UNION INTERNATIONALE DES SCIENCES PRÉHISTORIQUES ET PROTOHISTORIQUES
INTERNATIONAL UNION OF PREHISTORIC AND PROTOHISTORIC SCIENCES

National Archaeological Institute with Museum
Bulgarian Academy of Sciences

Исторически музей
Дряново

Annual Meeting of UISPP Commission 8 „RECENT UPDATES ON EURASIAN UPPER PALAEOLITHIC“

&

International Workshop „ORIGINS AND DEVELOPMENT OF THE EURASIAN INITIAL UPPER PALAEOLITHIC“

13 - 17 October 2025

Abstract books and program

Dryanovo, Bulgaria

2025

UNION INTERNATIONALE DES SCIENCES PRÉHISTORIQUES ET PROTOHISTORIQUES
INTERNATIONAL UNION OF PREHISTORIC AND PROTOHISTORIC SCIENCES

Annual Meeting of UISPP Commission 8
„Recent Updates on Eurasian Upper Palaeolithic“
&
International Workshop
„Origins and Development of the Eurasian Initial Upper Palaeolithic“

13–17 October 2025
Dryanovo, Bulgaria

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Defining the IUP: Origins in the Levant and Adjacent Regions - Diachronic and Techno-Typological Perspectives

The Initial Upper Palaeolithic and Its Connections to the Late Middle Palaeolithic

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From Central Asia to the Japanese Archipelago: IUP Blade Technologies, Ecological Adaptations, and Regional Diversity

PREFACE

We welcome you to Dryanovo, Bulgaria, for this joint UISPP Commission 8 meeting and "Origins and Development of the Initial Upper Paleolithic in Eurasia" workshop. Nestled in the Balkan Mountains, Dryanovo provides an ideal setting for discussing the cultural and biological transitions that shaped early *Homo sapiens* dispersals across Eurasia.

The Initial Upper Paleolithic (IUP) represents a crucial transitional period in human prehistory, characterized by technological innovations and demographic expansions during the Middle-to-Upper Paleolithic transition (50-40 ka BP). Yet critical questions remain: How did IUP blade technologies facilitate *Homo sapiens* adaptability in diverse environments while Neanderthals persisted? How can we distinguish between final Neanderthal technologies and those of early modern humans? What role did regions like the Levant, the Balkans, Central-Eastern Europe, and Central Asia play as corridors or refugia?

This meeting brings together specialists to address these themes through 51 interdisciplinary presentations, bridging paleoanthropology, ancient DNA, and radiocarbon dating, with emphasis on lithic studies within their archaeological contexts.

Scholars from 26 countries across Europe, Asia, and North America have convened to examine IUP technologies, *Homo sapiens* dispersal patterns bearing Neanderthal genetic legacy, and regional archaeological developments. This diverse participation underscores Dryanovo's significance as a hub for Paleolithic research and highlights the importance of international collaboration in advancing our understanding of early human dispersals and cultural evolution.

The program is designed to facilitate academic exchange and future collaborations through integrated events. The schedule includes visits to Bacho Kiro Cave, the inaugural exhibition at the History Museum - Dryanovo titled "Legacy in Stone and Bone: *Homo sapiens* at 45,000 Years in Bacho Kiro Cave" showcasing finds from 2015–2021 excavations, and key lectures on critical topics in Paleolithic research. These presentations focus on *Homo sapiens* dispersal patterns and Neanderthal interactions, complemented by groundbreaking ancient DNA studies of the Bacho Kiro individuals and advances in radiocarbon dating.

By combining fieldwork, museum exhibitions, and recent excavation data, this event creates a dynamic platform for interdisciplinary dialogue and hands-on engagement with archaeological evidence.

We extend sincere appreciation to the History Museum - Dryanovo and Dryanovo Municipality for their partnership, to all participants for their contributions, and to the scientific advisory team for their efforts. We gratefully acknowledge the generous support of our sponsors, recognized on the opening pages, which made this international forum possible.

Dr. Tsenka Tsanova and the organizing committees

Prof. Kozłowski in Egypte, 1978.
Photo Prof. M. Otte

In Memoriam

Prof. Janusz Krzysztof Kozłowski

1936-2025

(https://www.snap.org.pl/zmarl-profesor-janusz-krzysztof-kozlowski/)

Broksivinia, 1970. De droite à gauche: Prof. Kozłowski, Prof. N. Sirakov, Prof. B. Ginter. Photo: Prof. M. Otte

Banyoles, Colloque UISPP 1995, . Prof. Kozłowski debout en train de lire, à droite Prof. J.-Ph. Rigaud. Photo: Prof. M. Otte

Colloque UISPP de Nerja (Málaga, Espagne), novembre 2004. Visite à la grotte ornée paléolithique de La Pileta (Málaga). De gauche à droite Loudmila Iakovleva, Josep M. Fullola-Pericot, Janusz Kozlowski, Réné Desbrosse et deux jeunes préhistoriens espagnols, José Miguel Tejero et Xavier Esteve

Program schedule

Date: 13 October 2025

Location: Conference Hall, VSK Kentavar boutique Hotel, Dryanovo

08:00-09:15 Registrtion (In the Lobby in Front of the Conference Hall)

Annual Meeting of UISPP Commission 8

"Recent Updates on Eurasian Upper Palaeolithic"

09:30-10:00 ***Opening Ceremony***

Greetings from Bulgarian Academy of Sciences, Introductory words Prof. N. Sirakov, Dr. Tsenka Tsanova, Prof. José M. Fullola and Dr. Lioudmila Iakovleva

Session 1: Historiography and Tribute of the Commission 8, Upper Palaeolithic of Japan

10:00-10:20

Lioudmila Iakovleva - *The UISPP Commission 8 "Upper Palaeolithic of Eurasia": historiography of 50 years of activity*

10:20-10:40

Ivan Gatsov and Petranka Nedelcheva - *In Tribute to One of the Foremost Figures in World Prehistory - Professor Janusz Krzysztof Kozłowski*

10:40-11:00 (zoom presentation)

Damien Flas - *Janusz Kozlowski and the Lincombian-Ranisian-Jerzmanowician. From leaf points to DNA, 60 years of research (zoom)*

11:00-11:20 (zoom presentation)

Kazuki Morisaki - *The Upper Palaeolithic of Japan: An updated overview*

11:20-11:35 - ***Coffee Break***

Session 2: Regional Perspectives I: Crossroads of Eurasia- Southwest Asia and adjacent regions (Eastern Balkans)

11:35-11:55 (zoom presentation)

Berkay Dinçer - *The Upper Palaeolithic in Türkiye: Probable Sites from Western Anatolia*

11:55-12:15 (zoom presentation)

Marcel Otte - *The Middle Palaeolithic of the Black Sea and modern human origins*

12:15-12:35

Andrew W. Kandel, Boris Gasparyan and Firas Jabbour - *Behavioral Changes During the*

Upper Palaeolithic at Aghitu-3 Cave, Armenia

12:35-12:55

Tsenka Tsanova, Svoboda Sirakova, Elka Anastasova, Ivaylo Krumov, Ivan Gatsov, Nikolay Sirakov - *Upper Palaeolithic Lithic Technologies and Cultural Dynamics in the Eastern Balkans (Bulgaria)*

12:55-14:00 - ***Lunch Break***

Session 3: Regional Perspectives II: Western Balkans, Apennines peninsula, and Central Europe

14:00-14:20 (zoom presentation)

Fabio Negrino - *New data on the Palaeolithic of Northwestern Italy*

14:20-14:40

Annamaria Ronchitelli - *The Onset of the Upper Palaeolithic in southern Italy*

14:40-15:00

Dušan Mihailović and Steven Kuhn - *A New Perspective on Gravettian and Epigravettian Occupation in the Central Balkans*

15:00-15:20

Zsolt Mester and Agnès Lamotte - *The presence of Polish Świeciechów flint in the Palaeolithic of Hungary*

15:20-15:40

Csaba Bálint - *Exploitation of fossilized mollusc shells in the Epigravettian Danube Bend area (Hungary)*

15:40-16:00

Damian Stefański, Biba Hromadowa, Magda Moskal del Hoyo, Tsenka Tsanova, Andrea Zerboni Giovani Muttoni, Andrea Picin, Sahra Talamo, Jarosław Wilczyński - *Kraków - Zwierzyniec 1 and Mamutowa Cave: Multidisciplinary Perspectives on Key Upper Palaeolithic Sites in Southern Poland*

16:00-16:20 - ***Coffee Break***

Session 4: Regional Perspectives III- Southwestern Europe and the Iberian Peninsula

16:20-16:40

Brad Gravina - *Has the pendulum swung for the local origins model of the Châtelperronian?*

16:40-17:00

Rafael Domingo Martínez, Miguel Cortés, José M. Fullola, Xavier Mangado, Alvaro Arrizabalaga - *The Early Upper Palaeolithic (EUP) in the Iberian Peninsula*

17:00-17:20

Jonathan Haws - *The persistent lack of data driving explanations for the Middle to Upper Palaeolithic transition in Iberia*

17:20-18:00 ***Discussion & Closing Remarks***

Date: 14 October 2025

09:00
Visit to Bacho Kiro Cave, Departure from Hotel Kentavr parking area

12:00
Lunch at Bacho Kiro Hut, located near Dryanovo Monastery

Key Lectures: *Homo sapiens* Dispersals in Eurasia and Interactions with Neanderthals (15:00–16:30)
Location: History Museum, Dryanovo

15:00–15:20
Jean-Jacques Hublin - *Do Transitional Industries Really Exist? A Paleoanthropological Perspective*

15:20–15:40
Sahra Talamo - *Radiocarbon 3.0: Advancing Chronology in Prehistory*

15:40–16:00
Mateja Hajdinjak - *Bacho Kiro Cave humans in focus: update on new individuals and their genomes*

16:00–16:15
Alexandra Schuh, Mateja Hajdinjak, Helen Fewlass, Matthew Skinner, Mykolas Imbrasas, Shara E. Bailey, Sarah E. Freidline, Mikel Lana Alberro, Janet Kelso, Philipp Gunz, Robert C. Power, Shannon McPherron, Zeljko Rezek, Virginie Sinet-Mathiot, Hélène Rougier, Sahra Talamo, Nikolay Sirakov, Tsenka Tsanova and Jean-Jacques Hublin - *New fossil remains from Bacho Kiro Cave, Bulgaria*

16:25–16:55
Press Conference, for the exhibition ***"Legacy in Stone and Bone: Homo sapiens at 45,000 Years in Bacho Kiro Cave"***

17:00
Exhibition Opening: ***"Legacy in Stone and Bone: Homo sapiens at 45,000 Years in Bacho Kiro Cave"*** *- History Museum - Dryanovo*

18:00
Aperitif Reception

19:30
Official dinner in the restaurant of Hotel Kentavar

International Workshop

„Origins and Development of the Eurasian Initial Upper Paleolithic“

DAY 1: 15 October 2025
Defining IUP Origins and Western Expansion

I. Morning Session: Defining the IUP
I.1. Regional Perspectives I: The Levant & Adjacent Regions

Moderator: Nicolas Zwyns (9:10-11:30)

09:10–09:30
Opening remarks and introduction to the session

09:30–09:50
Nicolas Zwyns, Steven Kuhn - *Rethinking again – a decade of research on the IUP*

09:50–10:10
Yuri Demidenko, Petr Škrdla - *"Initial Upper Paleolithic: industry definition, origin and distribution throughout Eurasia"*

10:10–10:30
Omry Barzilai - *"The blade and the hammerstone: Shifts in blade production modes and striking techniques during the Initial and Early Upper Paleolithic in the Southern Levant"*

10:30–10:50
Lotan Edeltin, Ofer Marder, Mae Goder-Goldberger - *"Blade industries at the onset of the Upper Paleolithic Period in the Levant – Population dynamics and transfer of knowledge as reflected from the Shualim Rockshelter, Negev, Israel"*

10:50–11:10 - *Coffe Break*

I.2. Regional Perspectives I: IUP in Southwest Asia, Southeast/Central Europe, Use of IUP Term

Moderator: Marie Soressi (11:30-14:00)

11:10-11:30
Yuri Demidenko, Christopher Bergman, Tsenka Tsanova - *"Late Initial Upper Paleolithic: definition, origin and further development in the East Mediterranean Levant"*

11:30–11:50
Petr Škrdla, Yuri Demidenko, Jaroslav Bartík - *"Initial Upper Paleolithic Bohunician in Central and Eastern Europe and its comparison with Levantine IUP Early Emiran"*

11:50–12:10
Elham Ghasidian - *"Initial Upper Palaeolithic of the Iranian Plateau; Sorheh Rockshelter: a techno-typological perspective"*

12:10–12:30
Andrea Picin - *"From Technology to Chronology: The Expanding and Problematic Use of the IUP Term"*

12:30–14:00 - *Lunch Break*

Moderator: Marie Soressi (14:00-14:50)

14:00–14:20
Firas Jabbour, Boris Gasparyan, Andrew Kandel - *"Potential Evidence of Initial Upper Paleolithic at Aghitu-3, Armenia"*

14:20–14:40
Małgorzata Kot - *"Truncated-faceted pieces in Initial Upper Palaeolithic contexts: role, function and techno-functional structure"*

14:40-14:50 Session change

II. Afternoon session: IUP and its Relationship to the Late MP

Moderator: Małgorzata Kot (14:50-16:30)

14:50–15:10
Mae Goder-Goldberger - *"The two faces of the Middle to Upper Paleolithic transition, one looking back and the other forward, a view from the southern Levantine techno-complexes"*

15:10–15:30
Evgeny Rybin, Arina Khatsenovich - "*Levallois in Final MP and IUP assemblages in Mongolia"*

15:30–15:50
Leonardo Carmignani, Igor Djakovic, Marie Soressi - *"Beyond the Dualism: Refining Technological Analyses to Overcome the Late Mousterian/IUP Dichotomy"*

15:50-16:10
Ivaylo Krumov, Elka Anastasova, Tsenka Tsanova - *"Possible IUP component in the late Middle Paleolithic sequence of Samuilitsa II cave, Bulgaria"*

16:10–16:30
Amir Beshkani - "*Reassessing the Chronology of Warwasi Rock Shelter and the Technological Traits of the Initial Upper Paleolithic in the Central Zagros"*

16:30-16:50 - *Coffe Break*

III. IUP Innovations in Technology and Resource Use: Lithics, Osseous Artifacts, and Ornaments

Moderator: Luc Doyon (16:50–18:20)

16:50–17:10

Tsenka Tsanova, Elena Endarova - *"Initial Upper Paleolithic Lithic and Osseous Technologies in the Eastern Balkans: Chronology, Dispersal, and Cultural Transitions in Regional Context"*

17:10–17:30
Solange Rigaud, Luc Doyon - *"Tracing the transition: personal ornaments and bone tools at the onset of the upper Paleolithic"*

17:30–17:50
Elena Endarova - *"A typological study of Initial Upper Paleolithic bone artefacts from Bulgaria, featuring three unpublished tooth pendants from the 1971–1975 excavations at Bacho Kiro Cave"* **(zoom)**

17:50–18:20 ***Discussion & Closing Remarks***

DAY 2: 16 October 2025

IV. Regional Perspectives III (Levant and Arabia); Resource use and functional dynamics (Continued)

I. Morning Zoom Session

Moderator: Yuri Demidenko (9:30-11:50)

09:30–09:50
Tsenka Tsanova, Picin Andrea, Norbert Faragó, Zsolt Mester, Sahra Talamo - *"Initial Upper Paleolithic techno-typological component in the surface collection from Andornaktálya 2 site (Hungary)"*

09:50–10:10
Zeljko Rezek, Ergül Kodaş, Eşref Erbil, Çağdaş Erdem - "*New Initial Upper Paleolithic in northern Levant: First results from Elobrahimo Rockshelter in Mardin Province, southeast Türkiye"* **(zoom)**

10:10–10:30
Jeffrey Rose, Vitaly Usyk, Anthony Marks - *"The Nubian Tradition in South Arabia and its relationship to the IUP"* **(zoom)**

10:30–10:50
Seiji Kadowaki - *"From the IUP to the Ahmarian: Variability in the development of bladelet technology in the Levant"*

10:50–11:10
Vincent Delvigne, Chavdar Natchev, Christophe Tufféry, Ivan Gatsov, Tsenka Tsanova - *"Between Geology and Archaeology: Toward a Dynamic Cartography of Silicite-Bearing Formations in Bulgaria"* **(zoom)**

11:10–11:30
João Marreiros, Tsenka Tsanova - *"Understanding the lithic technological novelties and innovations at the onset of the Upper Paleolithic in Europe: a functional perspective from the site of Bacho Kiro"* **(zoom)**

11:30–11:50 - *Coffe Break*

Regional Perspectives IV: Asia

Moderator: Mae Goder-Goldberger (11:50-12:30)

11:50–12:10
Anton Anoikin, Vladislav Kharevich, Konstantin Pavlenok, Elena Bocharova, Zhaken Taimagambetov - *"A New Data on the Initial Upper Paleolithic of Northern Central Asia (Based on Materials from the Ushbulak site)"* **(zoom)**

12:10–12:30
Pavel Moroz - *"The easternmost appearance in Eurasia of Kara Bom-like situation with both pointed Late Levallois-Mousterian and IUP at Sukhotino workshop (eastern Transbaikal region, Far East of Russian Asia)"* **(zoom)**

12:30–14:30 - *Lunch Break*

II. Afternoon Session: Asia (Continued)

Moderator: Mae Goder-Goldberger (14:30-16:10)

14:30–14:50
Evgeny Rybin, Arina Khatsenovich, Natalia Belousova - *"Eastern Distribution Area of the Initial Upper Paleolithic: 'Cultural Norm' and Economic Patterns"*

14:50–15:10
Peiqi Zhang, Xiaoling Zhang, Linhui Li, Wei He, Dawa, Yingshuai Jin, Junyi Ge, Shejiang Wang, Fuyou Chen, Nicolas Zwyns, Xing Gao - *"Technological variability in two Marine Isotope Stage 3 blade assemblages in China: a study of Shuidonggou Locality 1 and Nwya Devu"*

15:10–15:30
Corey Johnson, Tsedendorj Bolorbat, Mark Grote, Clea Paine, Guunii Lkhundev, Davaakhuu Odsuren, Arina Khatsenovich, Masami Izuho, Evgeny Rybin, Byambaa Gunchinsuren, Nicolas Zwyns - *"A Little Goes a Long Way: Trends in small blank cutting edge efficiency during the Upper Paleolithic at Tolbor, Mongolia"*

15:30–15:50
Masami Izuho, Kaoru Otani, Karisa Terry - *"Changes in Ecology and Hunter-Gatherer Adaptations during the IUP and EUP in Southern Transbaikal and Mongolia"*

15:50–16:10
Nicolas Zwyns, Kaoru Otani, Lukas Dijkstra, Nicolas Teyssandier, Masami Izuho - *"Convergence at a glance: Initial Upper Paleolithic blade technology in mainland Asia and Hirosato method in the Japanese Archipelago"*

16:10–16:30 - *Coffe Break*

16:30-17:30
Concluding Session - *Round Table: UISPP Publication Discussion & Final Remarks*

Annual Meeting of UISPP Commission 8

"Recent Updates on Eurasian Upper Palaeolithic"

The UISPP Commission 8 “Upper Palaeolithic of Eurasia”: historiography of 50 years of activity

Lioudmila Iakovleva[1]

[1]Research director at the Institute of Archaeology of the National Academy of Science of Ukraine, Vice President of Commission 8 «Upper Palaeolithic of Eurasia» of the UISPP

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The purpose of this paper is to retrace the history of Commission 8 “Upper Palaeolithic of Eurasia”, one of the oldest commissions of the UISPP since its creation in 1976, by referring to the organization of sessions at UISPP worldwide congresses, specialized conferences, the publication of proceedings and quinquennial reports and finally the active role of its members contributing to the first syntheses on the European Upper Palaeolithic.

The Commission 8 «Upper Palaeolithic of Eurasia» of the UISPP, founded in 1976 during the IX Congress UISPP in Nice (France), is to bring together and synthesize the results of archaeological excavations and studies on the knowledge of the Upper Palaeolithic in Eurasia: peopling, territories, cultures, environments, dating, stone and bone industries and art. The commission quickly brought in a few years, a representative panel of specialists of the Upper Paleolithic European, native of almost all countries of Europe. In 48 years of activity, it organized conferences on a quasi-annual time from the World Congress UISPP of Nice (1976) to Timisoara (2023) as between congresses. They were all published, mainly in the acts of in international reviews (*L’Anthropologie, Quaternary International* and many others). The commission also publishes a five-year report about excavations and research on the European Upper Paleolithic, country by country. His work led to a unique synthesis on the European upper Palaeolithic in the context of the UISPP.

La Commission 8 « Paléolithique supérieur d’Eurasie de l’UISPP » : historiographie de 50 années d’activités

Résumé

L’objet de cette communication est de retracer l’histoire de la Commission 8 « Paléolithique supérieur d’Eurasie », l’une de plus anciennes commissions de l’UISPP à partir de sa création en 1976 en évoquant l’organisation de sessions aux congrès mondiaux de l’UISPP, les colloques spécialisés, la publication des actes et des rapports quinquennaux et enfin le rôle actif de ses membres contribuant aux premières synthèses sur le paléolithique supérieur européen.

La Commission 8 « Paléolithique supérieur de l’Eurasie » de l’UISPP, fondée en 1976 à l’occasion du IX° congrès UISPP de Nice (France), a pour objet de mettre en contact et de synthétiser les résultats des fouilles archéologiques et des études sur la connaissance du Paléolithique supérieur en Eurasie : peuplements, territoires, cultures, environnements, datations, industries lithiques et

en matières dures animales et art. La commission a rapidement regroupé en quelques années, un ensemble représentatif des spécialistes du paléolithique supérieur européen, originaire de quasiment tous les pays d'Europe. En 50 ans d'activités, elle a organisé des colloques sur un rythme quasi-annuel dans le cadre des congrès mondiaux UISPP de Nice (1976) à Timisoara (2023) comme entre les congrès. Ils ont tous été publiés, principalement dans les actes des congrès, dans les BAR, dans la collection ERAUL (Liège), dans les revu internationales (*L'Anthropologie, Quaternary International* et bien d'autres). La commission a également publié un bilan quinquennal des fouilles et des recherches sur le paléolithique supérieur européen, pays par pays. Ses travaux ont permis de réaliser une synthèse sur le Paléolithique supérieur européen unique dans le cadre de l'UISPP.

