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Neandroots in context

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► **To cite this version:**

Marie-Hélène Moncel, Paula García-Medrano. Neandroots in context. Neandroots in context, 2024.
hal-04402312

HAL Id: hal-04402312

<https://hal.science/hal-04402312>

Submitted on 18 Jan 2024

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NEANDROOTS

Understanding a threshold in human evolution at 450-350 ka through the roots of Neanderthal behavior

AGENCE NATIONALE DE LA RECHERCHE
ANR

Workshop: NEANDROOTS in context



6th-7th February 2024



Institut de Paléontologie Humaine
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NATURELLE



IPHES^{RS}
Institut Català de Paleoecologia
Humana i Evolució Social



Thursday. 6th February

10:00 – 10:15 Welcome: Marie-Hélène Moncel

Environmental Context

Session Chair(wo)man

10:15 – 10:30 Marie Bouchet, Amaëlle Landais, Antoine Grisart, Frédéric Parrenin, Frédéric Prié, Roxanne Jacob, Elise Fourné *et al.* The AICC2023 chronological framework and associated timescale for the EPICA Dome C ice core over the last 800,000 years.

10:30 – 10:45 Nicole Limondin-Lozouet, Julie Dabkowski, Pierre Antoine, Jean-Jacques Bahain, Pierre Voinchet. MIS 11 Interglacial dynamics in Northern France: coupling malacology and geochemistry.

10:45 – 11:00 Dael Sassoon, Vincent Lebreton, Nathalie Combourieu-Nebout, Odile Peyron, Marie-Hélène Moncel. MIS12/11 transition and the MIS 11 interglacial in the Alboran Sea: palaeoenvironmental and climatic insights from a high-resolution marine record.

11:00 – 11:15 Maria Fernanda Sanchez Goni, Baptiste Chaigneau, Dulce Oliveira, Gabriel Hes, Maud Chevalier, Deborah d'Olier. Vegetation and climate changes in Europe during MIS 11 (~400 ka) and 9 (~300 ka).

11:15 – 11:30 COFFEE BREAK

11:30 – 11:45 Hugues-Alexandre Blain, Simon Parfitt, C. Sánchez-Bandera, Ana Fagoaga, Josep Francesc Bisbal-Chinesta, Simon G. Lewis, Robert R. Davis, Nick Ashton - British Hoxnian (MIS 11e) herpetofaunal diversity at East Farm Barnham revisited.

11:45 – 12:00 Beniamino Meozzi, Alessio Iannucci, Raffaele Sardella. Large mammals from the Middle Pleistocene of the Italian Peninsula: an updated biochronological scheme.

12:00 – 12:15 Angelina Zapolska, Didier Roche. MIS11 climate and vegetation variability.

12:15 – 12:30 Jesús Rodríguez, Christian Willmes, Christian Sommer, Ana Mateos. Is there anybody out there? Climate, productivity and the distribution of humans during MIS11.



12:30 – 13:00 Discussion

13:00 – 14:30 LUNCH TIME

Neandroots: ca. MIS11 Behaviours. Technology and modeling

Chair(wo)man:??

14:30 – 14:45 Paula García-Medrano, Nick Ashton, Marta Arzarello, Andreu Ollé and Marie-Hélène Moncel. Archaeological and Technological data in the frame of the ANR NEANDROOTS Project.

14:45 – 15:00 Valentin Rineau, Valery Zeitoun, Paula Garcia-Medrano, Marie-hélène Moncel - The use of the cladistic method for investigating the MIS 11 lithic component of 47 sites-levels.

15:00 – 15:15 Lucy Timbrell, Paula Garcia-Medrano, Anoshe Kafash, Matt Grove, Marie-Hélène Moncel, William E. Banks - Ecological niche modeling applied to the MIS 11 archaeological record: data, hurdles, and results.

15:15 – 16:15 Discussion

16:15 – 16:30 Nena Galanidou. Exhibition *“The Origins of Sculpture: Archaeological finds from the Old World and Lesbos 2.5 million to 50,000 years Before Present”*



Wednesday 7th February

From the South to the North: specific studies

Chairwoman: Paula García-Medrano

9:30 – 9:45. Julie Arnaud, Marta Arzarello. What about the Italian MIS 11? An overview of Italian prehistoric MIS11 sites.

9:45 – 10:00 Iavia Marinelli, Cristina Lemorini. Disclosing Bone Tool use during the Lower Paleolithic in the Frosinone-Ceprano Basin: the case studies of Isoletta, Colle Avarone and Selvotta MIS 11/10 localities (southern Latium, Italy).

10:00 – 10:15 Eduardo Méndez-Quintas, Manuel Santonja. The Middle Pleistocene Acheulean in the Iberian Peninsula: current data and new approaches

10:15 – 10:30 Anne-Marie Moigne, Vadim Stepanchuk, Patricia Valensi. Occupation des rivages par les hommes préhistoriques du MIS 11, le cas de Medzhibysh et de Terra Amata.

10:30 – 10:45 Agnès Lamotte, Claude Monnet, Laurence Hutchence, David Hérisson. Biface's status before, during and after MIS 11 in Northern France.

10:45 – 11:00 COFFEE BREAK

11:00 – 11:15 Nick Ashton, Aaron Rawlinson, Ceri Shipton, Freddie Foulds, Mark White. **Across the River: Regional and Temporal** Variation in MIS 11 handaxes assemblages either side of the Thames.

