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NEWS AND INFORMATION

NEWS AND NOTES

Have news or announcements to share? Send them to IAOS.Editor@gmail.com for inclusion in the next issue of the *IAOS Bulletin.*

CONSIDER PUBLISHING IN THE IAOS *BULLETIN*

The *Bulletin* is a twice-yearly publication that reaches a wide audience in the obsidian community. Please review your research notes and consider submitting an article, research update, news, or lab report for publication in the *IAOS Bulletin*. Articles and inquiries can be sent to IAOS.Editor@gmail.com Thank you for your help and support!

Congratulations to the 2025 Skinner Poster Award Winner

Please join the IAOS in congratulating Talia Nishida, with co-authors Daniel Contreras, Oula Seitsonen, Katherine Grillo, and Mary Prendergast, as the winner of the 2025 Skinner Poster Award for the poster “Obsidian Sourcing and Interaction Networks in the Tanzanian Pastoral Neolithic” presented at the 2025 Society for American Archaeology conference in Denver, Colorado, USA. This award recognizes the best obsidian research poster presented at a major conference each year. We hope to publish this work in the *IAOS Bulletin* in a future issue.

NOTES FROM THE PRESIDENT

Hello, IAOS members. Summer is here and I expect many of you are getting ready or are already in the field for some much-anticipated geo-archaeological fieldwork action! I have just returned from two fascinating international conferences held in two very different, but equally fascinating, island settings. In Malta, I participated in the *Island Legacies: Prehistoric Insular Ecosystems, Societies, and Climate Change in the Mediterranean* conference, between 3rd-6th of June. In Australia, I contributed to the 10th World Archaeological Congress, (22-28 June) hosted at Charles Darwin University, Darwin. Although not obsidian conferences per se, obsidian did, of course, feature prominently. And being set on islands, my thoughts inevitably turned to maritime obsidian. Obsidian sources on islands of the eastern and central Mediterranean and extensive transport networks, involving both insular and continental locations, make the Mediterranean one of the most active regions worldwide for maritime obsidian research. Similarly, in the southern hemisphere, regions such as Vanuatu and Papua New Guinea, in the western Pacific, or the Lesser Sunda Islands in Island Southeast Asia, provide important insights into the human engagement with the sea in the consumption of obsidian.

Geochemical fingerprinting allows for the precise association of obsidian archaeological artefacts to their geological sources, while sea gaps result in many instances where obsidian is found in a location as 'exotica'. This is the case in both hemispheres of the globe, with examples in regions such as Island Southeast Asia or Japan, and not least the Mediterranean. My involvement in the study of maritime obsidian transfers in Cyprus the last ten years has alerted me to the captivating stories the archaeology of raw material circulation via open water routes can reveal. A snapshot of this work is included in this Bulletin in the form of a poster I prepared a while ago summarizing my Cypriot obsidian research.

Speaking of posters, huge congratulations to Talia Nishida and co-authors who won this year's Skinner Poster Award with their poster entitled *Obsidian Sourcing and Interaction Networks in the Tanzanian Pastoral Neolithic.* Competition was extremely high this time with many great posters that highlight the timeliness of obsidian studies in understanding past phenomena on water and land. For those of you who did not make it to the SAAs 2025, we hope to be able to publish an article on this work in a future issue of the *IAOS Bulletin.*

Lucas R.M. Johnson is stepping down as the IAOS secretary and treasurer so anyone interested in this position, do get in touch. Thank you for all your hard work, Lucas!

Lastly, please consider submitting an article, research update, or lab report to the *IAOS Bulletin*. You can submit your work to Carolyn Dillian at IAOS.Editor@gmail.com.

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FINE-GRAINED VOLCANIC LITHIC SOURCES OF THE GREAT SALT LAKE DESERT, UTAH

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Abstract
This research focuses on the geochemistry and archaeological exploitation of fine-grained volcanic (FGV) lithic sources of the greater Great Salt Lake Desert (GSLD) in western Utah's Bonneville basin. By combining X-ray fluorescence (XRF) characterization of these sources with a discussion of their exploitation history, this paper provides one of the few overviews of these resources, which were central to the earliest inhabitants of the region at the Pleistocene-Holocene transition.

Introduction

Regional volcanism during the Tertiary is responsible for recurring tectonic activity and normal faulting, and this geology holds a variety of toolstone sources that were useful to people of the eastern Great Basin and the GSLD in particular. Non-obsidian fine-grained toolstone of volcanic origin, such as andesite and dacite, is usually referred to by archaeologists as FGV and is widely available throughout the Intermountain West. Ringing the southern GSLD are geochemically distinct sources to the east at Flat Hills and off the southern toe of the Cedar Mountains near Dugway, Utah, and to the west in the Deep Creek Range. These are located upwards of 60 kilometers from the central region of the southern GSLD (Figure 1). There are also minor sources in the region of variable toolstone quality and limited evidence of archaeological exploitation that are not part of the current study. These consist of Wildcat Mountain on the Utah Test and Training Range (Carter et al. 2004), Rydalch Canyon in the Cedar Mountains north of the Cedar Mountain FGV source (Clark et al. 2016), and Gold Hill Wash, Ferber Wash, and Little White Horse Badlands found near the Deep Creek and Badlands sources (see Page 2008).

The term "fine-grained volcanic" is somewhat counter-intuitive from an archaeological perspective because, relative to obsidian and chert, FGV represents the coarse-grained end of the spectrum. It is in the purely geological sense that it seems most appropriate as a gross separator of volcanic (extrusive) versus plutonic (intrusive) igneous rocks, such as granite.

The majority of archaeological sites where the aforementioned FGV sources have been reported (n=128) come from the Old River Bed delta (ORBD), a large distributary wetland that existed in the GSLD from ca. 13,000 and 9500 cal BP on lands currently managed by the U.S. Army Dugway Proving Ground (DPG) and Hill Air Force Base as part of the Utah Test and Training Range-South (UTTR-S) (see Page and Duke 2015). Page (2008) was the first to formally describe the GSLD-area FGV sources and study their distribution archaeologically. He found FGV at major archaeological sites in the region such as Danger Cave, Bonneville Estates

