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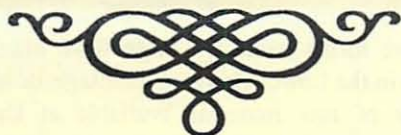
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Bulletin assembled and edited by William J. McFarlane

CONTENTS

<i>News and Information</i>	- 1
<i>Abstracts and Annotations</i>	- 2
<i>Reports, Articles, and New Research</i>	- 6
<i>About the IAOS</i>	- 9

NEWS AND INFORMATION



The IAOS Annual Meeting will be held during the upcoming SAA Meetings in New Orleans. The meeting will be held from 3:00 PM to 5:00 PM Friday, April 20. Check your program for an exact location.

The IAOS web site has recently been rewritten from the bottom up, including a new address: www.peak.org/obsidian. Plans for the immediate future include posting back issues of the *Bulletin* in full text format and to convert some of them to a downloadable Adobe Acrobat (PDF) format. Craig Skinner, the webmaster, also hopes to locate and post more full-text articles and abstracts to allow the site to function more usefully as a research resource as well as supplementing the IAOS Bibliography (also accessible from the home page). In an effort to expand the utility of the site,

Craig will continue to develop state and country reference lists to be tied into the source catalog. These are now available in varied degrees of completeness for several states. Please contact Craig, via the website or at cskinner@obsidianlab.com, if you have any information about obsidian characterization or hydration labs with a web presence.

The IAOS is pleased to announce two competitive funding opportunities to students. A \$500 stipend will be given to the organizer (or co-organizers) of a session at the next Society for American Archaeology meetings in Denver. The session topic is open to any aspect of obsidian studies, including but not limited to methodological and theoretical issues of sourcing and dating, exchange, production, or use of obsidian artifacts. Interested students should send a one page proposal to Michael Elam at jme@utkux.utec.utk.edu by July 1, 2000. The recipient of this stipend will also receive a one year IAOS membership.

A \$500 grant will also be offered by the IAOS during the next year. Students conducting research on any aspect of obsidian are eligible to apply. Please send a proposal no longer than one page in length to Michael Elam by November 1, 2001.

CALENDAR OF EVENTS

18-22 April 2000 - 66th Annual Meeting of the Society for American Archaeology, New Orleans.

Get your events added to the calendar listings by dropping an e-mail note to the editor.

ABSTRACTS AND ANNOTATIONS

Compiled by William McFarlane
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Bellot-Gurlet, L., Poupeau, G., Dorighel, O., Calligaro, Th., Dran, J.C., and Salomon, J.

A PIXE/fission-Track Dating Approach to Sourcing Studies of Obsidian Artefacts in Columbia and Ecuador. *Journal of Archaeological Science* (1999) 26, 855-86.

Using PIXE, we measured the chemical composition of 142 obsidian artefacts from 45 prehispanic archaeological sites and 22 obsidian samples from seven geological occurrences from Colombia and Ecuador. From PIXE data, these 164 samples may be classified into five chemical groups. Two source samples and a selection of 41 artefacts were dated by fission tracks. Some artefacts belonging to a single chemical group may have different formation ages and, hence, come from different sources. This results, for these 41 artefacts, in a minimum of eight sources, of which only three are identified. These are the Rio Hondo (Columbia), Mullumica and Quiscatola-Yanaurcu (Ecuador) sources. More than half (22) of the artefacts dated by fission tracks pertain to a single 0.25-0.30 Ma, age/composition group related to an unknown source. These artefacts were found essentially in archaeological sites (four in Columbia, 12 in Ecuador) of the Regional Development Period situated along the Pacific coast.

Brantingham, P. Jeffrey, Olsen, John O., Rech, Jason A., and Krivoschapkin, Andrei I.

Raw Material Quality and Prepared Core Technologies in Northeast Asia. *Journal of Archaeological Science* (2000) 27, 255-27.

The design and assembly of lithic toolkits is mediated by a number of factors including the abundance and quality of raw materials available. In general, low raw material abundance and high raw material quality are thought to lead to formal tool designs, whereas high raw material abundance and low raw material quality lead to informal designs. Low raw material quality is seen as the overriding factor producing informal tool designs, even where low raw material abundance would favor formal designs.

