INSTITUTE OF GEOLOGICAL SCIENCES

INSTITUTE OF ARCHAEOLOGY AND ETHNOGRAPHY

INTERNATIONAL OBSIDIAN CONFERENCE

IOC-2026

FROM MAGMA TO ARTIFACT: THE GEOLOGY AND ARCHAEOLOGY OF OBSIDIAN

Yerevan, Armenia
28 September - 01 October, 2026



Obsidian Hearth, sculpture by Jean-Michel Othoniel (b. 1964), France, 2014, Boghossian Foundation Collection, Lovers Park, Yerevan, 143x200x220 cm.

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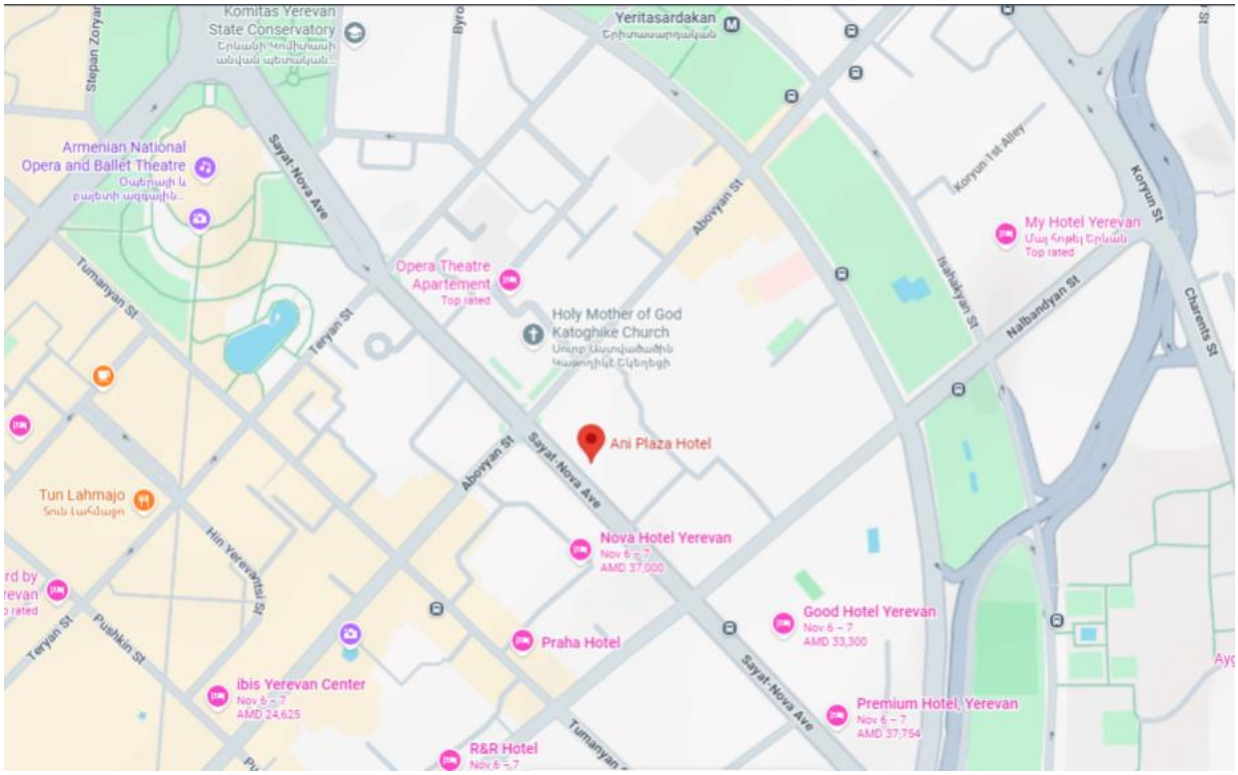
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CONFERENCE VENUE
ANI PLAZA HOTEL

Ani Plaza Hotel is located in the center of Yerevan, on 19 Sayat-Nova Avenue.







WELCOME "ICEBREAKER" EVENT

ICEBREAKER Reception meeting at the Geological Museum of the Institute of Geological Sciences on 27th Sep at 18.00,
Address: M. Baghramyan Avenue 24a, Entrance to the museum is from the opposite side of the building of the Institute of Geological Sciences.





Conference Programm	
September 28 Morning Session Nairi Hall (Ani Plaza Hotel)	
Time	**Description**
09:00 - 09:30	**Registration**
09:30 - 10:30	Welcome speeches **Director of IAE Dr. Sci Arsen Bobokhyan, Director of IGS Dr. Sci Khachatur Meliksetian, and others**
PLENARY SECTION. Nairi Hall (Ani Plaza Hotel) Keynote speeches (Chair: Arsen Bobokhyan)	
10:30 – 10:00	**Ruben Badalyan:** The use of obsidian in the South Caucasus (Armenia): history and results of provenance studies
11:00 – 11:30	**Khachatur Meliksetian:** Geochemistry of obsidian in the Armenian Highland: geochemical fingerprinting of archaeological artefacts and insights into the origin of rhyolitic magmas
11:30 - 11:50	**Coffee break**
Session 1. (Chair: Ruben Badalyan)	
11:50 – 12:10	**Cécile Menager:** Knapping without saving: obsidian economy and expedient lithic production at the Kura-Araxes II site of Voskeblur (Ararat valley, Armenia)
12:10 – 12:30	**Guram Chkhatarashvili:** Obsidian provenance and prehistoric mobility in Western Transcaucasia: new evidence from geochemical analysis
12:30 – 12:50	**Paolo Biagi:** Mount Chikiani obsidian sources: ten years of research in the Javakheti plateau (Georgia)
12:50 – 13:10	**Damase Mouralis:** Obsidian procurement strategies of ancient populations in the Ararat Plain during the Kura-Araxes; example from the Voskeblur excavation
13:10 – 14:00	**Lunch break**
Session 2. (Chair: Paolo Biagi)	
14:00 – 14:20	**Fumika Ikeyama:** Obsidian blade production in the Middle Kura Valley, Azerbaijan, during the Neolithic period
14:20 – 14:40	**Tristan Carter:** Obsidian sourcing studies in the Aegean: state of play and future directions
14:40 – 15:00	**Catherine Marro:** Interpreting the evolution of obsidian procurement strategies in the light of ceramic distribution patterns between Nakhchivan and North-western Iran during the Neolithic and Chalcolithic periods (6200-3500 BC)
15:00 – 15:20	**Damase Mouralis:** Cilicia between Central Anatolia and the Levant: Evidence of obsidian exchange from the Epipalaeolithic to the Chalcolithic periods
15:20 – 15:40	**Ekaterina Doronicheva:** Obsidian provenance and exploitation at the multilayer Epipaleolithic site of Sosruko grotto, North-Central Caucasus
15:40 - 16:00	**Coffee break**

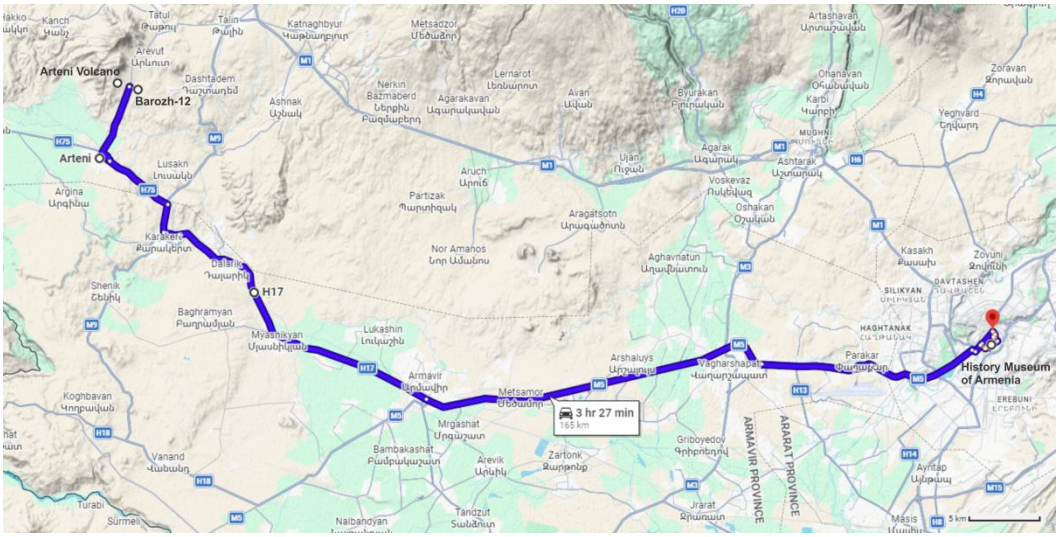
Session 3. (Chair: Tristan Carter)	
16:00 – 16:20	**Vladimir Doronichev:** Obsidian exploitation in the Middle and Upper Paleolithic of the North Caucasus
16:20 – 16:40	**Doron Yacobi:** A Kin-based Trade Partnership Model for the Distribution of Obsidian in the Southern Levant during the 8th millennium cal. BP
16:40 – 17:00	**Theodora Moutsiou:** Inferring social memory and identity through stone: obsidian provenance and circulation in the Eastern Mediterranean Neolithic transition
17:00 – 17:20	**Liubov Golovanova:** Exploitation of obsidian in the Neolithic site of Alebastroviy Zavod Rockshelter, North-Central Caucasus, Russia
17:20 – 17:40	**Mariam Saribekyan:** Increasing obsidian diversity during the Chalcolithic period at Yeghegis 1 rock shelter (Armenia)
September 29 **SECTION 1. Dvin Hall (Ani Plaza Hotel)** **Session 1. (Chair: Khachatur Meliksetian)**	
09:00 – 09:20	**Christian Reepmeyer:** Finally found! A new obsidian source on the island of Wetar - Geochemical analysis and interpretations
09:20 – 09:40	**Dagmara H. Werra:** Sharp as obsidian! Results of use-wear analysis of obsidians from the Early Neolithic site at Olszanica, South Poland
09:40 – 10:00	**Dennis Braekmans:** Investigating the chemical variability of Southeastern Honduran Obsidian sources
10:00 – 10:20	**Gor Ghazaryan:** Bronze Age obsidian tool and human activity beneath young lava flows near Lake Sevan (Armenia)
10:20 – 10:40	**Jalh Dulanto:** The Macizo and Antarqa obsidian sources, Arequipa, Peru: Locating the source of Chumbivilcas-type obsidian
10:40 - 11:10	**Coffee break**
Session 2. (Chair: Lilit Sahakyan)	
11:10 – 11:30	**Kelly McCartney:** Why does obsidian form? Insights from three-dimensional micro X-ray computed tomography textural analysis
11:30 – 11:50	**Kyle Freund:** Database construction for obsidian studies
11:50 – 12:10	**Lamya Khalidi:** Geochemical characterisation of obsidian from the Tibesti mountains (Chad)
12:10 – 12:30	**Roberto Campbell:** Challenges in obsidian geochemical databases: an experience from Southern South America
12:30 – 12:50	**Suda Yoshimitsu:** The Japanese obsidian database: a website providing comprehensive support for obsidian provenance analysis in archaeology
12:50 - 14:00	**Lunch break**
Session 3. (Chair: Kyle Freund)	
14:00 – 14:20	**Tamaki Miichi:** Reconstructing site formation processes from mt. Yugamine obsidian source,

	Central Japan
14:20 – 14:40	**Jalh Dulanto:** Source, shape, and social practice: wari obsidian bifaces from San José de Moro, Peru
14:40 – 15:00	**Marie Kolbenstetter:** Exploring diachronic developments in obsidian procurement in Southern Honduras (A.D. 0 – 1520)
15:00 – 15:20	**Mike Lyons:** A new method for sourcing obsidian in the Americas using image-based deep learning
15:20 – 15:40	**María Victoria Fernández:** Obsidian in Patagonia: a macro-regional database of natural deposits and archaeological patterns through the Holocene
September 29 SECTION 2. Nairi Hall (Ani Plaza Hotel) Session 1. (Chair: Christian Reepmeyer)	
09:00 – 09:20	**Yaroslav Kuzmin:** Long-distance exchange/trade in obsidian in the Holocene of the Siberian Arctic
09:20 – 09:40	**Atsushi Uemine:** Raw material or finished tool? Long-distance transport of Hokkaido obsidian
09:40 – 10:00	**Koshkina Daria:** Obsidian utilization for bifacial projectile points at Hamanaka 2: transitions from final Jomon to Okhotsk cultures (Rebun Island, Northern sea of Japan)
10:00 – 10:20	**Nobuyuki Ikeya:** Obsidian ccirculation between Shinshu and Kanto regions during the Late Early Jomon, Japan: evidence from p-XRF Analysis of 9.700 artifacts
10:20 – 10:40	**Riko Matsuyama:** Dispersal of Setouchi industries in Central Japan: based on a technological analysis of backed tool production in the Late Upper Paleolithic period
10:40 - 11:10	**Coffee break**
Session 2. (Chair: Yaroslav Kuzmin)	
11:10 – 11:30	**Satsuki Murai:** The lithic raw material utilization strategy in the Upper Paleolithic period: an analysis of flaking technology in the obsidian assemblage from the Coastal Plain
11:30 – 11:50	**Clive Bonsall:** All that glitters and black is not obsidian! Results of multi-analytical investigations of Neolithic artefacts from tell Gorzsa (Hódmezővásárhely, Hungary)
11:50 – 12:10	**Emma Lipsett:** Using obsidian sourcing to reconstruct the socio-seligious catchment area of the Later Bronze Age Peak Sanctuary at Stelida, Naxos (Greece)
12:10 – 12:30	**Kata Furholt:** Reassessing Carpathian obsidian: resource control, distribution, and exchange networks in Neolithic Central Europe
12:30 – 12:50	**Milan Kohut:** The provenance of the Carpathian obsidians - How to get out of the "Cul-de-sac"?
12:50 - 14:00	**Lunch break**
Session 3. (Chair: Theodora Moutsiou)	
14:00 – 14:20	**Clive Bonsall:** Obsidian exploitation patterns during the Upper Palaeolithic of Northwestern Romania
14:20 – 14:40	**Simone Sani:** Obsidian in the Early Neolithic of the Tuscan Archipelago (Italy): new insights

	from an integrated study approach
14:40 – 15:00	**Zsolt Kasztovszky:** Where there is one…
15:00 – 15:20	**Olivier Scancarello:** Obsidian procurement strategies and lithic miniaturization during the Late Holocene Neolithic of Central Afar, Ethiopia
15:20 – 15:40	**Margherita Mussi:** Obsidian use at Melka Kunture (Ethiopia), from Oldowan to Late Stone Age
15:40 – 16:00	**Dagmara Werra:** Obsidian procurement, utilisation, and mobility during the Late Neolithic in Northern Armenia: A case study from the Getahovit 2 cave site
September 29	
16:00 - 17:00	**Poster session + Coffee break**
	Ekaterina Doronicheva: The provenance analysis of obsidian artifacts from Boga-Orun rockshelter: a new Epipaleolithic site in the North-Central Caucasus, Russia **Elena Fausti:** Obsidian-tempered Kura-Araxes ceramics from Kotayk Province, Armenia: preliminary evidence for ceramic recipes and raw material procurement strategies **François-Xavier Le Bourdonnec:** Obsidian sourcing and techno-typological analysis at Basì, Corsica **Gayane Grigoryan:** From obsidian source to museum: scientific exhibition and geotourism development in Armenian obsidian deposits **Ito Ayaka:** The circulation process of lithic raw materials as revealed through a comparison of source sites and consumption sites **Laurence Astruc:** Obsidian procurement and exploitation of a Kura-Araxes community in third-millennium South Caucasus. The case of Qaraçinar (Azerbaijan) **Marcin Szeliga:** Symbolic gifts or everyday tools? Obsidian artifacts discovered in the Early Bronze Age warrior graves at selected sites in southeastern Slovakia **Jalh Dulanto:** From Source to Deposition: Obsidian Trajectories in the Peruvian Andes **Gevorg Navasardyan:** From volcanoes to heritage: the geoheritage value of Armenian obsidian
17:00-18.00	**CLOSING REMARKS**
20:00	**CONFERENCE DINNER (LOCATION TO BE ANNOUNCED LATER)**

MID-CONFERENCE FIELD TRIP 1 (September 30): ONE-DAY, INCLUDING HISTORY MUSEUM OF ARMENIA, ARTENI OBSIDIAN SOURCE AND BAROZH-12 MIDDLE PALEOLITHIC SITE

a. Visit to the History Museum of Armenia
b. Visit to Arteni rhyolitic (obsidian) volcano.
c. Visit to Barozh-12, Middle Paleolithic open-air site and obsidian workshop



GUIDED TOUR TO THE HISTORY MUSEUM OF ARMENIA

The History Museum of Armenia is a nationally significant cultural institution dedicated to preserving and showcasing Armenia's heritage. With a collection of over several hundreds of artifacts spanning from Paleolithic times to today, the museum serves as a bridge between the past and the future, contributing to science, education, and tourism.





Obsidian nuclei (Neolithic, VI Mil. BC) in the museum exhibition



Exhibition of History Museum of Armenia



Exhibition of History Museum of Armenia

ARTENI RHYOLITIC (OBSIDIAN) VOLCANO

Arteni volcanic complex is located within Aragats volcanic province. The age of Arteni rhyolites considered to be Early Pleistocene; K-Ar ages are: for Mets Arteni 1.45–1.5 Ma (Chernishev et al., 2002); fission track ages –1.27 Ma (Oddone et al., 2000) and 1.26 Ma for Pokr Arteni (Lebedev et al., 2011). Thus, rhyolitic eruptions and the formation of domes of Arteni volcano correspond to the Early Pleistocene. Eruption products of Arteni volcano are covered by more recent Middle Pleistocene andesitic lava flows of neighboring Ddmasar cinder cone and ignimbrites of Aragats stratovolcano.