Keywords: Palaeolithic research history, UISPP Commission 8, Upper Palaeolithic of Eurasia

Photo 1. The Commission 8 «Upper Palaeolithic of Eurasia» of the UISPP. Neuchatel 12.02.2013
Réunion de la commission 8 au Musée Latènium à Neuchâtel le 12/02/2013. De Droite à Gauche: Marcel Otte (Belgique), Vasile Chirica (Roumanie), François Djindjian (France), René Desbrosse (France), Marc-Antoine Kaeser (Latènium, Suisse), Lioudmila Iakovleva (Ukraine), Manuel Gonzalez Morales (Espagne), Krzysztof Sobczyk (Pologne), Denise Leesch (Suisse), Janusz Kozlowski (Pologne), Anna-Maria Ronchitelli (Italie), Paolo Gambassini (Italie), Tsenka Tsanova (Bulgarie)

Photo 2. The Commission 8 «Upper Palaeolithic of Eurasia» of the UISPP. Paris 9.06.2018
Réunion de la commission 8 au Congrès UISPP à Paris le 9 Juin 2018. De Droite à Gauche, Jarolaw Wilczynski (Pologne), Sergei Lev (Russie), Valentin Codrin-Chirica (Roumanie), Zsolt Mester (Hongrie), Janusz Kozlowski (Pologne), José Fullola (Espagne), Lioudmila Iakovleva (Ukraine), Marcel Otte (Belgique), Vasile Chirica (Roumanie), Pilar Utrilla (Espagne), Anna-Maria Ronchitelli (Italie), Bernaldo de Quiros (Espagne)

In Tribute to One of the Foremost Figures in World Prehistory - Professor Janusz Krzysztof Kozłowski

Ivan Gatsov[1*], Petranka Nedelcheva[1,2]

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It is with enduring respect and reflection that I offer these words in memory of one of the most distinguished archaeologists of global prehistory – Professor Janusz Krzysztof Kozłowski – who passed away this year. The passage of time has not diminished the weight of this loss, nor the impact of his remarkable contributions to archaeology, which continue to inspire scholars around the world.

I was privileged to know Professor Kozłowski for nearly half a century. Our paths first crossed when I was a doctoral student at the Institute of Archaeology in Kraków. From those formative years – including our joint work at the Bacho Kiro and Temnata caves, Bulgaria – to collaborations on numerous international research projects, I was continually struck by his intellectual brilliance, unwavering dedication, and rare generosity of spirit.

Born in 1936 in Kraków, Professor Kozłowski pursued his academic education at the Jagiellonian University, where he earned his PhD in 1962 and completed his habilitation in 1967. He was appointed Professor of Archaeology in 1976. Over the course of more than six decades, he remained a central figure at the Jagiellonian University, devoted to teaching, mentoring generations of students and doctoral candidates, and fostering international collaboration in archaeological research. His vision and leadership extended far beyond Poland. Together with Professor Marcel Otte, he co-founded Commission 8 of the International Union for Prehistoric and Protohistoric Sciences (UISPP) after the Congress in Nice in 1976. He later served with distinction as President of the International Union of Academies and as Vice-President of the International Council for Philosophy and Humanistic Studies.

Professor Kozłowski's scholarly work was broad in scope and transformative in its impact. His research encompassed the Palaeolithic and Neolithic periods of Central and Southeastern Europe and North Africa, the Neolithization of Europe, the Predynastic cultures of Egypt, and early seafaring and island archaeology in the Aegean and Caribbean. He led excavations at numerous key sites in Poland, Egypt, Bulgaria, Greece, Turkey, Montenegro, Morocco, Cuba, the Antilles, and Slovakia, producing a legacy of fieldwork and interpretation that has shaped the very foundations of our understanding of prehistoric humanity.

Yet beyond his extraordinary academic achievements, Professor Kozłowski will be remembered as a scholar of rare depth and warmth. He possessed encyclopaedic knowledge, a profound commitment to education, and a generosity that touched the lives and careers of many. For his students, colleagues, and friends, he was more than a mentor—he was a guiding light, always approachable, always supportive, and always deeply human.

In remembering Professor Kozłowski, we pay tribute not only to a towering figure in prehistoric studies, but to a life lived in the service of knowledge, discovery, and the shared human past. His legacy endures - in the pages of his publications, in the minds of his students, and in the fieldwork that continues to build on the foundations he so carefully laid.

Keywords: foundation of Commission 8 at UISPP, Prof. Janusz K. Kozłowski

Janusz Kozlowski and the Lincombian-Ranisian-Jerzmanowician. From leaf points to DNA, 60 years of research on the first Upper Paleolithic industry in northern Europe

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In the plains of northern Europe, from Poland to Wales, assemblages with leaf points made on blades appear at the beginning of the Upper Paleolithic. Their recognition as a specific industry, different from already defined technocomplexes (such as Szeletian, Aurignacian, and "Proto-Solutrean"), took almost a century as it was complicated by the scarcity of data and unclear archaeological contexts. Janusz Kozlowski had a prominent role in the definition of the Lincombian-Ranisian-Jerzmanowician, a new label that he proposed in the early 1980s. He also formulated important hypotheses regarding the chronological and geographical extension of this technocomplex as well as its origins and development.

Recently, new data, mostly on the chronology and the association of the lithic assemblages with human remains, has permitted gaining a better understanding of the position of the LRJ at the beginning of the Upper Paleolithic in Europe.

Keywords: Lincombian-Ranisian-Jerzmanowician (LRJ), beginning of Upper Paleolithic, leaf point industries

The Upper Paleolithic of Japan: An updated overview

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This paper overviews the possible route of modern human migration into the Japanese Archipelago, the presence/absence of predecessor prior to Homo sapiens, and the nature of Japanese Upper Paleolithic culture. High resolution chronology based on thoroughly gleaned radiocarbon dates clarify even if the preceding population existed in the Japanese archipelago before *Homo sapiens* inhabitation, it must have been a small population. The increase in the number of occupation sites and SPD after 39-37,000 cal BP indicates that the modern humans were basically the bearers of the Japanese Paleolithic culture. Climatic fluctuation strongly drove the destiny of modern humans on this island and the period of low population pulled the repetitive influx of new population with cultural information from the continental Asia, which create diachronically and synchronically diverse Paleolithic culture. It is becoming clear that the modern humans have undergone extreme increases and decreases during Late Pleistocene even in a mild and temperate coastal environment like Japan.

Objective. The spread of modern humans across Eurasia reached Oceania and the Japanese archipelago at its eastern end, marking the beginning of the Upper Paleolithic period in the Japanese archipelago. This paper questions the following issues: Which routes did modern humans take to migrate and settle in the Japanese archipelago? Did the preceding people exist there? Did the Paleolithic population form a stable and continuous culture in temperate and coastal environment of the Japanese archipelago?

Background. Currently, the Japanese Archipelago consists of four major islands, Hokkaido, Honshu, Shikoku, and Kyushu, and more than 6,800 small islands. Recent studies of glacial eustatic changes in sea level and sea bottom topography of channels along the Japanese Archipelago revealed various landmass situations (Figure 1-A).

During the glacial period, the Sakhalin, Hokkaido, and the southern Kurile Islands were combined into a sole Paleo-Sakhalin-Hokkaido-Kurile (Paleo-SHK) Peninsula connected to the Asian continent, whereas glacial eustasy caused Honshu, Shikoku, and Kyushu to form a single landmass called the Paleo-Honshu Island. A chain of islands, which are presently the Ryukyu Islands, was separated from each other also during the Pleistocene, extending to the southwest of Paleo-Honshu Island. This paper refers to these islands as the Paleo-Ryukyu Islands.

In considering Pleistocene human cultural dynamics in Japan, it is important to note that the narrower Tsugaru Strait separated Paleo-SHK and Paleo-Honshu; therefore, these two landmasses can be suggested to hold largely different cultural dynamisms, at least during the Upper Paleolithic. In addition, the narrower Tsushima Strait was located between Paleo-Honshu and the Korean Peninsula. These gaps caused differences in the formation process of human cultures between neighboring regions. On the other hand, the Paleo-Ryukyu Islands have often been argued to be closely related to Taiwan, southern China, and Southeast Asia during the Pleistocene based on biogeographic evidence.

The existence of predecessors prior to the Upper Paleolithic in the Japanese archipelago has also been debated by some scholars. Most candidates of Early/Middle Paleolithic sites were rejected from academic debate due to the 'Paleolithic Hoax' in 2000. Even today, many researchers are negative about the existence of predecessors, although they have not verified the results of past investigations and searched for new materials. Re-evaluation of past results at a modern level is necessary. However, even if there were candidate archaeological sites, there are only around 10 sites, which is far fewer than the Upper Paleolithic. There are more than 10,000 Upper Paleolithic occupation sites (Figure 1-B). This indicates human culture in Japan basically began in the Upper Paleolithic.

Methods. This paper answers the above questions by analyzing the bulk of the Paleolithic assemblages accumulated by CRM for decades and AMS radiocarbon dates associated with them.

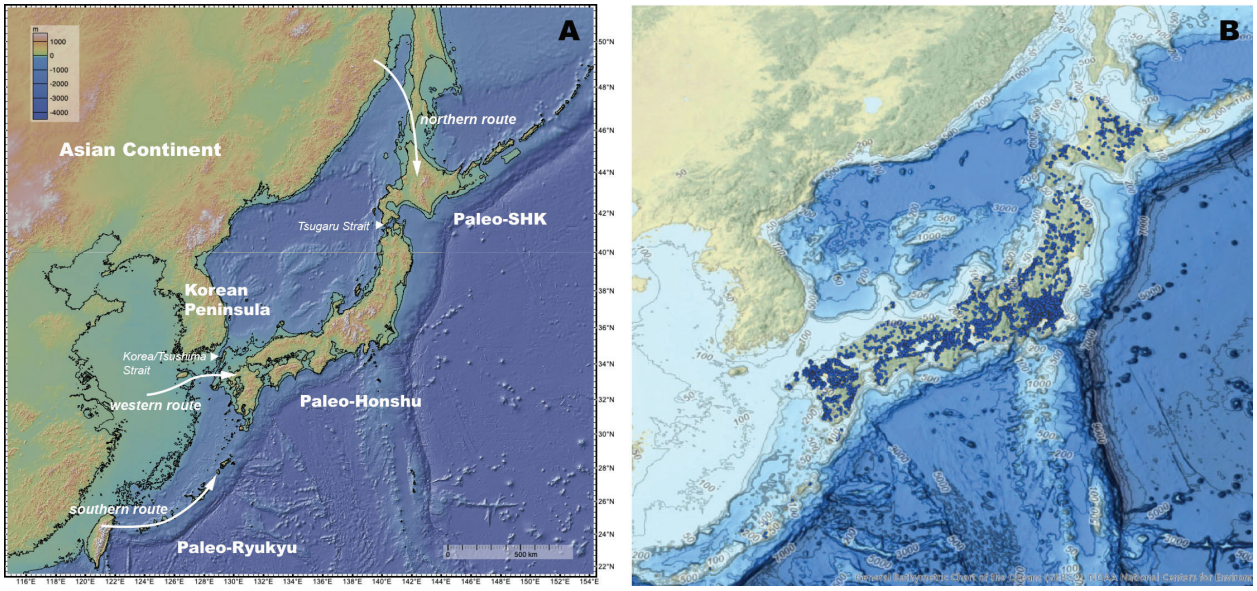

Figure 1. Topographic map of the Japanese Archipelago during the glacial period (A) and the distribution of Paleolithic sites (B). Areas colored in green indicate present bathymetry at ~120M, and which were exposed land during glacial period. The figure A was constructed using GeoMapApp (www.geomapapp.org)/CC BY. The figure B layered the location information of Upper Paleolithic sites (blue dots) provided Japanese Paleolithic Research Association (https://palaeolithic.jp/index-e.html#gsc.tab=0) on GEBCO Basemap Contours (NOAA NCEI Visualization) by using ArcGIS (©Esri).

A high-resolution archaeological chronology for the Japanese Archipelago can provide an overview of the beginnings of Upper Paleolithic, cultural diversification, and population dynamics.

Assemblages are described in terms of lithic reduction technology and diagnostic tools. This paper broadly classifies lithic reduction technology into five categories: Flake, Blade, Microblade, and Bifacial reduction technologies. Diagnostic tools consist of denticulates, trapezoids, basal-retouched points, backed points, bifacial points, microblades. We organize the spatiotemporal distribution of the combinations of the hunting weapon and the lithic reduction technology.

We also construct summed probability distribution (SPD) using the radiocarbon dates as a proxy of the intensity of human activity to address population dynamics and cultural change in the archipelago.

Results and Discussion

Early Upper Paleolithic. The start of the Japanese Upper Paleolithic is characterized by a flake industry with trapezoids and denticulates around 39-37,000 cal BP on southern Paleo-Honshu

Island. The oldest assemblages show partial technological resemblance with contemporary assemblages in China and the South Korean (Morisaki et al. 2022), which means the first migration occurred through western route via Korea/Tsushima Strait. However, trapezoids were endemic to Japan. The first modern human migration through southern route via the Paleo-Ryukyu Islands likely occurred later than migration into Paleo-Honshu Island, no later than 35-34,000 cal BP. People on the southern Paleo-Ryukyu Islands lack stone tools, using shell tools instead, indicating different cultural traditions from Paleo-Honshu Island (Fujita et al. 2016). Trapezoid industry is found also in the southern Paleo-SHK, indicating human migration occurred not from the northern route, but from the Paleo-Honshu Island around 30,000 cal BP or some earlier (Izuho et al. 2018). This strongly suggests that the migration of modern humans from the northern continental area may not have been very pronounced.

Blade technology and basal-retouched points first appeared on Central Paleo-Honshu Island ca. 500-1000 years later than the earliest flake industry. Although blade technology may have originated from the elongated flake technology of the previous period, the sudden simultaneous emergence implies diffusion from the nearby Korean Peninsula (Morisaki et al. 2019, 2022). This technology disseminated mostly in the northern Paleo-Honshu, whereas flake technology developed in the southern Paleo-Honshu. It should be noted that trap-pits were used along the Pacific coastal area of the southern Paleo-Honshu.

Middle Upper Paleolithic. In early MUP, 29-24,000 cal BP, the techno-typology of lithic assemblage in each region became diverse. Microblade technology was introduced in Hokkaido after 26,000 cal BP, while the development of basal-retouched blade points continued in northern Paleo-Honshu. Backed points on flakes were used in the southern part of the island. Stemmed points originating from the Korean Peninsula developed in Kyushu, at the western edge of the island. This regional characteristic becomes unclear after 24,000 BP, and the use of similar types of backed or basal-retouched points is widely recognized. Ryukyu Islander continued to use shell tools.

Late Upper Paleolithic. After 20,000 cal BP, microblade technology suddenly spread over the Paleo-Honshu from the continental area including Paleo-SHK. This may indicate drastic replacement of population in several regions in Paleo-Honshu. However, lithic tradition in Kanto region, characterized by small bifacial points, seems to continue after 20,000 cal BP and to have merged with microblade technology.

Climate and culture change. The dynamics of SPD made from more than 1000 radiocarbon dates suggest that the transition between EUP/MUP and MUP/LUP may have corresponded to periods of depression of human activity. Moreover, these depressions seem to have been caused by the climatic events, as EUP/MUP boundary corresponds to Heinrich Even 3 and the more pronounced MUP/LUP boundary corresponds to the LGM (22-19 ka BP).

Conclusion. Even if the preceding population existed in the Japanese archipelago before *Homo sapiens* inhabitation, it must have been certainly an extremely small population. The increase in the number of occupation sites and SPD after 39-37,000 cal BP indicates that the Paleolithic culture was dominated by modern humans.

The Upper Paleolithic culture of the Japanese archipelago is unique even in East Asia. On the one hand, this can be because the result of isolation of early modern humans who migrated there, but on the other hand it is becoming clear that the influence of climate change and the influx of continental cultures was also quite large. Periods of the significant influx of population and culture from the continent coincided with periods when Paleo-Honshu population was declining because of climate change.

This paper's analysis does not support the stable population increase in the Japanese Upper Paleolithic that has long been believed. It has become clear that the population has undergone extreme increases and decreases even in a mild and temperate coastal environment like Japan. In the future, explaining cultural dynamics by considering this type of population proxy will lead to a more detailed tracing of human history. It will also contribute to understanding cultural dynamics in other temperate zones and the nature of *Homo sapiens* adaptation.

Keywords: Japanese Archipelago, Upper Paleolithic, modern human, migration, population dynamics

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Upper Palaeolithic in Northwestern Anatolia: Where is it? What is it?

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The Upper Palaeolithic period is the least well-known era in Turkey. Despite the paucity of research conducted on the Palaeolithic in the country, the Lower and Middle Palaeolithic periods are much better known, while the finds from the Upper Palaeolithic period are almost non-existent. The reasons for this phenomenon were explained firstly, the period is comparatively brief when measured against the duration of the Lower and Middle Palaeolithic periods. Secondly, population was decreased during that period and thirdly the evidences of the Upper Paleolithic sites were destroyed due to geomorphological movements that occurred after the ice age. Nevertheless, the fact that archaeological discoveries from the Upper Paleolithic period cannot be identified by archaeologists, particularly in surface surveys, has not been cited as a reason.

In the surveys conducted in Northwestern Anatolia, blade technologies, which do not resemble the Lower and Middle Palaeolithic finds known from the region, are generally associated with later periods, Neolithic and later. The absence of typical Upper Palaeolithic artefacts like endscrapers is the reason for that, especially in this part of Türkiye, we do not know any technology resembling the Upper Palaeolithic of Europe yet.

The recent discoveries of probable Upper Palaeolithic artefacts in Karaburun, Izmir and Turkmen Mountain, Kütahya, suggest that Upper Palaeolithic technologies in this region of Türkiye may differ from those in Europe. The purpose of this presentation is twofold: firstly, to introduce the technologies in question; and secondly, to discuss the Upper Palaeolithic in Turkey.

Keywords: Upper Paleolithic Turkey, Blade technologies, Karaburun-Kütahya, Geomorphological bias

The Middle Palaeolithic of the Black Sea and modern human origins

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The site of Surmercik in Western Anatolia recently excavated by our colleagues in Ankara (Taskiran et al. 2021) presents quite remarkable cultural affinities (fig.1) and very different from the rest of Anatolia (Otte et al, 1998). As if we were entering a new province. This gigantic sequence shows the durability of this habitat and these local practices. However, these techniques are mainly reminiscent of the traditions recognized in Greece (Darlas, 1994), Bulgaria (Sirakova, 1990) and Crimea, as far as the Sea of Azov. The whole western Black Sea corresponds to a particular tradition, far from the classical traditions of the European Mousterian. In the Crimea, recent excavations by the Germans at Zaskalnaya have yielded bone remains apparently linked to Neanderthal populations (Kolosov,1982; Pigott et al.2024). It is therefore a question of assembling this immense region as a cultural entity in its own right, spread from the Sea of Azov to Central Anatolia. Probably at a much lower level than today.

Keywords: modern humans, Europe, Black Sea

Le Paléolithique moyen de la Mer Noire, aux origines des hommes modernes

Le site de Surmercik en Anatolie occidentale récemment fouillé par nos collègues d'Ankara (Taskiran et al., 2021) présente des affinités culturelles tout à fait remarquables (fig.1) et très différentes du reste de l'Anatolie (Otte et al. 1998). Comme si nous entrions dans une nouvelle province. Cette gigantesque séquence montre la pérennité de cet habitat et de ces pratiques locales. Cependant, ces techniques rappellent surtout les traditions reconnues en Grèce (Darlas), en Bulgarie (Sirakov) et en Crimée, jusqu'à la mer d'Azov (Velichko, 1982). L'ensemble de l'ouest de la mer Noire correspond à une tradition particulière, loin des traditions classiques du Moustérien européen. En Crimée, des fouilles récentes menées par les Allemands à Zaskalnaya ont permis de découvrir des restes osseux apparemment liés à des populations néandertaliennes (Kolosov,1986; Pigott et al. 2024). Il s'agit donc d'assembler cette immense région comme une entité culturelle à part entière, s'étendant de la mer d'Azov à l'Anatolie centrale. Probablement, alors lorsque la Mer Noire était à un niveau bien plus bas qu'aujourd'hui.

Mots-clefs: hommes modernes, Europe, Mer Noire

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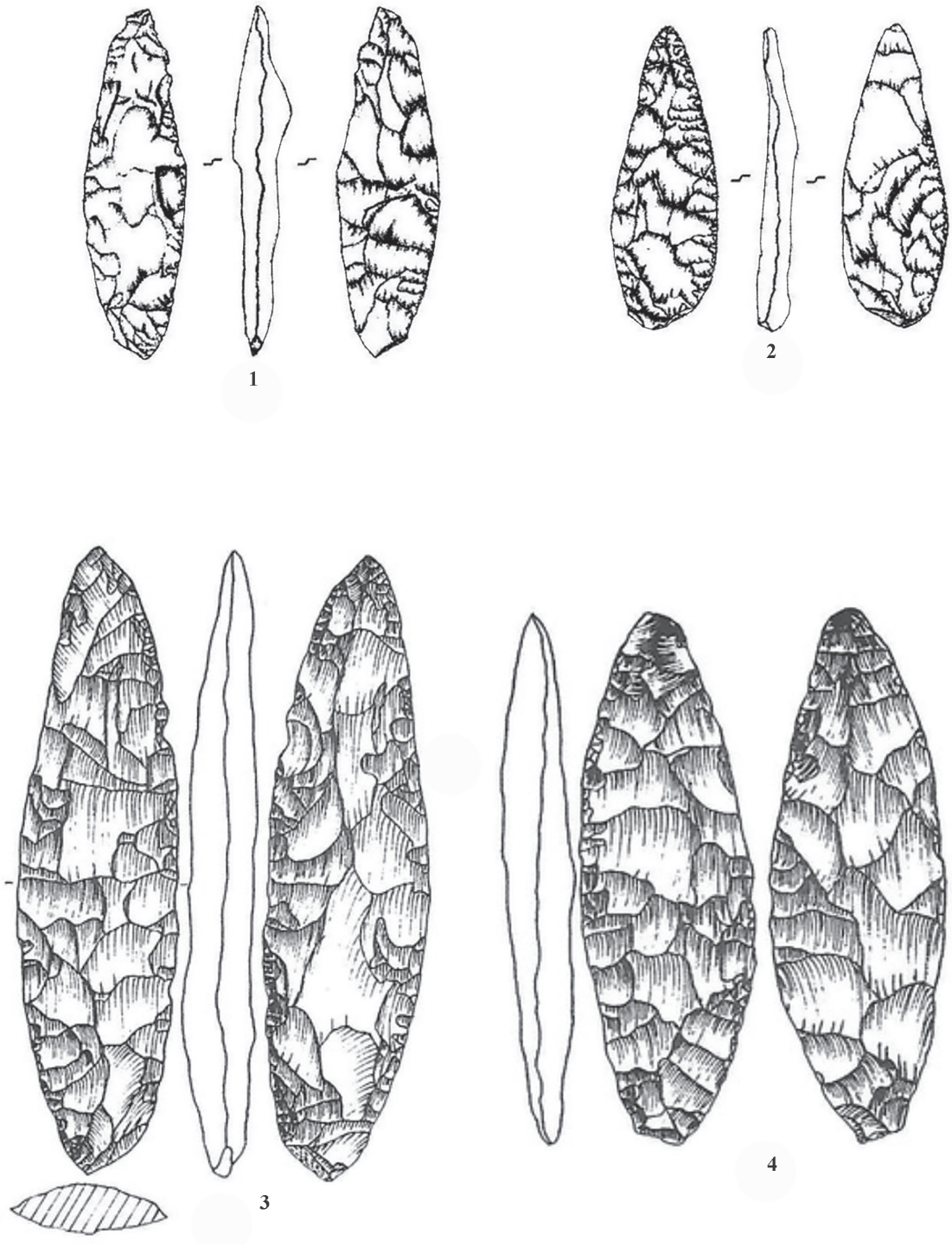

Figure 1. Mousterian with foliate tips from Zakalnia (Crimea)

An Assessment of Behavioral Changes During the Upper Paleolithic at Aghitu-3 Cave, Armenia

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In this paper, we present the results of our assessment of the assemblages from archaeological horizons (AH) VI and III at Aghitu-3 Cave. The 5.5 m stratigraphic sequence of the cave spans most of the Upper Paleolithic from 40,000 to 24,000 cal BP, which we attribute to the early and middle phases of the Upper Paleolithic. The deepest layer, AH VII, spans from 40-36,000 cal BP and will be presented separately at the workshop on the Initial Upper Paleolithic. AH VI dates to 36-32,000 cal BP, and AH V and IV date to 32-29,000 cal BP. The top part of the sequence is AH III which dates to 29-24,000 cal BP. All layers yielded stone artifacts, evidence of faunal processing, and combustion technology. Additionally, in AH III bone tools and shell beads appear for the first time. In this presentation, we explore diachronic changes in behavior across the Armenian Upper Paleolithic.

