

**International Association for Obsidian Studies  
Bulletin**

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Assembled and edited by B. Hamusek

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**NEWS AND INFORMATION**

**A REPORT OF THE IAOS ANNUAL MEETING**

by Dr. Michael Glascock

The eighth annual meeting of the IAOS was held at the New Orleans Marriott Hotel on the afternoon of Friday, April 12, 1996, in conjunction with the 61st annual meeting of the Society for American Archaeology. A total of 12 members and officers were present. The member who came from the greatest distance was Dr. Roger Green from the University of Auckland in New Zealand.

The meeting was called to order by President Michael Glascock who reported on a summary of the accomplishments and activities of the IAOS during the past year. These include: (1) publication of three IAOS Bulletins (the most recent being issue Number 16 was in the mail at meeting time); (2) an increase in the IAOS treasury balance from \$2,905.63 in May 1995 to \$3,837.81 at the end of March 1996; (3) membership approval of changes to the IAOS by-laws through ballot; and (4) election of new officers.

The election of new officers resulted in Jon Ericson being chosen as President-elect and Jeff Hamilton being chosen as Secretary-Treasurer. Jon will be President-elect from 1996-1997 and serve as IAOS President from 1997-1998. Jeff Hamilton was to serve as Secretary-Treasurer from 1996-1998, however, due to overwork Jeff resigned from the position. Pat Dunning of San Jose State University has agreed to take over the position of Secretary-Treasurer. The mailing address will remain as: IAOS, Department of Anthropology, San Jose State University, San Jose, CA 95192-0113. Phone: 408.997-9183. Blossom Hamusek will continue as Newsletter Editor for another year.

Total IAOS membership as of April 1, 1996 is 114 persons of whom 15 are international. Countries represented by IAOS membership include Israel, New Zealand, Australia, Russia, Mexico, France, Japan, Greece, Argentina, and the USA. Fifteen of the members are new since last year. Information for this report was provided by Viviana Bellifemmine (outgoing Secretary-Treasurer).

During the IAOS meeting, a motion was made by Jon Ericson to establish an "Excellence in Obsidian Studies Award" to be presented annually at the SAA meeting. The motion was discussed, amended, and passed by a unanimous vote of members present at the meeting. The conditions of the award are as follows:

*The Excellence in Obsidian Studies Award will be presented in recognition of excellence in obsidian research to a scientist or archaeologist whose innovative research or lifetime, repeated and enduring contributions have contributed significantly to obsidian studies. The protocol for this annual award will be as follows:*

1. *The award shall be presented at the Society for American Archaeology meeting as part of the award ceremony.*

2. *Nominations shall be accepted from the general membership of the IAOS as part of the regular election ballot.*
3. *The award shall be determined by a committee composed of the past President, current President, President-Elect, and Secretary-Treasurer.*

The first Excellence in Obsidian Studies Award will be presented at the 1997 SAA meeting.

A number of other items were discussed during the meeting. One of these was the possibility of making the IAOS President a two-year position. Incoming President Tom Jackson and President-elect Jon Ericson will provide future discussion on this topic.

A second item of discussion was the IAOS Homepage and the related Obsidian Source List Database now on the WWW. The Internet addresses for both are:

<http://www.peak.org/obsidian/obsidian.html>  
and  
[http://www.peak.org/~skinnrcr/s\\_home.html](http://www.peak.org/~skinnrcr/s_home.html),  
respectively.

Thanks are owed to Craig Skinner for making both of these possible.

Another item of discussion was a proposed new inter-calibration exercise for IAOS members interested in obsidian sourcing (i.e., NAA, XRF, ICP, PIXE, or any other analytical method). Mike Glascock has a 40kg boulder of obsidian from the well known Sierra de Pachuca obsidian source in the state of Hidalgo, Mexico. He will make half kilogram blocks available to anyone interested in participating in the inter-calibration exercise. Please write to Dr. Michael D. Glascock, Research Reactor Center, University of Missouri, Columbia, MO 65211. The analytical results will be compiled by Glascock and reported in a future IAOS Bulletin.

The meeting also included a round-table description of ongoing research by each of the members present. Some of these included obsidian sourcing in new regions (eastern Russia, Alaska, and the island of Borneo), new experiments to examine the underlying properties of obsidian hydration, and the use of internal-fissures to date obsidian artifacts in southern

Mesoamerica where surface erosion is a serious problem. All participants enjoyed hearing about each other's most recent developments.

A final item of discussion was a possible outreach (i.e., workshop) for other archaeologists at a future SAA meeting. The outreach would offer archaeologists unfamiliar with the possibilities of obsidian research an opportunity to interact with experts who would explain their techniques, procedures, and limitations and which of these are appropriate for answering specific archaeological questions.

The workshop may include demonstrations, photographs, slides, posters, etc. as well as discussion periods. At the same time, the outreach would enable obsidian researchers an opportunity to explain where their research is focused and how individual research efforts may compliment one another. The discussion concluded that an effort would be made to organize a workshop at the 1998 SAA meeting to be held in Seattle. Tom Jackson and Jon Ericson will work on this during the next year.

#### UC BERKELEY XRF AND SOUTHWEST OBSIDIAN SOURCES WEB PAGES

by Dr. M. Steven Shackley

Two informative home pages are now online at UC Berkeley. Perhaps the most useful is the Southwest obsidian source page <<http://obsidian.pahma.berkeley.edu/xrflab.htm>> An image map showing the location of known sources of archaeological obsidian in the region, as well as source lists by region, can be used to access source descriptions, compositional data, graphic displays and photographs of geologic features. Additional pages describe the silicic volcanic history of the Southwest relative to archaeological obsidian studies, and a definition of obsidian as a glass, emphasizing the Tertiary Period sources common in the region. Links to regional and topical geological and archaeological web sites are scattered throughout this web.

The EDXRF Lab page <<http://obsidian.pahma.berkeley.edu/xrflab.htm>> is devoted to the research services of the lab, but also links to feedback and printable forms, as well as the Southwest obsidian home page.

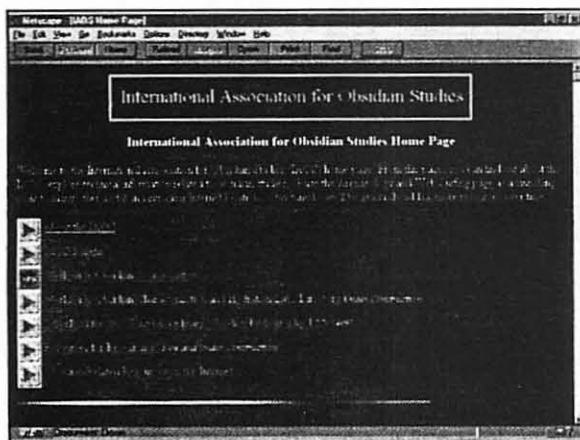
## UC BERKELEY GETS A NEW WAVELENGTH X-RAY FLUORESCENCE SPECTROMETER

The Department of Geology and Geophysics, and the Phoebe Hearst Museum of Anthropology, UCB in a cooperative venture, have recently received funding from the National Science Foundation and on-campus grants to acquire a state-of-the-art wavelength dispersive x-ray fluorescence spectrometer. This instrument will allow us to analyze archaeological obsidian, other raw materials, and ceramics with precision near that of the reactor (NAA) shut down at the Lawrence Berkeley Lab a number of years ago. This new facility should be in operation early next year. For further information contact:

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## IAOS WORLD WIDE WEB NEWS

by Craig E. Skinner  
Northwest Research Obsidian Studies Lab



<http://www.peak.org/obsidian/obsidian.html>

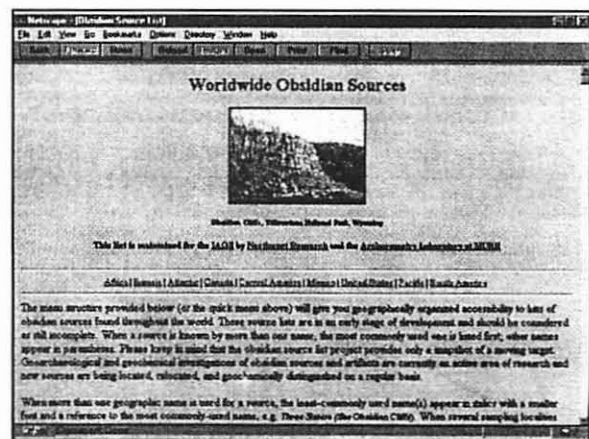
*IAOS Web Site.* Work on the IAOS Web site is progressing nicely and the site now looks fairly

presentable. Home page buttons and links will now take you to:

- Information about the IAOS
- A worldwide obsidian source list (see below)
- A directory of obsidian characterization and hydration laboratories (see below)
- Back issues of the *IAOS Bulletin*
- A downloadable copy of the IAOS Obsidian Bibliography
- A guide to obsidian-related Internet resources
- A resource page with links to various items that should be of use for obsidian researchers

The Webserver space for this site is being donated by PEAK, Inc., of Corvallis, Oregon. My thanks to them for their benevolent policies towards not-for-profit enterprises like the IAOS.