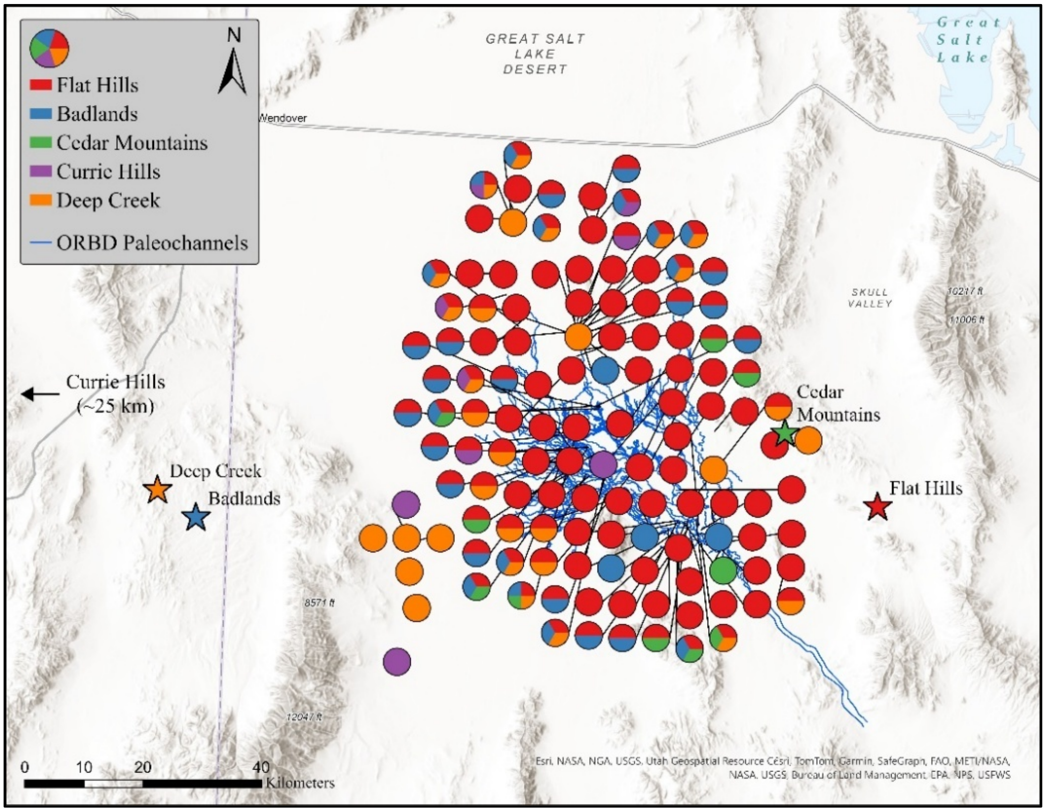

Figure 1. Archaeological sites on the ORBD containing FGV (data from Page and Duke [2015]). Source locations are also mapped.

Rockshelter, and Camels Back Cave. Duke (2011:106-112) provides additional information regarding local FGV toolstone qualities.

Building on decades of contract archaeology on UTTR and DPG, Far Western Anthropological Research Group has amassed a collection of FGV geological material that is part of the current study. Material collected by DPG archaeologists is also included. The geochemical results presented herein thus represent one of the few published studies on the geochemistry of FGV sources in the greater GSLD. When combined with our knowledge of obsidian procurement and use in the region (e.g., Duke 2011; Duke and Young 2007; Freund et al. 2022; Jones et al. 2003; Page and Duke 2015), this research contributes to understanding lithic conveyance zones and precontact patterns of mobility in the eastern Great Basin.

Geological Context

The geography of the western Bonneville basin varies significantly by elevation, and mountains surround the GSLD. The Deep Creek and Toano Ranges border the southern GSLD to the west, the Fish Springs and Dugway Ranges are on its southern margin, and the Cedar Mountains are immediately east. Granite Peak Mountain is a dominating feature extending into the GSLD from its southern edge. The Knolls Hills, Wildcat Mountain, and Kittycat Mountain protrude from the mudflats as small fault-block hills and outcrops within UTTR-S. The local mountain ranges and bedrock outcrops of smaller hills are primarily composed of bedded Paleozoic limestone, dolomite, shale,

Source	# of Samples	Fe (ppm)	Rb (ppm)	Sr (ppm)	Y (ppm)	Zr (ppm)	Nb (ppm)
Badlands A	32	43,578 ± 6,600	149 ± 10	433 ± 50	26 ± 4	183 ± 20	14 ± 4
Cedar Mountain B	16	35,645 ± 6,172	111 ± 10	451 ± 24	36 ± 6	273 ± 44	17 ± 2
Currie Hills	31	31,758 ± 8,366	181 ± 22	334 ± 48	29 ± 4	256 ± 28	18 ± 4
Deep Creek A	36	42,130 ± 4,590	78 ± 6	321 ± 32	48 ± 4	320 ± 48	18 ± 2
Flat Hills A	30	30,014 ± 2,278	88 ± 6	576 ± 40	20 ± 4	260 ± 48	13 ± 2
Flat Hills D	40	42,018 ± 6,182	95 ± 10	324 ± 32	32 ± 4	233 ± 26	22 ± 4
Flat Hills E	18	29,548 ± 4,060	185 ± 18	282 ± 32	28 ± 4	208 ± 26	18 ± 2

Table 1. XRF characterization results.

sandstone, chert, and conglomerate (Clark et al. 2016; Stokes 1988). Beginning in the Mesozoic Period, a mountain-building event known as the Sevier orogeny produced the thrust-faulted mountain ranges that surround the basin today (Stokes 1988).

The genesis of the ORBD is with the recession of Lake Bonneville. The distributary network debouched into the south-to-north regressing lake, entering the basin immediately east of Granite Peak on DPG-managed lands before crossing onto UTTR-S. Paleochannels of ORBD can be seen on aerial imagery continuing northward beneath Wild Isle Dunes, Wildcat Dunes, Lone Dunes, Knolls Dunes, and to some undetermined extent beyond. The ORBD and adjacent distributary areas likely represented the largest wetland complex in the eastern Great Basin at the Pleistocene-Holocene transition, varying in size through time within a now visible footprint of over 2,500 square kilometers (Madsen et al. 2015).

Methods

Analysis of FGV raw materials (n=203) was conducted using a Bruker Tracer III-SD portable XRF instrument (Serial Number T3S1878) equipped with a rhodium (Rh) X-ray tube. Each sample was analyzed at 40 kV and 40 µA for 90 live seconds with a 10-square-millimeter XFlash® detector, using a "green" filter composed of 6 mm Cu, 1 mm Ti, and 12 mm Al without a vacuum.

Trace-element peak intensities were normalized to the Compton scatter peak of rhodium (19.5-22 keV) and converted to ppm using the factory default, non-customized

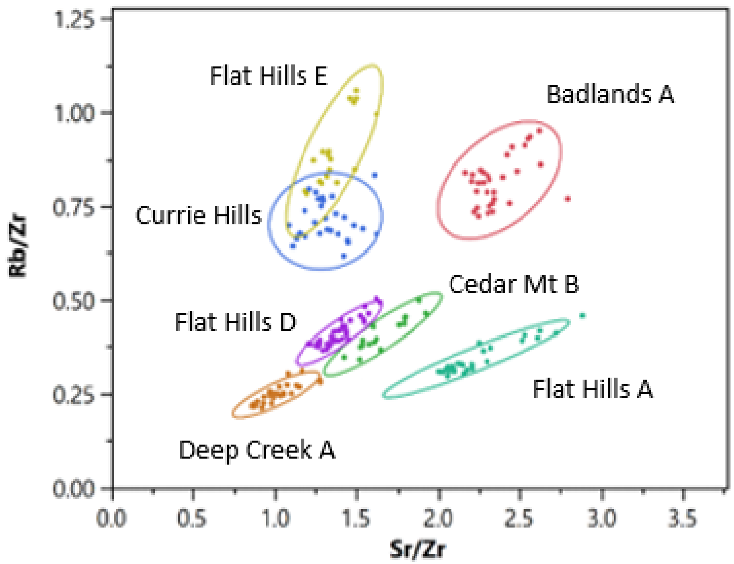

Figure 2. Bi-plot of Rb/Zr versus Sr/Zr with 95% confidence ellipses showing how FGV sources of the greater GSLD can be distinguished.