11:15 – 11:30. Nick Ashton, Rob Davis, Marcus Hatch, Simon Lewis, Claire Lucas and Simon Parfitt. Recent excavation at the MIS 11 sites of Barnham East Farm and Devereux Pit, Suffolk, UK.

11:30 – 11:45. Matt Pope, Paula Garcia Medrano, Ceri Shipton, Emily Flanders. Considering the MIS 12 Archaeological Record of Northern Europe: Landscape transformation and the scope for more complex demography.

11:45 – 12:00. Jordi Serangeli, Nicholas Conard. Schöningen: Hominins, wood, bone and stone artifacts in a changing landscape.

12:00 – 12:15 Kevin di Modica. Lower Palaeolithic and Early Middle Palaeolithic in Belgium: an overview of present knowledge and potential contexts.



12:15 – 12:30 Discussion

12:30-14:00 LUNCH TIME

From Central Europe to the Levant: specific studies

Chairwoman: Marie-Hélène Moncel

14:00 – 14:15. Olaf Jöris, Geoff Duller, Kirsty Penkman, Helen Roberts, Dustin White, Andrzej Wiśniewski. Between two major glaciations: The Central European Archaeological record around MIS 11.

14:15 – 14:30. Vadim Stepanchuk. MIS11 archaic core-and-flake industries in the west of the East European plain.

14:30 – 14:45. Alesander Naumenko. Lithic technology of Medzhibozh MIS11 assemblages: an experimental approach and archaeological data.

14:45 – 15:00. Ran Barkai. After the Acheulean: The lithic-fauna nexus in the Levant and beyond.

15:00 – 15:15. Ron Shimelmitz. MIS 11 and the Acheulian to Acheulo-Yabrudian transition in the late Lower Paleolithic Levant.

15:00 – 15:15 COFFEE BREAK

15:15 – 15:45 Discussion

15:45 – 16:00 Perspectives



BOOK OF ABSTRACTS



The AICC2023 chronological framework and associated timescale for the EPICA Dome C ice core over the last 800,000 years.

Marie BOUCHET^{1*}, Amaëlle LANDAIS¹, Antoine GRISART¹, Frédéric PARRENIN², Frédéric PRIE¹, Roxanne JACOB¹, Elise FOURRE¹, Emilie CAPRON², Dominique RAYNAUD², Vladimir Ya LIPENKOV³, Marie-France LOUTRE^{4,5}, Thomas EXTIER⁶, Anders SVENSSON⁷, Etienne LEGRAIN², Patricia MARTINERIE², Markus LEUENBERGER⁸, Wei JIANG⁹, Florian RITTERBUSCH⁹, Zheng-Tian LU⁹, Guo-Min YANG⁹.

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The motivation of this work is that the former reference EPICA Dome C (EDC) chronology (AICC2012) provides an age vs depth relationship covering the last 800 kyr with an uncertainty rising up to 8,000 years at the bottom of the ice core. The origins of this significant uncertainty are threefold: (1) the $\delta^{18}\text{O}_{\text{atm}}$, $\delta\text{O}_2/\text{N}_2$ and total air content (TAC) records are poorly resolved and sparse over the last 800 kyr, (2) the three orbital tools are not used simultaneously and (3) large uncertainties are associated with their orbital targets.

In this work, we present new highly resolved $\delta^{18}\text{O}_{\text{atm}}$, $\delta\text{O}_2/\text{N}_2$ and $\delta^{15}\text{N}$ measurements for EDC ice core covering the last five glacial - interglacial transitions (including the termination V, spanning the time interval from 435 to 427 ka Before Present) as well as novel absolute ^{81}Kr -ages. We have compiled chronological and glaciological information including novel orbital age markers from new data on EDC ice core as well as accurate firn modelling estimates in a Bayesian dating tool to construct the new AICC2023 chronology. The average uncertainty of the ice chronology is reduced from 3,400 to 2,200 years over the MIS 11c (427 – 397 ka BP). The new timescale diverges from the AICC2012 chronology and suggests age shifts reaching 2,200 years towards older ages over the MIS 11. The coherency between the new AICC2023 timescale and the independent U-Th-chronology of speleothems from Yongxing cave in China is improved by 2,000 years at the offset of MIS 11.c (from 395 to 380 ka BP).



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MIS11 Interglacial dynamics in Northern France: coupling malacology and geochemistry

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NW European valleys are characterised by stepped systems, within which terrace incision and sediment deposition are strongly controlled by climatic cycles. Temperate periods are represented by fine-grained fluvial sediments but malacological studies have demonstrated that full interglacial conditions are only recorded in tufa formations at the top of the sedimentary series. Calcareous tufas contain diversified fossils and are particularly favourable for the preservation of rich mollusc communities allowing detailed palaeoenvironmental reconstructions. In addition, geochemical analyses of tufa calcite provide high quality palaeoclimatic information. The chronology is settled by U-Series on calcite from tufa, TL on heated archaeological flints, ESR-U/Th combined on large mammal teeth and ESR on quartz grains from the associated fluvial silts.

In the last decade, multiproxy studies of tufa deposits dated from MIS 11c in NW France have been developed allowing the reconstruction of both climate and environmental dynamics during this interglacial. The recolonisation of forest land snails is shown to follow a pattern correlated with increasing temperature and humidity. The order of appearance of species, depending on their ecological tolerance, is linked to temperature increase. The maximum diversity and richness of woodland snails correlates with the thermal optimum and high moisture values in the isotopic data. The latter part of the interglacial tufas is characterized by a decline in forest land snails and a marked decrease in temperature.