*Worldwide Obsidian Source List.* The worldwide obsidian source list originally proposed by Michael Glascock (University of Missouri) in previous editions of the *IAOS Bulletin* is now a reality on the Web. The Archaeometry Laboratory at Murr (M. Glascock) and the Northwest Research Obsidian Studies Laboratory (C. Skinner) have combined resources to compile a working version of the list that is now available online. We've also integrated our coverage of the Southwest U. S. sources with Steve Shackley's excellent descriptions of sources available at the University of California (Berkeley) XRF Lab Web site. The current version of the source list also includes coverage for several obsidian characterization labs (Archaeometry Lab at Murr, Northwest Research, and Simon Fraser) so that you see who has the most complete source coverage for specific geographic areas.



The source list is, of course, a moving target and is destined to be a work in progress for some time to come. We are constantly tinkering with the lists – adding sources, chasing down alternate names, fixing mistakes, and so on. If you spot anything that needs adjusting, be sure and let us know.

*Updated Obsidian Labs Directory.* The last catalog of obsidian hydration and characterization laboratories appeared in the *IAOS Bulletin* in 1992 (No. 7) and 1993 (No. 9). The latest update to the lab directory is currently in production and a preliminary version should be posted on the IAOS Web site by the time you see this article. If you would like to be included in the directory or would like to make any changes to your listing, let me know and I'll make the necessary adjustments.

**WWW Directory:  
Obsidian-Related Resources**

- <http://www.peak.org/obsidian/obsidian.html>  
IAOS (International Association for Obsidian Studies) Home Page. All the Web sites below are accessible through the IAOS home page.

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- <http://www.missouri.edu/~murrwww/archlab.html>  
Archaeometry Laboratory at MURR
- <http://obsidian.pahma.berkeley.edu/xrflab.htm>  
Berkeley X-Ray Fluorescence Spectrometry Laboratory
- <http://www2.huji.ac.il/~applbaum/index.html>  
Hebrew University Institute of Archaeology  
Archaeometry Unit
- [http://www.peak.org/~skinnncr/iaos\\_bib.html](http://www.peak.org/~skinnncr/iaos_bib.html)  
IAOS Obsidian Bibliography 1.55 [340K]
- <http://www.peak.org/~skinnncr/megascop.html>  
Megascopic Descriptive Terminology for Obsidian
- <http://www.peak.org/~skinnncr/obsidian.html>  
Northwest Research Obsidian Studies Laboratory
- <http://www.ohas.com>  
Obsidian Hydration Analysis Service
- <http://www.auckland.ac.nz/ant/obsidian.htm>  
Obsidian Hydration Laboratory at the Centre for Archaeological Research, University of Auckland, New Zealand
- [http://www.peak.org/~skinnncr/ces3\\_2.html](http://www.peak.org/~skinnncr/ces3_2.html)  
Obsidian-Related Articles: Some full text articles and abstracts about obsidian-related topics
- [http://www.peak.org/~skinnncr/s\\_home.html](http://www.peak.org/~skinnncr/s_home.html)  
Obsidian Source List: A listing of worldwide obsidian sources
- [http://www.peak.org/~skinnncr/ces3\\_1.html](http://www.peak.org/~skinnncr/ces3_1.html)  
Resource list of obsidian-related topics

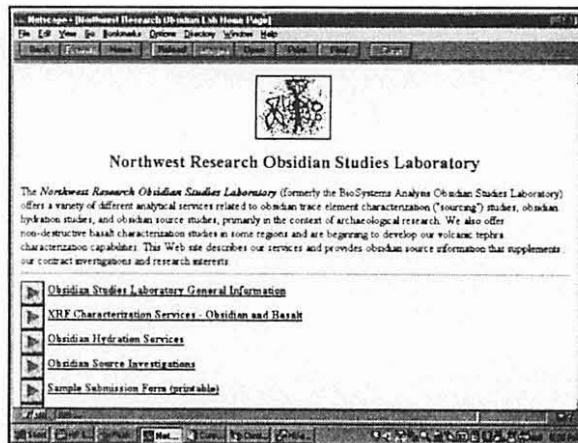
**OBSIDIAN LAB UPDATE:  
Northwest Research  
Obsidian Studies Laboratory**



*Craig E. Skinner  
Northwest Research Obsidian Studies Laboratory*

I'd like to announce the change of ownership of the BioSystems Analysis Obsidian Studies Lab to the *Northwest Research Obsidian Studies Laboratory*. We have recently concluded the purchase of the Spectrace 5000 XRF spectrometer, obsidian reference collection, and obsidian hydration laboratory from BioSystems Analysis of Santa Cruz, California, and have moved the lab to Corvallis, Oregon. Longtime BioSystems' XRF analyst Kathy Davis is still associated with the lab, joining me and Jennifer Thatcher, our obsidian hydration analyst.

For more information about the lab services and our ongoing research program, please take a look at our World Wide Web site (<http://www.peak.org/~Skinnncr/obsidian.html>) or get in touch with us at the address below:



**Northwest Research Obsidian Studies  
Laboratory**  
1414 NW Polk ■ Corvallis, OR 97330  
Voice: (541)754-7507  
Fax: (541)753-2420  
Internet: [skinnncr@peak.org](mailto:skinnncr@peak.org)

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## SHORT REPORTS & REVIEWS

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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 Report format contact Mike Rondeau.

### Beyond Ceramics? Late Post-Classic Chronometrics in the Basin of Mexico

*A Review*

A paper entitled *The Post-Classic Occupation at Otumba: A Chronological Assessment* was presented by Deborah Nichols and Thomas Charlton at the 60th Annual Meeting of the Society for American Archaeology in Minneapolis (1995). The paper focused on research efforts at the city-state of Otumba in the Teotihuacan Valley of Mexico. It provided an interesting overview of the chronometric use of pottery types in the Late Post-Classic era of the region. Both radiocarbon and obsidian hydration results were used in evaluating the ceramic-based chronology that had been developed at Otumba.

The paper provided information at some length on the relevant ceramic sequence and its development, the selected deposits, and the chronometric results of the radiocarbon and obsidian hydration analyses. One interesting cluster of obsidian hydration dates were divergent from what was expected based on ceramic assignments. While calendrical obsidian hydration dates were provided in the paper, neither the hydration band width readings from which the calendrical interpretations were made nor the method of calculating those dates were provided. It was explicitly stated, however, that

the paper would proceed on the assumed accuracy of the dates.

Several passing references to Pachuca obsidian left open the question, for those unfamiliar with the region, as to whether differing glass types might have been present at Otumba that could have played a role in the aberrant hydration findings. Whether or not sourcing studies were undertaken or even needed as a control for hydration band width analysis is not mentioned. Post-depositional mixing of deposits, curation, scavenging, and reuse of obsidian artifacts were all considered as possible reasons for the anomalous readings.

It should be remembered that the time limitations on such papers prevents the inclusion of all relevant data. The data selection and rejection process is always of interest. The radiocarbon analysis was provided by Beta Analytic Inc. and the obsidian hydration dating was directed by Christopher Stevenson.

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### Northeastern Most Occurrence of Napa Valley Obsidian, California

*Interview with Gerald Gates, Modoc National Forest Archaeologist*

Results from the study of an obsidian surface collection taken by the Forest Service in July 1995 from site FS-05-09-53-1024 in the Warner Mountain Ranger District, Modoc National Forest, Modoc County, California, has yielded a single percussion flake of Napa Valley obsidian with an average hydration band width of 2.6 microns (Skinner et al. 1995). This site is situated just above Lassen Creek at an elevation of 5720 feet in a riparian plant community within a forest of Ponderosa and Jeffrey pines, and White fir.

A total of twenty glass specimens were submitted for obsidian hydration analysis. Fifteen samples were characterized by XRF analysis and the other five specimens were visually sourced. Besides Napa Valley, the other glass types identified included Sugar Hill, Buck Mountain, and Blue Spring all of the North Warner Mountain geochemical sources, as well as Cowhead Lake, East Medicine Lake, and one unknown source.

