin sections show a predominant nephritic texture with a „felted" appearance of needle-shaped amphibols with hornblendic or actinolithic composition. The subordinate plagioclase is characterized by an intermediate to alkaline chemistry. A large amount (>5%) of opaque phases mainly ilmenite is characteristic. Further minerals are quartz, biotite and pyrite.

The search for similar rocks was focused on outcrops in the surrounding area of the excavation sites (within 45 km), such as the Sächsische Granulitgebirge or the Erzgebirge. We also took samples from the Neolithic quarrying complex from Jistebsko, approximately 170 km away from the archaeological sites.

The analysis of the thin sections revealed a positive correlation between the most artefacts and the samples from Jistebsko. In some cases this can be verified by geochemical matches in main and minor elements. This lead to the conclusion that the majority of sampled artefacts were made of raw material from Jistebsko or at least a similar material.

The quality of the raw material sought for the production of polished stone axes seems to have been most important. It resulted in a long-distance transport and exchange network more than 7.000 years ago.

Further aims in the interdisciplinary research should indicate possible differences in stone quality compared to the local amphibolite sources. The choice of raw material could have had cultural reasons, if there are no significant differences.

References

Christensen, A.-M. et al. (2006) Applied Geochemistry 21: 1635-1655;

Prostředník, J. et al. (2005) Archeologické rozhledy LVII: 477-492;

Ramminger, B. (2007) Internationale Archäologie 102: 1-653;

Schwarz-Mackensen, G., Schneider, W. (1983) Archäol. Korrespondenzblatt 13: 305-314;

Schwarz-Mackensen, G., Schneider, W. (1986) Archäol. Korrespondenzblatt 16: 29-44

LIST OF PARTICIPANTS

Last name	First name	Affiliation	E-mail
Bebermeier	Wiebke	Freie Universität Berlin	wbeberm@geog.fu-berlin.de
Berg-Hobohm	Stefanie	Bayrisches Landesamt für Denkmalpflege	Stefanie.Berg-Hobohm@blfd.bayern.de
Besler	Helga	Universität zu Köln	
Boháčová	Ivana	Archaeological Institute of the Czech Academy of Sciences, Prague, v.v.i.	bohacova@arup.cas.cz
Borowski	Michał	Universität Wrocław, Polen	michal.borowski@ing.uni.wroc.pl
Brestrich	Wolfgang	Landesamt für Archäologie, Dresden	Wolfgang.Brestrich@archsax.smwk.sachsen.de
Bretzke	Knut	Eberhard-Karls-Universität Tübingen	knut.bretzke@uni-tuebingen.de
Brockmüller	Svenja	Universität Koblenz-Landau	svenjabrockmueller@gmx.de
Brückner	Helmut	Universität Marburg	h.brueckner@staff.uni-marburg.de
Bubenzer	Olaf	Universität Heidelberg	olaf.bubenzer@geog.uni-heidelberg.de
Chudziak	Joanna	Universität Wrocław, Polen	joannachudziak@wp.pl
Conard	Nicholas	Eberhard-Karls-Universität Tübingen	nicholas.conard@uni-tuebingen.de
Dambeck	Rainer	Universtität Frankfurt Johann Wolfgang Goethe	dambeck@em.uni-frankfurt.de
Deckers	Katleen	Eberhard-Karls-Universität Tübingen	katleen.deckers@uni-tuebingen.de
Dinies	Michele	Technische Universität Berlin	Michele.Dinies@TU-Berlin.de
Dotterweich	Markus	Institut für Umweltwissenschaften, Landau	dotter@uni-landau.de
Engel	Max	Philipps-Universität Marburg	engelmax@staff.uni-marburg.de
Enters	Dirk	Niedersaechsisches Institut für historische Kuestenforschung	enters@nihk.de
Faust	Dominik	Technische Universität Dresden	dominik.faust@mailbox.tu-dresden.de
Fuchs	Markus	Universität Bayreuth	markus.fuchs@uni-bayreuth.de
Fülling	Alexander	Humboldt-Universität zu Berlin	alexander.fuelling@geo.hu-berlin.de
Gerlach	Renate	LVR - Amt für Bodendenkmalpflege im Rheinland	Renate.Gerlach@lvr.de
Göbel	Karin	Stiftung Schleswig-Holsteinische Landesmuseen	goebel@schloss-gottorf.de
Goßler	Norbert	Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum	n_gossler@hotmail.com
Gunia	Piotr	Mineralogisches Museum, Universität Wrocław, Polen	piotr.gunia@ing.uni.wroc.pl

