



Book of abstracts

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Table of contents

XVIIIe congres UISPP Paris.pdf	1
XIX-1. Holocene environmental and cultural variability in the Western Mediterranean.	5
CHABET NAÎMIA : DONNEES PARIETALES POUR MIEUX COMPRENDRE LE CLIMAT HOLOCÈNE DES OULED DJELLAL (ALGÉRIE SUD-EST ATLASIQUE), Iddir Amara	6
Technological change social change? The last hunter-gatherers societies in the Ebro basin, Adriana Soto [et al.]	7
The last hunter-gatherers of the Eastern Adriatic and the problem of Castelno- vian, Sonja Kačar	8
A Palaeoenvironmental framework for the Epipalaeolithic to Neolithic occupation of Northeast Morocco, Amy Prendergast [et al.]	9
Continuity or discontinuity of hunting between the last hunter-gatherer societies and the first farmers in the Iberian Peninsula, Alejandro Sierra [et al.]	10
Mesolithic and Neolithic human remains from El Toral III rockshelter (Asturias, Spain): two different funerary cultural behaviors, Borja González-Rabanal [et al.]	11
Trapezoidal armatures as markers of cultural dynamics in the Late Mesolithic of north-eastern Italy, Federica Fontana [et al.]	13
The conformation of Mesolithic deposits in Cueva de la Cocina (Eastern Iberia): Natural vs. Anthropological agents, Alfredo Cortell-Nicolau [et al.]	15
From the Mesolithic to the Neolithic in the western Mediterranean basin: the African impact, Thomas Perrin [et al.]	16

Nouvelles données sur le Castelnovien de la grotte Latronico 3 (Potenza, Basilicate) dans le contexte de la Méditerranée occidentale, Carmine Collina [et al.] . . .	18
From Typical to Upper Capsian: evolution of the lithic industries from the Kef Zoura D rockshelter (Algeria), Thomas Perrin [et al.]	20
Variability in the use of macro-tools during the Mesolithic of Northeastern Iberia, Susana Alonso [et al.]	21
ABOUT GENESIS OF LITHIC COMPLEXES IN THE ANCIENT HOLOCENE IN SOUTHERN ITALY, Domenico Lo Vetro [et al.]	22
Recalibration of radiocarbon dates using <i>Helix melanostoma</i> shell at A'in Misteheyia, eastern Algeria, Evan Hill [et al.]	24
Early Holocene socio-ecological dynamics in the central Mediterranean region of Iberia, Javier Fernández-López De Pablo [et al.]	25
” Haches ” mésolithiques en bois de cerf dans la moitié sud de la France : état des lieux des connaissances et perspectives de recherches., Benjamin Marquebielle	27
XIX-2. Hunter-gatherers confronting the expansion of farming communities.	29
Farmer-Foragers Interactions across the Levant and Mesopotamia, Ofer Bar-Yosef	30
Recent Mesolithic in steppes of Ukraine at dawn of the Neolithization, Nadiia Kotova [et al.]	31
The transition to an agricultural way of life in the sandy lowland of Belgium, Liesbeth Messiaen [et al.]	33
Between resilience and conservatism: symbolic productions at the dawn of agriculture, Solange Rigaud [et al.]	34
Derniers chasseurs-cueilleurs et premiers paysans en Italie du Sud : évolution des industries lithiques et traditions techniques entre VIIème et VIème mill. av. J. – C., Carmine Collina	35
Impact of adoption of the domestic sheep on the economic strategy of the first Neolithic communities in the Iberian Peninsula, Alejandro Sierra [et al.]	36
Looking for a diffuse frontier: A discussion on the evidence for interaction between hunter-gatherers and farmers in sixth millennium cal BC Iberia, Pablo Arias . . .	37

CONFRONTING THE DUAL MODEL: A MIXED MODEL TO EXPLAIN HUNTER-GATHERER AND FARMING INTERACTIONS IN EASTERN IBERIA, Oreto García Puchol [et al.]	38
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Coastal Neolithic: A discussion on the evidence for interaction between hunter-gatherers and farmers in Barrosinha (Grândola, Portugal), Pablo Arias [et al.]	39
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Les derniers chasseurs-collecteurs de la Font-aux-Pigeons (Châteauneuf-les-Martigues, Bouches-du-Rhône) : approche fonctionnelle croisée de l'industrie lithique et sur coquillage, Cristina De Stefanis [et al.]	40
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The 'Neolithic' and earlier types of 'agricultural' activities. Increasing evidence of pre-Neolithic resource manipulation, Ole Grøn	42
--	----

Do hunter-gatherers dream of a Neolithic sheep?, Mariana Diniz [et al.]	43
---	----

XIX-3. Exceptional sites or exceptional preservation? Interdisciplinary Approaches to the Function of Early Holocene Wetland Sites in Europe 45

Along the river-shore – excavations at Strandvågen, Motala 6000-4500 BC, Lars Larsson [et al.]	46
--	----

Butchery site or large-spectrum occupation ? Discussion about the Late Mesolithic refuse layers in Noyen-sur-Seine (France)., Alexandre Deseine [et al.]	48
--	----

Early Holocene Hunter-Fisher-Gatherer in transition? – Mesolithic sites in Duvensee Bog, south-eastern Holstein, Northern Germany, Harald Luebke [et al.]	50
---	----

Exceptional sites with exceptional preservation. The interpretation of the early Mesolithic bog sites from eastern Denmark., Kristoffer Pedersen [et al.]	52
---	----

Exceptional in every way ? Integrated approach of the Early Mesolithic settlements in Noyen-sur-Seine (France)., Colas Guéret [et al.]	53
--	----

From lake to swamp: environmental changes, stratigraphic records and human settlements at Palù di Livenza (north-eastern Italy), Roberto Micheli [et al.]	54
---	----

Inferring site function and technological organization from combined spatial, technological and microwear-analyses at the Mesolithic wetland site of Kerkhove-Stuw, northwestern Belgium (preliminary results)., Hans Vandendriessche [et al.]	56
--	----

Organic residue analysis of Neolithic 'bog pots' demonstrates mixed processing of foodstuffs, Harry Robson [et al.]	58
---	----

They have to be out there.... a strategic survey for mesolithic waterlogged sites in north western Germany, Svea Mahlstedt	59
--	----

To stay for a night or two. Small camps in a large lake dated to the Middle Mesolithic in Scania, southernmost part of Sweden, Lars Larsson	60
Wetland site Zamostje 2: From artefact preservation to paleolandscape reconstructions, Olga Lozovskaya	61

**XIX-1. Holocene environmental and
cultural variability in the Western
Mediterranean.**

CHABET NAÏMIA : DONNEES PARIETALES POUR MIEUX COMPRENDRE LE CLIMAT HOLOCÈNE DES OULED DJELLAL (ALGÉRIE SUD-EST ATLASIQUE)

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L'Oued Ittel et ses ramifications (Oueds Fercha, Fahadj, Saada, el-Ouaar, Melah, Belourimel, Zérig, Ijel, Besbes, El-Hadej, Zerba, Fahama) forment un réseau hydrographique développé au sud de la ville de Ouled Djellal (sud-ouest du Massif des Aurès, Algérie) et rejoignant le chott Meroune vers l'est. Il a alimenté un territoire étendu sans toutefois atteindre les dépressions endoréiques septentrionales du Sahara oriental. Actif durant l'Holocène ancien-moyen, il a attiré des communautés animales et humaines diverses ayant abandonné des vestiges signalés, mais encore peu étudiés.

Les représentations pariétales gravées sur les rochers évoquent une faune assez abondante et variée d'herbivores (grands bovins, antilopes, gazelles), de carnivores (félins, canidés) d'autruches, accompagnées de personnages. Ce corpus suggère des ressources et une attractivité certaine du milieu pour la grande faune et les hommes qui y installèrent leurs campements (non datés). Les espèces fauniques et la diversité animale représentées sont les mêmes que celles déjà signalés sur l'ensemble des piémonts atlasiques et les Hautes plaines du Constantinois et de l'Ouarsenis.

Ces données témoignent de circulations et de relations ouest-est avec les régions méridionales et orientales atlasiques. Le réseau hydrographique de ce territoire charnière a servi de voie de communication au sein d'une vaste région centrale de l'Algérie, aujourd'hui désertique. Evoquer les aspects d'un climat favorisant l'installation d'une faune variée au cours de l'Optimum climatique holocène passe par le réexamen de nombreuses gravures rupestres signalées dès la fin du XIX^{ème} siècle (Blanchard, 1892, Frobenius 1937) et d'autres plus récentes confirmant l'existence de présences tardives ininterrompues (nombreux monuments funéraires).

Les derniers témoignages de liaisons transversales soulignent l'importance des communications et des traversées de ce territoire que désenclave aujourd'hui un réseau routier. Faire le point des connaissances s'impose au moment où cette région se transforme.

Keywords: Chabet Na'imia, gravures rupestres, Holocène, réseau hydrographique, Ouled Djellal.

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Technological change social change? The last hunter-gatherers societies in the Ebro basin

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During the 7th millennium cal BC a profound technological change took place in the last Mesolithic societies. In different regions of Western Europe, the development of lithic industries characterised by a very regular and standardised blade production is recognised, usually associated with the use of indirect percussion. Also, it is associated to the generalisation of new tools, such as geometric microliths (trapezes) and notched and denticulate blades. In most regions of the Iberian Peninsula, the development and adoption of this lithic technology represents a clear technological break with the previous industrial tradition, the Notches and Denticulates Mesolithic. However, does this industrial change imply a major transformation in other areas of social organisation? Why does this technological change take place? Although in recent years different hypotheses have been proposed to explain this change, evaluating for example the possible influence of the 8.2 event, we still lack conclusive answers. In the present work we want to analyse both issues. Firstly, evaluate the impact of technological change in other areas of social organisation, such as the economy, the occupation of the territory or the mobility strategies of those populations. And secondly, debate the different reasons and mechanisms that motivate the adoption of these technological developments, including the possible influence of climate events. Our study focuses on the Ebro basin, where we have numerous archaeological sequences corresponding to this period. The conjugation of new information from technological, taphonomic, faunistic, anthracological and pollen studies, together with a critical review of the available dates, we hope will offer a new reading on this issue.

