International Association for Obsidian Studies
Bulletin

Number 12 Summer 1994

Business Address: Department of Anthropology, San Jose State University, San Jose, California 95192-0113

Assembled and edited by K.J. Tremaine

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NEWS AND INFORMATION

THE IAOS ANNUAL MEETING REPORT

The IAOS held it's sixth annual meeting April 20th at the Disneyland Hotel in Anaheim, California, in conjunction with the Society of American Archaeology meetings. There were a lot of new faces this year, with about 25 attendees. Less than half were from California. Members and non-members from diverse corners of the world were present, including Alaska, the Marshall Islands, New Zealand, Ecuador, and Greece.

Viviana Ines Bellifemine, Secretary-Treasurer, reported IAOS moneys totaling $2501.89. The last count of members was 99, with 15 international, and 84 from the U.S. (6 lifetime members). She plans to make available an updated membership directory with the next Bulletin.

Kim Tremaine, President-Elect and Bulletin Editor, reported plenty of news but not enough help. Blossom Hamusek, recent graduate at California State University, Chico, volunteered to assist with "Abstracts and Annotations". Note: Mike Rondeau has, and continues to cheerfully contribute with his "Short Reports and Reviews"; both he and Craig Skinner have been there for last minute read-throughs to catch the glaring errors and typos before going to print.

Steve Shackley reported old business (IAOS Obsidian Bioliography available on disk and hard copy; IAOS flyers available in Spanish; and our SAA affiliation). Kim reported on new business. She proposed the term for Secretary-Treasurer be extended from one to two years. All voted in favor. Revisions to the Bylaws, a project taken on by Steve, is still in progress. It will soon be completed. Proposals regarding next years meeting location were suggested. Most were in favor of the SAAs again in Minneapolis.

Interest in a workshop, similar to this year's sourcing standardization, was voiced, either emphasizing hydration measurement or applications, evaluations, and interpretations of hydration/source data.

NEW OFFICERS

Election results were announced at the Sixth Annual IAOS meeting. Kim Tremaine, previously serving as President Elect, became President. Michael Glascock was elected our new President Elect. Vivivana Ines Bellifemine was unanimously reelected for another term as Secretary/Treasurer.

WORKSHOP ON FIELD & LAB METHODS IN OBSIDIAN GEOCHEMISTRY

This workshop, organized by Steve Shackley, was held after the IAOS Annual Meeting. About 25 folks attended. The goal was to generate a dialog on field and lab methods and standards in archaeological obsidian source studies. Discussion included: field sampling (how much is enough, and when enough is enough); elemental determinations (incompatibles, major compounds etc.); discussions regarding XRF, PIXE/PIGME, NAA, and Electron microprobe; data presentation (multivariate statistical analysis vs. graphic displays); and encouragement to publish often. Details of the discussions will be reported in a future issue of the Bulletin.

WORLDWIDE OBSIDIAN CATALOG

A collaborative effort to produce a worldwide obsidian catalog has been initiated by Michael Glascock. He and Roger Bird have pooled their data so far (on obsidians from the New World and South Pacific Region), with additional contributions by Craig Skinner.

The plan is to create an informational database that will be made available to all interested obsidian researchers through the IAOS. At some time in the near future, a listing of the known sources will be published in the Bulletin. Any information you can provide on obsidian sources would be greatly appreciated. Categories for a master database give guidelines on descriptive and compositional data wanted (see yellow sheet attached). Please send all contributions to:

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223 Research Reactor
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OUTGOING PRESIDENT'S NOTE

M. Steven Shackley

Usually this is the place where the outgoing president summarizes the gains made in the last year and offers praise for the executive committee and various other committee members. But I must say, that while the executive committee actually make this all work, the real thanks should go to the members. It has been very gratifying to witness the growth of this organization and the diversity of countries now represented. It has truly become international, a trend we hope will continue.

The publication of the IAOS bibliography in hard copy format by Craig Skinner and Kim Tremaine was a high point of the 1993-1994 year. While the hard copy is essentially identical to the electronic copy in its bibliographic entries, the accompanying photographs and illustrations are worth the price of membership many times over. Craig and Kim went well beyond the call on this one.

During this year, we instituted the IAOS Advisory Council, germinated by Craig Skinner. This council is composed of IAOS Lifetime Members who have been involved in obsidian studies for a number of years. The current members include Dr. Irv Friedman (USGS, Denver), Dr. Roger Green (University of Auckland, emeritus), and Dr. Clement Meighan (UCLA, emeritus). We thank all for their support of IAOS and obsidian studies through the years.

At the IAOS Annual Meeting this year, we organized the first *Workshop on Field and Laboratory Standards in Obsidian Geochemistry*. This was a very successful workshop that brought together many of us involved in obsidian geochemistry. The summation of our discussions will be reported in a future issue of the Bulletin. There are plans for a similar workshop on hydration studies next year.

Again, I want to thank the members and particularly Kim Tremaine for the exceptional

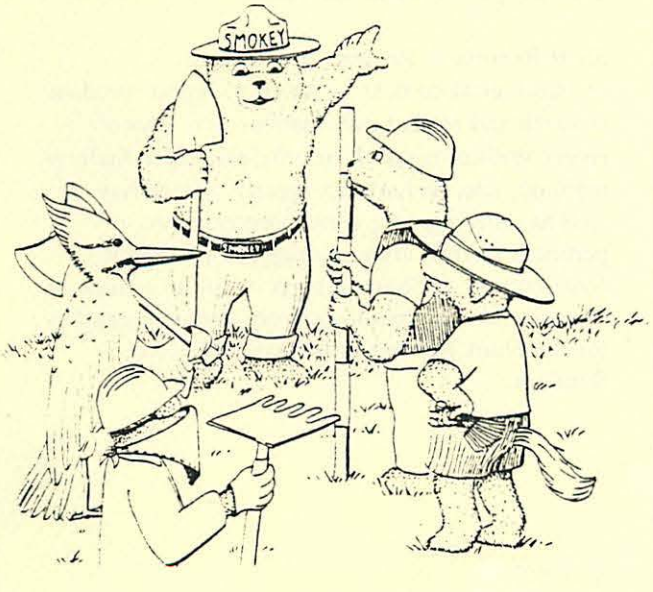
Bulletin editing, and Viviana Ines Bellifemine for such great support during my tenure. The IAOS will continue to grow and mature in the coming years. I'm glad to be a part of it.

INYO NATIONAL FOREST PLAN TO TEST THE EFFECTS OF FIRE ON OBSIDIAN

The Inyo National Forest, California, is planning to conduct research designed to test the effects of fire on obsidian hydration readings. This will be done by emplacing three different size classes of obsidian flakes on the surface, at 5 cm, 10 cm, and 15 cm depth, in two areas chosen for controlled burns. Several plots spatially distributed to cover a range of fire conditions will be retrieved and new measurements taken.

