Investigating the 1930s Kohl-Larsen collection from the Lake Eyasi Basin, Tanzania

Neue Forschungen an der aus den 1930er Jahren stammenden Sammlung Kohl-Larsen aus dem Becken des Eyasi-Sees, Tansania

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ABSTRACT

Since more than 80 years, the University of Tübingen hosts the archaeological collections excavated by Margit and Ludwig Kohl-Larsen between 1934 and 1939 in modern-day Tanzania. Despite the great scientific relevance of these collections, most of them were never published on an international scale and were thus unavailable for the broader Africanist archaeological community. In the light of new excavations around Lake Eyasi, conducted jointly by the Universities of Dar es Salaam and Tübingen and the Senckenberg Gesellschaft für Naturforschung, we decided to undertake a new inventory of the Kohl-Larsen collection, to analyze the assemblages using state of the art methods, link them with new excavation data and make them internationally available. As a first step, here we want to introduce the project by reporting on some preliminary observations from Njarasa Cave. Ultimately this research will help to create a coherent reconstruction of human cultural change and behavioral adaptions over the last ~200.000 years in this important archaeological landscape.

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Keywords: Tanzania, Njarasa Cave, Middle Stone Age, Later Stone Age, research project, Kohl-Larsen collection

Zusammenfassung

Seit mehr als 80 Jahren beherbergt die Universität Tübingen die archäologische Sammlung des Forscherehepaars Margit und Ludwig Kohl-Larsen. Die Kohl-Larsens führten zwischen 1934 und 1939 zahlreiche Ausgrabungen um den Eyasi-See im heutigen Tansania durch. Trotz des zweifellos hohen wissenschaftlichen Werts dieser Sammlung gingen die meisten Inventare daraus nie in international ausgerichtete Publikationen ein und blieben somit der Mehrheit der in Afrika forschenden Archäologen unzugänglich. Im Zuge neuer gemeinsamer Ausgrabungen um den Eyasi-See durch die Universitäten von Dar es Salaam und Tübingen sowie die Senckenberg Gesellschaft für Naturforschung lag es nahe, die Kohl-Larsen Sammlung von Grund auf neu zu inventarisieren, die archäologischen Inventare mittels moderner analytischer Verfahren auszuwerten und diese unter Einbezug der Resultate aus den neuen Ausgrabungen der internationalen Fachwelt zugänglich zu machen. An dieser Stelle soll zum einen das Projekt vorgestellt werden, zum anderen legen wir einige vorläufige Ergebnisse über die Njarasa Höhle vor. Das hier vorgestellte Forschungsprojekt wird dabei helfen, ein kohärentes Bild zu Kulturwandel und Verhaltensanpassungen früher Menschen in dieser wichtigen archäologischen Landschaft über die letzten 200.000 Jahre zu erlangen.

Schlagwörter: Tansania, Njarasa Höhle, Middle Stone Age, Later Stone Age, Forschungsprojekt, Sammlung Kohl-Larsen

Introduction

Ludwig and Margit Kohl-Larsen (Fig. 1) were researchers conducting archaeological and ethnographic fieldwork in and around the Lake Eyasi basin in Tanzania between 1934 and 1939. Ludwig, a German doctor by profession, was originally driven by a major ethnographic interest in the indigenous Hadza people, while his wife Margit from Norway was in charge of most of the archaeological excavations.

The most famous archaeological project led by the Kohl-Larsens was Mumba Cave. The site yielded one of the longest stratigraphic records in East Africa, spanning from the Middle Stone Age (MSA) to the Neolithic/Iron Age (Mehlman 1979; Prendergast et al. 2007; Bushozi et al. 2020). Most of the other sites excavated by the Kohl-Larsens, such as Njarasa Höhle (Njarasa Cave) or Straußenhöhle (Ostrich Cave), never gained attention beyond German-speaking countries. This was mainly due to Ludwig Kohl-Larsen publishing his opus magnum *Auf den Spuren des Vormenschen* (1943) in German, which was never translated into English. In the 1980s, Hansjürgen Müller-Beck, the former director of the Institut für Urgeschichte at the University of Tübingen, conducted a detailed review of the excavation history and published on several of the assemblages collected by the Kohl-Larsens (Müller-Beck 1978, 1981, 1985) all of them curated at the University of Tübingen until today. The results of this


Fig. 1: Ludwig (left) and Margit (right) Kohl-Larsen (photos: archive of the Department of Early Prehistory and Quaternary Ecology, University of Tübingen).