Arteni is the most compound rhyolitic volcanic complex in Armenia, and it consists of two independent rhyolitic volcanoes: Mets (Big) and Pokr (Little) Arteni (2047 and 1754 m asl, respectively). Volcanic activity began with an eruption of perlite-pumice pyroclastics, followed by eruptions of detrital perlite and zonal obsidian that flowed westward and southward; shorter flows also went northward. Arteni obsidian is of high quality; "smoky quartz" of the translucent, reddish-brown, black, and other varieties are known.



Arteni volcanic complex in Armenia, Aragats volcanic province.



Products of explosive eruptions of rhyolite pumice and perlite pyroclastics (left). Obsidian cliff in small modern quarry across a lava flow erupted from Pokr Arteni volcano(right).

BAROZH-12, MIDDLE PALEOLITHIC OPEN-AIR SITE AND OBSIDIAN WORKSHOP

Located in western Armenia, at the edge of the Ararat Depression near the Mt Arteni volcano, the open-air Middle Paleolithic site of Barozh-12 was excavated by an international–Armenian archaeological team from 2009 – 2014 (Glauberman et al., 2020a,b). This site yielded significant data on Late Middle Paleolithic technology, land use, and hominin behavior in a region that has heretofore been little explored. The lithic assemblage appears similar to those from other contemporaneous Middle Paleolithic sites in the region, and luminescence age estimates indicate the site was occupied around 60 – 31 ka, the time range when archaic and anatomically modern humans may have overlapped temporally and/or geographically. Barozh-12 is a large, high-density Middle Paleolithic site. A total of 4.85 m3 of excavated sediments yielded 17,317 obsidian artifacts with densities ranging from 1600–5200 artifacts / m3 according to stratigraphic unit.

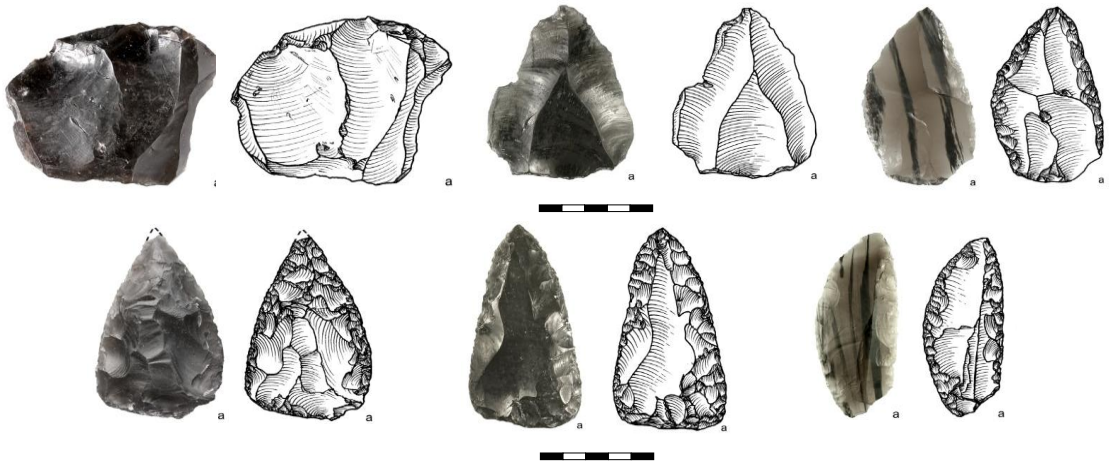
Unidirectional-convergent and unidirectional Levallois core reduction techniques dominate in the core and flake assemblage, and retouched pieces are numerous. These are mainly retouched Levallois points and convergent and other unifacial scraper forms on Levallois blanks.



View of Barozh-12 open-air Paleolithic site and test trench. Arteni volcano is in the background.

Surface and excavated artifacts are of all size classes and technological categories, including tool re-sharpening flakes and core trimming elements. Artifacts class frequencies and cortex analysis also suggest that all stages of core reduction and tool use, maintenance and discard occurred on site. While artifact assemblage analysis also reveals that site occupation intensity varied over time at the site.

The extent of a 'raw material exploitation territory' is suggested by obsidian sourcing. Results of portable X-Ray fluorescence (pXRF) analysis of samples of obsidian artifacts from all strata (n = 318) indicate that most were manufactured from local (1 - 2 km) Pokr and Mets Arteni material, while a smaller number of mainly retouched artifacts were manufactured on material that originates between 40 and 190 linear km away. Artifact transports overlap with sources in the Armenian Highlands and eastern Anatolia, and other Middle Paleolithic sites within the same time range. Interestingly, obsidian sourcing at the Upper Paleolithic site of Aghitu-3, around 200 km to the south of Barozh-12 also shows exploitation of the same obsidian sources. This suggests overlapping mobility ranges of hominins that employed both Middle and Upper Paleolithic technologies in the region starting around 40 ka.



Selected artifacts from Barozh-12: 1 Levallois core; 2 Levallois point; 3 Double straight-convex scraper; 4 Mousterian point; 5 Convergent scraper; 6 Double straight-convex scraper (modified after Glauberman et al. 2020a)

MID-CONFERENCE FIELD TRIP 2 (October 1): GARNI HELLENISTIC TEMPLE, COLUMNAR JOINTS LAVA FLOW, GEGHARD MONASTERY, GUTASNAR OBSIDIAN SOURCE

a. Visit to 1st century AD Classical Hellenistic temple of Garni.
b. Visit to gorge of Azat River, spectacular columnar joints lava flow and Garni active fault.
c. Visit to 4th – 13th Century AD Geghard monastery and view of Voghjaberd volcanoclastic suite of Upper Miocene – Pliocene age.
d. Gutansar volcano and obsidian outcrops



GARNI AND GEGHARD

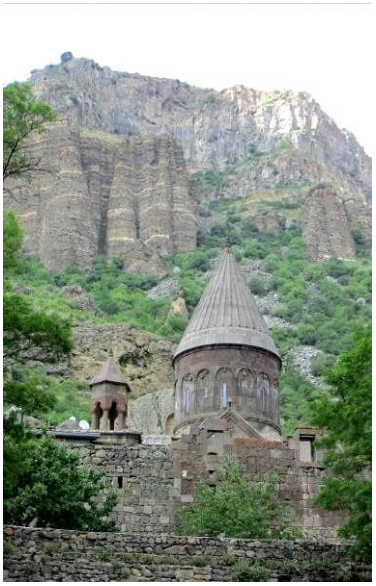
First we will visit Garni Fortress and the 1st century AD Classical Hellenistic Temple of Garni. It is located 28 km away from Yerevan. The fortification at Garni was a summer residence of the kings and the place where their troops were stationed. The structures of Garni combine elements of Hellenistic and national culture, which is an evidence of antique influences and the distinctive building traditions of the Armenian people.

Then the buses will take a route to the spectacular gorge of the Azat River, located at a short distance from the temple, and see spectacular columnar joints lava flow (dated 127 Ka years), and Garni active fault. The source of the lava flow is within Gegham volcanic upland. Hexagonal prisms formed in the canyon are related to the slow cooling and cracking of lava flow in Armenia. It got the name “Symphony of stone” and is recognized as a geological monument.



Garni Hellenistic temple

After the lunch we will visit the 4th-13th Century AD Geghard Monastery and view of Vokhchaberd volcanoclastic suite of Upper-Miocene-Pliocene Age. The monastery complex was founded in the 4th century by Gregory the Illuminator at the site of a sacred spring inside a cave. Both Garni and Geghard are located at the foothills of the Gegham volcanic ridge in the central Armenia.



Geghard Monastery



Columnar joint lava flow in Garni, 127 ka

GUTANSAR VOLCANIC COMPLEX



Jraber extrusive body related to the Gutansar volcanic complex.

The Yerevan - Sevan highway runs across the extrusion and spectacular obsidian and perlite outcrops can be seen on both sides along the road. A single sample from Armenia analysed in the seminal work by Colin Renfrew mentioned as “Yerevan obsidian”, actually belongs to the Gutansar complex. Samples from the Gutansar volcanic complex were analysed previously by many authors.

The activity of Gutansar begins with eruptions of rhyolitic pyroclastic material followed by rhyolitic flows and obsidians, and ended with quite lengthy flows of rhyolitic and dacitic lava, the final portions of which plugged the volcano channels and formed typical dome-shaped structures. In the Upper Pleistocene, the volcano was cut by other volcanoes of andesite and basaltic andesite composition, which erupted lengthy lava flows. A large crater (600 m in diameter, 5-8 m deep) formed on the Gutansar summit during the Late Pleistocene. The Large Extrusion (Djraber extrusion) occupies an area between the villages of Fantan, Gyumush (Karenis), Djraber, and Charentsavan city. Considering its geochemical homogeneity, geological structure and widely accepted volcanological conceptions it can be assumed that the activity of the Gutansar volcanic complex is related to the formation of a huge rhyolite extrusion and acid lava reached the surface by forming the Gutansar volcano and smaller domes at Alapars and Fantan.

References

Glauberman, P., Gasparyan, B., Wilkinson, K., Frahm, E., Nahapetyan, S., Arakelyan, D., Raczynski-Henk, Y., Haydosyan, H., Adler, D.S. 2020a. Late Middle Paleolithic technological organization and behavior at the open-air site of Barozh 12 (Armenia). *Journal of Paleolithic Archaeology* 3, 1095-1148.

Glauberman, P.J., Gasparyan, B., Sherriff, J., Wilkinson, K., Li, B., Knul, M., Brittingham, A., Hren, M.T., Arakelyan, D., Raczynski-Henk, Y., Nahapetyan, S., Haydosyan, H., Adler, D.S. 2020b. Barozh 12: formation processes of a late Middle Paleolithic open-air site in western Armenia. *Quaternary Science Reviews* 236, 106276, 1-23.

Meliksetian, K., Pernicka, E., Badalyan, R., Schifer, T., Keller, J., Gasparyan, B., Jrbashyan, R., Navasardyan, G., Kunze, R. 2024 Trace Element Geochemistry of Armenian Obsidian Sources and the Provenance of Archaeological Obsidian Artefacts. in Strategies of Obsidian Procurement, Knapping and Use in the First Farming Societies Vinet, A., Guilbeau, D., Milić, B (Eds.). Verlag der Österreichischen Akademie der Wissenschaften, 167-249 https://doi.org/10.1553/978OEAW93241

Chernishev, I.V., Lebedev, V.A., Arakelyants, M.M., Jrbashyan, R.T., Ghukasyan, Y.G. 2002. Quaternary geochronology of the Aragats volcanic centre, Armenia: evidence from K–Ar dating. Doklady Earth Sciences, 384, 95–102 (in Russian).

Oddone, M. Bigazzi, G. Keheyan, Y. Meloni S. 2000. Characterisation of Armenian obsidians: Implications for raw material supply for prehistoric artifacts. Journal of Radioanalytical and Nuclear Chemistry 243,3, 673-682.

Lebedev, V.A., Chernyshev, I.V., Yakushev, A.I. 2011. Initial time and duration of Quaternary magmatism in the Aragats neovolcanic area (Lesser Caucasus, Armenia). Doklady Earth Sciences, 437, 532-536.

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THE USE OF OBSIDIAN IN THE SOUTH CAUCASUS (ARMENIA): HISTORY AND RESULTS OF PROVENANCE STUDIES

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The report examines the various uses of obsidian in the Stone and Bronze Ages in Armenia, the main trends in the development of the industry, the circulation of raw materials, the economic significance of sources, and cultural connections. It presents the history of methods used in Soviet and foreign archaeology to determine the geological sources of archaeological obsidian in Armenia – from the characterization of physical properties and external features to modern precision analysis. This report summarizes data on more than 15,700 stratified Stone and Bronze Age artifacts from 77 sites/cultural-chronological contexts in Armenia, obtained through INAA, ICP-MS, LA-ICP-MS, ED-XRF, pXRF, and fission track dating (FT) analyses. Based on these data, primary, secondary, and incidental sources are identified, and the factors determining the role and significance of deposits are established. The importance of secondary sources—pebble deposits from riverbeds—is emphasized, as they sometimes served as an important source of raw materials.

The provenance analyses of artefacts provide two supply models: single-source for a small number of sites established near deposits, whatever the period and the place, and multi-source for the others, the nearest source not necessarily being the most preferred. Moreover, great variability is observed in the choice of sources between and within regions over time. The various patterns can be illustrated through a "least-cost path" analysis. The results clearly indicate that the factor of distance is often irrelevant in the choice of sources and that diversification of supply sources is the most commonly observed configuration.

The results obtained present a high degree of identification of obsidian from archaeological sites – 97%, and also enabled the classification of previously recognized but unidentified groups (“group 3c” and “TCUNK”).

The study of these provenances enables the identification of the patterns of exploitation of local obsidian over time in the different regions of Armenia, the importation of obsidian from sources adjacent to the present-day territory, and the discussion of the diffusion of Armenian sources in southern Europe and southwestern Asia.

GEOCHEMISTRY OF OBSIDIAN IN THE ARMENIAN HIGHLAND: GEOCHEMICAL FINGERPRINTING OF ARCHAEOLOGICAL ARTEFACTS AND INSIGHTS INTO THE ORIGIN OF RHYOLITIC MAGMAS

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The Armenian Highland hosts one of the largest concentrations of obsidian-bearing volcanic centres in Western Asia and represents a natural laboratory for studying both silicic volcanism and the interaction between prehistoric societies and volcanic resources. Obsidian occurrences are associated with Late Cenozoic rhyolitic volcanism distributed across the Aragats, Gegham, Vardenis, Syunik, Javakheti and Tsaghkunyats volcanic provinces of Armenia, and extend westward into the Kars–Erzurum Plateau and southwestward to the Lake Van volcanic province. Owing to the exceptional preservation of their primary magmatic signatures, obsidians provide a unique opportunity to investigate the generation and evolution of silicic magmas, as well as the physical volcanology of rhyolitic eruptions. Petrological and geochemical studies of obsidians of Armenian Highland indicate that rhyolitic melts were generated by partial melting of compositionally diverse crustal source rocks in a post-collisional geodynamic setting.

Since the Late Palaeolithic, obsidian has been one of the most valuable raw materials for the manufacture of stone tools and weapons and has been a major commodity in prehistoric long-distance exchange networks throughout Western Asia and beyond. Obsidian is exceptionally suitable for provenance studies because its chemical composition remains unchanged during the manufacture of artefacts, unlike metals produced through smelting and alloying. Moreover, individual volcanic sources are generally geochemically homogeneous, whereas the compositional differences between separate obsidian sources are sufficiently large to permit their reliable discrimination using trace-element geochemistry. These characteristics make obsidian one of the most powerful natural materials for reconstructing prehistoric trade routes and mobility.

Recent interdisciplinary studies of geological and archaeological obsidians demonstrate that all major obsidian sources can be reliably distinguished using trace-element geochemistry and innovative geochemical fingerprinting approaches. These methods enable the provenance of archaeological artefacts to be traced to specific volcanic centres, providing new insights into prehistoric mobility, exchange networks and cultural interactions across the Caucasus, the Armenian Highland, Anatolia and the Near East. At the same time, comparison of obsidian suites from different volcanic provinces highlights the diversity of silicic magmatism generated during the Arabia–Eurasia continental collision and contributes to a better understanding of magma evolution, crustal processes and Late Cenozoic volcanism in the Armenian Highland.

Integrated studies demonstrate how obsidian serves as a unique bridge between Earth sciences and archaeology, providing new perspectives on both the geological evolution of the Armenian Highland and the movement, trade and cultural interactions of prehistoric societies across Western Asia.

OBSIDIAN UTILIZATION FOR BIFACIAL PROJECTILE POINTS AT HAMANAKA 2: TRANSITIONS FROM FINAL JOMON TO OKHOTSK CULTURES (REBUN ISLAND, NORTHERN SEA OF JAPAN)

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The Hamanaka 2 site is situated on Rebun, a small, remote island located approximately 50 km west of Hokkaido. Despite the island lacking natural obsidian sources, obsidian artifacts are prevalent across the various cultural components of its archaeological sites, including Hamanaka 2. Consequently, every obsidian artifact serves as evidence of contact between ancient inhabitants and populations from other areas, primarily Hokkaido. This circumstance raises questions regarding the specific utilization of valuable imported lithic resources in relation to locally available lithic materials.

The aim of this research is a comparative study of bifacial projectile points-including arrowheads and harpoon heads-manufactured from obsidian and other raw materials. The sample consists of materials from the Final Jomon, Epi-Jomon, and Okhotsk cultures within the Hamanaka 2 site collection. The key research questions address whether there are morphological and/or functional differences between obsidian and non-obsidian bifacial points, and whether obsidian utilization patterns shifted across the Final Jomon, Epi-Jomon, and Okhotsk periods.

The classification of bifacial points is based on the shape of the points and their respective hafting methods. Because the morphology of arrowheads and harpoon heads at the Hamanaka 2 site is highly similar, the method for distinguishing between them relies on the analysis of dimensions and weight rather than form alone.