Despite the presence of several well-known Upper Paleolithic sites in neighboring Georgia, the Armenian Highlands received less attention prior to 2010. Since then, new stratified sites have been documented at Kalavan-1 (Montoya et al. 2013), Getahovit-2 (Kalantaryan et al. 2022) Karin Tak (Antonosyan et al. 2024), and Solak-1 (Kovach et al. 2025). Still, these sites represent just snapshots of the past. Only Aghitu-3 Cave (Kandel et al. 2017) allows us to view the majority of the Upper Paleolithic cultural sequence within a context that also enables fine-grained environmental studies.

The lithic assemblage of AH VI includes 364 chipped artifacts, while the richest layer is AH III with 9,599 pieces, sub-divided into four levels, AH IIIa-d. Since the intervening AH V and IV provide just 17 artifacts in total, we consider these layers to be sterile. Throughout this sequence we observe technological stability. In general, small cobbles of obsidian (85%) and chert (15%) were reduced in a unidirectional framework. In AH VI, transport distances for obsidian are 99% regional (within a maximum range of 30-40 km), while in AH III this figure drops to 92%, suggesting increased mobility.

The platform cores of AH VI and AH III are typically small, cortical, and wide-faced. The toolkit focuses mainly on laterally retouched and backed bladelets of width less than 10 mm, which we attribute to a hunting (armature) toolkit, while domestic tools such as scrapers, denticulates and burins are present, but less common. Technological and raw material analyses suggest that people interacted with the cave in different ways during each phase of occupation. In AH VI, stays were shorter and more limited in terms of activities; in AH III the length of stays increased and more activities occurred onsite.

In AH VI, wild sheep/goat provide the primary source of subsistence, while in AH III, horse is present in equal number to wild sheep/goat. Evidence of fire is present in AH VI as individual, well-preserved hearths, while in AH III stacked, multiple-use combustion features predominate. Only in AH III does organic technology make an appearance, with the presence of an eyed needle,

a point, and an awl, all made of bone. Perforated shell beads made of riverine gastropods, some stained with ochre, are found only in AH III.

From an environmental viewpoint, the distribution of small mammals helps define AH VI as a warm and humid period, while in AH III, a cold and arid climate prevails. Stable isotopic studies provide further information about shifts in the trophic level of large mammals and confirm the same climatic trend observed for small mammals. Well-preserved plant remains including charcoal, pollen, non-pollen palynomorphs, phytoliths, and even bast provide a full picture of the Late Pleistocene flora of the Armenian Highlands. An ancient DNA study of the sediment suggests that even with the large number of plant proxies, even more plant remains were present at the site, which we attribute to human activity during occupation.

Combining the climatic and cultural differences between the two layers we see that AH VI represents occasional use of the site by early Upper Paleolithic people during warmer and moister periods, while AH III shows an intensification of activities at the site by people of the middle Upper Paleolithic under much colder and more arid conditions. All told, Aghitu-3 Cave provides a detailed record of human and environmental interaction in the Armenian Highlands during the Upper Paleolithic and serves as an important benchmark for future work in the region.

Keywords: Lithic technology, Armenian Highlands, Upper Paleolithic, Obsidian

Figure 1. Photo of Aghitu-3 Cave looking to the west, taken on 19 June 2009 at the start of the first field season. The cave is found at the base of a basalt flow at an elevation of 1601 m above sea level. The opening of the cave is 18 m in length, 10 m in depth and 6 m in height. (Photo: Andrew Kandel)

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Upper Palaeolithic Lithic Technologies and Cultural Dynamics in the Eastern Balkans (Bulgaria)

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This paper synthesizes current data on the Bulgarian Upper Palaeolithic, focusing on key sequences from Temnata, Kozarnika, and Bacho Kiro caves. The aim is to highlight the range of cultural entities documented so far and to explore future research perspectives. We examine the chronological framework and lithic assemblages to better understand cultural trajectories across major Upper Palaeolithic phases:

1. Middle to Upper Palaeolithic Transition (MP/UP). Evidence from the open-air site of Musselievo characterized by bifacial leaf points and an estimated occupation between ~60-45 ka (Sirakova, 2020) and Samuilitsa II Cave dated to 42,780 ± 1270 uncal BP (GrN-5181) where Levallois-Mousterian assemblages in the lower layers transition to Initial Upper Palaeolithic (IUP) prismatic cores and blades with Levallois features in the upper layers (Sirakov, 1983; Tsanova, 2023) indicates an MP/UP transitional phase. This phase is marked by the persistence of leaf-point technologies and Levallois reduction strategies at Musselievo and in the middle part of the Samuilitsa II Cave sequence, indicating behavioral shifts among Neanderthals and possibly early *Homo sapiens.*

2. Initial Upper Palaeolithic (IUP). Stratified sequences from Bacho Kiro Cave (Layers I, J) and Temnata (TD II-Layer VI, TD I-Layer 4) document early blade production and the presence of *Homo sapiens* groups, contributing to current models of the IUP in southeastern Europe (Tsanova et al., 2024).

3. Early Upper Palaeolithic/Aurignacian. Technological and typological data from Temnata (TD V-Layers 3h, 3g) (Drobniewicz, Ginter, Kazior, & Kozlowski, 2000) and Bacho Kiro (Layer C from last excavation) reflect established blade and bladelet production systems, with implications for regional adaptation and cultural development of early *Homo sapiens*.

4. Gravettian and Epigravettian. Backed bladelets assemblages from Kozarnika (Gravettian Levels V–III) and Temnata (Gravettian layers 3f, 3d', 3d, 3c, Epigravettian layer 3a) (Kozlowski, Laville, & Ginter, 1992) illustrate the resilience and technological sophistication of later hunter-gatherer groups, particularly through bladelet-based reduction strategies and backed bladelets tools.

Lithic assemblages from some older excavations will be re-evaluated to refine their chrono-cultural attribution. By integrating stratigraphic information with techno-typological analysis, this study contributes to ongoing discussions about cultural continuity, mobility patterns, and the role of the Balkan Peninsula in wider European Upper Palaeolithic cultural dynamics.

Keywords: Bacho Kiro Cave, Bulgarian Upper Palaeolithic, Chrono - cultural stratigraphy, Kozarnika Cave, Musselievo, Samuilitsa II cave, Temnata Cave.

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New data on the Early Upper Palaeolithic in Northwestern Italy

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Within our knowledge of the early stages of the Upper Palaeolithic in Europe, the Liguria region in Northwestern Italy, characterised by a mountainous landscape overlooking the Mediterranean Sea, has yielded the most significant evidence thanks to research into two deposits located at the Balzi Rossi site near the French border: Riparo Bombrini and Riparo Mochi. The evidence unearthed there suggests that the Mousterian culture gradually disappeared around 42 ka BP, to be replaced by the Protoaurignacian culture, which dates back to at least 41.5 ka BP. Given the earlier dates of some Protoaurignacian sites in France, it seems likely that this culture arrived in Italy from the west shortly after the Neanderthals disappeared from the region. At the Balzi Rossi site the Mousterian-Neanderthal association - if the association between Mousterian and Neanderthal can be considered a valid paradigm - persisted at the same time as the French Châtelperronian and Italian Uluzzian. The use of increasingly local raw materials in the terminal levels of the Mousterian, the appearance of sporadic red ochre, and the sudden emergence of the Proto-Aurignacian culture, characterised by flints from Western Provence and the Adriatic region, decorative elements, and bone tools, show complex dynamics of replacement and behaviour. This may have involved interactions between human groups and different cultural aspects during the transition from the Middle to the Upper Palaeolithic.

Keywords: Mousterian-Neanderthal association, Protoaurignacian, Riparo Bombrini, Riparo Mochi, Chatelperronian-Uluzzian contemporaneity

The Onset of the Upper Palaeolithic in southern Italy

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The description of the development of the early Upper Palaeolithic, corresponding to the arrival and dispersal of *Homo sapiens* in southern Italy, was outlined some time ago (Palma di Cesnola, 2001) and later refined by a re-examination and initial synthesis of the different production systems used in lithic assemblages at reference sites of the area (Marciani et al., 2020). However, new data and studies now enable us to expand our knowledge providing a more robust chronological framework and a more detailed techno-economic analysis of the various Uluzzian, proto-Aurignacian and Aurignacian (the latter being a novelty) assemblages observed in the important stratigraphic series of Grotta del Cavallo (Nardò, Lecce), Grotta di Castelcivita and Grotta della Cala, both located in the province of Salerno. Current knowledge also sheds new light on the possible relationship between the newcomers and the local Neanderthal population that, in the upper layers of the Riparo l'Oscurusciuto (Ginosa, Taranto), seems to exhibit lithic production methods previously unknown in Italy.

L'aube du Paléolithique supérieur en Italie du sud

La description du développement des débuts du Paléolithique supérieur, correspondant à l'arrivée et à la diffusion de *Homo sapiens* dans le sud de l'Italie, a été tracée il y a un certain temps (Palma di Cesnola, 2001) et affinée par un réexamen et une première synthèse des différentes méthodes de production des assemblages lithiques sur les sites de référence dans la région (Marciani et al., 2020). Cependant, de nouvelles données et études nous permettent aujourd'hui d'avancer dans notre connaissance grâce à un cadre chronologique plus solide et à une plus détaillée analyse techno-économique des différents assemblages uluzziens, proto-aurignaciens et aurignaciens (une nouveauté pour ces derniers) observés dans les importantes séries stratigraphiques de Grotta del Cavallo (Nardò, Lecce), Grotta di Castelcivita et Grotta della Cala, toutes les deux situées dans la province de Salerno. Les connaissances actuelles jettent également un nouvel éclairage sur les relations possibles entre les nouveaux arrivés et la locale population néandertalienne qui, dans les niveaux supérieurs du Riparo l'Oscurusciuto (Ginosa, Taranto), semble posséder des méthodes de production lithique inconnues jusqu'à présent en Italie.

Keywords: Homo sapiens dispersal, Uluzzian, Aurignacian, Lithic techno-economy, Grotta del Cavallo, Grotta di Castelcivita, Grotta della Cala

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A New Perspective on Gravettian and Epigravettian Occupation in the Central Balkans

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Over the past fifteen years, research has provided an entirely new perspective on the Gravettian and Epigravettian occupation of the central Balkans. This region appears to have been most intensively inhabited between 30 and 27.5 ka cal BP—somewhat later than much of Central Europe, but earlier than the Adriatic coast and its immediate hinterland. The spatial and temporal distribution of Epigravettian sites in the Balkans clearly suggests population movements toward the Adriatic zone, raising the possibility that the Paleo-Adriatic lowland and its periphery served as a center of population aggregation during the Last Glacial Maximum (LGM). The lack of substantial evidence for settlement in the interior Balkans after 20 ka cal BP, and even during the Late Glacial, remains unresolved, though several explanations have been proposed. The few known sites located deep in the Adriatic hinterland that date to this period may reflect the gradual recolonization of the peninsula from the Adriatic zone, rather than the persistence of local populations that may have hypothetically survived there beyond the LGM.

Keywords: Balkan Gravettian, Paleo-Adriatic LGM refugium, Epigravettian recolonization

The presence of the Polish Świeciechów flint in the Palaeolithic of Hungary

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Since the 1960s, two tools found in the Sólyomkút Rockshelter (Bükk Mountains, Hungary), attributed to the Mousterian, were considered as one of the oldest evidence of use of the Świeciechów flint as lithic raw material. In the 1990s, though the archaeological revision of the site revealed uncertainties about the cultural attribution of these artefacts, further pieces were reported from Sajóbábony-Méhész-tető open-air site, eponymous site of the Middle Palaeolithic Bábonyian. The new French-Hungarian excavations at Sajóbábony unearthed the most numerous collections of artefacts made of Świeciechów flint ever found in Hungary. Although the Bábonyian is characterized by bifacial and leaf-shaped tool production, the assemblage of Polish flint demonstrates evidently a blade production and contains Aurignacian tool types. Most probably it represents a different occupation episode. This discovery shed new light on the problem of the appearance of this specific raw material in the Palaeolithic of Hungary. Moreover, the use of the Świeciechów flint during the Palaeolithic of the neighbouring regions (Poland, Moravia, Slovakia) is reconsidered too.

Keywords: Middle Palaeolithic, Early Upper Palaeolithic, Micoquian, Aurignacian, extralocal raw material, long distance contacts

Exploitation of geological sources of fossilized mollusc shells in the Epigravettian Danube Bend area (Hungary)

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Excavations done on the various Epigravettian sites of Central Northern Hungary's Danube Bend area have yielded sizeable amounts of mostly unmodified, fossilized tertiary mollusc shells. At most of the sites these shells were scattered throughout the habitation surface, and, moreover at the site of Szob-Ipolypart they were arranged into piles, interpreted as storage deposits. The shell assemblages present at the sites show distinct preferences of mollusc shells mainly focusing on one to three different genera. These prefereces hint at conscious selection during the procurement process. The Danube Bend area possesses numerous exposed sediments bearing tertiary marine fauna that were available as possible sources during the Epigravettian. This presentation focuses on pinpointing the geological sources that could have been utilized for collecting these items per site, attempts to discern how many different sources would have been needed to procure these assemblages and if the obtaining of shells could have been embedded into lithic raw material procurement strategies.

Keywords: Danube Bend shell procurement, Hungarian Epigravettian sites, Szob-Ipolypart shell storage

Kraków-Zwierzyniec 1 and Mamutowa Cave: From Old Finds to New Data - Multidisciplinary Perspectives on Key Upper Palaeolithic Sites in Southern Poland

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The Kraków-Zwierzyniec 1 site and Mamutowa Cave are among the best-known Upper Palaeolithic sites in southern Poland, with a research history spanning over a century. Mamutowa Cave, in particular, gained early prominence due to its exceptional assemblage of osseous artefacts and was regularly presented as early as the 1870s at meetings of the *Congrès international d'anthropologie et d'archéologie préhistoriques*. Both sites have played a foundational role in shaping regional Palaeolithic studies. Despite their significance, much of the material recovered has only been published in brief or dispersed formats, limiting its integration into broader interpretative frameworks. Archaeological assemblages from these sites confirm the presence of key cultural units: the Early Aurignacian and the Zwierzyniecian at Kraków-Zwierzyniec 1; the Late Aurignacian and the Gravettian at Mamutowa Cave. In addition, early Upper Palaeolithic leaf point industries have been documented at both localities.

New research is currently being conducted at these sites within two independent multidisciplinary projects. Their primary objective is to reassess the cultural and chronological significance of both sites through a comprehensive re-evaluation of their archaeological records. This is being achieved by digitising archival documentation and integrating it with modern three-dimensional spatial models. Such work is particularly important for Mamutowa Cave, where the stratigraphic sequence has been almost entirely excavated. An essential component of the projects involves the renewed study of legacy assemblages and associated environmental materials (faunal remains, charcoal, macrobotanical remains). Special attention is given to the re-analysis of osseous artefacts, including a notable assemblage of bone points and ornaments from Mamutowa. Targeted excavations are also being carried out in key areas at both sites. These small-scale interventions focus on high-resolution 3D documentation of artefacts and stratigraphy to refine the stratigraphic resolution and improve cultural attributions. This is particularly critical given the steeply inclined layers at Mamutowa and the partially disturbed context at Kraków-Zwierzyniec. In parallel, systematic wet-sieving of sediments ensures the recovery of small artefactual fractions, such as microblades or micropoints, which are crucial for understanding technological variability in early and mid-Upper Palaeolithic industries. This integrated approach supports a more precise reconstruction of site formation processes, cultural sequences, and environmental context. Ultimately, the ongoing research contributes to a broader understanding of human behaviour, technological change, and regional variability in the Upper Palaeolithic of Central Europe.

Keywords: Kraków-Zwierzyniec 1, Mamutowa cave, Lithic technological variability, Late Aurignacian, Gravettian

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Has the pendulum swung for the local origins model of the Châtelperronian?

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The Châtelperronian of France and northern Spain is now generally regarded as one of the first manifestations of the Upper Palaeolithic in western Europe, combining dedicated blade and bladelet production with personal ornaments. The emergence of this techno-complex equally coincides with a period the saw the development of a more complex demographic and cultural landscape in western and eastern Europe. The Châtelperronian has elicited debate for over a half a century, with the last two decades seeing a significant evolution and augmentation in the quality and types of the data at our disposal. While the nature of this industry is now clear, renewed excavations at key sites and the critical revision of older collections have rendered its origins and author less certain than previously thought.

A concise historical survey of the question reveals who made the Châtelperronian and its hypothesized cultural ancestor to be built from a scaffolding of three forms of evidence: techno-typological, stratigraphic, and, for lack of a better term, biological, that is to say, the reporting of Neanderthal remains in association with typical Châtelperronian stone tools. This presentation proposes a critical, admittedly qualitative re-evaluation of the archaeological evidence for continuity between the late Mousterian and Châtelperronian. We conclude that most, if not all, of the expectations that ought to be met in a such a scenario no longer appear tenable and that the local-origins model for the Châtelperronian may no longer be the most parsimonious reading of the available data.

Keywords: Châtelperronian, Middle-to-Upper Palaeolithic transition, Neanderthals, modern humans

The Early Upper Palaeolithic in the Iberian Peninsula

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After two decades of intense debate about the "Transition" between the Middle and Upper Paleolithic throughout Europe, the pace of research slowed down around 2012 (Mangado, 2010). Advances in radiocarbon dating or the genetic sequencing of Neanderthals posed a new framework, which shifted the focus of interest from the novelties of archaeological fieldwork to these disciplines. Now that the first quarter of the 21st century has passed, it seems advisable to address a new synthesis about how our knowledge of the Early Upper Paleolithic in the Iberian Peninsula has evolved. Iberia is one of the three peninsulas on the southern flank of the European continent, where the debate about the last Neanderthals and the first Anatomically Modern Humans and their lithic technocomplexes has been most active. During the first decade of the 21st century, the paradigm of the "Ebro frontier" proposed by Zilhão encouraged research and propelled a complete renewal of our thinking about the circumstances in which the first steps of our species took place in the Iberian Peninsula. Roughly speaking, this presentation will refer to three large technocomplexes (Chatelperronian, Aurignacian, and Gravettian) and their degree and patterns of permeability in the Iberian Peninsula, not only on the coastal areas of the Atlantic Ocean and the Mediterranean Sea but also –and this is the principal novelty- in areas of higher altitude located in inland regions (de las Heras et al. (coord.), 2013). Given the structural complexity of the Iberian Peninsula, we must identify at least four different entities, with nuances in their Paleolithic ecumene: to the northwest, the Cantabrian region; to the east, the Mediterranean seaside, including current Catalonia, Valencia and Murcia; in the north, the large basins of the Ebro and Duero; finally, in the southwest, the basins of the Tagus, Guadiana and Guadalquivir rivers.

The *Cantabrian region* is located northwest of the Iberian Peninsula and includes the present territories of Galicia, Asturias, Cantabria, the Basque Country, and a portion of the north of Navarre. If we divide this region into its western, central, and eastern sections, its cultural feedback with the southwest of France is obvious: the Chatelperronian barely goes beyond the limits of the Miera River, while it is well represented in the eastern sector. On the other hand, the initial phase of the Aurignacian (the Proto-Aurignacian) seems to reach the Nalón valley in Asturias, and only from the Early Aurignacian we will begin to have a complete vision of the Aurignacian and Gravettian in the Cantabrian region . Since the publication of the Labeko Koba site (2000), there have been three main developments affecting the Early Upper Palaeolithic in the Cantabrian region (Arrizabalaga et al., 2025):

- In its eastern area, we observe an increasing presence of Chatelperronian sites (Ekain, Labeko Koba, Aranbaltza, Zabaletxe, and Cueva Morín).

- The representation of Gravettian levels has become routine throughout the Cantabrian region, contrasting sharply with the situation recognised only four decades ago.

- With a relative gap in the western third of Asturias, which may be due to the absence of surveys, Galicia is incorporated into the map of the early Upper Palaeolithic, with sites such as Cova Eirós or A Valiña.

The *peninsular inner region* was traditionally considered empty during the Early Upper Palaeolithic. In the Central Plateau, limiting geographical factors such as the lack of natural rock shelters and a high average altitude (650 masl) have been accompanied by a lack of interest on the part of researchers, a situation that has only begun to be corrected in recent years. In the valley of the Ebro, rocky shelters abound in the mountainous foothills, but research has not started until a few decades ago, and at the moment, the Magdalenian campsites are much more frequent. In both territories, the testimonies of the presence of human groups in the initial Upper Paleolithic are scarce, almost anecdotal still, but this panorama will probably reverse as the studies progress. In recent years, the main developments have been:

- In the western area of the northern Plateau, in Portuguese territory, we find some enclaves of Gravettian affiliation in the Côa valley, dating ca. 28 ka cal BP. The Cardina-Salto do Boi deposit has offered OSL dates around 33,500 ka cal BP for materials with an Aurignacian appearance.

- In the eastern end of the Central System (upper Tagus Valley), two Early Upper Paleolithic (EUP) groups of the southern Plateau have been discovered: in the Malia shelter, two phases of human occupation have been discovered (36200-31760 cal BP and 32420- 26260 cal BP), suggesting a recurrent settlement in this place with Aurignacian features. In the same area, in Peña Capón, industries of Gravettian affiliation have appeared, dating from 25.2-26.1 cal BP, without further characterisation due to the incipient nature of the archaeological work.

- In the Ebro valley, a new C14 dating at level c of Peña Miel (41815-40974) seems to confirm Aurignacian occupations in a mountain pass (850 masl) between the Ebro and the northern Plateau, on dates similar to those of Cantabrian or Pyrenean sites (Domingo et al., 2024). In the central Pre-Pyrenees, the Fuente del Trucho presents materials of Aurignacian and Gravettian affiliation in mixed levels, and cave paintings dated by U/Th in Gravettian chronologies. The Gravettian campsite of Arenal de Fonseca, in the Maestrazgo mountains, dated 29964-28878 cal BP, seems linked to the Mediterranean coast.

In the *south of the Iberian Peninsula*, the model established as a result of studies developed in Middle Paleolithic sites (Carigüela, Zafarraya or Gorham's cave) advocated Neanderthal permanence in this region until advanced moments of the Gravettian (Nerja). However, over the last twenty years, work at various sites has made it possible to clarify the existence of a significant settlement in southern Iberia during the EUP.