Abb. 1: Ludwig (links) und Margit (rechts) Kohl-Larsen (Fotos: Archiv der Abteilung Ältere Urgeschichte und Quartärökologie, Universität Tübingen).

work culminated in another monograph that was, with the exception of the fossil human remains (Müller-Beck 1981), again published in German. Although Rafalski et al. in 1987 published some of the assemblages also in English, and thus the majority of Africanist archaeologists may have heard about the many sites excavated by the Kohl-Larsens, only little information on the archaeological assemblages is available to the non-German-speaking scientific community. This is an unfortunate situation, especially since the Lake Eyasi basin, due to the high site density, holds the potential to contextualize debated research questions about human behavioral adaptations and the tempo and mode of cultural change in the MSA and Later Stone Age (LSA). Unlike one might expect from an excavation done in the 1930s, Margit Kohl-Larsen excavated the sites by following natural stratigraphic units, which were further subdivided into artificial subunits of between 10 and 20 cm thickness. She also took sediment samples from each stratigraphic unit and surface casts of the stratigraphic profiles conserved in resins. During fieldwork, the team sieved excavated sediments and labeled artifacts with corresponding stratigraphic information. Thus, even after more than 80 years since its excavation, the Kohl-Larsen collection provides substantial research potential.

Objectives

In 2018, the Volkswagen (VW) foundation awarded a research grant to Pastory Bushozi from the University of Dar es Salaam that included Nicholas Conard and Gregor Bader from the University of Tübingen as collaborative research partners. The project entitled "Evolving Human Minds" was extended in 2020 and generally aims to understand the rich archaeological landscape in the Lake Eyasi basin through renewed archaeological fieldwork. In the course of this project, we decided to create a new inventory of the Kohl-Larsen collection in Tübingen in order to test its potential to support the ongoing VW project with supplementary archaeological information. This project is funded by the Senckenberg Gesellschaft für Naturforschung and the University of Tübingen. Over the coming two years, we are planning to reanalyze the archaeological collections using different analytical methods including lithic

technology, use wear analysis, petrography and zooarchaeology. We plan to publish our results in English and in international open access scientific journals. This project will take place in collaboration with students and researchers from Germany and Tanzania. As a first step, we started by assessing the size, integrity and research potential of the archaeological samples from different sites excavated by the Kohl-Larsens and curated them at the University of Tübingen. As many of the assemblages were recovered from stratified MSA and LSA sites, the collection offers large potential to improve the regional cultural and chronological framework in East Africa, where much archaeological information rests on unstratified open air sites (see Tryon and Faith 2013).