Last name	First name	Affiliation	E-mail
Hambach	Ulrich	Universität Bayreuth	ulrich.hambach@uni-bayreuth.de
Handler	Hanna	Universität zu Köln	h.hadler@uni-koeln.de
Haubold	Fritz	Technische Universität Dresden	fritz.haubold@mailbox.tu-dresden.de
Hein	Michael	Universität Leipzig	heinmichael@gmx.net
Heydari-Guran	Saman	Institut für Ur- und Frühgeschichte und Archäologie des Mittelalters, Schloss Hohentübingen	saman.heydari@uni-tuebingen.de
Heine	Yvonne	Landesamt für Archäologie Sachsen	
Hilgers	Alexandra	Universtität zu Köln	a.hilgers@uni-koeln.de
Hipp	Sylvia	GWZO Leipzig	hipp@uni-leipzig.de
Jäger	Klaus-Dieter	Martin-Luther-Universität Halle-Wittenberg	
Jahns	Susanne	Brandenburgisches Landesamt für Denkmalpflege	susanne.jahns@bldam-brandenburg.de
Kadereit	Annette	Universität Heidelberg	annette.kadereit@geog.uni-heidelberg.de
Kelterbaum	Daniel	Universität Marburg	daniel.kelterbaum@staff.uni-marburg.de
Kinkeldey	Thomas	Brandenburgisches Landesamt für Denkmalpflege und Archäologisches Landesmuseum	t_kinkeldey@freenet.de
Klamm	Mechthild	Landesamt für Denkmalpflege und Archäologie SA	mklamm@lda.mk.sachsen-anhalt.de
Kleber	Arno	Technische Universität Dresden	arno.kleber@mailbox.tu-dresden.de
Koch	Antonia	Universität Heidelberg	antonia.koch@geog.uni-heidelberg.de
Kranz	Annegret	Universität Kiel, Ökologiezentrum	akranz@ecology.uni-kiel.de
Kreuzer	Sebastian	Universität Bayreuth	sebastian.kreutzer@uni-bayreuth.de
Lange	Jan-Michael	Senckenberg Naturhistorische Sammlungen Dresden	geolange@uni-leipzig.de
Leopold	Matthias	Technische Universität München, Wissenschaftszentrum Weihenstephan	leopold@wzw.tum.de
Liebermann	Carmen	Landesamt für Archäologie, Sachsen	carmen.liebermann@archsax.smwk.sachsen.de
Lisa	Lenka	Geological Institute Academy of Sciences of the Czech Republic, v.v.i	lisa@gli.cas.cz
Lisowska	Ewa	Universität Wrocław, Polen	ewaliskamail@gmail.com
Lorz	Carsten	Technische Universität Dresden	carsten.lorz@tu-dresden.de