Keywords: Mesolithic, Ebro basin, technological change

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The last hunter-gatherers of the Eastern Adriatic and the problem of Castelnovian

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The last hunter-gatherers of the Central and Western Mediterranean are associated to the Castelnovian technocomplex which develops during the seventh millennium BC. The Late Mesolithic (or Second Mesolithic in French literature) Castelnovian is characterized mainly by its lithic industries which reflects important changes with regard to the preceding phases: the *débitage* is now orientated towards blade production by pressure flaking and manufacturing of special tools, such as trapezes (made by microburin technique) and notched blades. Although the sites are rare, the Castelnovian sites are identified in the wider Adriatic region: south-central Italy, Albania, Montenegro, Italian and Slovenian Karst. However, it seems that Croatian coast with hinterland lack any traces. No sites were found in Dalmatia and only few questionable surface finds come from Istria.

This paper explores whether the absence of Castelnovian findings on the Croatian coast reflects a historical reality, as a consequence of the depopulation during the Late Mesolithic and/or the region is for some reasons outside the Castelnovian expansion route, or it is related to some other factors, for example shift in the settlement pattern and/or loss of the sites by marine transgression, lack of research and specialists, etc.

In addition, the paper will focus on the hypothesis that the presence of last hunter-gatherers can be detected indirectly through the persistence of Castelnovian elements in the oldest Neolithic Impressed Ware assemblages of the Eastern Adriatic.

While Early Neolithic Dalmatian assemblages reflect a clear break with Castelnovian traditions as seen in more complex pressure blade *débitage* (long crutch standing mode and lever pressure), complex raw material procurement (almost complete reliance on exogenous garganic flint), tool typology (absence of notched blades and the trapezes were made without microburin technique) and incomplete *chaîne opératoire* (absence of elements pointing to decortication and trimming as well as blade cores), the Early Neolithic assemblages of Istria might reflect some similarities. These consist in the following: the blade production is local, made by local flint using simpler techniques (direct percussion and pressure with short crutch) while trapezes seem to be obtained with microburin technique.

Keywords: Castelnovian, Late Mesolithic, Adriatic, Impressed Ware, Lithic industry, Pressure flaking

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A Palaeoenvironmental framework for the Epipalaeolithic to Neolithic occupation of Northeast Morocco

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The Epipalaeolithic to Neolithic archaeological record in Morocco is key to understanding the shift from hunter-gatherer to pastoral-agricultural lifeways in North Africa. Some contend that these developments were modulated by shifts in climate and environment and connected to rapid climate change events during the Holocene. Evaluation of this hypothesis requires the linkage of local and regional climate records with well-dated archaeological sequences. The rock shelter of Ifri n'Etsedda, occupied between 10.0 and 6.0 ka cal BP, allows this hypothesis to be tested as the site contains both Epipalaeolithic and Neolithic deposits along with abundant material for palaeoenvironmental reconstruction. This study uses stable isotope analyses ($\delta^{18}\text{O}$ and $\delta^{13}\text{C}$) land snail shells (*Alabastrina soluta*) from the archaeological sequence to construct a palaeoenvironmental framework for interpreting human-environment interactions in northeastern Morocco. This offers the opportunity to study the Neolithic transition in the context of local palaeoenvironmental records. The land snail stable isotope records from Ifri n'Etsedda suggests that while the early Holocene was characterised by a fluctuating but generally more humid climate, conditions became progressively more arid towards the mid Holocene. This shift to arid conditions coincided with the beginning of the Neolithic at the site around 7.2 ka cal BP. These local palaeoenvironmental records mirror shifts in the pollen record from the site and regional trends seen in other palaeoenvironmental records and suggest that environmental changes may have played a role in the transition to food production in the region.

Keywords: land snail, stable isotopes, Neolithic, Epipalaeolithic, palaeoclimate, human, environment interaction, Morocco, North Africa, Mediterranean

*Speaker

Continuity or discontinuity of hunting between the last hunter-gatherer societies and the first farmers in the Iberian Peninsula

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Despite the incorporation of domestic species, hunting did not disappear as a way to obtain animal protein during the Neolithic period in the Iberian Peninsula. Hunting activity continued to occupy an important part of the economy in the middle of the 6th millennium BC. In fact, it continued to be the predominant activity in some sites, which has been tentatively explained in a multitude of peninsular neolithisation models. In this presentation, we offer the current state of knowledge concerning hunting activities between the last hunter-gatherer societies and the first farmers of the Iberian Peninsula. To do this, we will take the published data and incorporate those from our studies from the Ebro Basin (Rambla de Legunova, Peña 14, Paco Pons, Esplugón, Puyascada), in which hunting activities are predominant despite the adoption of domestic species, like the ovicaprines. From these data, the degree of persistence of the game among the Neolithic societies is analysed, taking into account the species that predominate during this period and correlating them with the species hunted by the last hunter-gatherers. The different hunting modalities are discussed both during the Mesolithic and during the Neolithic, taking into account the variety of species hunted, their variability, the different types of sites, etc. The possible causes of the permanence of this activity are evaluated, in functional, ecological or social terms. These data correlate with the neolithisation models of the Iberian Peninsula, seeking to explain the various social and economic dynamics that occurred during the transition between the Mesolithic and the Neolithic.

Keywords: hunting, Mesolithic, Early Neolithic. Iberian Peninsula

*Speaker

Mesolithic and Neolithic human remains from El Toral III rockshelter (Asturias, Spain): two different funerary cultural behaviors

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Data about funerary practices in Mesolithic shell middens and burial caves at the Cantabrian Region (northern Iberia) are relatively common. However, there is a limited knowledge about the burial deposits during the Neolithic in the region. Rescue excavations conducted in 2009 at the rockshelter of El Toral III (Asturias, Spain) produced a number of Mesolithic shell midden units and a funerary structure, probably dated to the Neolithic/Chalcolithic. During the excavation, several human remains were discovered in different archaeological contexts of the site. A Mesolithic burial was represented by human remains recovered in non-disturbed shell midden layers. However, these remains were not found in anatomical articulation. Moreover, a large amount of bones dated to the Late Neolithic were found in several disturbed levels, and also inside of a funerary cist that cuts the Mesolithic levels. Anthropological and taphonomic investigations were carried out to understand the complex funerary deposits at the site. Several quantification units were used to assess the remains, such as the Number of Specimens Identified, Minimum Number of Elements, Minimum Number of Individuals, Fragmentation Rate and Index of Anatomical Preservation. With the aim to estimate the age and sex of the individuals we used different anthropological techniques, such as auricular surface of the ilium and dental wear to determine the age, and the greater sciatic notch to establish the sex. In order to understand the formation of the deposits, we performed an exhaustive taphonomic analysis of the biostratinomic and diagenetic alterations. In total 310 remains were identified (66 Mesolithic and 244 Neolithic/Chalcolithic). They belonged to a minimum number of five individuals (one Mesolithic and four Neolithic). For the Mesolithic individual, the results indicate a primary

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burial with severe diagenetic modifications, while for the Neolithic the remains indicate a secondary burial in disturbed layers, probably related to the violation of the funerary cist. El Toral III constitutes one of the few archaeological sites in northern Iberia, together with Los Canes and Linatzeta, with human remains from both periods. Apart from the anthropological and taphonomic results presented here, the application of multidisciplinary techniques in progress (stable isotopes and aDNA) will provide accurate information about the health, diet, mobility and genetic relations of these human populations and cultures, revealing continuity or discontinuity, gradual or fast change, acculturation or colonisation process during the Mesolithic to Neolithic transition.

Keywords: Mesolithic, Neolithic, human remains, funerary traditions, Cantabrian Region, Taphonomy

Trapezoidal armatures as markers of cultural dynamics in the Late Mesolithic of north-eastern Italy

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1

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From both a geographical and chronological perspective the Mesolithic cultural landscape appears as a patch-work of entities reflecting the complex interactions occurred among the latest groups of European hunter-gatherers and possibly suggesting the existence of intercontinental connections. The "Second Mesolithic" corresponds to the main cultural shift of the period, as it is well testified by the major technological changes affecting the lithic assemblages. From the perspective of Western and Central Europe, according to different authors, such changes are believed to have originated either in Ukraine or in Northern Africa. This paper does not deal with the issue of the origin of the Late Mesolithic but it examines the interaction between the new cultural entity and the previous early Mesolithic substratum. As a case study the Castelnovian evidence from north-eastern Italy is considered. Namely the lithic assemblages from two reference sites - Romagnano Loc III and Pradestel – are analyzed by focusing the attention on the manufacturing processes of trapezes, the most representative category of armatures. Results are contextualized within the wide Castelnovian lithic technical systems. The archaeological series of Romagnano - with its 5 stratigraphic layers – has revealed to be more reliable with respect to that of Pradestel being characterized by higher resolution. In spite of being considered partly reworked, layer AB3 contains trapezoidal armatures that are significantly different from those of the overlying layers especially considering their manufacturing processes. This aspect - together with the general features of the assemblages - supports the occurrence of dynamic cultural processes within the Castelnovian throughout time and, possibly, of a progressive inclusion of the Castelnovian innovations within the Sauveterrian technical system.