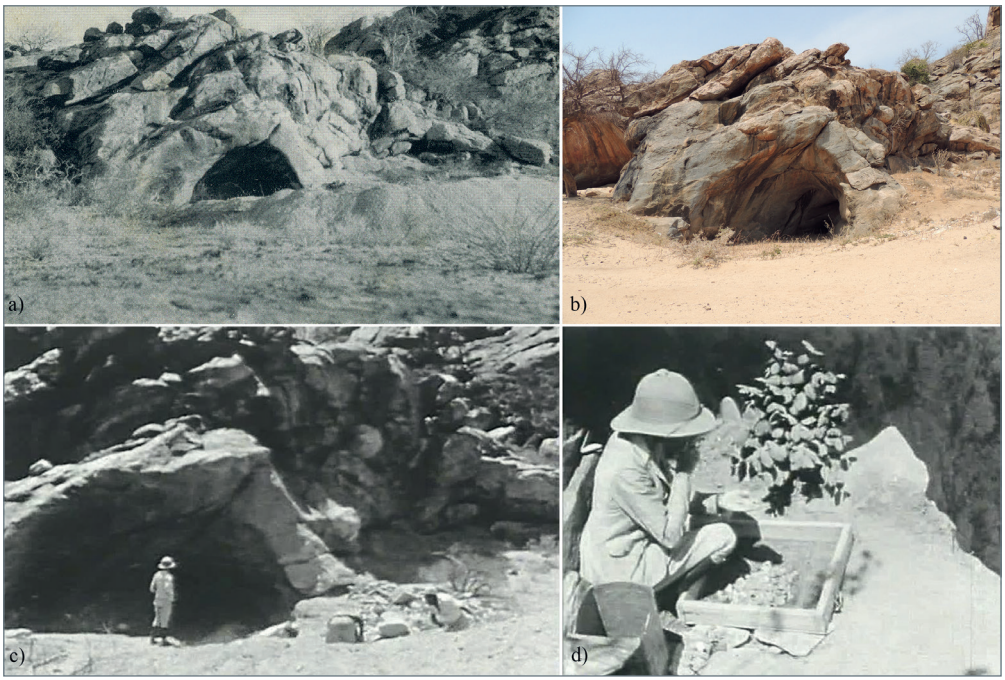


Fig. 2: a) Njarasa Cave with backdirt in front of the site 1935; modified after Kohl-Larsen (1943),
b) Njarasa cave in 2018,
c) Margit Kohl-Larsen next to the trench in front of Njarasa cave in 1935,
d) Margit Kohl-Larsen sorting sieved sediment during excavations at Mumba Cave.
(photos: 2c, 2d: archive of the Department of Early Prehistory and Quaternary Ecology, University of Tübingen, 2b: G. Bader).

Abb. 2: a) Die Njarasa-Höhle mit ausgehobenem Sediment davor im Jahre 1935; verändert nach Kohl-Larsen (1943), b) Die Njarasa-Höhle im Jahre 2018, c) Margit Kohl-Larsen neben dem Grabungsschnitt vor der Njarasa-Höhle im Jahre 1935, d) Margit Kohl-Larsen beim Aussortieren gesiebter Sedimente während der Ausgrabungen an der Mumba-Höhle.
(Fotos: 2c, 2d: Archiv der Abteilung Ältere Urgeschichte und Quartärökologie, Universität Tübingen, 2b: G. Bader).

Preliminary results

In the context of establishing a computer-based inventory of the Kohl-Larsen collection, we identified assemblages from 15 archaeological sites discovered by the Kohl-Larsens. The absolute count of the number of objects is not complete yet but is estimated to amount to over 200.000 pieces. Most of them are lithic artifacts and faunal remains as well as pigments, pottery, ostrich eggshell and soil samples. Three of the assemblages were considered to provide the highest research potential. These sites are Njarasa Cave, Ostrich Cave and Mumba Cave. The latter is subject to a monograph in preparation (Bretzke and Conard in prep.; see also Bretzke et al. 2006; Marks and Conard 2008). We decided to start this project with Njarasa Cave.

Njarasa Cave – stratigraphy

The site (Fig. 2) is located only 40 m north-east of Mumba and belongs to the same granite outcrop, the "Mumba Hügel" (Kohl-Larsen 1943). Margit Kohl-Larsen excavated the site between October 1935 and January 1936 (Kohl-Larsen 1943). Six archaeological units were defined from top to bottom, subdivided into further subunits. The excavations reached bedrock after ~7–8 m (Fig. 3). Below the surface layer I, which was a gray dust only 1–2 cm thick without any finds, layer II was described by Kohl-Larsen as orange sediment containing several stone artifacts, pottery and well-preserved faunal remains. Layer III at Njarasa Cave contained lithic artifacts, faunal remains and pottery. Layer IV can best be described as rockfall with numerous large, angular and also rounded stones. Kohl-Larsen mentions that all stones in this layer were covered with a whitish-gray crust as a possible result of percolating water. A similar layer was identified at Mumba both by Prendergast et al. (2007) (Level II-3) and our team. No artifacts from layer IV are mentioned and we found none during the inventory of the collection in Tübingen.

The underlying layer V could be further subdivided into three subunits, V1, V2 and V3 based on information provided on the old find tags and the Kohl-Larsen publication from 1943. Layer V1 at the top and V3 at the bottom were of whitish color, while V2 in between was gray (Fig. 3). Apart from numerous lithic artifacts and many faunal remains, several potential hearths where identified in this unit. Layer VI below was subdivided into VI1 and VI2. The sediment of the deeper unit was darker and siltier compared to the sandy, yellow matrix of VI1.