The submitted obsidian specimens were mainly percussion flakes. The only formal tool was a fragmentary square based point of East Medicine Lake glass. It exhibited a hydration band width that averaged 2.5 microns. Overall, the hydration band widths ranged from 0.8 to 5.4 microns. Clusters of readings were suggested at 0.8 to 1.3, 2.6, 3.8 to 4.2 and 5.0 to 5.4 microns. This distribution appears to suggest that a series of short term occupations occurred at the site.

The XRF analysis was accomplished by Craig Skinner. The obsidian hydration analysis was done by Tom Orieger.

Skinner, Craig E., M. Kathleen Davis, and Thomas M. Orieger  
1995 X-ray Fluorescence Analysis and Obsidian Hydration Rim Measurements of Artifact Obsidian from Eleven Modoc National Forest Sites, Modoc County, California. Northwest Research Obsidian Studies Laboratory Report No. 95-60.

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### **Modeling Archaeological Soil Temperatures in New Zealand**

*Submitted by Martin Jones, Peter Sheppard and Doug Sutton, Center for Archaeological Research, Auckland University, New Zealand*

The Center for Archaeological Research at Auckland University in New Zealand is operating a research program directed at developing reliable obsidian hydration dating. One of the major focuses has been understanding and predicting variation in soil temperature. Soil temperatures are one of the fundamental components of an obsidian hydration date and probably represent the greatest source of error in the production of dates (Jones *et al.* In press).

The results of a year long temperature survey of northern New Zealand ( Jones *et al.* In press) have demonstrated the acute need for accurate temperature controls, particularly for any variation that may occur at spatial resolutions measured in meters. A total of 100 locations were surveyed using zeolite hydration cells (Ambrose 1980). The results of this survey demonstrated that soil temperature regimes vary systematically based on aspect, vegetative

cover, latitude, and variation in soil thermal properties.

In light of these results a temperature modeling method, based on the integration of annual temperature functions derived from modeling soil surface energy balances, was field tested for six months. In this trial, 24 cells were placed in a meteorological station making 10 minute measurements of soil temperatures. Using the integration approach described above the exponential mean cell temperatures for the trial period were predicted. The predicted cell temperatures were within 0.2 C of the recorded cell temperatures. When compared to the predictions produced via other mainstream temperature estimation techniques (Table 1) this represents a considerable gain in estimation accuracy.

A new field survey using 300 zeolite cells is currently underway. The results of the surface balance modeling in predicting these cell temperatures will represent a very thorough field test of this approach. The preliminary results as well as associated work in other fields (see Jones *et al.* In press for an overview) suggest that with suitable field work accurate temperature regimes can be modeled.

Ambrose, W.  
1980 Monitoring long-term temperature and humidity. *Institute for the conservation of cultural material bulletin* 6(1), pp 36-42.

Jones M., P. Sheppard, and D. Sutton  
n.d. Soil temperature and obsidian hydration dating: a clarification of variables affecting accuracy. In press: *Journal of Archaeological Science*.

Leach, B., and G. Hamel  
1984 The influence of archaeological soil temperatures on obsidian dating in New Zealand. *New Zealand Journal of Science* 27, 399-408.



Table 1: comparison of cell temperatures with predicted values

DEPTH (cm)	Measured Cell Temperatures	Predicted Cell Temperatures via Surface Balance	Periodic heating model <sup>1</sup>	Lee's temperature integration model	Previous cell survey results <sup>2</sup>
SCREEN	17.6	17.8	19.1	18.9	16.8
2	21.7	21.5	19.1	18.9	16.8
10	21.1	21.2	19.2	18.9	16.8
20	21.0	21.0	19.4	18.9	16.8
30	20.6	20.7	19.4	18.9	16.8
40	20.2	20.3	19.5	18.9	16.8

<sup>1</sup> See Jones *et al.* for a review of the different models

<sup>2</sup> Estimated after Leach & Hamel 1984.

## ABSTRACTS AND ANNOTATIONS OF REPORTS AND PUBLICATIONS

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, or 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.

**Barrett, Thomas P.**

1996 Formative Obsidian on the Gulf Coast of Mexico Industry, Development in the Tuxtlas Region. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

### *Abstract*

Obsidian artifact data recovered from the Tuxtlas Mountain region of Veracruz, Mexico are presented and analyzed to document the lithic production-distribution system in operation during the Formative period. Debitage analyses, sourcing studies, technological attributes, and categorical edgewear methods are used to compare and contrast industry development over time within the Tuxtlas region. These data are also used to assess the complementary socio-economic processes of procurement, production, distribution and consumption of imported obsidian over time and across space. Several clear patterns are evident which have distinct implications for the structure and function of the subsequent Classic period obsidian industry.

**Bayham, Frank E. , and Kathleen L. Hull**

1996 Diachronic Population Reconstruction Using Calibrated Obsidian Hydration Rim Frequencies. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

### *Abstract*

Many aspects of the archaeological record are directly and indirectly influenced by population size. Yet, methods of reliably estimating

prehistoric population density are few. Although obsidian hydration rim width frequencies have been used to derive proxy estimates of local or regional population use through time, variable hydration rates and impaired temporal resolution have combined to limit its utility. Issues related to reconstructing estimates of regional population densities with obsidian-hydration are examined, and a procedure is outlined which allows for temporal calibration of source-specific rim width frequencies. Employing obsidians from two independent sources collected in the context of a linear transect through southwestern Utah, we propose a regionally specific population reconstruction spanning the last 11,000 years.

**Bayman, James M. and M. Steven Shackley**  
1996 Obsidian Studies at the Casa Grande/Grewe Site Complex, South-Central Arizona. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

This report summarizes geochemical characterization (X-ray fluorescence) studies and metric analyses of obsidian from museum collections and CRM excavations at the Classic period (A.D. 1200 - 1450) site of Casa Grande, as well as Grewe, a nearby pre-Classic period site. The obsidian assemblage from each site contains unmodified nodules, cores, manufacturing debris, and finished tools from a vast geographic territory of the American Southwest. Intersite comparisons of obsidian geologic sources, and lithic reduction technology, provide intriguing insights into the changing organization of Hohokam economy and society in the Sonoran Desert.

**Bevill, Russell, and Kathleen L. Hull**  
1996 An Appraisal of Projectile Point Sequences in the Southeastern Great Basin: Technological Observations and Obsidian-Hydration Data. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Integrated lithic technological, obsidian geochemistry, and obsidian-hydration analyses completed on an assemblage of projectile points from southwestern Utah indicate distinct geographic and temporal patterns within this artifact class. Methods and results of this study,

undertaken as an element of the Kern River Gas Transmission Project, are described. This paper includes a review of projectile point attributes and classification, an examination of source-specific obsidian-hydration rate formulation and application, and a discussion of the apparent validation of "long" and "short" projectile point sequences within this portion of the Great Basin.

**Bove, Fredrick J.**  
1996 Early Formative to Protohistoric Obsidian Procurement and Exchange in Pacific Guatemala: An Economic and Political Perspective. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

Studies of obsidian procurement and distribution have a long history as archaeological indicators of social, political, and economic systems. Diachronic data from regional controlled contexts, however, are scarce and consequently most investigations are unable to examine questions of economic or political change from a long term developmental perspective. Early Formative to Protohistoric regional data are now available from sites representing all hierarchical levels within central Pacific Guatemala. Patterns of obsidian procurement, distribution, and tool use are presented and the political and economic ramifications discussed.

**Braswell, Geoffrey E.**  
1996 The Obsidian Artifacts of Group 1OL-2, Copan: Production, Exchange, and Chronology. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

More than 30,000 obsidian artifacts from excavated contexts in GR. 1OL02, a royal residential group located south of the Copan acropolis, have been analyzed. Results demonstrate that inhabitants of the group were not only lithic consumers, but also producers. Neutron activation analysis and visual criteria have been used to determine the geological sources of artifacts, suggesting a stable pattern of resource procurement lasting from ca. A. D. 200 to ca. A. D. 850. New obsidian-hydration dates derived from the assemblage are compared to <sup>14</sup>C dates determined from the same contexts.



**Burton, Jeff, and Mary Farrel**  
 1996 The Hunter Mountain Incident: The Effects of Catastrophic Fire on Archaeological Resources. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

In August 1990, a Navy jet exploded above Hunter Mountain, in the Panamint Range of Death Valley National Park. Fiery debris ignited the pinyon forest burning 200 acres. When the hazardous materials had dissipated, an archaeological survey was conducted to assess the damages. Hunter Mountain, called *Sikai* (flat on top) by the Shoshone, has been the site of pine nut gathering for at least one hundred years. During the survey cabins, house pits, rock rings, and artifact scatters were recorded. Artifacts indicate use of the area extends back at least one thousand years. The fire apparently destroyed the obsidian hydration dating potential at some sites. XRF analysis identified at least 13 different obsidian sources, some over 100 miles away.