As a result, four morphological groups of bifacial points were identified within the Final Jomon, Epi-Jomon, and Okhotsk cultural components. Obsidian was identified in three of these groups: triangular, rhomb-shaped, and stemmed. However, leaf-shaped points were produced exclusively from local materials. While obsidian was frequently utilized for arrowheads, it was rarely used for the production of harpoon heads. Additionally, there are evidence of transportation of obsidian points to Rebun island while arrowheads and harpoonheads made of other materials were produced on site.

RAW MATERIAL OR FINISHED TOOL? LONG-DISTANCE TRANSPORT OF HOKKAIDO OBSIDIAN

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The discovery of worked obsidians far from its geological source is widely observed in archaeology. But what kind of history does this phenomenon indicate? Archaeologists must proceed through repeated trial and error to answer this question.

More specifically, how can we distinguish between cases in which unworked obsidian nodules were transported over long distances and then made into stone tools at their destination, and cases in which tools were already manufactured near the source and only then carried afar? The

problem becomes even more complicated depending on the degree of reduction performed near the source and on whether we should assume intermediate locations between the source area and the find spot. The geological source of the raw material of lithic tools can be identified through chemical compositional analysis, including XRF. However, the issues raised above cannot be addressed without archaeological observation of artifacts themselves. It is no exaggeration to say that source identification results become evidence for history only when integrated with information related to human actions preserved on the tools.

This study discusses archaeological methods for observing obsidian artifacts in order to interpret historically cases of long-distance obsidian transportation during the Middle Holocene of the Japanese Archipelago. In recent years, several cases have been confirmed in which obsidians from Hokkaido, including Shirataki, were brought to sites on Honshu Island. Many of these cases are distributed along the coast of the Sea of Japan, and their “stepping-stone-like” distribution suggests interregional interaction mediated by the sea.

At the center of this study is a notched point from the Tenjin Site, recently identified by the author as a long-distance transported Hokkaido obsidian. Although excavated in Toyama Prefecture, XRF analysis identifies its source as Akaishiyama in Shirataki. The distance between source and find spot is approximately 1,000 km.

This artifact is exotic in the area around the site both in raw material and in typological characteristics. Notched points made of obsidian are found almost exclusively in Hokkaido, and the specimen from Tenjin Site is therefore exceptional.

What history does the Tenjin Site notched point tell us? Was a raw nodule transported from Hokkaido and then worked near the find spot? Or was a finished tool produced in Hokkaido and then carried out? Through observation of the reduction sequence and manufacturing techniques, together with microscopic observation of fine traces preserved on the tool, this study aims to reconstruct the lithic technological tradition involved and the human actions associated with this artifact.

INTERPRETING THE EVOLUTION OF OBSIDIAN PROCUREMENT STRATEGIES IN THE LIGHT OF CERAMIC DISTRIBUTION PATTERNS BETWEEN NAKHCHIVAN AND NORTH-WESTERN IRAN DURING THE NEOLITHIC AND CHALCOLITHIC PERIODS (6200-3500 BC)

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This paper analyses the fluctuating relationships between the South Caucasus and North-western Iran during the Neolithic and the Chalcolithic periods through the cross-analysis of obsidian and ceramic distribution networks. Drawing on the geo-chemical analysis of a total of 5348 obsidian artefacts sampled from 14 archaeological sites in NW Iran and 9 sites in Nakhchivan, we first compare the respective shares of East-Anatolian, South-Caucasian and Iranian obsidian sources in the 23 assemblages under study. We then set the resulting data against the ceramic assemblages of the same sites in order to discuss the cultural-historical implications of the perceptible trends. It appears from this comparison that several obsidian circulation networks organized along different distribution patterns co-existed in both the South-Caucasus and North-western Iran during the Neolithic. Moreover, it is now clear that Late Prehistoric groups living in the Lake Urmia basin did not systematically tap the obsidian sources that were the closest or the most accessible to them, thus questioning the "least-cost path model" advocated in previous studies: as shown by the case with the Miandohab-Solduz region, it appears that obsidian sourcing strategies marked a shift at the turn of the 6th and the 5th Millennium BCE in certain areas. Thus, contrary to their Neolithic predecessors, who had favoured South-Caucasian deposits, the communities from the south Urmia basin started to tap East-Anatolian obsidian outcrops during the Chalcolithic period. The comparison of the Chalcolithic ceramic assemblages in the region at large suggests that this about-turn must be linked to a shift in gravity centre at the macro-regional level, probably in relationship with the Ubaid expansion ca. 5200-5000 BCE.

KNAPPING WITHOUT SAVING: OBSIDIAN ECONOMY AND EXPEDIENT LITHIC PRODUCTION AT THE KURA-ARAXES II SITE OF VOSKEBLUR (ARARAT VALLEY, ARMENIA)

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The lithic assemblage from the Early Bronze Age settlement of Voskeblur (Ararat valley) offers new insights into obsidian procurement and technological organization during the Kura-Araxes II (2900-2500 BC) period. The assemblage comprises 5,308 knapped stone artefacts recovered between 2020 and 2025, almost entirely made of obsidian (99.1%), with quartz, flint and other materials occurring only marginally.

Technological analysis shows that obsidian was knapped on-site from small pebbles likely collected from regional sources and nearby riverbed of Hrazdan (originating from the deposits of the Gutansar volcano), whereas flint was imported exclusively as finished or semi-finished products. This contrast points to a dual raw material economy in which abundant local obsidian supported domestic expedient production, while flint fulfilled more specialized functions.

Obsidian debitage at Voskeblur is overwhelmingly geared toward flake production. Pebbles were systematically split by anvil percussion, generating cortical opening flakes immediately

transformed into cores. Debitage strategies are dominated by centripetal and unipolar flake cores, with minimal preparation and virtually no core maintenance. Bipolar/anvil percussion structures the entire technological sequence and reflects a highly expedient technological system adapted to the morphology of small obsidian pebbles. There is also a very small minority of lamellar knapping.

The assemblage demonstrates little concern for raw material conservation: cores are frequently abandoned while still productive, and debitage waste constitutes the majority of the corpus. Tool production similarly reflects low investment, with splintered pieces, used flakes, and retouched flakes forming the core of the toolkit, while formal implements remain rare. Imported flint artefacts are mainly represented by sickle elements, underscoring the functional specialization of non-local raw materials.

The Voskeblur assemblage thus documents a highly expedient obsidian economy based on abundant local resources, simple knapping strategies, and limited curation of tools and cores. These results contribute to ongoing discussions regarding technological traditions, regional identities, and economic organization within Early Bronze Age communities of the South Caucasus.

FINALLY FOUND! A NEW OBSIDIAN SOURCE ON THE ISLAND OF WETAR: GEOCHEMICAL ANALYSIS AND INTERPRETATIONS

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Seafaring has played a vital role in human migration and the formation of an interconnected, globalized world. Examining the worldwide increase in maritime activity following the Last Glacial Maximum (LGM)—a period when sea levels rose episodically until about 7,000 years ago—many researchers argue that the loss of landmass was a key factor driving this pattern. Island Southeast Asia (ISEA), a region abundant in islands within the tropics, appears as an area of significant early innovations in maritime technology. Evidence includes the arrival of hominins on Java and Flores around one million years ago, the early maritime migration of Homo sapiens to continental Sahul (Australia and New Guinea) over 55,000 years ago, and the more recent Austronesian expansion from 5,000 to 3,000 years ago, marked by colonization of the Remote Pacific. Archaeological findings from Eastern Indonesia offer unique insights into factors influencing this development, such as environmental and sea-level changes, subsistence strategies, and population growth. Additionally, new evidence of late Pleistocene voyaging—exemplified by exotic stone tools found at archaeological sites—indicates that innovations in maritime technology were ongoing, and that ancient hunter-gatherers regularly traveled between islands.

This paper discusses recent developments in the analysis of obsidian sources and artefacts in the Lesser Sunda Islands of Indonesia. Initial detection of obsidian utilisation at around 15,000 years ago showed the distribution of at that stage unknown three obsidian sources. Since then, several field seasons revealed an obsidian source (formerly Group 3) on the south coast on Alor island, close to the village of Kulunan. This research was presented at the IOC in Engaru in 2023.

The source location of the other two sources, however, remained unknown. Additional fieldwork in recent years on the island of Wetar identified obsidian outcrops and secondary deposits. Geochemical analysis revealed a match with the artefacts formerly assigned to Group 1. The new findings are discussed in context of the terminal Pleistocene interaction zone.

OBSIDIAN EXPLOITATION PATTERNS DURING THE UPPER PALAEOLITHIC OF NORTHWESTERN ROMANIA

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Palaeolithic sites in northwest Romania exhibit a wide variety of lithic materials that were used for toolmaking. These are mostly of local origin, but invariably include some of exogenous origin. The use of obsidian is first evident during the Aurignacian period (43–29 ka BP) and continued into the Gravettian period (30–22 ka BP), with obsidian tools being relatively common at some sites.

To identify the provenance of the obsidian, non-destructive chemical analyses using a portable X-ray fluorescence (pXRF) spectrometer were performed on 232 'obsidian' artefacts from five sites – Bușag, Remetea Șomoș I, Călinești I, Boinești, and Turulung. The results show that people of the Early and Middle Upper Palaeolithic periods in northwestern Romania obtained their obsidian, either directly or indirectly, exclusively from sources on the western flank of the Carpathian Mountains, at distances of up to 170 km. While Middle Upper Palaeolithic (Gravettian) hunter-gatherers acquired their obsidian from the Carpathian 1 and 2 (C1 and C2) source areas, the Early Upper Palaeolithic (Aurignacian) people who preceded them acquired some of their obsidian from the Carpathian 3 (C3) source area in present-day Ukraine. In addition, among the artefacts from Bușag that archaeologists had provisionally identified as obsidian, several pieces were made from another black volcanic rock, hyaline dacite, probably from the Korolevo locality in Transcarpathian Ukraine. Arguably, the Aurignacian site at Bușag has the only known finds of artefacts made from C3 obsidian and Korolevo dacite outside southwest Ukraine. Moreover, at Bușag, chemical analysis of the obsidian has shown that the pattern of obsidian acquisition differs between the 'Aurignacian' and 'Gravettian' series, reinforcing the view that the two series belong to different periods of the Upper Palaeolithic.

ALL THAT GLITTERS AND IS BLACK IS NOT OBSIDIAN! RESULTS OF MULTI-ANALYTICAL INVESTIGATIONS OF NEOLITHIC ARTEFACTS FROM TELL GORZSA (HÓDMEZŐVÁSÁRHELY, HUNGARY)

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The authors present the results of recent sourcing analyses conducted on 175 obsidian artefacts from Late Neolithic (Tisza culture) contexts at the tell site of Hódmezővásárhely-Gorzsa in southeastern Hungary. The artefacts were analysed using portable XRF, and the results were compared with reference measurements obtained from geological samples of known European obsidian sources. Most of the Gorzsa assemblage originated from the Carpathian 1 (C1 – Cejkov-Viničky) source area in southeastern Slovakia, with a single specimen traceable to the C2E (Mád-Erdőbénye) source in northeastern Hungary. However, four artefacts that visually resemble C2E obsidian could not be matched to any known Carpathian or European obsidian source.

This discrepancy prompted a further analytical step, involving a detailed investigation of these four outliers to determine whether they were true obsidians from an unknown source or visually similar volcanic rocks. We present here the results of petrographic (thin section), SEM (Scanning Electron Microscopy), and PGAA (Prompt Gamma-ray Activation Analysis) analyses, which demonstrate that this black, glassy, very fine-grained material is not obsidian but a very glass-rich, hyalopilitic rhyolite, possibly originating from the Transcarpathian Volcanic Region, which is the northeastern part of the Neogene calc-alkaline Inner Carpathian volcanic arc. Active primarily between 13.8 and 9.1 Ma, this approximately 120 km-long northwest–southeast-trending chain, which is part of the Vihorlat-Gutin ridge (Vihorlat-Sinyak-Velikij Dil-Velikij Sholets-Berehove Hills-Oaș-Gutin-Lapuș-Țibleș). Rock compositions vary from calc-alkaline basalt to rhyolite.
These findings underscore the need for scientific analyses to accurately identify and source obsidian, as visual classification alone—even by experienced archaeologists—can be misleading.

OBSIDIAN PROCUREMENT, UTILISATION, AND MOBILITY DURING THE LATE NEOLITHIC IN NORTHERN ARMENIA: A CASE STUDY FROM THE GETAHOVIT 2 CAVE SITE

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The Late Neolithic period in the South Caucasus is not evenly documented, especially in the mountainous Armenian Highlands, where finds are limited. This research discusses the obsidian collection from layered Late Neolithic deposits at Getahovit 2, a cave site in northeastern Armenia (Kalantaryan 2025; Kalantaryan et al. 2022). The collection comes from clearly identified archaeological layers associated with hearths and specific activity zones, offering insights into technological practices and cave use across multiple occupation phases.

A total of 28 obsidian artefacts were studied through technological, typological, and spatial analyses, complemented by geochemical analysis using handheld X-ray fluorescence (XRF). The results show that the majority of these artefacts come from the Arteni volcanic complex, while a smaller number originate from the Hatis source, indicating that prehistoric communities moved across considerable distances within the Armenian Highlands. The technological study reveals that most tools were likely made elsewhere and transported to the cave as finished objects or pre-shaped blanks, with only minimal on-site modifications and quick production methods.

Comparing Getahovit 2 with other Late Neolithic assemblages from the Ararat Valley indicates that it reflects a selective and mobile expression of a larger obsidian blade-based technological tradition, rather than being an isolated upland technological adaptation.

The pattern of artefact distribution around hearths, along with the sparse lithic debris, suggests that Getahovit 2 was likely a site for brief visits rather than a permanent settlement. These results highlight the importance of caves as logistical hubs in mobile settlement networks and enhance our understanding of obsidian sourcing and movement during the Late Neolithic period in the South Caucasus.

References

Kalantaryan, I. 2025. "South Caucasian Chalcolithic pottery as seen from the cave Getahovit-2, north-eastern Armenia". *Studii de Preistorie* 21:79-135.

Kalantaryan, I., Białowarczuk, M., Przeździecki, M. 2022. „Getahovit-2. New evidence of an Upper Palaeolithic settlement in Northern Armenia.” *Polish Archaeology in the Mediterranean* 31: 13–24. https://doi.org/10.31338/uw.2083-537X.pam31.14.

SHARP AS OBSIDIAN! RESULTS OF USE-WEAR ANALYSIS OF OBSIDIANS FROM THE EARLY NEOLITHIC SITE AT OLSZANICA, SOUTHERN POLAND

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Prehistoric communities used obsidian throughout the entire Stone Age. The oldest specimens made from this raw material, known from archaeological sites in Poland, date to the Middle Palaeolithic period, while the youngest specimens are from the Late Neolithic. Only a few specimens from the Oldest and Middle Stone Age have been documented. With the influx of Neolithic communities, we observe an increase in the proportion of obsidian products (Hughes et al. 2018; Szeliga 2021).

Obsidian was found within a well-defined area around its geological source, and this distribution occurred over a relatively short period (Furholt 2026). This can indicate a specific system of values, significance, and use of this raw material (Werra et al. 2024). Use-wear analysis of obsidian artefacts is crucial in those studies. Unfortunately, the use-wear analyses of obsidian artefacts have not been the focus of extensive studies in Europe.

Recently, use-wear analysis was conducted on 161 obsidians from the Olszanica site (South Poland). The site was inhabited by Linear Pottery Culture communities. Additionally, pottery from the Bükk and Alföld Linear Pottery culture groups was distinguished (Milisauskas 1976, 1986). The main goal of the conducted analysis was to assess whether the utilisation of particular raw materials can reflect changes and social dynamics of prehistoric communities in the Early Neolithic communities. The obtained results revealed a unique rule in the use and morphological character of obsidian items.

References

Hughes R., Werra D. H. and Sulgostowska Z. 2018. On the sources and uses of obsidian during the Paleolithic and Mesolithic in Poland. Quaternary International 468: 84–100. https://doi.org/10.1016/j.quaint.2017.11.013

Furholt K. 2026. Carpathian obsidian exchange and social connectivity in eastern central Europe between the 7th and 3rd millennia BCE. Journal of Archaeological Science: Reports 71, 105653. https://doi.org/10.1016/j.jasrep.2026.105653

Milisauskas S. 1976. Archaeological investigations on the linear culture village of Olszanica. Wrocław: Ossolineum.

Milisauskas S. 1986. Early Neolithic Settlement and Society at Olszanica. Ann Arbor: The Regents of the University of Michigan. Memoirs of the Museum of Anthropology, Number 19.

Szeliga M. 2021. The inflow of obsidian north of the Carpathians during the Neolithic – chrono-cultural variability of distribution. In K. T. Biró and A. Markó (eds), Beyond the Glass Mountains. Papers Presented for the 2019 Intrnational Obsidian Conference 27-29 May 2019, Sárospatak, 69–94. Budapest: Magyar Nemzeti Múzeum. Inventaria Praehistorica Hungariae.