*Speaker

Keywords: Second Mesolithic, trapezes, North, eastern Italy, Castelnovian

The conformation of Mesolithic deposits in Cueva de la Cocina (Eastern Iberia): Natural vs. Anthropological agents

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Cocina Cave was excavated for the first time by Lluís Pericot during the 1940s of the XX century. Due to the archaeological methodology followed at the time, some problems may arise for the sake of today's needed accuracy. The main goals of the team of the University of Valencia currently working at the site are not just providing a more detailed recently excavated stratigraphic frame, but also to better understand how human and taphonomic processes are reflected in old excavations.

By using some new methodologies, such as virtual 3D reconstruction, we have been able to figure out how some natural processes are deployed through Pericot's deposit. By observing the XYZ distribution of different types of snails –some of which belong to fresh-water habitats and others to terrestrial habitats– through the stratigraphic record we have been able to identify flood episodes affecting the stratigraphy of the site. A logical next step is to proceed to the XYZ distribution of anthropological material (i.e. lithic industry).

In this present communication we would like to present the results of the comparison between the afore mentioned natural deposition processes and human deposition rates, all this embedded into a chronological framework refined through a bayesian approach. This comparison will be deployed not only from an XY point of view, but also from a Z point of view. Analytical statistics will be implemented in order to better understand the record.

Our goal is to find out what (or how much) influence have natural processes had in the construction of the archaeological assemblage. Also, one of our main objectives is seeing how human distribution rates behave regarding the understanding of our archaeological record, so that we can check if a more accurate layer discrimination –and, therefore, a better understanding of the dynamics of the cave– is possible.

Keywords: Mesolithic, Cueva de la Cocina, Taphonomy, 3D analysis, Transition to agriculture, Eastern Iberia

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From the Mesolithic to the Neolithic in the western Mediterranean basin: the African impact

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3

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Between the 8th and 5th millennia BC, the human societies of the Western Mediterranean underwent several major changes. The first occurred during the seventh millennium with the appearance of the ‘Second Mesolithic’. It can be seen mainly in the material productions of these populations, in particular their stone tool industries, by a fundamental change of production, operating sequences and technical procedures. Deeper changes in the social organization of these societies are also perceptible, in particular through changes in rites and funeral practices. The precise origin of these changes escapes us at present, but they seem to occur initially in North Africa before spreading rapidly along the Mediterranean shores and reaching Western Europe. A second major upheaval took place a few centuries later, with the appearance of the Neolithic. In this extensive process, the southern shores of the Mediterranean should not be ignored. Recent data suggest that, during the 6th millennium before our era, human communities practicing hunting and gathering and having acquired the ceramic technology, occupied parts of the Maghreb. Interactions with spheres of the Impresso/Cardial complex occurred in southern Italy and, at the other end, southern Spain. This seems to be indicated by some characters of the technical systems of the first Neolithic communities of Andalusia. These hypotheses should be tested by close examination of timelines and technical systems. If confirmed, they may offer a possible alternative to strictly European scenarios.

In 2016-2017, the international research program MeNeMOIA, funded by the IDEX of Toulouse, has therefore sought to provide new elements of response to these questions. Several important and unpublished series from Algeria have been studied, particularly from the point of view of lithic industries (technology, typology, use wear analysis). The chronological framework has also been radically renewed with more than 40 new radiocarbon measurements.

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This communication will attempt to present in more detail the aims and objectives of this program, its general progress, the main results that we have been able to achieve, and especially the new lines of research and perspectives.

Keywords: Holocene, Mesolithic, Neolithic, Hunter, gatherers, Algeria

Nouvelles données sur le Castelnovien de la grotte Latronico 3 (Potenza, Basilicate) dans le contexte de la Méditerranée occidentale

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Les industries lithiques mésolithiques du VII^{ème} millénaire BC calibré se rattachent à un vaste ensemble, celui du second Mésolithique, présentant de l’Afrique du Nord à l’Europe occidentale des caractéristiques communes, en rupture avec les industries plus anciennes du premier Mésolithique. Quelques traits technologiques et typologiques sont largement partagés par ces industries : débitage de lames et lamelles par percussion indirecte et/ou pression, lames à coches (lames Montbani), trapèzes. Plusieurs études récentes ont approché la question de l’évolution de ces industries (Perrin et al 2010), leur caractérisation des modes de débitage laminaires et lamellaires (Binder et al. 2012; Collina 2006; 2012; 2015) et leur définition fonctionnelle (Gassin et al. 2014). Dans ce cadre, en partant du travail d’un des auteurs (CC), on a abordé l’étude du site de Latronico 3, qui joue, avec la Grotte de l’Uzzo (Sicile), un rôle très important pour comprendre la position du Sud de la péninsule italienne dans les dynamiques culturelles et techniques du VII^{ème} millénaire BC en Méditerranée occidentale.

La grotte Latronico 3 (fouilles G. Cremonesi) se situe en Basilicate (Italie du Sud) et est un des sites les plus méridionaux du Castelnovien. Elle présente une épaisse stratigraphie du Mésolithique récent. L’étude démarrée en 2015 s’inscrit dans une approche intégrée destinée à caractériser les industries lithiques mésolithiques. Notre étude technologique et fonctionnelle de la production laminaire et des géométriques des niveaux 41-44 (seconde moitié du VII^{ème} millénaire BC) vise notamment à préciser les modalités du débitage par pression et les finalités fonctionnelles de l’industrie. La comparaison avec des industries contemporaines permet de discuter des relations entre cet ensemble et d’autres entités du second Mésolithique méditerranéen et de comprendre les voies de diffusion et la diversité culturelle du Second Mésolithique.

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Keywords: Mésolithique, technologie lithique, chaîne opératoire, analyse fonctionnelle, outillage, géométriques, traditions techniques, pression, percussion indirecte

From Typical to Upper Capsian: evolution of the lithic industries from the Kef Zoura D rockshelter (Algeria)

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4

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The Kef Zoura D rock-shelter, located in the Téli djène Basin, eastern Algeria, was partially excavated by David Lubell and colleagues in 1976-1978. The deposits revealed a significant stratigraphy that allows us to understand the evolution of the material productions and the way of life of the populations established in this region at the beginning of the Holocene as described in the recently published monograph (Lubell dir., 2016). A new examination of the lithic industries (raw materials, technology, typology and use-wear analysis) was carried out as part of the collective research program MeNeMOIA. Relying on the 3D registration of the material and a revised chronological framework using additional radiocarbon dates, we have been able to confirm and precisely identify the technological shift which marks the end of the Typical Capsian and the emergence of the Upper Capsian. This crucial moment of transition is characterized by major changes in the knapped flint industries, in terms of the operating systems as well as the technical processes and the use of the tools produced. Thanks to the quality of the excavations, Kef Zoura D can be seen as a reference site to approach the nature and timing of the evolutionary dynamics at work in the 9th to 8th millennia cal. BP in Algeria and Tunisia.

Keywords: Holocene, Mesolithic, Neolithic, Hunter, gatherers, Algeria

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Variability in the use of macro-tools during the Mesolithic of Northeastern Iberia

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Macro-tools constitute an important part of the Mesolithic assemblages from the beginning of the Holocene. In this category we include both worked cobbles and cobbles intentionally transported and used without being previously modified. Despite its importance, the study of these macro-tools has generally received little attention from researchers. This contrasts with the remarkable presence of these artifacts and with their great variability at different levels (morphology, raw material, size, use). In addition, they often represent the main component of the assemblages in terms of weight, with what this implies concerning the cost associated with their transport and use.

Our objective is to analyze the role of macro-tools in the technical behavior of Mesolithic populations of northeastern Iberia. As a case study, we will present the macro-tools found at the Abric Agut site (Capellades, Barcelona, Spain). The Abric Agut sequence has been dated between ca. 12,000 and 10,000 years cal BP and corresponds to the Mesolithic Macrolithic, a technological facies very well represented in the whole of Iberia at the beginning of the Holocene and defined by the expedient nature of the knapping and tool manufacture strategies. The stigmas of use documented in the Abric Agut macro-tools indicate a wide variety of uses in essential domestic activities associated with subsistence. It is difficult to discern if this diversity of functions responds to the multifunctional character of these artifacts or to the successive reuse of these elements throughout the formation of the level. We must keep in mind that, due to their size, some of these artifacts could be considered as site furniture. We propose the technical and functional study of these artifacts, and the identification of different moments of use, as a diagnostic element in the identification of tasks.

The use of macro-tools in expedient technical contexts is fundamental to identify the subsistence activities of Mesolithic hunter-gatherers. In addition, we think that these artifacts can play an essential role in the cultural characterization of the populations from the beginning of the Holocene, especially in relation to the use of macro-tools in the immediately preceding moments. With this objective, we will make a comparison with the macro-tools found in the Molí del Salt (Vimbodí i Poblet, Tarragona, Spain), a late Upper Paleolithic site dating from ca. 15,000 to 13,000 years cal BP.