The test will take place at the Indian Summit Research Natural Area in the Jeffrey Pine Forest of southern Mono County and at Monache Meadow in the southern Sierra Nevada. These two areas have very different vegetative and edaphic conditions.

A less controlled test will be done on obsidian from a site near Mammoth Lakes where logging slash was accidentally piled on a quarry locus and burned. Hydration reading from debitage recovered before the burn will be compared with readings from burned debitage. For more information, please contact Wally Woolfenden (619) 647-3031, Jan Cutts (619) 873-2481, or Linda Reynolds (619)873-2423.



ARTICLE

PRELIMINARY RESULTS ON AN ASSESSMENT OF THE EFFECTS OF FIRE ON OBSIDIAN SPECIMENS FROM CA-SON-458, SALT POINT STATE PARK SONOMA COUNTY, CALIFORNIA

by Thomas M. Origer and Jessica Anderson
Santa Rosa Junior College, California

Introduction

In November of 1993, a wildfire broke out along the Sonoma County coast in Salt Point State Park, which is located 70 miles north of San Francisco. The fire, resulting from an out-of-control campfire, burned rapidly across the landscape for several hours. Within the fire's path were dozens of recorded archaeological sites, some newly identified after the incineration of dense forest vegetation. Obsidian items had evidently undergone extreme heat, exhibiting a peculiar sheen. An investigation of the effects of fire on obsidian hydration development was undertaken by archaeologists from the Santa Rosa Junior College following this event. Preliminary results are presented below.

Study Procedures

Previous investigations had been conducted at site CA-SON-458, during which obsidian had been collected (Bramlette and Fredrickson 1990; Dowdall n.d.). Because this study was dependent upon comparative data from pre-fire contexts, this site became the focused of our studies.

Less then three months after the fire, an intensive systematic surface search for obsidian was conducted. One-hundred-seventeen specimens were collected. Subsequently, in April 1994, five small subsurface collection units were excavated in areas of evident surface concentration. These units were excavated in five centimeter increments. Maximum unit depths reached 20 centimeters. Recovered specimens appeared to remain undisturbed since the fire. No signs of faunal turbation were observed.

Thirty-seven specimens from post-fire contexts, and twenty three from pre-fire contexts, were analyzed by the senior author using standard analytical techniques employed at the Obsidian Hydration Laboratory, Sonoma State University. Hydration data are assembled and shown in Table 1.

Table 1. CA-SON-458 Obsidian Hydration Data from Pre- and Post-Fire Contexts

Event	Investigation	Provenience	Number Samples	Percent Measurable
Pre-fire	1987 Survey	surface	3	100
	1990/91 Excavation	0-10 cm	20	100
Post-fire	1994 Survey	surface	21	14
	1994 Excavation	surface	1	0
		0-5 cm	1	100
		5-10 cm	4	100
		10-15 cm	8	100
		15-20 cm	2	100

Comments

The total number of specimens included in this study is few, however, some important trends are suggested. It was found that the percent of samples yielding measurable hydration bands from pre-fire surface and near surface contexts was 100%. In contrast, <15% of the samples collected from post-fire surface contexts exhibited measurable hydration bands. All items from near surface and subsurface proveniences, however, were apparently unaffected, bearing measurable bands. A thin mantle of soil was evidently sufficient to protect specimens from damaging effects.

The 1993 Salt Point State Park fire clearly affected hydration on surface specimens. A build up of substantial fuel loads as a result of modern fire suppression practices probably contributed to high fire temperatures. In contrast, there is evidence to suggest that prehistoric occupants of the region may have managed the land somewhat differently by periodically burning to improve resources availability (Lewis 1973). Prehistoric fires, then, possibly burning with reduced fuel loads, may have had less affect on obsidian.

Despite potential fuel load increases instigated by modern land management practices, it was heartening to note that specimens below the ground surface were not adversely affected. Even a thin veneer of soil appeared to protect buried specimens. If these data are replicated in other studies in other areas, then perhaps they can encourage the consideration of more careful ways that burns can be conducted so that artifact obsidian is protected and preserved for future analyses.

References

Bramlette, A. and D. Fredrickson
1990 A Cultural Resources Study for a Burn Management Plan at Salt Point State Park, Sonoma County, California. Report on file at the Northwest Information Center, Sonoma State University, Rohnert Park, California.

Dowdall, K.
n.d. Masters Thesis in progress. Department of Anthropology, Sonoma State University, Rohnert Park, California.

Lewis, H.
1973 Patterns of Indian Burning in California: Ecology and Ethnohistory. Ballena Press Anthropological Papers 1. Menlo Park, California.

SHORT REPORTS & REVIEWS

Compiled by Mike Rondeau, Caltrans, Environmental Division, 650 Howe Avenue, Suite 400, Sacramento, California 95825 USA; (916) 263-3375; FAX (916) 263-3384

Short Reports & Reviews provides an archaeological context in which to report obsidian research and related information. Reviews of recent studies, research in progress, older findings, regional, site, and artifact specific summaries, as well as other reports, announcements, etc. of pertinent interest are encouraged. To submit contributions to Short Reports or for an outline of recommended archaeological/obsidian information for the Short Reports format contact Mike Rondeau.

OBSIDIAN SOURCE STUDIES IN NORTHERN ITALY

The article "Recent Italian Obsidian Analyses" by K. Randle, L. H. Barfield, and B. Bagolini in the *Journal of Archaeological Science* (1993, 20:503-509) provides a brief mention of previous obsidian studies in northern Italy along with their methods of applying Neutron Activation Analysis. Several research problems are mentioned. One is the problem of "precise dating of samples (often from multiperiod sites)" although no mention of the potential utility of hydration band width analysis is made. The article mainly addresses the research problem of when the earliest and latest manifestations of obsidian occurred in the region.

It is suggested that importation of obsidian into northern Italy began by the start of the Neolithic. Early Neolithic obsidian use in the region was supported by radiocarbon dates of 6329+60 BP (4370 bc) (5339-5230 Cal BC) from Fondo Cappuccini and 6120+60 (4170 bc) (5211-4958 Cal BC) from Sammardenchia. One example presented as evidence for the use of obsidian into the Chalcolithic was debitage from the manufacture of arrow points.

The possibility of Early Bronze Age use of obsidian in the area was also noted. That some late obsidian use may have resulted from locally scavenged material recycled from earlier periods is suggested as an outside possibility. The potentials of hydration band width and technological studies, especially if used in concert to develop further information on this question, were not considered.

