

BOOK OF ABSTRACTS

# West Africa AND THE *ORIGINS* OF HUMANKIND



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»» A DEEP TIME PERSPECTIVE ««



HUMAN  
PALAEO-  
SYSTEMS



MAX PLANCK INSTITUTE  
OF GEOANTHROPOLOGY



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## **MSA:LSA – New Perspectives, Old Sites**

| Philip Allsworth-Jones

The long stasis in the study of the West African palaeolithic was broken by the work done in 1997-2012 by the Swiss-French team at Ounjougou and Songona on the Dogon Plateau in Mali, whereby a succession of stratified deposits was located covering the period from 75 to 25 ka. They have since continued their work in eastern Senegal. A chart summarising the results was recently presented in an exhibition at the Gorée museum. The succession begins with an Acheulean site at Ravin Blanc IV dated to MIS 7. MSA and LSA sites together cover MIS 3 and 2, from Missira III to Fatandi V. In between are two sites attributed to 'MSA-LSA' at Toumboura II and Ravin des Guépriers. That is a very intriguing formulation, which requires further investigation. The industries exhibit very simple reduction techniques, characteristic tools being sidescrapers, denticulates, and notches, with no bifacial or backed pieces. Whether this represents a purely local phenomenon or has wider implications remains to be determined. OSL dating, rather than C<sup>14</sup>, has been the mainstay for the new chronological framework, to which it is hoped ESR may be added. There is no doubt that this kind of multi-disciplinary study, based on the analysis of securely dated archaeological occurrences, is the way of the future. Nonetheless, the potential that may still be offered by old sites, valuable in themselves, should not be ignored. A notable example is Zenabi, in northern Nigeria, known since 1948. A series of outwash fans, on the edge of the Liruei ring complex, were exploited for tin-mining, revealing an imposing section. This included a large log, which produced a well-known uncalibrated C<sup>14</sup> date of 5440±100 BP. While the industry appears homogeneous, it is a selected sample, and the question of the extent to which the archaeological material has been displaced is an open one. An attempt to remedy these deficiencies was made at Saminaka on the Rahama river, in an undisturbed context. The excavated artefacts are thus more truly representative. The non-quartz material, largely rhyolite, was traceable to three ring complexes, including Kudaru at 40 km distance. The same pattern of exploitation continued into the LSA, as at Kariya Wuro, north-east of the Jos plateau, where at least seven non-quartz varieties of material can be traced to ring complexes up to 80 km distant. Such complexes belonging to the Younger Granite province extend as far north as the Air mountains, where three sites with MSA layers have been securely recorded above the Acheulean and below the Aterian. A similar situation exists in northern Cameroun, where the MSA occurs both in somewhat disturbed contexts, e.g. the 'graviers sous berger' at Mayo Louti, and in a more secure (but hardly explored) context at the Dent de Mindif. So far as the LSA is concerned, a new perspective has been opened up at Iwo Eleru in southern Nigeria, following the recent re-examination of the original excavated material held at the University of Ibadan. An exhaustive analysis of the palaeobotanical and faunal remains has been carried out. Overall, it is suggested that the site constituted a 'persistent forested island' throughout its occupation, somewhat at variance with Shaw's original interpretation. The presence of a human skeleton in a secure stratigraphic position was recognised from the start. The cranium always appeared to be somewhat unusual. This was confirmed by Harvati and her colleagues in 2011. A detailed morphometric analysis showed that it was nearest to Qafzeh and Skhul, both early anatomically modern. More recently, the same kind of analysis has been carried out on the mandible. By contrast, its nearest affinities are found in the Epi-palaeolithic of north Africa. Indeed, it is suggested that this 'may indicate population

movement across the Sahara'. There are no similarities to earlier Pleistocene samples. On the other hand, if the shape of the Iwo Eleru cranium is a result of interbreeding with an archaic lineage, 'we would not necessarily expect to see a similar effect on the shape of the mandible'. That may be the case, but this story suggests caution. If the mandible alone had been found at Iwo Eleru, the interpretation of the site would have been quite different.