**Cannon, Kenneth P. , and Richard E. Hughes**  
 1996 Obsidian Studies in the Greater Yellowstone Ecosystem. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Since 1989, the Midwest Archaeological Center and Geochemical Laboratory have collaborated on the analysis of geologic obsidian and obsidian artifacts from Yellowstone National Park. This paper traces the development of obsidian sourcing studies in the region, and the impacts of these early studies on current understandings of obsidian use and distribution in the region. We present the results of recent sampling and geochemical analysis of obsidian-bearing locations, with emphasis on their implications for ongoing obsidian procurement and conveyance in the Intermountain West.

**Connolly, Thomas J.**  
 1996 Obsidian Resource Use in the Northern Great Basin. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

The measurement of obsidian geochemistry has become standard practice in archaeological studies providing the basis for interpretations of commercial activities, ethnic boundaries, and other cultural patterns in prehistory. This paper will examine several recently developed obsidian data sets from the northwestern Great Basin and periphery—Drew's Valley, the Fort Rock Basin, and the Newberry Volcano caldera which span the Holocene. Changes in the use of sources and the distribution of obsidian raw material over time will be documented, and social implications of these patterns will be explored.

**Day, Donna A., William W. Bloomer, M. Kathleen Davis, and Thomas L. Jackson**  
 1996 Basalt Distribution as a Reflection of Procurement and Mobility Across the North-Central Sierra. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Basalt XRF analysis is developing as a major vehicle for recent research in the North-Central Sierra and along the Eastern Sierra Front. Samples from basalt quarries and geologic sources from the Upper Feather River Drainage south to the American River, has resulted in the identification of 10 distinct basalt chemical groups. Hundreds of curated and recently collected basalt artifacts from the Tahoe National Forest database have been submitted for source analysis along with additional samples from adjoining areas. Our analysis illuminates basalt procurement strategies, suggesting mobility patterns and interaction spheres during the era of basalt quarrying.

**Dolan, Barbara J. W.**

1996 Geochemical Source Analysis of Lithic Artifacts from O'ahu: Implications for Interregional Exchange in Pre-Contact Hawai'i. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

This paper examines results of geochemical analyses of basalt and volcanic glass artifacts recovered from excavations at ten archaeological sites on O'ahu. Eight of the sites are situated along the western flank of the Ko'olau Range with the remaining two along its eastern rim. The two general source areas for volcanic rock are the broad range of Wai'anae lavas in leeward O'ahu, and those found within the Ko'olau Range along the windward side of the island. Results of geochemical analyses evaluated here emphasize the importance of such techniques for studies of pre-Contact interregional relations and resource procurement patterns.

**Elam, James M.**

1996 General Typological Analysis of Obsidian and Other Chipped Stone Artifacts from Chalco, Basin of Mexico. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

Lithics, particularly chipped stone artifacts of obsidian, are one of the most prevalent categories of material remains recovered from Mesoamerican archaeological sites. Changes in lithic technology, form and function can reflect concurrent changes in the economy of a particular site or culture. This report presents the results of a general typological analysis of obsidian and other chipped stone artifacts recovered from the site of Chalco in the Basin of Mexico. Focus is on correlating observed changes in the Chalcan lithic complex with perceived changes in the economy of Chalco from Toltec through Aztec times.

**Gates, Gerald R.**

1996 CA-MOD-1976: "Battle Site" Trilogy. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

A unique site on the Devil's Garden Lava Plateau in Modoc County, California, contains a large rock circle (over 26 m in diameter) with four associated loci of broken and whole projectile points. Over 200 projectile points are represented in the collection so far; primarily, either Gunther Barbed/Guntheroid or Rose Spring series. Based on a preliminary analysis of the projectile points, their distribution and breakage patterns, it would appear that one possible explanation for this phenomenon is that it represents a late prehistoric "battle" site, possibly the location mentioned in the literature of a battle between an alliance of Pit River and Modoc against the Northern Paiute. Obsidian source and hydration data will be used to attempt to confirm or deny this interpretation. The site area lies within a "border" zone between two bands of the Pit River (Achumawi) to the south and the *Kokiwas* band of the Modoc to the north.

**Gilreath, Amy, Bill Bloomer, Terry Ozbun, John Fagan, and Douglas Wilson**

1996 Distribution and Use of Medicine Lake Highlands Obsidian. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

Medicine Lake Highlands obsidian is common in prehistoric sites in northern California and southern Oregon. X-ray fluorescence and hydration data from a variety of sites are used to plot the geographical and temporal distribution of this obsidian. Technological analyses of a sample of lithic assemblages from within this region suggest changes in the distribution of this glass are the consequence of cultural developments reflected in the organization of technology.

**Giambastiani, Mark**

1996 The Analytical Potential of Existing Archaeological Collections: A Case from Owens Valley. Paper presented at 30<sup>th</sup> Annual Meetings for the Society for California Archaeology, Bakersfield, California.

*Abstract*

Since NAGPRA went into effect a few years ago government agencies and universities alike have been struggling to salvage analytical data from archaeological collections that were not, for various reasons, adequately inventoried and/or analyzed at the time of their recovery. Many of these materials were collected several decades ago by avocational archaeologists who used recovery methods differing somewhat from those that became common only in the late 1970s. In some cases, these collections lack detailed provenience data, are biased towards certain kinds of artifacts, or were retrieved unsystematically. Nonetheless, they can still be quite useful in certain analytical studies which are not dependent upon strict spatial or recovery controls.

During the late 1960-70s several large archaeological collections were generated from the Owens Valley region, most notably those made by H. Riddell at Owens Lake and by E. L. Davis at China Lake. Another group of these materials, recovered by Grace and Rollin Enfield from the Volcanic Tablelands, is currently being used in a dissertation study to create an extensive obsidian sourcing and hydration database. Deriving from several hundred sites, this collection includes a wide range of obsidian tools and debitage, making it particularly useful in addressing chronological and spatial issues regarding patterns of obsidian acquisition and use in northern Owens Valley. This study is but one example of how existing, outdated archaeological collections can serve modern research needs, despite the serious budgetary restrictions facing management agencies and academic institutions today.

**Giambastiani, Mark**

1996 A Current Assessment of the Early-Holocene Archaeology of Fish Slough. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Discussion will focus on the preliminary analysis of obsidian flaked stone debris from Enfield collections and from several recently excavated sites at Fish Slough. Temporally diagnostic artifacts, obsidian hydration data, and recurrent trends in assemblage composition and obsidian source use together characterize a distinctive early Holocene occupation linked to the slough environment. Implications of these data for subsistence-settlement organization will be addressed in conclusion.

**Glascoek, Michael D.**

1996 Lithic Data Bases: A View from the Midwest. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

Data bases for lithic raw materials and artifacts are being compiled by individual archaeologists from all across North America to record various chemical, physical and visual attributes as well as source locations. A few of the problems with so many individuals working independently are incompatibility, duplication, and the possibility that many of the data bases will not be maintained for posterity. Communication, cooperation, and planning for future are essential if current and future users of lithic data bases are to maximize the full potential of their efforts.

**Hartwell, William T., Gregory M. Haynes, and David Rhode**

1996 Early Exhaustive Use of Obsidian in the Yucca Mountain Area, Southern Nevada: Evidence from Hydration Studies. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Obsidian hydration studies carried out by Desert Research Institute for the Yucca Mountain Site Characterization Project on the Nevada Test Site support the idea that locally available obsidian was depleted significantly by Early Archaic human populations. Hydration band measurements were obtained for 104 pieces of obsidian debitage from three expansive sites along entrenched ephemeral washes. Eighty-seven of the 104 pieces are represented by band measurements in the 8 to 13 micron range—

values consistent with measurements obtained from Western Stemmed Tradition and Pinto points made from local obsidian sources. It is hypothesized that early exhaustive use of large obsidian nodules significantly depleted this resource in the Yucca Mountain region.