The presence of imported Carpathian obsidian was identified during both the earliest and latest periods of obsidian use. For the former this was suggested to support other archaeological interpretations of contacts with Central Europe during the Early Neolithic. Other obsidian is noted to be from the Lipari islands to the west.

CHEMICAL CHARACTERIZATION OF OBSIDIAN CLIFFS, OREGON

This trace element study was reported in the article "Trace Element Geochemistry of Volcanic Glass from the Obsidian Cliffs Flow, Three Sisters Wilderness, Oregon" by Richard Hughes (1993) in *Northwest Science* 67(3):199-206. A brief review of the status and potentials of prehistoric obsidian studies in Oregon is offered. Discussion of the field reconnaissance, collection, and methods of laboratory analysis are provided.

Ten specimens each, from eight localities in the Obsidian Cliffs source area were analyzed. The results of testing eleven minor, trace, and rare earth elements are included. A statistical evaluation found that the eight localities "contain obsidian of remarkably uniform geochemical composition".

Conditions that must be met to define minor, trace and/or rare earth elements to serve as general diagnostics in the segregation of obsidian sources are set forth. Intrasource variability was found to be low, while comparative intersource variability was notable. Evaluation of specific examples follow. One example is the use of Sr to distinguish five glass sources in the Cascade Range, including Big Obsidian Flow, Newberry Volcano, McKay Butte, South Sister, and Obsidian Cliffs. An example of where the Sr content to too low to be useful is also discussed.

GREAT BLADES CACHE: OBSIDIAN BIFACES ON PARADE

John Rick and Thomas Jackson (1992) report on a thoughtful study of an obsidian biface cache in "A funny thing happened on the way from the quarry... Analysis of the Great Blades Cache of Northern California in Stone Tool Procurement, Production, and Distribution in California Prehistory", edited by Jeanne Arnold (Perspective in *California Archaeology* 2:5-65).

The site, CA-Gle-138, the Great Blades Cache, was comprised of 69 whole and fragmentary bifaces of Borax Lake glass. The site was discovered by Les White in 1972 and excavation was directed by Don Miller, U.S. Forest Service. The site is located at an elevation of 5060 ft (1560 m) in Mendocino National Forest. This isolated cache was exposed by the combination of a road cut and erosion. Sourcing of all specimens was accomplished by Tom Jackson using x-ray fluorescence. Ten specimens were cut and read by Tom Origer for hydration band width analysis. Five yielded an average band width of 3.5 microns and five 3.6 microns.

This study documents the importance of micromapping of such features. Careful consideration of initial assumptions, appropriate uses in analysis of morphological, technological, and numerical description. Data abounds. Statistic-speak is available for those who know the language. An anthrostory of what may have happened, that can tempt the reader to spin an alternative prehistoric yarn, is also provided.

The article is a bifacephile's delight. At times it is a mind walk. The concluding advice of Rick and Jackson for other investigators faced with the analysis of similar caches, "Stay calm, think carefully, and get help (1992:59)" might also be offered to any biface-phobes that consider reading this report. A wide array of photographs, charts, maps, graphs, diagrams, tables, and illustrations are provided.

STONEWORKING IN MONO COUNTY: THE CASE OF THE CASA DIABLO HYDRATION DATA

In 1988, data recovery was conducted on four archaeological sites in the general Casa Diablo source locality by INFOTEC Research, Inc. for the California Department of Transportation along U.S. Highway 395 in Mono County, California. The sites are found in a Jeffrey pine forest at an elevation of ca. 2300 m (7600 ft) in the Long Valley Caldera, Inyo National Forest. The ages of these sites vary, involving periods beginning as early as 6400 B.P. to as late as 200 B.P. A total of 253,271 pieces of debitage, 172 bifaces, 77 cores, 47 retouched pieces, and 39 projectile points were recovered. Nearly all of the flaked stone was Casa Diablo glass.

Nine hundred obsidian hydration measurements were taken on 871 specimens. A thoughtful sampling strategy was used to produce three different Casa Diablo artifact samples for hydration studies. Sample one (n=200) involved a random sample of 50 obsidian specimens from each of the four sites to look at reduction intensity through time.

The second sample (n=333) included 35 projectile points and 298 tools and cores. Temporal changes in technology and artifact styles as well as deposit integrity were the initial focus of this study. Both multiple and specifically placed cuts on some specimens were required.

The third sample removed approximately 12 specimens from each level of a selected unit at both CA-Mno-574 and CA-Mno-578. This sample was chosen to generate data regarding stratigraphic integrity and occupational components.

The results of these studies are carefully considered for each sample at each site, and for the aggregate of hydration band width results for each site. Temporal interpretations are the primary focus of these evaluations. There is some limited discussion of actual hydration band width findings although most of the findings are reported after having been converted to calendric dates using Hall's (1984) power function rate. There are some presentations of hydration band width data in tables and charts while other portions are presented in calendric fashion. The raw hydration data is provided in Appendix H.

Given the substantial proportions of the hydration study, a discussion focused first on the raw hydration data could have provided a more clear

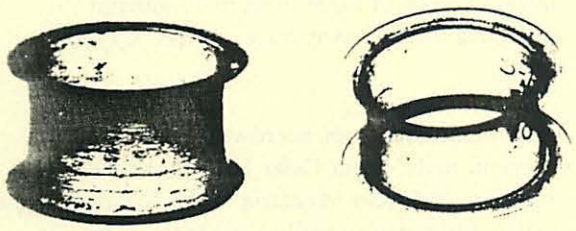
picture of the actual results of each sample (e.g., patterns of dispersion and central tendency). A general evaluation of the band width data, unfiltered by summarized calendric assignments, might have provided a more firm basis for calendric discussions. However, the report and the undertaking that it represents are impressive and massive amounts of raw data are present.

The technological lithic studies also produced a wealth of data and are supported by numerous graphs and excellent artifact illustrations. The appendix on estimating flake counts from weights offers interesting findings and conclusions worthy of further discussion, if not debate.

The excavations were directed by Jeff Burton. Richard Hughes undertook x-ray fluorescence analyses and the hydration band width studies were done by Tom Origer. The flaked stone studies were accomplished by Elizabeth Skinner and Peter Ainsworth. "Archaeological Excavations at Sites CA-Mno-574, -557, -578, and -833: Stoneworking in Mono County, California" by Susan Goldberg, Elizabeth Skinner, and Jefferey Burton (1990) is currently available via the Publications Distribution Unit of Caltrans, Sacramento.