The oldest phases of the Aurignacian (up to 44 Ky) have been documented in Cueva Bajondillo (Bj/13) (Cortés-Sánchez et al., 2019) and Lapa do Picareiro (Portugal). Likewise, lithic industries with ages of ~39-35.7 cal ka BP have been identified in Ardales. The Evolved Aurignacian (<34.9 cal ka BP), has been documented in Bajondillo/11; The existence of signs attributable to this stage in Ventanas (36.9 cal ka BP) has also been proposed. As for the Gravettian (from 33 ky), the work in Vale Boi, Nerja, Ardales or Palomas has provided new information about this technocomplex, consolidating the line of a stable settlement by modern humans in the region.

In another vein, preliminary data from the G40 shelter of Tajos de Marchales reinforces the idea of a prolonged occupation during the EUP. Likewise, the indirect data of pre-Solutrean art in some of the main sites in the region (Ventanas, Pileta, Nerja or Ardales), or the existence of several sites such as Maltravieso (Extremadura) or outdoors with representations of hands in Cádiz (Estrellas, Palomas IV or Montera del Torero) allow us to assess the extension and density of the settlement through the network of landmarks with symbolic load identified in southern Iberia.

The Chatelperronian lithic tradition appears represented testimonially in the *northeast of Iberia* through the identification of Chatelperronian points in sites such as Cova dels Ermitons and Cova de l'Arbreda (Girona) or Cova Foradada de Calafell (Tarragona) (Morales et al., 2019). Today, this last site represents Europe's southernmost point of this technocomplex.

The Aurignacian evidence from the northeast of the Iberian Peninsula corresponds to both the Early and Evolved Aurignacian. We find the Early Aurignacian in the sites of Cova del Reclau Viver, Cova de Mollet and Cova de l'Arbreda. In the latter, level H provides Dufour bladelets and split-base assegais. Recent dating from the bone industry and faunal remains with anthropic manipulation place this H level at 36,000 ± 700 BP (OxA-21784). Other sites with similar dates are Abric Romaní and Cova Gran de Santa Linya, the latter in the pre-Pyrenean area. The evolved

Aurignacian and its typical lithics and bone industries are also found in l'Arbreda -level G- dated to 32,250 ± 450 (OxA-21667), next to dates from Cova Beneito (Alicante). For the Aurignacian of the peninsular Levant, the available dates for the Cova de les Cendres, the Cova de les Malladetes and other Valencian sites have allowed us to formulate a well-defined chronological framework of the Aurignacian, whose beginning would be between 39,500 – 36,900 cal BP and its completion, between 31,600 – 29,800 cal BP. In Cova de les Malladetes, recent work has confirmed the existence of Aurignacian levels due to the presence of Dufour bladelets. In level VI of the Palomar Shelter (Albacete) the same technological characteristics are observed. In both Cova de les Malladetes and Cova de les Cendres, the low density of lithic remains would argue for sporadic episodes of occupation.

The Gravettian (31,900-30,900 cal BP to 25,700-25,000 cal BP) is generally well represented throughout the region analysed, from the Paratge del Reclau (Girona) to the central Mediterranean Levant. In the northeast, we recorded levels without unambiguous direct fossils but with dating from the period, such as Cova Gran de Santa Linya or the Balma de la Griera de Calafell. We also have well-defined sites industrially and chronometrically, such as Cova Foradada de Calafell (level IIIn: 26.5 ± 0.1 BP), Reclau Viver (levels C, D and E), or Cova de l'Arbreda (levels F, E and D). Special mention deserves the discovery of an aerophone in Cova d'en Pau, which is recognised as the first musical instrument in Iberia. The dating of the skull from the Cova de Mollet III site, also in the Paratge del Reclau, stands out, which has provided diverse grave goods and a date of 22,330 ± 90 BP, being considered the most complete adult Gravettian skull (probably female) on the Peninsula. From Cova de les Malladetes comes a plaquette engraved with aurochs with evident stylistic similarities with the aurignacian plaquettes painted and engraved from Cova del Parpalló and some representations of Fuente del Trucho and the northern Pyrenean area, which argues for the existence of long-distance contacts.

Keywords: Early Upper Paleolithic (EUP), Iberian Peninsula, Aurignacian / Gravettian / Chatelperronian, Radiocarbon chronology

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The persistent lack of data driving explanations for the Middle to Upper Paleolithic transition in southern Iberia

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The appearance of Upper Paleolithic technocomplexes in southern and western Iberia, widely considered to be associated with the arrival of modern humans in the region, was thought to post-date 37 ka due to the late survival of Neanderthals and the Middle Paleolithic. The Ebro Frontier model postulated a biogeographic boundary separating the populations of Neanderthals and modern humans with the former maintaining sufficient population density and reproductive success to block the latter from colonizing Iberia (Zilhão, 2009). In the last 15 years, most of the purported late Middle Paleolithic sites south of the Ebro River in Spain have been redated using new techniques in radiometric dating. In every case, the redated sites were shown to be thousands or even tens of thousands of years older than previously thought.

Despite the available data, the Ebro Frontier and associated ecological models persist in the absence of corroborating evidence and a large body of contradictory data. This is partly because sites dated ~42-37 ka cal BP are extremely rare, and a few are dated to this interval by less precise methods such as OSL (Aubry et al., 2020). The lack of archaeological and fossil evidence may be due to climatic and landscape instability that erased the record or prevented its formation. Under these conditions, survivorship is likeliest in sedimentary traps or sheltered locations where accumulative processes preserve material evidence.

The discovery of new sites in central Iberia and ongoing excavation of others has begun to fill the gap in our knowledge. In Spain, Abrigo de la Malia, Peña Capón, and Cueva Millán, demonstrate early Upper Paleolithic human presence in areas previously thought to be uninhabitable (Sala et al., 2024, Sánchez-Yustos et al., 2024). The excavation of Lapa do Picareiro, in central Portugal, revealed an early Aurignacian presence with diagnostic carinated endscraper/core and bladelets in western Iberia several thousand years earlier than previously known. Radiocarbon dating on human modified ungulate bones places this assemblage between 41-38 ka cal BP (Haws et al., 2020). The results from Picareiro provide definitive evidence that modern humans were in western Iberia at a time when Neanderthal populations would have been extremely sparse or non-existent. Considering the available data, new models should be developed to incorporate the recent archaeological, fossil, and genetic evidence.

Keywords: Upper Paleolithic, Aurignacian, radiocarbon dating, Iberia, Portugal

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Figure 1. Map of Iberia with Late Middle and Early Upper Paleolithic sites.

International Workshop

„Origins and Development of the Eurasian Initial Upper Paleolithic“

Do Transitional Industries Really Exist? A Paleoanthropological Perspective

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The concept of "transitional industries" has traditionally referred to lithic assemblages such as the Châtelperronian, Uluzzian, Lincombian-Ranisian-Jerzmanowician (LRJ), and Initial Upper Paleolithic (IUP), thought to represent a cultural bridge between the Middle and Upper Paleolithic. Long viewed as products of late Neanderthal innovation or acculturation, these industries are now being fundamentally reinterpreted. Recent advances in chronometric dating, lithic analysis, and especially ancient DNA studies have shown that many of these assemblages were, in fact, produced by early *Homo sapiens* groups expanding into Europe well before the onset of the Aurignacian. Rather than transitional forms, these industries appear to reflect the adaptive strategies of pioneering modern humans entering new ecological and cultural frontiers. This shift challenges the very notion of a linear "transition" and calls for a reassessment of long-standing interpretive frameworks.

Bacho Kiro Cave humans in focus: update on new individuals and their genomes

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A few years ago, we first obtained the mitochondrial (mt) DNA (Hublin at al, 2020) and, subsequently, genome-wide ancient DNA (aDNA) data (Hajdinjak at al, 2021) from four Bacho Kiro Cave individuals, which were directly dated to between 46,000 and 43,000 calibrated years before present (cal BP) and found in a direct association with the Initial Upper Palaeolithic (IUP) stone tools (Hublin at al, 2020; Fewlass at al, 2020). We found that these individuals contributed very little to the genetic ancestry of later populations in Europe, including the ~35,000-year-old BK1653 individual found in the same cave. They were, surprisingly, related to the populations that contributed their ancestry to the populations living in East Asia and the Americas. Moreover, all four IUP Bacho Kiro Cave individuals had very recent Neandertal ancestors, only 4-10 generations back in their family trees.

Most recently, we screened seven new teeth recovered from the layers N1-I and N1-I/J of Bacho Kiro Cave, including an upper left second molar A8-1327 fitting in the human maxilla, and the tooth G4-427 recovered from a layer A2/B, for aDNA preservation. Following shallow shotgun sequencing, we enriched single stranded DNA libraries for both human mtDNA (Fu at al, 2013) as well as for the sites across the genome informative of individuals' relationships to other humans, including Neandertals and Denisovans (Fu at al, 2015). We found that two teeth, CC7-2789 and CC8-1635, belonged to Bovidae. From the remaining six specimens, we reconstructed full mtDNA genomes to an average coverage of between 540 and 1665-fold. After aligning them to the mtDNA genomes of 54 present day humans, 60 radiocarbon dated ancient humans, 42 Neandertals, seven Denisovans, a Neandertal from Sima de los Huesos and a chimpanzee, we found that they all fall within the known human variation. The mtDNA genomes from the new IUP specimens fall close to the other four IUP Bacho Kiro Cave individuals, whereas the mtDNA from the G4-427 has the smallest number of pairwise differences to the mtDNA genomes of ~30,000-year-old Dolni Vestonice individuals.

By recovering genome-wide data from all Bacho Kiro Cave specimens, we found that the molar A8-1327 belongs to the same male individual as previously published molar F6-620 and a bone fragment AA7-335. Furthermore, two new teeth, AA8-1975.1 (N1-I/J) and CC7-2045.1 (N1-I low) belonged to another, previously unsampled, male individual. An additional female individual is represented by the tooth BB8-817. Thus, we find a minimum of six IUP individuals at Bacho Kiro Cave represented by a total of six teeth and four bone fragments. All individuals belong to the same population as they share significantly more alleles with each other than with any other human group, but are unrelated to each other to the sixth-degree family level (Ringbauer at al, 2024). Using the hapROH method (Ringbauer at al, 2021), we find intermediate levels of runs of homozygosity in these individuals' genomes, indicating a small population size of around 400 individuals. Interestingly, these runs of homozygosity are significantly smaller than in most of the later Upper Palaeolithic individuals in Europe. Lastly, all six IUP Bacho Kiro Cave individuals have at least two pulses of Neandertal ancestry, with the second pulse less than ten generations in their family history.

Keywords: Bacho Kiro Cave, genome-wide ancient DNA data, Neandertal ancestry

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Radiocarbon 3.0: Advancing Chronology in Prehistory

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Advances in radiocarbon science are dramatically reshaping our understanding of human prehistory. Over the past decade, key innovations in sample pretreatment, AMS measurement precision, and high-resolution calibration using glacial tree-ring chronologies have ushered in what can be called Radiocarbon 3.0. This next-generation approach allows researchers to overcome long-standing chronological bottlenecks, especially between 50,000 and 15,000 years ago, precisely the window when *Homo sapiens* expanded into Eurasia, interacted with Neanderthals, and developed increasingly complex cultural behaviors.

High-resolution radiocarbon chronologies, anchored to independently dated tree-ring sequences from glacial contexts in the Mediterranean and the Southern Hemisphere, are revealing more refined timelines for archaeological occupations. These advances allow for tighter correlation with Greenland climatic events and challenge previous assumptions that relied on broad chronological estimates. In particular, the integration of new datasets from sites such as Obłazowa Cave in Poland and Bacho Kiro Cave in Bulgaria illustrates how radiocarbon dating is now able to resolve previously undetected occupational pulses, some of which correlate closely with abrupt environmental changes.

Sites once thought to represent a single cultural phase now show multiple, distinct episodes of human activity closely tied to climatic fluctuations. These findings emphasize the need to move beyond generalized narratives and instead embrace a framework in which human dispersals, settlements, and cultural expressions are read in high resolution, against the backdrop of dynamic environmental change.

Radiocarbon, therefore, is not only a clock, it is also a mirror, reflecting how far we have come, and how far we still have to go. Radiocarbon 3.0 is not merely a technical upgrade; it marks a conceptual shift in how archaeological time is constructed and interpreted. By recovering more fossil trees, reducing measurement errors, and refining sampling strategies, we can significantly improve the chronological resolution of archaeological contexts, yielding clearer insights into the temporal dynamics of prehistoric hunter-gatherer societies and their adaptability to climatic instability.

Keywords: Radiocarbon, chronology, IntCal, prehistory, Climate change

New fossil remains from Bacho Kiro Cave, Bulgaria

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Bacho Kiro Cave (Bulgaria) has emerged as a key site for understanding the initial dispersal of *Homo sapiens* into Western Europe during the onset of the Upper Paleolithic. The last excavations at this site have yielded new human remains, including a partial maxilla and several isolated teeth, some from stratigraphic layers securely associated with the Initial Upper Paleolithic (IUP) assemblage. Here, we present preliminary analyses of these new specimens, integrating morphological and metric assessments with comparative data from both recent and Pleistocene human populations.

The maxilla, a male individual, preserves diagnostic features consistent with anatomically modern humans, including the presence of a canine fossa and a gracile morphology. The isolated teeth display crown and root morphology falling within the variation of *H. sapiens*. Geometric morphometric analyses of the maxilla further confirm these finds, reinforcing previously published results on a dental remain belonging to the same individual.

Together with newly available genetic data, these new remains expand our knowledge of morphological and genetic diversity of these populations and reinforce the significance of Bacho Kiro as a major site documenting one of the earliest incursions of our species into Western Europe, contemporaneous with the last Neanderthals.

Keywords: Initial Upper Paleolithic, Facial morphology, Morphological and genetic diversity, Geometric morphometrics, Introgression

Rethinking again – a decade of research on the IUP

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The Initial Upper Paleolithic (IUP) is a remarkably widespread technological phenomenon. It has been identified in dozens of sites distributed across the full breadth of Eurasia. In a 2014 paper, we discussed alternative hypotheses to explain the near-global distribution of the IUP, ranging from a single dispersal event to repeated instances of convergence in lithic technology (Kuhn and Zwyns, 2014). Over the past 10 years, new archaeological and fossil discoveries, comprehensive programs of radiometric dating, as well as aDNA evidence, have greatly advanced our understanding of the chronology of the IUP, the biological identity of its makers, as well as the spectrum of cultural and behavioral variability it encompasses. The wealth of recent findings, however, do not necessarily confirm the simplest scenarios we proposed. Instead, they show that the processes by which the IUP came to be so widespread were more complex, and varied, than anticipated. Genetic evidence from Bacho Kiro Cave suggests that the makers of the IUP were, at least in these cases, *Homo sapiens*, with relatively recent evidence of Neanderthal ancestry (Hublin et al, 2020). They seem to have a modest contribution to the current Asian gene pool, while their descent cannot be traced among living populations of western Eurasia (Hajdinjak, et al, 2021). The complexity of biological processes should find parallels in the cultural record. Not every assemblages called IUP are necessarily part of a unified technocomplex made by modern humans only, not all technological practices identified with the IUP are came with exogenous populations, and what introgression means for the emergence and fixation of the IUP cultural traits is still unclear. In some places, such as central Europe and East Asia, there are marked discontinuities between the IUP and older, local Middle Paleolithic cultures, while in others (Zwyns, 2021), such as the Levant, researchers make a stronger case that it had local roots (Goder-Goldberger and Malinsky-Buller, 2022) . Along with more dates and more genetic evidence, achieving a more nuanced understanding of what the IUP represents and how it came to be so widely distributed will require going beyond the basic technological definition. We briefly discuss a few more complex models to stay consistent with the existing data. A deeper understanding of regional and chronological variability, and particularly of the locally derived features of IUP technologies, is needed to investigate the cultural evolutionary processes that led to their appearance in different places and to properly test these models.

Keywords: Convergence, Dispersal, Technological variability, Introgression, Phylogeny, Referrences

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Initial Upper Paleolithic: industry definition, origin and distribution throughout Eurasia

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Initial Upper Paleolithic (IUP) industry is characterized by bidirectional bladey opposed-platform core technology with a *lame à crête* technique with the core tablet technique still absent, and an UP toolkit. Originally, IUP Early Emiran industry (Boker Tachtit site, levels 1–3 / AH-B) is thought to have appeared ca. 50 ka cal BP following the move of Late MSA Nubian Afro-Arabian *Homo sapiens* into the East Mediterranean Levant. The Levantine industry's bidirectional technology features Levallois points with *chapeau de gendarme* butts (Fig. 1A: 1-4) removed as end products after preparatory blade detachments (Volkman, 1983; Škrdla, 2003). Several of the Levallois points were bifacially thinned for hafting, making Emireh points (Fig. 1A: 5-7). Innovation of such a point type could be understood as a need for a new projectile weaponry for the IUP *Homo sapiens* as they competed for food resources with co-occurring Neanderthals of Latest Levantine Mousterian of Tabun-B type (Kebara cave, units VIII-VI) having mainly centripetal Middle Paleolithic (MP) core technology and an MP toolkit.

After their rise of IUP Late Emiran industry (e.g. Boker Tachtit, level 4 / AH-A; Ksar Akil, levels XXIII - XXI) and its localized appearance in the Levant, early Emiran *Homo sapiens* moved successfully throughout Eurasia between ca. 50–40 ka cal BP periodically meeting MP Neanderthals. The IUP industry did not acquire any MP techno-typological elements from Neanderthals, although *vice versa* "enrichment" of MP industries by some IUP traits is traced, resulting to the evolvement of new local industries (e.g. Szeletian in Central Europe). The latter industries are not IUP by archaeological criteria but belong to the IUP period as transitional to UP industries.

IUP outside the Levant appears in unmodified and modified versions of the basic lithic tradition and "split point" for the tradition could be at Sorheh rockshelter in the Persian Plateau (northern Iran). Bohunician in Central and Eastern Europe is an archaeological copy of the Levantine Early Emiran industry (Škrdla, 2017). However, most IUP assemblages known for sites in Central and Eastern Asia and in the Balkans are characterized by the absence of true Levallois points within bidirectional core technology having instead blades (Fig. 1B: 1-9) as desired debitage products.

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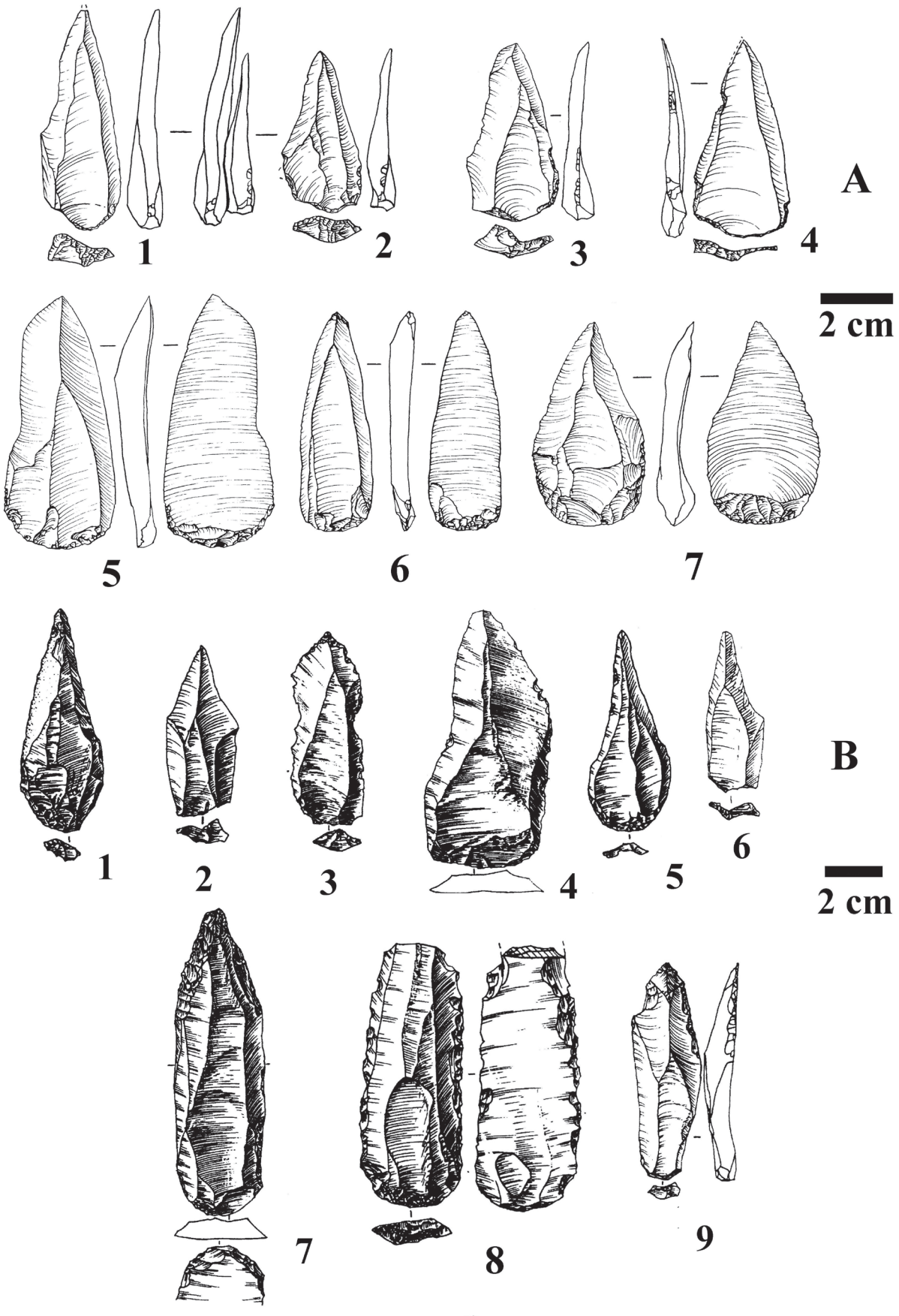

Figure. 1. 1A – Early Emiran artifacts from Boker Tachtit site, level 2 (Israel): 1 – 4 – Levallois bidirectional points; 5 – 7 – Emireh points (after Marks & Kaufman, 1983). 1B – Early Emiran-like / non-Levallois point facies of the Early Emiran artifacts from Kara-Bom site, levels 6-5 (Altai, southern Russia): 1 – 6 – blades; 7 – 9 – points on blades (after Derevianko et al. 1998).

The blade and the hammerstone: Shifts in blade production modes and striking techniques during the Initial and Early Upper Paleolithic in the Southern Levant

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The Upper Paleolithic period in Eurasia is marked by the development of systematic methods for producing pointed blades, a technological innovation often associated with the arrival of modern humans. While many studies have examined both the geographical origins and the mechanism of distribution of such blade industries across Eurasia, less emphasis has been placed on regional cultural dynamics and local developments. Comprehensive lithic studies, supported by high-resolution absolute dating of assemblages from the southern Levant, provide valuable insights into the Initial and Early Upper Paleolithic (IUP and EUP). The earliest evidence of blade technologies, attributed to the Emiran techno-complex, appeared in the Negev Desert (~ 50–47 ka). Emiran blades were produced from bidirectional cores using hard hammerstones. In the subsequent stage in the Negev, originally defined by A. Marks as IUP, blade production shifted to a unidirectional method, still employing hard hammerstones.