Keywords: Mesolithic, macro, tools, northeastern Iberia

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ABOUT GENESIS OF LITHIC COMPLEXES IN THE ANCIENT HOLOCENE IN SOUTHERN ITALY

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ABOUT GENESIS OF LITHIC COMPLEXES IN THE ANCIENT HOLOCENE IN SOUTHERN ITALY

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The authors present new data about Sauveterrian lithic productions from two sites located in the Low-Tyrrhenian side of Italy: Grotta del Romito (Northern Calabria) and Grotta della Serratura (Southern Campania). One of the main topics about the Early Mesolithic of this area concerns the emergence of Sauveterrian assemblages in the South of Italy and the role, in their formational process, of the Northern Sauveterrian. In these southern Mesolithic assemblages "typical" Sauveterrian features seem to have been interpolated in techno-typological trends rooted in the local Late Epigravettian substrates. Even though some techno-typological variability can be detected between lithic assemblages from Grotta del Romito and Grotta della Serratura, they show similar features to those of the Northern Sauveterrian group: a) flaking is oriented to produce micro- and hypermicro blanks, mainly bladelets and laminar flakes; b) two main categories of cores occur, prismatic and discoid, which are generally intensely exploited; c)

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local raw materials exploitation is almost everywhere predominant; d) occurrence of Sauveterre-like points, three sides retouched triangles, crescents, hyper-micro short handscarpers. New radiocarbon dates from Grotta del Romito e Grotta della Serratura (13th-12th mill. cal. BP) seem to indicate a precocity in the emergence of the Sauveterrian in the Low-Tyrrhenian side of Italy in respect to the Central and Northern regions. This new chronological record lead us to reconsider the diffusionist model taking into account alternative explications. A new hypothesis which does not exclude the possibility of an interaction with external influences but contemplate the local evolution model ("Sauveterrianization") of these regions principally as the result of a local transformations started at the end of the Pleistocene.

Keywords: Sauveterrian lithic complexes, Southern Italy, Mesolithic assemblages

Recalibration of radiocarbon dates using *Helix melanostoma* shell at A'ïn Misteheyia, eastern Algeria

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The 1973-6 excavations at A'ïn Misteheyia, a Capsian site in eastern Algeria, revealed an archaeological sequence dated between approximately 9500 and 6000 calBP showing evidence for technological and subsistence change coeval with what we interpret to have been the 8200 bp cold event. Using a new shell reservoir offset of 476 ± 48 14Cyr for the terrestrial shell, *Helix melanostoma*, we show that the sequence at A'ïn Misteheyia, based on pre-AMS dates using *H. melanostoma* shell, is coeval and comparable to the very well documented one from the nearby site of Kef Zoura D based on AMS dates for samples of both charcoal and bone. The revised dating shows a clear break in the A'ïn Misteheyia chronological sequence that corresponds to a transition in the archaeological record from *Capsien typique* to *Capsien supérieur*, equivalent to the one documented for Kef Zoura D. The revised chronology shows that this change, reflected in both techno-typological and subsistence criteria, correlates closely with the 8200 bp cold event.

Keywords: Capsian, radiocarbon, 8200 cal bp cold event

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Early Holocene socio-ecological dynamics in the central Mediterranean region of Iberia

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Over the past few years, an increasing body of palaeo-ecological and palaeo-environmental evidence indicates that the Early Holocene was a period of significant climatic instability in the Western Mediterranean. In the central Mediterranean region of the Iberian Peninsula, lake records indicate centennial scale climatic fluctuations along the Early Holocene warming, with a recurrent pattern of aridity events. In addition, the sea level rise dramatically transformed coastal landscapes and seascapes, flooding the coastal plains and changing configuration of littoral biotopes.

This contribution discusses Mesolithic adaptations to this changing scenario in the central Mediterranean region of Spain. Particularly, we focus on the relationship between Early Holocene climate and palaeo-environmental changes with human socio-ecological systems (specially settlement dynamics and subsistence patterns through the integrated analysis of open-air residential sites and lake records from inland and coastal areas. On one hand, we present the first results of the recent excavations at the lakeside site of the Arenal de la Virgen site, in the Upper Vinalopó Valley (Villena, Alicante) in the context of the ERC project Paleodem (ERC-CoG-2015 Ref.683018). New fieldwork undertaken in 2017 has broaden the excavation area up to 100 m² uncovering a palimpsest of lithic scatters and occupational features dated between 9.3 and 8.4 ky cal BP. A new inter-disciplinary program consisting on geoarchaeological studies (stratigraphy, micromorphology and pedology), palaeo-environmental geochemistry, palaeo-botanical analyses and radiocarbon dating, has been developed to better constrain the correlation between changes in occupational intensity and palaeoenvironmental dynamics in inland locations.

On the other hand, in the south of the Valencian gulf, we present a synthesis of our current work on the bio-archaeological collections (shell and faunal assemblages) of the Mesolithic site of El Collado (Oliva, Valencia) whose archaeological sequence has been subject of a new Bayesian chronological model. In addition, we present the preliminary results of the palaeoecological research carried out in the Pego-Oliva wetland, in the context of the Marie Curie project Medcores (H2020-MSCA-IF-2015 Ref. 704822). New coring fieldwork undertaken in 2017 has provided new sedimentary and chrono-stratigraphic evidence to reconstruct Early to Middle Holocene

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relative sea level changes and the morphogenetic evolution of past coastlines.

Our preliminary results suggest a significant increase on land use and economic intensification along the Early Mesolithic, especially during an Early Holocene sub-period of climatic stabilization. In contrast, the Late Mesolithic witnessed significant changes on settlement distribution and land use patterns due to the variable effects of the 8.2 kya cal BP event and the reduction of coastal wetlands.

Keywords: Early Holocene, Mesolithic, Settlement, Paleoecology, Radiocarbon, Mediterranean

” Haches ” mésolithiques en bois de cerf dans la moitié sud de la France : état des lieux des connaissances et perspectives de recherches.

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La hache (et la herminette) sont traditionnellement vues comme l'une des caractéristiques du Néolithique européen. Pourtant, ce type d'outil massif est également connu en contexte mésolithique : il peut s'agir d'instruments dotés de lames en pierre ou en matières osseuses. Dès les premières recherches sur les cultures mésolithiques du Nord de l'Europe, la présence de telles pièces est soulignée. En Europe occidentale en revanche, les découvertes d'objets finis de ce type restent exceptionnelles. Cet état de fait a abouti à une dichotomie culturelle opposant un monde mésolithique nordique avec haches et un monde méridional sans hache, dichotomie élargie à l'ensemble de l'équipement en matières osseuses. Ce raccourci a été dénoncé, notamment par J.-G. Rozoy, qui soulignait les biais induits par les conservations différentielles des matières organiques.

Une récente synthèse sur l'outillage en matières osseuses au Mésolithique dans le sud de la France est venue confirmer le caractère trop simple et rapide de ce raccourci. Grâce à une approche technologique de ce pan de la culture matérielle, permettant notamment de palier au problème du faible nombre d'objets finis découverts, il a été possible de mettre en évidence une exploitation du bois de cerf standardisée et planifiée, orientée notamment vers la production d'outils biseautés massifs qui constituent une part du fonds commun de l'outillage mésolithique en matières osseuses, et ce dès les phases anciennes. Bien avant les premiers contacts avec les sociétés néolithisées, les populations holocènes européennes étaient donc déjà dotées d'outils biseautés massifs.

De nombreuses questions se posent autour de la cause de l'apparition de ces outils, de leur fabrication et de leurs fonctions. Faut-il y voir des haches ou des herminettes *stricto sensu*, c'est à dire des outils emmanchés à partie active tranchante, dédiés au travail du bois, à lier avec un développement de la forêt et un accroissement des ressources en matières ligneuses ? Ou s'agit-il d'outils plus polyvalents, notamment en lien avec des travaux de terrassement, qui apparaissent, depuis la récente multiplication des découvertes de fosses mésolithiques, plus courants que ce que l'on imaginait ? Et qu'en est-il de leur possible signification sociale, quand on connaît tout le poids, social et symbolique, des lames de hache dans les cultures néolithiques ? Au final, existent-il des liens de filiation entre les outillages mésolithiques et néolithiques, morphologiquement proches ?

*Speaker

Keywords: Mésolithique, Néolithique, matières osseuses, bois de cerf, hache, étude technologique

**XIX-2. Hunter-gatherers confronting
the expansion of farming
communities.**

Farmer-Foragers Interactions across the Levant and Mesopotamia

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Foragers and farmers surviving in terrestrial variable environments across southwestern Asia, were familiar with each other whether they belonged to the same social and mating systems, spoke similar dialects of the same language, or simply spoke more than one language. Interactions were frequent among close neighbors, and less frequently with ‘others’ who lived further away. Prehistoric research focused on the emergence of sedentary farming societies some 15,000 years ago and during the early Holocene should be able to trace communications that left behind artifacts, techniques and belief systems as evidence for interactions between Levantine, Mesopotamian and Egyptian entities. Two major rivers served for transport for many millennia in the Fertile Crescent: The Tigris and the Euphrates were major highways. Floating and rowing in small boats made of reeds and covered with the hides of hunted or domesticated animals would not take more than a month or two to reach southern Mesopotamia from the northern Levant. Similarly simple water vessels allowed for communication in the Eastern Mediterranean including several islands. Employing these simple vessels for water transport facilitated the transfer of information, technologies, seeds and animals across the entire region and brought sedentary farmers-hunters ‘face to face’ with relatives and ‘others’ who remained mobile foragers. Somewhat similar situations occurred when herding goat and sheep as specialized activity (early pastoralism) took place. These interactions probably played various roles during the early millennia when the foundations of the Western Asia civilizations were formed. This complex issue will be discussed pointing out different options for the interpretations of variable interactions in the fields of economy, social structure and religion.

Keywords: Foragers, Farmers, Fertile Crescent

*Speaker

Recent Mesolithic in steppes of Ukraine at dawn of the Neolithization

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In southern Ukraine the development of Neolithic society is generally placed within the framework of interaction between Mesolithic hunters and external Neolithic groups. Meanwhile, the Mesolithic sites immediately prior to the arrival of most ancient ceramics (presence of domesticates in the Early Neolithic of Ukraine is currently under dispute) are poorly known. The general cultural situation seems to be clear. There were two cultural blocks: Grebenyky and Kukrek sharing the steppes of north Black and Azov Seas littoral. However, there is an evident lack of well-dated excavated sites of both cultural aspects for the Early Atlantic period (7000-6200 calBC) for the regions of future Neolithic colonization.