In North China, the predominance of simple flake and core technologies, based on relatively poor quality raw materials, and the near absence of sophisticated

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prepared core technologies seems to corroborate the importance of raw material quality in toolkit design. Recent studies of a late Pleistocene lithic assemblage from the Lower Grotto at Tsagaan Agui cave, Mongolia, suggest however that raw material quality is not an absolute constraint on the development of sophisticated core reduction strategies. Levallois-like and other prepared core forms based on large flake blanks are conspicuous in the Lower Grotto assemblage, despite the poor quality of raw material available at the site. Contrary to expectations, these core forms appear to have developed in response to poor raw material quality. The implication is that raw material quality alone cannot explain the apparent technological simplicity of the North Chinese Middle and Upper Paleolithic.

Braswell, Geoffrey E., Clark, John E., Aoyama, Kazuo, McKillop, Heather I., and Glascock, Michael D.

Determining the Geological Provenance of Obsidian Artifacts from the Maya Region: A Test of the Efficacy of Visual Sourcing. *Latin American Antiquity* (2000) 11(3):269-282.

During the last four decades, mesoamerican archaeologists regularly have employed various chemical assay techniques to determine the geological sources of obsidian artifacts. In recent years, the reliability of these analytical procedures has increased and their costs have declined, encouraging the assay of ever larger samples. Nonetheless, several constraints make it unlikely that compositional data will be used routinely to attribute

entire collections to their geological sources. This report describes a test of visual sourcing, a technique that for many sites in the Maya region is only slightly less accurate than compositional assay. We also propose sampling strategies that combine visual and compositional sourcing in ways that allow large collections to be accurately sourced at low costs. Finally, we suggest ways to develop the technique for use throughout Latin America

Burger, Richard L. and Glascock, Michael D.

Locating the Quispisisa Obsidian Source in the Department of Ayacucho, Peru. *Latin American Antiquity* (2000) 11(3):258-268.

In 1999, the Quispisisa source of obsidian was located in the Province of Huanca Sancos in central Ayacucho near the village of Sacsamarca. This discovery has been confirmed at the University of Missouri Research Reactor (MURR) by comparing the neutron activation analyses of source samples with artifacts. The Quispisisa source of volcanic glass provided the raw material for most of the obsidian artifacts utilized in central and northern Peru throughout prehispanic times.

Glascock, Michael, Kunselman, Raymond, and Wolfman, Daniel (deceased)

Intrasource Chemical Differentiation of Obsidian in the Jemez Mountains and Taos Plateau, New Mexico. *Journal of Archaeological Science* (1999) 26, 861-868

Obsidian specimens from the Jemez Mountains and Taos Plateau source regions of north central New Mexico were characterized by instrumental neutron activation analysis and X-ray fluorescence analysis to establish the number of geochemical groups present. In addition, 37 obsidian artefacts from sites in New Mexico were similarly analyzed. The results of this research have determined that at least eight geochemical varieties of obsidian exist within the two source regions. The results also indicate that an abbreviated-INAA procedure previously found to be successful in assigning obsidian artefacts from Mesoamerica is also capable of sourcing artefacts from the northern New Mexico sources.

Gratuze, B.

Obsidian Characterization by Laser Ablation ICP-MS and its Application to Prehistoric Trade in the Mediterranean and the Near East: Sources and Distribution of Obsidian within the Aegean and Anatolia. *Journal of Archaeological Science* (1999) 26, 869-88.

For geological studies, interest in mass spectrometry with an inductively coupled plasma as an ion source and its association with laser ablation as a sample introduction technique (LA-ICP-MS) has steadily increased during the past few years and is now being developed in other fields such as archaeology. After a description of the analytical procedure and the calculation method, we show the potential of this technique to characterize, almost non-destructively, archaeological artefacts. Among the 70 elements that could be routinely analyzed by LA-ICP-MS with detection limits below the ppm level, we choose to determine the more critical ones in order to evaluate the geochemical models of the magmatic process (major elements, rare earths and some transition elements). A detailed survey of Cappadocian obsidian flows is given, and includes the characterization of nine different sources. Evidence of complex trade activities is clearly shown by the obsidian tools found at different prehistoric sites (from Neolithic to Bronze Age levels) in the Mediterranean and the Near East. New results on some archaeological sites located in Turkey, Syria and Cyprus are presented. They show the importance of Cappadocian sources in obsidian trade. Our results show that LA-ICP-MS allows a non-destructive analysis of archaeological objects and that it combines the advantage of the different classical methods used to characterize obsidian sources (mainly XRF and INAA) with high sensitivity and rapidity. Thus LA-ICP-MS appears to be a very powerful analytical tool and, at this time, this technique is the only one which can non-destructively determine such an important number of elements with such low detection limits.