The MIS 11c series contains rich malacological communities with numerous Central and Eastern European modern species, whereas the Holocene assemblages are characterised by species with mostly Western and Northern European modern ranges. Comparison of associated isotopic data shows that the MIS 11c interglacial, and especially its optimum, appears stronger than the Holocene: MIS 11c was clearly wetter and warmer.

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MIS12/11 transition and the MIS 11 interglacial in the Alboran Sea: palaeoenvironmental and climatic insights from a high-resolution marine record

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The transition from Marine Isotope Stage (MIS) 12 to 11 (430–400 ka BP), is regarded as one of the largest shifts in climatic conditions over the last 900 ka. This period is particularly important as it represents a phase of innovation for Hominins. We present here a high temporal resolution pollen record that encompasses the period between MIS 12 and MIS 10 (433–365 ka BP), recovered from the ODP Site 976 in the Alboran Sea. This study aims to provide new insights into the response of vegetation in climatically sensitive region, and to highlight changes in seasonal aridity and precipitation in the continent during Termination V and MIS 11. Pollen-based quantitative reconstruction techniques (MAT, WA-PLS and BRT) were implemented to produce climatic reconstructions for this period.

The ODP Site 976 pollen record shows the shift from glacial to interglacial, highlighted by the transition from predominantly herbaceous and steppic taxa and a high abundance of *Pinus*, to an assemblage comprised of temperate and Mediterranean taxa. The climatic reconstructions show a significant rise in mean annual temperatures and precipitation. A climatic optimum for temperate and Mediterranean taxa is identified between 420–405 ka BP, equivalent to MIS 11c and synchronous with maxima in temperature, precipitation and insolation. Substage MIS 11b, characterised by an increase of *Pinus*, *Cedrus* and steppic taxa is reflected by a drop in temperature and precipitation. Finally, substage MIS 11a was determined as a period of increased variability characterised by fluctuations in forest communities and high-amplitude changes in temperature and precipitation towards the MIS 10 glacial.

Our record from ODP Site 976 provides evidence for the strong climatic transition during Termination V. Our results confirm the intense shift during the MIS 12/11 transition and show that this region is uniquely sensitive to millennial-scale climatic variation during MIS 11. The abrupt shifts in vegetation observed in this record may be used to infer that Hominins, particularly the ancestors of Neanderthal, would have had to adapt to these climatic shifts and fluctuations by finding new strategies of subsistence and technologies.

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Vegetation and climate changes in Europe during MIS 11 (~400 ka) and 9 (~300 ka)

María Fernanda SANCHEZ GOÑI^{1,2}, Baptiste CHAIGNEAU^{1,2}, Dulce OLIVEIRA^{3,4},
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The duration, magnitude and variability of interglacial periods, and in particular their early phases, are still poorly documented and understood at global and regional scales. The latest synthesis of the interglacials (PAGES, 2016) suggests that they lasted between 5,000 and 30,000 years, with Marine Isotopic Stages (MIS) 7e, ~220 ka, and 9e, 320 ka, being the shortest according to pollen and speleothem evidence. The long duration, ~30,000 years, of the terrestrial counterpart of MIS 11c is well established, as is its greater forest expansion in the high northern latitudes of Eurasia compared to its expansion at lower latitudes. In contrast, the duration and magnitude of the forested phase during MIS 9e is more controversial. Some authors, based on pollen records from southwestern Europe, suggest a short duration of 3,000-5,000 years associated with weak forest development, while other records show a duration of ~10,000 years. To address this question I will present a new deep-sea pollen record from the southwestern Iberian margin that shows a longer, ~14,000 years, and stronger forest expansion during MIS 9e in southwestern Europe than previous studies. Interestingly, regional forest development during MIS 9e is stronger compared to that recorded during MIS 11c. These contrasts in the spatial magnitude of afforestation during MIS 11c and the different duration of forested phases in MIS 11c and MIS 9e may have had an impact on the distribution and population size of the first Neanderthals who colonised Europe.

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British Hoxnian (MIS 11e) herpetofaunal diversity at East Farm Barnham revisited

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The Lower Palaeolithic site at East Farm, Barnham (UK) is archaeologically important because of its stratified Acheulian and Clactonian industries firmly dated to the Hoxnian interglacial. The deposits are assigned to the early part of the Hoxnian interglacial stage, at approximately 425-390 Kyr BP. This interglacial stage is one of the longest and warmest periods of the last 800 000 years; at this time conditions were suitable for southern species to colonise as far North as Britain, which was still connected to the continental mainland. The sediments preserve a vertebrate assemblage that includes one of the richest collections of Pleistocene amphibians and reptiles known from Europe (more than 10.000 remains). A verification of osteological attributions of the amphibian and reptile material (1989-1994 excavations) done by J. A. Holman is undertaken, as well as a quantification the Minimum Number of Individuals and analysing the taphonomy of the accumulation. Diverse paleoclimatic methods (e.g. Mutual Ecogeographic Range) to estimate temperature and rainfall for the Hoxnian have been applied. The results will provide the basis for new palaeoenvironmental and palaeoclimatic reconstructions and establish a more secure basis for understanding the environmental and climatic context of the human occupation at the site.

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Large mammals from the Middle Pleistocene of the Italian Peninsula: an updated biochronological scheme

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The latest Early to early Middle Pleistocene (~1.2–0.5 Ma) is commonly known as the Early–Middle Pleistocene Transition (EMPT; or Mid-Pleistocene Revolution), a period characterized by remarkable environmental and climatic changes. In this broad context, the European continent was affected by important faunal turnovers, where newcomers diffused and previous Villafranchian mammals disappeared.