MURR 2 matrix-specific calibration developed by Bruker Elemental in collaboration with the University of Missouri Research Reactor or MURR (Glascock and Ferguson 2012; Speakman 2012). This factory-installed calibration is based on analysis of 40 samples of unmodified obsidian and fine-grained volcanic rock from around the world, chosen by Bruker and MURR to represent the range of trace-element concentrations known to occur in these materials (see Johnson et al. 2021 for further details about calibrations). The reference standard USGS RGM-2 was scanned for 90 seconds prior to any new assay session to confirm the instrument's stability and to provide independent characterization of a known international standard. Note that the RGM-2 standard is analyzed each time the machine is used to ensure the accuracy of the data produced. If inconsistencies are detected, then samples are re-run. The 90 second thresh old for obsidian measurements is common in the published literature and allows adequate time to yield accurate results. In our lab, geological samples are analyzed for 240 seconds, which is more time than in most other

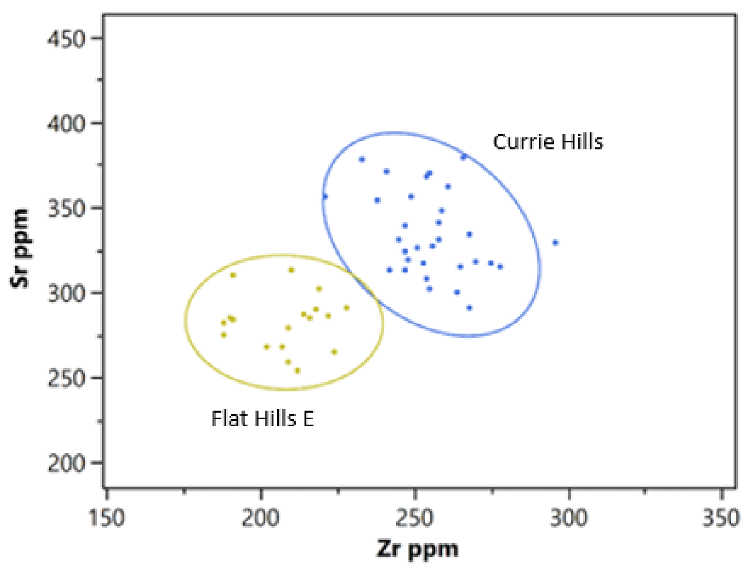

Figure 3. Bi-plot of Sr versus Zr with 95% confidence ellipses showing how Currie Hills can be distinguished from Flat Hills E.

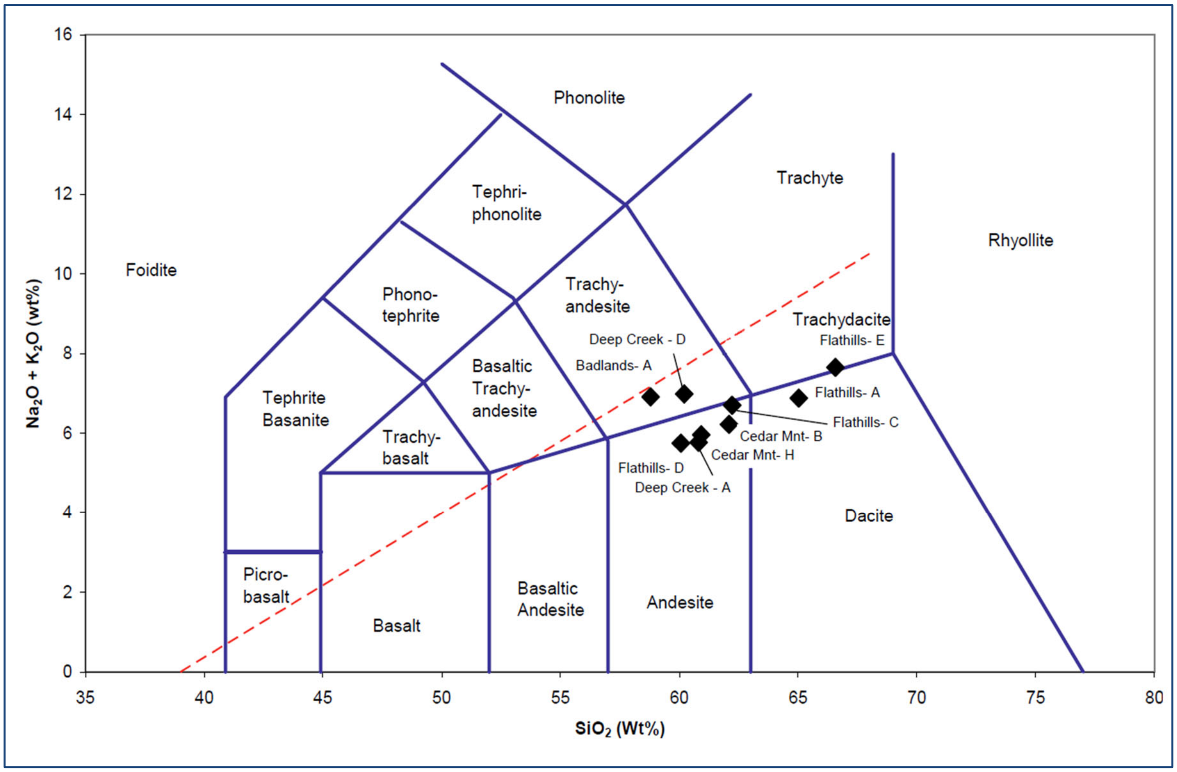

Figure 4. Total Alkali Silica (TAS) diagram of select geologic sources to determine igneous rock type (red line shows alkaline/subalkaline dividing line) (after Page 2008).

labs. Given the resolution of the detector (145eV) and because counts per second are greater than 5,000 for infinitely thick samples, the difference in the final results obtained any time after 90 seconds of analysis is negligible.

The Sources

The five primary FGV sources in and around the GSLD can be distinguished by their geochemistry, and in particular through an examination of the elemental concentrations of rubidium, strontium, and zirconium (Table 1; Figures 2-3). A further characterization of the sources through a Total Alkali Silica (TAS) diagram reveals that most of these materials are subalkaline andesites, trachyandesites, dacites, or trachydacites (Page 2008; Figure 4).

These materials are generally of high knapping quality but are granular and can contain small phenocrysts and vesicles. This makes them challenging to work but highly durable (Duke 2011:106-112). The primary limitations of FGV appear to be brittleness and granularity, with even slight increases in granularity exponentially exacerbating the problem of brittleness. Increased granularity requires greater force to detach flakes from a matrix of cohesive and interlocking grains, which creates broader flakes with larger bulbs of percussion as a result. Applying greater force also adds error and failure risk during reduction simply by making the athletic movement of flaking more forceful and less accurate.