In parallel to the IUP stage in the Negev region, (~47–44 ka), a new techno-complex known as the Early Ahmarian emerged in the northern Mediterranean Woodland region. The Early Ahmarian is distinguished by the production of slender blades from narrow-fronted bidirectional cores using soft hammerstones. This techno-complex, distinguished by blade production from narrow unidirectional cores with soft hammerstones appeared in the Negev at a later stage (~40 ka).

The available data suggests that systematic blade production marked the initial step in the technological transition from the Middle to the Upper Paleolithic. Blades were originally produced with hard hammerstones, undergoing rigorous platform preparation, resulting in a final configuration of “Levallois” blanks. Later, in the IUP, blade production continued with hard hammerstones, however core planning shifted to a unidirectional method, resulting in narrower blanks. This method required less preparation, as evidenced by simpler striking platforms. Finally, a clear transition to soft hammerstones is observed in the Early Ahmarian. This innovation facilitated the production of thinner blades from narrow cores with punctiform striking platforms.

In light of these observations, we propose that blade technology spread from the Negev Desert to the Mediterranean woodland region, while the use of soft hammerstones spread in the opposite direction. The coexistence of parallel lithic industries such as the IUP and Early Ahmarian within a confined geographical area, suggests that the Levant contained distinct cultural groups at the time of modern human arrival in Eurasia.

Keywords: Southern Levant, Negev desert, Emiran, Ahmarian, blade technology, hammerstone

Blade industries at the onset of the Upper Paleolithic Period in the Levant – Population dynamics and transfer of knowledge as reflected from the Shualim Rockshelter, Negev, Israel

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Shualim Rockshelter bears three Upper Paleolithic (UP) occupation layers spanning the Initial and Early Upper Paleolithic (IUP-EUP ~47-36 ka cal. BP). The chrono-cultural variability at Shualim was examined following a techno-typological analysis of each layer independently, applying the *chaîne opératoire* concept (Pelegrin, 1985 and therein). Layers I-II are attributed to the Ahmarian culture, while Layer III is attributed to the IUP as seen at Boker Tachtit Layer 4 (Marks and Kaufman, 1983).

Site chronology was established using ostrich eggshells' radiocarbon dating and optically stimulated sediments' luminescence dating. Layer I (39-36 ka cal. BP) reflects a unidirectional production of standardized el-Wad points and retouched blade tools, similar to other Ahmarian sites in the Negev, southern Jordan, and Sinai. Layer II (43-42 ka cal. BP) displays bidirectional production of slightly coarse el-Wad points, occasionally shaped by semi-abrupt to abrupt retouch, a technique rarely known from the southern parts of the Levant but common in northern Ahmarian sites. Layer III lacks radiometric dates (> 43 ka cal BP based on Layer II dates). However, its lithic assemblage resembles that of 'Boker Tachtit 4' with a robust blade industry and the production of broad-based "Levallois-like" points from unidirectional cores.

Only a handful of Levantine sites depict an IUP-EUP stratigraphic sequence. The overlying of the IUP Layer III at Shualim Rockshelter by a bidirectional Ahmarian industry in Layer II resembles the stratigraphy at Üçağızli (Kuhn et al., 2009), in the northern Levant, and differs from Tor Sadaf (Fox & Coinman, 2004) where the IUP layers are overlain by a unidirectional Ahmarian industry. Considering that Layer II is earlier than other dated unidirectional Ahmarian examples and the rarity of the bidirectional approach in the Negev may attest to the high mobility of the Levantine hunter-gatherers and possible interactions and cultural diffusion between the IUP and the two Ahmarian traditions. Our results indicate synchronic and diachronic changes that enable tracing possible social interactions and knowledge exchange among hunter-gatherers during the IUP-EUP in the Levant.

Keywords: Blade technology, Initial Upper Paleolithic, Early Upper Paleolithic, 'Boker Tachtit 4', Ahmarian, Population dynamics, Transfer of knowledge

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Late Initial Upper Paleolithic: definition, origin and further development in the East Mediterranean Levant

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Based upon our current understanding, the Initial Upper Paleolithic (IUP) Late Emiran in the Levant (e.g., Boker Tachtit, levels 4 / AH-A; Ksar Akil rockshelter, levels XXIII-XXI; Antelias cave, layers VII–V; Abu Halka rockshelter, layers IVf–IVe; Üçağizli cave, layers I–F; Umm El Tlel site, level II base), derived from the local IUP Early Emiran (e.g., Boker Tachtit site, levels 1–3 / AH-B), ca. 47-44 ka cal BP. Moreover, in the Levant the IUP Late Emiran subsequently developed into the Early Upper Paleolithic (EUP) Ahmarian (e.g., Ksar Akil rockshelter, levels XX-XVI; Üçağizli cave, layers B1-3; Manot cave, Units 7-8 of Area C; Boker A site), ca. 46-42 ka cal BP. Thus, the IUP Late Emiran occupies a pivotal chronological and developmental stage before the advent of the local Levantine EUP (Marks & Ferring, 1988). The Late Emiran role in the Levantine IUP-EUP transition perhaps suggests that the local population did not spread beyond the Levant as depicted in the absence of culturally related sites in any other part of Asia or Europe. Levantine IUP Late Emiran assemblages are characterized by unidirectional single-platform blade core technology. The *lame à crête* and core tablet techniques are only applied ad hoc for core preparation and maintenance. Blades and elongated "pointed pieces" were serially detached from single-platform blade cores, which typically feature faceted striking platforms and converging/ pyramidal plan shapes (Fig. 1A, 1-2; Fig.2, 1-10). No other core reduction methods have been reported for the IUP Late Emiran. The "pointed pieces" from Boker Tachtit, level 4, have been described as "*clearly not produced by a Levallois method, since they are never consciously predetermined by prior removals*" (Volkman, 1983, 187). Similarly, the blades and "pointed pieces" from Ksar Akil, levels XXIII-XXI, were detached "*from prismatic cores during continuous production of blades*" (Ohnuma & Bergman, 1990, 112) (Fig. 3, 1-21). Therefore, what we refer to here as "pointed pieces" are not technologically formal Levallois points. Instead, they should be recognized as Levallois-like or, using Volkman's terminology (1989, 360), "*morphologically Levallois points produced from a single platform blade core strategy.*" These Late IUP "pointed pieces" also show evidence of being used as projectile tips (Fig. 1B, 1-5; Fig. 3, 20-21), indicating their intentional production and functional role within the tool kit.

Early researchers, such as Azoury (1986: 108-129) and Copeland (1975, 337, 339), identified the blade cores (Fig. 2) and debitage (Fig. 3) of the Levantine Late IUP as Levallois due to the lack of refitting and detailed technological analyses. While a Middle Paleolithic (MP) classification could be proposed based on faceted platform cores and "pointed pieces" morphologically similar to Levallois points, the Levantine Late IUP is primarily characterized by a UP typology. Notably, end-scrapers and burins dominate, with chamfered pieces present at Ksar Akil (52.3% for Boker Tachtit, level 4 – recalculated from Marks & Kaufman, 1983, Table 5-33; 60.2-69.9% for Ksar Akil, levels XXIII-XXI – recalculated from Ohnuma, 1988, Tables 15, 20, 25). The scarcity of Mousterian side-scrapers and points (none at Boker Tachtit, level 4 – see Marks & Kaufman, 1983, Table. 5-33; 1.3-1.9% at Ksar Akil, levels XXIII-XXI – recalculated from Ohnuma, 1988, Tables 15, 20, 25) suggests that Mousterian affinities are unlikely.

Recently, some Late Middle Palaeolithic (MP) industries in Western Europe have been classified

by certain scholars as IUP such as Levallois-Mousterian Neronian in southern France (Slimak et al., 2022). It has been claimed that the Neronian "*Mandrin E* (niveau 6 in Slimak, 2004) *shared precise technical features with the IUP in the Levantine region*" based on "*technical comparisons with lithic artifacts from levels XXV to XX at Ksar Akil, Lebanon*" when "*technologies used to produce Levallois points from both the Ksar Akil IUP and the Neronian are the same*" (Slimak et al., 2022, 7). Building on these conclusions, it was further suggested "*that members of the IUP populations spread very early through the Mediterranean basin*" from the Levant into Western Europe (Slimak et al., 2022, 7-8). However, ignoring chronological considerations, whereby the Neronian predates the Levantine IUP by ~10,000 years, and the difference between Levallois and blade technologies, the Mandrin E/6 Neronian remains clearly MP, characterized by unidirectional convergent Levallois point technology. By contrast the Ksar Akil IUP exhibits a unidirectional blade technology. Slimak's comparison of the Mandrin and Ksar Akil assemblages appears unfounded. The Ksar Akil IUP lacks MP core reduction strategies or related core types and contains less than 2% of MP tool types (e.g. side-scrapers, retouched Levallois points). In contrast, Mandrin E/6 shows 26.9% non-Levallois MP core types ("*Nucléus Kombewa*", "*Nucléus Discoïde plan*", "*Nucléus Discoïde bipyramidal*", "*Nucléus polyedrique*" and "*Nucléus triface*" (recalculated from Slimak, 2004, Fig. 134) and tool frequencies as follow: end-scrapers and burins – 5.9% (recalculated from Slimak, 2004, Fig. 134) and Mousterian side-scrapers and retouched Levallois points of the Soyons type – 60.8% (recalculated from Slimak, 2004, Fig. 159). Finally, Levallois-like points with ventral retouch a typological hallmark of the MP Neronian, including Mandrin E/6 (Slimak, 2004, Pl. 153-161; Combier, 1955) are entirely absent from the Ksar Akil IUP.

Based on the explained data we believe the questionable IUP attribution of the Levallois-Mousterian Mandrin E/6 stems from a limited study that lacks detailed analysis of MP and IUP Levallois and non-Levallois technologies, as well as insufficient consideration of key differences between the character of the Ksar Akil and Mandrin tool assemblages. Notably, the recent study on Mandrin has been accepted by some researchers, prompting claims of IUP affinities for Late MP complexes in southern Europe (Carmignani et al., 2024; SánchezYustos et al., 2024), and links between Middle Stone Age assemblages in Central Asia and the proposed IUP at Mandrin (Plisson et al. in press). We hope our discussion of the IUP Late Emiran industry in the Levant will contribute to a clearer understanding of the IUP techno-cultural phenomenon across Eurasia.

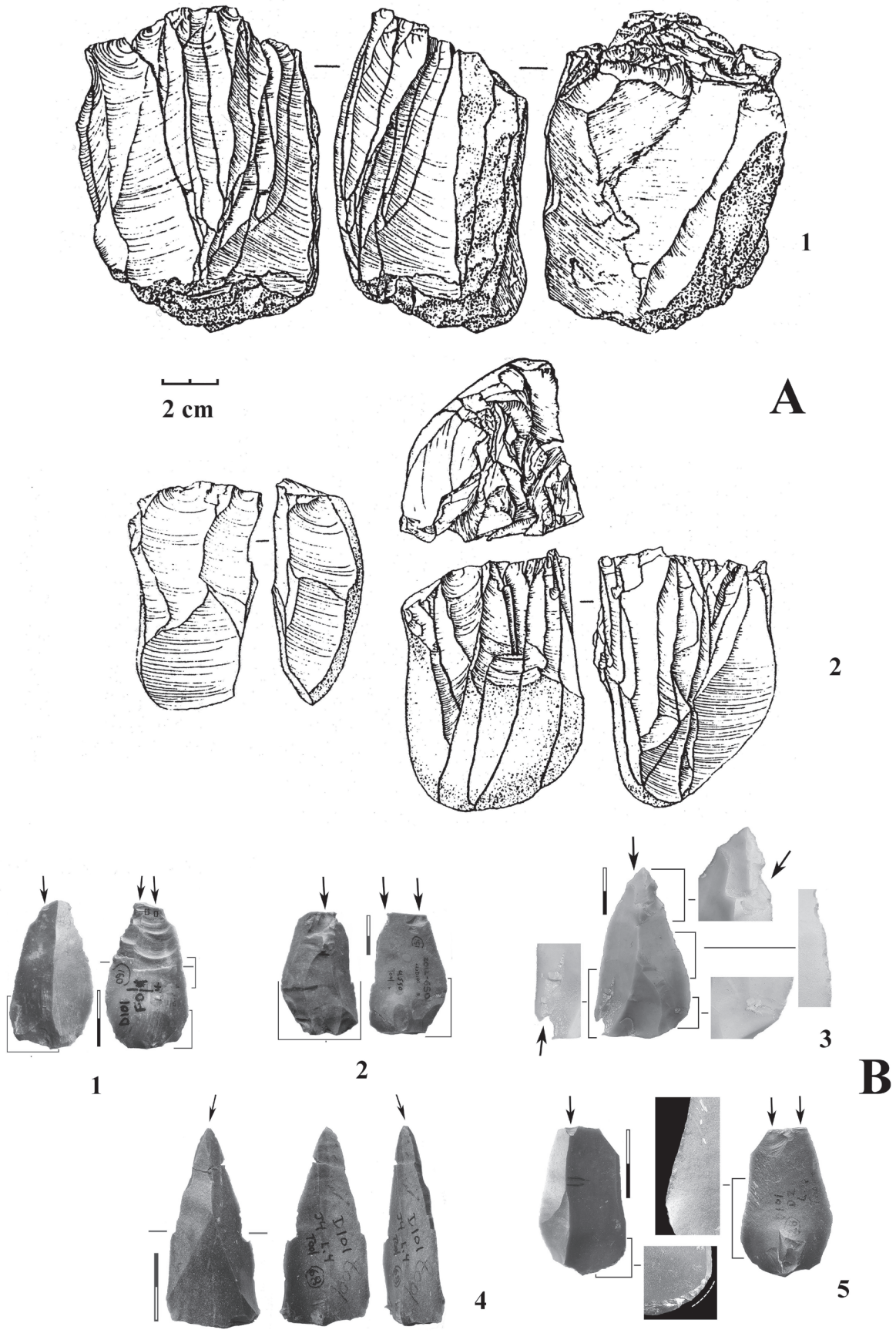

Figure. 1. IUP Late Emiran artifacts from Boker Tachtit site, level 4 (Israel). A: 1–2 – Core refits (modified after Volkman, 1983); B: 1–5 – Levallois-like points with diagnostic impact fractures (modified after Yaroshevich et al., 2021).

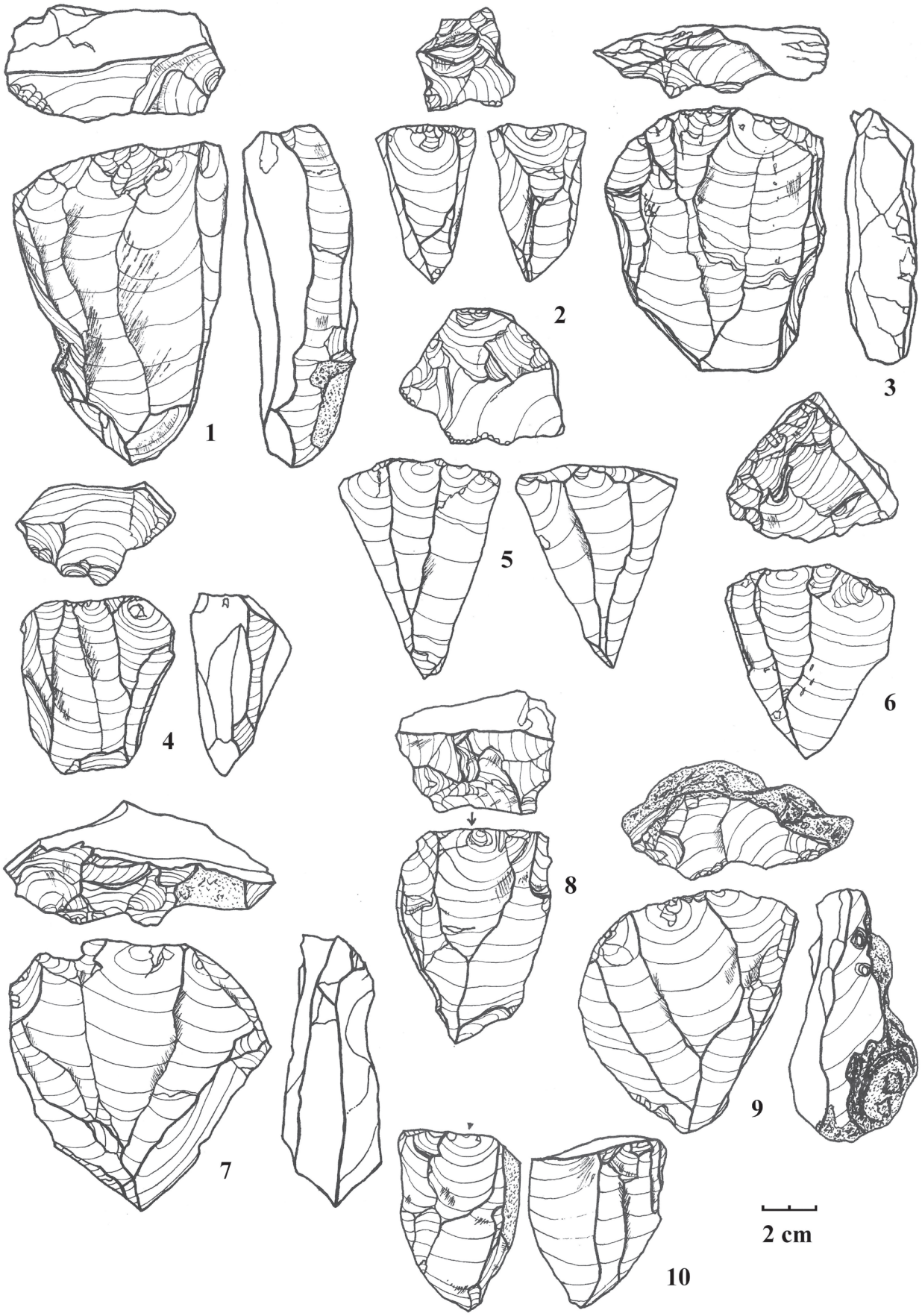

Figure. 2. IUP Late Emiran artifacts from Ksar Akil rockshelter, levels XXIII-XXI.
1–10 single-platform blade cores with faceted striking platforms and converging/pyramidal shapes. Level XXIII: 1, 3-4; Level XXII: 2, 5-8; Level XXI: 9-10 (modified after Ohnuma, 1988).

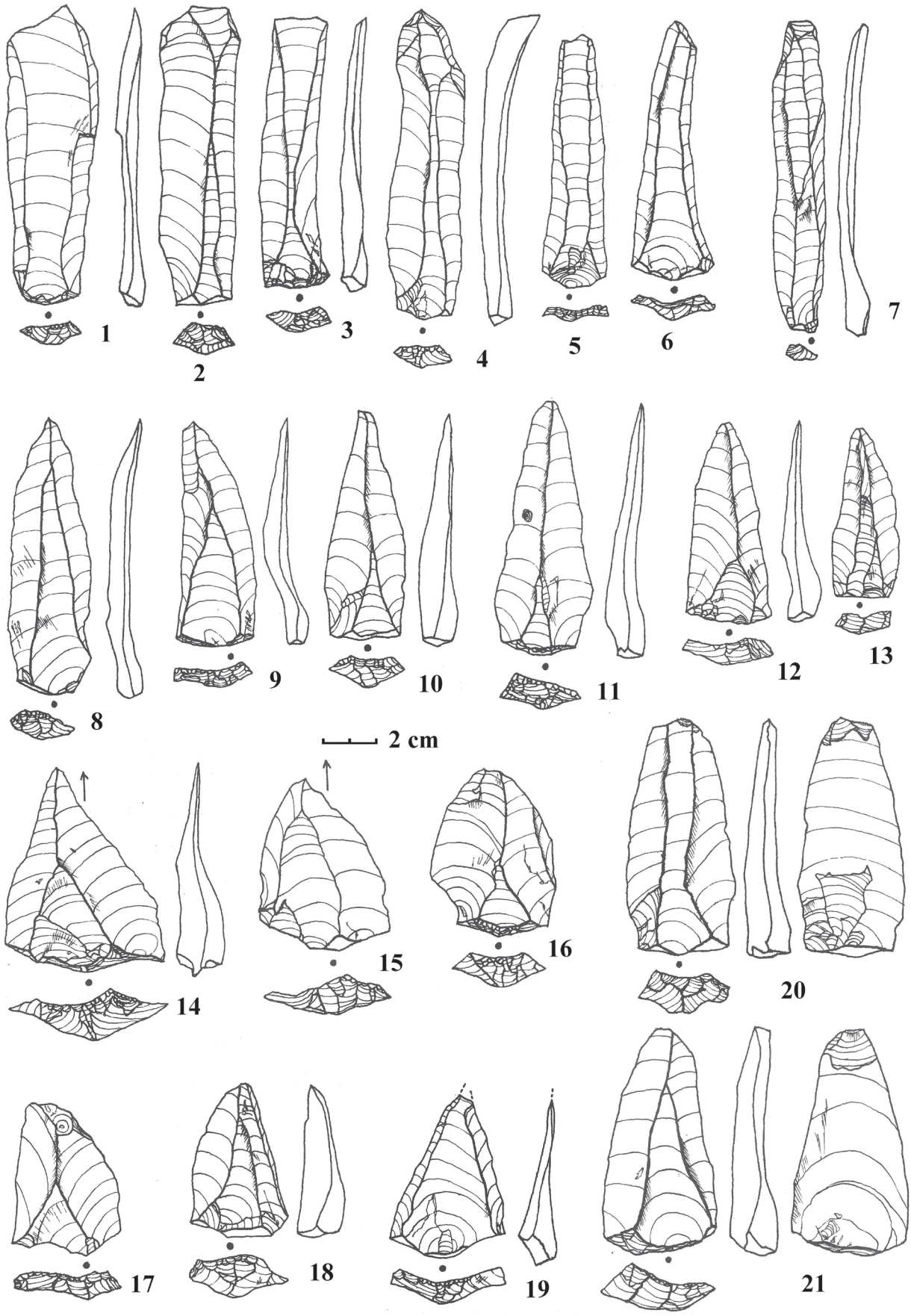

Figure. 3. IUP Late Emiran artifacts from Ksar Akil rockshelter, levels XXIII-XXI (Lebanon). 1–7 blades; 8-19 Levallois-like points; 20-21 Levallois-like points with diagnostic impact fractures. Level XXIII: 5, 9, 13-14; Level XXII: 1-3, 6-8, 10, 12, 16-21; Level XXI: 4, 11, 15 (modified after Ohnuma, 1988).

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Initial Upper Paleolithic Bohunician in Central and Eastern Europe and its comparison with Levantine IUP Early Emiran

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Artifacts known from an Interpleniglacial paleosoil excavated at Brno-Bohunice site (Czech Republic) in the 1970s, now understood as a palimpsest of IUP Bohunician and Szeletian finds, mark the beginning of industrial comparisons for the Levantine Early Emiran and European Bohunician. Their similarity was strengthened when one of us (P.Š.), after refits with technological reconstructions for Stránská skála site complex Bohunician materials, directly compared his European data in 2000-2001 in Jerusalem with the respective Levantine Boker Tachtit data (Volkman, 1983).

