IAOS

International Association for Obsidian Studies

Bulletin

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NEWS AND INFORMATION

CALL FOR PAPERS

Please consider joining an IAOS sponsored session on long distance exchange at the 2007 Society for American Archaeology meetings in Austin, TX. If interested, please contact Carolyn Dillian at cdillian@princeton.edu

THE *BULLETIN* NEEDS YOUR HELP

The *Bulletin* is a twice-yearly publication that is typically a struggle to complete. The biggest hurdle is trying to acquire quality articles for publication. Please review your research notes and consider submitting an article, research update, or lab report for publication in the IAOS B*ulletin*! Articles and inquiries can be sent to cdillian@princeton.edu Thank you for your help and support!

AWARDS

The IAOS has instituted a new student award for obsidian-related papers presented during conferences or meetings. The award consists of a one-year membership in the IAOS and publication of the paper in the IAOS *Bulletin.* If you have a paper you wish to nominate, or wish to nominate your own paper for consideration, please send the following information to Phil LeTourneau at plet@unm.edu :

- Name and affiliation of nominee
- Title of paper
- Conference where presented
- Student's graduate/undergraduate program

NOTES FROM THE PRESIDENT

The SAAs in San Juan were a lot of fun. The number of symposia and individual papers on obsidian hydration, geochemistry, and sources; quarries; and archaeometry was encouraging and showed how much interest there is in these topics.

Only a few of us made it to the annual IAOS meeting, but we had a productive discussion about a number of topics. Colby Phillips officially began his term as Secretary-Treasurer. Thanks again to outgoing Secretary-Treasurer Janine Loyd for all of her hard work.

We reviewed the different funding sources for students conducting obsidian-related research (Archaeological XRF Laboratory at the University of California, Berkeley; Northwest Research Obsidian Studies Laboratory; and Society for California Archaeology's James A. Bennyhoff Memorial Fund) and formalized an IAOS award for student conference papers. The award is a one-year membership for papers about obsidian-related research. All students presenting papers on their obsidian-related research are eligible for the award. Thus far this year we have given three of the awards for papers presented at the SAAs in San Juan. The recipients are Kimberly Kersey, Karin J. Rebnegger, and Nicholas Tripcevich. We hope to reprint their papers in the next issue of the *Bulletin*.

We discussed a couple of ideas for an IAOS-sponsored symposium at the SAAs in Austin next year and welcome suggestions. We are also considering the possibility of an IAOS obsidian studies workshop at the 2008 SAAs in Vancouver. It will have been 10 years since the last IAOS workshop in Seattle. I think the numerous advances in geological, hydration, and geochemical studies over the past decade make the idea of a workshop especially timely. Please let us know if you have any ideas for specific workshop topics.

I hope everyone has a great summer.

Phil

NOTES FROM THE SECRETARY/TREASURER

I am excited to have taken over the Secretary/Treasurer position and am working to make a smooth transition from Janine Loyd. Over the next few months I will be updating the IAOS membership list and sending out reminders about membership renewals. If you have any questions about your membership or need to update your contact information, please feel free to contact me anytime at colbyp@u.washington.edu. Thanks! Colby

Also, please note the new IAOS mailing address:

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c/o University of Washington
Department of Anthropology
Box 353100
Seattle, WA 98195-3100

Fire Effects to Obsidian during the Valle Toledo Prescribed Burn

Jamie A. Civitello
Valles Caldera Trust, Jemez Springs, NM

The Valles Caldera National Preserve is located in the Jemez Mountains of north-central New Mexico. In the fall of 2005, the Preserve conducted a prescribed burn in the Valle Toledo, one of the high elevation (greater than 8500 ft amsl) grasslands that characterize the caldera. The primary goal was to measure the effectiveness of prescribed fire as a tool for improving grassland community health as part of the Preserve's science-based adaptive management principle. The Preserve contains deposits of high-quality obsidian which have been used locally and regionally throughout prehistory. Fire can physically alter obsidian and affect the obsidian hydration dating potential of artifacts. Previous studies have examined fire effects under various conditions (see Loyd, Origer, and Fredrickson 2002). However, the effects of low-intensity grassland fire on obsidian artifacts are not well known. The Valle Toledo prescribed burn provided an opportunity to examine fire effects to obsidian in a grassland setting under controlled circumstances where effective temperatures could be precisely and accurately measured.