As the end of their first expedition was coming closer, the Kohl-Larsens were not able to excavate the entire cave. Layer VI was excavated down to bedrock only in a small test-trench and according to the profile drawing (Fig. 3), remnants of layer V may likewise still be preserved.

Njarasa Cave – dating

For our analysis of the Njarasa assemblages, we decided to start with layer III and V in order to get comparative information from the LSA (layer III) and MSA (layer V). We selected five bones from both layers for C14 dating. Unfortunately, none of them contained enough collagen to provide any results (MAMS-46631 – 46635). Based on this outcome, we are currently

assessing other possibilities such as ESR dating on herbivore teeth with attached sediments. This being said, the nature and succession of the upper four stratigraphic units at Njarasa closely resemble the stratigraphy from nearby Mumba Cave. The orange layer II at Njarasa was also identified at the top of Mumba Cave by Prendergast and colleagues (2007) as level II-1 and dated to 398 ± 86 cal BP (OS-61330). During the new excavations at Mumba Cave by P. Bushozi, N. Conard and G. Bader since 2017, the same orange layer was identified. Furthermore, in Mumba Level III-2, which is overlying the rockfall Level III-3, a Kansyore potsherd was directly dated using radiocarbon to 4190 ± 20 BP, respectively 4825–4574 cal BP (ISGS-A2413) (Prendergast et al. 2014). Kohl-Larsen (1943) mentions several "decorated" sherd fragments in layer III at Njarasa which might be of Kansyore type. Although we could not find these decorated sherds in the collection (only several highly fragmented, undiagnostic pieces), the stratigraphic situation of layer III in between the orange sediment of layer II

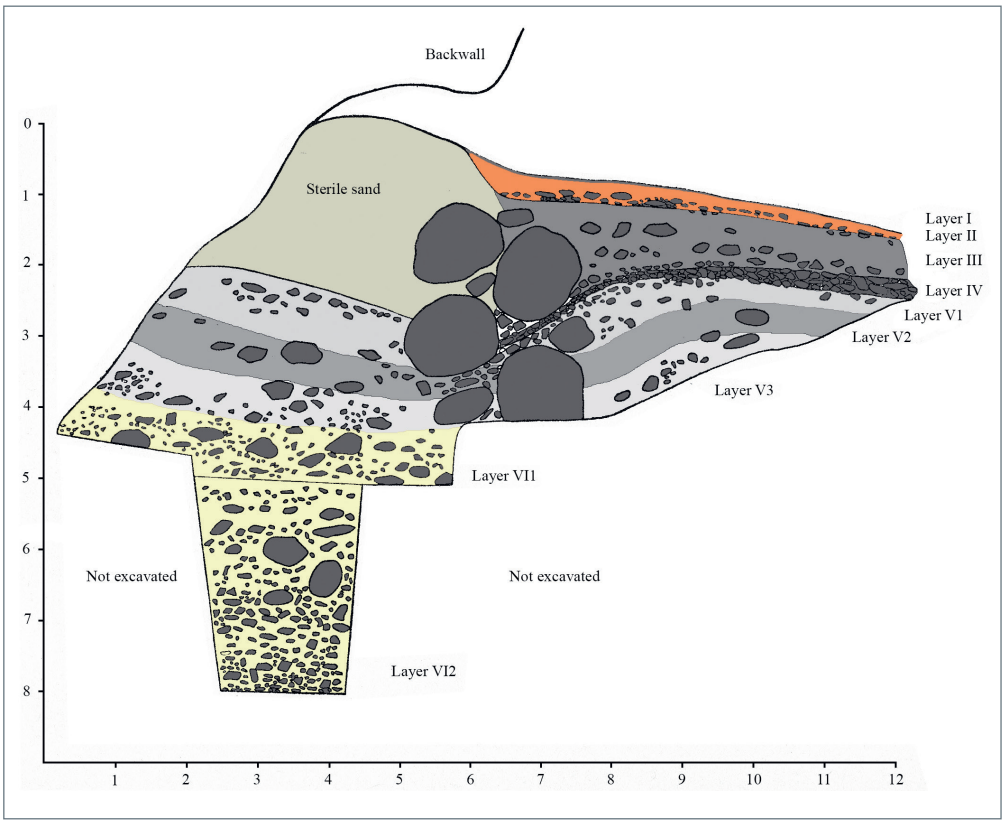


Fig. 3: Stratigraphy of Njarasa Cave; modified after Kohl-Larsen (1943).