References:

Hall, M. C.
1984 Obsidian, Paleoeconomy, and Volcanism in the Eastern Sierra Nevada. Paper presented at the 19th Biennial Meeting of the Great Basin Anthropological Conference, Boise.



not to scale

Ground and drilled obsidian ear spool from Veracruz, Mexico
Produced from Sierra de Pachuca obsidian, Hildago Mexico
On display at the Phoebe Hearst Museum of Anthropology

ABSTRACTS AND ANNOTATIONS ON REPORTS AND PUBLICATIONS

Compiled by Blossom Hamusek of Archaeological Research Program, Department of Anthropology, California State University, Chico,California, 95929-0400, USA; (916) 898-4360.

... with contributions by Michael Glascock, who recently attended the 29th International Symposium on Archaeometry in Ankara, Turkey.

The volume of so-called "gray literature" in archaeology is staggering, making it difficult for researchers who are not "plugged-in" to contract or research archaeology of a certain region to hear of and gain access to reports. In addition, the proliferation and number of journals, and the interdisciplinary nature of obsidian and glass studies make it difficult to keep abreast of all relevant, current literature. The IAOS Bulletin will alert readers to some of this information by reproducing abstracts and summarizing literature that may be of particular interest to IAOS members.

Acquafredda, P., S. Lorenzoni and E. Zanettin
1994 SEM-EDS:Non Destructive Method to Discriminate Obsidian Archaeological Artefacts. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Our research program deals with the possibility of recognizing the source area of obsidian artefacts through non-destructive chemical analyses. The source areas of the Mediterranean obsidians are Mt. Arci, Lipari, Palmarola, Antiporas, Milos, Giali. The present work considers obsidians outcropping at Milos, Lipari, Palmarola and archaeological artefacts from the first two islands.

At Milos, obsidians outcrop in four different geological positions. From bottom upwards, i)

Middle-Upper Pliocene basal pyroclastites, ii) Lower Pleistocene pyroclastites, iii) Lower Pleistocene lava domes, iv) younger conglomerates.

At Lipari, obsidians take part of the Post-Pleistocene Mt. Pilato dome. At Palmarola, obsidians outcrop in a lava dome at Mt. Tramontana. Samples of the three islands were analyzed by XRF; several of them were also analyzed by SEM-EDS. Moreover, some samples of obsidian artefacts and refused archaeological material were analyzed by SEM-EDS on original surfaces.

Both XRF and SEM-EDS analyses represent a powerful technique in order to discriminate the provenance of obsidians. XRF technique allows to distinguish the three different populations, particularly on the basis of the contents of Na_2O, K_2O, CaO, Rb, Sr, Nb, La, Ce. SEM-EDS analyses points out evident differences as regards major elements, particularly in CaO and alkali contents.

First investigations performed by SEM-EDS on original (i.e. not worked) surfaces of refused archaeological material and artefacts collected at Lipari and Milos give interesting results as regards the discrimination of the two source areas. We conclude also that SEM-EDS analysis, a non-destructive technique, represents an important tool to indivituate the provenance of obsidian archaeological artefacts.

Anderson, J., T. Origer, and B. Parkman
1994 A Preliminary Study of Fire Effects on the Northern Sonoma County Coastal Archaeological Resources at Salt Point State Park. Paper presented at the Annual Meeting of the Society for California Archaeology, Ventura.

Abstract

On November 27, 1993, a wildfire burned a portion of Salt Point State Park, located on the Northern Sonoma Coast. This paper will discuss the preliminary findings of a planned five year study of the effects of fire on archaeological resources. This will include the effects of fire on site constituents, such as shell and obsidian, and the effects on site exposure. The removal of vegetation has resulted in high site exposure. New sites have been found in recent survey work and during the fighting of the fire. Also, the boundaries of previously recorded sites have become more distinct. This study has been able to turn this destructive event into a beneficial and informative occurrence. (Note: results reported in this Bulletin)

Anderson, Patricia C.
1994 Methods of Study of the Use-Traces on Obsidian "Cayonu Tools" and Finishing of Stone and Plaster Objects in the Pre-Pottery Neolithic B. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Our paper will address functional analyses of a class of distinctive obsidian tools common in certain PPNB sites in the Eastern Taurus, along the Middle Euphrates, and in the Sinjar, referred to as "Cayonu" tools (or "baked blades"), and thought by most archaeologists to be sickles. The tools have visible, marked linear abrasion traces on a single flat face, which is sometimes adjacent to an edge with abrupt retouch forming a dentate outline. Numerous experiments were carried out with modern copies of these tools in an attempt to reproduce the use-wear traces of the "Cayonu tools".

We present data from microwear analysis of "Cayonu tools" from Cafer Hoyuk and Cayonu in Anatolia, and from Magzalia in the Sinjar (Iraq), as well as for experimentally-used tools. Our observations, using a reflected-light microscope and the SEM, show some variation in micromorphology of the striae comprising this use-abrasion, as well as in the elemental composition found (using

EDAX) for residue material seen in the troughs of the use-striae. The special abrasion traces were reproduced experimentally only by working objects of soft lithic materials similar to those found in the same levels as the Cayonu tools (grooved marble bracelets, limestone, marble and plaster bowls, engraved limestone slabs and polished axes). SEM and EDAX analysis of fragments of the latter prehistoric stone objects were compared to residues on the ancient tools. At this time, the experimental study clearly shows that presence of the characteristic Cayonu tools in these sites does not represent harvesting, but rather on-site artisanal activity consisting of decorating and finishing various characteristic stone objects.

Bigazzi, G., Z. Yegingil, T. Ercan, M. Oddone, and M. Ozdogan

1994 Pisa-Adana Joint Project on Provenance Studies of Prehistoric Obsidian Artifacts: First Results from Eastern Anatolia. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Many obsidian occurrences were recognized in several volcanic fields in Anatolia. These obsidians - potential sources of prehistoric artifacts are not yet sufficiently studied. The knowledge of their characteristics (in particular, their chronology) is still inadequate, therefore correlation of obsidian artifacts with natural sources is an arduous task in that region.

The Pisa-Adana joint project was planned to contribute to fill up this gap. Previously three volcanic fields located in Central and Northern Anatolia were studied by neutron activation analysis (NAA) and by fission-track (FT) dating. Both these provenance identification techniques were also applied to artifacts from Neolithic sites in Istanbul area.

More recently this interdisciplinary study was applied to several potential source areas in Eastern Anatolia (Bingol, Mus, Nemrut Dagi, Suphan Dagi, Meydan Dagi, Erzurum, Pasinler, Sarikamis, Kars) and to 50 artifacts from the Cayonu Neolithic site (near Ergani, Diyarbakir, SE Anatolia).

The results of this research can be summarized as follows:

NAA - Most potential source areas are fully discriminated by cluster analysis applied to trace element composition. An imperfect discrimination was obtained for some occurrences.

