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SOUTH OF THE SAHARA, AFRICA
»Entangled Africa« – new interdisciplinary research from Africa's east to west coast

December 2018 to December 2020

Commission for Archaeology of Non-European Cultures (KAAK)

by Johanna Sigl and Jörg Linstädter

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Cooperation partner: University of Cologne (»Learning through connecting«: Ø. Eide, E. Fäder, T. Lenssen-Erz, A. Marcic, E. Reuhl, T. Siemssen; »Necked Axes«: F. Jesse, M. Schwienbacher; »Archaeology and Palaeoecology of the Inner Congo Basin«: H.-P. Wotzka, J. Lebamba); DAI, Department for Natural Sciences (»ClimCellMed«: I. Heinrich), IT Department (iDAI.chronontology: W. Schmidle), Oriental Department (»Routes of Interaction«: I. Gerlach, K. Pfeiffer; »Connecting Foodways«: S. Wolf, P. Wolf, S. Matthews, U. Nowotnick); Westfälische Wilhelms-Universität Münster (»InterLINK«: A. Lohwasser, J. Eger, T. Karberg); Goethe University Frankfurt a. M. (»Borrowed words and shared objects«: N. Gestrich, S. Pedersen; »Lake Chad region as a crossroad«: C. Magnavita, S. Magnavita; »Cultivated Landscapes«: A. Höhn); Université de N'Djamena (»Lake Chad region as a crossroad«: Z. Dangbet); Free University Berlin (»Routes of Interaction«: B. Schütt, J. Hardt; »DeGree«: P. Hoelzmann, M. Dinies, L. Schimmel); University of Cape Town (»DeGree«: E. Razanatsoa); University of Leipzig (»Routes of Interaction«: D. Raue, C. Breninek, A. Grünberg); GFZ Potsdam (»ClimCellMed«: M. Mdawar); University of Hamburg (»Borrowed words and shared objects«: H. Schreiber, E. Morgenthal).

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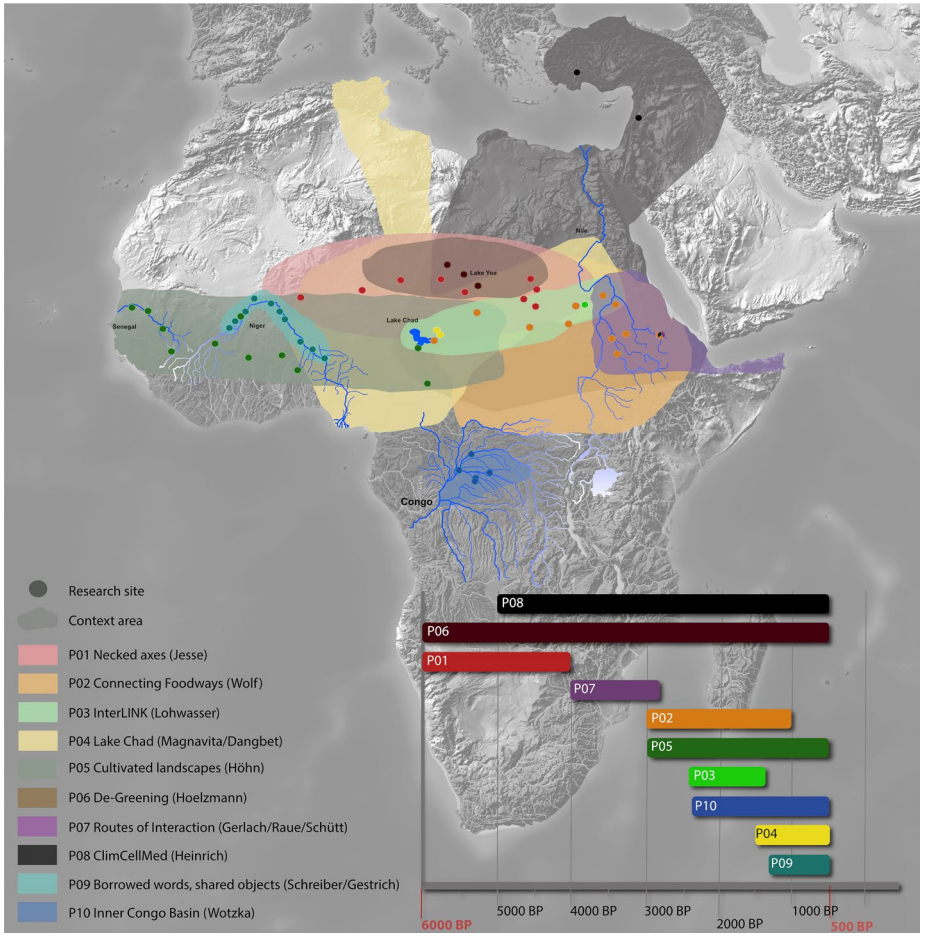
Head of the program: J. Linstädter.