The end of the EMPT is marked by another important climatic episode, known as Mid-Brunhes Event (MBE, ca. 424 ka; MIS 12–11 transition). This event marks the consolidation of the glacial cycles ruled by a 100 kyr periodicity, the longest cyclicity recognized during the Quaternary. This climatic episode strongly influenced the European terrestrial ecosystems, which recorded one of the last important faunal turnovers.

As such, the EMPT recognized the dispersal of the several forms closely related to extant lineages or species, as red deer, wild boars and hyenas. During the end of the EMPT, or during MBE, multiple key bioevents occurred in Europe, as for example the first dispersal of aurochs, Regalia ass and grey wolf.

In this work, we present an updated biochronological scheme of the large mammals of the Italian Peninsula in the light of the recent discoveries, and the impact of the MBE on terrestrial ecosystems.

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MIS11 climate and vegetation variability

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We present climate and vegetation simulations, generated by iLOVECLIM and CARAIB models respectively. The simulations cover two time windows within Marine Isotope Stage 11 (MIS 11): 410k and 385k BP. We also apply the bias correction methodology on climate variables, which relies on the 'Cumulative Distribution Function-transform' (CDF-t) technique, and accounts for climate change within the bias-correction procedure. The results are evaluated through comparison with existing models and reconstructions of climate evolution during the MIS11. CDF-t bias correction is shown to mitigate several modelling biases, including temperature overestimation by iLOVECLIM in Central Europe, and the impact of high resolution iLOVECLIM grid on simulated results. The application of the CDF-t method on iLOVECLIM-simulated climate variables improves the compatibility of simulated data with existing knowledge on MIS11 climate variability and enhances the reliability of our forthcoming niche modeling, where these bias-corrected climate variables will be used as one of the key inputs. As for vegetation simulations, CARAIB simulates dynamic shifts in vegetation between cool (385k BP) and temperate (410k BP) MIS 11 phases, presented as changes in biome distribution that align with previous models and reconstructions. Notably, the transition from temperate open woodlands to semi-desert conditions in North Africa and the Middle East, and expansion of tundra in the North, signifies changing climatic conditions. These results agree with, among others, the findings from the Ocean Drilling Program (ODP) Site 976, previously studied within the NEANDERROOTS project. Of particular significance is our generation of a unique and highly reliable continuous high-resolution dataset of Net Primary Productivity (NPP) values. Despite the difficulties in verifying NPP simulations, this dataset also promises to improve NEANDERROOTS's subsequent niche modeling efforts.

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Is there anybody out there? Climate, productivity and the distribution of humans during MIS11

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The Marine Isotope Stage 11 (MIS11), marked by the appearance of Levallois technology and other behavioural changes, was a critical period for biocultural evolution in Europe. The size and distribution of the human population during this period are factors that likely influenced the emergence and expansion of cultural innovations. However, estimating the size of the European human population in the paleolithic is not straightforward. It may be assumed that the maximum population density of the palaeolithic groups was mainly constrained by the environment. Moreover, analysis of ethnographic data show that the maximum population of hunter-gatherers the environment may sustain is determined by the net primary productivity (NPP). Niche modelling has long being recognized as a usefull approach to estimate the extent of the geographical area with suitable environmental conditions for a certain species, and it has been applied to both recent and fossil species. Thus, it is possible to estimate the maximum sustainable human population in the past by combining the predicted inhabitable area with the sustainable population density inside that area.

We used a dataset of palaeoclimate maps and a species distribution model to reconstruct the changes in the area of Western Europe with suitable environmental conditions for humans during MIS 11. The estimated total sustainable population of Western Europe during MIS11 oscillated between 20,000 and 25,000 individuals. The areas with a potentially higher population density were the Atlantic and Mediterranean coasts. The results show an increment in the maximum population size during MIS11c, but this was mainly due to an expansion of the area with suitable conditions.

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Archaeological and Technological data in the frame of the ANR NEANDROOTS Project

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One of the main aims of NEADROOTS was to create a database including the contextual and technological data from MIS11 sites in Western Europe. In total, 47 key sites/levels from France, UK, Italy, Iberian Peninsula, Germany, Ukraine and Hungary to explore the apparition of innovative technological features which help us to identify the onset of a new and more complex behavior. In fact, this database has been used not only on specific technological studies but also it has opened new collaborations with other disciplines, trying to read the technological data from other perspectives. Together with the Sorbonne University, Bordeaux University and Liverpool University, our dataset is being key in new cladistics, environmental suitability and niche modelling studies.

We have also led particular studies about technology: 1) case studies about MIS11 sites (e.g. La Noira, Menez-Dregan); 2) regional studies assessing the Acheulean variability of Large Cutting Tools in Europe and in Britain. Besides, we have several ongoing works about MIS11 particular sites, such as Terra Amata (France) and Santa Ana cave (Spain).

But in the frame of NEANDROOTS, we haven't forgotten the dissemination of our work in Seminars and Conferences, as well as specific advises to International PhD students from Toulouse University (France), Cambridge University, Southampton University (UK) and Rovira i Virgili University (Spain).