Fire Effects to Obsidian in Experimental Plots

To assess fire effects to obsidian in a grassland setting under controlled conditions, experimental plots were established in the Valle Toledo prior to the burn. Artifacts from a large quarry on the Preserve were collected, cataloged, and sawed in half. Four plots were established in areas of varying biomass within the burn area. Ten artifacts were placed at each plot; one sawed half of each artifact remained as an unburned control sample. The artifacts in the plots were placed intentionally within fuel, etched for identification, and mapped. Fuel type and height was recorded. Strings were placed at known heights on T-posts to record flame length. A HOBO thermocouple was placed at the center of each plot with the thermocouple sensor tip extending 1 cm to 5 cm above ground surface. Temperatures were recorded during the fire every 15 seconds. After the fire, the artifacts were re-mapped and collected. Both the control and burned sample were re-examined for macroscopic fire effects and submitted for obsidian hydration analysis to Tom Origer and Associates.

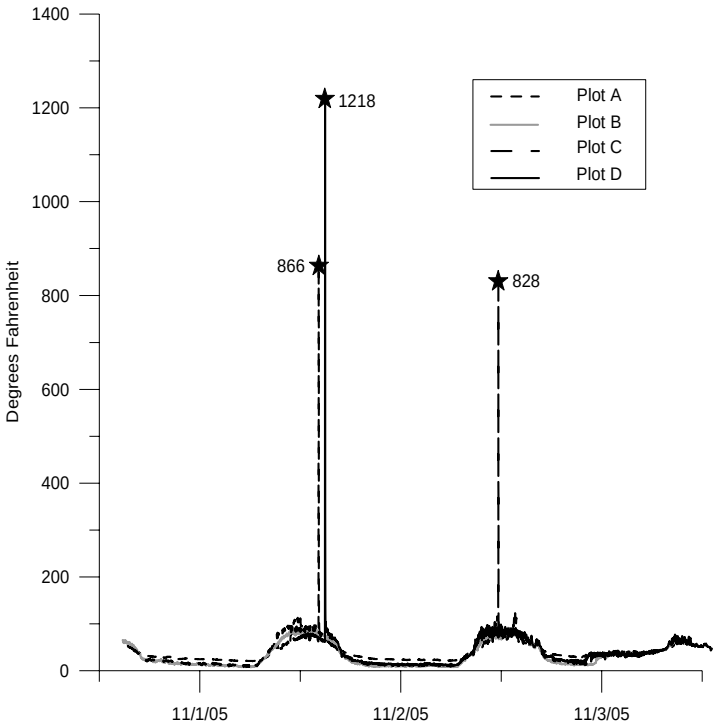

Figure 1. Recorded temperatures at plots A, B, C, and D during the Valle Toledo prescribed burn. Plot B did not burn. Fifteen second recording interval.

Results

All plots burned with the exception of Plot B in the low biomass condition of the lower montane grassland. Preserve archaeologist William Barfuss monitored the plots during the burn. Temperatures at Plots A and C reached over 800°F for a maximum of 15 seconds. Plot D reached 1218°F for a maximum of 15 seconds (Table 1; Figure 1).

Fire Effects to Obsidian Hydration Bands

Ten percent (3/29) artifacts exposed to fire showed altered obsidian hydration bands. Two affected bands became diffuse, while one became thickened. Broken down by plot, 1 of 10 artifacts in Plot A and Plot C each showed altered hydration bands, while 1 artifact of 9 in Plot D was altered.

Macroscopic Fire Effects to Obsidian

No artifacts showed surface crazing, a diagnostic fire effect (Friedman and Trembour 1983, Steffen 2002, Steffen 2005). Sixty two percent (24/39) of artifacts showed sooting or plant residue buildup. All artifacts in Plot A (10/10), 60 percent of artifacts in Plot C (6/10), and 89 percent of artifacts in Plot D (8/9) showed sooting/residue.

Discussion

Previous studies have indicated that fire effects are primarily influenced by the variables of temperature and duration of fire exposure. Most studies that have documented altered hydration bands involved temperatures reaching at least 300°F or exposure of specimens to long duration of heat exposure (e.g., Solomon 2002; Trembour 1990; but see also Benson 2002). Although temperatures at our plots reached up to 1218°F, exposure to temperatures above 200°F only ranged from 30 seconds to 1 minute, 45 seconds. Short duration of exposure may account for the relatively low occurrence of altered bands, even in the two plots with the highest biomass and highest experienced temperatures (Plot A and D). The most widespread fire effect was the buildup of soot and plant residue on artifact surfaces, particularly on the artifacts in Plot A under the pine and grass litter. The prevalence of soot buildup likely resulted from the poor combustion associated with brief duration of heat exposure. Even though more artifacts in Plot A experienced sooting than artifacts in other plots, there is no greater proportion of altered hydration bands on those artifacts. This prescribed grassland fire altered obsidian hydration bands on only a small proportion of exposed artifacts.