## **Prehistoric settlement in the Atakora region of northwestern Benin Republic and prospects for paleoenvironmental reconstruction**

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Archaeological research in the mountainous Atakora region of north-west Benin has identified a number of prehistoric sites. The excavation of some of these sites has enabled us to reconstruct the chronocultural framework of prehistoric settlement in this region from the Early Stone Age through the Middle Stone Age to the Late Stone Age, based on the analysis of artifacts and relative and absolute dating. The aim of this presentation is therefore to use the sites that have been located and excavated, in particular those at Kumaaku, Tanongou and Pendjari, to propose a chronocultural framework for the prehistoric occupation of Atakora. In addition, the sites share the same characteristics as several other prehistoric sites in West Africa, making it possible to characterize their paleoenvironmental setting while integrating them into the West African context

## **Lithic industries of granite outcrops of the Massili Basin (tributary of the Nakambé River): techno-economic approach and research perspectives**

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The Massili watershed is located in central Burkina Faso, in the Sudano-Sahelian climate zone. In this area, the subsoil is largely occupied by immense granite massifs stretching for hundreds of kilometres, which erosional phenomena have revealed in certain places. These outcrops, where we have identified lithic industries, are relatively rare in the region, and those that do exist are often exploited as quarries by local populations for building materials. Technological analysis of the survey data indicates the presence of complete chaîne opératoire at certain sites, permitting us to define the degree of homogeneity of the methods employed and to test the hypothesis of the possible low level of disturbance at these sites. The exclusive use of granite as a raw material, regardless of production objectives, periods or sites, enables us to identify the behaviour of prehistoric human groups in a territory limited by the availability of raw materials. Some sites are crossed by watercourses whose incision reveals alluvial deposits that show a significant sedimentary accumulation where archaeological remains appear, thus necessitating excavation. On a different note, the re-use of prehistoric remains, first as materials for Iron Age pavement sites, and then for various current uses, raises the question of how humans have used granite over time.

## Between climatic instability and technical variability: lithic industries from MIS 2 in the lower Falémé valley (eastern Senegal)

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Marine Isotope Stage 2 (MIS 2; 29,000-11,700 BP) is the arid, unstable climatic phase that precedes the establishment of the Holocene. In many parts of Africa, this phase is marked by a sedimentary and/or occupational hiatus, particularly during the Last Glacial Maximum (26,500-19,000 BP). The extreme aridity that characterizes this period may have led human groups to abandon certain regions and prefer certain areas, particularly major rivers. The Falémé valley, in eastern Senegal, may have served as a refuge for prehistoric populations. Paleoenvironmental, geochronological and geomorphological studies carried out in the area by the interdisciplinary and international research program *Human Population and Paleoenvironment in Africa* (HPPA) since 2012 have revealed that, far from having dried up, the river remained active throughout this period, generating sedimentary deposits of nearly four meters high. The archaeological remains discovered in these deposits provide rare and precious evidence of this little-documented period in West Africa. It was also at this time that the transition between the Middle and Later Stone Age began locally, characterized in the lower Falémé valley by a succession of diversified lithic industries, marking the transition from flake to lamellar products, from bifacial tools to geometric microliths. This paper aims to discuss this pivotal period, at the interface of cultural, technological, environmental and climatic issues.

## The Earlier to Middle Stone Age in West Africa and beyond: old paradigms and new perspectives

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*Homo sapiens* first emerged in Africa during the Middle Pleistocene (~780-130 ka). The most significant component of cultural change during this period was the transition from the Acheulian, a technological complex of the Earlier Stone Age (ESA), to the Middle Stone Age (MSA). The earliest MSA assemblages that lack any diagnostic ESA elements appear in southern, eastern, and northern Africa by 300 ka, roughly coincident with the oldest fossil evidence for *H. sapiens*. Although the West African archaeological record contains numerous ESA and MSA sites, documented within a large body of research from the mid-to-late 20<sup>th</sup> century, robustly dated sites are rare, limiting the contribution of this region to our understanding of the evolutionary history of *H. sapiens*. The nature, pace, and geographic distribution of technological change across the ESA-MSA gradient also remains poorly understood, in part because of the lack of standardisation of approaches for investigating continuity and change in stone tool manufacture. New research at sites in Senegal and Côte d'Ivoire have demonstrated that the archaeological record of this region extends until at least Marine Isotope Stage 6 (~191-130 ka), providing important archives with which to contextualise early human habitation in West Africa. Elsewhere in Africa during this period the pattern of change is spatio-temporally variable and complex, involving regional trajectories and a degree of variability greater than had preceded it. Tracking these changes through time relies heavily on the quality of available data, particularly from assemblages with accurate and high-resolution chronologies. It also requires the standardisation of approaches to examining quantifiable patterns of lithic diversity both within and between assemblages if we are to engage with and test hypotheses relating to the evolution of hominin behaviour in West Africa and its neighbouring regions.