It is worth noting that none of these sources have an identified primary bedrock source and are all found as secondary residuum. Unlike obsidian, however, there is limited evidence for the archaeological exploitation of small pebbles of FGV (see Duke 2011). Hence, the source localities as mapped, which represent the areas where the largest nodules have been identified, likely reflect the general location of primary deposits and the area where these materials were likely collected, although we cannot preclude unknown/unmapped availability.

Flat Hills

The Flat Hills source has several geochemical variants designated as A, C, D, and E (Page 2008) and takes form as secondary deposition of rounded to sub-rounded cobbles 10-30 cm in size intermittently scattered across an alluvial plain for roughly 5 km between the Cedar Mountains and the Flat Hills. No bedrock source has been located, and it is likely that it no longer exists. These materials are of high knapping quality and contain few inclusions and phenocrysts.

Flat Hills A and D are the main variants that were utilized archaeologically, and Flat Hills is the most widely utilized FGV source in the region (Figure 5). One hundred eleven of the 128 sites with reported FGV across the GSLD have Flat Hills in their assemblages.

Badlands

The Badlands source contains two geochemical variants (A and B) and materials take form as rounded to sub-rounded cobbles and boulders 10-30 cm in size from across the surface of a dissected alluvial plain between the Antelope Range and the Deep Creek Range, where it intermixes with secondary deposits of Deep Creek FGV (Page 2008). These materials are generally of high knapping quality but contain small phenocrysts and vesicles that limit their workability. Badlands A is the main variant utilized archaeologically, and Badlands more broadly is the second most utilized source in the region, being found at 35 sites at both the eastern and western ends of the ORBD.

Deep Creek

The Deep Creek source contains several geochemical variants (A through D). The primary source area for variant A is located in the Little Antelope Hills, and secondary distribution of these materials covers an area of about 15 km in diameter (Page 2008). Cobbles are also incorporated into fluvial gravels of the Deep Creek itself where they have been transported upwards of 28 km to the point where the creek debouches near the playa interface. The remaining variants are found in secondary contexts where materials are found as rounded to sub-rounded cobbles 5-15 cm in size. These materials are of high knapping quality and contain few inclusions and phenocrysts. Deep Creek A is the main variant utilized archaeologically, and Deep Creek more broadly is the third most utilized source in the region, being found at 31 sites at both the eastern and western ends of the ORBD.

Cedar Mountain

The Cedar Mountain source has nine geochemical variants (A through I), most of which can be found as rounded to sub-rounded cobbles of varying size scattered across alluvial fan slopes and drainages of the Cedar Mountain range (Page 2008). Initial investigations by D. Duke in 2003 identified cobbles of poor quality in a gravel pit along the edge of the Cedar Mountains (variants A and D). Several bedrock outcrops were later located and sampled, being identified as the primary source locations for variants A, F, G, H, and I. Cobbles identified as variant B were found in Provo beach gravels along the southeast edge of the Cedar Mountains. Cedar Mountain FGV is of variable knapping quality, generally degrading with increased inclusions and phenocrysts (Duke 2011:109-110). Cedar Mountain B is the main variant utilized archaeologically, although the source was not heavily exploited, being found at 10

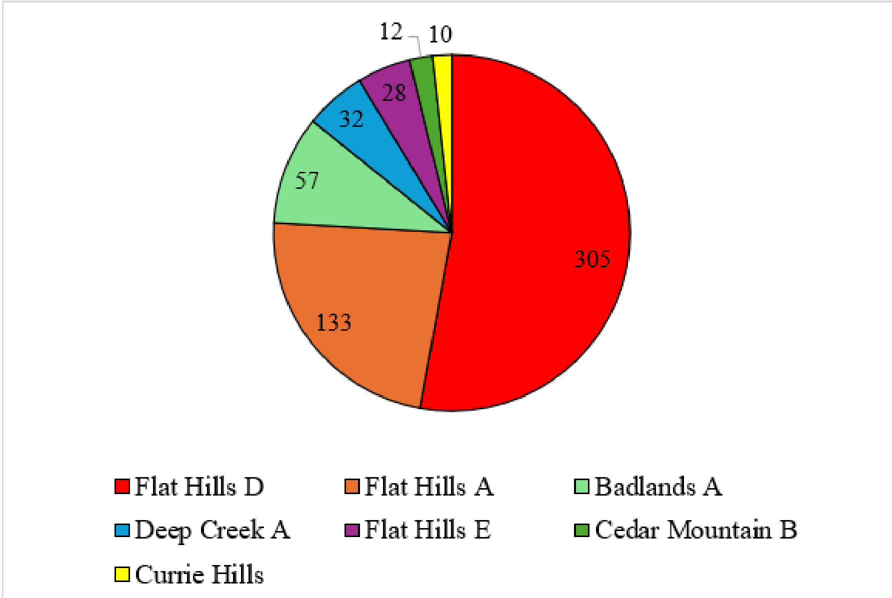

Figure 5. Pie chart displaying the source breakdown of FGV artifacts found on the ORBD (n=577; data from Page and Duke 2015).

sites at both the eastern and western ends of the ORBD.

Currie Hills

The Currie Hills source was identified by T. Jones in 2003, but not much is known about it beyond its general location (Page 2008). Its geochemical signature is very similar to Flat Hills E and can easily be confused (Figure 3); in fact, further review of the chemistry suggests it may be underrepresented on the ORBD by such assignments by Page (2008) and Page and Duke (2015). Currie Hills is a cobble source in secondary context that has been sampled north of the intersection of NV US 93 and NV US 93A around Currie Hills. Even if misassigned, Currie Hills was not heavily utilized on the ORBD, being found at nine sites primarily on the western end; 26 sites contain Flat Hills E material. However, the Currie Hills source has been recognized at multiple sites across eastern Nevada (Duke and Young 2023).

Discussion and Conclusions

Obsidian and FGV account for over 95% of the toolstone used for the creation of lithic artifacts on the ORBD (Freund et al. 2023). However, the FGV sources represented in archaeological assemblages tend to be more local when compared to the more distant obsidian sources (Duke 2011; Page and Duke 2015). The main obsidian sources that were used include Browns Bench in southern Idaho and Topaz Mountain and Black Rock Area in west-central Utah, highlighting the north to south orientation of hunter-gatherer procurement ranges (cf. Jones et al. 2003, 2012; Smith 2010). The most common FGV sources are Flat Hills D and Flat Hills A located together to the east of the ORBD near Dugway, Utah. Badlands A represents the most widely used FGV source west of the GSLD.