Abb. 3: Stratigraphie der Njarasa-Höhle; verändert nach Kohl-Larsen (1943).

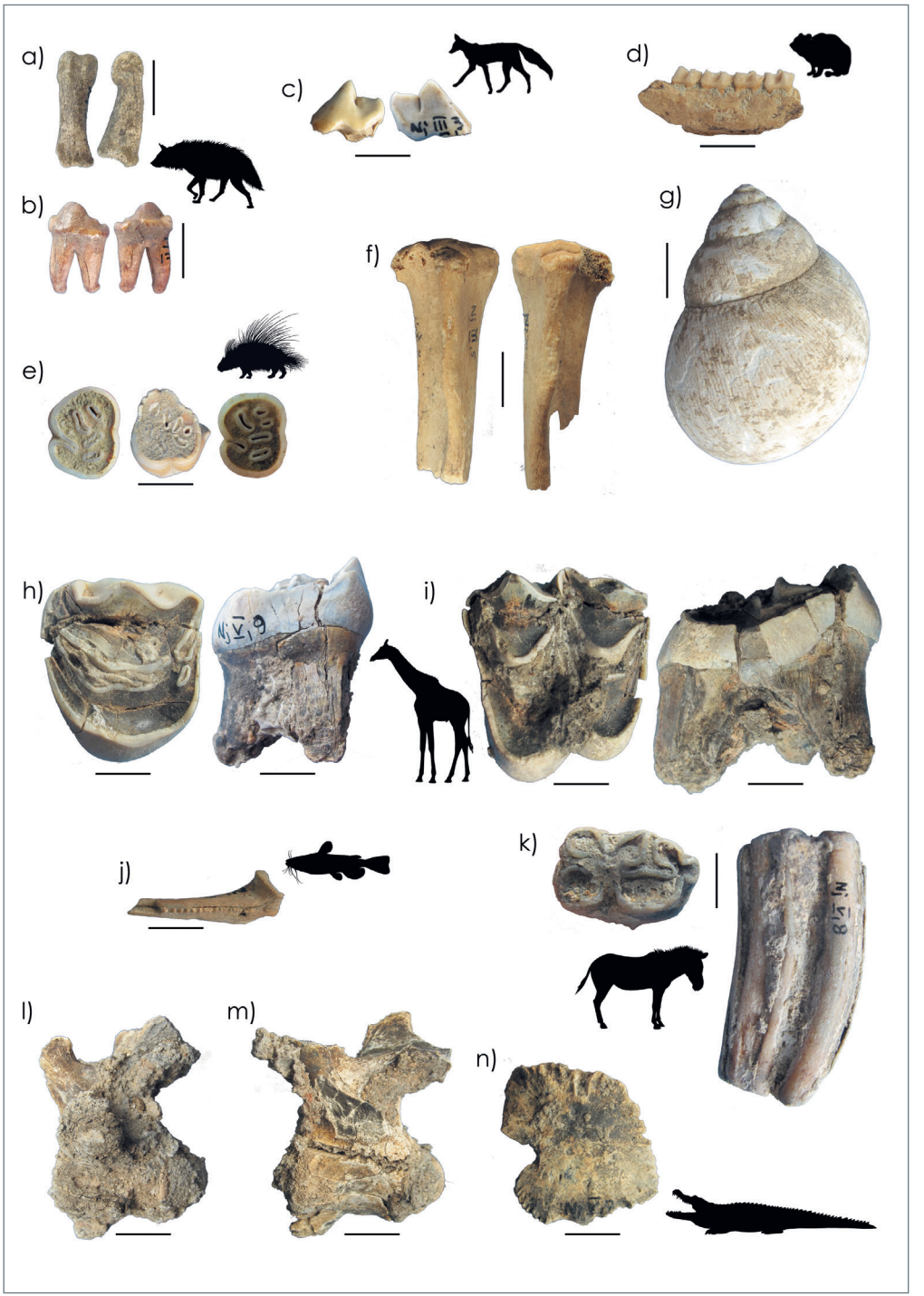
(similar to Level II-1 at Mumba) and a massive rockfall with a thick crust on the stones (similar to Level III-3 at Mumba) might indicate a similar age like Level III-2 at Mumba, falling roughly in the 5th millennium BP. The layers V and VI underneath the rockfall have not yet yielded absolute dates. Our analysis of the lithic material is still in progress but from our initial observations we can firmly state that both layers belong to the East African MSA. This assessment matches with Kohl-Larsen's (1943) observation that the assemblage shows broad similarities to the European Mousterian. Based on the fact that sediments are still left in situ from layer VI and probably also layer V, we plan to reopen the old Kohl-Larsen trench at Njasara in the coming field season in order to verify the stratigraphy, excavate a small control sample of artifacts and to gain absolute ages from Optically Stimulated Luminescence (OSL) dating.