Team: A.-K. Bahr, J. Linstädter, J. Sigl.

Die Geschichte des nordhemisphärischen Afrika zwischen 6000 und 500 vor heute ist von vielen politischen, sozialen und religiösen Prozessen, von großen Klima- und Umweltereignissen, von Konflikten und Migration geprägt. In der archäologischen Forschungsarbeit in Afrika wurden diese Ereignisse und Faktoren meist von außerhalb des Kontinents betrachtet, so dass es am Verständnis für innerafrikanische Prozesse mangelt. In dem von der DFG geförderten Schwerpunktprogramm »Entangled Africa« wird ein grundlegender Perspektivenwechsel angestrebt. Die interdisziplinäre Forschungsarbeit konzentriert sich auf Indikatoren, Mechanismen und Muster von Interaktion in Afrika südlich der Sahara aus innerafrikanischer Sicht.

The history of northern hemispheric Africa between 6000 and 500 BP has been subject to many political, social and religious processes, to major climate and environmental events, to conflicts and migration. The archaeological research work in Africa often took an extra-African point of view on these events and factors, thus it still lacks understanding of inner-African



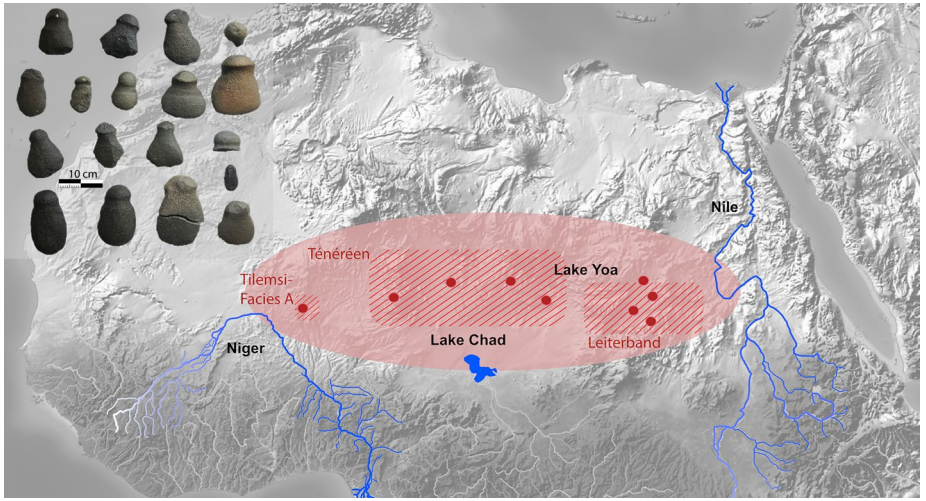
1 Africa. Research sites, context area and approximate temporal extent of the »Entangled Africa« projects. (Graphics: Johanna Sigl; Map: Michael Schmeling)

processes. In the DFG-funded priority program »Entangled Africa« a fundamental change of perspective is attempted. The interdisciplinary research work is focusing on indicators, mechanisms and patters of interaction in sub-Saharan Africa from an inner-African point of view.

Entangled Africa

1 Africa is from an archaeological point of view a hotspot for the study of human history. Many political, social and religious constellations and processes that we can observe today in the northern hemisphere of this continent have their origin in the historical development of the last 6000 years. We owe numerous cultural inspirations and innovations to the people living here, some of which have spread throughout the world. But Africa has also been affected by climate and environmental changes for millennia. They have had an impact on the economy and thus on society, they led to conflicts and major migratory movements, and to a metamorphosis of nature, people and language that continues to this day.