Werra D. H., Szeliga M., Pyżewicz K. and Burgert P. 2024. Value, significance and use of ’exotic’ materials – in the light of the presence of obsidian on Neolithic sites in Poland. Sprawozdania Archeologiczne 76(1): 71–97. https://doi.org/10.23858/SA/76.2024.1.3616

CILICIA BETWEEN CENTRAL ANATOLIA AND THE LEVANT: EVIDENCE OF OBSIDIAN EXCHANGE FROM THE EPIPALAEOLITHIC TO THE CHALCOLITHIC PERIODS

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The sourcing of obsidian offers the possibility to trace not only the exchange of raw material but also the mobility of the people who carried it from the geological sources to the archaeological sites. Moreover, obsidian provenance studies can also track the technology-transfer across regions, concerning the spread of important prehistoric techniques employed in artefact knapping. Our presentation focuses on a key region in the south of Anatolia (Türkiye), Cilicia, one of the largest plains in the eastern Mediterranean, which lies at the crossroads of several cultural areas. Cilicia is a focal point of cultural connections between Anatolia, the Levant and even Cyprus, as well as between plains and mountains.

We present here the sourcing of 839 obsidian artefacts retrieved during the extensive surveys in Cicilia in three different settings. More than 200 artifacts come from the Eşek Deresi site, a cave located in the Taurus foothills at an altitude of around 300 m which material date back to the Epipaleolithic, Neolithic and Chalcolithic periods. In addition, more than 70 artefacts come from the settlement of Yumuktepe, a höyük (= archaeological mound) located in the heart of the modern city of Mersin on the coastal plain. Here the obsidian analysed dates from the Neolithic to the Chalcolithic period. Finally, we analysed nearly 550 artefacts from an extensive survey (Central Taurus Archaeological Research/OTTA) of the coastal plain and the foothills of the Taurus Mountains across Cilicia.

The preliminary results indicate an increase in the diversity of sources used from the Epipalaeolithic period onwards. This is particularly evident at Eşek Deresi Cave, where Göllüdag was the only source used during the Epipalaeolithic period before diversification occurred later on (while remaining in Central Anatolia). Our results also confirm that Central Anatolian sources have been preferentially used in Cilicia, while obsidian from Eastern Anatolia only arrives at Yumuktepe not before the Late Chalcolithic 1 period. Moreover, among the Central Anatolian sources, the survey shows some specific spatial patterns in the use of Göllüdağ, Acigöl and Nenezi outcrops. Finally, our preliminary results suggest possible relationships between the preferential selection of certain obsidian sources and specific knapping technologies. For example, obsidian from the Eastern Göllüdağ and Nenezi sources appears to be more frequently associated with pressure blades, whereas other obsidian sources seem to show a greater diversity in other blade-production technologies.

OBSIDIAN PROCUREMENT STRATEGIES OF ANCIENT POPULATIONS IN THE ARARAT PLAIN DURING THE KURA-ARAXES PERIOD: EVIDENCE FROM THE VOSKEBLUR EXCAVATION

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Located in the Ararat Plain, Voskeblur is one of the best-preserved Kura-Araxes sites in

Armenia. It has yielded not only significant remains of earthen architecture but also a large lithic assemblage. This assemblage, recovered between 2020 and 2025, is almost entirely made of obsidian (99.1%), other materials occurring only marginally. Using a portable XRF device, we have processed to the elemental characterization of more than 270 artifacts, in order to present a preliminary sourcing of the obsidian used by ancient people of Voskeblur and to precise their procurement strategy.

This presentation focuses on the sourcing of obsidian assemblage that is systematically analysed through an integrated approach combining technological analysis and geochemical sourcing. Finally, for comparison with other geographical settings, during the same period, we also include in our presentation three other contemporaneous Kura-Araxes sites where we analyzed a smallest amount of artifacts: Hagahartsin (n=31 artifacts) and Ayrum (n=19) in the northeast of Armenia and Karnut (n=11), in the northwest.

In Voskeblur the main geological sources used by ancient people were located within the Gutansar volcano (more than 90 % of the analysed artifacts), followed by Hatis (approx. 4 %) and Tsaghkunyats (approx. 2 %), Gegham and Arteni. These findings underlie the preferences of the ancient inhabitants of Voskeblur regarding the choice of the geological sources. Clearly, distance plays a significant role. However, as the crow flies, the Gutansar geological source is just a little further away than the Hatis one, which is far less frequently represented in the corpus. Furthermore, the location of the Gutansar and Hatis geological sources of obsidian in the upper part of the catchment area in which the Volskeblur site is situated could explain the preference for these geological sources.

The study of 20 pebbles retrieved during the excavation also suggests an opportunistic consumption of obsidian. The large majority (19/20) also points to Gutansar geological source, indicating that ancient people also use the pebbles transported by the Hrazdan river and its tributaries to the Ararat plain where the site is located. This observation indicates that a part of the raw material may have been collected as pebbles in the immediate vicinity of the archaeological site.

INVESTIGATING THE CHEMICAL VARIABILITY OF SOUTHEASTERN HONDURAN OBSIDIAN SOURCES

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Obsidian studies have held a central place in Mesoamerican archaeological scholarships for half a century. While 50 years of studies have provided a robust understanding of the exploitation of Mexican and Guatemalan sources, Honduran sources have received little attention. The southeastern Honduran source of Güinope, in particular, is thought to have supplied the essential part of obsidian to Lower Central America, yet this region has never been formally investigated. This paper presents the results of a survey in Southeast Honduras which aimed to provide an understanding of the variability of chemical signatures for sub-sources and different outcrops,

improving the resolution of socio-economic reconstructions of resource exploitation in the precolonial past. This survey led to the identification of a new obsidian deposit in the region, and to the systematic sampling of the known outcrop of Güinope. While a more systematic survey would be required to understand the reach of the Güinope geochemical signature, these first results enable a preliminary assessment of intra-source variability for this particular source through applying a combination of ICP-MS and pXRF methodologies. The potential for the accurate sourcing to sub-source level of archaeological obsidian is explored.

A KIN-BASED TRADE PARTNERSHIP MODEL FOR THE DISTRIBUTION OF OBSIDIAN IN THE SOUTHERN LEVANT DURING THE 8TH MILLENNIUM CAL. BP

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Obsidian first appears in the Southern Levant at the end of the Epipaleolithic and reaches peak frequencies during the 8th millennium cal. BP Wadi Rabah culture, before declining sharply and virtually disappearing with the onset of the Early Bronze Age and the widespread adoption of metallurgy. Within this trajectory, the site of Hagoshrim IV in northern Israel (Wadi Rabah, ca. 7600–6800 cal BP) provides a particularly rich assemblage of obsidian, alongside stamp seals, imported chlorite vessels, and evidence for skilled obsidian knapping, all of which suggest sustained engagement with distant source regions.

Drawing on the archaeological and provenance data, we propose that obsidian distribution in Hagoshrim IV and other Wadi Rabah sites in the Southern Levant may reflect an early form of kin-based direct trade. In this model, exchange is facilitated by the movement of family members from source regions into consumer regions, where they act as embedded agents within local communities, maintaining long-distance supply networks.

We further suggest that Hagoshrim IV may have functioned as a nodal trading community within a wider network linking Wadi Rabah settlements in northern Israel with obsidian source zones in Anatolia. The observed shift in the dominant obsidian sources supplying the Southern Levant from central Anatolia in the Pre-Pottery Neolithic to predominantly eastern Anatolian sources in the Pottery Neolithic may reflect broader socio-political changes in the source regions, potentially associated with the emergence of the Halaf cultural complex in northern Mesopotamia and the northern Levant and its presence in the north and expansion in the 8th millennium cal. BP.

Ongoing provenance research aims to refine our understanding of how obsidian was distributed among Wadi Rabah settlements during the Late Neolithic, far from primary source areas. This work seeks to further clarify the mechanisms by which obsidian circulated between these communities and we will present relevant results at the conference.

OBSIDIAN EXPLOITATION IN THE MIDDLE AND UPPER PALEOLITHIC OF THE NORTH CAUCASUS

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The Zayukovo (Baksan) obsidian source, located in the Elbrus region in the north-central Caucasus, is the only obsidian source known in the Northern Caucasus. Recent archaeological research indicated the value of the Zayukovo (Baksan) obsidian during the Paleolithic. In our presentation, we report some of new data about exploitation of obsidian in the Middle (MP, 90–40 kya) and Upper (UP, 38–20 kya) Paleolithic in the region.

The Zayukovo (Baksan) obsidian source was actively exploited by hominins that occupied the Saradj-Chuko grotto, located 5–8 km from the source. The only Mousterian obsidian industry known in the Northern Caucasus (96.7% of artefacts are made from obsidian) is represented in layer 6B at Saradj-Chuko grotto, dated 80–90 kya. In layer 6B, the laminar Mousterian industry similar to Zagros Mousterian was defined.

Later, in the upper MP layers 6A and 3, hominins less intensively visited the grotto.

The Zayukovo (Baksan) obsidian was also transported by MP hominins during 70–40 kya to Mezmaiskaya and Monasheskaya cave sites located in the north-western Caucasus. In Mezmaiskaya cave, obsidian artifacts were found in several MP layers, assuming sporadic contacts between remote regions of the North Caucasus.

To date, the most representative series of obsidian artefacts was analyzed from the UP layers in Mezmaiskaya cave dated between 40 to 21 kya (Doronicheva & Shackey, 2014; Doronicheva et al., 2019). A chemical composition of the obsidian artefacts indicates that most of them are derived from the Zayukovo source, while a few pieces originate from the Chikiani (Paravani or Kojun Dag) obsidian source in southern Georgia (approximately 450 km southwest from Mezmaiskaya Cave). In Mezmaiskaya, the most numerous collections of obsidian artefacts was found in the uppermost UP Layer 1A. The obsidian transport from the south of Georgia to the north-western Caucasus suggests contacts among UP humans of these regions.

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THE PROVENANCE ANALYSIS OF OBSIDIAN ARTIFACTS FROM BOGA-ORUN ROCKSHELTER: A NEW EPIPALEOLITHIC SITE IN THE NORTH-CENTRAL CAUCASUS, RUSSIA

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In recent years, several new Epipaleolithic sites have been discovered in the Elbrus region, in the North-Central Caucasus, including Psytuaje rockshelter in 2019 (Doronicheva et al., 2022) and Boga-Orun rockshelter in 2023 (Golovanova et al., 2025). Boga-Orun rockshelter is situated about

30 km linear distance from the Baksan (Zayukovo) obsidian source (Doronicheva et al., 2019). Boga-Orun rockshelter located at 1577 m asl now represents one of the highest stratified Epipaleolithic sites known in the Caucasus, alongside with the open-air site of Kalavan 1 (1640 m asl) in the Lesser Caucasus, in Armenia (Montoya et al. 2013; Tornero et al. 2016). OSL dates indicate the age of the Epipaleolithic occupation in layer 5 between ca. 17 and 19.5 ka BP, corresponding the beginning of Late Glacial. The lithic assemblages from layers 4 and 5 at Boga-Orun consist of stone artefacts made from flint of various colors, varying from light gray and gray-brown to gray-pink and pink, and black obsidian, and one tool is made from sandstone. In our presentation, we report results of obsidian provenance studies using pXRF and possible sources of obsidian exploited by the Epipaleolithic inhabitants of this site.

The comparative data form a high altitude Epipalaeolithic hunting campsite of Kalavan 1 suggest that the Boga-Orun rockshelter is also a hunting campsite that the Epipalaeolithic hunters occupied on a seasonal basis during a warm period of the year (probably from the late spring to summer, or during the summer, or from the end of summer to early autumn) and during seasonal migrations of wild goat/sheep herds from high altitude alpine meadows to lowland areas or back. Boga-Orun rockshelter is situated in the bottleneck of the Kochkortash River valley which controls the descent into the Baksan valley from the alpine meadows above. The lithic assemblage recovered from a small test excavation shows evidence of diverse human activities in the rockshelter, mostly related to butchering animal carcasses, and also the production of hunting weapons and hide working.

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OBSIDIAN PROVENANCE AND EXPLOITATION AT THE MULTILAYER EPIPALEOLITHIC SITE OF SOSRUKO GROTTO, NORTH-CENTRAL CAUCASUS

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Among the Epipaleolithic sites of the Caucasus, Sosruko Grotto occupies a particularly important position. The site contains a multi-meter sequence of Epipaleolithic deposits (layers 15, 12, 10, 8, 7, and 4, from bottom to top) dating from ca. 27–23 ka to ca. 12–10 ka (Golovanova et al., 2020, 2022, 2025). At Sosruko grotto, interdisciplinary research and comprehensive absolute dating studies using several dating methods have been conducted. Research shows that obsidian and high-quality Cretaceous flint originating from several flint deposits were used in all layers. Other types of flint were also found in small quantities, as well as rare artifacts made from other rocks (granite, silicified limestone, sandstone, and marl). The transportation of obsidian and high-quality flint was carried out in the form of pieces or pre-cores.

The external homogeneity of the region's flint and obsidian precludes their separation based solely on macroscopic characteristics and origin. The use of several geochemical methods (XRF, pXRF, LA-ICP-MS, and ICP-MS) for flint and obsidian allows the better identification of the origin

sources of lithic raw materials in archaeological collections.

This study aimed to analyze as many obsidian samples as possible to determine their sources. A portable Explorer 5000 X-ray fluorescence spectrometer, specifically calibrated for this study, was used. The portable spectrometer allowed for relatively rapid and non-destructive analysis of large data sets. A total of 2,646 obsidian artifacts from layers 4, 5, 6, 7, 8, 10, 11, 12, and 15 of Sosruko Grotto were analyzed. To assess variability of the elemental composition of obsidian samples from Sosruko, principal component analysis was used. This study has shown that the obsidian artefacts originate primarily from the Zayukovsky deposit, located approximately 20 km from the grotto.

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EXPLOITATION OF OBSIDIAN IN THE NEOLITHIC SITE OF ALEBASTROVIY ZAVOD ROCKSHELTER, NORTH-CENTRAL CAUCASUS, RUSSIA

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The Alebastroviy zavod rockshelter located in the Baksan River valley (Terek River basin) in the Elbrus region, North-Central Caucasus, was discovered and excavated in the 1950s on the area of over 60 m^2 (Zamyatin, Akritas, 1957). The new research in the site began in 2019 and to date 42 m^2 have been excavated in 2021 and 2023-2024. The site's stratigraphic sequence contains cultural layers ranging from the final Epipaleolithic to the Middle Ages. Layers 6/7 and 6B are dated to the Neolithic, based on a large series of radiocarbon dates (Golovanova et al., 2024). For the early Neolithic layer 6/7, most dates range from 9180 ± 220 to 8150 ± 130 cal BP. For layer 6B, dates vary in the range from 7590 ± 80 to 6730 ± 130 cal BP.

In our presentation, we focus on the analysis of materials from layers 6B (1,398 pieces) and 6/7 (3,585 pieces) from the 2024 excavation, comprising a total of 4,981 artefacts, including 639 obsidian artefacts. This collection originates from the excavation area of 12 m^2.

We present the first results of the study of Neolithic obsidian artefacts from Alebastroviy zavod rockshelter using the pXRF method. The results of our analysis are consistent with the data previously obtained by M.S. Shackley that most of the obsidian artifacts are made from obsidian originating from the Zayukovo (Baksan) obsidian source, located in a close proximity to the site.

Also, our research attributes the obsidian used for the bifacial transversal arrowheads in the studied collection from layer 6B to the Chikiani obsidian source in southern Georgia, located approximately 250 km from the site. Importantly, similar arrowheads made from obsidian are found in the South Caucasus. Such arrowheads are known from the Aknashen and Kmlo-2 sites in Armenia and from the Neolithic layer of the Bavra Ablari rockshelter in Georgia. The Aknashen site is associated with the Aratashen-Shulaveri-Shomutepe culture of the late Neolithic (Badalyan et al., 2021). The Kmlo-2 site may represent a different cultural facies, contemporaneous with or

preceding this culture (Arimura et al., 2009).

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OBSIDIAN-TEMPERED KURA-ARAXES CERAMICS FROM KOTAYK PROVINCE, ARMENIA: PRELIMINARY EVIDENCE FOR CERAMIC RECIPES AND RAW MATERIAL PROCUREMENT STRATEGIES

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The Kura-Araxes ceramic tradition of the South Caucasus is commonly discussed in relation to vessel morphology, surface treatment, firing conditions and regional stylistic variability. Less attention has been paid to the possible use of obsidian as a component of ceramic fabrics. This poster presents preliminary observations on Kura-Araxes pottery from Kotayk Province, Armenia, where vitreous inclusions visible in selected ceramic fragments raise questions about raw material procurement, ceramic recipes and the relationship between pottery production and obsidian exploitation.

Kotayk represents a particularly suitable case study due to its proximity to major Armenian obsidian sources, especially the Gutansar volcanic complex and Hatis. The study aims to determine whether the vitreous inclusions observed in ceramic fabrics may be attributed to obsidian, whether they were intentionally added as temper or naturally incorporated through local volcanic sediments, and how these choices may relate to the broader obsidian-rich landscape of central Armenia.

The study is based primarily on macroscopic and low-magnification observation of selected ceramic fabrics, using stereomicroscopy to identify and describe vitreous inclusions potentially attributable to obsidian. Particular attention is given to their frequency, size, shape, angularity, sorting and distribution within the ceramic matrix, in order to evaluate whether they may represent intentionally added temper or naturally occurring components of local raw materials. These observations provide a preliminary basis for discussing ceramic recipes and raw material selection in relation to the obsidian-rich volcanic landscape of Kotayk Province. Future archaeometric analyses may further clarify the nature and provenance of the inclusions.

By integrating ceramic technology and obsidian studies, this research explores whether obsidian-tempered pottery reflects opportunistic use of locally available volcanic materials, deliberate selection of knapping debris, or a more structured technological practice. The results contribute to broader discussions on Kura-Araxes craft production, resource management and the interaction between ceramic and lithic chaînes opératoires in the Early Bronze Age South Caucasus.