## A Functional Study of Ground Stone Axes assemblages from Akwanga, Central Nigeria

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Use wear analysis or functional study is the microscopic and macroscopic examination of artefacts' edges and surfaces for the identification, description and characterisation of use attributes on them. Most Stone Age studies in Nigeria have focused on typo-technological classifications of such with the use wear component missing. However, functional studies of stone artefacts from the global North have been used to identify and reveal probable functions of stone tools in the past. This Doctoral research focuses on the use wear analysis of Ground Stone Axes from Akwanga, central Nigeria and was designed to examine and identify use wear attributes on the assemblages with the view to account for their prehistoric relevance; and this is first of its kind in West Africa. The artefacts were mostly retrieved from ridges in Akwanga, which falls within the geographical matrix of the Nok cultural landscape. The use wear analysis of a total of fifty ground stone axes/artefacts were used for this

study and the analysis was carried out in the TraCEr laboratory for controlled experiments located in the Monrepos Archaeological Centre and Museum for Human Behavioural Evolution, Neuwied, Germany. In the laboratory, different levels of wear analysis were carried out on the artefacts in order to achieve quantitative and qualitative characterisation of the use wear attributes associated with them and this method is referred to as correlative microscopy. This study employed high magnification microscopes (Zeiss A.1 metallographic microscope and a Zeiss Z2 Laser Scanning Confocal Microscope as well as a Zeiss A1 Transmitted Light microscope). Findings from this research shows diverse use wear attributes reflecting their typological diversity as well as the different functions associated with the studied Ground Stone Axes and these include fracture, edge damage, pits and scratches, and striations. Residue, particularly collagen was also identified on the axes.

## Archaeology and palaeoclimate of Dutsen Kura, Central Nigeria

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The Jos Plateau region in Nigeria holds significant archaeological and palaeoenvironmental insights. Archaeological excavation carried out in 2022 in Dutsen Kura, west of Jos in Central Nigeria, revealed a Later Stone Age (LSA) rock shelter site. The Bace people currently occupy present-day Dutsen Kura, and Dutsen Kura's landscape features numerous hills, some of which have rock shelters that were likely occupied by prehistoric LSA populations. Dutsen Kura Hill is one of the many hills located on the Jos Plateau in the Savanna region of Central Nigeria. Excavations at a rock shelter on another hill, Dutsen Kongba, situated about 2km away from my study site, Dutsen Kura, have revealed evidence of LSA occupation. Dutsen Kongba Hill produced LSA assemblages comprising mainly microliths, attributing the use of the rock shelter to a lithic workshop site. This multidisciplinary study integrates palaeoclimate reconstruction, archaeology, and archaeobotany to understand the diachronic human-environment interactions and possible food system and dietary patterns of the occupants who once settled in the rock shelter on Dutsen Kura Hill. This study employed micro and macro botanical analysis. Soil samples were taken from different occupational phases of an excavated test pit from a rock shelter at the foot of Dutsen Kura Hill. We collected 10 liters of sediment samples for flotation from excavation at 10cm intervals. We floated these sediment samples, and heavy and light fractions were dried, sorted, and identified. Sediment samples were also collected from the profile of the test pit at 5cm intervals for pollen analysis. They were processed using all the protocols required in a chemical lab. Archaeological materials recovered from this excavation provide information about the subsistence activities of the occupants of the rock shelter. Artefacts uncovered showed evidence of continuous utilization of LSA tools by occupants transitioning from stone tool use to ceramics. Plant macro remains from archaeological contexts suggest heavy dependence on cereal crops and wild plant exploitation. Results from pollen analysis showed ten plant families, including Fabaceae, Sterculiaceae, and Cannabaceae, indicating that these families of plant species flourished in this area at different periods. Species like *Elaeis guineensis* and *Alchornea* were present, indicating forest opening, and *Commelina* sp., indicating montane vegetation.