2 In the study of Africa, well known geographic areas and historical periods are juxtaposed with almost unknown regions and contexts. Until now, the view at the continent's history has been directed primarily from the outside, shaped by insights and ideas from studies in Europe and the Near East. In it, Africa is portrayed as a recipient of technological, political, and religious innovations. The 10 interdisciplinary research projects ↗ of the priority program (SPP) »Entangled Africa« (Fig. 1) are now working to correct this viewpoint. The focus is on intra-African interactions in the past and processes that originated on the African continent and affected neighboring regions. Under-researched areas south of the Sahara are targeted. Indicators for interaction (e.g., non-local objects or raw materials, innovative technologies), mechanisms of interaction (e.g., the types of migration, exchange, and trade), and patterns of interaction (the role of the geographic situation of a settlement, climate and environmental changes, etc.) from about 6000 to 500 BP are be examined in detail. The program is coordinated through the Commission for Archaeology of Non-European Cultures (KAAK). The



2 Africa, south-east Sahara. Main research sites Project P01 of the »Entangled Africa« program, and core distribution area of necked axes (examples at University of Cologne in top left corner; Photos: curtesy of Friederike Jesse) overlapping with find areas of archaeological materials the Leiterband, Ténéréen and Tilemsi-Facies A cultural groups. (Graphics: Johanna Sigl; Map: Michael Schmeling)

»Learning through connecting« ↗ project at the University of Cologne, in close cooperation with the »Coordination« ↗ (P12), supports the other SPP projects in sustainably securing and publishing their data according to the most up-to-date standards. Apart from the administrative management of the program, the main task of the Coordination is to ensure that the core questions of the SPP are answered and that a golden thread is tying the projects' research together.

Picking sherds

3 The study of ceramic remains is central to more than half of the currently active »Entangled Africa« projects. Ceramic vessels have been used in the past by all social classes – and they still play a major role in Africa today, for example for cooling and storing drinking water, despite the increased use of metal products. Ceramic sherds represent the most numerous find material in many excavations. Using a number of analytical methods, they allow conclusions to be drawn about dietary habits, social status, cultural identity of their former users, about relative chronological classification of finds and features in their context, and about connections between groups living at a distance.

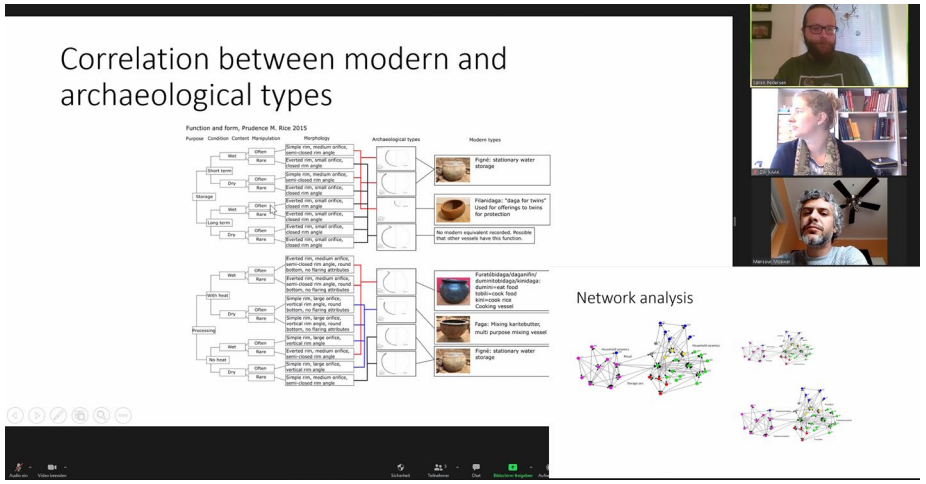
4 About 5000 to 6000 years ago, for example, people lived in the still largely green Sahara, for whom cattle played an important role, as countless rock paintings indicate. They were assigned to different cultural traditions based on the scattering of sites and the types of archaeological remains found at these. Some of these groups used stone axes, including the so-called necked axes ↗ (also known as dt. *Typ Dafur* or fr. *hache à gorge*; Fig. 2). Hatchets of this form have been found at sites throughout North Africa, but they concentrate in the south of the present-day desert between Mali and the Nile Valley (Fig. 2). The specimens whose archaeological context was preserved could be assigned, for example, to the Leiterband, Ténéréen, and Tilemsi-Facies A cultural groups on the basis of the ceramic remains found in the same context. However, neither the ceramic sherds nor the shape of the stone axes helped to reconstruct connections between these groups and other, more distant sites or groups. Friederike Jesse therefore had X-ray