FROM OBSIDIAN SOURCE TO MUSEUM: SCIENTIFIC EXHIBITION AND GEOTOURISM DEVELOPMENT AT ARMENIAN OBSIDIAN DEPOSITS

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Armenia, located within the Armenian Highland, is one of the important regions of the Near East characterized by extensive Late Pliocene–Quaternary volcanism and significant obsidian-bearing volcanic formations. Approximately two-thirds of the territory of Armenia is covered by volcanic rocks, among which obsidian occupies a distinctive place due to its geological, archaeological, and cultural significance. Armenian obsidian deposits, associated with rhyolitic and rhyolite–dacitic volcanic centers, are concentrated in several volcanic regions and have been widely utilized since prehistoric times for tool production and long-distance exchange.

The Geological Museum of the Institute of Geological Sciences (IGS) of the Republic of Armenia, named after H. Karapetyan and established in 1937, preserves important geological collections related to Armenian volcanism, including unique obsidian specimens collected from different volcanic provinces of Armenia. The museum exhibition presents volcanic rocks, obsidians of various colors and textures, volcanic bombs, pumice, perlites, and other volcanogenic formations, illustrating the diversity of Armenia's volcanic heritage.

Particular attention is devoted to scientific interpretation and public communication of obsidian as both a geological material and an archaeological resource. Museum collections include obsidian samples from major volcanic centers and deposits, accompanied by information concerning their geological origin, mineralogical characteristics, prehistoric use, and significance in ancient technologies and exchange networks. In this context, the museum acts as an interdisciplinary platform linking volcanology, geoarchaeology, education, and cultural heritage.

In recent years, the Geological Museum has expanded its educational activities beyond the museum environment through field-based scientific and educational programs. One of the most significant initiatives is the scientific expedition entitled *"The Road of Obsidian,"* designed to introduce students, young researchers, guides, and visitors to Armenian obsidian-bearing volcanoes and deposits. These field visits provide opportunities to observe volcanic landforms, obsidian outcrops, prehistoric lithic evidence, and the broader geological landscape while emphasizing the role of obsidian in Armenian historical traditions, mythology, and folk culture.

The present study highlights the importance of integrating museum exhibitions with field experiences in order to promote geotourism in Armenian obsidian localities. Scientific exhibitions, educational interpretation, and direct engagement with geological monuments contribute to raising public awareness of volcanic heritage and fostering sustainable tourism. Thus, the Geological Museum serves not only as a repository of scientific collections but also as an educational and cultural center supporting the preservation, interpretation, and promotion of Armenia's obsidian heritage.

USING OBSIDIAN SOURCING TO RECONSTRUCT THE SOCIO-RELIGIOUS CATCHMENT AREA OF THE LATER BRONZE AGE PEAK SANCTUARY AT STELIDA, NAXOS (GREECE)

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Obsidian sourcing has long been used to reconstruct cultural interaction, not least in the Aegean, since the work of Renfrew and colleagues in the 1960's. In this study, we employed pXRF to elementally characterize a small quantity of obsidian pebbles from Stelida, a later Bronze Age (ca. 1650-1450 BCE) peak sanctuary on the island of Naxos in the Cyclades as a means of reconstructing its socio-religious sphere of influence.

This type of elevated, extramural religious complex is primarily associated with the Minoan culture of Bronze Age Crete, with Stelida one of only a handful of known overseas examples, discovered in 2019. Over a century of scholarship has yet to detail these sanctuaries' catchment areas, though it is suggested that later examples – like Stelida – were closely related to the main political centres of the region. We are testing this hypothesis by characterizing, and sourcing some of the 10,000 water worn pebbles that were brought to the site for dedication via lithological, petrographic, and isotopic analyses, a process aided by the island's geological heterogeneity. While the origin of this material is mainly local (Naxian), the assemblage contains a handful of obsidian pebbles, a volcanic resource that is foreign to the island, with the closest sources located elsewhere in the Cyclades (Antiparos, Melos), and further to the north-east in the Dodecanese (Giali).

This paper details the pXRF analysis of these obsidian pebbles, discussing the significance of the artefacts' overseas origins, and the broader significance of these finds in the context of later Bronze political and religious interaction, and other instances where obsidian played a ritual role in the southern Aegean second millennium BCE.

OBSIDIAN SOURCING AND TECHNO-TYPOLOGICAL ANALYSIS AT BASÌ, CORSICA

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The archaeological site of Basì, an open-air settlement in south-western Corsica, is a key reference site for recent Corsican prehistory owing to its well-preserved stratigraphy. Excavations first identified the Basian culture, dated to the early 4th millennium BCE, while recent work has revealed occupations ranging from the Mesolithic to the Bronze Age, including several thousand obsidian artefacts. Obsidian appears in Corsican lithic assemblages from the beginning of the

Neolithic alongside the first imported lithic materials and became the predominant raw material during the Late Neolithic. Most derives from the Monte Arci volcanic sources in Sardinia.

This study combines provenance analysis and techno-typological investigation of 859 obsidian artefacts from two successive occupation phases at Basì. Geochemical analyses (ED-XRF, LA-ICP-MS and PIXE) demonstrate that all artefacts originate from Sardinia, with a marked predominance of the SA and SC sources, a few SB1 artefacts, and no SB2 material, consistent with other Corsican Recent and Late Neolithic assemblages. The corpus comprises equal proportions of bladelets and knapping waste, indicating at least partial on-site production. The techno-typological study seeks to reconstruct the reduction sequence of the assemblages and explore exchange networks and the circulation of technical knowledge between Sardinia and Corsica, as well as possible differences between the two occupation phases.

OBSIDIAN BLADE PRODUCTION IN THE MIDDLE KURA VALLEY, AZERBAIJAN, DURING THE NEOLITHIC PERIOD

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Obsidian pressure blade production constitutes an important technological element in the Neolithic of the South Caucasus, dated to ca. 6000–5300 BC. Pressure bladelets have been reported from Mesolithic contexts in the region, whereas obsidian blades are documented in Neolithic assemblages, including specimens wider than 2.8 cm that may have been produced by the lever-pressure technique. These blades have often been discussed in relation to the wider transmission of farming, herding, and associated technological practices during the Neolithic. Understanding the technological characteristics and practice of pressure blade production is therefore important for examining the formation of Neolithic technological traditions in the South Caucasus.

This paper examines obsidian blade production at Hacı Elamxanlı Tepe and Göytepe in the Middle Kura Valley, Azerbaijan. Hacı Elamxanlı Tepe represents one of the earliest Neolithic sites in the South Caucasus, dating to the early sixth millennium BC, whereas Göytepe provides evidence from the Late Neolithic phase. Taken together, these sites offer an opportunity to investigate the emergence and subsequent development of obsidian pressure blade production within the same regional setting.

The present study applies fracture wing (FW) analysis to obsidian debitage and cores as a means of identifying the detachment techniques. FWs are V-shaped microscopic traces formed on fracture surfaces. Importantly, FW analysis has been applied and developed through experimental research and analytical case studies primarily on obsidian, where the accumulation of such work has established it as a reliable method. Crack velocities calculated from FW measurements can be used to identify the detachment techniques for individual artifacts and removal scars. These results support the technological analysis of individual artifacts and, when considered at the assemblage level, also allow quantitative assessment of the detachment techniques represented within the

assemblage

In addition to the FW analysis, the obsidian lithic assemblages are examined in detail from a technological perspective, and the results of both lines of analyses are integrated. This combined approach enables an assessment of how the production of obsidian pressure blades was practiced in the Neolithic of the Middle Kura Valley. On this basis, this study contributes to discussions of how introduced Neolithic technologies were adopted, maintained, and transmitted in the South Caucasus.

BRONZE AGE OBSIDIAN TOOL AND HUMAN ACTIVITY BENEATH YOUNG LAVA FLOWS NEAR LAKE SEVAN (ARMENIA)

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Recent shoreline exposure caused by rising water levels in Lake Sevan has revealed new stratigraphic sections near the villages of Berdkunk and Lchap (west coast of the Small Sevan Lake). The studied sequence consists of a 0.8-1.0 m thick sandy lacustrine layer containing abundant mollusk remains, overlain by a carbonate crust. The lacustrine layer intercalated between volcanic lava. The upper lava layer is composed of angular basaltic-andesite boulders. Previous studies suggested that volcanic activity in this area of the age between 7860±100 and 2090±70 yr BP covered the sediments of Lake Sevan (Karakhanyan et al., 2004). Later investigations (Avagyan et al., 2020) provide new chronological and archaeological data from the Berdkunk section.

Approximately 15 cm below the upper boundary of the lake sediments, bovine remains, including a complete skull, were discovered together with an obsidian artifact. Radiocarbon dating of the bones yielded an age of 3460±40 BP (1890-1680 BC, 2σ), indicating maximum age of the upper lava flow. The obsidian tool was used for cutting livestock meat. Most likely, the more valuable tools were taken with them by the Middle Bronze Age man or had not yet been discovered. It is important to note that there is no source of obsidian nearby (on a scale of kilometres). Chemical and trace element analysis (CNRS-IRAMAT laboratory, Orléans, directed by B. Gratuze, using LA-ICP-MS) of the obsidian tool shows that it originates from the Geghasar volcano, located ~30 km from the outcrop in the Gegham volcanic highland (Li ppm for obsidian tool is 61.2 and for Geghasar obsidian sample is 64.3, for Sc is 5.59 and 5.51, for Sm is 2.2 and 2.6, for Tb is 0.4 and 0.5, for Tm is 0.2 and 0.3 and etc.). The presence of the obsidian artifact suggests human activity and hunting along the paleoshoreline of Lake Sevan during the Middle Bronze Age. These findings contribute to the understanding of prehistoric human mobility, obsidian exchange networks, and the relationship between volcanic activity and human occupation in the Lake Sevan basin.

References

Avagyan, A., Sahakyan, L., Meliksetian, K., Karakhanyan, A., Lavrushin, V., Atalyan, T., Hovakimyan, H., Avagyan, S., Tozalakyan, P., Shalaeva, E., Chatainger, C., Sokolov, S., Sahakov, A., Alaverdyan, G., 2020. New evidences of Holocene tectonic and volcanic activity of the western part of Lake Sevan (Armenia). Geol. q. 64 (2), 288-

303.

Karakhanyan, A., Jrbashyan, R., Trifonov, V., Philip, E., Arakelyan, S., Avagyan, A., Baghdasaryan, A., Davtyan, A., 2004. Active volcanoes and volcanic hazard in the Armenian highland and adjacent areas. NAS RA, Earth Sci. 57 (1), 3-24 (in Russian).

OBSIDIAN PROVENANCE AND PREHISTORIC MOBILITY IN WESTERN TRANSCAUCASIA: NEW EVIDENCE FROM GEOCHEMICAL ANALYSIS

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Recent archaeological research in Western Transcaucasia has revealed substantial Early Holocene assemblages containing obsidian artifacts, providing a valuable framework for reconstructing prehistoric mobility and interaction networks. This study aims to determine the provenance of obsidian and to assess patterns of raw material procurement and human movement in the region.

The research was conducted within the framework of a project supported by the Shota Rustaveli National Science Foundation of Georgia. Obsidian collections from approximately 20 archaeological sites located in Ajara, Guria, Samegrelo and Imereti were sampled and analyzed at the Archaeometry Laboratory of the University of Missouri Research Reactor Center. The analytical approach combines X-ray fluorescence (XRF), inductively coupled plasma-mass spectrometry (ICP-MS) and Neutron Activation Analysis (NAA), enabling high-precision characterization of the geochemical composition of the samples and reliable source attribution.

The results indicate that the studied assemblages include obsidian originating from multiple geological sources across the wider Caucasus and adjacent regions. Identified sources include the Javakheti volcanic region (notably Chikiani), as well as sources in Armenia, Eastern Anatolia (Turkiye), and the North Caucasus. The presence of both local and distant raw materials demonstrates complex procurement strategies and reflects long-distance mobility and/or exchange networks during the 10th–6th millennia BC.

These findings significantly contribute to our understanding of prehistoric mobility, interregional contacts, and raw material circulation in Western Transcaucasia, highlighting the region's role within broader Early Holocene interaction systems.

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THE CIRCULATION PROCESS OF LITHIC RAW MATERIALS AS REVEALED THROUGH A COMPARISON OF SOURCE AND CONSUMPTION SITES

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Lithics are involved in a sequence extending from raw material procurement through processing, use, and eventual discard. Within this chain, Archaeological sites around the lithic raw

material source occupy a particularly important position in the stages of raw material acquisition and tool production. Raw materials were transported from these source sites to consumption sites either as unmodified cobbles or after being subjected to a certain degree of reduction. As a result, source sites often preserve abundant evidence of lithic production, including workshops for manufacturing points.

This study compares a point production site located at the foot of a raw material source area with a consumption site in order to examine the condition in which lithics were transported from the source and the processes they underwent before reaching the consumption site, focusing on Gero obsidian and its source site, Mt. Yugamine.

This result suggest the existence of intermediate locations where lithic materials were further reduced between the source and consumption sites. This finding provides evidence for reconstructing lithic raw material exchange systems during the Incipient Jomon period and contributes to a better understanding of their operational structure.

FROM SOURCE TO DEPOSITION: OBSIDIAN TRAJECTORIES IN THE PERUVIAN ANDES

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Obsidian offers a sensitive tracer of changing regimes of mobility, exchange, and value in the Central Andes. This paper compares three obsidian “life histories” in the Peruvian Andes by integrating provenance data (pXRF), reduction-stage analysis (chaîne opératoire), morphometrics, and depositional context. Rather than treating obsidian as a material with fixed meanings, we examine how its significance emerged through situated practices of acquisition, manufacture, circulation, use, and deposition.

At the Late Pleistocene-Early Holocene coastal site of Pampa Lechuza, pXRF results indicate that more than 99% of the obsidian assemblage derives from the Quispisisa source, located approximately 250 km away by least-cost routes. Technological and debitage evidence shows a strong predominance of late-stage products, minimal cortex, and no cores, suggesting that obsidian reached the south-central coast mainly as finished or nearly finished tools that were maintained and reworked on site. During the Final Formative-Epiformative, preliminary pXRF results from Pallaucha indicate multi-source provisioning (90% Quispisisa, 8% Potreropampa, and 0.63% Jampatilla). Variability in provenance and reduction stages points to active acquisition and local production, implying that interaction involved not only the circulation of raw materials but also the transmission of technical knowledge through recurrent highland-coastal connections, including the Pallaucha-Karwa corridor. Finally, in the Middle Horizon, a tightly clustered obsidian assemblage from Capillapata (Huari, Ayacucho)—entirely sourced to Quispisisa and morpho-technologically standardized—was placed as a coherent funerary deposit. This pattern is consistent with a curated offering in which formal design and limited use were incorporated into ceremonial performance.

Together, these cases show that source-to-deposition trajectories materialized distinct social and technical histories: long-distance mobility in early coastal contexts, expanded interregional connectivity during the Formative/Epiformative transition, and the ritualized deployment of

standardized obsidian objects in Middle Horizon mortuary practice.

SOURCE, SHAPE, AND SOCIAL PRACTICE: WARI OBSIDIAN BIFACES FROM SAN JOSÉ DE MORO, PERU

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Obsidian offers a privileged record for tracing the movement of volcanic glass from source to socially charged artifact. This paper presents a multi-scalar study of a cache of 39 Wari obsidian artifacts from San José de Moro, a Late Moche ceremonial and funerary center in the Jequetepeque Valley, northern Peru. The assemblage includes 35 bifaces and 4 flake tools associated with elite ritual practices. Because obsidian is not locally available on the north coast, these objects provide a key case for examining Middle Horizon exchange networks and Wari–Moche interaction.

We combine pXRF, 2D geometric morphometrics, and technological analysis based on *chaîne opératoire* and diacritical reading. pXRF attributes the assemblage to Alca-1 (n=29, 74.36%) and Quispisisa (n=10, 25.64%), two major Central Andean sources. Morphometric results reveal recurrent outline regularities without strict standardization: Quispisisa artifacts occupy a more constrained morphospace, whereas Alca-1 artifacts show greater variability. Technological analysis identifies differentiated shaping modes, cross-sections, structural units, and convergent edge types, indicating multiple reduction trajectories within a shared Wari technological grammar.

The assemblage was neither a simple typological set nor a utilitarian toolkit. It materializes the articulation of source selection, blank morphology, bifacial thinning, edge configuration, and final deposition through skilled practice. Finished or near-finished obsidian objects reached the northern coast through structured interregional networks and entered local elite contexts, where their value was social, political, and ritual as much as functional. This study integrates geological sourcing, morphometrics, and lithic technology to reassess obsidian circulation, craft specialization, and interaction in the pre-Hispanic Andes.

THE MACIZO AND ANTARQA OBSIDIAN SOURCES, AREQUIPA, PERU: LOCATING THE SOURCE OF CHUMBIVILCAS-TYPE OBSIDIAN

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Keywords: Obsidian sourcing; Chumbivilcas type; Antarqa; pXRF; Andes; least-cost paths.

The Chumbivilcas obsidian type has long been recognized in archaeological assemblages from southern Peru, yet its geological source remained unidentified. This paper presents the discovery and initial characterization of the Antarqa obsidian source, located at Cerro Antarqa near the borders of Arequipa, Cusco, and Apurímac. The source was located following the pXRF analysis of obsidian artifacts recovered at Casacancha, Chumbivilcas, whose chemical composition matched the previously defined Chumbivilcas type. Subsequent fieldwork around Cerro Antarqa recovered obsidian nodules from secondary and primary contexts, allowing the source area to be identified.