Although there is evidence that obsidian was obtained from greater distances when compared to FGV, there is little difference in the preponderance of the various artifact classes represented in corresponding lithic assemblages. For example, in a recent surface survey of roughly 5,000 acres on a large portion of a distal segment of the ORBD, Freund et al. (2023) found roughly comparable 50–50 percentages of projectile points, cores, bifaces, flake tools, and debitage made from obsidian versus FGV. Two differences of note were that 51 of the 74 formed flake tools in the assemblage were made from FGV compared to eight of obsidian, and five of the 12 crescents were made from obsidian (four being sourced to Topaz Mountain) while none were made from FGV. Of the various projectile point types, there did not appear to be a preference for obsidian versus FGV in any type except for Haskett points. Of the nine recorded Haskett points, seven were obsidian, one was FGV, and one CCS; this is actually opposite the pattern for Haskett reported by Duke and Stueber (2024) for the ORBD but represents a smaller sample. The geochemical sources are diverse and consisted of three from Black Rock Area, two from Browns Bench, one from Topaz Mountain, one from Wildhorse Canyon, and one FGV Haskett point from Flat Hills A. These patterns are consistent with those found in neighboring survey blocks (e.g., Duke et al. 2018a, 2018b) that demonstrate a trend through time from the terminal Pleistocene into the Early Holocene of higher to lower mobility via intensifying emphasis on use of the ORBD (Duke 2011).

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MARITIME CONNECTIONS IN EASTERN MEDITERRANEAN PREHISTORY

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Introduction

Despite recent mounting evidence demonstrating the successful early exploitation of insular environments around the globe as far back as 100ka, the island of Cyprus is still persistently regarded as isolated from regional phenomena and largely unaffected by them. The main reason behind this marginality view is the island's insularity and geographic location at the periphery of the continent. Following a Terminal Pleistocene occupation, the Early Holocene signals the first permanent settlements on the island dating to around 10ka and followed by a settlement expansion in the Middle Holocene (ca. 8ka). The traditional view of Cyprus regards these early settlements as the outcome of Neolithic farmers who arrived from the mainland and subsequently turned their backs to the continent developing in isolation because of the presumed sea barriers prohibiting communication. However, the presence of exotic obsidian across Cyprus during this time suggests that contrary to outdated marginality narratives, Cyprus participated in the regional Eastern Mediterranean "socialscape" formulated via the long-distance exchange of Anatolian

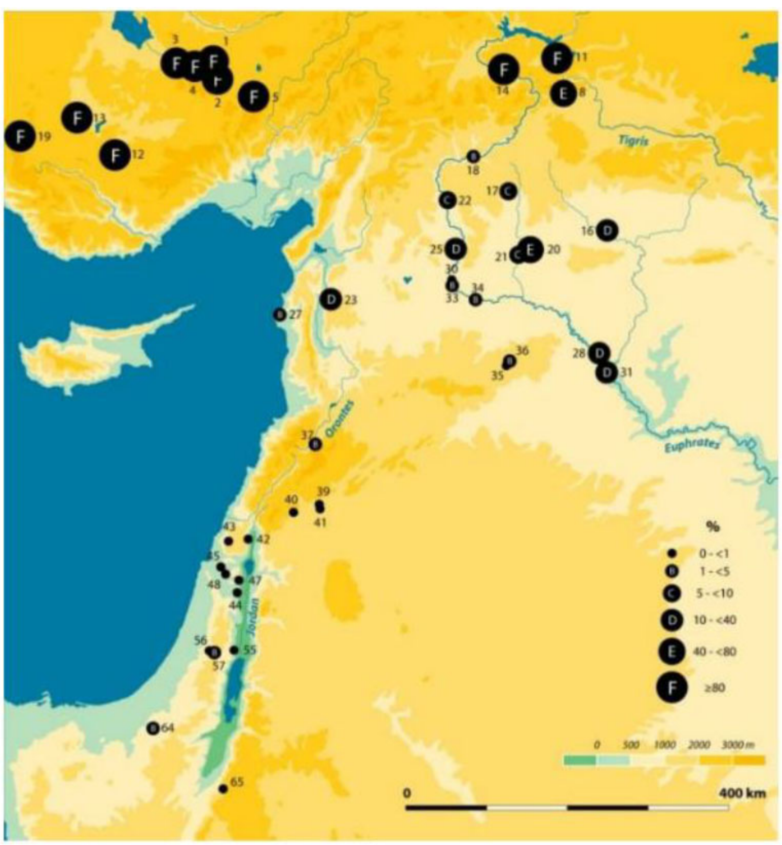

Figure 1. Obsidian distribution in the Near East during the Pre-Pottery Neolithic B (PPNB), 8,500-6,400 cal BC (from Ortega et al. 2016).

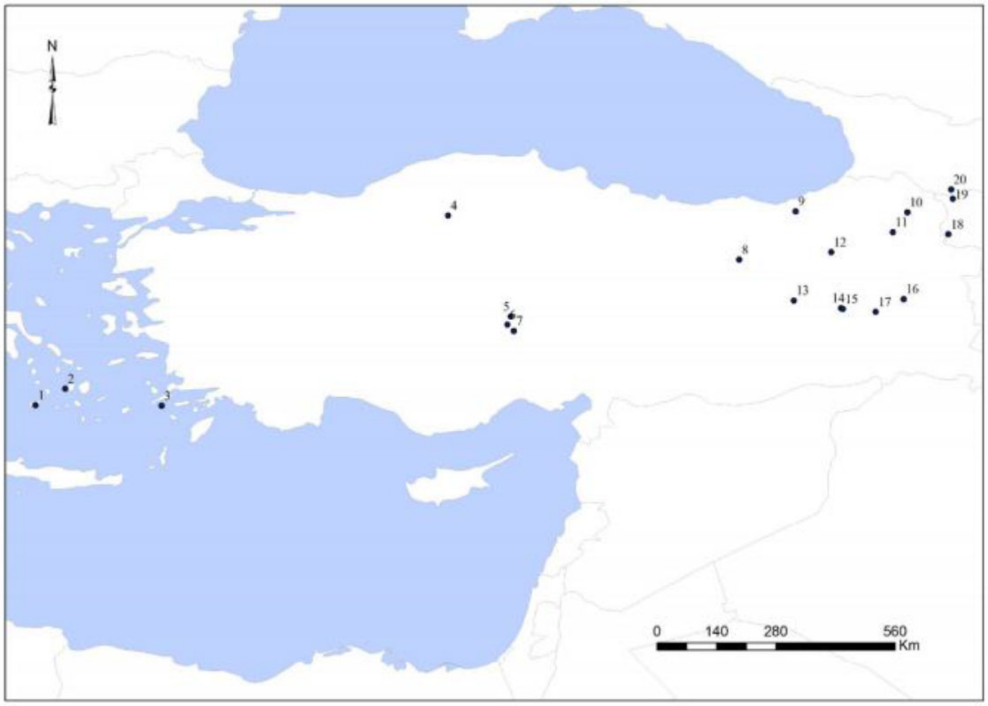

Figure 2. Map showing the location of the main geological sources of obsidian in the eastern Mediterranean region neighboring the island of Cyprus. [Note: 1=Melos, 2=Antiparos, 3=Giali, 4=Sakaeli, 5=Acigöl, 6=Nenezi Dag, 7=Göllüdağ, 8=Erzincan, 9=Ikizdere, 10=Kars, 11=Sarikamis, 12=Erzurum, 13=Bingöl, 14=Mus, 15=Meydan Dag, 16=Suphan Dag, 17=Nemrut Dag, 18=Arteni, 19=Ashotsk, 20=Chikiani]. From Moutsiou 2019.

obsidian (Figures 1 and 2) as far south as Israel (Ibáñez et al. 2015), which also involved seafaring since Cyprus has never been connected to the continent with any form of land bridge (Moutsiou 2018).