3 Ethiopia, West of Yeha. View along a hollow way trodden down to the bedrock. (Photo: curtesy of Jacob Hardt)

fluorescence analyses carried out on nearly 60 pieces from the Sudan (see sites in the iDAI.gazetteer ↗ under the search term »P01«). This showed that both quite similar rocky raw material was used at sites distant from each other, and different materials were fabricated into axes at the same site. Did the former inhabitants of the slowly drying Sahara (since 5500 BP; [1]), quarry or pick these rocks at their respective habitation sites or do they indicate large-scale movement of man and/or material? These questions will require further research.

5 In the interdisciplinary project »Routes of Interaction« ↗, on the other hand, ceramics actually represent the leading indicator for the reconstruction of connections between the Ethiopian-Eritrean highlands and the Sudanese Nile valley [2]. In the Rama valley, about 30 km away from the site Yeha ↗, which is known for its spectacular architecture, ceramic sherds were found that show great similarities with pieces of the 6th–3rd millennium BP from Sudan, but no local traditions. The archaeological work is consolidated by geographical research. By means of erosion features in hollow ways (Fig. 3) and gullies, as well as by statistically determining the easiest and most direct routes, paths between the two regions are traced and explored that were probably already in use millennia ago, walked by the users of the ceramic fragments found en route.

6 Technologies, materials, and tools of pottery production, as well as ceramic types and their use, are aspects that are reflected in culturally specific terms, which evolve over time. A wide variety of ethnic groups live along the Niger River in West Africa, speaking an equally varied number of languages and dialects. Their histories between 1500 and 500 BP are in the focus of the project »Borrowed words and shared objects« ↗. Archaeologically, the team is looking for objects that link individual research sites, such as ceramic remains with certain roulette pattern. This pattern is one of the most common decorations on pottery items in the area and can be created when, for example, a twisted piece of string is rolled over the wet clay of the vessel before burning. Ceramics are still decorate with this technique today (see SPP film ↗ on the project). Terms which describe individual work steps of ceramic production, specific ceramic shapes or patterns, and tools used in



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4 Germany, Denmark, Libanon, South Africa, Egypt, virtual SPP Young Scientists Meeting. S. Pedersen presents preliminary results of his ceramic studies in the scope of Project P09 to other young researchers enrolled in the program. (Screenshots: Johanna Sigl; Slides: Søren Pedersen)

5 Left: Democratic Republic of Congo. Experimental farming of pearl millet in rainforest climate (Photo: curtesy of Hans-Peter Wotzka, Joël Bosongo Andiswa). Right: Germany, University of Cologne. Example for a vessel of the Imbonga ceramic style. (Drawing: Anja Rückmann; Photo: Johanna Sigl)

production can linguistically be traced back though centuries. The archaeological, ethnological and linguistic data is processed with the Correlation and Dynamic Social Network Analyses (Fig. 4). An algorithm calculates the probability of connections between different sites and cultural groups – and displays their change over time. These statistical values reflect real contacts and exchanges between cultural and ethnic groups in the past. Which role the Niger River played in these processes is a question that needs yet to be answered.

Water and bread

7 Water bodies can function as borders and bridges, they are essential for survival and are integrated into cultic or religious ideas and practices of many cultures. Even when they dry up or are only present for a limited time, people, animals and plants are drawn to their banks. Former river courses, for example, are used as connecting routes. Life at the water's edge brings with it not least its own language, its own vocabulary, which – like the body of water itself – separates or connects people.