Table 1. Plot Conditions and Experienced Temperatures.

	Vegetation Type	Ground Fuel Conditions	Relative Biomass Level	Maximum Experienced Temperature
Plot A	Ponderosa pine overstory with Parry's oatgrass and Thurber's fescue understory	Thick pine needle and grass litter and duff.	high	866°F (463°C)
Plot B	Lower Montane Grassland	Sparse pine dropseed and blue grama clumps. High % bare ground.	low	n/a
Plot C	Upper Montane Grassland	Parry's oatgrass and Arizona fescue bunches. Low % of bare ground.	moderate	828°F (442°C)
Plot D	Upper Montane Grassland	Vigorous oatgrass and fescue. Zero % bare ground.	high	1218°F (659°C)

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RESEARCH NEWS AND NOTES

This new section of the IAOS *Bulletin* is devoted to research news and notes from our membership. Please consider submitting an abstract or brief description of your current research, and include your contact information if you would like to receive comments, questions, or suggestions from our readers. Contributions for the research news and notes can be emailed to the *Bulletin* editor at cdillian@princeton.edu

Carolyn Dillian
Princeton University
cdillian@princeton.edu

Though I frequently try to avoid publishing too much of my own research in the *Bulletin*, I'm writing this entry as a call for help, rather than a presentation of my latest data. I have recently been invited to join Rutgers University and the National Museums of Kenya on a project near Koobi Fora, on the shores of Lake Turkana in northern Kenya. My task is to investigate the feasibility of sourcing studies on obsidian from Holocene sites in the region. Though I have familiarized myself with the work of Harry Merrick and Francis Brown, probably the most comprehensive obsidian study in the country to date, I continue to seek additional information regarding obsidian sources in the region. I welcome any and all suggestions for citations, research methodology, or contacts. Here are some of the issues I'm trying to overcome:

- It is difficult, if not impossible, to take artifacts out of the country for analysis.
- XRF and/or other sourcing technologies are difficult to access in Kenya.
- There are many unknown obsidian sources in the region, and few published datasets for the composition of known sources.

During the first field season, I plan to develop a protocol for visual sorting and description of obsidian artifacts. I hope to identify visually distinctive categories that may or may not correlate to geologic sources. I also would like to explore the utility of using specific density as a preliminary sorting category. There are both trachyte obsidians and rhyolite obsidians in the vicinity of Koobi Fora that may sort differently on a density scale. Finally, I plan to begin discussion of resource procurement, exchange, and interaction in the Holocene on the eastern shores of Lake Turkana, Northern Kenya.

Please contact me if you have any suggestions, comments, citations, resources, or critiques of this proposed research. I'm in the preliminary planning stages at this point, and welcome any and all comment. Thank you!

Obsidian Abstracts from the 2006 Annual Meeting of the Society for American Archaeology, San Juan, Puerto Rico

Lisa Beyer and Robert Tykot: *The Prehistoric Sources of Obsidian on the Island of Lipari, Italy: Preliminary Results Using LAICPMS*
Our preliminary results of LAICPMS analysis performed on obsidian derived from in situ prehistorically available obsidian flows on the island of Lipari were studied in order to determine which of these flows were likely utilized during the Neolithic period. Our results seem to indicate that both Gabellotto Gorge and Canneto Dentro volcanic vents produced high quality obsidian that was exploited during the Neolithic and that both of these sources of obsidian formed an integral part of a long-distance coastal trade network.

Jamie Civitello: *Valle Toledo Prescribed Burn: Site Discovery Issues and Fire Effects to Obsidian*
The Valles Caldera National Preserve recently conducted a prescribed burn in the Valle Toledo, on e of the large high-elevation grassland valleys that characterize the caldera. Numerous undocumented archaeological deposits occur within the 1900 acre burn area, providing an opportunity to monitor fire effects and to assess site discovery methods in a grassland setting. A pre-burn sample survey documented cultural material as well as surface visibility. Pre-burn results will be compared to 100 percent post-burn survey results. Fire effects to obsidian are documented within artifact monitoring plots, with obsidian samples exposed to fire under varying biomass loads and effective temperatures.