Njarasa Cave – lithic artifacs

At the current stage, the lithic analysis of layer V and III is still in progress, but some preliminary findings are presented here. In both assemblages, most artifacts are made of hydrothermal quartz (Fig. 4.1), which is available in large quantities directly at the site in the form of large angular blocks. This raw material is also the most abundant lithic material at Mumba. Apart from this rock type we observed a large variability in different cherts (Fig. 4.4–8) and very few pieces of obsidian. Among the cherts are metasomatic sedimentary cherts from the Great Rift lakes and hydrothermal cherts formed in volcanic suites which are suitable for provenience tracing. The potential implications for our understanding of long-distance movements and territorial effects in the MSA and LSA of East Africa are obvious.

Fig. 4: Selection of different raw materials from layer III and V at Njarasa. 1) Quartz, 2) Basalt, 3) Rose quartz, 4–8) different variations of chert to be further investigated.

Abb. 4: Auswahl verschiedener Rohmaterialien aus Schicht III und V der Njarasa Höhle. 1) Quarz, 2) Basalt, 3) Rosenquarz, 4–8) verschiedene noch weiter zu untersuchende Silexvarietäten.


a)
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The MSA assemblage from layer V is dominated by flakes with very little evidence of secondary modification. At least three different core reduction methods – (multi-)platform, Levallois and bipolar – were observed, while the latter is less common than expected from a quartz dominated assemblage. In general, we see a decrease in artifact density from layer V3 at the bottom to layer V1 at the top. In layer III, we found a similar raw material distribution as in layer V. The artifacts are considerably smaller and typical for LSA assemblages, and we discovered several ground stone tools which are absent in layer V. Due to the presence of several microlithic bladelet cores and the absence of the corresponding bladelets, we suggest that a large quantity of the assemblage may have ended up in the backdirt of the excavation as the mesh size (probably 2 cm) was almost certainly too big to retrieve these kinds of artifacts.

Fig. 5: Faunal remains from Kohl-Larsen's excavation at Njarasa Cave.
From layer III:
a) anterior (right) and lateral (left) views of the proximal phalanx of a juvenile hyenid;
b) buccal (left) and lingual (right) views of the lower left second premolar of an hyenid;
c) buccal (left) and lingual (right) views of the right upper fourth premolar of a black-backed jackal (*Canis* cf. *mesomelas*); e) series of molars and premolars of a porcupine (*Hystrix* sp.);
f) antimeric set of tibiae of a springhare (*Pedetes surdaster*); g) shell of a giant African land snail (*Achatina sp.*).
From layer V:
d) right mandible of a hyrax (*Hyrax/Heterohyrax* sp.) with the lower second, third and fourth premolars and first molar; h) distal (left) and occlusal (right) views of the left upper third premolar of a giraffe (*Giraffa camelopardalis*); i) distal (left) and occlusal (right) views of the left upper second molar of a giraffe;
j) left pectoral spine of a catfish (*Clarias* sp.); k) buccal (left) and occlusal (right) views of the left molar or premolar of a zebra (*Equus* sp.); n) osteoderm of a crocodile (*Crocodylus niloticus*).
From layer VI:
l) and m) two lumbar vertebrae of a crocodile.
Bar scales are 1 cm.