8 In the Congo Basin, the river's branches have always been the most usable routes through the rainforest. Along them, humans conquered this habitat. It is still unclear today where the users of the so-called »Imbonga« pottery ↗ (Fig. 5: right), the oldest ceramic style attested in the Inner Congo Basin, came from. It has been suggested that a brief dry spell enabled their migration to this area. Remains of pearl millet (*Pennisetum glaucum*) found in the archaeological context were cited as evidence. The millet is considered a savanna plant and is not cultivated in the rainforest today. However, Hans-Peter Wotzka and his colleagues were able to show that pearl millet does thrive in rainforest climates [3] (Fig. 5: left). Now they are using a combination of archaeological and natural scientific methods to search for the actual background of the settlement of the Inner Congo Basin ↗ (see also SPP film ↗ »Entangled Africa«).

9 *Pennisetum glaucum* and *Sorghum bicolor* are examples for Africa's contribution to world food. Sorghum (Fig. 6: left) was domesticated in eastern Sudan as early as the 6th/5th millenium BP and subsequently spread west and

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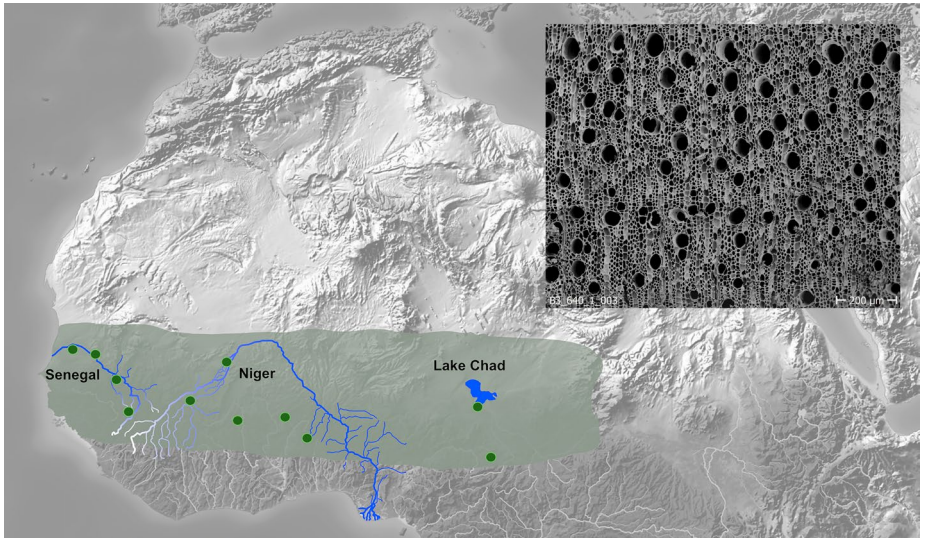

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6 Sudan, near Musawwarat es-Sufra. Left: Grinding flour from Sorghum millet with grinding tools which are shaped and used in similar fashion since many thousand years. Right: Flat bread made from Sorghum dough baked on a metal plate. (Photos from filming material: curtesy of Ulrike Nowotnick, Steven Matthews)

7 West Africa, Chad, Mege. Main sampling sites for charcoal examination in the scope of Project P05, and (top right) SEM image of cross section of a charcoal fragment of type RUBIACEAE I & II. (Photo: curtesy of Alexa Höhn; Graphics: Johanna Sigl; Map: Michael Schmeling)

north. Probably in close association with the cereal ceramic baking plates, on which a Sorghum-based flatbread was made, were distributed. Similar ceramic plates were still in use in Sudan a few generations ago, until they were replaced by metal plates (see SPP film ↗ on the »Connecting foodways« project; Fig. 6: right). This typical Sahelian food and the associated baking traditions in the Middle Nile Valley met with emmer and barley-based dietary and cult customs, which had been introduced from Egypt and the Mediterranean. In places like Meroe ↗, they blended, at least in cultic use, to form a modified tradition that combined the African food with the Egyptian custom of baking breads in moulds [4]. The »Connecting Foodways« ↗ project is now searching for similar examples for the spread of everyday traditions. In particular, the focus is on connecting the Middle Nile Valley to the south, the Ethiopian-Eritrean highlands, and west to the Lake Chad area.