## Lower Pra River Archaeological Research Project: Prospects and possibilities for understanding the prehistory of Ghana's forest people

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This paper focuses on the prehistoric archaeological record in the lower reaches of the Pra River in southwestern Ghana. As the second most crucial drainage system in Ghana's forest and auriferous region, ongoing work shows the river's immense potential for understanding human occupation, technology, and the environment in the south-central forest of Ghana. The archaeological work along the river's banks, floodplains, and adjacent isolated low rises combined terrestrial survey with small-scale test excavations at two sites, Wawase and Supomu Island. Additional work undertaken by Sean Reid uses satellite imagery to understand the landscape transformations in the region. A series of radiocarbon dates obtained situates the region's occupation in the first millennium BC, promising a wealth of insights into the prehistoric past. The prehistoric component of the site includes a small assemblage of utilized and non-utilized flakes, core tools, debitage, ambiguous iron tools, and pottery. I discuss and explore the implications of this research in the context of Ghana's forest human occupation and social transformation in the Later Stone to the Iron Age and wider social evolution in the southwestern forest of West Africa.

## Late Quaternary environmental and cultural dynamics in the Niger Delta, Nigeria

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Globally, tropical rainforests are key to our understanding of early human occupation and cultural history particularly in regions such as West Africa where such information is scarce. In the Niger Delta (ND) region of Nigeria, previous palynological data revealed that there were significant environmental changes such as the Last Arid Maximum and African Human Phase in the last 40ka BP. However, the history of human occupation as well as cultural evolution during most of this period, the late Pleistocene and early Holocene in particular, remain poorly understood. Situated within the larger project, 'Developing a West African Rainforest Prehistory and History (DWARPH)', and guided by oral and ethnographic information, we obtain a suite of multi-proxy datasets from archaeological and lacustrine contexts in the ND to investigate its environmental and human-environment history. The adoption of this ecological anthropology approach provides new and complementary data that will advance the state of knowledge of environmental dynamics and human-environment interactions in the ND.

## Paleoanthropological approach to the ancestral and anthropic heritage of paleoenvironments at archaeological sites in Côte d'Ivoire

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In West Africa and particularly in Côte d'Ivoire, the inventory of natural sites for the study of anthropogenic dynamics are an important factor in the re-appropriation of ancestral heritage that includes the diversity of anthropological and historical references of the evolutionary ecological processes of peoples. Ancestral heritage is what belongs to our ancestors, whether in fossil form, in archaeological artifacts, human biology (DNA-Desoxyribose Acid Nuclide), or cultural or natural site practices with which people have a secular bond, sometimes sacralised by extraordinary stories or legends that punctuate the ethnobiological substrate. The discovery of sources of authenticity in historical natural heritage, which are the receptacles of material traces of evolutionary trajectories, collective memories and endogenous knowledge, is a major scientific concern in our field of study. In this sense, the archaeological park of Ahouakro, the ancestral site of the Mafa mountains and the Ehotilé islands have been the subject of systematic prospecting and ethnographic observations, associated with literature research. The results of studies conducted with an interdisciplinary paleoanthropological approach at the interface of archaeology and human ecology, have identified geoarchaeological and anthropoecological components on sites to deploy an eco-musal valorisation system. However, one of the equations is the question of traditional prohibitions attached to sites with systems of sacrosymbolic representations of nature. These prohibitions are a means of traditional biodiversity conservation but also a brake on in-depth scientific research. The need for training and international scientific co-operation is necessary for data dating and the use of innovative research tools to understand the past and adaptive mechanisms of the evolution of Afro-Black peoples.