The applied *chaîne opératoire* approach showed that "*the highest degree of similarity was documented between Boker Tachtit Level 2 and Stránská skála, while Boker Tachtit Level 4 represents a local development without any influence on European assemblages*", why it was indeed possible to strongly argue 20 years ago on "*the Emiran – Bohunician connection*" with a hypothesis on "*a diffusion of lithic technological practices from the Levant to Moravia ... during a period most probably connected with the first migrations of early anatomically modern humans into Europe*" (Škrdla, 2003: 50).

Both IUP industries indicated the same production of points with *chapeau de gendarme* butts as Levallois predetermined end products within a bidirectional opposed-platform core technology, where blades with convex faceted butts were mainly technological by-products forming "Y-*arrêté*" scar pattern prior a Levallois point detachment. Typologically, both industries are fully UP with just a few MP looking sidescrapers, never composing, however, specific type series. Recent finding of an Emireh point at Bohunician Ořechov IV–Kabáty site completes the Early Emiran-Bohunician association.

Geographically, Bohunician is a ca. 900 km strip in Central Europe stretched from Bavaria in the west to eastern Slovakia in the east with a center in southern Moravia (Škrdla, 2017). Taking Eastern Europe, there is only a single IUP site of Kulychivka, lower layer in western Ukraine (Demidenko & Usik, 1993; Škrdla et al., 2016). The site's lithics are not only industrially Bohunician but have most topographic and archaeological features known for Stránská skála site cluster. In sum, Bohunician testifies some IUP *Homo sapiens* moved from the Levant to Europe bearing with them the Early Emiran unmodified lithic treatment tradition.

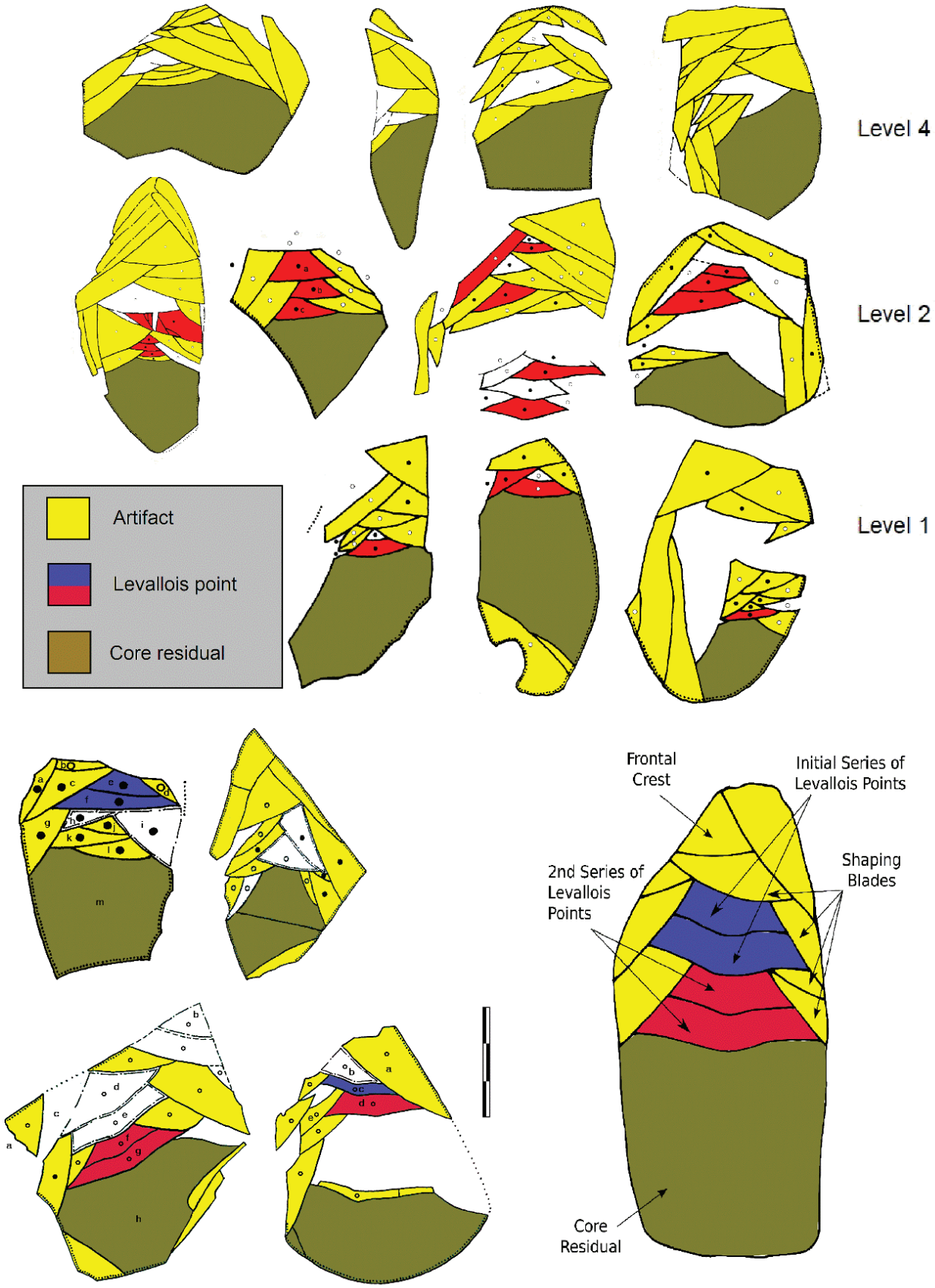

Figure 1. Cross-sections of refitted sequences from Boker Tachtit (Level 4,2 &1) aand Stránská skála (modified from Škrdla 2003)

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New Initial Upper Paleolithic in northern Levant: First results from Elobrahimo Rockshelter in Mardin Province, southeast Türkiye

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There are more than fifty rockshelters in limestone hills of Tur Abdin around Mardin between the upper Tigris and Euphrates Rivers in southeast Turkey. These have started to be systematically explored only recently (Kodaş, 2023). Stratified deposits are bearing abundant lithic record and fauna from late Lower Paleolithic to Late Epipalaeolithic. At the moment, we are in preparation for an extensive excavation campaign of some of these rockshelters, while conducting detailed analysis of lithics, proteomic screening of excavated bone fragments, and first OSL dating of what seems to be an IUP record in Horizons 1 and 2 of Elobrahimo Rockshelter (Uluköy Mağarası). The lithic record from these two horizons overlies a Levallois dominant Middle Paleolithic of Horizons 3 and 4. Here we report on the technology of this IUP and place these preliminary results into the context of the Levantine IUP technological variability. First results show affinities with the IUP of both Üçağızlı (Kuhn et al., 2009) on the Mediterranean coast and Bacho Kiro Cave (Tsanova et al., 2024) in Bulgaria. Combined with limited lithic samples from some of the other rockshelters and open-air locations, there is a clear significance of this area that is rich in raw material not only for the discussion of the emergence and diversity of the IUP in space and time, but also for a better understanding of cultural dynamics and technological developments across the Levant, Anatolia, southeast Europe, the Caucasus, and the Zagros Mountains.

Keywords: Initial Upper Paleolithic, lithic technology, Levant, Türkiye

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The Nubian Tradition in South Arabia and its relationship to the IUP

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The discovery of a Nubian-related industry in southern Oman – the Mudayyan – that demonstrates overlapping technological elements with Boker Tachtit, level 1, led us to theorize that the Emiran Industry might be a late manifestation of the Afro-Arabian Nubian Technocomplex (Rose and Marks 2014). Since publishing this hypothesis, assemblages based primarily on Nubian prepared core technology have been reported in the Negev (e.g., Goder-Goldberger et al. 2017; Oron et al., 2024), Lebanon (Hilbert, personal communication), Syria (e.g., Demidenko et al. 2023), and Saudi Arabia (e.g., Hilbert et al. 2017). This paper revisits the question of the Afro-Arabian Nubian Technocomplex and its relationship to the IUP, considering these discoveries. We present new OSL ages and quantitative evidence from 15 Nubian-related assemblages in southern Oman (Rose et al. 2025a). Using lithic taphonomy to evaluate diachronic change on time averaged surfaces, we demonstrate at least two chronological stages within the local MSA tradition: the earlier "Dhofar Nubian" and later "Mudayyan" industries (Rose et al. 2025b). While Nubian reduction is present in the Mudayyan, it is eclipsed by bidirectional point production from opposed platform cores to produce elongated blanks – the hallmark of the Eurasian IUP. Moreover, all Mudayyan core technologies underwent a dramatic miniaturization from the preceding stage, which we interpret as a response to diminished climatic conditions. This talk considers the cultural and evolutionary relationship between the Mudayyan, its archaeological antecedents, and potential Afro-Arabian Nubian Technocomplex assemblages found elsewhere in the Middle East.

Keywords*:* IUP origins, Nubian technology, Cultural diffusion, Lithic miniaturization, Behavioral adaptation

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From Technology to Chronology: The Expanding and Problematic Use of the IUP Term

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The term Initial Upper Paleolithic (IUP) was originally defined based on the lithic assemblage from Boker Tachtit (Israel), marking a transition from bidirectional Levallois point production to more volumetric Upper Paleolithic unidirectional blade production (Marks, 1983; Marks & Volkman, 1983). Over time, its terminology expanded, and it has been broadly applied to industries across Eurasia as well as assemblages from Northeast Asia (Kuhn & Zwyns 2014). More recently, it has even encompassed assemblages with small points produced by "schéma croisé" flaking strategy, despite lacking any elements of Levallois-like blade production (Slimak et al., 2022; Sánchez-Yustos et al., 2024). This broad usage has transformed the term IUP from a specific lithic technology to a vague chronological framework (50,000–35,000 yr BP), leading to conceptual ambiguity (Goder-Goldberger & Malinsky-Buller, 2022). Furthermore, the ambivalent meaning of the term IUP as an overarching label for diverse technological traditions creates an artificial homogeneity. This oversimplification obscures the variability of the lithic industries before the emergence of the Early Upper Paleolithic and highlights the need for a more precise and consistent terminology. The widespread yet inconsistent application of the term risks conflating distinct technological approaches and regional adaptations, thereby hindering meaningful cross-cultural comparisons. This paper aims to critically examine the current usage of the term IUP, arguing for a clearer definition and a reconsideration of its scope. By refining its definition, we can better understand the technological shifts characterizing the beginning of the Upper Paleolithic.

Keywords: Initial Upper Paleolithic; lithic technology; Homo sapiens dispersals.

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From the IUP to the Ahmarian:
Variability in the development of bladelet technology in the Levant

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While the origin and spread of the Initial Upper Paleolithic (IUP) have been increasingly studied, we know less about its development and relationship with subsequent Upper Paleolithic technologies/cultures. In the Levant, the IUP has been traditionally considered to have developed to the Ahmarian industry, which is part of the widespread occurrences of Early Upper Paleolithic bladelet technology in West Asia and Europe (and probably also in Central–North Asia), and some researchers have discussed it in relation to multiple dispersals of *Homo sapiens*. However, the Levantine IUP and Ahmarian lithic technologies involve temporal and spatial variations that do not appear to show a simple pan-Levantine transition.

In this presentation, I review currently available data on the techno-typological and chronometric variations of the Levantine IUP and Ahmarian assemblages and discuss variations in the IUP-Ahmarian transition in the Levant. For this purpose, I use data from three IUP sites in southern Jordan: Wadi Aghar, Tor Fawaz, and a newly discovered site, Aswad Terrace. I also use two bladelet assemblages from Layers F–G and H at Tor Hamar in southern Jordan. I compare these assemblages with other IUP and Ahmarian assemblages in the Levant by focusing on several techno-morphological attributes of blades/bladelets that are commonly available from publications, such as dorsal scar patterns, striking platform types, and distal shapes.

I suggest it effective to consider the IUP and Ahmarian variations together in combination with chrono-stratigraphic records so that they indicate two geographic variations in the IUP-Ahmarian transition in the Levant. The southern sequence is represented by a stratigraphic sequence of Boker Tachtit and then leads to the southern Ahmarian while the northern sequence is illustrated by the Ksar Akil stratigraphic sequence that leads to the northern Ahmarian. I also discuss issues in the partial chronological overlap between the late Middle Paleolithic and the IUP as well as that between the IUP and the Ahmarian. Consequently, I hope that the diversity under the general term, such as IUP and Ahmarian, will be recognized more widely so that it makes regional cultural comparisons more accurate and precise particularly in the discussion of *Homo sapiens*' dispersals.

Keywords: Levant, Jordan, Initial Upper Paleolithic, Ahmarian, bladelet technology

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Potential Evidence of Initial Upper Paleolithic at Aghitu-3, Armenia

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In this paper, we present a study of the lithic assemblage from archaeological horizon (AH) VII at Aghitu-3 Cave and explore its possible relationship to the Initial Upper Paleolithic (IUP) based on a detailed lithic analysis. The cave provides a stratigraphic sequence spanning the period from 40,000 to 24,000 cal BP, which we divide into early and middle phases of Upper Paleolithic occupation. The site yielded a significant collection of lithic artifacts from the Upper Paleolithic periods, and AH VII is the oldest layer, dated to 40-36,000 cal BP.

The IUP represents a cultural and biological transformation, marked by the replacement of Neanderthals with modern humans who brought new lithic technologies (Zwyns et al., 2024; Goder-Goldberger & Malinsky-Buller, 2022). The IUP first appears at Levantine sites such as Boker Tachtit (Marks & Ferring, 1988) around 48,000 cal BP then spreads from the Levant into North Africa, Central Asia, and Eastern Europe (Tsanova, 2008). It is characterized by several technological features, including the use of hard hammerstones, faceted platforms, and unidirectional or bidirectional reduction (Kuhn, 2014). Although distinctive tools such as Umm Tlel points, Emireh points, and chanfrein burins appeared, these tools did not take hold in all regions.

At Aghitu-3, the lithic assemblage of AH VII is small but shows technological homogeneity (Fig. 1). The cores in AH VII are narrow-faced or burin-like, unidirectional and bidirectional, with simple or faceted platforms, often knapped using hard hammerstones, and significantly larger than those from the other horizons. In contrast, in the younger layers, AH VI and AH III, cores are small, cortical, unidirectional, and wide-faced. The AH VII toolkit lacks backed tools and includes faceted burins on truncations.

These technological and morphological differences suggest that AH VII represents a distinct phase predating the Early Upper Paleolithic. While features reminiscent of the IUP are present, the absence of nearby IUP sites and characteristic IUP tools in AH VII complicates establishing this connection. Additionally, the dating of AH VII is younger than what is typical for the IUP.

Keywords: Lithic technology, Armenian Highlands, Initial Upper Paleolithic (IUP), Obsidian

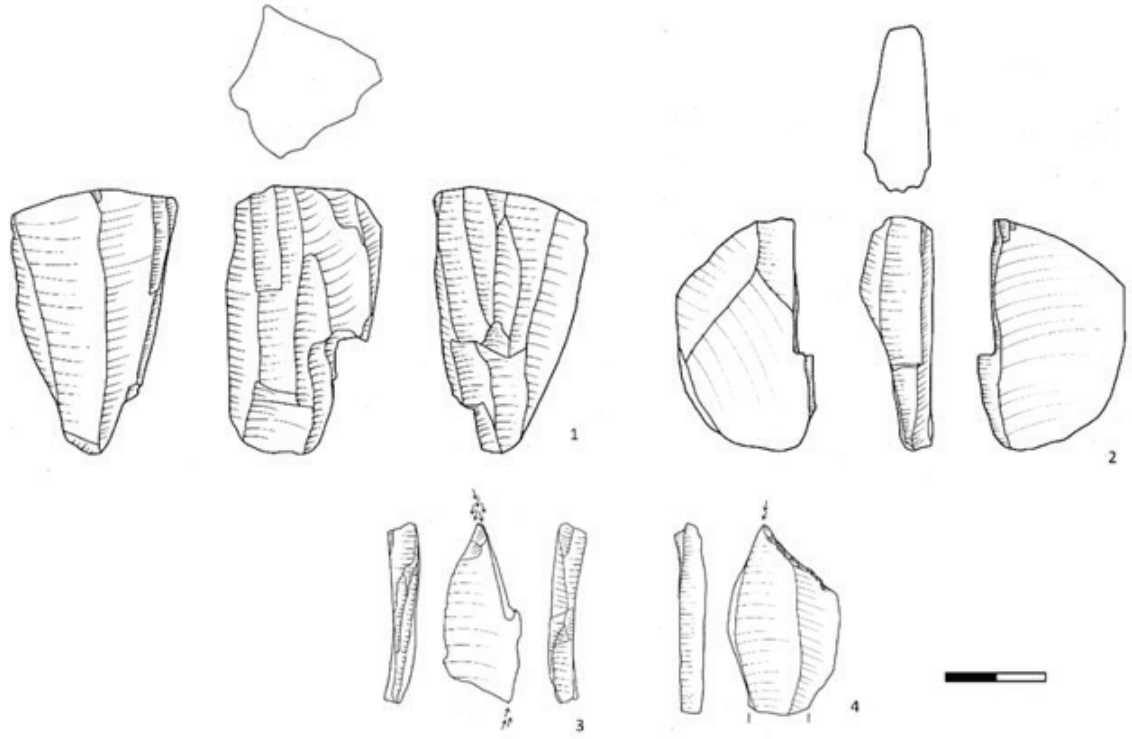

Fig. 1. Obsidian artifacts from AH VII reminiscent of the IUP: 1) blade core; 2) burin-like core; 3) faceted burin with nine removals, one end dihedral, the other end on truncation; 4) burin on truncation.

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Initial Upper Palaeolithic of the Iranian Plateau; Sorheh Rockshelter: a techno-typological perspective

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Iranian Plateau is a vast geological feature that connects western Asia (including Caucasus) to the south (India) and east (including Central Asia). This Plateau consists of different biogeographical units, making it attractive to a high variety of fauna, flora and hominin taxa. This geographic location puts the Plateau at the centre of important evolutionary changes in the late Pleistocene. Sporadic Palaeolithic research in Iran confirms its high potential in answering important questions regarding late Pleistocene hominins and diversity of culture (Ghasidian et al. 2019, Ghasidian 2019). One of these questions is the transition from the Middle to Upper Palaeolithic and the generation of new lithic techno-complexes and cultural units.

The newly discovered site of Sorheh rockshelter located on the southern piedmonts of the Alborz Mountains at the northern Iranian Plateau revealed a novel behavioural trait known as Initial Upper Palaeolithic techno-complex (Ghasidian et al. 2024). Sorheh Rockshelter, located at a high elevation of 1903 m asl., is one site in a complex of six caves and rockshelters. During two seasons of excavation in 2019 and 2022, numerous lithics and faunal remains were recovered, indicating a single cultural occupation in a long chronological frame of ~50–35 ka. Sorheh Initial Upper Palaeolithic shares techno-typological features with known counterparts in the Levant, Eastern Europe and East Asia, it reveals strong local characteristics. The combination of prismatic blade and centripetal flake cores documents the mixture of Middle and Upper Palaeolithic traditions with early manifestations of blade production at this site (Fig. 1), which is, so far, unique on the Iranian Plateau. Sorheh lithic techno-typological characteristics indicate the diversity of hominin behaviours during the Middle to Upper Palaeolithic transition. The temporal window exposed in Sorheh, suggests the Initial Upper Palaeolithic occupation at this site as one of the oldest known and hypothesizes this part in the Iranian Plateau as a potential core area for this techno-complex. Meanwhile, regardless of this hypothesis, Sorheh fills the gap in the diffusion of Initial Upper Palaeolithic towards Central and East Asia (Zwyns et al. 2019, Tsanova 2024), uncovers the important role of this Plateau in the cultural evolution of our lineage and its expansion.

Keywords: Iranian Plateau, Alborz Mountains, Southwestern Asia, Central Asia, Neanderthals, Anatomically Modern Humans, Initial Upper Palaeolithic, lithic techno-typology.

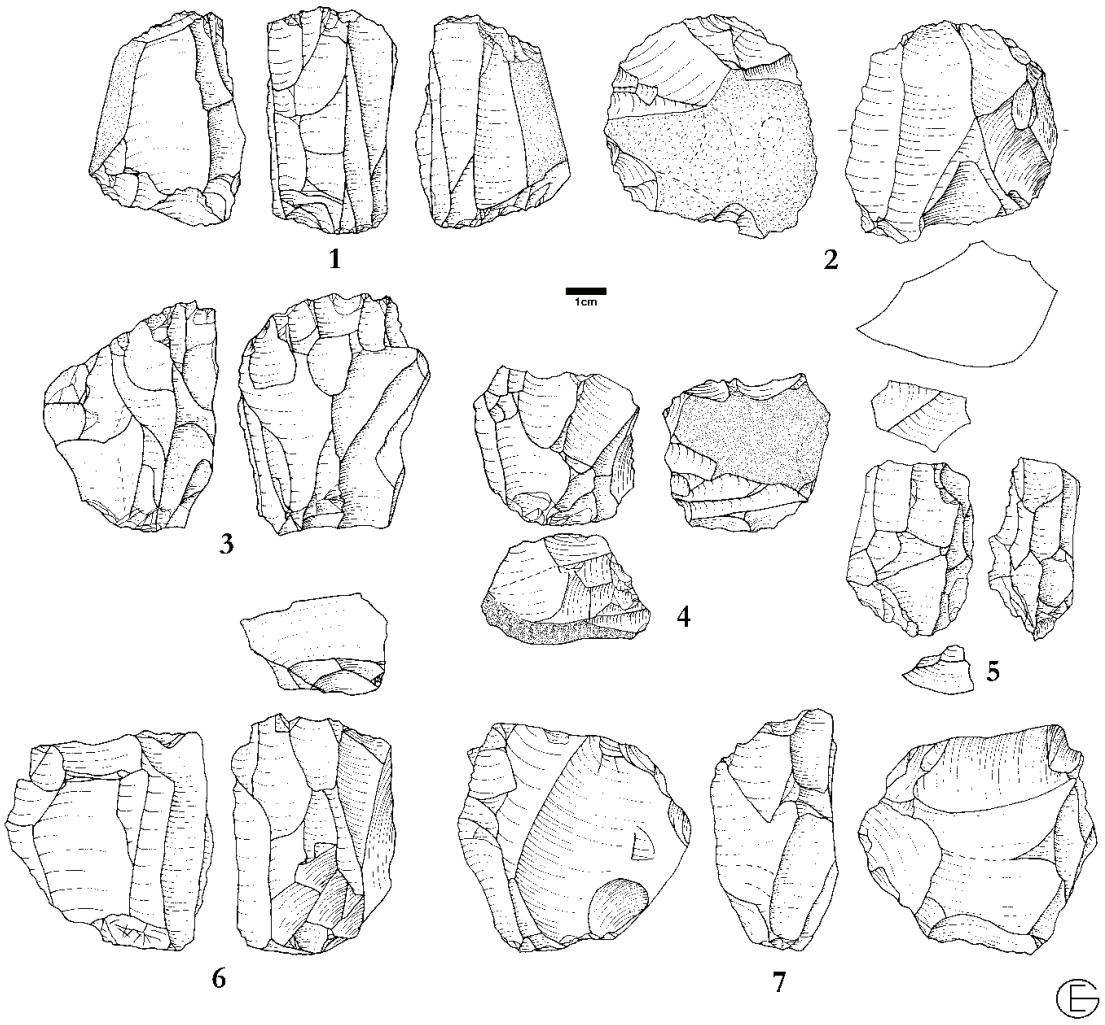

Figure 1. Cores from Sorheh rockshelter.