Véronique Darras: *Obsidian Strategy and Power in the Tarascan Society from the Malpais de Zacapu, Michoacan.* The study of obsidian artefacts from the Zacapu region, for the Postclassic period, has emphasized important transformations which broke with regional productive and technical systems which were previously in existence between Late Classic and Early Postclassic period. These changes modified the main structure of the economic system involving new patterns in acquisition strategy, production, technology, distribution and use. They may be connected with the emergence of centralized power structures in the Tarascan society. This paper focuses on the mechanisms which regulated the obsidian economic activities during the Late Postclassic period at the Tarascan sites of the Malpais de Zacapu.

Mary Beth Day, William Hoffman, David Bailey and George Jones: *Chemical Characterization of Chert and Fine-Grained Volcanic Artifact Source Materials in the Eastern Great Basin*
Paleoarchaic (11,500-8,000 BP) inhabitants of the eastern Great Basin left behind tools made primarily from three materials: obsidian, fine-grained volcanics, and chert. The majority of volcanic rock sources have been identified and characterized. Trace element data from ICP-MS analysis does not distinguish between various chert sources. However, preliminary major and trace element data from XRF analysis show that some of the chert sources are chemically uniform and can be distinguished from other sources. The potential of chert characterization is considered in light of prehistoric material selection patters and previous provenance studies of fine-grained volcanic and obsidian sources.

Carolyn Dillian, Charles Bello and M. Steven Shackley: *Mid-Atlantic Super-Long Distance Obsidian Exchange.* Preliminary analysis of a small sample of obsidian artifacts from archaeological contexts in the mid-Atlantic region has yielded tentative trade connections to western U.S. obsidian sources. This research has resulted in exciting suggestions that cross-continental down-the-line exchange may have occurred in prehistory. However, due to the extreme distances covered by the exchange networks proposed here, archaeological provenience, in addition to geologic provenance, is of utmost concern. A critical examination of archaeological provenience and geochemical sourcing as tools for understanding prehistoric exchange remains valuable in ongoing archaeological dialogue.

Mostafa Fayek, Lawrence Anovitz, Lee Riciputi, David Cole and Michael Elam: *A New Understanding of Obsidian Hydration*
Obsidian hydration dating (OHD) is based on the premise that when an obsidian artifact is manufactured the fresh surface exposed immediately begins to hydrate. Unfortunately,

surface concentrations may not equilibrate at room temperature for hundreds or thousands of years., and diffusion coefficients are compositionally dependent. “Self-stress” caused by the in-diffusing species, plays an important role. SIMS analysis of H and O, however, clearly suggests that only the hydrogen from water enters the glass at lower temperatures, not oxygen. Applications of new analytical approaches and experimental data to chronology and paleoclimatology have shown the potential applicability of this new approach.

William Fowler: *The Conquest-Period Obsidian Industry of Ciudad Vieja, El Salvador*
Ciudad Vieja, the ruins of the first villa of San Salvador, occupied 1528-1545, was inhabited by a large indigenous Mesoamerican population. They continued to use obsidian implements after the Conquest, but a drastic change occurred in the patterns of procurement and manufacture of these implements. No evidence exists that obsidian tools were produced on site. The pattern of evidence presented indicates that prismatic blades were imported ready-made for sale or barter at the town. In less than a generation after the Conquest, a highly specialized skill was lost, and ancient trade and exchange patters were greatly altered forever.

Helen Haines: *To See the World in a Shard of Glass: The Wider Implications of the Ancient Maya Obsidian Trade.* Obsidian is one of the most ubiquitous and easily traceable long-distance exchange goods in the ancient Maya world. Yet, because of its pluralistic social value (utilitarian & ritual), the networks through which this material was exchanged are among the most difficult to identify. This situation has been compounded by a research approach in which obsidian from all geological sources is considered equal. Based on contextual evidence that suggests the Maya ascribed different values to the various sources of obsidian, this paper will present a new paradigm to explain the means and rationale behind the Formative and Classic period obsidian trade.

Ricardo Leonel Cruz Jímenez and Dolores Tenorio Castilleros: *Dinámicas de Circulación de Obsidiana entre el Centro Norte del Golfo de Veracruz y los Yacimientos en el Estado de Hidalgo, a Traves de Análisis por Activación de Neutrones.* Se plantea de una forma diacrónica la interacción que existió entre el centro-norte del Golfo de Veracruz y los principales yacimientos de obsidiana localizados en el actual estado de Hidalgo: Zacualtipán, Sierra de las Navajas y Tulancingo. La propuesta de interacción se hace a partir de los resultados obtenidos con análisis de activación neutrónica reportados en la literatura de esta región arqueológica, así como por los efectuados por los autores en muestras obtenidas en el área periférica de El Tajín. Se aborda la importancia de estas fuentes de obsidiana en la conformación de las dinámicas culturales, políticas y geográficas de esta porción de Mesoamérica.