## Keynote Talk: From “*terra incognita*” to archaeological crossroad: current perspectives on West African archaeology

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The origin of our species is a key anthropological topic that reveals the evolutionary processes shaping *Homo sapiens* including the socio-cultural, and environmental factors that have influenced our development across varied landscapes. Research has predominantly concentrated on eastern and southern Africa, as well as North Africa, due to the richness of fossil evidence and geographic connectivity with Eurasia, providing crucial insights. However, this emphasis, has often overlooked the potential contributions of West Africa, where emerging archaeological and genetic data reveal a complex narrative of human evolution. This region presents a compelling case of "cultural anachronism" during both the Pleistocene and the Holocene. Furthermore, the scarce biological evidence may suggest the introgression of other hominin lineages into *Homo sapiens* populations during the final Pleistocene. These phenomena raise important questions about the potential biogeographic isolation in the region and the impact of climatic shifts on these complex processes. Investigating how biological and cultural archaic traits persisted through the early Holocene can



illuminate the adaptive strategies employed by early humans in diverse environments. The presentation will also address the cultural transformations that occurred from the Pleistocene to the Holocene, emphasizing key cultural patterns, the shift from foraging to farming and the emergence of complex societies. Through an examination of recent archaeological and genetic findings, this paper will enhance our understanding of broader patterns of human evolution across the continent, revealing how environmental factors and possible geographic, climatic barriers shaped the genetic and cultural landscape of West Africa. It also uncovers the complexities of Holocene adaptation and cultural development in this region, highlighting its significance in the broader narrative of human biological and cultural evolution.

**WEDNESDAY, DECEMBER 4<sup>TH</sup> 2024**

## **Developing the stalagmite palaeoclimate record in West and Central Africa: Implications for enhancing archaeological understanding and future climate projections**

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West and Central Africa's long-term climate dynamics are poorly understood due to a dearth of high-resolution palaeoclimate records and observational data thus exacerbating uncertainty in future climate predictions and human-climate interactions through time. Cave stalagmites provide a valuable record of past climate due to their sensitivity to changes in rainfall, temperature, and vegetation, as well as

their suitability for precise radiometric age dating. Despite extensive karst landscapes in the region, stalagmite records are currently lacking.

Recent caving expeditions in SW Gabon have uncovered several stalagmites that offer a continuous record of seasonal-scale climate variability from the Last Glacial Maximum to the present. Caves in this region are 5-10 million years old and therefore have the potential to yield stalagmites that temporally overlap with the full range of regional archaeological evidence of human activity. Preliminary lamina counting results from recent Gabon stalagmites aligns with and extends existing instrumental climate records by hundreds of years. Future multi-proxy analysis of these and older stalagmites will deepen our understanding of regional climate dynamics. Because the most accurate palaeoclimate records have undergone rigorous modern calibration, we will also present preliminary findings from a study of the drivers of modern climate variability across West and Central Africa based on Global Network of Isotopes in Precipitation and model/reanalysis rainfall and temperature datasets. Exploration of karst terrains in Nigeria and Cameroon are ongoing but should be extended across West Africa to advance understanding of the region's climatic and cultural history and its implications for the future.

## **Lake Bosumtwi recording the last one million years of hydroclimate change in West Africa – insights into potential habitat variability**

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After the climatic and environmental context of hominin evolution in East Africa centred the spotlight for decades, West Africa gains increasing interest considering a pan-African early human history. Yet, little data are available to characterise the potential living-environment of our ancestors here, especially in terms of hydroclimate fluctuations that largely drive the availability of fresh water and food resources. With Lake Bosumtwi (Ghana) hosting a 294 m thick lacustrine sedimentary sequence that formed after a meteorite impact ~1.07 Ma ago, a pivotal record of (hydro-) climate and environmental change covering the last one million years is available. Recently, we created an age-depth model that is supported by various dating techniques (<sup>14</sup>C, U/Th, OSL, palaeomagnetic investigations, cyclostratigraphy and correlative data analyses). In addition, we presented a sedimentary model that links hydroclimatic fluctuations at Lake Bosumtwi to large-scale changes in the Hadley cell. Variation in

natural gamma radiation (NGR) governed by the content in potassium traces the input of K-enriched soil material from the steep crater rims during moist periods, dominated by the North African Monsoon (increased NGR values). Conversely, during more arid phases reduced erosion and possible input of K-depleted dust from the Sahara would lead to lower NGR values. Interestingly, the NGR curve progression is quite similar to precipitation estimates from climate model output (PastClim) for Lake Bosumtwi in terms of frequency and amplitude. This raises confidence for the robustness of our model, and highlights that Lake Bosumtwi is an excellent recorder of hydroclimate changes waiting to be linked to a close-by high-resolution marine record and archaeological findings across West-Africa.