**Hess, Sean C.**

1996 Avoiding Anarchy in Provenance Analysis: A View for the Pacific Northwest. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

As elsewhere, the problem of overlap in macroscopic attributes between lithic raw material sources confronts Pacific Northwest archaeologists, making difficult studies of regional and inter-regional interaction. A solution to this problem requires agreement on procedures for naming lithic raw material types, the distinctive microscopic or geochemical attributes defining those types, and consistent names for individual sources. Sharing data will be an important part of this process. Electronic methods of storing, organizing, and transmitting data, especially World Wide Web sites, would be ideal. While establishing this system may be tough, it will help provenance analysts avoid self-destructive anarchy.

**Hohmann, Bobbi, and Michael Glascock**  
1996 Formative Period Obsidian from the Belize River Valley: A View from Pacbitun and Cahal Pech. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

Approximately 300 Formative period (1000-300 B.C.) obsidian artifacts have recently been recovered from various stratigraphic contexts at the medium-sized Maya centers of Pacbitun and Cahal Pech, in west central Belize. Provenience and technological analyses conducted on Formative obsidian samples collected at these sites during earlier excavations have indicated temporal patterning in the utilization of a number of obsidian sources and in the production of technological types. Analysis of the current sample provides valuable new information regarding both temporal and spatial patterning in the procurement and distribution of this non-local material. These analyses help to define the

degree of political, social, and economic complexity present at these sites during this early period of development and provide a base-line for future comparisons.

**Holmer, Richard N., John M. Knox, and Richard E. Hughes**

1996 Experiments in Non-Destructive Ion Beam Hydration and Measurements on Obsidian Artifacts. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

An energetic (2MeV) ion beam focused on an obsidian artifact will penetrate 20 to 30 micrometers into the surface and has the potential of accurately measuring the thickness of the hydration rind, thus providing an estimate of age. The advantage of the ion beam is that it is non-destructive (facilitating multiple measurements on a single artifact), and is potentially more accurate than optical measurements. Ion beam-derived hydration measurements on reduction flakes (all of Malad obsidian) recovered from Weston Canyon Rockshelter in southeastern Idaho have produced encouraging results.

**Hughes, Richard E.**

1996 Thoughts on Quantity Control in Archaeological Lithic Databases. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

The usefulness of lithic databases depends on the quality of the geological and geochemical data they contain, and it is therefore critical that these data are evaluated. Drawing on examples from obsidian sourcing research in California, the Great Basin, and Columbia Plateau the present discussion illustrates how lack of critical evaluation can lead to the acceptance of erroneous results. These errors in reports and regional summaries can be perpetuated and even amplified in data bases created from the literature consulted by unwary archaeologists. The implications of such problems in any internet-linked community are far-reaching.

**Hull, Kathleen L.**

1996 Temperature and Rate of Hydration: A Consideration of Casa Diablo Obsidian In Western Great Basin Archaeology. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Routine application of obsidian-hydration analysis and compilation of surface and subsurface temperature data within the central Sierra Nevada have allowed development of a temperature-dependent function for data derivation from Casa Diablo obsidian-hydration measurements. This paper presents the results of this exploratory research, which is based on calibrated radiocarbon dates from feature contexts, associated obsidian-hydration rim measurements and provenience-specific temperature estimates from archaeological sites in Yosemite National Park. The implications of these findings are discussed with respect to ongoing laboratory studies, archaeological research on hydration analysis, and regional artifact chronology and lithic technology.

**Jones, George T., David G. Bailey, Charlotte Beck, and John J. Innes**

1996 Nondestructive XRF Analysis of Andesite Artifacts from Eastern Nevada. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

Central Great Basin Paleoindian occupants used fine-grained andesite and obsidian interchangeably for tool manufacture. Obsidian artifacts are comparatively rare, coming from distant geologic sources. We believe that more proximate geologic sources of andesite supplied this alternative toolstone. To evaluate source representation we have used X-ray fluorescence spectrometry to compare major and trace element chemistry of andesite artifacts and geologic sources. Although quantitative analysis cannot be produced accurately by a non-destructive procedure, ratios of element X-ray intensities do provide an effective means to make geologic source attributions of artifacts. We illustrate this approach with materials from White Pine County, Nevada.

**Knight, Charles**

1996 Distributional Analysis of Obsidian Technology at Tres Zapotes. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

Systematic surface collections from Tres Zapotes, Veracruz, Mexico indicate the employment of both expedient flake and prismatic blade technology. Differential distribution of artifact types and material sources revealed through quantitative analysis and topographic modeling suggest long-term changes in the organization of the lithic production/distribution at the site. These changes are interpreted in the context of evolving social differentiation at Tres Zapotes.

**Lyons, William H., and Scott P. Thomas**

1996 Shosoni Sherds, Oregon Obsidian and Bison Butchering at the Lost Dune Site, Southeastern Oregon. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Lost Dune (35HA792) contains sherds of nine or more brown ware pots, tooth enamel and bone of bison, Desert Series points, white chert knives and flakes, and obsidian blades. Undisturbed buried cultural material is associated with at least three dated hearths. WSU field schools excavated here in 1995 and 1996. Pottery technology and forms compare to Shoshonean brown ware found 100 to 150 km to the east and southeast in Idaho and Nevada. Yet, all 16 obsidian projectile points and flakes identified as to source by XRF came from Oregon quarries, 14 of them to the west and north of Lost Dune.

**Maher, John**

1996 Sourcing and X-Ray Fluorescence Dating of Obsidian Artifacts from the Lake Tahoe Basin. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Recently, the Lake Tahoe Basin Management Unit of the USDA Forest Service obtained x-ray fluorescence trace element analysis and hydration rim data from over 175 obsidian artifacts. The sample comprises most of the artifacts large

enough for x-ray fluorescence collected from localities throughout the basin. This paper compares these new data to those summarized by the Framework from Archaeological Research and Management on the Forests of the North-Central Sierra (FARM) and other obsidian data, and explores avenues for future research and data needs.

**Northrup, Jeffrey J.**

1996 Archaeological Investigations at 26Hu3297: Implications of a Hunting-Related Site in Greeley Flat Valley, Northern Humboldt County, Nevada. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Data recovery efforts at 26Hu3297, on the northern periphery of Greeley Flat Valley resulted in the recordation of 13 prehistoric hunting blinds and 435 lithic tools, including 87 typable projectile points spanning the Pre-Archaic to the Late Archaic Periods. Intensive lithic analyses of tools and debitage, including hydration rim and XRF analysis of all obsidian projectile points, suggest a Middle/Late Archaic occupational emphasis. Spatial analysis of stone features and surficial projectile point distribution provided important implications from aboriginal hunting behavior related to the use of hunting blinds. These data sets are presented in association with data from five other sites subjected to extensive investigation at Greeley Flat.

**Oetting, Albert C.**

1996 Patterns of Obsidian Use on Buffalo Flat, Christmas Lake Valley, Oregon. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Archaeological research indicates that humans have long used the eastern floor of Christmas Lake Valley (Fort Rock Basin) for short term activities. This mobility is reflected in the large number of obsidian sources identified. People visiting this arid basin were aware of and used many different Oregon obsidian sources, and maintained this diversity through time. Directionality and distance to source studies indicate particular ties with sources to the southwest, which also persisted through time.

These and other analyses demonstrate that Buffalo Flat was but one stop in a larger system of broad-spectrum resource use that endured throughout the Holocene.

**Olsen, Kristen, and Anabel Ford**

1996 Settlement Patterns and Hierarchical Organization: Procurement, Production, and Distribution of Obsidian among the Maya of the Belize River Area. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

Complex societies depended on an hierarchical structure to organize and integrate constituent populations and mobilize resources. Hierarchies are manifest in the arrangement of individual settlements, the variability within local communities, and the composition of regional centers. For the Maya, agriculture dispersed the settlements and frustrated the hierarchical structure. What were the mechanisms of integration in these societies so tied to the production potential of land? This presentation examines the reciprocal linkages of the elite settlement hierarchy through procurement, production, and distribution patterns of obsidian.

**Ramos, Brian A.**

1996 A Preliminary Report of Continuing Research at the Truman/Queen Obsidian Quarry, Mono County, California and Mineral County, Nevada. Paper presented at the 25th Great Basin Anthropological Conference, Kings Beach, California..

*Abstract*

Previous archaeological research at western Great Basin obsidian quarries has identified similar temporal patterns of source use intensity, reduction strategies and technological change. These patterns have largely been interpreted with the assumption that acquisition was conducted through intergroup trans-Sierran exchange, and thus reflect socio-political and population change in central and southern California. Initial results of continuing dissertation research at the Truman/Queen obsidian source are presented here, along with a competing hypothesis, that the patterns in western Great Basin obsidian quarry use reflect changes in the organization of technology, necessitated by regional shifts in mobility and subsistence.