FT dating - Young ages ($\sim$ 0.02 - $\sim$ 0.6 Ma) were measured on obsidians from Lake Van area (Nemrut, Suphan, Meydan). Pliocene ages were obtained on the remaining volcanic fields (expect Erzurum, age $\sim$ 6.9 Ma). FT parameters (age, track densities, track annealing rate) do not fully discriminate some occurrences in few cases only.

Artifacts - Both NAA and FT dating correlate most Cayonu artifacts with Bingol obsidians. Few artifacts recall other alternative sources. However, source identifications based on very few samples have to be considered with caution, especially because our geological sample-set do not represent all the potential sources of the region.

Blackman, M. James

1994 Out of Anatolia: Changing Patterns of Obsidian Exchange from the 8th to 5th Millennium BC. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

In central and eastern Anatolia and Trans Caucasia, five general regions have been identified as having been exploited for their obsidian occurrences in antiquity. The central Anatolian sources, located southeast of Lake Tuz, were exploited by peoples of western and south central Turkey and the Levant. For archaeological sites located in the arc that includes the Tarsus and Zagros Mountains and

the adjacent lowlands, the major sources in the obsidian exchange were the Lake Van region, the recently identified Upper Euphrates obsidian sources located in the Bingol area, and the Kars/Caucasian sources. Chemical characterization, by INAA, of obsidian from Aceramic Neolithic sites in the Khabur River drainage of northeastern Syria and in the Batman area of southeastern Turkey demonstrate quite different procurement patterns for the two areas. In the Khabur reliance is exclusively on the Bingol sources, while in the Batman area a mixed Bingol-Van pattern prevails, the pattern in the Khabur, by the Halaf Period (6th millennium), had altered only slightly to include a small amount of Vanic obsidian from Nemrut Dag and the as yet unlocated 3a and 3d sources of Renfrew. However, by the "Ubaid" period (5th millennium), the domination of the Euphrates sources in this region has been replaced entirely by Vanic obsidian. To the east in the Zagros Mountains of Iran, the mixed pattern of Vanic and Bingol sources, displayed in the Batman area, prevails in sites on the western slopes, however in the valleys on the eastern slopes on the Zagros the pattern includes a mix of Vanic and Caucasian obsidian. This paper will discuss the obsidian source identification and the implications of the shifts in obsidian procurement both spatially and temporally.

Bouey, P.

1994 After Bennyhoff: The Future of Central California Prehistory. Paper presented at the Annual Meeting of the Society for California Archaeology, Ventura.

Abstract

Archaeologists in central California have long depended on James Bennyhoff as an information source, and although he was virtually indispensable, his responses to inquiries were not always without biases. The CA-SAC-43 project offered the opportunity to work closely with Bennyhoff, and provided greater insight into his perspective of the prehistoric record. Data from this study--radiocarbon, shell beads, obsidian hydration, projectile points, burials, and site structure--all indicate considerably more variation in prehistoric reconstructions than those proposed originally by Bennyhoff. While the basic structure of his cultural-historical scheme appears sound, all dating methods possess intrinsic deviations that ultimately lead to the rejection of the short-term cultural-historical intervals presented in Bennyhoff and Hughes (1987). Central California archaeologists must re-evaluate this entire system, enlisting Bennyhoff's notes where appropriate, but more significantly, scrutinizing data and collections from a more objective vantage.

Bulur, E., A.M. Ozer, Wieser, and H. Y. Goksu

1994 Electron Spin Resonance and Thermoluminescence Studies of Tooth Enamels and Obsidians from Asikli Hoyuk (Turkey). Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Teeth and obsidians collected from various Archaeological levels of Asikli Hoyuk (Aksaray-Turkey) were studied by Electron Spin Resonance (ESR) and thermoluminescence (TL) spectroscopy respectively.

Teeth from various animals were studied by ESR for age determination. The typical axially symmetric signal ($g\perp = 2.0018$) of hydroxyapatite crystal from the tooth enamel was used to obtain the artificial dose response curves and hence the Accumulated Dose (AD) using the additive dose method. Besides the dating study the ESR signals and growth curves of different animals were compared in many respects.

Obsidians collected at the site from burned levels are investigated by TL for dating. Unburned obsidians from the site as well as from two main sources near to the site namely, Nenezi Dag and

Kayirli were investigated for source identification. To estimate the external annual dose a portable gamma counter was used and also some TL dosimeters buried to associated levels of the site. The internal doses were obtained via thick sample alpha counting.

Cauvin, M.-C., and C. Chataigner
1994 Proposals for the Correlation of Geochemical Groups of Obsidian from the Near East. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Obsidian recovered from Neolithic archaeological sites in the Near East has been subjected to new analyses (Optical Emission Spectrometry, Inductively Coupled Plasma-Atomic Emission Spectrometry, Neutron Activation Analysis, Proton-Induced Gamma-Ray Emission, X-Ray Fluorescence). This information has been entered into a computerized data bank, which combines the Neolithic archaeological sites from the Near East as well as the deposits. A chart has been established to show a synthesis of the groups defined by the various laboratories (Berkeley, Bradford, Cambridge, Heidelberg, Jerusalem, Michigan, Orleans, Rome, Strasbourg).

In the course of the comparison of the results, a certain number of difficulties have emerged, related to variability in the experimental conditions within a laboratory for a given method, as well as between one laboratory and another, and between one method and another. A reference sample was circulated among three laboratories using different methods in order to correlate their results. Despite the variability, we found there were homogenous groups as well as a good comparability between laboratories.

To resolve certain problems related to the differentiation of obsidian flows from different locations but with similar geochemical composition, more refined methods are currently being tested (Lithium/Boron, and dating by fission tracks or K/Ar). This study is being undertaken within the structure of the obsidian group of PACT (European Study Group on Physical Chemical Biological and Mathematical Techniques Applied to Archaeology).

de Romanis, F., V. Francaviglia, G. Patermoster, and R. Rinzivillo
1994 Origin and Technology of Obsidian Cups from Pompeii and Stabia. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

A set of obsidian turned cups, handled and with finely inlaid Egyptian figures in gold, semi-precious stones, ivory and coral, has been found in the fifties at the Roman Stabia under lithified mud of the famous A.D. 79 Vesuvius eruption. Another obsidian turned and inlaid cup, Stabian artefacts are still in store in the same museum.

All these items have been non-destructively analysed "in situ" by means of a portable ELD-XRF spectrometer and a fragment of one of them in Rome, using a WLD-XRF spectrometer. Both analyses reveal that all the artefacts were made of calc-alkaline obsidian. This rules out any Pantellerian, Tibestian, East Anatolian, Yemeni and to some extent, Ethiopian origin.