## From the coast to the tropical forest: recent results for the timeline of the Pleistocene Hominin evolution in West Africa

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While humans emerged across Africa shortly before 300 thousand years ago (ka) in Africa, the chronology of hominin occupation in various West African environments is still poorly resolved. In this context, the “WATIME” project (West African Middle Stone Age Timeline using ESR dating of quartz) funded by Marie Skłodowska-Curie Actions specifically aims to contribute to the chronology of early MSA and MSA sites in West Africa located in various present-day ecoregions (tropical forest, coast, Sahelian savannah, etc.) through the development of the ESR method applied to optically bleached quartz grains. We present here an overview of all recent chronological data obtained from key early MSA and MSA sites in Senegal and southern Côte d'Ivoire, and their implications for hominin evolution in this region and across Africa.

## Rethinking the past: investigating early forest agriculture dynamics in Southwestern Nigeria

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Despite gaining recognition, West African archaeology, particularly its early agricultural history, remains understudied compared to other regions. Recent research challenges colonial narratives of late agricultural origins by linking iconic West African forest-savanna crops, such as yams and palm oil, to Neolithic technologies dating back to around 13,000 BP, suggesting a much earlier agricultural timeline. However, the paleoenvironment in which these age-old subsistence strategies evolved, amid complex human-environmental interactions remains poorly understood and understudied. This paper therefore explores the potential of a multidisciplinary approach, including archaeological, archaeobotanical, GIS analysis, and archival research to develop suitable models to investigate the Later Stone Age (LSA) paleoenvironment in southwestern Nigeria, a region with potentials for studying early subsistence practices in the forest-savanna ecotone. This research also aims to shed light on and further emphasize the role of human agency in the development and intensification of early forest agriculture. Ultimately, this research seeks to contribute significantly to West African paleoenvironmental and

archaeobotanical discussions by providing insights into the dynamics of forest agriculture during the LSA.

## Middle Stone Age (MSA) in the Atlantic rain forests of Equatorial Guinea, West Central Africa

Presenting:

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Understanding human evolutionary history in the rainforest ecosystems of West Central Africa remains a challenge, despite the relevance of these areas in addressing both the biological and cultural history of *Homo sapiens*. However, the scarcity of archaeological and chronological reference sequences in African rainforests complicates their placement within a broader evolutionary framework. To address this, the Paleoanthropology Group of the MNCN-CSIC, in collaboration with Equatoguinean researchers, has been conducting archaeo-paleontological campaigns in Equatorial Guinea since 2014. The primary objective has been to locate evidence of the earliest human settlements in the rainforests of Central Africa. Concurrently, osteological studies have been conducted with a taphonomic approach to understand the processes affecting the preservation and fossilization of bone remains in African rainforests (Rosas et al., 2021; 2022; Saladié et al., 2024). During these surveys, we have documented 449 Quaternary outcrops, 46 of which have yielded Paleolithic stone tools. The different technological features observed in these assemblages exhibit a clear affinity with the Middle Stone Age (MSA). These lithic collections, however, also include Acheulean morphotypes and heavy-duty tools, alongside bifacial points, prepared core technologies, and evidence of laminar knapping. The techno-typological characterization aligns with the definition of the Lupemban technocomplex. This technocomplex incorporates morphotypes rooted in the final phases of Mode 2, such as bifaces and cleavers, along with a variety of knapping techniques and tool classes typical of the MSA. This combination of elements suggests the continuity of cultural traditions dating back at least to the transition from Mode 2 to Mode 3, approximately 250,000 years ago. However, the dating conducted so far in Equatorial Guinea suggests a very late chronology within the Upper Pleistocene for these industries, while the



geological characteristics and geomorphological dynamics point to the lack of preservation of sedimentary records prior to the last glacial cycle.

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## A vegetation and climatic history of the Sahel in West Africa: new data from Senegal

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The Late Holocene in the tropics was a period generally characterised by degradation of the lowland rainforests, marked decline of mangrove swamp forests, expansion and southward shift in savanna vegetation and widespread dry climatic conditions. Although the timing of this event varies from place to place, palaeoecology data for this period obtained from several localities in West Africa seem to indicate that (i) this dry period started earlier during the mid-Holocene in the northern region, the Sahel zone, than in the southerly areas and (ii) that the dry conditions prevailed until the present.

