

The Evolution of Human Settlement and the Transformation of a Lacustrine Basin into a Fluvial One during the Middle Pleistocene :Aïn Beni Mathar – Guefaït (Eastern Morocco)

Robert Sala-Ramos^{1,2}, Lee Arnold³, Mathieu Duval⁴, Josep Maria Parés⁵, Alfonso Benito-Calvo⁵, Claudia Álvarez⁵, Pedro Piñero^{1,2}, Hugues-Alexandre Blain^{1,2}, Maria Soto-Quesada⁶, Antonio Rodríguez-Hidalgo^{7,8}, Leticia Menéndez^{1,2}, Arturo de Lombera⁹, Jan Van der Made¹⁰, Florent Rivals^{11,1,2}, Andoni Tarriño⁵, Hassan Aouraghe¹², Hamid Haddoumi¹², Kamal El Hammouti¹², Jordi Agustí^{11,1,2} & M. Gema Chacón-Navarro^{1,2,13}

- 1 Institut Català de Paleoeologia Humana i Evolució Social (IPHES), Tarragona, Spain
- 2 Àrea de Prehistòria, Universitat Rovira i Virgili (URV), Tarragona, Spain
- 3 ARC Future Fellow and Senior Research Scientist, School of Physical Sciences, University of Adelaide, Adelaide, Australia
- 4 Australian Research Centre for Human Evolution, Environmental Futures Research Institute, Griffith University, Australia
- 5 Centro Nacional de Investigación Sobre la Evolución Humana (CENIEH), Burgos, Spain
- 6 Department of Anthropology and Archaeology, University of Calgary, Canada
- 7 Department of Prehistory, Complutense University, Madrid, Spain
- 8 Instituto de Evolución en África (IDEA), Madrid, Spain
- 9 Grupo de Estudos para a Prehistoria do Noroeste (GEPN), Departamento Historia I, Universidade de Santiago de Compostela, Santiago de Compostela, Spain
- 10 Consejo Superior de Investigaciones Científicas (CSIC), Museo Nacional de Ciencias Naturales, departamento de Paleobiología, Madrid, Spain
- 11 Institució Catalana de Recerca i Estudis Avançats (ICREA), Barcelona, Spain
- 12 Faculté de Sciences, Département de Géologie (FSO), Université Mohamed Premier, Oujda, Morocco
- 13 Institute d'Histoire Naturelle de l'Homme Préhistorique, CNRS, Université de Sorbonne and Musée de l'Homme, Paris, France

The Aïn Beni Mathar – Guefaït basin provides a long stratigraphic sequence and a faunal record that covers the Early and Middle Pleistocene. During the Pliocene and Early Pleistocene, a fluvio-lacustrine basin developed in the area. This landscape has been occupied by hominin developing a Mode 1 technology. This fluvio-lacustrine basin has its final phase in the early Middle Pleistocene.

During the Middle Pleistocene the lacustrine basin was captured by the Moulouya River and the current Oued Haï-Za began dissecting the previous Plio-Pleistocene infilling. This second phase in the region records the settlement of human communities represented by Lower Paleolithic (Acheulean) assemblages in the upper terraces and Middle Paleolithic assemblages in the lower ones.

The Aïn Beni Mathar basin records the passage from the Lower to the Middle Paleolithic within the Middle Pleistocene fluvial phase. There seems to be a transitional stage between a clear Lower Paleolithic phase found in a 0.5 Ma old fluvial terrace and Mode 3 industries in the lower terraces. This transitional stage bearing a non-standardized industry is related to the passage from the Middle to the Upper Pleistocene.

The Lower to Middle Paleolithic boundary: A view from the Near East

The Zinman Institute of Archaeology, University of Haifa, Haifa, Israel

Session H: Europe

Chair: Gonen Sharon

The Gran Dolina TD10 Lithic Assemblages and the Transition from the Late Acheulean to the Early Middle Paleolithic in Atapuerca

Andreu Ollé^{1,2}, Marina Mosquera^{2,1}, Xosé Pedro Rodríguez-Álvarez^{2,1}, Paula García-Medrano¹, Antonella Pedergrana^{1,2}, Arturo de Lombera-Hermida^{1,2,3}, Esther López-Ortega^{1,2}, Amèlia Bargalló⁴, Marcos Terradillos⁵, María Soto-Quesada⁶, Palmira Saladié^{1,2,7,8}, Antonio Rodríguez-Hidalgo^{9,10}, Jesús Rodríguez¹¹ & Eudald Carbonell^{2,1}