The Consumption of Obsidian on the Island of Cyprus

The island of Cyprus in the Eastern Mediterranean is rich in good quality raw material resources for human exploitation, such as chert, but obsidian is not one of them. Nevertheless, exotic obsidian appears in lithic assemblages of Early Holocene (8900-6400 cal BC) sites across the island (Figure 3). Obsidian artifacts are mostly in small quantities (20-50 pieces), although larger assemblages are also known, such as Parekklisia Shillourokambos (~600) and Akanthou Arkosyko (~5000). Unretouched blades and bladelets dominate the assemblages; formal tools are extremely rare and no evidence for in situ tool manufacture has been unearthed anywhere on the island (Moutsiou 2018). Complete obsidian assemblages were elementally characterized using X-ray Fluorescence Spectrometry (XRF) and demonstrated the dominance of central Anatolian obsidian sources in the Cypriot archaeological assemblages (Figure 4).

In Aceramic Neolithic Cyprus, obsidian—when not a surface find—usually derives from contexts that represent everyday activities. Most of the obsidian pieces found across Cyprus (Figure 5) are associated with living floors or fills interior or exterior to building structures. In fact, in all documented instances, there are only two occasions where obsidian artifacts are found within "special" contexts, although the notion of their association with activities such as feasting or

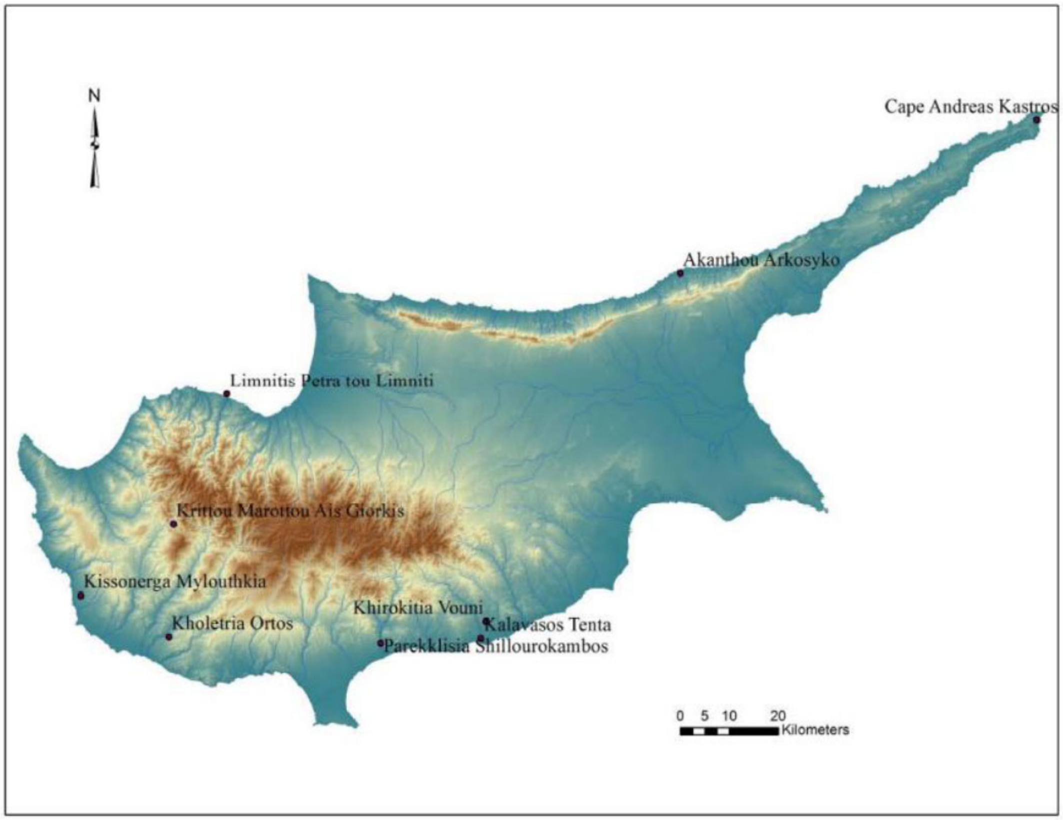

Figure 3. Map showing the main Aceramic Neolithic (8900-6400 cal BC) sites on Cyprus with documented presence of obsidian.

grave goods remains weak. Although the stratigraphic association of obsidian artifacts with domestic rather than religious or other ritual contexts is usually taken to mean that obsidian had no significant value in Aceramic Neolithic Cyprus, it is argued that objects can accrue special value beyond their original functionality, especially when made of materials that are rare, visually distinctive and found at great distances from their source (Saunders 2001, Moutsiou 2018).

Obsidian Distribution on Cyprus

Least Cost Pathways (LCP) analysis of obsidian distribution across the island (Moutsiou and Agapiou 2019) demonstrates that water played an important role in facilitating obsidian movement on Early Holocene Cyprus. Specifically, our models suggest that (a) riverine and (b) coastal waterways were commonly exploited by the early inhabitants of the island in the context of social exchanges (Figure 6). Moreover, the analysis suggests that not all insular communities were involved in the social landscape delineated by obsidian circulation. The LCP model clearly shows a fragmentation between north and south. A possible explanation could be that in the division between coastal obsidian-bearing sites and inland sites with no obsidian we are, in fact, observing two distinct (contemporaneous but separated) social territories. In this context, the north and south coastlines experience an influx of new populations from the mainland, who settle themselves along the coast as a first stage in the colonization process. During this initial exploration phase, humans are more likely to be risk-averse and obsidian objects