A peculiarity of this obsidian is a K_2O content higher than that of Na_2O. Unfortunately, this is typical of the other Italian obsidians (Lipari, Sardinia and Palmarola), and also of Carpathian and some Ethiopian volcanic glasses.

From the technological point of view, these cups are a marvel. Cups and handles form a single piece. This implies that turning of these artefacts was stopped at some point as the handles were finished by hand. Moreover, the fact that handles are identical in shape to those of some Pompeian silver cups on display in the same museum induces us to suspect that this obsidian pottery was locally made.

Unfortunately, until now, any sure identification of the raw material used has failed. This exercise is far from being academic, because a precise provenancing of the original raw material could help in identifying the manufacturing place of such beautiful artefacts.

Ercan, Tuncay, and Fuat Saroglu
1994 Features of Obsidian Beds Formed by the Activity of the Volcanoes in Anatolia since 25 Million Years B.P. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Obsidian is amorphous volcanic glass generally black, sometimes gray, brown, red and green in color characterized with glassy appearance, and conchoidal fracture. It is formed by the sudden cooling of the molten, generally acidic magma with high water content. Obsidian is found in vicinity of the volcanoes, as lenses in lava or pyroclastics rocks together with the other volcanic products. It has been used for making arrowheads, other sharp implements, jewelry and art objects in historical times. Obsidian, therefore, has significance in archaeological point of view.

Many volcanic eruption centers have been active in the last 25 million years (Lower Miocene-Holocene), now considered as inactive, and have formed rich beds of obsidian in different times and phases, especially in Hasandagi and Kizilcahamam regions (Central Anatolia) and around Nemrut, Bingol, Suphan, Agri Mountains (Eastern Anatolia). These volcanoes have different chemical and physical features. Radiometric datings by different methods have yielded in 25 million years-0500 years for these obsidians.

This proceeding aims to give information on the position of the obsidians in volcanic stratigraphy, their chemical and physical features, ages and also the relation between the historical towns around and the obsidians that formed since 25 million B.P.

Glascock, M.D., H. Neff, and M. Giesso
1994 New Perspectives on Obsidian Procurement in the Titicaca Basin, Bolivia. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

The city of Tiwanaku located near the shores of Lake Titicaca, about 3850 meters above sea level, has astonished travelers and explorers who contemplated the remains of the magnificent temples and pyramids built there during the period from 300 to 1000 A.D. As the Tiwanaku state collapsed several centuries prior to the Spanish conquest, and there are no written records, the nature of its influence over the political, economic, and religious aspects of contemporaneous societies in the south-central Andes is yet unclear. However, there is evidence that the Tiwanaku state may have exerted substantial influence over the procurement and distribution of stone tools made from obsidian, basalt, and chert. Previous research indicates that obsidian was brought there in the form of small nodules and worked to produce small flakes and projectile points. To further advance the study of obsidian, a sample of nearly 100 artifacts was analyzed by neutron activation analysis at the Missouri University Research Reactor. Ten obsidian sources were represented in the Tiwanaku heartland materials indicating that the Tiwanaku peoples had a more complex long distance exchange network than had been previously supposed. This study establishes a database for future obsidian studies in the south-central Andes enabling a better understanding of Tiwanaku's network of raw material procurement, tool production, and distribution.

Hamusek, B.
1994 The Tuscan Obsidian Source of Northern California: Archaeological Implications and Geochemical Variability. Paper presented at the Annual Meeting of the Society for California Archaeology, Ventura.

Haumsek continued...*Abstract*

Prior to this study there had been no formal attempt to identify the full geographical extent and geochemical variability of the Tuscan obsidian source contained within the Tuscan Formation. Field investigations conducted by the author identified eight new glass sources within this northern California geological formation. Obsidian characterization of samples revealed significant geochemical differences between several of the locales, indicating that in addition to the known sources (Hughes 1983), there are two new identifiable geochemical groups. Archaeological implications of these source groups will be discussed in regards to the lithic procurement patterns of the prehistoric inhabitants who inhabited north-central California.

Keller, J., R. Djerbashian, E. Pernicka, S. Karapetian, V. Nasedkin

1994 Armenian Obsidian Occurrences as Sources for the Neolithic Trade: Volcanological Setting and Chemical Characteristics. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Obsidian has been widely used in Prehistoric civilizations of the Mediterranean and the Near East. A large number of natural occurrences are known from Anatolia, and chemical characterization is well advanced. Less well explored and characterized are obsidian sources in the Caucasus and Transcaucasus, especially in Armenia, and their contribution to the Neolithic trade, though clearly important, still lacks satisfactory constraints.

A survey for obsidian occurrences in Armenia and surrounding areas as possible sources for prehistoric use has been carried out. We describe the geological context of 12 distinct volcanic complexes with obsidian flows including Artenia, Atis, Gutansar, Spitaksar, Gechasar, Bazenk, Satanacar,Sevkar and Choraphor in the Armenian Republik, Kaksan in the Northern Caucasus, Paravan (Kojun Dag) in Georgia and Kecheldag in Azerbeidzan.

Chemical characterization defines at least 15 chemically distinct groups as some volcanic complexes, e.g., Arteni, have produced chemically different obsidian flows. Distinction of individual obsidian sources is based on chemical analysis of major and minor elements by XRF analysis, and a detailed trace element study by neutron activation analysis. It is shown that unambiguous chemical correlations are possible through detailed element-by-element comparison. It is shown, however, that major distinctions are already possible with significant two-element plots.

Kilikoglou, V., Y. Bassiakos, K. Souvatzis and A.P. Grimanis

1994 Carpathian Obsidian in Macedonia, Greece. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

The three main Carpathian sources of archaeological obsidian have provided material to a wide geographical area, in the centre of Europe. The most southern site where obsidian has been found and attributed, after trace element analysis, to the Carpathians is Veliki popovic-south of Belgrade. Another important source in the antiquity was the island of Melos, in the Aegean, which supplied with obsidian the greek mainland and the western Anatolia since the seventh millennium B.C. The most northern appearance of Melian obsidian is up to now the site of Sitagroi in Thrace, Greece.

The area of the south Balkans is far from both sources and the obsidian findings are extremely rare. More specifically, in north Greece (Macedonia and Thrace) very few pieces of archaeological obsidian have been found in only three sites. One of these objects has been

attributed to Ciftlik and the rest to Melos. However, in the Neolithic site of Mandalo, 60 km north from Thessaloniki, twelve obsidian blades were found recently and their provenance was investigated. Instrumental neutron activation analysis was applied for the determination of eighteen minor and trace elements. Additionally, geological samples from the Carpathians were analysed and added to the already existing in the literature reference groups. Furthermore, geological samples from all the Aegean sources were analysed. Comparison of the Mandalo results to all reference groups shows a complete match to the eastern Carpathian sources, indicating transportation of obsidian to Greece. This finding extends the know distribution of Carpathian obsidian, for another 500 km to the south, reaching the Aegean area.