Recently, two sites of Kukrek cultural aspects were re-excavated with enhanced stratigraphic controls and further radiocarbon dating of sediments namely the sites of Kamyana Mohyla 1 (north Azov Sea) and Melnychna Krucha (south-western Ukraine). The Mesolithic layers underlie the layers of later pottery-bearing cultures in both cases. The former can be attributed to the Kukrek technocomplex by a characteristic techno-typological composition of lithic assemblage. In Kamyana Mohyla 1 (middle layer) tools include retouched flakes (14% of tools), retouched blades (24%), notched or denticulate blades (5,6%), a backed bladelet, Kukrek inserts (19%), a simple end-scraper, perforator on a flake, burins and points. *Burins* are mostly composed by three distinctive groups: double / multiple burins on blades and dihedral and multiple (Kukrek) burins on flakes and simple burins on flakes. "Kukrek burins" resemble secondary cores (cores on flakes). *Points* were produced by an oblique truncation of microblades and bladelets.

The Kukrek-type inventory is also characteristic for the earliest pottery-bearing cultural aspects in the regions under study: Pechera (the south-western Ukraine) and Surska (the Azov Sea region). It can generally be distinguished from the Recent Mesolithic assemblages by more advanced microlithization, systematic presence of geometrics, extended variety of end-scrapers subtypes etc. Kukrek culture bearers are the best candidate so far known for the role of Mesolithic hunters which experience and/or were influenced by the earliest stages of "Ceramization" in southern Ukraine. Supported by SNF SCOPES SNF-IZ76Z0.147550

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Keywords: Mesolithic, Steppe, Earliest pottery, Radiocarbon chronology

The transition to an agricultural way of life in the sandy lowland of Belgium

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Until recently the neolithisation process in Belgium focused almost exclusively on the loamy areas of Middle Belgium, with the study of the LBK and the Michelsberg cultures. These studies have demonstrated that the introduction of domesticated plants and animals was a rapid process, most likely resulting from migration of early farmers from the Central European loess areas as early as 5300 cal BC. On the other hand, research in the sandy lowlands of Northern Belgium was limited until the recent fortuitous discovery of a number of well-preserved wetland sites in the Lower-Scheldt floodplain (Doel, Bazel, Melsele). For the first time, these discoveries offer the opportunity to investigate the neolithisation process and thus possible contacts between indigenous hunter-gatherers and adjacent farmer-herders throughout the 5th and 4th millennium cal BC. This paper will present the first results of a multidisciplinary analysis of these wetland sites, focusing on the study of lithic artefacts and ceramics from a typological, technological and functional perspective. These sites have yielded remains of the southernmost expansion of the final Mesolithic Swifterbant culture, the last hunter-gatherers of the region, and the subsequent Middle Neolithic Michelsberg culture, representing the first local farming societies. The so far obtained data clearly indicate that, compared to the loess region, the transition to an agro-pastoral economy was a late and gradual process resulting from increased contact and exchange with farmers. Contact probably started in the first half of the 5th millennium with the exchange of "exotic" pottery, non-local flint raw materials and cereal grains, followed by the local production of indigenous pottery. The economic turnover dates to the second half of the 5th millennium from at least 4300 cal BC onwards, with the first hard evidence of local agriculture and stock-breeding.

Keywords: Mesolithic, Neolithic, neolithization, lithics, ceramics, Swifterbant culture, Belgium

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Between resilience and conservatism: symbolic productions at the dawn of agriculture

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3

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Until recently, little efforts were made on the characterization of large-scale population interactions from the scope of symbolic productions. This is especially detrimental considering that cultural items fulfilling exclusively symbolic functions are very powerful for detecting cultural affinities between populations and patterns of cultural change through time.

In our study, we explore bead type associations and pottery decorations to document the evolutionary processes that led to variations between European archaeological cultures, and micro-scale processes responsible for the transmission of cultural practices within foraging and farming communities in Western Mediterranean. We use several multivariate analyses, including Partial mantel test, NeighboNet Joining, AMOVA analysis, Wilcoxon rank test and spatial interpolation, in order to document how cultural traits, knowledge and symbols circulated from a community to another and if similar cultural mechanisms acted in the various regions.

Our results show that pottery decoration diversity correlates with local processes of circulation and exchange, resulting in the emergence of stylistic and symbolic boundaries between groups, while personal ornaments reflect more conservative traditions shared over the territory. We conclude that the high level of connection revealed by personal ornaments correspond to selective appropriation of old indigenous attires by incoming farmers. Foraging societies were not passive participants in the establishment of the European farmers' personal ornamentation, suggesting the long-term maintenance of circulation networks for exogenous raw material supply and a deep time persistence of the symbolic messages expressed by the bead-type configurations.

Keywords: Personal ornaments, pottery, symbols, cultural evolution

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Derniers chasseurs-cueilleurs et premiers paysans en Italie du Sud : évolution des industries lithiques et traditions techniques entre VIIème et VIème mill. av. J. – C.

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La Néolithisation en Italie du Sud représente une problématique toujours ouverte. Plusieurs identités archéologiques sont impliquées dans le déroulement de ce processus et l'analyse des données lithiques est, traditionnellement, passée au second plan. Dans ce travail nous souhaitons proposer un bilan des dynamiques impliquées, entre VIIème et VIème mill. av. J. – C (dates calibrées), dans le passage des derniers groupes de chasseurs-cueilleurs aux premières sociétés néolithiques et une réflexion sur l'apport que l'étude technologique des industries lithiques peut donner à ce sujet. Ce travail fournit une étude technologique qui a permis de mettre en évidence les méthodes, les techniques de débitage et les différentes chaînes opératoires mises en place par les derniers chasseurs-cueilleurs et les premières communautés de paysans dans le Sud de la péninsule italienne et en Sicile. Les séries lithiques abordées dans cette étude sont issues de sites primordiaux donc la fiabilité a été testée par la cohérence des procédures de fouille, des associations culturelles et de leur niveau de perturbation stratigraphique. Elles appartiennent à différents horizons du Mésolithique final et du Néolithique ancien de l'Italie du Sud et sont réparties dans plusieurs régions (Ripa Tetta et Scamuso, Pouilles ; Rendina et Latronico, Basilicate ; La Starza de Ariano Irpino, Campanie ; Grotte de l'Uzzo, Sicile). Est-il possible de reconnaître une variabilité techno-économique dans les systèmes de débitage du Néolithique ancien ? Est-il possible de donner une valeur culturelle à la variabilité des faits techniques ? Quels sont les rapports de continuité et discontinuité entre les derniers groupes de chasseurs cueilleurs et les premières sociétés productrices ? Par l'étude de sites cruciaux comme la Grotte de l'Uzzo, ces questions ont permis de viser l'ensemble des transformations techniques et culturelles entre VIIème et VIème mill. av. J. – C (dates calibrées) dans la Méditerranée occidentale en Italie du sud, une région qui joue un rôle clés dans le processus de diffusion du Néolithique vers l'Ouest de la Méditerranée.

Keywords: Italie du sud, Mésolithique, Néolithisation, Néolithique, industrie lithique, chaîne opératoire, silex, économie du débitage, économie des matières premières, techniques, pression

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Impact of adoption of the domestic sheep on the economic strategy of the first Neolithic communities in the Iberian Peninsula

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Sheep were domesticated in the Near East and introduced later in the Western Mediterranean area, a fact that is generally associated with the expansion of Neolithic communities. The wild taxon of sheep is absent at the beginning of the Holocene in this region. In the Iberian Peninsula, the first testimonies of sheep husbandry are documented in the middle of the 6th millennium BC. The sheep and goat remains have a greater relative importance in the early Neolithic sites compared to other species such as bovids or suids. This greater quantitative importance could be due to its rapid adoption. The remains of sheep tend to exceed numerically those of goats throughout the Neolithic, both in cave and open-air sites, although high variability is documented. The following communication presents a synthesis of current knowledge about the dynamics of domestic sheep adoption in the early Neolithic incorporating new data obtained in the Pyrenees area. The current state of research evidences a fast introduction of this species during the second half of the 6th millennium BC. This situation is compared with the integration dynamics of other species as goats, cattle and pig to the domestic livestock. The success in the adoption of this species is evaluated, taking into account slaughter patterns and size variability of sheep in relation to ecological and social pressures. The importance and role of domestic sheep in funerary practices are also examined. Finally, the possibility of existence of different sheep adoption modalities is debated, considering the variability registered in animal management strategies practiced for last hunter gatherer societies along the Iberian territories.

Keywords: sheep, Early Neolithic, Iberian Peninsula

*Speaker

Looking for a diffuse frontier: A discussion on the evidence for interaction between hunter-gatherers and farmers in sixth millennium cal BC Iberia

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The Iberian Peninsula is one of the most complex areas of Europe for the study of the transition from the Mesolithic to the Neolithic. Located at a crossroads, between the Atlantic and the Mediterranean, and constituting a bridge from Africa to Europe, it displays an astonishing geographic and environmental variability in a relatively small surface (582,000 km²). Moreover, the late Mesolithic is also very diverse, with high differences in the density of settlements and a high cultural variability. Therefore, it is not surprising that the spread of the Neolithic was a long and complex process, lasting for at least 600 years (from ca. 5600 cal BC to the beginning of the fifth millennium cal BC), which, according to recent research, probably involves a wide array of situations, from the arrival of groups of farmers coming from other parts of the Mediterranean basin to the acculturation of local communities of hunter-gatherers. We can consider Iberia a mosaic of transition processes providing an excellent reference for understanding the Neolithization of western Europe. In this context, the relationship between hunter-gatherers and farmers is a key issue. However, although the transformation of the local hunter-gatherers by the influence of the Neolithic newcomers has been one of the favorite explanations for the neolithization in many parts of the Iberian Peninsula (following the so-called "dual model, which has been the leading paradigm for the last forty years), the nature of the interaction between both kinds of communities has rarely been addressed to in an explicit way. Yet some sites provide some information that deserves to be carefully analyzed. In this paper, we examine and discuss the existing evidence concerning the contacts and reciprocal influences between hunter-gatherers and farmers along the Iberian Peninsula.