Wooden history

10 With the cultivation of crops, man has changed his environment permanently – and still does today. The retreat of the water level of the former Mega Chad Lake from about 4000 BP exposed new land, which was intensively used as settlement land, for agriculture and keeping livestock. The flood plains in the area around the site Mege ↗ (see other research sites in the iDAI.gazetteer ↗ under the search term »P05«), which were once seasonally supplied with nutrient-rich sediments by the flooding of the lake, were used, among other things, for the extraction of firewood. Charcoal remains from this area examined by Alexa Höhn [5] (Fig. 7; project »Cultivated Landscapes« ↗) suggest that a ›parkland‹ landscape with alternating fallow areas and generously spaced tree cover had not developed here at the end of the 1st millennium BP as it did elsewhere in West Africa. Instead, the naturally existing vegetation was used for more than 2000 years, apparently without over-exploiting it. Only in the last 500 years large parts of the dense tree vegetation were lost forever. Whether this loss was already preceded by a thinning of the vegetation due to restricted field and pasture management cannot be told from the charcoal finds.

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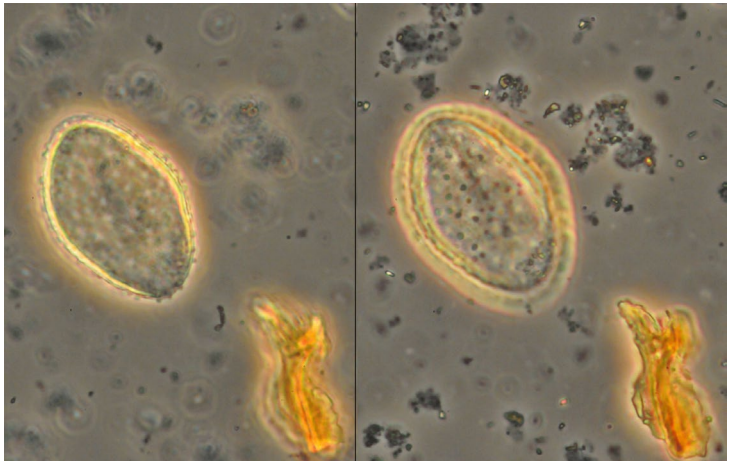

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8 Libanon, near Beirut. Mansour Mdawar is sampling juniper trees for dendrochronological analysis in the scope of Project P08. (Photo: curtesy of Serge Karam)

9 Chad, Ounianga area. Doum palm pollen (Hyphaene/Borassus-type; 400 x magnification) from an approximately 1000-year-old sediment sample from Lake Teli in various focal planes. (Photo: curtesy of Michèle Dinies)

11 Woody plants are important archives for environmental conditions – and for time. Dendrochronology is a method that has long been used in archaeological research. In large parts of Africa, however, climatic conditions prevail under which trees do not form annual rings in the same way as they do in e.g. Europe. Nevertheless, some woody plants show seasonal ring patterns (e.g., the baobab) [6]. These are difficult to detect and are due to factors such as water availability. Confocal laser scanning microscopy can reveal minute differences in the cell structure of woody plants. In the »ClimCellMed« ↗ project, juniper wood (Fig. 8), an important building material locally available in both North Africa and the eastern Mediterranean, is being studied using this method. The results should provide chronological data that will assist dating for research sites such as Yeha ↗ in Ethiopia, where juniper wood was extensively used. In addition, when combined with the results of other projects, such as »DeGree« ↗, it may be possible to reconstruct a comprehensive local-specific as well as overarching climatic history of the eastern Sahara with high temporal resolution.

People in the Sahara

12 Climate change is a highly topical issue, but it has been affecting human, animal, and plant life for millennia. As the Sahara dried up (from about 5500–2700 BP) [7], creatures that depended on water year-round, including the groups that used the so-called necked axes, had to retreat to shrinking favourable areas – groundwater oases and lakeshores, river courses, and mountainous regions. It is surprising to observe that some of these oases were used less intensively than their capacity allowed. In the scope of the »DeGree« ↗ project amongst other a sediment core from Lake Yoa, a remnant of a once much larger lake system in the Ounianga ↗ area of northeastern Chad, is studied. Pollen deposited in the sediments provides proof for the vegetation changing from savanna to full desert. Compared to other oases in the Sahara and the Arabian Peninsula, the influence of humans in the local vegetation becomes visible only late. For a long time, native fruit trees such as jujube (*Ziziphus sp.*) and doum palm (Fig. 9) were used instead of the cultivation of already widespread imported crops such as grapevine and date