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Truncated-faceted pieces in Initial Upper Palaeolithic contexts: role, function and techno-functional structure

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Truncated-faceted pieces are quite common in various Initial Upper Palaeolithic (IUP) assemblages but also appear in Middle/Upper Palaeolithic transitional contexts such as Lincombian-Ranisian-Jerzmanowician (LRJ) (e.g. Beddings) or Middle Paleolithic (MP) assemblages. This particular type of artefact has been widely and deeply discussed, but it remains unclear whether we are coping here with a single tool concept or a similar realisation of different tools or even core concepts. It is still debatable whether they should be treated as tools or cores, and if so, what would be the deliberate product of such a core exploitation. In the presentation, I plan to overview the diversity of truncated-faceted pieces found in the IUP context and present their specific features from the perspective of a techno-functional approach, which might shed some light on their function within the IUP assemblages. One of the aspects to be discussed is whether they might be treated as artefacts specific for IUP assemblages, and if so, what would be the functional reason for producing such pieces, no matter whether they are cores or tools.

Initial Upper Paleolithic techno-typological component in the surface collection from Andornaktálya 2 site (Hungary)

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This study examines the surface lithic collection from the Andornaktálya 2–Gyilkos (A2-GT) site to document technological strategies associated with the Initial Upper Paleolithic (IUP) and to assess their implications for early *Homo sapiens* dispersals in Central Europe. The IUP marks the emergence of blade-based technologies during the Middle-to-Upper Paleolithic transition (MIS 3), chronologically framed by Heinrich Events 5 and 4. In Central Europe, it is represented by the Bohunician industry, characterized by volumetric blade production from prismatic cores (Mylopotamitaki et al., 2024; Škrdla, 2013).

The A2-GT surface lithic collection consist of 10,516 artifacts which exhibit notable raw material diversity, including imported obsidian, limnosilicite, silesian flint, radiolarites and others alongside locally sourced chert (Group 7 called also hornstone, <20km provenance) (Mester & Kozłowski, 2014). Techno-typological analysis follows the *chaînes opératoires* approach, with each raw material group demonstrating internal techno-typological coherence despite the collection's surface context.

The local chert component (n=1,210) reveals core reduction strategies adapted to nodular (≤60mm) and cobble (≤110mm) raw material forms, featuring predominantly unidirectional and often bidirectional volumetric blade production. The resulting blades are robust exhibiting straight to slightly curved profiles and parallel edges. The heavy gauged blades feature exterior platform angles between 80° and 90°, and technological attributes consistent of direct percussion with hard hammer. The retouched tool group in chert is dominated by UP types including endscrapers, burins, retouched and truncated blades. Three chert bladelets with straight profiles and alternate/inverse marginal retouch (consistent with Dufour subtype bladelet) represent a marginal EUP component.

The technological analysis reveals the chert component is predominantly of IUP character, marked by volumetric blade production and Upper Paleolithic tool types. The sporadic occurrence of Early Upper Paleolithic (EUP) (id. Protoaurignacian) style bladelets suggests two plausible interpretations: 1) discrete Protoaurignacian activity contemporaneous with the obsidian component, or 2) technological innovation by IUP groups. These patterns underscore the complex cultural landscape during the Middle-to-Upper Paleolithic transition, though the exact nature of IUP-EUP interactions requires further investigation. Andornaktálya 2's diverse lithic inventory and geographic position at the crossroads of Central Europe make it particularly significant for examining IUP technological adaptations and potential intercultural exchanges during early Homo sapiens dispersals.

Keywords : *chaîne opératoire*, chert, Initial Upper Paleolithic blade technology, surface lithic collection

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The fate of the Initial Upper Paleolithic: Testing the hypothesis for cultural evolution of the Bohunician IUP into the Lincombian-Ranisian-Jerzmanowician

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The evolutionary significance of the Initial Upper Paleolithic (IUP) has been greatly increased with the integration of ancient DNA studies that provide independent data on the genetic inheritance of the makers of the technocomplex. Yet the epistemologically typological nature of technocomplexes (i.e., "it is or it is not") limits the ability of archaeologists to study gradual change in cultural inheritance across space and time (Tostevin 2009). This is due to the practice of defining technocomplexes based on detailed *chaînes opératoires* rather than comparable variables of lithic technological performance that are both those used by learners to acquire their skills and are also visible to archaeologists today (Tostevin 2019).

The present study uses the insights from two recent publications to make the case for a *complementary* approach that uses cultural transmission-sensitive variables to test hypotheses of gradual change between technocomplexes. First, Demidenko & Škrdla (2023) re-examined recently excavated open-air sites in Moravia, previously characterized as slightly atypical examples of the Bohunician, Szeletian, or Aurignacian, to argue for a smooth technological transition within Moravia from the Bohunician IUP to the Lincombian-Ranisian-Jerzmanowician (LRJ), previously known only from the North European Plain. In the second paper, Mylopotamitaki et al. (2024) used mtDNA studies of newly recognized hominin bones associated with an LRJ assemblage at Ranis, Germany, to determine that *Homo sapiens* were the makers of this technocomplex. Together, these two papers make a strong argument that the makers of the Bohunician IUP were intrusive *Homo sapiens* rather than local Neanderthals (cf. Zilhão 2006).

I use atribute analysis of cultural transmission-sensitive lithic variables, as well as lithic economic variables sensitive to site function, to present an independent test of the Demidenko & Škrdla hypothesis. Two of the Moravian sites in question (Lišeň/Podoli I and Želešice III) possess lithic behaviors in line with the hypothesis whereas another (Tvarožná X) beter fits the expectations of a landscape variant of the Bohunician instead. The paper concludes with an exploration of the implications of these technological relationships for our understanding of the role of the Initial Upper Paleolithic in the period of Neanderthal-Modern hybridization.

Keywords: Blade technology, Initial Upper Paleolithic, Early Upper Paleolithic, 'Boker Tachtit 4', Ahmarian, Population dynamics, Transfer of knowledge

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The two faces of the Middle to Upper Paleolithic transition, one looking back and the other forward, a view from the southern Levantine techno-complexes

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Most debates concerning the Middle to Upper Paleolithic(MP-UP) transition intertwine changes in techno-typological traditions with the replacement of Neanderthals by incoming modern humans. At face value, these two evolutionary processes seem to overlap, yet by relating to them as a unified processes two points are overlooked; (1) Paleogenetic studies suggest several events of admixture between Neanderthals and modern Humans (Sümer et al., 2024), (2) The archaeological sites dated between 50-40 ka display variable techno-cultural traditions (e.g. Carmignani et al., 2023; Marciani et al., 2025; Tsanova et al., 2024; Zwyns 2021). This talk will center round the second point, focusing on the Levantine MP-UP transitional record, where associated human remains are yet to be found.

In the Levant there is a temporal overlap at 50-48 ka between the final MP and appearance of the Initial Upper Paleolithic (Goder-Goldberger and Malinsky-Buller 2023). When refitted reduction sequences from late MP open-air sites in the north-western Negev (i.e. Far'ah II and B37) are compared to those from Boker Tachtit. Among the typical Levallois reduction sequences defined at Far'ah II and B37, there are additional volumetric reduction sequences that become prominent at Boker Tachtit. At B37 as at Boker Tachtit there are reduction sequences that depict a change in technology within the same sequence. If lithic assemblages act as proxies of behavioral flexibility and adaptability (Belfer-Cohen and Hovers 2010), can these assemblages be used to suggest that a need to adjust to changes in the social and/or ecological environment facilitated the introduction and acceptance of innovative technological practices during the Middle to Upper Paleolithic transition?

Keywords: Late Middle Paleolithic, Open-air site, MP-IUP Transition, Technology

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Levallois in Final Middle Paleolithic and Initial Upper Paleolithic assemblages in Mongolia

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Levallois technology is generally not considered part of the Initial Upper Paleolithic (IUP) technocomplex in most regions of Central Asia (Kharevich et al., 2022; Zwyns, 2021)particularly, in Central Asia. Here, we present the results of a detailed reconstruction of the principal knapping method targeting blade production at the Ushbulak site in eastern Kazakhstan that currently marks the southwestern extent of the distribution of Asian IUP industries. Based on the typology of IUP cores at Ushbulak, we carried out experimental blade production using three main knapping methods that have been described in IUP complexes across northern Eurasia. Each technique was applied to the production of blades and core management elements morphologically similar to artifacts from the Ushbulak assemblage. Experimental approaches and attribute analysis established the dominance of the sub-prismatic bidirectional laminar method, based on well-prepared pre-core knapping. The reconstructed bidirectional method for blade production reflects traits in common with Moravian Bohunician IUP complexes, but the closest analogies can be found in IUP complexes of the Russian Altai Region (Kara Bom, with the notable exception of the Altai Mountains (Rybin, 2014). This view stems from the hypothesis of a complete population turnover in Siberia and Central Asia sometime after 50 cal. ka BP, with incoming IUP populations not employing Levallois methods and instead relying entirely on bidirectional production of large blades.

We challenge that view using evidence from Mongolia, focusing on Final Middle Paleolithic (MP) assemblages from Orkhon-7 (AH3, Pits 2 & 3), Orkhon-1 (AH3, Pits 1 & 2), and the IUP assemblage from Tolbor-21 (Layer 4). These sites are located in the Orkhon and Tolbor valleys within the Selenga River Basin in northern and central Mongolia, approximately 220 km apart.

New radiocarbon dates for the Orkhon sites place the Final MP assemblages with Levallois components between 47 and 54.5 cal. ka BP, although these dates may be slightly younger due to inversions observed in the OSL and AMS date series for the entire Orkhon cultural sequence. Previously, we identified two Levallois methods in the Orkhon assemblages—centripetal and parallel reduction strategies for preferential flake production (Rybin & Khatsenovich, 2020). The average age of Layer 4 at Tolbor-21 is 42 cal. ka BP (Rybin et al., 2020)the Upper Paleolithic dates as early as 45 ka cal BP, but until recently, there was little reliable information concerning human occupation during the following period, between 45 and 40 ka cal BP. Here we present results of the excavation of the site of Tolbor-21, in the Selenga drainage system, Northern Mongolia. We focus on Tolbor-21 Archeological Horizon 4 (AH4. During the 2021–2022 excavation campaigns, a representative series of Levallois cores was recovered from this layer.

Using scar-pattern analysis, we compare the Levallois methods of the Final MP and IUP contexts in Mongolia and find striking similarities. Possible explanations—given the likely chronological gap of at least 2,000 years, and possibly up to 5,000 years, between the assemblages—include technological convergence, the persistence of a late MP refugium in northern Mongolia and further population interaction, or the broader universality of Levallois methods across the MP and IUP: this stands in contrast to the high dependence of bidirectional blade production on large, high-quality raw material blocks, whereas Levallois and bidirectional methods could have been employed sequentially, depending on the degree of reduction of the original raw material block.

Keywords: Central Asia, Mongolia, raw material, Final Middle Paleolithic, Initial Upper Paleolithic, Levallois methods.

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Beyond the Dualism: Refining Technological Analyses to Overcome the Late Mousterian/IUP Dichotomy

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Lithic assemblages dating between 60 and 40 ky ago across Europe, the Mediterranean, the Levant, and as far east as Mongolia and China exhibit a high degree of technological variability. However, current interpretive frameworks tend to reduce this complexity to a binary classification between the Late Mousterian and the Initial Upper Paleolithic (IUP), with few exceptions (e.g., Uluzzian, Châtelperronian). New data from the upper layers of Riparo l'Oscurusciuto (Southern Italy) suggest that this dichotomy oversimplifies the dynamic nature of lithic production during a crucial phase, marked by the possible coexistence of distinct human lineages across overlapping zones within the aforementioned macro-regions.

The lithic assemblages at Oscurusciuto reveal a complex toolset, including blades, bladelets, axial points, and micro-points. These patterns in the Italian Peninsula constitute a discontinuity with both earlier and later lithic traditions, pointing instead to a reorganization of technological systems driven by innovation. To clarify the nature of these changes-and, in a second step, to contextualize them within broader patterns-priority must be given to high-resolution technological analyses of lithic production, with a special focus on the qualitative identification of minor elements. This perspective may contribute to a more accurate reconstruction of the technological landscape between 60 and 40 ky ago and foster a more nuanced understanding that goes beyond the traditional Middle-Upper Paleolithic dichotomy.

Possible IUP component in the late Middle Paleolithic sequence of Samuilitsa II cave, Bulgaria

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Samuilitsa II cave, located in the Karlukovo karst area of western Bulgaria near the reference site of Temnata cave, provides critical evidence for Late Middle Paleolithic (LMP) technologies and their evolution toward Initial Upper Paleolithic (IUP) traditions in the Eastern Balkans. Originally excavated in the 1950s (Džambazov, 1981), the site's lower levels exhibit classic Levallois-Mousterian assemblages featuring Levallois cores for flake/blade production and a toolkit dominated by local coarse grained grey silicite (chert) sidescrapers and bifacial leaf points comparable to those from Musselevo (Sirakov, 1983; Sirakova, 2020). The upper levels reveal emergent IUP characteristics and increasement of Upper Paleolithic tool types, establishment of blade technology with prismatic core and semi-rotating laminar reduction systems, and increased use of imported fine grained flint (likely Upper Cretaceous Miziiski) (Tsanova, 2012). These techno-economic shifts - particularly in blank production and raw material procurement - mirror patterns observed at nearby Temnata Cave (Sirakov 1983) and Bacho Kiro Cave. The stratigraphic continuity at Samuilitsa II cave, coupled with its outdated radiocarbon age from the middle part of the sequence (42,780 ± 1,270 BP), suggest models of gradual technological transformation rather than abrupt techno-cultural shift in the Eastern Balkan Middle-to-Upper Paleolithic transition.

Keywords: Late Middle Paleolithic (LMP), Initial Upper Paleolithic (IUP), Eastern Balkans, Samuilitsa II cave, Transition LMP-IUP

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Initial Upper Paleolithic Lithic and Osseous Technologies in the Eastern Balkans: Chronology, Dispersal, and Cultural Transitions in Regional Context

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This study reassesses three key Eastern Balkan sites (Bacho Kiro, Temnata, and Kozarnika caves) to clarify: (1) the role of Initial Upper Paleolithic (IUP) blade technologies in *Homo sapiens* dispersal, and (2) cultural transitions during the Middle-to-Upper Paleolithic shift (50-39 ka). The IUP, recognized as a marker of early *Homo sapiens* migrations across Eurasia (Kuhn & Zwyns, 2014), provides critical insights into technological innovation and Neanderthal-sapiens interactions. Recent discoveries at Bacho Kiro Cave have securely associated IUP assemblages with *Homo sapiens* remains (Hajdinjak et al., 2021; Hublin et al., 2020), establishing a crucial regional benchmark.

We integrate stratigraphic, chronological (radiocarbon dates, CI Y-5 tephra), lithic and osseous technological data: blade/bladelet production systems and core reduction strategies (Tsanova et al., 2024) with faunal assemblages and osseous tool/ornament analyses. Our results demonstrate that in Kozrnika cave, the IUP is stratigraphically positioned between Middle Paleolithic (MP, Levallois-Mousterian) and Early Upper Paleolithic (EUP), bladelet-based technological tradition. The IUP blade technologies show clear technological distinctions from local Levallois-Mousterian. We identify: (1) chronological overlap between the IUP at Bacho Kiro Cave and the EUP bladelet industries at Kozarnika Cave, and (2) potential chronological overlap between the Temnata IUP and Kozarnika EUP (Tsanova 2023).

The Eastern Balkans' geographic position as a nexus between Southwest Asian and Central European IUP sites - and as the departure point to the Danube corridor - makes it critical for understanding population dynamics. Two distinct technological traditions (IUP blade vs. EUP bladelet tradition) suggest sequential *Homo sapiens* dispersal waves, probably originating in Asia Minor. The relationship between local Levallois-Mousterian assemblages (e.g., Samuilitsa II Cave) and the IUP remains unresolved, raising questions about either Neanderthal-sapiens interaction or an earlier, unsuccessful *Homo sapiens* dispersal.

These findings position the Eastern Balkan IUP as a pivotal phase in *Homo sapiens* expansion, bridging Southwest Asian and European techno-cultural traditions. The technological patterns support models of multiple dispersal waves, with implications for investigating cultural transmission, technological convergence, and population interactions during this critical period of human evolution.

Keywords: Bacho Kiro Cave, blade technology, bladelet technology, Early Upper Paleolithic, Initial Upper Paleolithic, Kozarnika Cave, lithic analysis, Temnata Cave

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Tracing the transition: personal ornaments and bone tools at the onset of the upper Paleolithic

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Once considered a relatively straightforward, monolithic process involving the swift replacement of the last Neanderthals by dispersing *Homo sapiens* groups, the period between 55 and 42 ky, referred to as the "Middle-to-Upper Palaeolithic transition", now appears as a significantly more complex demographic and cultural process involving multiple dispersal events by modern human populations bearing different stone technologies and material culture traditions. Some of the key material culture changes coincident with the emergence of the Upper Palaeolithic in Eurasia include the near systematic presence of symbolic expressions, primarily in the form of personal ornaments and pigment use, and the emergence of fully shaped osseous tools. Prior to the Middle-to-Upper Paleolithic transition in Eurasia, personal ornaments are both extremely limited and sporadic. Possible examples of Neanderthal personal ornaments include cut-marked eagle phalanges, potentially linked to talon extraction, claims for the exploitation of large bird feathers, and the discovery of a handful of naturally perforated or intact, pigment-stained shells. Likewise, Middle Paleolithic bone technology is mainly restricted to the use of readily available bone fragments, e.g., retouchers, or, in some rare instances, the preferential selection of skeletal elements with standardized morphology, e.g., lissoirs, to perform a diversity of tasks including the shaping of lithic cutting edges and the transformation of pliable perishable raw materials. It is only after ca. 45 ka in Eurasia that we observe the spread of ornamental traditions involving the use of hundreds of different bead types made of a range of raw materials (for example, ivory, bone, antler, teeth, shells, stone, fossil, amber, jet and so on) and the integration of fully shaped bone tools in the technological system. By cross-referencing data on personal ornaments and bone technology at this pivotal period in the European Palaeolithic, we explore the cultural mechanisms that led to the emergence of distinctive regional and local expressions of both traditions at the onset of the Aurignacian. We argue that repeated interactions between Neanderthals, Denisovans, and modern humans likely contributed to the increasing complexity of ornamental practices. This complexity is evident in the selection of diverse raw materials for bead manufacture, the extended technical sequences involved in shaping specific pendants, and the varied associations of bead types. Ethnographic evidence underscores the role of personal ornaments as a key medium for conveying social and symbolic information among individuals sharing cultural affinities. The diversification of personal ornaments after ~42 ka likely reflects a growing interest among individuals—regardless of their taxonomic affiliation—in signaling group membership. Sustained interactions among culturally affiliated individuals may have facilitated the formation of networks for the exchange of people and information. Building on recent research on the adoption of innovations in structured populations, we hypothesize that increased social connectivity at a continental scale—albeit unevenly distributed across regions—likely played a critical role in fostering local and regional adaptations. These adaptations could explain the observed variation in fully developed bone technologies.

A typological study of Initial Upper Paleolithic bone artefacts from Bulgaria, featuring three unpublished tooth pendants from the 1971–1975 excavations at Bacho Kiro Cave

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Bone artefacts from prehistoric contexts serve as valuable indicators of the growing complexity of human behaviour and cultural expression. The typological classification of bone tools offers critical insights into past technological systems, symbolic practices, cultural affiliations, and patterns of faunal exploitation across different geographic regions.

This presentation examines a set of previously unpublished tooth pendants discovered during the 1970s excavations at Bacho Kiro Cave, Bulgaria. Now housed in the collection of the National History Museum, Bulgaria, these artefacts were unearthed from the basal layer of the Upper Palaeolithic sequence, specifically layer I (formerly layer 11), which is attributed to the regional occurrence of the Initial Upper Palaeolithic (IUP).

In light of recent discoveries from the 2016–2021 excavations, this study seeks to reassess the pendants within a broader framework of technological and cultural variability characteristic of early Upper Palaeolithic populations. By developing a detailed typological classification of the associated osseous ornament assemblage and analysing the spatial distribution of pendant types, this research aims to enhance our understanding of the variability, diachronic developments, and technological refinement in ornament production during the IUP occupation of Bacho Kiro Cave.

Between Geology and Archaeology: Toward a Dynamic Cartography of Silicite-Bearing Formations in Bulgaria

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Petroarchaeology, whether based on a naturalistic or geochemical approach, relies on the completeness of geological reference collections. These require carefully planned surveys that are representative of the diversity of rocks present in the geological formations of a given area. The samples collected during these surveys, preserved and organized in *lithothèques*, and then characterized, help in understanding the spatial distribution of rock types.

The dynamic mapping tools developed over the past decade within the framework of the GDR "Silex"[1] aim to represent the currently available resource potential in siliceous raw material (i.e. silicite). In a collaborative and shared GIS (Geographic Information System), a first data layer represents geological formations containing silicites, while a second layer of points represents the current state of sampling available in the *lithothèques*. This layer includes several heritage and scientific attributes, including image data that allow the visualization of microfacies. The maps produced using this GIS are freely accessible and allow anyone to obtain information about the availability of raw materials in a given area.

In Bulgaria, the lithic reference collection (*lithothèques)* of the Earth and Man Museum in Sofia has been integrated into this GIS. The microfacies characterization of representative samples from 268 sites in central and northern Bulgaria has made it possible to establish criteria for distinguishing and classifying the variability of Lower and Upper Cretaceous flint formations. In addition to defining families of silicites—including the famous "Balkan flints"—and their variability in terms of genesis and deposit type (i.e. the evolutionary chain), the application of these results to archaeological assemblages from the Upper Paleolithic and Neolithic has proven highly valuable to reconstruct the transfers of materials during Prehistory.The better example of such application is the evidence of the physical links between human groups and their raw material sources within the Initial Upper Paleolithic (IUP). The data highlight the long distances covered to acquire specific lithic resources, pointing to well-organized acquisition strategies, deliberate transportation of high-quality finished lithic products, and the logistical planning of subsistence activities among IUP groups.

Keywords: Geology, Petroarchaeology, GIS, reference collection, silicite, Bulgaria

[1]The "Silex" Research Group (GDR "Silex") is a project co-funded by the CNRS and the French Ministry of Culture. Its main objective is to harmonize and disseminate research in petroarchaeology. Initially focused on France, the project has since taken on a transnational dimension, and the development of tools specifically tailored to address the "flint" issue now extends well beyond French borders.