Keywords: Mesolithic, Neolithic, Neolithization, Interaction, Iberian Peninsula

*Speaker

CONFRONTING THE DUAL MODEL: A MIXED MODEL TO EXPLAIN HUNTER-GATHERER AND FARMING INTERACTIONS IN EASTERN IBERIA

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The spread of farming and herding practices along the Western Mediterranean has been explained through demic and/or cultural models including narrative as well as mathematical approaches. This debate is also maintained in Iberia where most of the researchers considers the existence of some degree of demic expansion currently supported by recent DNA results. The "dual model" was proposed in the 70th from the seminal works conducted by Martí in Cova de l'Or (Alicante) and Fortea in Cueva de la Cocina (Valencia). Using these two major sites to illustrate its, Cova de l'Or constituted an example of first agricultural settlement while Cueva de la Cocina showed a wide deposit including both last hunter-gatherers and Early Neolithic levels explained in terms of interaction. Summarizing, the dual model described the hypothesis of coexistence between farming pioneers and hunter-gatherer communities and the subsequent possible interaction scenarios. Nevertheless, as it is frequently emphasised by the literature, the explanation of this kind of acculturation contexts implies a major challenge due to the difficulties that usually involves to identify this kind of processes from archaeological record. In this presentation we propose to realize an evaluation of the proposed interaction scenario in Cueva de la Cocina in the context of the neolithization in Eastern Iberia considering, a) The new radiocarbon program conducted at the cavity in a Bayesian approach, b) geostatistical methods to test archaeological record dispersal patterns, and c), the regional framework in order to analyse local and regional processes.

Keywords: neolithisation process, interaction, Eastern Iberia, Cueva de la Cocina, Radiocarbon

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Coastal Neolithic: A discussion on the evidence for interaction between hunter-gatherers and farmers in Barrosinha (Grândola, Portugal)

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The substitution of subsistence systems focusing on the exploitation of the marine resources for others, which rely mainly on domestic species, and where the contribution of the former is nearly negligible, appears to be a very frequent pattern in the transition to the Neolithic in coastal areas. However, there are some exceptions. One of them is the group of late Neolithic/early Copper Age shell middens of Comporta, in the southern bank of the Sado estuary, in Portugal. These sites were explored in 1979 by two of us (Joaquina Soares and Carlos Tavares da Silva), displaying a very high density of marine or estuarine fish and invertebrate's remains. In the context of a research project on the transition to the Neolithic in coastal areas of SW Europe (CoChange), we have recently re-excavated a series of well-preserved Mesolithic and Neolithic sites in the valley of the Sado river, one of the classic areas for the study of the late hunter-gatherers communities in southern Portugal. One of the issues raised in that research was the characterization of the latest stages on the intensive exploitation of marine or estuarine resources. With that aim, we have obtained new samples in Barrosinha, a large open-air site located on top of a dune facing the Sado estuary. In this communication we present the preliminary results of our investigations, including new Radiocarbon dates, and analysis of the industries and the faunal remains recovered in our test pits.

Keywords: Marine resources, Late Neolithic, Portugal, shell middens

*Speaker

Les derniers chasseurs-collecteurs de la Font-aux-Pigeons (Châteauneuf-les-Martigues, Bouches-du-Rhône) : approche fonctionnelle croisée de l'industrie lithique et sur coquillage

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Site éponyme du Castelnovien, la Font-aux-Pigeons est un abri sous roche situé à 2 km au sud de l'étang de Berre, dans la commune de Châteauneuf-les-Martigues (Bouches-du-Rhône, France). Les couches attribuées au Mésolithique final ont été reconnues lors des campagnes de fouilles de M. Escalon de Fonton entre 1947 et 1949 et de J. Courtin en 1979. Le mobilier archéologique découvert par ces dernières fouilles indique une exploitation différenciée des ressources du milieu littoral dans lequel s'inscrit le site.

Des faunes marines et terrestres sont pêchées et chassées. Les mollusques marins participent aussi à la diète des occupants de l'abri.

L'industrie lithique des couches 18G2 et 18G3 des fouilles Courtin a fait récemment l'objet de nouvelles analyses typo-technologiques, pétrographiques et fonctionnelles. Les matières premières lithiques provenant essentiellement d'affleurements de silex barrémo-bédoulien très proches du site font cependant l'objet d'une exploitation différenciée. Le panel des matériaux travaillés s'avère assez large. Le travail de matériaux d'origine animale (peau et matières dures) est

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le plus représenté. Les autres activités réalisées dans l'abri concernent surtout des gestes de transformation par raclage, perçage ou perforation de végétaux et de minéraux. Les géométriques et les microlithes montrent des traces diagnostiques de l'impact suite à leur emploi comme projectiles.

L'abri a livré en outre de nombreux fragments de *Mytilus galloprovincialis* L. à bord denté. Leur emploi en outils, proposé par des études antérieures, est conforté par nos analyses tracéologiques qui viennent affiner l'interprétation fonctionnelle.

Ainsi, la combinaison des analyses fonctionnelles du mobilier lithique et des coquillages fournit un cadre plus précis et plus complet des activités réalisées sur le site. Elle détermine par la même, le statut de ces deux types d'outillages au sein du système technique des derniers chasseurs castelnoviens.

Keywords: Mésolithique, Analyse fonctionnelle, Lithique, Coquillage

The ‘Neolithic’ and earlier types of ‘agricultural’ activities. Increasing evidence of pre-Neolithic resource manipulation

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To analyse properly and understand the relation between the Holocene ‘hunter-gatherers’ and ‘Neolithic’ farmers it is important to understand the differences and similarities between these two types of societies. Recent research indicates stronger and stronger that systematic agricultural-like manipulation of the local natural resources was an important economic factor far back in the Pleistocene. Accordingly, there is an increasing suspicion that the introduction of ‘Neolithic’ economies is mainly visible in the archaeological materials because of its use of foreign domesticated species whereas it may not represent a radically new economic approach. Ethnoarchaeology as well as some archaeological data elucidate the economy of such quite agricultural pre-Neolithic cultures which according to some indicators may go a hundred thousand or even more years back in time. Due to its potentially large time depth this phenomenon is not properly covered by the term ‘Mesolithic’, which originally was meant to signify a ‘pre-Neolithic hunter-gatherer phase’. The present development in the understanding of human economy at least back to the beginning of the Upper Palaeolithic indicates that a revision of the present terminology is needed, to reflect properly the cultural processes we are dealing with. This is a pre-condition for understanding the relation between the different types of societies and their economies.

Keywords: Farming, Gardening, Neolithic, hunter, gathering, Ethnoarchaeology

*Speaker

Do hunter-gatherers dream of a Neolithic sheep?

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4

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After Philip K. Dick 1968 novel, *Do hunter-gatherers dream of a Neolithic Sheep?* will discuss cultural models in confrontation, moving beyond generalized, even if unconsciously, presumption that less sophisticated groups – hunter-gatherers - aimed, like androids with human expectations, to mimitize more elaborated societies – the Neolithic ones. This presumption, however, stands on a debatable issue that consider particular cultural achievements and norms as elements equally valued by different groups, who necessarily would share an anthropological hunger towards technological and economic complexity.

In southwestern Iberia – a finisterra where Mesolithic hunter-gatherers are deeply rooted in main paleoestuaries – the discussion of the Neolithisation was traditionally based on Neolithic groups and traits, underestimating the hunter-gatherer role in this transitional process. Nevertheless, different social strategies can be observed in the archaeological record concerning hunter-gatherer's attitudes towards the Neolithic, from active/ passive acculturation processes to different forms of cultural resistance. To establish which and when those particular social strategies were underway in the Early Neolithic and the Final Mesolithic, chronology, settlement patterns, material culture, food procurement strategies and funerary practices should be compared.

This presentation will focus on Final Mesolithic and Early Neolithic lithic technologies, considering raw material procurement strategies, core exploitation process, blanks, geometric armatures (mainly segments) and microburins from the Mesolithic shell midden of Cabeço das Amoreiras (Sado valley) and the Early Neolithic open air settlement of Valada do Mato (inner Alentejo),

*Speaker

both sites located in the southern Portugal and occupied at the end of the 6th millennium cal BC, according to the available 14C dates and the material cultural typology. Through the inventory of differences and similitudes of the flaked technology of the Final Mesolithic and the Early Neolithic, we aim to identify the presence of Mesolithic traditions within Neolithic groups and, at the same time, the ways in which hunter-gatherers confront/adopt/adapt the expansion of farming communities raising the question on whether they have ever dreamed, as expected in the Europocentric literature, of a Neolithic sheep?

Keywords: Final Mesolithic, Early Neolithic, southwestern Iberia, lithic industries, cultural confrontation

**XIX-3. Exceptional sites or
exceptional preservation?
Interdisciplinary Approaches to the
Function of Early Holocene Wetland
Sites in Europe**

Along the river-shore – excavations at Strandv’agen, Motala 6000-4500 BC

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Mesolithic sites in eastern Central Sweden are common and due to continuing post-glacial rebound often situated on dry sandy soils with poor conditions for preservation of organic remains. Typically, sites constitute features like pits, hearths and lithic scatters in combination with dry occupational layers. Excavated wetland sites are few and usually only cover submerged stratigraphy, thus, excluding adjacent settlement remains on dry land.