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The use of the cladistic method for investigating the MIS 11 lithic component of 47 sites-levels

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Through a detailed database of 47 archaeological sites/levels from Western Europe dated between the end of the MIS 12 and MIS 10/9, we have applied a new approach for investigating the lithic component, searching for innovative technological features, their distribution and possible roots around the MIS11 boundary. To answer this question, we used three-item analysis, a cladistic method which aims to highlight a pattern of kinship relationships between the different sites in the database. This pattern is shown by analysing the presence of technological and behavioural innovations associated with cores, large cutting tools and small tools. The result of the analysis is a fully resolved dichotomous tree whose nodes represent monophyletic groups of sites understood as cultural units. These sites are grouped by the presence of shared derived states (i.e. cultural innovations). The main pattern is the presence of two distinct groups opposing northern and southern European sites. This cladistic tree can then be used as a basis for archaeological inferences concerning the MIS 11, and in particular the impact of climatic events on the historical processes of diffusion of technological innovations.

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Ecological niche modelling applied to the MIS 11 archaeological record: data, hurdles, and results

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Following an intense glacial event around 450,000, an enigmatic period of human evolution ensued that is commonly described as a threshold for behavioral change in Western Europe. Specifically, increases in the number of well-preserved occupation levels, along with the appearance of new subsistence behaviors and technological innovations, are observed in the archaeological records in certain European regions but not others. This suggests the emergence of regional cultural traditions, although the factors behind the regional appearance of technological innovations during this period of climatic amelioration remains unexplored. We use ecological niche modeling methods to examine the archaeological record of Marine Isotope Stage (MIS) 11 of Western Europe, and we focus on two periods within this isotope stage: 405,000, a warmer phase, and 380,000, a cooler phase. Our aim is to evaluate whether climatic factors and niche dynamics could have played a role in the observed technological diversification of basal Neanderthal populations during MIS 11. Our analyses show that there was not a significant niche shift between phases but populations inhabited similar areas and locally adapted to changing climatic conditions. We also note significant but contrasting relationships between habitat suitability and biface morphology between the two phases. This presentation outlines the data employed, the challenges faced working with this archaeological record, as well as how our methods can be used to explore technological variability and habitat suitability in an effort to infer the factors that could have influenced demography and culture change.

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Exhibition

“The Origins of Sculpture: Archaeological finds from the Old World and Lesbos 2.5 million to 50,000 years Before Present”

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The poster for the exhibition 'The Origins of Sculpture' features a dark green background with a large, stylized orange stone tool on the right. The text is in white and orange. At the top, it reads 'Under the patronage of H. E. the President of the Hellenic Republic Ms. Katerina Sakellariopoulou'. The main title 'The Origins of Sculpture' is in large orange letters. Below it, the subtitle 'Archaeological finds from the Old World and Lesbos 2.5 million to 50,000 years Before Present' is in white. Further down, it says 'Based on the exhibition First Sculpture: Handaxe to Figure Stone, organized by the Nasher Sculpture Center, Dallas, 2018.' The dates '27.9.2023 - 7.1.2024' and the location 'Benaki Museum of Greek Culture - 1 Koumbari st., Athens' are also in white. At the bottom, there are logos for the co-organizers: University of Crete, Benaki Museum, and the Region of Crete, along with logos for the cooperating organizations: the Region of Crete and the Hellenic Republic Ministry of Culture.

Under the patronage of H. E. the President of the Hellenic Republic Ms. Katerina Sakellariopoulou

The Origins of Sculpture

Archaeological finds from the Old World and Lesbos
2.5 million to 50,000 years Before Present

Based on the exhibition First Sculpture: Handaxe to Figure Stone,
organized by the Nasher Sculpture Center, Dallas, 2018.

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Benaki Museum of Greek Culture - 1 Koumbari st., Athens

CO-ORGANIZED BY

UNIVERSITY OF CRETE BENAKI MUSEUM ΠΕΡΙΦΕΡΕΙΑ ΚΡΗΤΗΣ
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HELLENIC REPUBLIC
Ministry of Culture

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What about the Italian MIS 11? An overview of Italian prehistoric MIS11 sites

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MIS 11, in the Italian peninsula, is characterized by a scarcity of sites. It isn't straightforward to trace clear behavioral, morphological, and occupational trends.

In terms of human evolution, it is characterized at the European level, by the onset of Neanderthal species. In Italy, the situation is different since the first Neanderthal is attested later, around 300 ka at the Grotta della Ciota Ciara. The closest MIS 11 fossil remains in the Italian peninsula are scarce, usually isolated and fragmented preventing the identification of the species. The most representative and complete Italian fossils attributed to this timeframe are the cranium of Ceprano and the mandible of Visogliano whose morphological features bring different elements for the comprehension of Italian prehistoric peopling. While Ceprano bears several plesiomorphic features and no clear Neanderthal-derived features, the dentition of the Visogliano mandible seems more Neanderthal-like.

In terms of technological production, according to the few sites discovered, the lithics assemblages show very different features: some sites are characterized mainly by non-Acheulean assemblages without attested Levallois method, some other show a typical Acheulean production together with Levallois reduction sequences.

From a general point of view, once again, the Italian peninsula is characterized by a mosaic of features both culturally and morphologically. These differences cannot be clearly justified on the basis of obvious ecological barriers, only new findings could contribute to this debate.

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Disclosing Bone Tool use during the Lower Paleolithic in the Frosinone-Ceprano Basin: the case studies of Isoletta, Colle Avarone and Selvotta MIS 11/10 localities (southern Latium, Italy)

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The Latium area in Italy has yielded rich testimonies of Lower Paleolithic sites with both faunal remains, artefacts, and human fossil remains, such as the Ceprano human skull. Many are the sites where lithic industry has been found in association with bone industry. Bone tools are so far few documented for early period of time and especially for the Middle Pleistocene in Western Europe.