Abb. 5: Faunenreste aus Kohl-Larsens Ausgrabung in der Njarasa Höhle.
Aus Schicht III:
a) anteriore (rechts) und laterale (links) Ansichten der proximalen Phalanx einer juvenilen Hyäne;
b) bukkale (links) und linguale (rechts) Ansichten des unteren linken zweiten Prämolaren einer Hyäne;
c) bukkale (links) und linguale (rechts) Ansichten des rechten oberen vierten Prämolaren eines Schabrackenschakals (*Canis* cf. *mesomelas*); e) Serie von Molaren und Prämolaren eines Stachelschweins (*Hystrix sp.*);
f) antimerischer Schienbeinsatz eines Springhasen (*Pedetes surdaster*); g) Schale einer afrikanischen Riesen-Landschnecke (*Achatina* sp.).
Aus Schicht V:
d) rechter Unterkiefer eines Schliefers (*Hyrax/Heterohyrax* sp.) mit den unteren zweiten, dritten und vierten Prämolaren und dem ersten Molar; h) distale (links) und okklusale (rechts) Ansichten des linken unteren dritten Prämolaren einer Giraffe (*Giraffa camelopardalis*); i) distale (links) und okklusale (rechts)
Ansichten des linken oberen zweiten Molaren einer Giraffe; j) linke Brustwirbelsäule eines Welses (*Clarias* sp.);
k) bukkale (links) und okklusale (rechts) Ansichten eines linken Molaren oder Prämolaren eine Zebras (*Equus* sp.);
n) Knochenplatte eines Krokodils (*Crocodylus niloticus*).
Aus Schicht VI:
l) und m) zwei Lendenwirbel eines Krokodils.
Die Maßstäbe sind 1 cm lang.

Njarasa Cave – faunal remains

The faunal sample from the Kohl-Larsen's excavations at Njarasa comprises ~300 remains, the majority of which are from Layer III (n=208). It includes horncore, dental and bone material, as well as tortoise and mollusk shells, scales and osteoderms (Fig. 5). The sample is biased towards identifiable (e.g., teeth and carpals/tarsals) and/or large remains. Despite the small size of the sample, the faunal spectrum is taxonomically diverse and includes gastropods, fishes, birds, reptiles and a variety of small to large mammals (Fig. 5). The ungulate remains from layers VI, V and III include large browsers (*Giraffa camelopardalis*), as well as grazers (e.g., *Equus* sp.), consistent with savanna paleohabitats. The occurrence of crocodile remains in layers VI and V documents the proximity of a large body of freshwater (Fig. 5). The preservation of the material varies from well-preserved to highly weathered, heavily water-abraded, decalcified or completely encrusted specimens. The taphonomic analysis is currently underway but a preliminary appraisal of the material suggests the action of several geogenic and biogenic processes in the accumulation as well as in the post-depositional modifications of the Njarasa faunal sample that include carnivore damage, porcupine gnawing, water transport and anthropogenic consumption.

Future perspectives

Our multidisciplinary team plans to study each material group from the different layers at Njarasa Cave in detail with modern analytical methods, including flaked lithics, ground stone tools, ochre, fauna, and also botanical remains, which might be preserved in the sediment samples. We will proceed with the same strategy at all sites in the Tübingen Kohl-Larsen collection and thus follow creditable examples of reinvestigating forgotten collections from this region such as e.g. Nasera or Kisese II (Ranhorn and Tryon 2018; Tryon et al. 2019). Students from the University of Dar es Salaam will be included into the process and be given access to the collection for the purpose of Bachelor, Master and PhD theses. Further, we hope to publish the results together with our Tanzanian partners in international scientific journals. We plan to link the results from this collection work to the new fieldwork conducted at Mumba and beyond. We also plan to re-open Njarasa Cave in the coming field season to take sediment samples for OSL dating and to revise the archaeological stratigraphy. A further goal of the project is to contextualize the results from Mumba Cave within a regional chronocultural sequence in the Lake Eyasi region. The combination of new excavations and investigations of old collections will help to create a coherent reconstruction of hominin cultural change and behavioral adaptions over the last ~200.000 years in this important archaeological landscape.

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