The Late Mesolithic complex in Motala includes extensive remains in form of thick occupational layers on land as well as submerged stratigraphy in the waters of the river Motala Str’om. The remains have been interpreted as a central place in the Mesolithic society of this part of Sweden. Robust post-built dwellings, work spaces for lithics and bone craft as well as complex ceremonial depositions and Mesolithic burials speaks in favor of a sedentary settlement populated all year around.

Three contemporary sites have been excavated adjacent to the river, the outflow of Sweden’s second largest lake, Lake V’attern. The largest excavations were conducted at Strandv’agen, situated on a promontory close to the first small rapids of the river. The site comprises thick occupation layers along the shore with contiguous refuse layers under water in an anaerobic environment preserving organic remains such as wood, bone and antler as well as archaeobotanical material. By building dams, enclosing part of the area beyond the present shore and pumping away the water, in combination with divers and underwater archaeology, it was possible to uncover and excavate the submerged stratigraphy with large numbers of organic finds from the bottom of the river. A contextual field methodology included water-sieving of more than 3000 m², of both dry occupational layers and submerged sediments. The ongoing project is multi-disciplinary combining archaeology, osteology, geology and archaeobotanical studies.

Until today Strandv’agen is the only Mesolithic site with a large assemblage of bone and antler from this part of Sweden. In addition to human and faunal remains this material also includes significant amounts of osseous tools as well as waste products from the manufacturing process. Not all finds were recovered from the river. Important portions were also collected from land, in areas adjacent to dwellings and thus supplementing the better-preserved finds from wet refuse layers.

This extensive excavation of different areas of a site, with multivalent remains of diverse activities, is exceptional within Scandinavia.

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Keywords: Central Sweden, late Mesolithic, Mesolithic, wetland finds

Butchery site or large-spectrum occupation ? Discussion about the Late Mesolithic refuse layers in Noyen-sur-Seine (France).

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Noyen-sur-Seine is best known for the abundant remains from the Early Mesolithic, but much less for those dated to the Late Mesolithic. Excavated between 1985 and 1987, the most recent levels are located inside two small depressions filled with peat during the second half of the 7th millennium BC. The study of the numerous faunal remains has been supplemented in recent years by a technological analysis of the lithic material. This approach was accompanied by a critical return on the taphonomy of archaeological levels and their spatial organisation. Despite the very good apparent conservation of the archaeological material, this work has shown the existence of chronological mixtures and a sedimentary history much more complex than expected. As for the older occupations, the river shore occupied by the Mesolithic populations also was totally destroyed by the floods. Therefore, the protected objects within the peat layers constitute the last available remains to reconstruct the function of the occupations. In this respect, research conducted over the past 30 years give us a solid basis for understanding the nature of the material discarded into the refuse layers. However, the archaeozoological and lithic data give fairly contrasting data. The abundant faunal remains reflect the image of relatively short occupations related to hunting episodes focused on the wild boar. At the opposite, the flint tools dated to the Late Mesolithic correspond to highly selected material which therefore give only a very partial picture of the activities that have taken place on the river shore. The use-wear traces found on the tools are few but indicate a surprising functional diversity that tempers the image of too specialised occupations. These data are supported by the discovery of several human bones and some osseous tools. In the end, the different approaches around the Late Mesolithic occupations show the necessity of this interdisciplinary approach. Even in the case of wetland sites, apparently well-preserved, it is essential to conduct a critical analysis of the contexts, combined with a real cross-study of the archaeological remains.

*Speaker

Keywords: Mesolithic, wetland site, lithic industries, taphonomy, butchery, use, wear analysis

Early Holocene Hunter-Fisher-Gatherer in transition? – Mesolithic sites in Duvensee Bog, south-eastern Holstein, Northern Germany

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The Duvensee peat bog in south-western Schleswig-Holstein, Northern Germany, represents one of the most prominent Stone Age palaeo landscapes in Northern Europe. After first archaeological investigations of Mesolithic sites by G. Schwantes and K. Gripp in the 1920s and later H. Schwabedissen further research was conducted by Klaus Bokelmann since the 1960s. An intensive survey and excavation programme led to the discovery of several new Mesolithic and Neolithic camp sites on small islands or peninsulas on the western border of the former Holocene lake. The two oldest sites, Wohnplatz 8 and 9, are dated to ca. 11,100-10,700 cal BP to the late Preboreal. They are followed by the early Boreal sites Wohnplatz 2, 11, 21, 1, and 6, which are dating between 10,800 and 9,900 cal BP. The sequence of Mesolithic sites with flint assemblages on the western bank of ancient Lake Duvensee ends with the late Boreal site Wohnplatz 13 (9,900-9,700 cal BP), the early Atlantic site Wohnplatz 19 delivered only a bark mat and a few charcoal concentrations.

The outstanding preservation of these camp sites with hearths, bark mats and flint knapping areas allows detailed examinations of the spatial organisation of prehistoric hunter-gatherer camp sites even though they may present only one very specialised, temporary part of the economic and settlement behaviour on an annual cycle. Hazelnut harvest was certainly very important at the temporary camp sites in Duvensee. However, specialized hazelnut roasting hearths are only proven for some of the early Boreal sites. Therefore it is still subject to intensive discussion, if hazelnut exploitation was a leading characteristic for the Early Holocene and hunting only secondary or if the contribution of hazelnuts to the Mesolithic subsistence is easily overestimated and the clear evidence of the importance of hunting and fishing on other North German Mesolithic sites like Hohen Viecheln or Friesack is ignored.

Since 2010, studies on the Mesolithic Duvensee bog sites has resumed under the auspices of the ZBSA. In a first step, all existing excavation records, augmented by geological, paleobotanical and archaeological data sets, have been digitalized and integrated in a Geographic Information System (GIS). Today the archaeological investigations are a fundamental part of the research project B2: "*Transitions of Specialized Foragers*" of the Collaborative Research Centre (CRC)

*Speaker

1266 *"Scales of Transformations. Human-Environmental Interaction in Prehistoric and Archaic Societies"* of Kiel University, ZBSA and Schleswig-Holstein State Museum of Archaeology.

Keywords: Early Holocene, Bog site, Hazelnuts, Mesolithic, Hunter, Fisher, Gatherer

Exceptional sites with exceptional preservation. The interpretation of the early Mesolithic bog sites from eastern Denmark.

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The early Mesolithic settlement at Køng-Sværdborg bog and Holmegaard bog in southern Zealand (DK) has been an important frame of reference for the Maglemose culture in general. But can these sites really live up to this honour? The sites were mainly excavated in the first half of the 20th century, under circumstances that are hard to believe today: water everywhere, almost no skilled labour and a tight time schedule rushing ahead of the peat diggers. Could the exceptional preservation have fooled the researchers into exaggerating the importance of the sites?

The bog sites represent a wide range of different types, from butchering sites with only animal bones, to small summer-camps situated directly on the bog surface and large sites on the dry land shore that could represent aggregation camps used during the cold season. No sites are properly scientifically dated and there has been no attempt to unravel the problems of different phases on the same sites.

Since 2013 the University of Copenhagen, The National Museum and The Museum of Southeast Denmark has conducted fieldwork on selected sites in Holmegaard bog. The aim has been to evaluate the present state of preservation in the bog and to search for potential supersites to excavate. By comparing the old excavations, with only limited field registrations, with newer excavations it becomes possible to make a preliminary interpretation of how the bogs were used during the early Mesolithic.

So far the conclusions are that although a large part of the bog has been destroyed by agriculture and drainage, large areas of the bog are still intact and could house potentially very well preserved sites.

Keywords: hunter, gatherers, bogs, mesolithic

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Exceptionnal in every way ? Integrated approach of the Early Mesolithic settlements in Noyen-sur-Seine (France).

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Excavated between 1983 and 1984, the Early Mesolithic occupations from Noyen-sur-Seine (Paris Basin) were recognised in two peat depressions corresponding to a palaeochannel, partly active at the beginning of the 7th millennium. The wetland context of these discoveries has allowed the exceptional preservation of lithic, faunal and plant remains that have been released into the refuse layers. Conversely, the banks where the Mesolithic evolved have been eroded by the floods of the Seine and have delivered no material at a distance from the peat levels. The remarkable preservation of the organic remains makes Noyen-sur-Seine a precious site for the understanding of the Paris Basin Mesolithic and beyond. The rich and varied faunal spectrum (small and large mammals, birds, reptiles and fish) is accompanied by dozens of human remains marked by cutting traces and also six fragments of fish traps, a basket and a dug-out canoe among the oldest in Europe. In contrast, the lithic corpus appears very monotonous but atypical, in particular by the scarcity of geometric microliths. This paper proposes to summarise the various analyses conducted on these Early Mesolithic occupations, which now make it possible to clearly identify the activities carried out by hunter-gatherer populations during their passage. The functional diversity observed by the interdisciplinary approach developed over the last 30 years is exceptional for the region. The perfect preservation of organic remains is obviously an essential parameter to recognise this archaeological diversity but it does not explain everything. Indeed, the functional analysis of the lithic tools allows identifying a broad activity spectrum which finds no equivalent in the other sites in the Paris Basin. If one also considers the environmental data revealing a marked anthropic signal at the very beginning of the 7th millennium, all the clues are gathered to consider the Early Mesolithic remains as the rejections of rather long occupations (base camps ?).

Keywords: Mesolithic, wetland site, basketry, zooarchaeology, use, wear analysis, mortuary practices

*Speaker

From lake to swamp: environmental changes, stratigraphic records and human settlements at Palù di Livenza (north-eastern Italy)

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Palù di Livenza is a wetland at the foot of the Cansiglio Cretaceous plateau in the Po-none area located in a tectonic depression. The characteristic geomorphology, the rich water supply granted by the karst springs of the Livenza river and the availability of natural resources made the basin particularly favourable for human occupation since the Late-glacial period. Archaeological evidence confirms an initial, sporadic frequentation of the area by hunter-gatherer groups during the Late Paleolithic and the Mesolithic, and the subsequent establishment of a stable pile-dwelling settlement during the Late Neolithic. The history of the basin also shows that from the Late-glacial period to our time the area has changed from lake, to swamp, to the current wetland conditions.