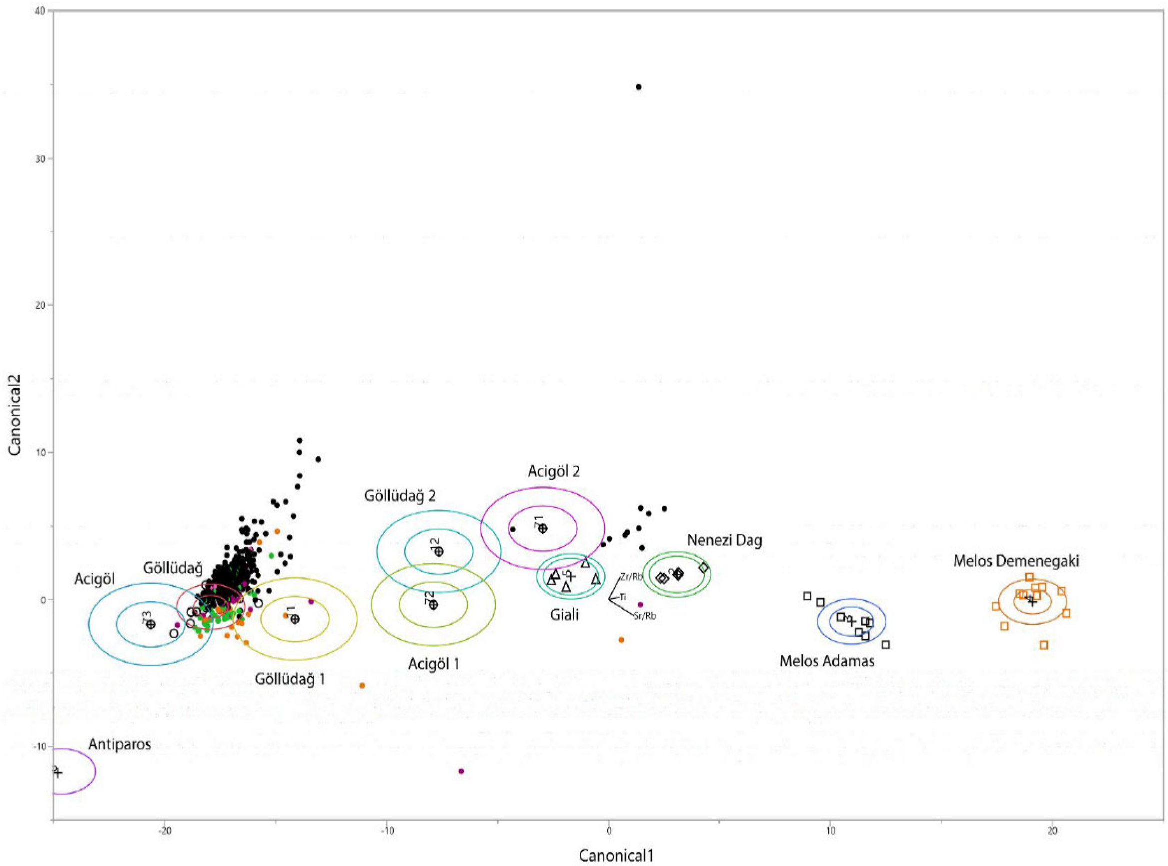

Figure 4. Discriminant Function Analysis (DFA) comparing pXRF data on obsidian from Aceramic Neolithic Cyprus with the main Eastern Mediterranean geological obsidian sources. The figure shows that based on Sr/Rb and Zr/Rb ratios and Ti absolute values, the majority of the Cypriot obsidian can be attributed to the central Anatolian source of Göllüdağ. Colors: black= Shillourokambos, green= Ais Giorkis, orange= Mylouthkia, pink= Arkosyko (covered by the Shillourokambos main cluster), purple= Tenta (Moutsiou 2018).

would enable the maintenance of social ties as an adaptive strategy in the new conditions.

Modeling Maritime Connectivity in the Eastern Mediterranean

To support archaeological inquiry and inference regarding prehistoric seagoing to/from Cyprus, Lagrangian-based simulation algorithms were employed for modeling the drift-induced, as well as directed sea-borne movements, based on data and assumptions regarding the prevailing paleo-environmental conditions and vessel characteristics. Although directed sea-borne movements are still under investigation, preliminary drift-induced simulation results indicate that there exist at least two periods, during winter for South to North routes (south coast of Anatolia–Cyprus and vice versa), and during summer, for East to West routes (eastern coast of Levant–Cyprus and vice versa), whereby the sea state is favorable to drifting vessels, especially for shorter distances. During almost all the time, departures from the southern side of the Levantine mainland are blocked by currents flowing almost parallel to the coast (Nikolaidis et al. 2020, Figure 7).

Figure 5. Obsidian artifacts from Early Holocene (Aceramic Neolithic) Cyprus.

Maritime Obsidian Networks in the Eastern Mediterranean

The location of Early Holocene obsidian-bearing sites along the north and south coasts of the island and the apparent obsidian gap between the two regions likely support two different mainland routes for the introduction of obsidian to Cyprus: (a) Levant and south coast of Cyprus, and (b) Turkey (Anatolia) and north coast of Cyprus. The application of simulation-based modeling of sea-borne movement in the Eastern Mediterranean allows us to test these hypotheses and determine the most realistic routes for obsidian maritime movement between the island of Cyprus and its surrounding mainland. Work so far points to support both scenarios as likely. The lack of obsidian-bearing sites on the southern coast of Turkey contemporaneous with those found on Cyprus may point towards a closer link with the Levantine mainland.

Conclusions

Complex networks of exchange, where some long-distance links between non-neighboring villages were present (Ortega et al. 2016) in the mainland from the PPNA, with settlements able to develop and maintain distant exchange links that connected different regional exchange networks. The subsequent PPNB period sees an increase in obsidian consumption and longer-distance networks. The detailed analysis of obsidian on Cyprus demonstrates similar patterns were taking place on Cyprus too. The island across the seas was an active participant in this broader “socialscape” that joined mainland and insular prehistoric communities together. Obsidian exchange (Figure 8), in particular, facilitated the creation and maintenance of long-distance maritime networks. Social networks are a valuable asset crucial for the sharing of information, resources, and genes.