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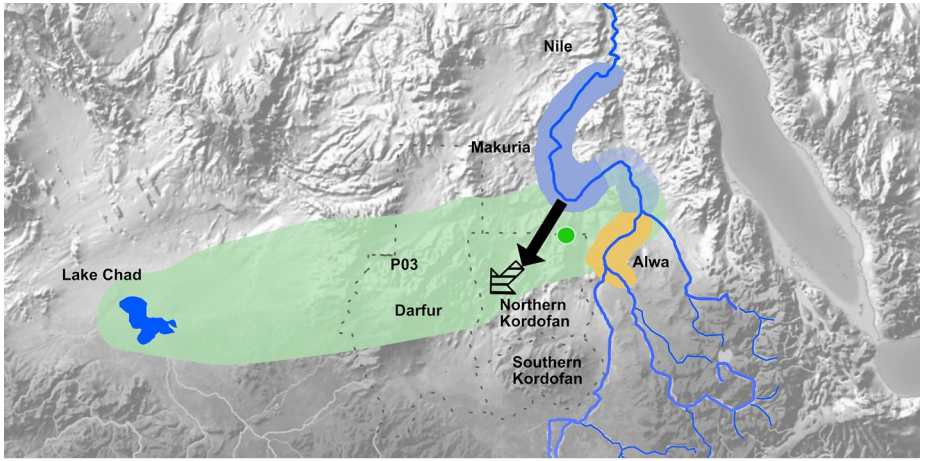

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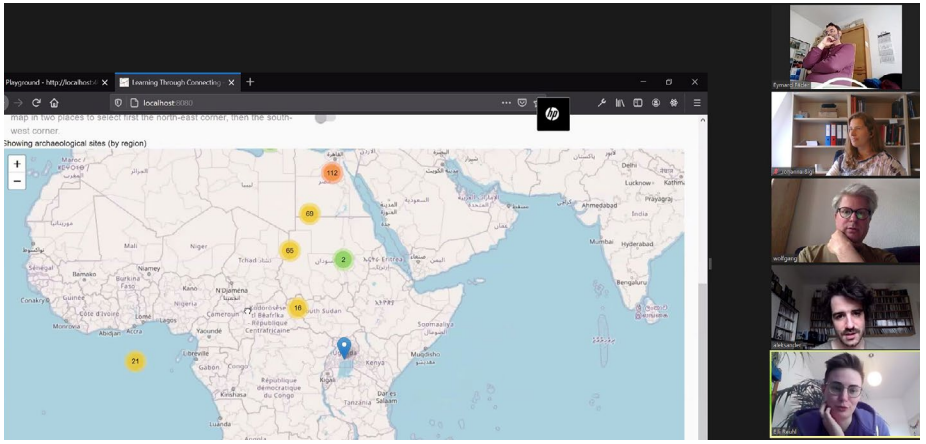
10 Chad, Tié. Excavating fired brick structures in the savanna east of Lake Chad. (Photo: curtesy of Carlos Magnavita)

11 Sudan, Kordofan. The connection of the Middle Nile Valley Kingdom of Makuria (and Alwa) with nomadic groups roaming as far as the outskirts of the Zankor curlture's territory is attested by so-called box graves, which are typical Christian burials. (Graphics: Johanna Sigl; Map: Michael Schmeling)

palm. Only about 1000 years ago agriculture switched from the use of native fruit trees to intensive cultivation of non-native date palm (see the presentation by Michèle Dinies ↗ at the Ground Check Conference of ArcHerNet). In comparison with the results of other projects of the SPP, it may be possible to determine the background of this unusual use history of the Lake Yoa area.