- 1 Institut Català de Paleoeologia Humana i Evolució Social, Tarragona, Spain
- 2 Àrea de Prehistòria, Universitat Rovira i Virgili, Tarragona, Spain
- 3 Grupo de Estudos para a Prehistoria do Noroeste Arqueoloxía, Antigüidade e Territorio, Dpto Historia I, Universidade de Santiago de Compostela, Santiago de Compostela, Spain
- 4 University College London, Institute of Archaeology, London, United Kingdom
- 5 Facultad de Humanidades y Ciencias Sociales, Universidad Internacional Isabel I de Castilla, Burgos, Spain
- 6 Department of Anthropology and Archaeology, University of Calgary, Canada
- 7 Unit associated to CSIC, Departamento de Paleobiología, Museo Nacional de Ciencias Naturales, Madrid, Spain
- 8 Grupo Quaternário e Pré-História do Centro de Geociências, Portugal
- 9 Department of Prehistory, Complutense University, Madrid, Spain
- 10 Institute of Evolution in Africa, Madrid, Spain
- 11 National Research Centre on Human Evolution, Burgos, Spain

Unit TD10 at Gran Dolina cave (Burgos, Spain) comprises several archaeological layers containing the richest archaeological associations recorded to date in the Sierra de Atapuerca sites. Here we present the technological succession documented in TD10, a 2.5 m thick unit dated from MIS 11 to the end of MIS 9.

The archaeological layers included in unit TD10 were formed as a consequence of several human occupations differing in nature, from short and varied stays in the cave certainly forming palimpsests, to well defined campsites, and to butchery sites in which evidence of communal hunting has been identified. Carnivores are also intermittently present in the archaeological record.

The study of the lithic assemblages coming from these layers enables documenting the technological evolution in the same cavity entrance, and offers a good opportunity to assess technological features with an evolutionary significance. Issues related to raw material management, the representation of the production sequences, the exploitation methods, the shaping patterns for both large cutting tools and small retouched flakes, as well as use-wear data and some cognitive aspects are taken into consideration to draw the aforementioned evolutionary technological assessment. As

The Lower to Middle Paleolithic boundary: A view from the Near East

The Zinman Institute of Archaeology, University of Haifa, Haifa, Israel

a first objective, we aim to discuss whether the differences observed along the TD10 sequence regarding the aforementioned issues can be explained according to functional variables (tactical and strategic responses to subsistence pressures, which for sure affect group mobility and foraging behavior), and which of the observed tendencies can be related to the behavioral and cultural shifts traditionally characterizing the Lower to Middle Paleolithic transition.

By qualitatively comparing our record with the Levantine Acheulo-Yabrudian we also aim to explore how Western Europe (and Iberia in particular) and the opposite end of the Mediterranean basin (the Levant) are coincident with respect to some relevant technological traits commonly pointed to as indicators of an initial Middle Paleolithic, such as the role of the large cutting tools, the complexity of the prepared core reduction systems, the standardization and diversification of the retouched flakes, the hafting techniques, the introduction of tools made of organic materials, and the existence of complex subsistence strategies including specialized hunting, etc. In the end, we aim to discuss the set of technological and behavioral issues commonly taken into account in drawing the transition between the late Acheulean and the early Middle Paleolithic. Such a discussion will contribute to our knowledge of the geographic and temporal variability of this transition.

The Shift from Typical Western European Late Acheulian to Micro-lithic Stone Knapping in Level 'D' of the late Middle Pleistocene Deposits of the Caune de l'Arago (Pyrénées-Orientales, France): An Experimental Approach

Deborah Barsky^{1,2} & Miquel Guardiola¹

1 Institut Català de Paleoeologia Humana i Evolució Social, Tarragona, Spain

2 Àrea de Prehistòria, Universitat Rovira i Virgili (URV), Tarragona, Spain

Archeostratigraphic Unit 'D' of the Caune de l'Arago cave (Pyrénées-Orientales, France), situated in the upper part of the depositional sequence of *Ensemble Stratigraphique III*, has yielded a rich Late Acheulian stone-tool assemblage attributed to the upper part of the Middle Pleistocene (end of OIS 12). The site, dating from 690 to 90 Ka, is well known for its significant Acheulian cultural sequence, including some of the oldest evidence so far documented in Western Europe. The accumulation comprises a succession of archeologically-rich occupation levels, some of which have yielded hominin remains (*H. heidelbergensis*). These levels are generally intercalated by sedimentary infill containing sparse artifacts and carnivore fossils. Towards the top of the sequence, from level 'D', while Levallois knapping is extremely rare, other features seem to signal a transition from the Lower to the Middle Paleolithic, including a marked reduction in overall tool size, a shift in raw material exploitation patterns, a reduction in cobble-tool frequencies and more numerous composite light-duty tool types. Handaxes are scarce and display only a low degree of symmetry compared with the older levels of unit 'P'. The most outstanding characteristic of the 'D' level assemblage is that it was knapped predominantly from small-sized quartz cobbles. We present preliminary results from experiments carried out in the aim of better understanding whether the knapping was carried out by direct hard hammer methods or using bipolar-on-anvil technologies. Also, we explore this knapping preference on a regional level, contrasting it with other microlithic praxis observed elsewhere in Europe in a similar timeframe.