In three sites, Isoletta, Colle Avarone and Selvotta (Italy), several bone tools and bone flakes have been discovered dated to the MIS 11/10. They were associated to stone artefacts part of the hominins tool-kit. The technological analysis and the use-wear analysis carried out on these bone industries, located in a chronological range between 410 and 430 ka (Moncel et al., 2020), produce relevant results to understand the effectiveness of the bones tools found associated with lithic series including handaxes. To better understand how these tools were used, an experimental protocol was adopted in this study demonstrating that the bone tools were efficient for carrying out various activities.

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The Middle Pleistocene Acheulean in the Iberian Peninsula: current data and new approaches

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The appearance of unequivocally African-type Acheulean sites in the Iberian Peninsula is currently around MIS 12, extending to MIS 6. This age range overlaps with the Early Middle Palaeolithic development, which allows us to affirm their temporal coexistence and independent origin.

The main Iberian Acheulean sites are in the open-air, are linked to the Atlantic rivers (from the Miño to the Guadalquivir River), and mainly to the middle levels of their fluvial terrace systems. Technologically, this Acheulean was characterised by the use of a non-standardised flaking system and retouched tools with a low degree of systematisation and shape repetition. Associated with them, we observe another trend focused to the production of Large Cutting Tools (LCTs), such as handaxes and cleavers on flakes. These are made on cobbles and mainly on large flakes detached from large/giant cores. Raw materials are usually locally available, and quartzite is the most common one. Iberian geological conditions do not allow the extensive preservation of faunal remains in all sites, although there are many examples of sites with a high presence of faunal remains such as Áridos, Ambrona or Torralba. However, a direct relationship between human activity and macromammals cannot be established in all cases.

The features of the Peninsular and Aquitanian Acheulean (mainly the extensive use of large flakes and cleavers on flakes) link these assemblages to the African technocomplex and differentiate them from those identified in northerly regions of Europe. This circumstance leads us to think of a strictly African origin of the “Ibero-Acheulean” technocomplex as opposed to the “continental Acheulean”, whose age and technological features invite us to relate them to different migratory pathways and times.

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Occupation des rivages par les hommes préhistoriques du MIS 11, le cas de Medzhibysh et de Terra Amata

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Les sites préhistoriques datés de l'interglaciaire du MIS 11 semblent propices à l'installation de structures comme des foyers, en particulier sur les zones de rivages. Les études de faunes et des industries associées montrent une haute densité de remontages, chauffe, accumulations de coquilles liées à différentes activités humaines plus faciles à identifier que dans les sites plus anciens. Quels sont les facteurs qui ont favorisé cette diversification?

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Biface's status before, during and after MIS 11 in Northern France

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During the Middle and Upper Pleistocene, northern France, as part of the great plains of northern Europe, was characterised by discontinuous human settlements driven by a succession of glacial and interglacial cycles. In this part of Europe and among the equipment of nomadic hunter-gatherers, the biface is an emblematic tool in the lithic industries. Before, during and after the 11 isotope stage, bifaces were multi-functional tools, until they became rare and then disappeared in favour of other tools such as scrapers, Levallois points and Mousterian points. Alongside the technical performance and persistence of these tools, other innovations have emerged, changing their status from a tool in its own right to a support for other tools and a mixed tool/nucleus matrix. More specifically, there are also differences in terms of size, processing and morphology. Unlike other neighbouring geographical entities such as the United Kingdom, where in this time sequence (MIS 11, before, after) the assemblages are with or without a biface, there our tool is always present. The time has therefore come for a large-scale regional investigation of the biface in all its states.

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Across the River: Regional and Temporal Variation in MIS 11 handaxes assemblages either side of the Thames.

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Here we present preliminary results of 3-D scanning and geometric morphometric analysis of handaxes from British MIS 11 sites in Suffolk (Hoxne, Elveden) and Kent (Swanscombe, Dartford Heath), representing geographical regions north and south of the Thames and spanning both warm sub-stages MIS 11c and MIS 11a. From scans of handaxes in numerous museums, our analysis proceeds from the largest and finest-grained analysis of the Swanscombe sequence to date, including several levels within the Middle Gravels and material from the Upper Loams/Upper Gravels. Comparison with other regions and other sites shows clear regional and temporal variation at the sub-Milankovitch level, with hints of smaller changes in handaxe manufacture over generational timescales.

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Recent excavations at the MIS 11 sites of Barnham East Farm and Devereux's Pit, Suffolk, UK

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The Breckland area of East Anglia contains several sites that date to the early part of MIS 11 (the Hoxnian; MIS 11c), including Elveden, Beeches Pit, Barnham and Devereux's Pit, and the last two are currently being excavated. Three of the sites can be correlated through palynological sequences and molluscan biostratigraphy, while more work is required at Devereux's Pit. Barnham and Devereux's Pit both show a changeover in human populations from a first group with a core and flake technology, but no handaxes, succeeded by a group with handaxes. At Barnham, the change in assemblages occurs at the palynological boundary of Hoxnian Zone II/III, c. 415 ka, which correlates to a similar change in assemblages at Swanscombe. Unlike sites in the Thames or larger river valleys, the Breckland sites all occupy marginal, safer locations in the landscape. At Beeches Pit and Barnham there is evidence of burning, which if interpreted as human fire-use, lends support to the idea that the four Breckland sites are 'home bases'. This paper describes the recent work at the sites and how we can begin to place them in the wider European context.