13 One reason behind the late introduction of non-native plant species at Lake Yoa could be the missing or less frequented connection of the oasis to the network of routes spanning the desert. In the 12th–7th centuries BP the kingdom/sultanate of Kanem-Borno may have been situated at the junction of one strand of this network [8]. The palace or administrative center of Tié ↗ (Fig. 10) in the savanna east of Lake Chad is considered the oldest known monumental building between the Nile Valley and the Niger. The firebrick architecture, together with historical written sources, indicates that Tié may have been the former capital of the kingdom. Glass beads, copper objects, and iron nails were found on site and probably represent imported goods, some of which came from as far away as the Indian Ocean.

14 A connecting route between Chad, the Nile Valley, and the east coast of Africa may have passed through northern Kordofan (including the »Wadi Milik« ↗) in Sudan. Several archaeological sites have been discovered in the area of the table mountain Jebel el-Ain a few years ago [9]. With the help of remote sensing, the »InterLINK« ↗ project has now been able to locate numerous other sites in the vicinity [10]. Among these are structures that have clear parallels to features from the Middle Nile Valley, e.g., water retention basins known as hafirs, which are known from Meroitic contexts (ca. 2300–1650 BP) on the Nile and as far south as the Butana ↗. Moreover, via a synopsis of archaeological evidence, textual sources, and historical maps, the spread of Christianity by nomadic groups can be traced well into the Kordofan [11] (Fig. 11). However, the religion was not adopted by the Zankor culture living in the central area of this Sudanese state and, it was not passed on to people inhabiting the shores of Lake Chad. So how exactly northern Kordofan ties into the network of far reaching desert routes and what



12 Germany, Bonn, Cologne, Berlin. Virtual meeting of the members of the two SPP structural projects and the Scientific IT of the DAI to discuss the functions of the »Entangled Africa Data Explorer«. (Screenshot: Johanna Sigl; Presentation: Elli Reuhl)

other »goods« were exchanged through this area remains to be determined.

Laying the foundations

15 Whether through ceramics, botanical data or statistical methods, whether through the proximity to water bodies, the connecting link desert or agriculture in the Sahel – despite their wide temporal and geographical dispersion, the research efforts of the »Entangled Africa« projects overlap in several methodological and thematic aspects (Fig. 1). Guided by the Coordination project and supported by the commitment of the scientists of the program, specific questions on these coherences will be answered in the next years. On the one hand, various web services of the iDAI.world ↗ will serve as a basis for this endeavor. A cooperative effort between the Coordination, the project »Learning through connecting« (P11) and the scientific information technology of the DAI is currently made to further develop and link these web services. iDAI.chronontology ↗ can be used, for example, to juxtapose cultural, political, find-, or climate-based time periods in a certain research region, to enter the current discourse of their definition, and to illustrate their geographical relevance. For the »Entangled Africa« program's research this web service offers the possibility to illustrate how the terms known from written scientific discourse relate to each other, and thus possibly the diverse groups of historic people. To enable queries targeting not one, but several of the iDAI.world applications simultaneously, such as the temporal and spatial distribution of certain plant species and objects plus the related time phases, the »Entangled Africa Data Explorer« is currently being developed by members of project P11 (Fig. 12).

16 On the other hand, the specialists for this ceramic material working in the program agreed on a synthesis of both recording principles and descriptive vocabulary of form, decoration, raw material and other identification features of vessels, with the aim to achieve a SPP-wide comparability of pottery finds. This effort is to be reflected in a common data collection, which can be queried e.g. for statistical evaluations. The raw data may also be sustainably stored and published via iDAI.world.

17 All of the above sketched research work is based on the intensive exchange between the scientists of the SPP, coordinated through both the KAAK as well as the scientists themselves, and on the work of the junior staff in the program (see various reports on the SPP blog page ↗; Fig. 4).

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Authors
Dr. Johanna Sigl
Deutsches Archäologisches Institut, Kommission für Archäologie Außereuropäischer Kulturen (KAAK)
Dürenstraße 35–37
53173 Bonn
Deutschland
Johanna.Sigl@dainst.de
ORCID-iD: https://orcid.org/0000-0002-0752-155X
GND: http://d-nb.info/gnd/10114610-3

PD Dr. Jörg Linstädter
Deutsches Archäologisches Institut, Kommission für Archäologie Außereuropäischer Kulturen (KAAK)
Dürenstraße 35–37
53173 Bonn
Deutschland
Joerg.Linstaedter@dainst.de
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