Laylander, D.

1994 The Chronology of Lake Cahuilla's Final Stand. Paper presented at the Annual Meeting of the Society for California Archaeology, Ventura.

Abstract

Lake Cahuilla was a large freshwater lake in the Salton Basin of Imperial and Riverside Counties, formed by natural diversion of the lower Colorado River. New evidence from the Elmore Site (CA-IMP-6427) establishes the existence of a substantial stand for the lake in the seventeeth century A.D. Chronological evidence bearing on the problem comes from radiocarbon dates, obsidian hydration measurements, ceramic, early historical accounts, and hydrological modelling.

Montague, S.

1994 High Altitude Test Excavation in Yosemite National Park. Paper presented at the Annual Meeting of the Society for California Archaeology, Ventura.

Abstract

Montague continued...

Nine prehistoric sites located between 9,280 and 9,920 ft in elevation in the Dana Meadows area of Yosemite National Park were test excavated during the summer of 1992. Obsidian debitage and tools generally comprise the sites; however, stationary milling features, subsurface hearths, and rock alignments were also documented. With the project focus on delineating the site chronologies, the primary analysis methods included obsidian hydration and x-ray fluorescence analysis of selected artifacts, and radiocarbon assays of carbon samples from cultural features. Subsistence issues were addressed through macrofloral, faunal and organic residue analyses. This paper presents a general overview of the project and a summary of analysis results.

Ozdogan, Mehmet

1994 Source Determinations of Anatolian Obsidian: An Archaeological Overview. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Source determination of obsidian is among the most popular concerns of archaeometric studies. The possibility of determining provenience of raw materials that were used in making artifacts, have provided archaeologists the unique opportunity of detecting trade routes. Accordingly, since the first implementation of source determination methods of obsidian, archaeologists have immediately began drawing not only trade-route maps, but also began dividing up the Near East into segregated territories according to which obsidian source was used. Employment of this method to regions where the formation of obsidian is either restricted to a small area or to a single volcanic activity, can bear reliable results; obsidian sources in the Aegean or Italian islands, as well as in the Carpathian basin, should be regarded as such areas. However in Anatolia, obsidian bearing zones cover hundreds of square kilometers, and moreover, multiple phases

of volcanism is involved. Besides major obsidian zones of Eastern and Central Anatolia, smaller sources are scattered throughout the country. The fact that some sources have completely finished as a result of intensive exploitation, and that some are buried under recent alleviation, further complicates the problem.

Yet no attempt has been initiated to register and to document all existing sources, or to detect the exhausted ones by searching left over chipping areas. Almost all work on Anatolian obsidian is based on random and hasty collection of source material, either from a few reputed sources or from those that are easily accessible. In the few, restricted areas, where a more intensive and systematic search for sources have been conducted, it became evident that there are many more sources than predicted, and that a rather complex sequence of volcanic activity has to be taken into account.

The paper will also stress on some fallacious archaeological inference based on source determinations of obsidian.

Pernicka, E., J. Keller, G. Rapp, Jr., T. Ercan
1994 Provenance of Late Neolithic and Early Bronze Age Obsidian Artefacts from the Troad. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Although, claims have occasionally been made that obsidian occurs in western Anatolia, no sources of workable obsidian have yet been found. Accordingly, obsidian artefacts are very rare in prehistoric contexts of this region. Renfrew et al. (1965) counted altogether 27 pieces from Troia and other sites. So far we have analyzed ten minute samples of obsidian finds from Hisarlik and from Besiktepe on the Troadic shoreline dating from Neolithic to Early Bronze Age 1. Eight of these can be associated with the Adhamas source on the Cycladic island of Melos. This is not too surprising, because Melos is still the nearest obsidian source to Troia although it is some 400 km away. In fact, the finds from Troia lie on the outermost fringe of the distribution of Melian obsidian which now compries practically all of the Aegean region.

For two artefacts - one from Kisarlik and one from Besik-Sivritepe - all Aegean sources as well as the Carpathian ones (Williams Thorpe et al. 1984) could be definitely excluded. This finding sparked off a thorough geochemical survey of obsidian sources in Anatolia and Transcaucasia by NAA, many of which have already been analyzed by XRF (Keller and Seifried, 1992). At present some 40 flows in this area can be distinguished geochemically. Several of these have been known and exploited from early prehistoric times on as indicated by matching artefacts from archaeological sites in their vicinity. The possibilities to differentiate between these sources and the evidence of their prehistoric use will be summarized and reviewed.

While for the above mentioned artefact from Hisarlik no matching source has yet been found, the other (late Neolithic) artefact from Besik-Sivritepe has close parallels to sources in Armenia as well as in central Anatolia in the Ciftlik area. Both source areas comprise a number of individual but genetically related flows, which are geochemically distinguishable in most cases. Based on NAA results our sample from Besik-Sivritepe seem to resemble the source at Golludag-Bozkoy better than the well known "Ciftlik" source that mostly refers to a flow near Komurcu on the eastern side of the Golludag. However, it is not yet clear, if the Bozkoy source has been used in prehistoric times. In any case, this find for the first time indicates a link between northwest Anatolia and the eastern regions in a period when most other archaeological parallels point to the Balkans.

References

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Williams Thorpe, O., Warren, S.E. and Nandris, J.G. 1984: The distribution and provenance of archaeological obsidian in central and eastern Europe. J. Arch. Sci. 11, 183-212.

Schroth, A., M. Robinson and D. McDougall
1994 Absolute and Relative Dating and Cultural Periods Represented at Sites in the Domenigoni Valley Project Area. Paper presented at the Annual Meeting of the Society for California Archaeology, Ventura.

Abstract

This paper presents preliminary results of the application of absolute and relative dating methods to assign temporal placement of site occupations in the DVR Project area. Archeometry, the most precise method, involves radiocarbon dating and obsidian hydration measurements. Geological methods include correlating stratigraphic units and soil profiles both within and between sites. Relative dating of cultural assemblages and artifacts, the least precise method, involves correlating cultural materials with similar material found at sites that has been dated through archaeometric methods. A time span of 9,000 years is postulated, and the assemblages are correlated with southern California periods.