Geochemical analyses conducted with portable X-ray fluorescence at the Archaeology Laboratory of the Pontificia Universidad Católica del Perú, and complementary laboratory XRF analyses at the Archaeometry Laboratory of the University of Missouri, indicate the presence of two chemically distinct obsidian types at or near Cerro Antarqa. Antarqa 1 matches the archaeological Chumbivilcas type, while Antarqa 2 represents a previously unreported chemical group. Antarqa 2 is more porphyritic and appears to be of lower knappability, whereas Antarqa 1 is represented in archaeological assemblages and can now be securely linked to the long-known Chumbivilcas obsidian distribution.

Technological observations of Antarqa 1 artifacts from Casacancha suggest the local reduction and use of this material, including flakes, a scraper, and projectile points. Least-cost path modeling further contextualizes the source within regional mobility networks, showing that sites with confirmed or probable Chumbivilcas-type obsidian fall into near and far groups, with modeled travel times ranging from approximately 11 to 38.5 hours. A recurrent high-altitude movement corridor connects the Antarqa source area with routes toward the Cusco Basin.

By locating the source of Chumbivilcas-type obsidian, this study resolves a long-standing problem in Andean obsidian research and adds a new point of reference for reconstructing prehistoric procurement, mobility, and exchange in the south-central Andes.

REASSESSING CARPATHIAN OBSIDIAN: RESOURCE CONTROL, DISTRIBUTION, AND EXCHANGE NETWORKS IN NEOLITHIC CENTRAL EUROPE

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Keywords: Neolithic; LBK (LPC, Linear Pottery Culture); Carpathian obsidian; knowledge transfer; mobility; social complexity; lithic procurement.

Carpathian obsidian has long been regarded as a highly valued exotic raw material distributed across Central Europe. It is geographically restricted to point-like geological sources situated in the Tokaj-Eperjes Mountains along the inner fringe of the Carpathian Mountains, and its utilisation began in the Upper Palaeolithic, reached a peak in the second half of the Neolithic, and decreased in the Bronze Age. The recognised spatial and temporal patterns in the circulation of Carpathian obsidian indicate that the dynamism and direction of its appearance matched the spread

of Neolithisation in eastern Central Europe. That Carpathian obsidian can be seen as a specific element of the Neolithic package associated with the LBK communities.

Throughout the twentieth century, several scholars, such as Vere Gordon Childe, John Nandris, and János Makkay, argued that control over these sources enabled the Bükk communities, □as one local group of the LBK□, to regulate access to obsidian procurement and distribution, thereby exercising a significant degree of social and economic power.

This presentation critically reassesses long-standing interpretations of Carpathian obsidian as a strategically controlled and socially and economically significant raw material in Neolithic Central Europe. For this purpose, I examine quantifiable data and spatial patterns in the distribution of Carpathian obsidian across archaeological contexts to better understand access to raw material sources, exchange networks, mobility, and depositional practices.

WHY DOES OBSIDIAN FORM? INSIGHTS FROM THREE-DIMENSIONAL MICRO X-RAY COMPUTED TOMOGRAPHY TEXTURAL ANALYSIS

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While obsidian is an archeologically significant natural material that has been utilized by humans and ancient hominins for over a million years, the volcanic processes surrounding its formation are still vigorously debated. All models for obsidian formation include the premise that H_2O solubility in magma decreases with decreasing pressure but they differ as to the mechanism of gas release and physical separation from the liquid. A conventional view is that ascent of magma in volcanic conduits leads to this cascade: H_2O exsolves from solution; vapor is partitioned into bubbles; bubbles impinge upon one another, producing gas-permeability; gas escapes from the liquid via pathways of connected bubbles; the foam drains and the liquid collapses; this liquid erupts as lava, which solidifies into a dense glass (obsidian). However, selected textural observations and dynamical modeling suggest that magma can undergo fragmentation due to high shear. The particles subsequently outgas, relax, and then rejoin—all within the conduit. The available field observations indicate the process is complex; obsidian manifests a variety of textures from dense-block to pumiceous-block flows, intermingled bands of pumiceous and dense-but-fluid obsidian, as well as associations with perlite deposits. The variety of preserved textures suggests that multiple processes contribute to obsidian formation.

This study seeks to develop a catalogue of obsidian textures via a series of nested high-resolution 3D Micro X-ray computed tomography (□CT) scans at 6.5 and 1.5 µm/voxel resolution to help investigate the formation mechanism(s) of obsidian through three-dimensional textural analysis. We have collated a sample catalogue of multiple rhyolitic systems and emplacement styles, including lava flows, domes, and welded ash deposits. With □CT we have quantified bubble number density (BND), vesicle size distributions, connectivity, and deformation fabrics. BND values range from 10^9 to 10^{12} m^{-3} in lava flows samples, to 10^{11} to 10^{13} cm^{-3} in dome samples, and 10^{13} – 10^{14} m^{-3} in welded ash. Textures vary throughout these emplacement style categories, from

highly angular and irregular bubble textures in the welded ash, to subrounded to rounded bubbles in the domes and flows. These preliminary observations provide a means of evaluating competing formation mechanisms and identifying textural signatures associated with degassing, foam collapse, and viscous sintering. Obsidian micro-textures preserve a record of processes that govern the transition between explosive and effusive silicic volcanism and are a key source of information to begin deconvolving the formation mechanism(s) behind this archeologically and geologically significant material.

DATABASE CONSTRUCTION FOR OBSIDIAN STUDIES

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This presentation discusses archaeological database creation, highlighting the role of various data management structures for obsidian studies. Two case-studies are used as examples to highlight how data can be effectively organized for obsidian provenance research and the interpretation of published sourcing results. The first case-study outlines the structure of a relational database of geological source data for provenance studies in the U.S. Great Basin, underscoring inherent issues that arise when compiling data from complex geological contexts. The second case-study relates to the central Mediterranean and the collation of large volumes of published data with the goal of making interpretations about the long-term prehistory of regional obsidian use. The presentation emphasizes how obsidian researchers can benefit from a more explicit engagement with and consideration of the ways in which we think about information and organize it to achieve our goals.

GEOCHEMICAL CHARACTERISATION OF OBSIDIAN FROM THE TIBESTI MOUNTAINS (CHAD)

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Obsidian has been a prized raw material for manufacture of stone implements. As the product of specific volcanic processes its occurrence is comparatively rare. It has particular archaeological

significance since volcanic glass can be geochemically fingerprinted, enabling correlations to be established between and among distinct source rocks and manufactured tools and associated waste. This enables mapping of exchange networks and sometimes reveals long-range transport of the material (e.g., more than 1000 km). Obsidian provenance studies are performed worldwide but one major volcanic province that has hitherto been largely neglected in this regard is the Tibesti massif of northern Chad. Here we report the first delineation of the typology and geochemistry of obsidian lithics from the area made possible by a brief reconnaissance mission. Obsidian was an abundant constituent of surface scatters of lithics found at several sites, and we sampled one artisanal quarry in rhyolite lavas outcropping in the caldera wall of Trou au Natron. Based on laser-ablation inductively coupled mass-spectrometry of the specimens we identify six main geochemical clusters. The most widespread geochemical class was represented at four sites stretching 125 km across the northern limits of the volcanic massif. The archaeological materials included obsidian pebbles indicative of a secondary, alluvial source. Our findings demonstrate the importance of obsidian in the Late Pleistocene and Holocene regional economy of this part of the central Sahara (during the African Humid Period) and additionally highlight the ancient heritage of the trails that cross the Tibesti today. While no samples geochemically match any obsidian lithics (or sources) that have been reported beyond Chad, future survey has the potential to identify longer-range exchange networks (e.g., to/from Libya and Sudan).

OBSIDIAN PROCUREMENT AND EXPLOITATION OF A KURA-ARAXES COMMUNITY IN THE THIRD-MILLENNIUM SOUTH CAUCASUS: THE CASE OF QARAÇINAR (AZERBAIJAN)

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The modes of exploitation, circulation, and use of obsidian during the Bronze Age in the South Caucasus have received little attention comparing with earlier periods. This research aims to contribute new data to this field by focusing on the third millennium BCE. The first half of the third millennium in the region is characterized by the late developments of the long-lived Kura-Araxes cultural tradition, that was the expression of small-scale, egalitarian, sedentary, village-based communities. While their subsistence strategies, diet, and material culture have been systematically investigated, aspects related to lithic production, as well as the procurement of obsidian, remain poorly understood.

The case study is the site of Qaraçinar (district of Goranboy, Azerbaijan), located on the eastern piedmont of the Lesser Caucasus. Excavations carried out by the Mission "Böyük Kesik" (MEAE) and by the ANR-DFG KUR(A)GAN project, in collaboration with the Institute of

Archaeology and Anthropology of the Azerbaijan National Academy of Sciences, have revealed a continuous occupation sequence spanning the entire third millennium BCE.

The Kura-Araxes phase at Qaraçinar is characterized by a dense sequence of occupation levels. The earliest levels yielded circular mud-brick domestic structures, while in later phases these were replaced by post-hole structures. A series of radiocarbon dates places the Kura-Araxes occupation between 2900 and 2600 cal BCE. Excavations also revealed a subsequent occupation phase dating to the second half of the third millennium BCE. This phase, consisting of multiple levels with post-hole structures and pits, provides rare evidence for a settlement associated with the so-called Early Kurgan communities, which are only sporadically documented in the South Caucasus.

This paper focuses on the obsidian assemblage from the Kura-Araxes occupation at Qaraçinar that is systematically analyzed through an integrated approach combining technological analysis and geochemical sourcing. These data are compared with assemblages from other Kura-Araxes sites across the South Caucasus in order to identify similarities and differences in patterns of obsidian procurement and regional circulation.

Finally, the Kura-Araxes data are compared with preliminary results from the obsidian assemblage of the Early Kurgan occupation at the site. This comparison aims to highlight continuities and changes in obsidian use and procurement throughout the third millennium BCE, and to assess the extent to which differences in the exploitation of obsidian sources may reflect variations in territorial organization and mobility strategies between the Kura-Araxes and Early Kurgan communities at Qaraçinar.

OBSIDIAN USE AT MELKA KUNTURE (ETHIOPIA), FROM THE OLDOWAN TO THE LATE STONE AGE

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Melka Kunture, inscribed in Unesco's World Heritage List, is a cluster of palaeolithic sites on the banks of the Upper Awash River and along its tributaries, at c. 2000 m above sea level on the Ethiopian plateau. Obsidian outcrops at Balchit, at 2200 m of elevation and at a distance of 5 to 7 km from the sites. Obsidian pebbles, deposited along the valleys draining Balchit as well as in the alluvia of the Awash river, were extensively used at Melka Kunture all over the Pleistocene and the Holocene. At Oldowan sites, 2 Ma years ago, obsidian is the widely predominant raw material, before anywhere else in Africa. Over the long Acheulean sequence, starting 1.95 million years ago, obsidian was notably used to shape handaxes, but other volcanic raw materials were predominant.

However, Simbiro III site, which predates 1.2 million years ago, records the earliest known handaxe workshop, with obsidian as the exclusive raw material. Obsidian was predominant at Middle Stone Age sites, as elsewhere in Africa, and in the Late Stone Age which closes the prehistoric record at Beefa Cave, 5.000 years ago. At the Balchit outcrop, where knapping residues accumulated at surface level, obsidian was probably quarried in historic times,.

References

Gallotti R., Mussi M. 2015. The Unknown Oldowan: ~1.7-Million-Year-Old Standardized Obsidian Small Tools from Garba IV, Melka Kunture, Ethiopia. *PLoS ONE 10*(12): e0145101.

Mussi M. et al. 2014. Garba III (Melka Kunture, Ethiopia): a MSA site with archaic *Homo sapiens* remains revisited. *Quaternary International* 343: 28-39

Mussi M. et al. 2022. Une vue d'ensemble sur Melka Kunture, grand complexe de sites pléistocènes dans la vallée supérieure de l'Awash (Ethiopie). *L'Anthropologie* 126, 102999

Mussi M. et al. 2023. A surge in obsidian exploitation more than 1.2 million years ago at Simbiro III (Melka Kunture, Upper Awash, Ethiopia). *Nature Ecology & Evolution* 7: 337–346

Mussi M. et al. 2023. Early *Homo erectus* lived at high altitudes and produced both Oldowan and Acheulean tools. *Science 382*: 713-718

Mutri G. et al. 2026. Everyday Life and Activities of a Later Stone Age Community at Beefa Cave (Melka Kunture, Upper Awash, Ethiopia). *Journal of African Archeology*: 1–21

SYMBOLIC GIFTS OR EVERYDAY TOOLS? OBSIDIAN ARTIFACTS DISCOVERED IN EARLY BRONZE AGE WARRIOR GRAVES AT SELECTED SITES IN SOUTHEASTERN SLOVAKIA

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Obsidian is one of the most intriguing and "exotic" stone raw materials used by prehistoric communities in Central and Eastern Europe. Its only geological deposits in this area are located in a relatively small area in the north-eastern part of the Carpathian Basin, covering the border of southeastern Slovakia, northeastern Hungary and Transcarpathian Ukraine (e.g. Rosania *et al.* 2008). Their exploitation, combined with the processing, use and distribution of local raw material, has been documented since the Paleolithic period, covering vast areas on both sides of the Carpathians.

In the area of southeastern Slovakia itself, the greatest importance and scale of obsidian processing took place primarily in the Late Paleolithic and Neolithic, and to a much lesser extent also in the Eneolithic (e.g. Biro 1998). A much bigger problem is to assess the actual role and purpose of obsidian among the communities inhabiting the Eastern Slovak Lowland in the early Bronze Age. This is mainly due to the almost complete lack of settlement finds and their extremely rare presence in such dated grave complexes. New, important data in this respect are provided by the results of excavations carried out at the Gačina site in Michaľany, and more precisely, by the collection of four bifacial arrowheads discovered in the graves of the Koštian culture (ca. 2000-1700 BC). This collection, despite its small size, is a valuable contribution to studies of the use of Carpathian obsidian in the Early Bronze Age. The results of micro-X-ray fluorescence (μXRF) analyses confirmed the local origin of the raw material used to produce all specimens, allowing its identification with the *Carpathian* 1 variety, whose main outcrops are located in the area between

Čejkov, Brehov, and Zemplén (Přichystal, Škrdla 2014). Furthermore, the results of use-wear analyses indicate the utilitarian nature of the arrowheads among the warriors of the Koštian culture, and they allow us to rule out, for now, a strictly symbolic meaning for this type of artifact, linked solely to funerary rituals. The obtained results clearly indicate the need for further research and analysis in this area, utilizing not only a much larger series of grave finds but, above all, currently missing materials from settlement sites that existed in southeastern Slovakia in the first half of the 2nd millennium BC.

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References

Biró K. T. 1998: *Lithic implements and the circulation of raw materials in the Great Hungarian Plain during the Late Neolithic Period*. Budapest.

Přichystal A., Škrdla P. 2014: Kde ležel hlavní zdroj obsidiánu v pravěku střední Evropy? *Slovenská Archeológia* 62/2, 215–226.

Rosania C. N., Boulanger M. T., Biró K. T., Ryzhov S., Trnka G. and Glascock M. D. 2008. Revisiting Carpathian obsidian. *Antiquity* 82 (318).

OBSIDIAN IN PATAGONIA: A MACRO-REGIONAL DATABASE OF NATURAL DEPOSITS AND ARCHAEOLOGICAL PATTERNS THROUGH THE HOLOCENE

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In Patagonia, obsidian has been widely used since the beginning of human occupation, frequently appearing in archaeological sites far from its natural sources. While geochemical analyses indicate that multiple sources were used for procurement, some outcrops remain overlooked or underrepresented in archaeological studies. This work integrates all current geological and archaeological information to construct a comprehensive map of both known and geologically prospected sources.

By reviewing archaeological and geological records, we documented 57 obsidian deposits and 30 geochemical types across Argentinian and Chilean Patagonia. Our geographical analysis identifies a concentration of deposits in northwestern Patagonia, suggesting the existence of "source-scapes" that influenced land use throughout history. The primary goal of this research is to create a graphical representation of obsidian use patterns divided into three chronological blocks: the Early, Middle, and Late Holocene.

Finally, we propose and discuss different hypotheses to explain these temporal patterns in relation to technological decision-making, the extent of social relations, territorial organization, mobility, and exchange systems. This chronological and geoarchaeological approach allows for a more complex study of the supply, transport, and exchange of obsidian on a macro-regional scale, revealing the social dynamics of this "long-distance traveler" rock within Patagonian hunter-gatherer contexts.

INCREASING OBSIDIAN DIVERSITY DURING THE CHALCOLITHIC PERIOD AT YEGHEGIS 1 ROCK SHELTER (ARMENIA)

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The Chalcolithic Period of the Southern Caucasus corresponds to a phase of increased copper production alongside the continued use of lithic technology, chronologically situated between the agricultural settlements of the Neolithic Period and the far-reaching Kura-Araxes material culture "package" of the Early Bronze Age. Despite the relevance of this time period for understanding the development of social complexity across the Southern Caucasus, relatively little is known about these transformations during the Chalcolithic in this region.