**Ross, Neil A.**

1996 Cores in the Periphery: The Politics of Obsidian in the Naco Valley, Honduras. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

Long-term archaeological investigations in the Naco Valley, Honduras suggest that production and distribution of craft items played important roles in Late Classic (A.D. 600-950) political arrangements. This paper evaluates the political significance of obsidian prismatic blade production, focusing on the distribution of manufacturing debris among sites of varying sizes and locations. Paramount elite monopoly over blade manufacture would have contributed to the thralldom of supporters while more dispersed participation in the industry might have enhanced household autonomy. This paper assesses both models and considers the study's implications for modeling Naco's Late Classic political economy.

**Sanchez, Carleen D.**

1996 The Cutting Edge: Obsidian from Formative Yarumela, Honduras. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

This paper will report on the results of lithic analysis for material from the Formative Period site of Yarumela, Honduras, which maintained interaction with other southeastern Mesoamerican societies. Although lithic analysis has become increasingly more important in Mesoamerican studies, methods and theories regarding the role of lithic materials in patterns of production, exchange and consumption have often been uncritically adopted. My findings suggest that the commonly used ratio of Cutting Edge to Mass (CE/M) employed as an index of access to obsidian, can be determined by other variables. As a result, the utility of CE/M ratios for obsidian as an indication of access/control should be re-examined.

**Sander, Jay, Ronald H. Towner, and Donn R. Grenda**

1996 Late Prehistoric Obsidian Distribution in Southern California: The *Yulaipa't* Village. Paper presented at the 30th Annual Meetings for the Society for California Archaeology, Bakersfield, California.

*Abstract*

*Yulaipa't* Village (CA-SBR-1000) is a late prehistoric/protohistoric Serrano site that was abandoned in the 1860s. Research by SRI indicates that the site played an important role in the distribution of obsidian in southern California. Strategically located on the west side of San Gorgonio Pass, the site contains a high proportion of obsidian relative to nearby contemporaneous village sites. Glasses from a variety of sources, some 800 km distant, are present in the assemblage, both as finished tools and as debitage. This paper evaluates different models that may explain the obsidian distribution and their implications for settlement patterns and interaction spheres in southern California.

**Schondube Baumbach, Otto G.**

1996 Obsidian ornaments from the shaft tomb period in Jalisco, Mexico. Paper presented at the 61<sup>st</sup> Annual Meeting of the Society for American Archaeology, New Orleans, Louisiana.

*Abstract*

A great variety of obsidian ornaments exist in the Museo Regional de Guadalajara (Jalisco, Mexico) without exact dates and provenience. Recent findings tend to show they occur only in Jalisco between A.D. 0-500. A description of them and the special techniques of flaking used in their manufacture is described.

**Swillinger, Lisa**

1995 Intra-Source Variation in Borax Lake Obsidian and Potential Effects on Hydration Rate. Unpublished M.A. thesis, Department of Anthropology, California State University, Chico.

*Abstract*

The phenomenon of obsidian hydration has been used in archaeology to date obsidian artifacts since 1960. Continued research has resulted in the recognition that a given obsidian source may possess sufficient compositional variability to

affect the uniformity of hydration rate. Through an investigation of megascopic, microscopic, and compositional differences in obsidian from archaeological contexts in the southeastern Clear Lake basin of Lake County, California, a tentative identification of three sub-types of Borax Lake obsidian, one exhibiting a distinct chemical gradient, was established.

Archaeological assemblages from potential single-event deposits dominated by Borax Lake obsidian were then examined using hydration measurements and intrinsic water content determinations to explore the possibility that this intra-source variation may result in a lack of hydration rate uniformity in this obsidian source. The findings, extremely provisional at this time, suggest that the variation present in the obsidian from the Borax Lake deposit may also yield variable hydration rates. This suggestion, however, requires substantial additional testing for confirmation.

#### **Whatford, J. Charles**

1996 An Armchair Tour of a Rural Cultural Landscape: Annadel State Park. Paper presented at the 30th Annual Meetings for the Society for California Archaeology, Bakersfield, California.

#### *Abstract*

This armchair tour and slide show highlights key elements and features comprising a 5000-acre rural cultural landscape. Recognizing the entire park as a rural cultural landscape has contributed to a fuller understanding of the cultural, geographical, and historical associations of the over 120 historical/archaeological resources within the park boundaries. Resource types within this cultural landscape include stone quarries (obsidian and chalcedony quarries used by California Indians during pre-Contact times as well as andesitic basalt pavingstone quarries dating from c. 1880-1920), aboriginal trail systems, access/haul roads, 19<sup>th</sup> and 20<sup>th</sup> century structural remains, late 19<sup>th</sup> and early 20<sup>th</sup> century trash deposits, miles of rock faces, a two-mile section of an 1888 railroad grade and remains of an early 20<sup>th</sup> century tram system.

## TECHNOTES

This section of the newsletter is devoted to sharing new techniques, innovative ideas, source of equipment and supplies, and discussing new technologies. Obsidian analysts are invited to submit information relating to these topics.

### GEOCHEMICAL CHARACTERIZATION OF ARCHAEOLOGICAL OBSIDIAN FROM THE RUSSIAN FAR EAST: A PILOT STUDY

*By M. Steven Shackley, Michael D. Glascock, Yaroslav V. Kuzmin, and Andrei V. Tabarev*

*(excerpts taken with permission by the authors from an Poster Presentation at the 30<sup>th</sup> International Symposium on Archaeometry, Champaign-Urbana, Illinois, May 1996)*

While obsidian studies have advanced considerably in many regions of the Pacific Rim, the Russian Far East on the western Pacific has not. In a collaborative effort between Russian archaeology and geography, and the labs at the University of Missouri, Columbia and University of California, Berkeley, we have taken the first step in alleviating that condition.

A total of 78 obsidian tools and flakes recovered from 28 sites ranging from Late Paleolithic to Early Iron Age in the southern part of the Russian Far East were subjected to Energy Dispersive X-Ray Fluorescence (EDXRF), and Neutron Activation Analysis (NAA) (Figure 1).

The analysis was conducted in two phases: the first group included sites 0 through 13, and the second sites 14 through 34. No geological samples have yet been analyzed; the proposed chemical groups here are based solely on the archaeological material.

EDXRF was used in the analysis of 14 elements (Ti, Mn, Fe<sup>T</sup>, Ni, Cu, Zn, Ga, Pb, Th, Rb, Sr, Y, Zr, Nb), and NAA was used to measure a total of 27 elements including five short lived elements (i.e., Cl, Dy, K, Mn, Na), seven medium-lived elements (i.e. Ba, La, Lu, Nd, Sm, U, and Yb), and 15 long-lived elements (i.e. Ce, Co, Cs, Eu, Fe, Hf, Rb, Sb, Sc, Sr, Ta, Tb, Th, Zn, and Zr).