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Considering the MIS 12 Archaeological Record of Northern Europe: Landscape transformation and the scope for more complex demography.

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Marine Isotope Stage 12 was a period of global cooling which had a profound and prolonged impact on northern Europe, in particular on large parts of the British peninsula. In this paper we consider the period, as a prelude to complex and rich record of reoccupation of the region in MIS 11, in terms of landscape transformation, palaeogeography and human activity. The impact of the glaciation and intense periglacial conditions on landscape structure and raw material availability is considered speculatively, while the formation of the English Channel is looked at critically in terms of the timing and impact on later human dispersal. The period is also considered as one with potential for a more complex record of human occupation. How far into the onset of MIS12 was a human presence maintained? is there any evidence for human reoccupation during interstadials? and how far to the south of the Channel was the limit of human activity at various times during the cold stage? Understanding these aspects in further detail will not only allow a more nuanced interpretation of MIS 11 dispersals back into Britain but will enhance our appreciation of the adaptive tolerance of Middle Pleistocene populations more widely.

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Schöningen: Hominins, wood, bone and stone artifacts in a changing landscape.

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The site complex of Schöningen (Lower Saxony, Germany), with the localities 12 II, 13 I and 13 II, has been dated to approx. 300,000 years ago (MIS 9) using various dating methods. Excellent conditions in the humid, calcareous and anaerobic environment have enabled the preservation of flint and bone artifacts as well as wood artifacts. The sediments also contain plenty of evidence of the environment and climate of the time. This allows a reconstruction of the landscape over a period of several millennia. With all this data and the results of 30 years of scientific research, we can make a significant contribution to understanding the lifeway of archaic hominins during the late Middle Pleistocene of Northern Europe.

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Lower Palaeolithic and Early Middle Palaeolithic in Belgium: an overview of present knowledge and potential contexts.

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Only few human settlements related to the Lower palaeolithic and the Lower to Middle Palaeolithic transition are presently known in Belgium and are mainly related to two specific areas: the Haine Bassin alluvial terraces system and the loess sequences preserved in the Lower-Meuse area. This situation is partly due to the lack of active program research dedicated to that time period in Belgium, as well as to the scarcity of sedimentary context potentially preserving such evidence.

We will present an overview of the current archaeological evidence related to the period between MIS 14 and 8, and discuss the virtual absence of traces of occupation in sedimentary contexts attributed to MIS 11. We will then present the sedimentary contexts potentially containing evidence related to the MIS 14-8 time frame, which should be specifically targeted by future program research dedicated to the Lower Paleolithic, and which should be the subject of accumulated surveillance within the framework of preventive archaeology.

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Between two major glaciations: The Central European archaeological record around MIS 11

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During the late Middle Pleistocene Central Europe has been affected repeatedly and directly by the climatic impact of severe glaciations, resulting in an ebb and flow of hominin presence. The archaeological record preserved between deposits attributed to the Elsterian and Saalian ice advances is both extremely fragmentary and heterogeneous and the number of sites dating to MIS 11 is limited. Furthermore, the scarce dating evidence makes it difficult to securely distinguish between sites that date to MIS 11 and those dating to MIS 9 further hampering understanding of the cultural heterogeneity observed for this period. Here, we review and update the chronostratigraphic and palaeoenvironmental evidence from key-archaeological sites such as Bilzingsleben, Kärlich, Steinheim and Schöningen in western Central Europe, and sites such as Horky nad Jizerou (Horky I) and Karlštejn -, altán in the Czech Republic, as well as some further sites in Poland in the eastern part of Central Europe.

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MIS11 archaic core-and-flake industries in the west of the East European plain

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This communication focuses on presenting the Lower Palaeolithic localities in the west of the East European plain in frameworks of modern Ukraine, with a particular reference to MIS11 sites. Conventionally, we refer to this geographical zone as the territories west of the Dnieper. Accordingly, the sites revealed in the eastern part of the foothills of the Carpathian Mountains and in the valleys of such large rivers as the Dniester and Southern Buh and their small tributaries are presented. Among these sites are Skhidnytsia II and new surface localities nearby Drogobych (Eastern Carpathians), Neporotove VI, Shutnivtsi, Kubachivskyi quarry, Luka Vrublevetska, Kuludorova Balka (Dniester valley), Medzhibozh 1, A, Golovchintsy 1, 2, Maslove (Southern Buh valley).

Based on geological, geomorphological, biostratigraphical data and ESR dates, the age of the Lower Palaeolithic assemblages of the area in question is estimated to be between 1.2 and 0.4 million years. The sites are believed to correlate with a few warm phases between MIS 35 and MIS 11. The most important Lower Palaeolithic multilayered localities are recorded in the upper flow of the Southern Buh area. The uppermost artefact-bearing horizons of Medzhibozh 1, layer IV and Medzhibozh A, layers II and I are dated to MIS11. Lithic industries are based on various local raw materials, where small-sized quartz and flint pebbles predominate. Morphologically, these industries belong to the core-and-flake variety and display only quite archaic artefact types. The technology used is also archaic and characterized by almost absolute bipolar-on-anvil knapping.

The coherent archaic morphology and typology of the named Medzhibozh MIS11 industries make it necessary to define them as mode I (Oldowan type) despite their relatively recent age. The reason for this archaism has yet to be apparent. It may have been multidimensional, and one of its aspects is a specific adaptation to the relative scarcity of lithic raw materials in the area.