The first investigations, carried out in the early 1980s at a drainage channel in the middle of the basin, highlighted archaeological materials and wooden features of the Late Neolithic settlement, but several archaeological issues are still debated and unclear. Luckily, a vast part of the site is protected and still unexplored, thus preserving an important archaeological and palaeoenvironmental archive. For this reason, in 2011 Palù di Livenza was inscribed on the World Heritage List of UNESCO in the transnational serial property *Prehistoric pile-dwellings around the Alps*. Between 1980 and 2015 numerous geo-archaeological investigations were carried out at Palù di Livenza by means of manual core sampling in order to delimit the Late Neolithic settlement, to understand the geomorphological history of the basin and the various environmental changes occurred over time. In recent years a new phase of research and excavations has been launched at the site to gain a better insight into everyday life in the Late Neolithic pile-dwelling site, its chronology, and the settlement dynamics. Thanks to the archaeological and archaeobotanical evidence, to a great amount of sedimentological and geomorphological data, to some palynological

*Speaker

samples and to the study of digital terrain model (DTM) interpolated from detailed topographic airborne LiDAR data, we analyze the environmental history and the archaeological landscape of the Palù di Livenza. On the basis of old and new data, we present the recent interdisciplinary GIS-based approach to the study of the wetland area with the aim of defining its transformations from the Late-glacial period through the Holocene and identifying the human-environment interactions, with a focus on the impact of the pile-dwelling settlement during the Late Neolithic phase in the first half of the 4th millennium cal BC.

Keywords: pile dwelling, archaeobotany, geoarchaeology, LiDAR, Late Neolithic

Inferring site function and technological organization from combined spatial, technological and microwear-analyses at the Mesolithic wetland site of Kerkhove-Stuw, northwestern Belgium (preliminary results).

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The extensive Mesolithic site of Kerkhove-Stuw was located on the top of a natural levee, adjacent to a palaeochannel of the river Scheldt. Subsequently (from the boreal onwards), the landscape was covered by approximately 4,5m to 9m of peat and alluvial clay. The infill of the palaeochannel deposits were studied by means of a high-resolution multi-proxy analysis (i.e. pollen, microcharcoal, loss on ignition, magnetic susceptibility, granulometry, mollusc fauna ...etc.) to reconstruct the varying ecological settings of the prehistoric occupation.

The excavations yielded thirteen spatially distinct concentrations of lithic artefacts that could be dated to the Early, the Middle and the Late Mesolithic, based on typology. This was partly confirmed by 14C-dates on single entity charred hazelnut shells. Additionally, the site had great potential for a comprehensive technological analysis thanks to the overall low-density of the lithic concentrations and the diversity of macroscopically discernable raw material categories.

Besides lithics, a considerable amount of unburnt and burnt bone fragments, and palaeobotanical remains were documented. The preservation of a faunal assemblage (dominated by roe deer and wild boar, but also comprised of fur animals and fish remains) is exceptional for the Early and Middle Mesolithic in the region and will allow us, for the first time, to gain a better understanding of Mesolithic subsistence practices.

Finally, to determine the inter- and intrasite functional properties and aspects of the technological organization of the thirteen lithic concentrations, the spatial distribution of the different types of material remains are studied, combined with a technological and microwear analysis of the lithic artefacts. For example, the location of ten possible surface hearths could be derived from heavily burnt lithic artefacts and burnt organic remains. So far, preliminary results from

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the technological analysis indicate the presence of several expedient technologies, more elaborate opposed striking platform knapping sequences and a possible diachronic evolution in preferential raw material use. Both spatial analyses and lithic technology are reinforced by an extensive microwear analysis that can specify the objectives of the knapping sequences and mostly the spatial organization of the different activities (butchery, hide and plant scraping, osseous tools manufacturing...) for each occupation phase.

In the future, the results from Kerkhove will have to be compared with those previously obtained with the same protocol from other (dryland) sites in northwestern Belgium.

Keywords: Mesolithic, spatial analysis, lithic technology, microwear analysis

Organic residue analysis of Neolithic ‘bog pots’ demonstrates mixed processing of foodstuffs

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Stone Age wetland sites does not only contain well preserved bone, antler and wooden artefacts, but also organic remains on non-organic artefacts like lithics or ceramics. One example are the well preserved organic residues on Neolithic potsherds, which allow us to employ novel bioarchaeological methods to study the diets of the peoples at that time.

In this study we combined published and unpublished data for thirty Early to Middle Neolithic (ca. 3950-2350 cal BC) ‘bog pots’ that were sampled from the collections of The National Museum of Denmark, Copenhagen. Their organic residues were analysed using a combination of bulk carbon and nitrogen stable isotope analysis, solvent extraction followed by gas chromatography-mass spectrometry (GC-MS), and compound-specific carbon stable isotope analysis by gas chromatography-combustion-isotope ratio mass spectrometry (GC-c-IRMS). The organic residues included absorbed residues (from powdered sherds), partially carbonised cooking residues from the interior of some vessels (‘foodcrusts’) and sooted material from the exterior surfaces of some vessels (sooted residues). Detailed analysis of the composition and isotopic signatures of the residues revealed the presence of ruminant adipose fat, dairy fat and aquatic fats with some residues containing a mixture.

Keywords: Organic residue analysis, Funnel Beaker culture, Neolithic, pottery

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They have to be out there.... a strategic survey for mesolithic waterlogged sites in north western Germany

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In the northern part of central Europe the current state of research on the Mesolithic is very unbalanced. Best results have been achieved in southern Scandinavia, where postglacial climate change and following changes in the landscape have led to fantastic conservation conditions. There, mesolithic settlement layers often got into waterlogged surroundings through sea level rise and the formation of raised bogs and give an impressive insight into the daily life of the last hunter-gatherer communities of northern Europe. In north western Germany investigations on sites with good organic preservation are lacking so far, although postglacial peat growth as well as direct influence of the holocene sea level rise is largely present in that region.

The Lower Saxony Institute of Historical Coastal Research has set up a project that is designed to conduct an extensive survey for Mesolithic sites with good conditions for organic preservation. Using an interdisciplinary approach, first insights into economical, ecological and social aspects of the Mesolithic communities in this area will be gained. These results will be the framework for further investigations on sites with waterlogged sediments.

Following a multi-level survey strategy it is planned to investigate 40 selected sites that are already known as Mesolithic surface sites situated along the edges of bogs, fens and kettle bogs as well as on the border between sandy moraines and marsh areas. These sites are going to be tested for their archaeological as well as preservation potential by surface surveying, mega-drill corings and geomagnetic investigations. Sites with the most promising results will be selected for more detailed investigations by small test excavations.

The presentation is giving an introduction to the state of the art on Mesolithic research and landscape reconstruction in northwestern Germany and the planned investigations during the coming years.

Keywords: Mesolithic, Survey, Landscape reconstruction, Peat growth

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To stay for a night or two. Small camps in a large lake dated to the Middle Mesolithic in Scania, southernmost part of Sweden

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A large bog, R'onneholms mosse, southernmost part of Sweden, is the aim of exploitation of turf. The removal of turf has been made by milling thin layers several times every season. Surveys have been carried out in order to identify loose finds and settlement remains. A large number of small camps, just a few square meters in size, have been found and excavated. They date to the middle Mesolithic. These camps provide a detailed insight into the activities taken place during a short time.

Keywords: Southern Sweden, mesolithic, bog sites, survey

*Speaker

Wetland site Zamostje 2: From artefact preservation to paleolandscape reconstructions

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Wetland sites of European Russia with remains of the material culture from the Mesolithic and Neolithic period (Early and Middle Holocene) possess unequal potential, both in preservation degree of organic materials and in breadth of the presented inventory. Questioning functional interpretation of these sites raises problems of paleolandscape reconstructions.

For Zamostje 2, which is a multi-layered site with evidences of occupation during the Late Mesolithic, Early and Middle Neolithic (first half of the Atlantic period) and is characterized by a rich bone-antler assemblage and representative wooden inventory, these questions can be solved both with archaeological and natural scientific methods.

Over 100,000 artefacts, a wide range of tools and weapons satisfying needs of the base settlement and made equally of solid animal materials and stone, make the site exceptional. Presence of certain categories of non-utilitarian items-in the first place dozens of engraved stone pebbles-sharply distinguishes it from not only synchronous waterlogged but also all "dry" sites and emphasizes its peculiarity regardless of preservation conditions of artefacts. Analysis of faunal remains of mammals, birds and fish, as well as fruits and berries indicates year-round human presence.

On the other hand, the preserved wooden inventory and proximity of the water-related economic zone with fishing structures raise questions about conditions of site functioning and the mode of sedimentation in different chronological periods. Complex analysis of vegetation (pollen, seeds, coals, wood, diatoms) as well as geochemical characteristics of sediments generally indicates conditions of a shallow, gradually overgrowing reservoir, with repeated fluctuations in the water level. In each geological rhythm, short periods of regressions are recorded when this territory was a low flat coast. Archaeologically it is associated with two periods of occupation in the Late Mesolithic and Early Neolithic (zones of activities, dwellings are absent). Their duration, taking into account the specie identification of wooden remains and their condition, could reach one to two decades max. In other periods, this area was the coastal part of a paleolake not far from human settlements in the elevated areas of the relief.

Keywords: wetland sites, lake settlement, Mesolithic, organic materials, wood artefacts, paleolandscape

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