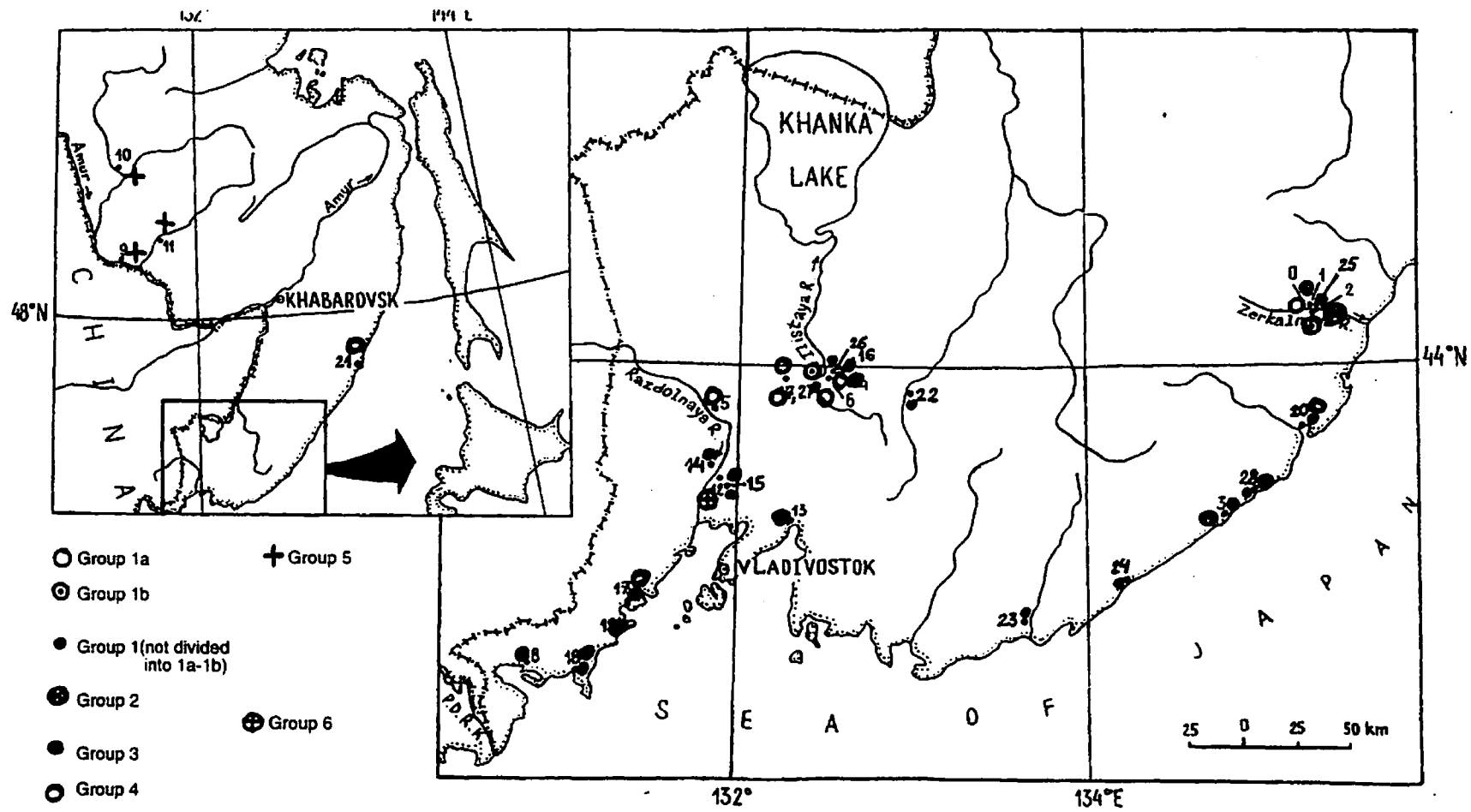
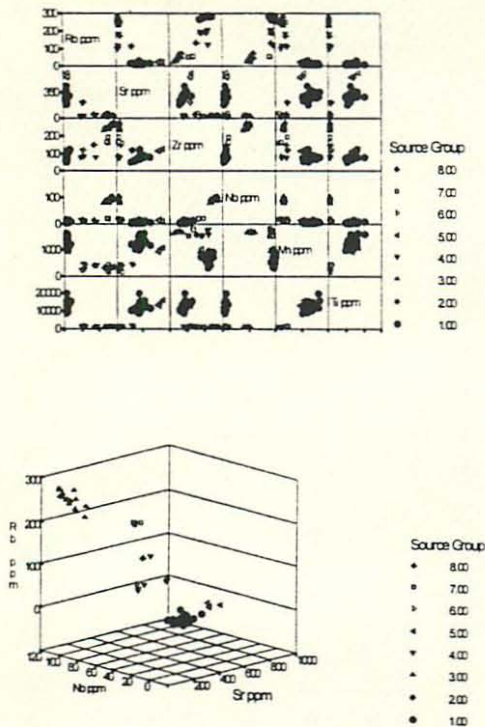


Figure 1

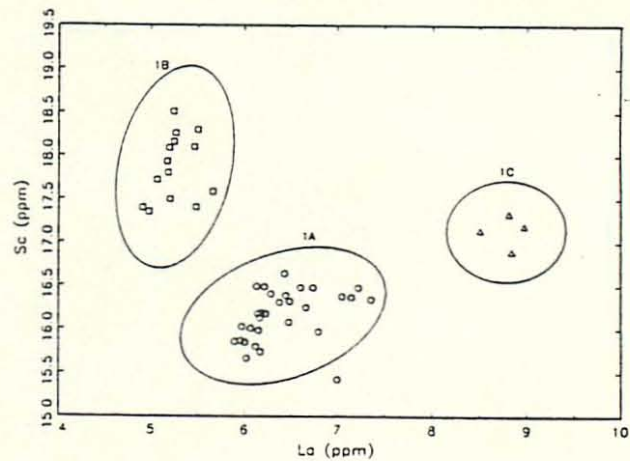
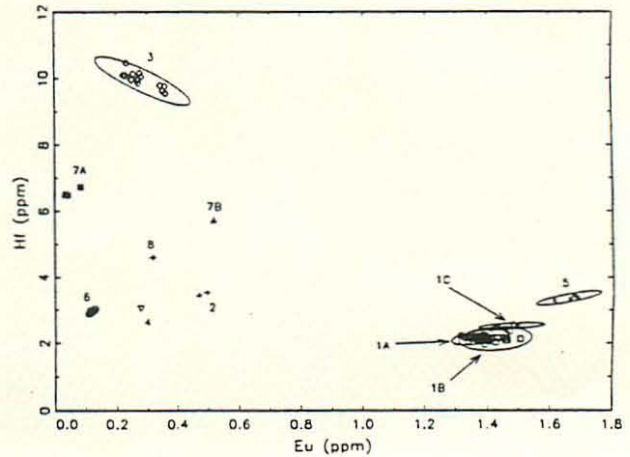
These results (the first study of its kind in the region) using bivariate and 3-D plots, cluster, and discriminant classification analyses indicate that at least seven and probably eight major geochemical groups reflect probable sources in the region. One group represents only the artifacts from the middle Amur River basin, and doesn't appear in other regions. Five other groups are distributed in Primorye (Ussuri River basin and the northwestern coast of the Sea of Japan). Two of these are very local, represented by one sample each. One of these groups is very widely dispersed along the coast (ca. 700 km). Two other groups are widely distributed within Southern Primorye.

Both EDXRF and NAA identified the same major geochemical groups. NAA consistently discriminated sub-groups within Major Groups 1 and 7 (see Figures 2a and b and 3a and b). Based on previous experience, and in the absence of geological samples, it seems reasonable that these sub-groups represent intra-source variation, common in some volcanic fields (Hughes and Smith 1993; Glascock 1994; Glascock et al. 1996; Macdonald et al. 1987; Mahood and Hildreth 1983; Shackley 1995, 1996). These sub-groups, based on NAA analysis, are often separated by only a few ppm, as you can see in the Figures 2a and b.



Figures 2a and b. EDXRF Plots of Chemical Groups

The high level of discrimination available through the precision of NAA enables a more confident analysis of intra-source variability. EDXRF through the analysis of the middle and high Z elements, many that function as silicic incompatible elements, allows for confident inter-source discrimination that is non-destructive. This may be desirable for solving many archaeological problems, particularly with museum collections or where repatriation issues require a rapid non-destructive analysis.



Figures 3a and b. NAA Plots of Chemical Groups

As important as the archaeological inferences are, the archaeometric information may be of equal importance. This investigation of obsidian assemblages, where the location of nearly all the sources is unknown, presents an excellent opportunity to test our ability to predict the source composition and number of sources in a given region. Additionally, an equally important result is the direct comparison of current EDXRF and NAA analyses of the same archaeological obsidian. The agreement in assignment to the major groups between the two instrumental techniques was excellent, although NAA predicts chemical sub-groups, particularly for groups one and seven, that cannot be discerned with EDXRF. These sub-groups may be the result of intra-source variability, an ability at which NAA is particularly adept.

Finally, all of this remains rather subjective until geological samples are analyzed. The first batch of geological samples will be analyzed this year, and the discussion of the *probable* sub-groups will, hopefully, be resolved.

This research was supported in part by grants from US NSF (DBS-91-02016 and DBS-92-05506) and Russian RFFI (95-06-17515).

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1995 Sources of archaeological obsidian in the Greater American Southwest: an update and quantitative analysis. *American Antiquity* 60:531-551.
- Shackley, M S.  
1996 Intrasource chemical variability and secondary depositional processes in sources of archaeological obsidian: a case study from the American Southwest. In *Archaeological Obsidian Studies: Method and Theory* edited by Shackley, M .S., New York: Plenum Press, in press.

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#### MEETINGS AND EVENTS

##### 1996

**December 5-7.** Australian Archaeological Association Conference, Dzintari Camp, Fleurieu Peninsula, South Australia. For information contact Colin Pardoe, South Australian Museum, University of South Australia, North Terrace, Adelaide, S.A., 5000.