Recent excavations have yielded a wealth of new data, much of it at odds with the older studies. For decades, Chalcolithic sites found in the Southern Caucasus were assigned to one of two archaeological material cultures-either the Sioni or Chaff-Faced cultural horizons-on the basis of ceramic types. However, further research is necessary to substantiate seeming shifts in land use and to consider the potential interplays among them, such as the role that transhumance played (or did not) in the observed trends.

To address these questions our team excavated the Chalcolithic rock shelter site of Yeghegis-1 in the Vayots Dzor Province of southern Armenia. Yeghegis-1 reflects an occupation of five centuries, as attested by radiocarbon dates from ~ 4200 to 4000 cal BCE in the lowest layer to ~ 3600–3500 cal BCE at the top. It is a partially collapsed cave in which pastoralists, we hypothesize, wintered with their herds. The stone tool assemblage is predominantly obsidian (92.1%), despite the shelter being > 60 km on foot from the nearest sources. We use obsidian sourcing to investigate two purported trends in the Southern Caucasus during the Chalcolithic Period: (1) occupation of more varied high-altitude environments and (2) more expansive social networks. Our data show both trends were dynamic phenomena.

EXPLORING DIACHRONIC DEVELOPMENTS IN OBSIDIAN PROCUREMENT IN SOUTHERN HONDURAS (AD 0-1520)

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While large-scale obsidian exchange networks throughout Mesoamerica and Southern Central America have been extensively researched (e.g. Braswell, 2003; Gotliko and Feinman, 2014), we

are still missing an understanding of micro-regional exchange dynamics and how they relate to larger scale trade routes. Geochemical characterization by pXRF (portable X-ray fluorescence spectrometry) of obsidian artefacts in four assemblages from the south coast of Honduras and nearby islands has shown the potential of a more systematic approach to sourcing in the region for the identification of regional patterns in obsidian procurement (Kolbenstetter et al., 2026). The results from this study allowed us to posit two hypotheses: (1) that islands and coastal communities of southern Honduras did not partake in the same networks of procurement and (2) that there are differences in source access or preference between the Terminal Classic/Early Postclassic (AD 700 – 1200) and the Late Postclassic (AD 1300-1520). More data from coastal and inland sites from Southern Honduras are still missing to fully support these hypotheses, and to assess the chronological differences in obsidian procurement networks in southern Honduras. Robust chronological contextualization of this data, while paramount, is unfortunately still lacking. In this paper, we propose to reevaluate our original hypothesis in light of recent chronological and provenance data obtained during survey and excavations of eight sites conducted in 2025. By providing a new chronological anchor for the precolonial settlements, we will present new insights into the diachronic and diatopic variability of obsidian procurement and use in southern Honduras.

A New Method for Sourcing Obsidian in the Americas Using Image-Based Deep Learning

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Geochemical techniques for identifying the provenance of obsidian artifacts have proven highly effective in the Americas. Preferred methods for source attribution generally rely on X-ray fluorescence (XRF) or instrumental neutron activation analysis (INAA), followed by comparison with known reference collections. While these techniques are clearly among the most reliable approaches in the field, and their accessibility has increased significantly with the relatively recent advent of portable XRF (pXRF), they often remain financially and logistically out of reach for many projects, especially in Latin America. This research presents a new method for sourcing obsidian using convolutional neural networks trained on standard documentation images of obsidian artifacts with known sources. As of yet, the technique has achieved high classification accuracy across several major Mesoamerican and Isthmo-Colombian obsidian sources. The approach offers a scalable and low-cost alternative for preliminary source attribution and the screening of entire assemblages. Although it is not intended as a replacement for established geochemical approaches such as INAA or XRF, with further development, the technique has the potential to democratize obsidian sourcing in the Americas—and perhaps other regions as well-by expanding its application to projects that currently lack access to geochemical methods.

THE PROVENANCE OF THE CARPATHIAN OBSIDIANS: HOW TO GET OUT OF THE "CUL-DE-SAC"?

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The Carpathian obsidians (CO) represent the only natural volcanic glass region in Central Europe on the *C1* – Zemplín area (SE Slovakia), *C2* – Tokaj region (NE Hungary), and *C3* – Zakarpattia province (W Ukraine). Their systematic provenance study based on chemical characterization of the CO has nearly a fifty-year tradition. Since the pilot application of the NAA technique, various methods have been applied to the chemical characterization of CO from archaeological and geological perspectives, such as the XRF, EPMA-EDS, LA-ICP-MS, PGAA, PIGE, PIXE and pXRF during subsequent decades. Currently, there are many works available discussing the provenance of the CO, mainly based on chemical composition, but parity is not always achieved in the designation of individual established groups and subgroups of CO. However, the situation is complicated by the fact that the data were obtained using multiple methods across various laboratories (instrument and inter-laboratory bias). There are several discrimination diagrams using more or less 'critical' elements; yet with the increasingly used pXRF method, the range of elements has reduced to a limiting minimum (Fe, Rb, Sr, Zr, Y, ±Mn, ±Nb), which are used in simple binary and ternary diagrams. The database of our samples from all principal localities (*C1*, *C2* & *C3*), which were comprehensively analyzed by LA-ICP-MS, WDXRF and pXRF, was supplemented with available data from identical locations of the CO and uniformly evaluated. Our comprehensive analysis of the chemical composition of the studied CO confirmed the correctness of the basic discrimination (*C1*, *C2*, *C3*) and demonstrated the fractionation of obsidian (rhyolite) magma in space and time within these three principal CO areas. Notably, sufficient parity was demonstrated among our localities' data within the framework of the methods we used. However, when we compared our data from identical locations with works where results were obtained using other methods, it sometimes seemed as if we were comparing the incomparable. Therefore, it is necessary to establish not only reference values for individual groups and subgroups, but also representative reference values for individual methods within each studied location.

OBSIDIAN CIRCULATION BETWEEN THE SHINSHU AND KANTO REGIONS DURING THE LATE EARLY JOMON PERIOD, JAPAN: EVIDENCE FROM P-XRF ANALYSIS OF 9,700 ARTIFACTS

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In the central and Kanto regions of the Japanese archipelago, there are two major obsidian sources: the Shinshu source group (hereinafter “Shinshu”), comprising areas such as Suwa and Wada in Nagano Prefecture, and Kozushima, located in the northern Izu Islands. Although their relative importance fluctuated through time, obsidian from both sources circulated within roughly 200–300 km from the Paleolithic to the Early Jomon periods, with overlapping distributions in the Kanto region.

The late Early Jomon Period (Moriso A, Moroiso B, Moroiso C and Jusanbodai phases) witnessed increasing sedentism marked by the widespread establishment of pit-dwelling settlements. At the same time, procurement of Shinshu obsidian intensified, leaving numerous traces of underground mining, a phenomenon often described as the “Obsidian Rush.”

Despite its significance, obsidian circulation during this period remains poorly understood because provenance studies in central and Kanto Japan are still limited.

To clarify the distribution of Shinshu obsidian toward the southern Kanto region, we analyzed 9,700 obsidian artifacts from 20 sites around the Kofu Basin in Yamanashi Prefecture, spanning the Yatsugatake foothills, the Kofu Basin, and Hachioji City. Provenance was determined using portable X-ray fluorescence (p-XRF; Bruker Tracer 5g), and data on artifact dimensions, weight, and pebble cortex were recorded.

The results indicate that Shinshu obsidian was distributed in substantial quantities across the Kofu Basin and into the foothills of the Kanto Mountains, up to approximately 70 km from its sources, but its frequency declined sharply farther east. A reanalysis of previously published provenance datasets further suggests that Kozushima obsidian overwhelmingly dominated the Kanto areas east of the Kanto Mountains.

Whereas Shinshu and Kozushima obsidian had overlapping distributions from the Paleolithic through the Beginning Jomon periods, their distribution zones became clearly differentiated during the late Early Jomon: Shinshu obsidian was distributed mainly in central Japan, while Kozushima obsidian predominated in the Kanto region. This pattern likely reflects increasing sedentism and accompanying changes in regional obsidian circulation systems.

References

Nobuyuki I., Takuto K. and Yasuo H. 2025 Chubu-kanto niokeru Jomon-jidai zenki kohan no kokuyoseki rutsu―kahangata keikou ekkususen bunseki sochi no jissenrjiei to Tomoni― Center for Obsidian and Lithic Studies, Meiji University.

OBSIDIAN PROCUREMENT STRATEGIES AND LITHIC MINIATURIZATION DURING THE LATE HOLOCENE NEOLITHIC OF CENTRAL AFAR, ETHIOPIA

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Keywords: Late Holocene; Neolithic; Ethiopia; Obsidian exploitation; Lithic technology; Lithic miniaturization.

The introduction of herding in the Horn of Africa is currently dated to around 4.8 ka. This process occurred during a climatic and environmental transition, marked by progressive aridification beginning at the Middle–Late Holocene boundary. These shifts in climate and landscape were accompanied by the adoption of new subsistence strategies and significant technological and social innovations, including pottery, grinding equipment, funerary and domestic structures, and a shift toward miniaturization in stone tool production. Here, we report on two recently excavated Neolithic sites in the Central Afar region of Ethiopia, namely Kurub-07 NE (4300-4000 cal BP) and Kurub-07 (3900-3300 cal BP). These sites provide new data on approximately 1000 years of semi-continuous occupation of the region by herding communities that relied greatly on the exploitation of obsidian for lithic production. In this paper, we present an integrated approach combining analyses of raw material procurement strategies, lithic technology, and provenance studies of archaeological obsidian. The results reveal clear techno-economic patterns in raw material selection, which are closely related to production objectives and lithic miniaturization. Despite access to a wide range of obsidian nodules, these Neolithic communities preferentially targeted small, rounded, and naturally rolled pebbles from secondary deposits for the production of miniaturized blanks and tools. This selection strategy reflects an intentional alignment of resource choice with functional and economic goals and may have been favored by increased residential or seasonal mobility adopted as an adaptive strategy in the face of growing aridification. These findings highlight how environmental change, mobility, subsistence strategies, and local resource exploitation shaped technological innovations and shed light on the central role of obsidian in late prehistoric subsistence systems in the Horn of Africa.

MOUNT CHIKIANI OBSIDIAN SOURCES: TEN YEARS OF RESEARCH IN THE JAVAKHETI PLATEAU (GEORGIA)

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Surveys carried out in the Javakheti Plateau in the Georgian Caucasus and its surroundings during the last decade, have shown the importance of the Mt. Chikiani obsidian sources in the archaeology of the region. The surveys have improved our knowledge regarding a few aspects of the exploitation of obsidian and the manufacturing operative chain of some characteristic knapped stone artefacts of the Bronze Age. They consist mainly of bifacial arrowheads and spearheads that were knapped in workshops located a few km from the exploitation areas. Moreover, they have led to the discovery of many obsidian mining fields that are still clearly visible along the eastern slopes of the volcano, and many complex stonewalled villages located at about 2000 m a.s.l. The surveys were later extended to the slopes of Mts. Paravani and Shaori where more high-altitude stonewalled villages have been discovered, GPS located and drone-photographed. Over 300 obsidian artefacts and "bombs" have been characterised during these years retrieved from Mt. Chikiani mining areas,

villages, kurgans and workshops located within ca 10 kms from the exploitation areas. Only a few preliminary research results have been published so far. They have shown the importance and complexity of the exploitation of the Mt. Chikiani obsidian sources and have contributed to the interpretation of its circulation in the archaeological sites located in this part of the plateau. Moreover, the surveys have led to the discovery of a few small kurgans whose surface is covered with small obsidian fragments, which suggest that some rituals had been conducted after the kurgan were closed. The characterization of the obsidian artefacts has been made at the Institut de Recherche sur les Archéomatériaux (IRAMAT) of the Orléans University, France, directed by B. Gratuze. The research has been financed by the Italian Ministry of Foreign Affairs and International Cooperation (MAECI).

DISPERSAL OF SETOUCHI INDUSTRIES IN CENTRAL JAPAN: BASED ON A TECHNOLOGICAL ANALYSIS OF BACKED TOOL PRODUCTION IN THE LATE UPPER PALEOLITHIC PERIOD

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The widespread occurrence of common raw materials and lithic production techniques indicates the dispersal of human groups.

It is well known that Setouchi industries spread throughout the Japanese Archipelago from the Kinki and Setouchi regions during the Late Upper Paleolithic period. Setouchi industries are characterized by production techniques used to continuously detach similar form of wide flakes as blanks for backed tools. However, the dispersal of these groups has not been sufficiently examined from a technological perspective that considers the entire lithic production sequence, from raw material procurement to the manufacture of backed tools.

This study focuses on the production and dispersal of Setouchi industries made from Gero obsidian and examines the technological relationship between Mt. Yugamine as the source of the obsidian in Gifu Prefecture and the Hokuriku region.

Excavations conducted in 2025 at the Yunotaira Site on Mt. Yugamine identified for the first time a Setouchi industry made from Gero obsidian. This discovery made it possible to examine the relationship between the Setouchi industries made from the obsidian excavated in the Hokuriku region, revealing shared production techniques between the two regions. Although relationships between the Kinki–Setouchi region and both Hokuriku and Gero have previously been discussed separately, the relationship between the source of the obsidian and Hokuriku region has not been sufficiently investigated.

These results suggest that it is possible to reconstruct Paleolithic human mobility and resource use in greater detail. By examining the broader distribution and chronological changes of Setouchi industries sharing similar production techniques, it may be possible to clarify patterns of human-group mobility and technological transmission in the Japanese Archipelago during the Late Upper Paleolithic.

CHALLENGES IN OBSIDIAN GEOCHEMICAL DATABASES: AN EXPERIENCE FROM SOUTHERN SOUTH AMERICA

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In recent years, the number of geochemical analyses of obsidian in archaeological research has increased exponentially. However, a critical issue persists: the construction of robust and reliable obsidian geochemical databases based on geological samples. These databases function as reference collections; without them, the assignment of archaeological samples to specific geochemical groups -and ultimately to their sources- remains methodologically weak and potentially unreliable.

This presentation addresses these challenges through a regional review focused on Northwestern Patagonia, Mendoza, and Central and Southern Chile (34°–42°S). We compiled a corpus of approximately 150 publications produced between 1988 and 2026, within which 32 geochemical groups have been proposed.

Our analysis identifies several recurring problems that limit the comparability and reproducibility of existing data—issues that are not restricted to this region but are shared globally. These include insufficient or inadequate reporting of analytical techniques, protocols, and results; the aggregation of geological and archaeological samples within the same datasets; and the definition of geochemical groups based on very small sample sizes, among others.

These limitations constrain the capacity of obsidian studies to reconstruct past societies and undermine the long-term usability of published data. By systematically evaluating these issues, our work contributes to ongoing efforts to improve data transparency, standardization, and the development of more reliable geochemical reference frameworks in both South American and global obsidian research.

THE LITHIC RAW MATERIAL UTILIZATION STRATEGY IN THE UPPER PALEOLITHIC PERIOD: AN ANALYSIS OF FLAKING TECHNOLOGY IN THE OBSIDIAN ASSEMBLAGE FROM THE COASTAL PLAIN

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The reconstruction of human-nature relationships necessitates the unraveling of prehistoric flaking technology. This technology serves as a reflection of the available lithic raw material and elucidates the interactions between their resource environment and human activity. Humans demonstrated active adaptation to their environment, leading to the development of a culture through activities such as lithic production and utilization. This focus on human activity facilitates

discussions on the diversity of human behavior and the adaptability of Homo sapiens and other human species.

In numerous instances, large-scale sites with extensive artifact discoveries have addressed this question. However, even small-scale, limited lithic assemblages can provide valuable insights when analyzed in conjunction with the site's location. This study presents a case study of this approach.

The subject of this study is 18 obsidian lithics excavated from Unit 2 and 11 of the Sugusaka Site, situated on the edge of a plain formed along the Sea of Japan coast. The assemblage comprises small backed blades, retouched flakes, chips, and a single ultra-small round pebble, devoid of cores. This composition suggests that the assemblage dates to the Upper Paleolithic period and indicates that obsidian was transported to the site in the form of blanks or flakes and subsequently retained during processing.

Previously, the backed blades in this assemblage were interpreted as points from the early Jomon period, based on chronological judgments derived from their typological names. However, meticulous analysis of flaking technology has revealed that these artifacts are small and have undergone multiple reworks, resulting a form of a point. Consequently, they are classified as backed blades from the Upper Paleolithic Period. In this study, based on the absence of cores, the presence of small flakes, and the absence of signs of use on any of the lithics, we interpret this assemblage as being in the process of being manufactured from perspective of lithic production management.

This assemblage suggests that precious obsidian was systematically managed, and a reserve supply was maintained. This serves as concrete example of human risk management and mobility in response to the uneven distribution of lithic raw materials and environmental fluctuations in coastal regions. The study underscores the highly sophisticated planning capabilities of humans in conserving limited resources for future use.

OBSIDIAN IN THE EARLY NEOLITHIC OF THE TUSCAN ARCHIPELAGO (ITALY): NEW INSIGHTS FROM AN INTEGRATED STUDY APPROACH

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This contribution presents the results of an integrated technological, traceological, and provenance study of the obsidian assemblages from the Neolithic sites of La Scola (Pianosa Island) and Le Secche (Giglio Island) in the central Mediterranean basin. The aim is to understand in which form obsidian was circulating, for which purpose and the chronology of the distribution routes from the insular sources to the continent.

The Early Neolithic occupation of the Tuscan Archipelago (Northern Tyrrhenian Sea, Italy) began in the mid-sixth millennium BCE. The establishment of settlements on Giglio and Pianosa islands marks the integration of this area into the broader obsidian circulation networks, making it a key region for understanding early maritime exchange systems in the central Mediterranean.