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Lithic technology of Medzhybizh MIS 11 assemblages: an experimental approach and archaeological data

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Within the central part of the Podillia Upland, in the upper reaches of the Southern Buh River, near the village of Medzhybizh (Khmelnyskyi region), there is a zone of concentration of sites with early stone tool industries. There are two sites with MIS 11 assemblages. These are Medzhybizh 1 (layer III) and Medzhybizh A (layers I and II). Artefact-bearing horizons have ESR dates (ca. 400,000 BP) and various biostratigraphic, paleopedological, and geomorphological data confirming their belonging to the Zavadivian (Holsteinian) unit.

Together assemblages comprise no more than 500 artefacts. These are mainly products of processing flint pebbles, less often quartz, quartzite, granite, limestone, sandstone, and slate. Angular block fragments represent some raw material types. The artefacts of Medzhybizh 1 and Medzhybizh A differ in the degree of post-depositional alteration: a significantly larger number of rounded and weathered samples represents the assemblages of Medzhybizh A layers. Some of the artefacts from both sites show traces of recycling, sometimes in rather complex systems.

The structure of lithic assemblages of three artefact-bearing layers is similar enough. It comprises knapped pebbles, angular pieces, flakes, and small shatter fragments. In addition, there are pebbles with percussion marks. Some of them are active elements, while others probably demonstrate failed knapping attempts. Various technical and morphological attributes indicate the prevalence of bipolar on anvil technique in the raw materials reduction and the production of the tools on both Medzhybizh 1 and Medzhybizh A. The same raw material base, processing methods, and general technology trajectory (obtaining a sharp edge through short operational sequences) determine the external similarity of complexes. However, there are differences between the layers in the intensity of raw materials utilisation, the degree of secondary processing (the presence and number of deliberately prepared tools), and the technical procedures applied.

In 2022–2023, we conducted an experimental program on knapping local flint. At the most general level, our tasks were to investigate physical, in particular processing, properties of local flint, to determine the restrictions it may impose on the control of the



knapping surface, and to identify the attributes of the modelled techniques following previous data on the technology at Medzhybizh 1 and Medzhybizh A.

The obtained experimental data form the basis for specifying the artefact-diagnostic criteria and interpretation of the assemblages. We confirmed that bipolar products prevail in the complexes. The usual flake attributes may have a low informative degree depending on the raw material, technique, and intensity of reduction. Flakes do not always have opposite processing markers of any type and shape (for example, bidirectional scar organization, two platforms (active and passive), clearly defined zones of impact and counter-impact) due to isolated single removals by the bipolar on anvil technique. Percussion traces become more pronounced during the intensification of knapping. The point of impact may not be visible because of the same reasons. The bulb of percussion has a flattened shape (even hinged type), and it crushes together with the platform under conditions of intensification of knapping. The bipolar on anvil technique is a quick way to form a working edge and test a piece of raw material. The freehand technique has a complementary role here. Maybe it is related to the considerable amount of skill and time for preparation that would be needed due to the low quality and rather amorphous shape of the pieces of raw material.

The sites Medzhybizh 1 and Medzhybizh A have a compact location (up to 500 meters) and similar archaic non-standardised assemblages. This is most likely due to the quality of local raw materials, the bipolar on anvil technique used, and the profile of the sites. The value and interest of Medzhybizh 1 and Medzhybizh A are not regionally limited. They need to be introduced into the European context of the Lower Palaeolithic sites of MIS 11.

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After the acheulean: the lithic-fauna nexus in the levant and beyond

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Significant cultural and biological transformations took shape in the course of the process of changes from Acheulean to post-Acheulean human adaptations in the Levant and beyond. In this talk I will put an emphasis on the lithic-fauna nexus, in an attempt to correlate between faunal turnovers/transformations and possible related technological preferences. I will focus on the dependency of Paleolithic human groups on large game and the significant relations between hunters and their prey. I will suggest that human interactions with animals were not only practical and economic, but based on ontological and cosmological conceptions. Thus, changes in the availability of major game animals might have necessitate a significant modification in human mode of adaptation, which is not only practically oriented. Furthermore, several behavioral transformations characterizing the Acheulean and post Acheulean continuum will be viewed in light of the evidence for the decline in game size during the Pleistocene. This talk will attempt at presenting a new model for reconstructing changes in human adaptation during Middle Pleistocene times in the Levant and beyond.

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MIS 11 and the Acheulian to Acheulo-Yabrudian transition in the late Lower Paleolithic Levant

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The late Lower Paleolithic Levant is comprised of the late Acheulian and the subsequent Acheulo-Yabrudian Complex. The transition between the two technocomplexes is placed at ca. 400 ka, paralleling MIS 11 that forms one of the most extreme interglacial phases of the last 800 ka. The Acheulo-Yabrudian Complex (ca. 420/400-250/220 ka) is long known for its set of behavioral innovations including habitual fire use, intensive implementation of preplanned technologies and frequent use of basecamps, to note just a few. Several models were suggested to explain the transition, however all of them are based on a dual comparison between the late Acheulian and the Acheulo-Yabrudian and lack a processual view that traces the transition itself. Only one site enables closing this gap – Tabun Cave, Mount Carmel, Israel. While former excavations at the site by D.A.E. Garrod (1929-1934), A. Jelinek (1967-1971) and A. Ronen (1975-2003) provided only a very limited window towards investigating the very early part of the cave's sequence, several trajectories of change can be discerned. Using results from the reanalysis of former excavations at the site, we will discuss what we can and cannot conclude about the character of the Acheulian–Acheulo-Yabrudian transition.

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