##### 1997

**February 10-13.** Sixth Australasian Archaeometry Conference. Australian Museum, Sydney, Australia. Australian Institute of Nuclear Science and Engineering, Australian Nuclear

As important as the archaeological inferences are, the archaeometric information may be of equal importance. This investigation of obsidian assemblages, where the location of nearly all the sources is unknown, presents an excellent opportunity to test our ability to predict the source composition and number of sources in a given region. Additionally, an equally important result is the direct comparison of current EDXRF and NAA analyses of the same archaeological obsidian. The agreement in assignment to the major groups between the two instrumental techniques was excellent, although NAA predicts chemical sub-groups, particularly for groups one and seven, that cannot be discerned with EDXRF. These sub-groups may be the result of intra-source variability, an ability at which NAA is particularly adept.

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**February 10-13.** Sixth Australasian Archaeometry Conference. Australian Museum, Sydney, Australia. Australian Institute of Nuclear Science and Engineering, Australian Nuclear

Science and Technology Organization, Australian Museum. Dr. Claudio Tuniz, Sixth Australian Archaeometry Conference, AINSE, PMB 1, Menai, NSW 2234, Australia; tel: (02) 717-3493; FAX: (02) 717-9265; email: tuniz@atom.ansto.gov.au.

**March** 26-30. Society for California Archaeology Annual Meetings. Red Lion Inn, Rohnert Park, California, USA.

**April** 2-6. The 62<sup>nd</sup> Annual Meeting of the Society for American Archaeology. Opryland Hotel, Nashville, Tennessee, USA.

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## 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 characterization results;
- (3) provide technical support in the form of training and workshops for those wanting to develop their expertise in the field, and;
- (4) provide a central source of information regarding the advances in obsidian studies and the analytic capabilities of various laboratories and institutions.

### Membership

The IAOS needs membership to ensure success of the organization. To be included as a member and receive all of the benefits thereof, you may apply for membership in one of the following categories:

- Regular member \$20.00/year
- Institutional member \$50.00
- Life-Time Member \$200.00

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.

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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.

\*Membership fees may be reduced and/or waived in cases of financial hardship or difficulty in paying in foreign currency. Please complete the form and return to the Secretary with a short explanation regarding lack of payment.

\*\*Because membership fees are very low, the IAOS asks that all payments be made in US dollars in international money orders or checks payable on a bank with a US branch. If you do not do so, much of your dues are spent in currency exchange. If you wish to join us, mail a check or money order to the IAOS:

Pat Dunning, Secretary-Treasurer  
Department of Anthropology  
One Washington Square  
San Jose State University  
San Jose, California 95121-0113  
408.997-9183

### CALL FOR ARTICLES AND INFORMATION

Submissions for articles, short reports, abstracts, or announcements for inclusion in the newsletter are accepted at any time. We accept electronic media on IBM compatible 3.5" or 5.25" diskettes in a variety of word processing formats, but Wordperfect (5.n) or Word for Windows 95 is preferred. A hard copy of the text and any figures should accompany diskettes.

Deadline for submission for the Spring Bulletin is February 1, 1997. Send to Blossom Hamusek, PAR ENVIRONMENTAL SERVICES, INC., P.O. Box 160756, Sacramento, CA 95816-0756, USA. Voice: 916.739-8356; FAX: 916.739-0626.

**I**nternational  
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**Business Address:**  
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**Department of Anthropology**  
**San Jose State University**  
**San Jose, CA 95192-0113**  
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December 2, 1996

Dear Member,

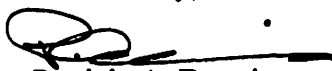
It is again time to solicit nominations for President-Elect for the 1997-98 term, and, because Jeff Hamilton has resigned, for Secretary-Treasurer for the 1997-99 term. Nominees must be IAOS members; a current membership list is included at the end of this Bulletin. Two nominations are required for an individual to be placed on the ballot. (We will verify a nominee's interest in serving in the position.)

At the last Annual Meeting, we established an Excellence in Obsidian Studies Award (see Glascock's report in this Bulletin). This award will be presented at the awards ceremony at the Annual Meeting of the Society for American Archaeology, in recognition of excellence in obsidian research, to a researcher who has made innovative or lifetime (repeating and enduring) contributions to obsidian studies. Please submit nominations for this award, including a brief summary of your nominee's contributions to the field and why your nominee should receive it.

Please note that the mailing label on this Bulletin indicates your last renewal year in the upper right-hand corner (blank if you are a lifetime member, 1996 if you are up-to-date). Please also note that we are a small organization, which relies on membership fees—most of which go for printing and mailing costs—to remain in operation. Of our 114 members, 12 are lifetime, 31 have paid 1996 dues, 21 1995 dues, and 50 not since 1994. To help us remain in operation, and to continue receiving the Bulletin, please remit unpaid fees as soon as possible.

Please return your nominations by early February. Thank you.

Yours Truly,

  
Patricia A. Dunning,  
Secretary-Treasurer, IAOS

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IAOS Nominations for 1997

Nominee for President-Elect \_\_\_\_\_

Nominee for Secretary-Treasurer \_\_\_\_\_

Nominee for Obsidian Studies Excellence Award (enclose supporting comments):  
\_\_\_\_\_

Please return to: IAOS, Department of Anthropology, San Jose State University, San Jose, CA 95192-0113. (Or, fold, staple, and affix stamp.)

**IAOS**

**Department of Anthropology**

**San Jose State University**

**San Jose, CA 95192-0113**

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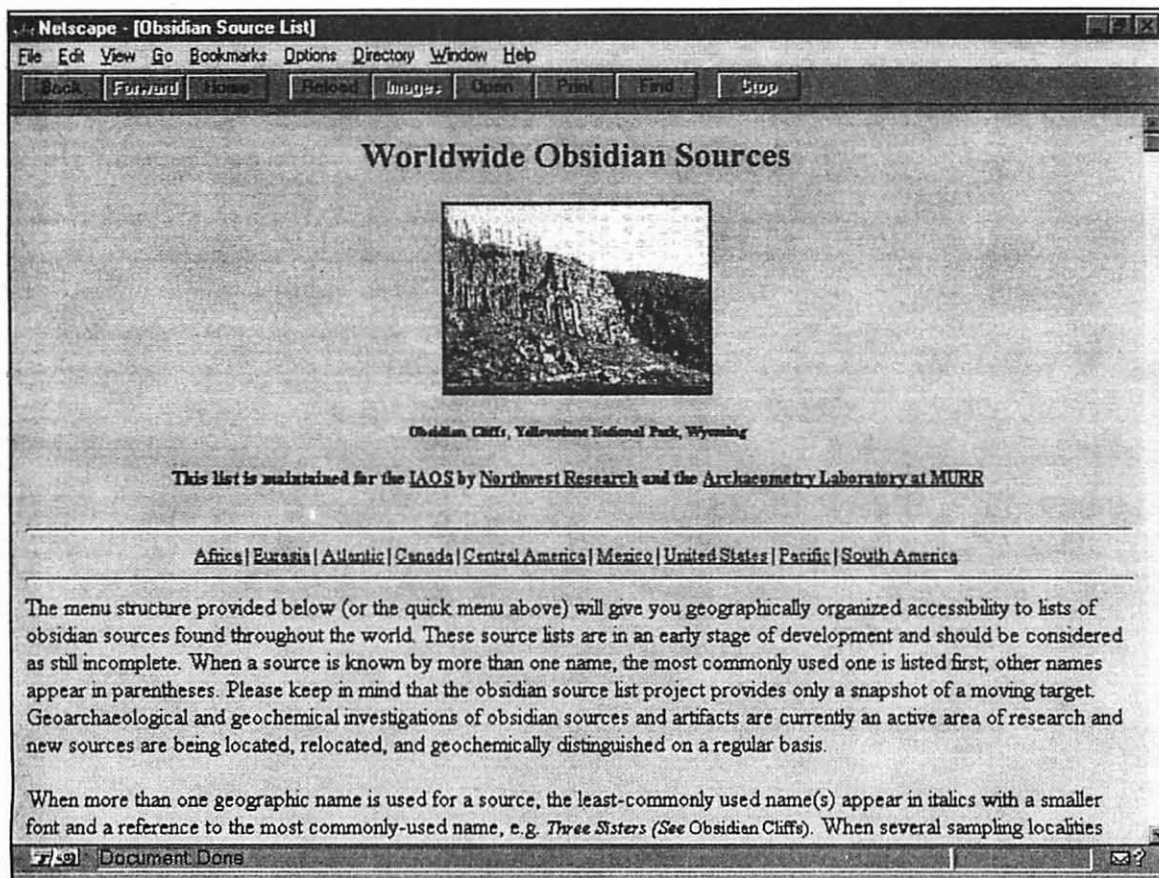


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