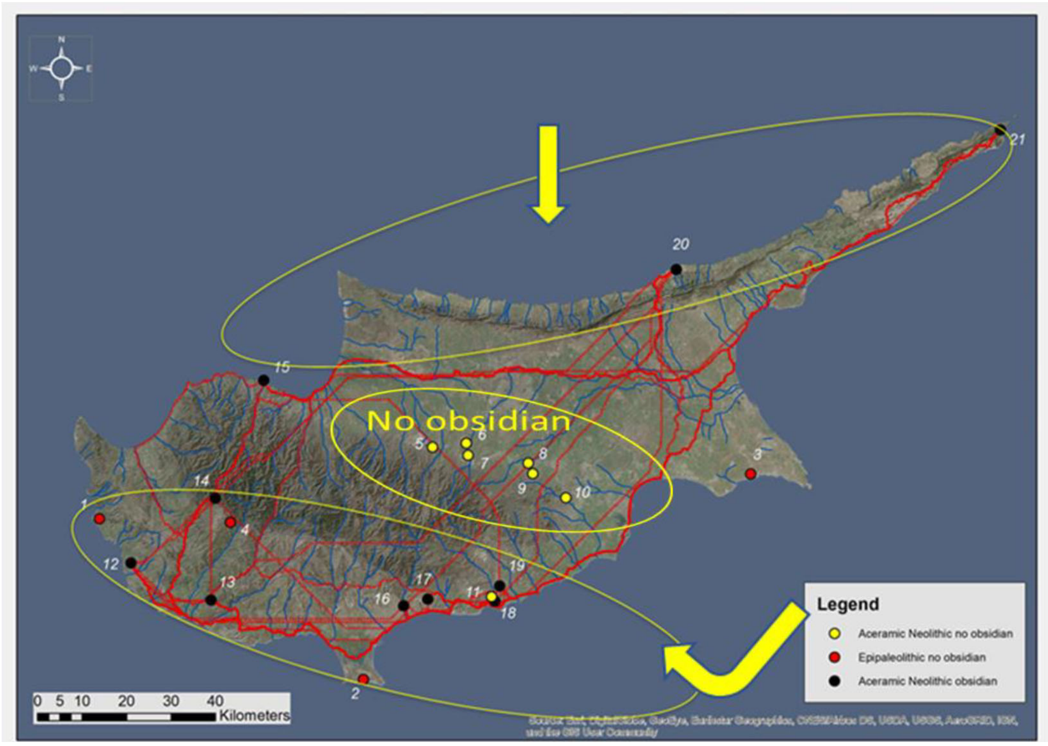

Figure 6. Least Cost Paths Analysis (LCPA) of Aceramic Neolithic sites on Cyprus. The analysis has shown that not all contemporary sites use obsidian. On most occasions sites that do not use obsidian are located at a distance from the least cost routes. However, on some occasions, such as Agrokipia Paleokamina and Pera Chorio Moutti, obsidian is absent from the lithic assemblages even though the sites fall on the least cost route. The image also illustrates that obsidian circulation is fragmented with exploitation restricted along the north and south coasts and a major gap in the interior of the island. Sites: 1=Akamas Aspros, 2=Akrotiri Aetokremmos, 3=Nissi Beach, 4=Vretsia Roudias, 5=Agrokipia Paleokamina, 6=AVA Asprokremmos, 7=Politiko Kelaidoni, 8=Pera Chorio Moutti, 9=Alambra Spileos and Koudourka, 10=Ayia Anna Perivolia, 11=Mari, 12=Kissonerga Mylouthkia, 13=Choletria Ortos, 14=Krittou Marottou Ais Giorkis, 15=Limnitis Petratou Limniti, 16=Parekklisia Shillourokambos, 17=Ayios Tychonas Klimonas, 18=Kalavasos Tenta, 19=Khirokitia Vouni, 20=Akanthou Arkosyko, 21=Cape Andreas Kastros. [Note: sites 2 and 4=Epipalaeolithic, 1 and 3=Epipalaeolithic?, 5-11=Aceramic Neolithic with no obsidian, 12-20=Aceramic Neolithic with obsidian]. (Moutsiou and Agapiou 2019).

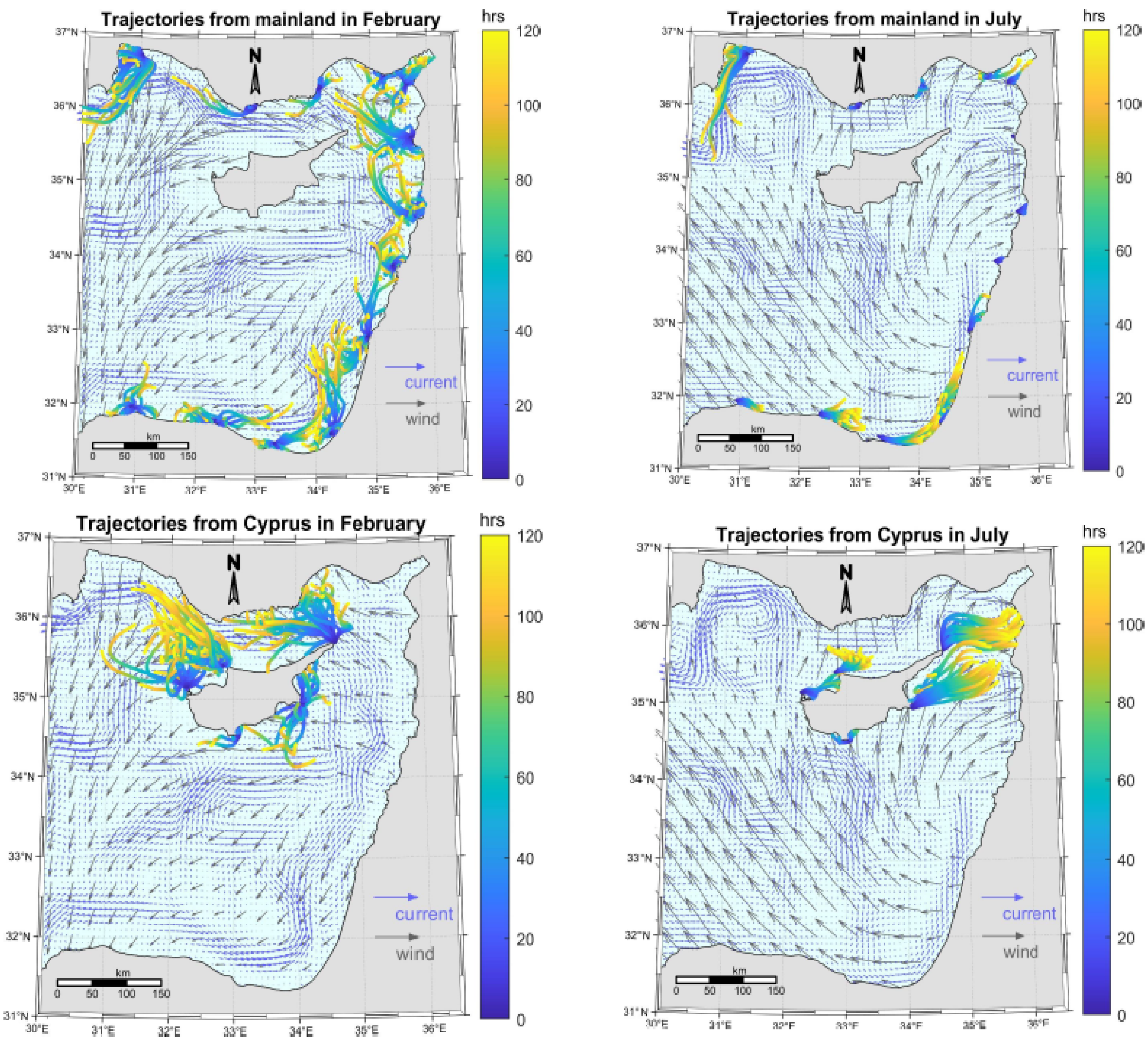

Figure 7. Simulations of prehistoric seagoing to/from Cyprus based on drift-induced modeling (Nikolaidis et al. 2020).

Figure 8. Obsidian artifacts from Early Holocene/Aceramic Neolithic Cyprus.

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1. Develop standards for analytic procedures and ensure inter-laboratory comparability.
2. Develop standards for recording and reporting obsidian hydration and characterization results
3. Provide technical support in the form of training and workshops for those wanting to develop their expertise in the field.
4. Provide a central source of information regarding the advances in obsidian studies and the analytic capabilities of various laboratories and institutions