Kimberly Kersey: *Emerging Elite Economies: A Diachronic View of Obsidian Trade in the Mesoamerican Formative Period in the Belize Valley.* Trade and exchange networks in ancient Mesoamerica were composed of dynamic, interlaced systems defined by a variety of relationships among people from many regions. The diversity and density of “exotic” materials recovered from ritual contexts, dating to the Formative period at the ceremonial centers of Blackman Eddy and Cahal Pech, indicate that interactive spheres of trade and exchange of ritual paraphernalia were well-established by this time. With the data acquired from past and recent excavations, and through new and refined techniques of sourcing materials, it is possible to reconstruct trade routes which can be used to examine ancient ritual economies.

Michael Love: *Obsidian Procurement and Use in Formative Period Households in Pacific Guatemala.* Obsidian was essential to ancient Mesoamerican households and they pursued multiple strategies for its obtainment and use. In Formative Period Pacific Guatemala, obsidian was exchanged in many forms, most notably raw materials, used production at the household level, and prismatic blades, obtained in finished form. This paper compares obsidian use at the sites of La Blanca and El Ujuxte. La Blanca was a Middle Formative regional capital, while El Ujuxte emerged during the Late Formative. There were significant changes in household strategies over time, due largely to greater centralized control over the economy at El Ujuxte.

Karin Rebnegger: *Changes in Obsidian Production and Consumption in the Lake Patzcuaro Basin, Michoacan.* A hierarchy of settlements existed around Lake Patzcuaro from the Tarascan capitol of Tzintzuntzan to secondary administration sites and tributary centers. Analysis of obsidian from two sites, one an administration center and the other a tribute center have highlighted particular patterns and changes in production and consumption of obsidian from local and long distance sources. Local and state elites inhabited both sites and analyses of obsidian manufacture and source location show that these sites may have had different functions. This too may indicate the changing socio-political organization of obsidian production and use throughout the Tarascan State.

Timothy Seaman and Anastasia Steffen: *Walking on Broken Glass: 2005 Survey on Cerro del Medio* Despite the renown of Cerro del Medio as a major southwestern U.S. obsidian source, private ownership has severely restricted past archaeological investigations. During the 2005 season, the VCNP Cultural Resource Program conducted the first systematic block survey on Cerro del Medio. Site documentation in the 475-acre survey area provides a representative sample of diverse surface assemblages that range from discrete clusters of biface-reduction debitage to enormous quarries atop obsidian-rich geological deposits. The survey design incorporated recent geological data, providing an opportunity to fully integrate the geological and archaeological investigations and overcome inadvertent bias in obsidian sampling.

Anastasia Steffen: *Investigating Obsidian Water Content in Valles Caldera Volcanic Glasses*
Analyses of obsidian composition are critical for both archaeological obsidian sourcing and hydration dating. This study integrates investigation of elemental composition and water content in rhyolitic glasses from Valles Caldera sources in the Jemez Mountains in northern New Mexico. Results of LOI and FTIR analyses of water content demonstrate important differences in compositional variation when comparing obsidian-bearing deposits of explosive origin, as in the Cerro Toledo obsidians (e.g. Obsidian Ridge), to glasses formed in extrusive volcanic contexts as at Cerro del Medio. These results indicate new research directions for improving the performance of hydration dating.

A. Natasha Tabares, Helen Wells and C. William Clewlow, Jr.: *Obsidian Subsources, Hydration and Projectile Points: New Data from the Rose Valley Region, Southeastern California.* Sourcing obsidian samples from sites in the Rose Valley region has yielded new data regarding the use of subsources in the Coso Volcanic Field. Hydration readings and diagnostic projectile points support a time span of 9000 years for occupation of the region. Hydration data also contribute to a growing database of revised time ranges for specific point types in southeastern California.

Nicolas Tripcevich: *Mobility and Exchange in the Andean Preceramic: Insights from Obsidian Studies.* Regional patterns of obsidian use during the Andean preceramic reveal developments that took place during this long and variable period. Data from recent survey and testing at the Chivay obsidian source provides information about the preceramic use of lithic source areas. These data are examined in conjunction with published obsidian distribution data from the Andes in a GIS environment in order to evaluate models of preceramic mobility and regional interaction. Transformations that occurred during the preceramic, such as the domestication of camelids and early social complexity, can be explored with data from obsidian procurement and distribution.