Understanding the lithic technological novelties and innovations at the onset of the Upper Paleolithic in Europe: a functional perspective from the site of Bacho Kiro

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The dispersal of *Homo sapiens* across Eurasia during Marine Isotope Stage 3 (MIS 3) is marked by technological novelties and consequent behavioural changes, collectively referred to the archaeological record as the Initial Upper Paleolithic (IUP). Although often discussed, the nature and significance of the high techno-typological variability within the IUP remains still unclear. Investigating how stone and bone tools in the IUP were used and what they were used for can shed light on the co-existence of Middle and Upper Paleolithic technologies and typologies in the same archaeological horizon. Such insights are crucial for characterizing human occupation dynamics during the onset of the IUP. The Middle-Upper Paleolithic cave site of Bacho Kiro is well known for its Initial Upper Palaeolithic at the base of the chrono-stratigraphic sequence. Since its excavation in the early 80's (Kozlowski,1982), the Initial Upper Palaeolithic (aka *Bachokiran)* has been described and interpreted as a pre-Aurignacian industry that combines some Middle Paleolithic technological features (i.e. Levallois and hard hammer percussion) with Upper Paleolithic tool types (Tsanova, 2008). Hence, Bacho Kiro is now understood as one of the key sites for understanding the expansion of the recently reassessed IUP into Eurasia (Hublin, 2012; Kuhn and Zwyns, 2014). Located in the Eastern Balkans, the Bacho Kiro cave represents one of the most important case studies in this discussion.

Since 2015, reopened excavations have uncovered new archaeological materials from two main excavation areas, Niche 1 and the Main Sector, allowing detailed examination and re-analysis of both bone and lithic assemblages from well-controlled contexts. Here we present the preliminary results of lithic use-wear analysis from the IUP Layer I (Layer 11from previous excavation), uncovered on the newly excavated material. Use-wear analysis on lithic tools was carried out on a sample drawn to reflect the general technological characterization of the assemblage; therefore, the selected tools for use-wear analysis include artefacts from all different technological categories, such as chips, flakes, blades and retouched tools. Unmodified and retouched tools were also included. While combining qualitative and quantitative analyses, results from this study show that evidence for tool use is mainly present on blades with unmodified and retouched edges. While unmodified blades show traces of woodworking, different types of retouched blades seem to have been designed and used intensively (e.g. long-term use) to work different materials, including bone. This is consistent with the bone tool assemblage, which includes complete tools, reworked pieces, and waste fragments. This evidence is consistent with the curation and multifaceted character of the lithic economy at the site (Tsanova et al., 2024). In sum, Bacho Kiro Cave significantly contributes to understanding the technological, behavioral evolution and the local adaptation of early *Homo sapiens* in western Eurasia.

Keywords: Initial Upper Paleolithic, lithic use-wear analysis, Bacho Kiro Cave, Homo sapiens dispersal, MIS 3 behavioral adaptations

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A New Data on the Initial Upper Paleolithic of Northern Central Asia

(Based on Materials from the Ushbulak site)

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Ushbulak (Eastern Kazakhstan) is a stratified archaeological site with eight lithological layers, including the Holocene assemblage (layer 1), the Late Paleolithic assemblages (layers 2.1–3.3), the Upper Paleolithic assemblages (IUP, layers 4–5.1), and the Initial Upper Paleolithic assemblages (layers 5.2–7.2) (Anoikin et al, 2019). Using Bayesian statistics based on OSL chronology and AMS dates, the site's initial settlement is dated to 55(50)–42(37) ka BP (Kurbanov et al, 2021).

The IUP assemblages, comprising 11 cultural horizons and ~16,000 items, include blade cores with opposite platforms, burin-cores, end-scrapers, intensively retouched blades, truncated-faceted tools, truncated blades, a biface, non-utilitarian objects, etc. Our experiments on technology reconstruction revealed the dominance of subprismatic bidirectional blade production method using well-prepared pre-cores; a specific technique for preparing a striking platform is picketing. These assemblages represent a lithic workshop located near raw material outcrops (siliceous rock/chert).

Ushbulak site shares similarities with other IUP assemblages from Southern Siberia and Northern Mongolia (S-M IUP) - Kara-Bom, Tolbaga, Tolbor-4, etc. (Zwyns, 2021; Rybin et al. 2023), it's unique feature is the exclusive use of bidirectional blade production and the complete absence of Levallois techniques.

Remarkably, no significant changes in knapping methods or tool-kits occurred during its ~15,000-year occupation period, i.e. almost all the time of existence of the cultural phenomenon of IUP in the Siberian-Mongolian region (Kharevich et al. 2022).

The absence of Levallois techniques in this industry allows us to assume that the emergence of IUP in the region is a more complex process than previously assumed. There may be several explanations for this phenomenon:

1) This industry is an unique local variant of the S-M IUP without Levallois.

2) This is typical S-M IUP with a very small presence of Levallois.

3) This is a «pure» S-M IUP. Levallois only appears in the S-M IUP-industries upon contact with archaic local populations, which raises a question of their origin.

Altai is traditionally considered to be the "mother" region for S-M IUP. Nevertheless, the possibility that the industry of Ushbulak could have been formed on the basis of the Meddle Paleolthic blade industries of the south of Central Asia, in our opinion, cannot be ruled out.

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Keywords: Initial Upper Paleolithic, North Central Asia, blade technology, bidirectional knapping, Levallois technique

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The easternmost appearance in Eurasia of Kara Bom-like situation with both pointed Late Levallois-Mousterian and IUP at Sukhotino workshop (eastern Transbaikal region, Far East of Russian Asia)

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The Transbaikal region of Russia borders Eastern Siberia in the West, as well as Mongolia and China in the South and Southeast. (Fig. 1). In 2019, excavations were carried out at the Sukhotino workshop, located in Eastern Transbaikalia (Moroz et al., 2024). The location is associated with the slope of the paleovolcano, which is a source of raw material, hornfels (Moroz, Yurgenson, 2016).

The archaeological material recovered from a small excavation of the Sukhotino site consists of five cultural layers (MP and IUP) with high density of artifacts. Currently, archaeological materials are chronologically determined by a clear analogy with the nearest dated Paleolithic sites of southern Siberia and Central Asia as corresponded with the first half of MIS 3. The MP assemblage of layer 5 contains solid evidence of the use of the Levallois convergent technology seen in the form of refitted atypical unidirectional elongated points. One of the two lateral edges of the points is covered with a primary cortex, replacing the previously prepared one of the flat surfaces of the Y-shaped pattern of the blank. It is analogous to the pieces of one of the refitted cores of the Kara-Bom site's MP materials (Derevianko et al., 1998).

The IUP industry is represented by two assemblages of layers 4 and 3, which belong to the same cultural complex but with different chronologies. The main function of the IUP occupations is the preparation of core-shaped blanks and cores for transportation, as well as flaking of some cores in order to obtain blanks. Without taking into account technical flakes of primary processing of raw material blocks, blade cores and blade blanks themselves have been realized in a specific reduction technique using crushing of the striking platform edge (pecking). The use of the Upper Paleolithic unidirectional and bidirectional subprismatic technologies to get large- and medium- sized blades was recorded. This kind of core reduction is the main one in the IUP of Southern Siberia and Central Asia.

Thus, the Sukhotino is a workshop having a direct analogy with the famous Kara-Bom site (Altai), wich expands the distribution of industries with both pointed Late Levallois-Mousterian and IUP to the North-East.

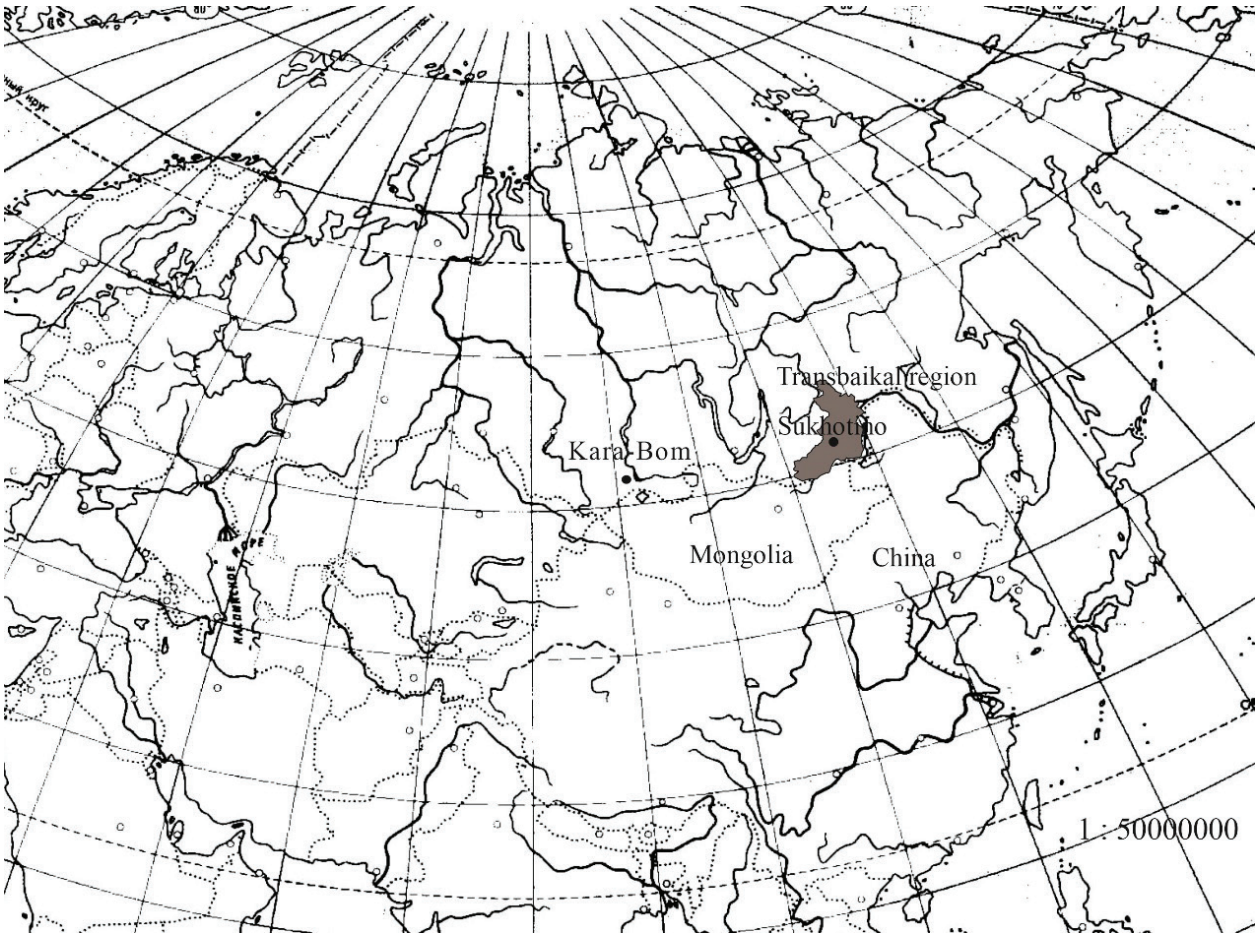

Fig.1 Research area on the map of Eurasia with sites of Sukhotino and Kara-Bom location.

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Eastern Distribution Area of the Initial Upper Paleolithic: "Cultural Norm" and Economic Patterns

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At present, two main distribution areas of blade-based Initial Upper Paleolithic (IUP) industries are conventionally recognized. These areas can be broadly defined as the western (Levant–Central Europe) and the eastern (Southern Siberia–northern East Asia) domains. Both regions exhibit a territorial core where the earliest appearance (though not necessarily the formation) of IUP industries is assumed to have occurred, currently debated to fall within approximately 50–48 ka BP (Rybin et al., 2023). In a relatively short period, these industries dispersed over considerable distances within their respective areas.

Within the two territorial clusters where eastern IUP industries are most densely distributed namely, the Russian Altai and the Selenge River basin in southern/central Mongolia and Russian Transbaikali, the assemblages exhibit striking technological and typological similarities. These similarities have served as the basis for the technological and typological definition of the IUP in Southern Siberia–East Asia (Rybin, 2014; Zwyns, 2021). As hypothesized, the spread of these industries was associated with early movements of anatomically modern human (AMH) populations (Zwyns et al., 2019).

Based on refitting data, attribute analysis, and seriation methods, we examine the characteristic features of the reduction technology and typology, and present new data on the chronology and preservation of the cultural layers from two early IUP sites Kara-Bom (Altai) and Tolbor 4 (Mongolia), which are separated by approximately 1,500 km yet exhibit a complete IUP cultural assemblage, similar paleoenvironmental conditions, settlement characteristics, and raw material procurement. From the same perspective, we compare synchronous IUP complexes from these regions, analyzing their chronology, settlement systems, and raw material acquisition in relation to the completeness of their technological and typological IUP contexts. Our aim is to explore approaches to determining how economic and cultural factors may have influenced the formation of the cultural assemblage of the eastern IUP distribution area. Ultimately, we interpret the IUP cultural package of the eastern distribution area as evidence of a unified variant of the IUP cultural tradition within 50–42 ka BP, linked to the rapid expansion and subsequent dispersion of culturally homogeneous populations.

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Technological variability in two Marine Isotope Stage 3 blade assemblages in China: a study of Shuidonggou Locality 1 and Nwya Devu

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The Initial Upper Paleolithic (IUP) in Central and North Asia is considered as one of the cultural signatures of anatomically modern humans at the time of their dispersal in the region. IUP assemblages are widely documented in Kazakhstan, Siberia, and northern Mongolia and they are mostly dated to around 48–45 ka cal BP. Their lithic assemblages are characterized by a relative consistency in blade production systems which could, at least partly reflect shared social norms (Kuhn and Zwyns 2014; Zwyns et al., 2024). During Marine Isotope Stage 3, blade technology appears to have extended southward into China as shown by assemblages from Shuidonggou Locality 1 and Nwya Devu. Unlike other regions of Eurasia (e.g., the neighboring North and Central Asia), however, blade system in China lasted for a relatively short period (Zhang et al., 2022). To address these differences, it is essential to better understand population interactions and the mechanisms of cultural transmission during this critical period of human migration. Here, we compare core reduction strategies and blank production between Shuidonggou and Nwya Devu assemblages. Beyond general similarities, we observe that both assemblages lack some of the shared characteristics observed between IUP assemblages in the Eurasian steppe. We also highlight significant differences between the two assemblages themselves, leading us to consider possible sampling issues or differences in site functions. With blade industries in North and Central Asia showing remarkable typo-technological similarities across a vast geographic area, the contiguous steppe or tundra-steppe landscapes of these regions may have facilitated the transmission of those shared normative traits. The technological variability observed in China, however, may reflect a more significant influence of adaptive behaviors emphasized by a diversity of local micro-environments around and beyond the Gobi Desert. Furthermore, during Marine Isotope Stage 3, this eastern part of Eurasia was home to the archaic Denisovans as well as multiple lineages of modern humans (Mao et al., 2021). Although limited by the small number of blade assemblages in China, technological and population interactions under complex population dynamics may have contributed to behavioral variations.

Keywords: Technological variability, blade technology, Initial Upper Paleolithic, Early Upper Paleolithic, Marine Isotope Stage 3, modern human dispersal

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A Little Goes a Long Way: Trends in small blank cutting edge efficiency during the Upper Paleolithic at Tolbor, Mongolia

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The emergence and development of Upper Paleolithic technologies in East Asia generally involved processes of lithic miniaturization similar to Western Eurasia, with several key distinctions. However, unlike Western Eurasia, the evolutionary parameters of technological efficiency underlying lithic miniaturization in East Asia are underexplored. To address this, we analyzed blank cutting-edge efficiency from four recently excavated archaeological assemblages in the Tolbor Valley, Mongolia, spanning the IUP, EUP, and LUP. Notably, our analysis inferred the allometric relationship between the length of the cutting edge of each blank and its size (i.e. weight) within each assemblage. Our results show two distinct increases in efficiency in small blanks: one between 42–35 ka and another after 29 ka, reflected in the allometry of microblades. These findings suggest that behaviors optimizing sharp edge production of small blanks were positively selected for at least twice during the establishment of Homo sapiens in East Asia. Furthermore, changes in Upper Paleolithic blank cutting-edge efficiency at Tolbor appear to align with trends observed in parts of Europe and West Asia.

Changes in Ecology and Hunter-Gatherer Adaptations during the IUP and EUP in Southern Transbaikal and Mongolia

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Abstract:

In Asia, the Initial Upper Paleolithic (IUP) is marked by consistent material culture patterns across the Russian Altai, Eastern Kazakhstan, northwest China, Transbaikal, and Mongolia (Rybin, 2014; Zwyns et al., 2016; Fei et al., 2018; Zwyns and Lbova, 2019; Zwyns, 2021). The emergence of these patterns around ~45,000 years ago was followed by a peak in cultural occupations in Baikal Siberia at the northeastern edge of its geographical distribution between 44,000 and 40,000 years ago, coinciding with climatic amelioration (Shichi et al., 2024). Despite significant advancements over the past decade, key questions remain unresolved including: (1) The factors driving the appearance of IUP assemblages around ~45,000 years ago, (2) Relationships between modern and archaic humans (e.g., Neanderthals and Denisovan), (3) The abrupt decline of IUP occupation intensity during Heinrich (H) Event 9 (40,000-39,000 years ago) in Baikal Siberia, (4) The timing and location of the transition to the EUP, and (5) The reasons for increased assemblage diversity during the EUP across the region.

Here we examine the correlation between the intensity of cultural occupations, local ecology, and hunter-gatherer technological organization using empirical data collected along the North-South transect spanning Mongolia and Transbaikal, Russia (MO-TB). Focusing on lithic raw material acquisition strategies, particularly from the Tolbaga site in southwest Transbaikal (Vasiliev and Rybin, 2009; Izuho et al., 2019), we reconstruct lithic technological organization. Our findings, while limited by data scarcity in the Mongolian steppe, reveal the following: (1) A negative correlation in occupation intensity between southern (low-high) and northern (high-low) regions during MIS 3-2, (2) A sharp decline in the intensity of cultural occupation during H4 (39,000-40,000 years ago) across most areas, except for the Ikh-Tolbor valley, (3) Regional variability in climatic regimes and subsequent local ecological landscapes including tundra, steppe-taiga, and dry steppe, (4) Expansion of tundra and polar desert landscapes in some areas, particularly during H4, (5) Hunting activities focused on steppe-taiga landscapes during the IUP, with broader landscape diversity (e.g., taiga, steppe-tundra, steppe, dry steppe, rocky canyon) during the EUP, and (6) hunter-gatherers mostly relied on local lithic raw materials both at IUP and EUP, with increased use of low-quality (but knappable) materials during the EUP in both long-term residential base and short-term logistic camps. These findings suggest that population distribution shifted between the IUP and EUP in response to local ecological changes in MO-TB.

Keywords: Asia; Archaeology; Initial and Early Upper Paleolithic; Hunter-Gatherer Adaptations; Ecological Changes.

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Convergence at a glance: Initial Upper Paleolithic blade technology in mainland Asia and Hirosato method in the Japanese Archipelago

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The Initial Upper Paleolithic (IUP) has become essential when discussing the dispersal of our species in Eurasia (Hoffecker, 2009; Hublin, 2011; Hublin et al., 2020). With its known geographical scale, however, it is unlikely to represent an 'archaeological culture' in the classical sense. Instead, it probably encapsulates shared and distinct cultural lineages, time-averaged sequences, but also instances of technological convergence (Kuhn & Zwyns, 2014, 2018; Goder-Goldberger & Malinsky-Buller, 2022; Premo & Rezek, 2025). Albeit well documented in the Pleistocene archaeological record, it is unclear to what extent convergences affect the IUP lithic productions. In Asia, the IUP is defined based on a remarkably consistent set of lithic technological features occurring between Eastern Kazakhstan and North China. Typically, they include a production of large, sometimes massive, paralleledged or triangular stone blades detached from cores reduced in a peculiar way. Some of the byproducts, such as *debordant* and neo-crest blades, are snapped and used as burin-cores to obtain smaller blades following systematic pathways. What is remarkable is that the large and small blade productions are integrated into a complex, yet coherent, techno-economic system, with one-way dependance relationships between the constitutive elements (Zwyns, 2021). Although individual components of the IUP definition may occur in other times and places during the Pleistocene in Eurasia, rarely (if ever at all) are they combined as a system in the same way. With many questions remaining regarding the function of these stone tools, why, and how such technological consistency is maintained remains unclear.

Here we present a specific technology known from the island of Hokkaido, in Japan, and named the Hirosato core reduction method (Nakazawa et al., 2005). Although it remains to be confirmed, assemblage would occur during or after the LGM, and with ages estimated on a stratigraphic basis to be ca. 22~16 ka they are considered as a regional Late Upper Paleolithic (LUP) (Izuho et al., 2012; Izuho and Hayashi, 2015). Hence, there is little basis for discussing a direct cultural connection between the continental IUP and the LUP from Hokkaido, except for a high degree of structural similarities between blade production systems. They have in common methods oriented toward the production of massive blades, including burin-core reduction systems and with a great lack of other bladelet/microblade production methods. They also differ in significant ways; the Hirosato method being characterized by an exclusive use of obsidian, a unidirectional core reduction patterns, and the use of pressure flaking technique on burin-cores. Overall, what we are describing here is most likely a case of technological convergence that can inform on the shared derived cultural traits observed in the IUP on mainland Asia, and the LUP from the Japanese Archipelago.

Besides being the results of stochastic choices, convergence is often seen as a form of cultural homoplasy in which behavioral choices are strongly influenced by selective forces - hence by the environment (O'Brien, et al. 2018). By revealing the nature of the selective forces generating the IUP and Hirosato blade production, a cross look at the two technological systems helps us to address the difficult yet fundamental question of the 'why'. Why did people engage in unnecessarily complicated challenges, such as the production of oversized blades, or the repetition of intricate

reduction systems? What is the role of the social environment in the process? Ultimately, we believe that such comparisons between blade technological systems across time and space are relevant for the definition of IUP. It informs us on the scope and limitations of relying on technological convergence to discuss issues of shared cultural identity.

Keywords: *Homo sapiens* dispersal; Asia; Archaeology; Upper Paleolithic; Cultural convergence; blade technology

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Reassessing the Chronology of Warwasi Rock Shelter and the Technological Traits of the Initial Upper Paleolithic in the Central Zagros

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Warwasi Rock Shelter is one of the few Paleolithic sites in the Central Zagros where researchers have extensively studied its three main cultural phases—Mousterian, Upper Paleolithic, and Epi-paleolithic—to reconstruct techno-cultural continuity, discontinuity, and paleodemographic shifts, particularly during the transition from the Middle to the Upper Paleolithic.

Through a techno-typological analysis of the Warwasi assemblages (spits CCC to NN), this study re-evaluates the layers generally labeled as Mousterian. The rrsults indicate that the Mousterian facies likely ended much earlier than previously estimated, beneath spits XX/YY. More importantly, spits WW to PP plausibly represent the Initial Upper Paleolithic (IUP) complex rather than the Zagros Mousterian, as e.g. the pointed laminar blanks released through bidirectional opposed striking platform cores which only morphologically resemble the Levallois products. Recognizing the presence of an IUP phase at Warwasi has now led to its broader acceptance among researchers in the Central Zagros, highlighting the need for further clarification of this phase. This study aims to refine the understanding of technological diversity at Warwasi (spits CCC to NN) and contribute to the ongoing reassessment of prehistoric technological and societal dynamics in the region.

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