Last name	First name	Affiliation	E-mail
Lungershausen	Uta	Graduiertenschule „Human Development in Landscapes“	ulungershausen@gshdl.uni-kiel.de
Mächtle	Bertil	Universität Heidelberg	bertil.maechtle@geog.uni-heidelberg.de
Mailänder	Sonja	Universität Stuttgart, Institut für Geographie	sonja.mailaender@geographie.uni-stuttgart.de
Märker	Michael	Heidelberg Academy of Sciences and Humanities +(ROCEEH) c/o University of Tübingen	michael.maerker@geographie.uni-tuebingen.de
May	Simon Matthias	Universität zu Köln	mays@uni-koeln.de
Meszner	Sascha	Technische Universität Dresden	sascha.meszner@mailbox.tu-dresden.de
Miller	Christopher	Institut für Ur- und Frühgeschichte, Eberhard-Karls-Universität Tübingen	christopher.miller@uni-tuebingen.de
Neumann	Barbara	Saarland Universität	barbara.neumann@geo.uni-saarland.de
Peters	Swetlana	Fachhochschule Osnabrück	sweta_p@web.de
Raab	Alexandra	Technische Universität München, Wissenschaftszentrum Weihenstephan	raab@wzw.tum.de
Renno	Andrea	Landesamt für Archäologie Sachsen	andrea.renno@archsax.smwk.sachsen.de
Richter	Anja	TU-Dresden, Senckenberg Naturhistorische Sammlungen Dresden	Anja.Richter2710@web.de
Schlöffel	Marlen	Freie Universität Berlin	marlen.schloeffel@fu-berlin.de
Schmidt	Ronny	Universität Leipzig	ronny.schmidt@uni-leipzig.de
Schneidhofer	Petra	Österreich	petra.schneidhofer@gmx.at
Schulz	Erhard	Universität Würzburg	erhard.schulz@mail.uni-wuerzburg.de
Siart	Christoph	Universität Heidelberg	christoph.siart@geog.uni-heidelberg.de
Stahlschmidt	Mareike	Universität Tübingen	mareike.stahlschmidt@web.de
Stebner	Lars	Universität Hamburg	Lars.Stebner@uni-hamburg.de
Steinmann	Christoph	Landesamt für Archäologie	christoph.Steinmann@archsax.smwk.sachsen.de
Stolz	Christian	Universität Mainz	c.stolz@geo.uni-mainz.de
Strobel	Michael	Landesamt für Archäologie	Michael.Strobel@archsax.smwk.sachsen.de
Suchodoletz	Hans von	Technische Universität Dresden	Hans.vonSuchodoletz@uni-bayreuth.de
Thews	Stefanie	Graduiertenschule Human Development in Landscapes, CAU Kiel	sthews@gshdl.uni-kiel.de
Thiemeyer	Heinrich	Universtität Frankfurt Johann Wolfgang Goethe	thiemeyer@em.uni-frankfurt.de

Last name	First name	Affiliation	E-mail
Tinapp	Christian		Ctinapp@t-online.de
Tolksdorf	Johann Friedrich	Philipps-Universität Marburg	Johann.Friedrich.Tolksdorf@gmx.de
Vogel	Sebastian	Deutsches Archäologisches Institut, Berlin	sv@dainst.de
Vogt	Richard	Landesamt für Archäologie	vogt-richard@t-online.de
Völkel	Jörg	Universität Regensburg	geo@wzw.tum.de
Vött	Andreas	Universität zu Köln	andreas.voett@uni-koeln.de
Werther	Lukas	Otto-Friedrich-Universität Bamberg	lukas.werther@gmx.de
Westphalen	Thomas	Landesamt für Archäologie	Thomas.Westphalen@archsax.smwk.sachsen.de
Will	Mathias	University of Exeter	mw325@exeter.ac.uk
Wolf	Daniel	Technische Universität Dresden	Daniel_Wolf@mailbox.tu-dresden.de
Wunderlich	Jürgen	Universität Frankfurt	j.wunderlich@em.uni-frankfurt.de
Wygasch	Carolin	RWTH Aachen Universität	c.wygasch@geo.rwth-aachen.de
Zeeden	Christian	Universität Bayreuth	christianzeeden@yahoo.de
Zielhofer	Christoph	Technische Universität Dresden	christoph.zielhofer@uos.de
Zschornack	Ludwig		ludwig.zschornack@gmx.de