Robert H. Tykot, Carlo Lugliè, Teddi Setzer, Giuseppa Tanda and Ronald Webb: *Surveying and Excavating a Prehistoric Obsidian Workshop in Sardinia (Italy): Studying the Chaîne Opératoire*
Survey and excavation has been conducted at the large obsidian workshop site of Sennixeddu, adjacent to the SC geological source on Monte Arci. Artifacts from this source are found throughout Sardinia, and also in Corsica, mainland Italy and southern France, dating as early as the 6th millennium BC. Systematic survey, along with excavations in different areas, has produced information on the organization and intensity of obsidian production during the Neolithic period. More than 100,000 obsidian artifacts have been recovered and are being studied and integrated with research on obsidian technology, trade and use, and other parts of the chaîne opératoire.

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/year*
Institutional Member: $50/year
Student Member: $10/year or FREE with submission of a paper to the *Bulletin* for publication. Please provide copy of current student identification.
Lifetime Member: $200

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

Institutional Members are those individuals, facilities, and institutions who are active in obsidian studies and wish to participate in interlaboratory 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 it to the Secretary-Treasurer with a short explanation regarding lack of payment.

NOTE: Because membership fees are very low, the IAOS asks that all payments be made in U.S. Dollars, in international money orders, or checks payable on a bank with a U.S. branch. Otherwise, please use PayPal on our website to pay with a credit card. http://www.peak.org/obsidian/

For more information about the IAOS, contact our Secretary-Treasurer:

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ABOUT THE IAOS

The International Association for Obsidian Studies (IAOS) was formed in 1989 to provide a forum for obsidian researchers throughout the world. Major interest areas include: obsidian hydration dating, obsidian and materials characterization ("sourcing"), geoarchaeological obsidian studies, obsidian and lithic technology, and the prehistoric procurement and utilization of obsidian. In addition to disseminating information about advances in obsidian research to archaeologists and other interested parties, the IAOS was also 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
4. Provide a central source of information regarding the advances in obsidian studies and the analytic capabilities of various laboratories and institutions.

ABOUT OUR WEB SITE

The IAOS maintains a website at http://www.peak.org/obsidian/
The site has some great resources available to the public, and our webmaster, Craig Skinner, has recently included a members' only section.

NEW: You can now become a member online or renew your current IAOS membership using PayPal. Please take advantage of this opportunity to continue your support of the IAOS.

Other items on our website include:

- World obsidian source catalog
- Back issues of the *Bulletin.*
- An obsidian bibliography
- An obsidian laboratory directory
- Photos and maps of some source locations
- Links

Thanks to Craig Skinner for maintaining the website. Please check it out!

CALL FOR ARTICLES

Submissions of articles, short reports, abstracts, or announcements for inclusion in the *Bulletin* are always welcome. We accept electronic media on IBM compatible disks and CD in a variety of word processing formats, but MS Word or WordPerfect are preferred. Files can also be emailed to the *Bulletin* at cdillian@princeton.edu Please include the phrase "IAOS Bulletin" in the subject line. An acknowledgement email will be sent in reply, so if you do not hear from us, please email again and inquire.

Deadline for Issue #36 is September 30, 2006.

Send submissions to:

Carolyn Dillian
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U.S.A.

Inquiries, suggestions, and comments about the *Bulletin* can be sent to cdillian@princeton.edu Please send updated address information to Colby Phillips at colbyp@u.washington.edu

MEMBERSHIP RENEWAL FORM

We hope you will continue your membership. Please complete the renewal form below.

NOTE: You can now renew your IAOS membership online! Please go to the IAOS website at http://www.peak.org/obsidian/ and check it out!

___ Yes, I'd like to renew my membership. A check or money order for the annual membership fee is enclosed (see below).

___ Yes, I'd like to become a new member of the IAOS. A check or money order for the annual membership fee is enclosed (see below). Please send my first issue of the IAOS *Bulletin*.

___ Yes, I'd like to become a student member of the IAOS. I have enclosed either an obsidian-related article for publication in the IAOS *Bulletin* or an abstract of such an article published elsewhere. I have also enclosed a copy of my current student ID. Please send my first issue of the IAOS *Bulletin.*

Not convinced, but want to know more?

___ Please send me a complementary issue of the latest IAOS *Bulletin.*

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