Schneider, Gerwulf
1994 Analysis of Obsidian from Sites in Central-Anatolia and Northern Syria by X-Ray Fluorescence. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Analysis by WD-XRF is a well established method to determine the provenances of obsidian artefacts. Small samples of 100 mg are sufficient to analyse a series of 18 elements including the major elements as well as the geochemically most relevant trace elements Zn, Sr, Y, Rb, Nb, Zr, Ba and Ce, which allow a comparison with the data given in the basic papers by Renfrew and his coworkers. Analyses of a series of some 120 obsidian artefacts from excavated sites in Central-Anatolia (Asikli Hoyuk) and northern Syria (Tell Kashkashuk, Tell Mashnaqa, Dj'ade el Mughara, Hallula, Tell Khazne) reveal only few compositional groups which can be attributed to geological source samples from Central or Eastern Anatolia. The importance of precision and accuracy and the necessity of data exchange will be discussed as prerequisites of building.

Turetken, Naif
1994 Obsidian Source Analyses in Anatolia. Paper presented at the 29th International Symposium on Archaeometry, May 9-14 Ankara, Turkey.

Abstract

Correlating prehistoric tools with their natural sources has always been of great importance to the study of archaeology. It is now generally accepted that a neolithic specimen, for example, found far away from its provenance may safely be taken as an indication of trade activities between prehistoric groups, and this does not depend on whether the specimen is traded in the worked form or as raw material.

Since the early sixties, various scientific and technical methods of measurements and data analyses have been utilized for source identification of obsidian and successful results have been obtained. Optical Emission Spectroscopy (OES), X-Ray Fluorescence (XRF), Neutron Activation Analysis (NAA), Fission Track Dating (FTD), and Proton Induced Gamma-Ray Emission (PIGRE) are some examples of the methods used for obsidian characterization.

There are dozens of obsidian sources known to be located in the three main areas of Anatolia: the Cappadocia, the west-north of central Anatolia, and the Lake Van with its environment. Furthermore, it is strongly probable that there are other sources of obsidian in Anatolia, though not known yet, that are of quality convenient for making tools. Obsidian artifacts are found in large numbers almost at every prehistorical site in Anatolia, and in relatively small numbers in the surrounding regions. This spread of obsidian throughout Anatolia underlines the importance of the subject to the Turkish Archaeologists and archaeometrists. This paper sets out to review the work done so far on the Anatolian obsidian, and to try to suggest new steps for further studies on the subject.

Way, K.R.
1994 Oak Ridge Glass At Antelope Valley Prehistoric Sites: Fused Shale in Archaeological Contexts. Paper presented at the Annual Meeting of the Society for California Archaeology, Ventura.

Abstract

Recent re-analyses have shown that "fused shale", or Oak Ridge glass, is present among lithic assemblages from several sites in the Antelope Valley, which is located in the western Mojave Desert region. Based on the presence of fused shale at CA-LAN-298 in the Fairmont Buttes, these re-analyses were conducted in order to determine its socio-economic significance, if any, as a lithic material to the prehistoric inhabitants of the Antelope Valley. This paper will present some preliminary determinations based on the data studied to date, as well as address several hypotheses concerning lithic distributions, frequencies, and their significance relating to the interaction sphere of Antelope Valley peoples.

MEETINGS AND EVENTS

October 6-8. Biennial Great Basin Anthropological Conference. Elko, Nevada. Kevin T. Jones, Utah Division of State History, 300 Rio Grande, Salt Lake City, UT 84101; tel 801-533-3524 or 533-3500; fax 801-533-3503.

October 14-16. Science and Archaeology: A Multi-Disciplinary Approach to Studying the Past; sponsored by the SAS. Cambridge. Robert H. Tykot, Archaeometry Laboratories, Harvard University, Cambridge, MA 02138, USA; tel 617-496-8991; fax 617-495-8925; e-mail Tykot@HUSC4.Harvard.Edu.

October 23-27. Scientific Basis for Nuclear Waste Management. XVIII International Symposium. Featuring papers on glass leaching mechanisms, glass-environment interactions, natural analogues etc. Kyoto, Japan (All papers presented in English) Address all inquiries to Mrs. Helga Fuchs, c/o Professor R.C. Ewing, Dept. of Earth and Planetary Sciences, University of New Mexico, Albuquerque, NM, 87131-1116, USA; tel 505-266-1105 or 277-4163; fax 505-277-0090.

November. International Symposium "The Pleistocene/Holocene Boundary and Human Occupations in South America, Mendoza, Argentina.. Organized by the Facultad de Filosofia y Letras, Universidad Nacional de Cuyo. Contact: Marcelo Zarate, Centro de Geologia de Costas y del Cuarternario - UNMP, Casilla de Correo 722 - Correo Central, 7600 Mar del Plata, Argentina.

1995

April 2-7. Archaeological Chemistry. Symposium to be held at the American Chemical Society National Meeting, Anaheim, California. Major areas of interest: Bone Dating, Artifact Dating, Archaeology of Genetic Material, and Peopling of the New World. Contact: Mary Virginia Orna, College of New Rochelle, New Rochelle, NY 10805 USA; tel 914-654-5302; fax 914-654-5387.

ABOUT THE IAOS

The IAOS was established to:

1) develop standards for analytic procedures and ensure inter-laboratory comparability;

2) develop standards for recording and reporting obsidian hydration and sourcing 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 advances in obsidian studies and the analytic capabilities of various laboratories and institutions.

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Regular members are individuals or institutions who are interested in obsidian studies, and wish to support the goals of the IAOS. Regular members will receive any general mailings; announcements of meetings, conferences, and symposia; bulletins; and papers distributed by the IAOS during the year. Regular members are entitled to attend and vote in Annual Meetings.

Institutional members are those individuals, facilities, and institutions who are active in obsidian studies and wish to participate in inter-laboratory comparisons and standardization. If an institution joins, all members of that institution are listed as IAOS members, although they will receive only one mailing per institution. Institutional members will receive assistance from, or be able to collaborate with, other institutional members. Institutional members are automatically on the Executive Board, and as such have greater influence on the goals and activities of the IAOS.

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Submissions for articles, short reports, abstracts, or announcements for inclusion in the next newsletter should be received by October 15, 1994. We accept electronic media on IBM compatible 3.5" or 5.25" diskettes, in a variety of word processing formats including Wordperfect (5.n), Wordstar, and Microsoft Word or ASCII text formats. A hard copy should accompany diskettes. Send to Kim Tremaine, c/o BioSystems Analysis, 1017 Front Street, Sacramento, California, 95814; (916) 557-4506.

Short Reports & Reviews: If you are interested in briefly reporting on research findings (e.g., one

column in length), contact Mike Rondeau at Caltrans, Office of Environmental Analysis, 650 Howe Avenue, Suite 400, Sacramento, California 95825; (916) 263-3375; FAX (916) 263-3384.

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