Palaeoenvironmental and geomorphological evidence from palynomorphs (pollen, non-pollen palynomorphs), charcoal, phytoliths and diatoms and sediments from Lac De Guiers (Lake Guiers), Senegal revealed a continuity of coastal and aquatic ecosystems and the prevalence of humid conditions in the Sahel into the Late Holocene. The mechanisms of this unusual occurrence and its implication for the development of human settlements and the dynamics of coastal transformations in the region are discussed.

## Anthropisation and dynamics of a temporary pond in the Ferlo (Senegal) during the Holocene: the contribution of palaeoecological studies for conservation management

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In 2007, the African Union embarked on a project named The Great Green Wall. The initiative aimed at creating a mosaic of green and productive landscapes across the Sahel, from Djibouti to Dakar-Senegal to combat desertification in the Sahel region. The objectives included planting a wall of trees in response to the degradation of natural resources, drought and climate change. One way of achieving the goals was to use historical ecological data to understand past environmental dynamics in the region of Ferlo, Senegal. Using palynological data from the sedimentary sequence of a 1 m sediment core obtained from a temporary pond, this study reconstructed the vegetation history and the impact of human disturbance on the Sahelian ecosystem over the last 3100 years. Four distinct phases, A-D, of environmental changes were identified in the sedimentary sequence. During Phase A, dated to around 3060 Cal BP, the vegetation was characterised by Guinea savanna (*Combretaceae*, *Poaceae*) and aquatic elements (*Cyperaceae*); this indicated the prevalence of generally wet conditions. In Phase B (1450-1200 Cal BP), pollen taxa typical of Sahelian vegetation (*Acacia*-type spp., *Ziziphus*-type *mauritanica*, *Balanites aegyptiaca*-type and *Boscia*-type *senegalensis*) appeared, indicating the occurrence of drier environmental conditions. Subsequently, around 500 Cal BP (Phase C), pollen types of economic plants (*Vigna*-type sp., *Typha*-type sp.) emerged in association with coprophilous fungal spores. These signalled anthropogenic impacts including agropastoralism, the impact of which further exacerbated an over-stretched landscape. In the latest phase, D, (200 Cal BP-Present), there were significant increases in the pollen of xerophytic taxa that characterize the Sahelian and Sahelo-Sudanian biome that is present there today. The study reveals the capacity of nature and humans to transform original landscapes and offers insights into effective management strategies of marginal ecosystems to achieve the UN Sustainable Development Goals for a more equitable and sustainable world.

# Modelling human habitability in Late Pleistocene West Africa

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Recent research has begun to radically transform what we know about Late Pleistocene human behaviour in West Africa. In particular the use of trapped-charge dating methods, such as OSL, over the past decade has enabled a chronometric framework for Middle Stone Age (MSA) sites to be constructed, illustrating occupations extending from the terminal Middle Pleistocene to the onset of the Holocene. However, the spatial variability of newly excavated sites has not expanded in tandem with advances in understanding the chronology of MSA occupations, limiting understanding of how widespread human inhabitation may have been. Here, I will examine the use of modelling approaches to explore patterns of human habitability in Late Pleistocene West Africa through space and time. The first approach uses data on mean annual precipitation and temperature from ethnographic datasets of recent mobile hunter-gatherers to constrain palaeoclimate models to predict patterns of past habitability, and validated against Late Pleistocene occupations of eastern Africa (Blinkhorn et al. 2022). The second approach extracts data on mean annual precipitation and temperature from climate models datasets based on archaeological occurrence records to model patterns of past habitability, and exemplified in eastern Africa (Timbrell et al. 2022). I will explore what patterns of past habitability these approaches reflect for Late Pleistocene West Africa, how these correspond to existing occurrence data in the region, and what overlaps and mismatches in these data may mean for future work.

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## Round Table Discussion

Professor Eleanor Scerri, Human Palaeosystems Group, Max Planck Institute for Geoanthropology, Germany

Round table discussion chaired by Prof Eleanor Scerri