Provenance analysis documents the exploitation of multiple raw material sources, with Sardinian obsidian predominating alongside minor contributions from Palmarola and Lipari.

From a techno-functional standpoint, the assemblages reflect a mixed production and consumption pattern. Bladelet production is largely represented by finished products introduced to the sites, suggesting that part of the production sequence was carried out elsewhere. Alongside this, on-site low-investment reduction strategies are documented, including unstructured flake production and bipolar-on-anvil techniques. Within the analysed sample, use-wear analysis reveals a high proportion of functionally exploited artefacts. Cutting activities on soft materials dominate, while artefacts displaying abrupt edges appear mainly associated with transverse motions on harder materials. Notably, even by-products show evidence of use, suggesting a maximising management of this non-local raw material.

This evidence may reflect the specific nature of these settlements, potentially functioning as logistical stopovers or transient occupations within maritime exchange routes rather than fully permanent domestic sites. The recurrent co-occurrence of multiple obsidian sources and shared technological traits supports the hypothesis of a shared cultural framework within the Early Neolithic of the Tuscan Archipelago, displaying common traits with both insular Italy and the Sardo-Corsican block.

THE JAPANESE OBSIDIAN DATABASE: A WEBSITE PROVIDING COMPREHENSIVE SUPPORT FOR OBSIDIAN PROVENANCE ANALYSIS IN ARCHAEOLOGY

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Obsidian provenance analysis has greatly contributed to the understanding of exchange networks and human mobility in the Japanese archipelago since the 1970s. Approximately 80 obsidian sources are known in Japan, and vast numbers of obsidian artefacts have been recovered from Palaeolithic and Jomon archaeological sites. However, several million unanalysed artefacts remain stored in cultural heritage institutions, while only a limited number of laboratories are currently capable of conducting provenance analysis. Expanding analytical facilities and establishing a standardised analytical framework therefore represent major challenges in Japanese archaeology.

To address these issues, we are developing a comprehensive framework for obsidian provenance analysis based on quantitative energy-dispersive X-ray fluorescence (EDXRF) analysis. Our research focuses on three main components: (1) the development of non-destructive quantitative EDXRF analysis using obsidian calibration standards, (2) the determination of discriminant (compositional) groups and associated reference obsidian specimens, and (3) the development of data-processing algorithms and web-based interfaces for provenance analysis.

As part of this project, we established the Japanese Obsidian Standards (JOS), consisting of 39 geological obsidian samples mainly from Japan. Reference values for major and trace elements were determined by wavelength-dispersive XRF (WDXRF) analysis using fused glass beads at

Meiji University. Based on these standards, we are developing an application package for the Rigaku NEX DE EDXRF instrument that incorporates calibration curves and corrections for matrix effects, spectral interference, and geometric variations using the Compton scatter internal standard method. This enables rapid and non-destructive quantitative analysis of archaeological obsidian.

We also established reference obsidian specimens and quantitative group-assignment methods using discriminant ellipses constructed from elemental ratios and fractions. Archaeological obsidian is assigned to a discriminant group only when the analytical data fall within the same group across four discrimination diagrams.

The Japanese Obsidian Database provides information on discriminant groups, geographic distributions of obsidian, representative WDXRF compositions, analytical facilities, and reference materials (Suda and Ikeya, in press). Through this framework, we aim to facilitate the broader adoption of obsidian provenance analysis in Japan and strengthen international collaboration in obsidian studies.

References

Suda, Y. and Ikeya, N. (in press) The Japanese obsidian database: a website providing comprehensive support for obsidian provenance analysis in archaeology. International Association for Obsidian Studies Bulletin 76.

RECONSTRUCTING SITE FORMATION PROCESSES FROM THE MT. YUGAMINE OBSIDIAN SOURCE, CENTRAL JAPAN

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Understanding site formation processes is essential for reconstructing past environmental conditions and interpreting human behavior. Archaeological sites, even those located on gently sloping terrain, are subject to post-depositional processes such as sediment movement from higher to lower elevations. These processes can alter the original spatial distribution of artifacts, making it necessary to evaluate the extent to which archaeological materials retain their primary context. Identifying the nature and causes of such disturbances allows for more accurate reconstruction of both depositional environments and human activities.

This study investigates the site formation processes of a site located on a broad, relatively flat plain on Mt. Yugamine in Central Japan, an area associated with the Gero obsidian source. The research focuses on human activities within this resource-rich environment and aims to clarify the depositional conditions affecting the site. Magnetic susceptibility analysis was employed to obtain detailed information on sedimentary processes and stratigraphic variability.

Stratigraphic correlations across multiple excavation areas were examined in conjunction with patterns of sediment influx. The results revealed significant variations in magnetic susceptibility and its frequency dependence among different locations and specific stratigraphic layers. These variations indicate spatial heterogeneity in sedimentary environments across the site. In addition, evidence suggests that sediment transport from higher to lower elevations occurred in the past, even in areas that are currently characterized by relatively flat topography.

These findings imply that the present landscape has undergone gradual topographic leveling

over time, reducing former elevation differences. Such changes have influenced the distribution and preservation of archaeological materials. By integrating sedimentological analysis with artifact distribution data, this study provides a more refined reconstruction of site formation processes.

Ultimately, this research contributes to a more accurate interpretation of human behavior by improving our understanding of the dynamic interactions between natural processes and archaeological deposits in Gero obsidian source areas.

INFERRING SOCIAL MEMORY AND IDENTITY THROUGH STONE: OBSIDIAN PROVENANCE AND CIRCULATION IN THE EASTERN MEDITERRANEAN NEOLITHIC TRANSITION

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The reciprocal relationship between humans and the landscapes they exploit allows archaeologists to reflect on how landscapes become the tools by which humans create their understanding of themselves and their relationship to the landscape in terms of belonging and emplacement. Feelings of belonging to a locality are a powerful element in the construction of shared identity, while social practices, such as exchange, can be thought of as performative of feelings of emplacement and belonging, forging a sense of community. This paper presents the latest evidence in the consumption and circulation of obsidian on the island of Cyprus during the transition to the Neolithic (12-8 kya), in the context of long-distance social networks. Obsidian is an exotic raw material to the communities inhabiting the island as no geological sources of the volcanic glass exist within Cyprus. Yet during the Early Holocene, i.e., transition to the Neolithic, small quantities of obsidian artefacts are found across the island, despite the existence of a plethora of excellent quality local chert sources. The materiality of obsidian is here considered as a powerful symbol of relatedness in the negotiation of social identity and memory, with obsidian's unique physical properties seen as embodying identity and a feeling of community extended even beyond the boundaries of the island via long-distance exchange. Bearing in mind that populations with distinct lifestyles, i.e., hunter-forager-gatherers and farmers, inhabited Cyprus at the Terminal Pleistocene/Early Holocene transition, the paper also considers the extent to which insularity might have united island communities under a shared social identity, and, how this might have been reflected in social interactions within the island and across the sea.

OBSIDIAN SOURCING STUDIES IN THE AEGEAN: STATE OF PLAY AND FUTURE DIRECTIONS

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While the Aegean region played a key role in the earliest Old World obsidian sourcing studies by Renfrew and colleagues in the 1960's, there are now significantly fewer published studies than in surrounding regions (e.g., Western Mediterranean, Anatolia). This paper attempts to explain

these regional divergent histories of research, then reviews a recent increase in characterisation studies that - as with most areas of the world – coincides with the availability of portable, non-destructive XRF technologies.

While the dominance of Melian obsidian in Aegean lithic assemblages is well documented, it is now becoming apparent that there are significant long-term distinctions in the use of the island's two main sources – Sta Nychia and Dhemenegaki – with the latter clearly dominant during the Bronze Age. Key to maximising the interpretative potential of these high-quality elemental analyses, is the integration of sourcing data with the artefacts' techno-typological characteristics, at which point we can discern different lithic traditions between broadly contemporary populations using the *same raw material*. The paper finishes by highlighting major gaps in our knowledge, and suggestions as to where research energies might be best spent in the next decade.

LONG-DISTANCE EXCHANGE/TRADE IN OBSIDIAN IN THE HOLOCENE OF THE SIBERIAN ARCTIC

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The phenomenon of long-distance exchange of obsidian is well-known in prehistory. The Siberian Arctic is one of the regions where this process was studied recently. It includes the basins of major rivers, the Kolyma, Indighirka, and Anadyr; and the New Siberian Islands (Kuzmin 2024).

The obsidian transport from remote sources in the Kamchatka Peninsula and Chukotka to all over the eastern part of the Siberian Arctic is known for the sites dated since the end of the Late Pleistocene (Late Palaeolithic), but it was the most active in the Holocene.

Obsidian from two Kamchatkan sources, Itkavayam and KAM-8, spread north toward Chukotka (straight distance of 1100 km), the Omolon River valley (500–640 km), and the Bering Sea coast (960 km).

The largest distribution network existed with the centre at the Lake Krasnoe source in the lower course of the Anadyr River (Chukotka region). It supplied a vast territory, up ca. 4.000.000 km^2 in size (Pitulko et al., 2019). The longest transportation route of 1500 km as the crow flies is established between Lake Krasnoe and the Mesolithic site at Zhokhov Island, dated to ca. 9200–8600 cal BP. The real distance was even greater, up to 2000 km. The presence of sledges and domestic dogs at the Zhokhov site testify in favour of long-distance travel in order to obtain the valuable raw material, most probably via a chain of middlemen. Obsidian from the Lake Krasnoe source was also traded in later prehistory across the Bering Strait to Alaska, with distances of 800–1050 km.

References

Kuzmin, Y.V. (2024). Across the Seas in Prehistoric Northeast Asia: Obsidian as a Commodity for the Study of Human Migrations. Singapore: Springer Nature.

Pitulko, V.V., Y.V. Kuzmin, M.D. Glascock, E.Y. Pavlova & A.V. Grebennikov (2019). 'They came from the ends of the earth': Long-distance exchange of obsidian in the High Arctic during the Early Holocene. Antiquity 93(367), 28–44.

WHERE THERE IS ONE...

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In the Carpathian Basin, and specifically within Hungary, archaeologists and natural scientists have been collecting archaeological obsidian specimens since the second half of the 19th century. Since the 1970s, it is possible to clearly identify the origin of this raw material, supported by analytical methods. Accordingly, within the interior of the Carpathian Basin, archaeological sites were almost exclusively supplied with Carpathian 1 (C1, Slovak) and Carpathian 2 (C2T, C2E) types of obsidians. The later-identified Carpathian 3 (C3, Transcarpathia) type obsidian was distributed at archaeological sites mainly locally, in the immediate vicinity of the raw material source.

However, there are exceptions to every rule. As early as the first series of analytical studies in Hungary (SEM-EDS, Biró et al. 1986 and 1988), it became apparent that, among the samples examined, one sample from the Berettyóújfalu-Herpály site and prepared for Obsidian Hydration Dating analysis as well as an unusually large retouched blade from the Csongrád-Kettőshalom site did not fit into the general picture. For typological, aesthetic, and authenticity reasons, the latter find can only be examined using non-destructive methods.

Since the early 2000s, we were able to perform non-destructive bulk analysis on obsidian samples, to measure fingerprint-like elements. Prompt-gamma activation analysis (PGAA) provides average volumetric composition of the samples, and we have collected a wide range of geological reference data for provenance identification. The result on the Csongrád blade was truly surprising; the tool from the authentic grave find (Copper Age [Ocker Grave Culture], radiocarbon age Poz-41865: 5470 ±40 BP, 4355–4265 cal BC, 1 σ, 4443–4239 cal BC, 2 σ; Ecsedy 1979, Dani – Horváth 2012) seems to be Anatolian origin (Göllü dag East (Kömürcü); Kasztovszky et al. 2025, Markó et al. 2025).

Encouraged by the first results, we have planned further analyses on contemporary obsidian finds from the Hungarian National Museum (Tiszapolgár and Bodrogkeresztúr cultures), and we also re-examined the presumed Late Neolithic obsidian tool from Herpály. As a first step, macroscopic typological and petroarchaeological analyses were completed; in the near future, we plan to perform X-ray fluorescence spectroscopy and PGAA analyses, the results of which we will present at the conference in Yerevan.

FROM VOLCANOES TO HERITAGE: THE GEOHERITAGE VALUE OF ARMENIAN OBSIDIAN

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Obsidian in Armenia represents an important component of the volcanic heritage of the Armenian Highland. These volcanic glasses were formed by silica-rich magmatism, and more than ten Quaternary volcanic centres in Armenia are associated with silica-rich volcanism characterized by highly viscous magma and predominantly effusive or explosive eruptive activity (Karapetyan et al., 2001). Owing to its unique physical properties and widespread availability, Armenian obsidian was extensively used by prehistoric communities as a primary raw material for stone tool production, making it an outstanding example of the link between geological processes and human history (Gluberman et al., 2020).

Although Armenian obsidian sources have been extensively investigated from both geological and archaeological perspectives (e.g. Keller et al., 1996; Blackman et al. 1998; Badalyan et al. 2004; Frahm et al. 2016; Juharyan 2018; Meliksetian et al., 2024), their significance as elements of geoheritage has received relatively little attention. This contribution explores the transition in the perception of obsidian from a product of volcanism to an element that connects geoheritage, highlighting its importance for conservation, education and geotourism.

The geoheritage assessment is based on field observations, published geological, volcanological and archaeological data, and analysis of the principal obsidian-bearing volcanic formations and their associated landscapes. Armenian obsidian occurs in a variety of volcanic settings, including lava flows, domes and agglomeratic deposits. These volcanic features provide insights into magma evolution, silica-rich volcanism, and the development of volcanic landscapes. At the same time, many obsidian-bearing sites preserve evidence of prehistoric exploitation and the long-distance transport of obsidian artefacts, reflecting the close relationship between geological resources and cultural development.

The results indicate that Armenian obsidian sites, including Arteni, Hatis and Gutansar, possess high scientific, educational and geotourism value, emphasizing their importance as key elements of Armenia's geoheritage (Navasardyan et al., 2025, 2026).

Viewing obsidian as a bridge between volcanic processes and human history opens new opportunities for promoting Armenia's geological heritage. The inventory and assessment of obsidian-related geoheritage sites can provide a solid basis for their conservation, public interpretation, and the development of sustainable geotourism in Armenia.

References

Karapetian, S.; Jrbashian, R.; Mnatsakanian, A. Late collision rhyolitic volcanism in the northeastern part of the Armenian highland. J. Volcanol. Geotherm. Res. 2001, 112, 189–220.

Glauberman, P.; Gasparyan, B.; Sherriff, J.;Wilkinson, K.; Li, B.; Knul, M.; Brittingham, A.; Hren, M.T.; Arakelyan, D.; Nahapetyan, S.; et al. Barozh 12: Formation processes of a late Middle Paleolithic open-air site in western Armenia. Quat. Sci. Rev. 2020, 236, 106276.

Keller J., Djerbashian R., Karapetian S., Pernicka E., Nasedkin V. Armenian and Caucasian obsidian occurrences as sources for the Neolithic trade. Volcanological setting and chemical characteristics, in: Ş. Demirci – A. M. Özer– G. D. Summers (eds.), Archaeometry 94. The Proceedings of the 29th International Symposium on Archaeometry, Ankara 9–14 May 1994 (Ankara 1996) 69–86.

Blackman J., Badaljan R., Kikodze Z., Kohl P. Chemical characterization of Caucasian obsidian geological sources, in: M.-C. Cauvin – A. Gourgaud – B. Gratuze – N. Arnaud – G. Poupeau – J.-L. Poidevin – C. Chataigner (eds.), L'obsidienne au Proche et Moyen Orient. Du volcan à l'outil, British Archaeological Reports International Series 738 (Oxford 1998) 205–31.

Badalyan R., Chataigner C., Kohl P. L., Trans-Caucasian obsidian. The exploitation of the sources and their distribution, in: A. Sagona (ed.), A View from the Highlands. Archaeological Studies in Honour of Charles Burney, Ancient Near Eastern Studies Supplement 12 (Leuven 2004) 437–465.

Frahm E., Campbell S., Healey E. Caucasus connections? New data and interpretations for Armenian obsidian in Northern Mesopotamia, Journal of Archaeological Science: Reports 9, 2016, 543–564.

Juharyan A. Portable X-ray fluorescence analysis of Armenian obsidian sources, Aramazd. Armenian Journal of NearEastern Studies XII, 1, 2018, 66–75.

Meliksetian, K., Pernicka, E., Badalyan, R., Schifer, T., Keller, J., Gasparyan, B., Jrbashyan, R., Navasardyan, G., Kunze, R. Trace Element Geochemistry of Armenian Obsidian Sources and the Provenance of Archaeological Obsidian. In Strategies of Obsidian Procurement, Knapping and Use in the First Farming Societies; Austrian Academy of Sciences Press: Vienna, Austria, 2024; 167–249.

Navasardyan, G., Meliksetian, K., Savov, I.P., Gevorgyan, H., Bangoyan, M., Galstyan, A., Grigoryan, E. Volcanic Geoheritage and Geotouristic Potential of the Gegham Monogenetic Volcanic Upland (Armenia). Geoheritage 2025, 17, 146.

Navasardyan G., Meliksetian Kh., Mirzoyan L., Grigoryan E. The Arteni Volcanic Complex (Armenia): A Volcanic Geoheritage Site for Geotourism. Land 2026, 15, 1091.