Hamilton, Victoria E.; Christensen, Philip R.

A Global View of Martian Surface Compositions from MGS-TES[Report]. *Science* 287(5458):1626-1630, March 3, 2000.

Thermal Emission Spectrometer (TES) data from the Mars Global Surveyor (MGS) are used to determine compositions and distributions of martian low-albedo regions. Two surface spectral signatures are identified from low-albedo regions. Comparisons with spectra of terrestrial rock samples and deconvolution results indicate that the two compositions are a basaltic composition dominated by plagioclase feldspar and clinopyroxene and an andesitic composition dominated by plagioclase feldspar and volcanic glass. The distribution of the two compositions is split roughly along the planetary dichotomy. The basaltic composition is confined to older surfaces, and the more silicic composition is concentrated in the younger northern plains.

Morgenstein, Maury E., Wicket, Carolyn L., and Barkatt, Aaron

Considerations of Hydration-rind Dating of Glass Artefacts: Alteration Morphologies and Experimental Evidence of Hydrogeochemical Soil-zone Pore Water Control. *Journal of Archaeological Science* (1999) 26, 1193-1210.

SEM-EDAX textural-chemical alteration morphologies of man-made glass from Egypt and modern soda lime glass are compared to literature data for obsidian and sideromelane (rhyolitic and basaltic glass). A series of laboratory experiments using soda lime glass slides held at 90° C for 3-21 days of baths using different salt solutions (MgCl₂, LiCl, NaCl, CaCl₂, and KCl) in various concentrations provides compelling evidence that for any particular glass composition the style of glass corrosion (hydration-dissolution) is dependent on solution geochemistry. Two fundamental styles of glass corrosion occur: pitting dissolution and gel-laminated hydration. Glasses of different compositions may behave differently in similar environments. Reaction style and kinetics, and hydration-dissolution rates are controlled by soil temperature, glass and soil water chemistry, and ultimately alkali exchange between the glass artefacts and the soil-zone pore water. Glass and gel thickness loss through dissolution reactions may comprise hydration dating and may be responsible for a variety of reported apparent chronological inconsistencies. Future studies with obsidian and sideromelane under bath conditions and in the natural environment are needed to assess their response to variable soil-zone solution geochemistry.

Nakazawa, Yuichi

Management of core blanks in terms of lithic raw material availability in the Last Glacial Maximum in Hokkaido, Japan. Presented at the 30th annual meeting of Japan Association for Quaternary Research, Chiba, Japan, August 25th, 2000.

Management of core blanks of Upper Paleolithic hunter-gatherers, dated at approximately 20,000-14,000 B.P. in terms of lithic raw material availability is discussed, based on the examination of two lithic assemblages, recovered from Kashiwadai 1 site and Marukoyama site. The distance of both sites is 7 km and the nearest provenance of obsidian, which is called Akaigawa, is more than 70 km away from both sites in direct. Two main issues, regarding lithic raw material availability of prehistoric hunter-gatherers, are examined. First is the issue how we can elucidate lithic raw material management in terms of maintainability

and productivity. Second is how lithic raw material availability relates to site occupation duration and frequency of activities across the site.

In terms of core reduction sequences, 85 cores from Kashiwadai 1 site are classified into four types of A, B, C and D. The mean size of each type is significantly different (ANOVA; $df=3$, $F=5.1365$, $P<0.01$) and type A and B are apparently smaller than type C and D (ANOVA; $df=2$, $F=41.5778$, $p<0.01$). Type A and B are made from flakes while the type C and D are made from nodules, represents that size difference is in relation to the form of blanks.

The productivity of flakes from those cores are estimated by a value that the weight of each core is divided by number of scars on it. Distribution of this value in each type of core, showed that flake core blanks have higher productivity than nodule core blanks in both assemblages. Thus, the productivity of flakes from type A and B are higher than type C and D. However, the data that Marukoyama assemblage has higher rate of obsidian cores than the Kashiwadai 1 ($F=4.487$, $df=1$, $p<0.05$), may contradict the issue that the lithic raw material is not necessarily correlated with the distance between raw material provenance and the site. This result is well explained with the data that Marukoyama assemblage shows higher rate of retouched tools reutilized from cores (flake core blanks) than that of Kashiwadai 1 assemblage ($F=21.268$, $df=1$, $p<0.001$). Thus, the maintainability of obsidian flake core blanks in Marukoyama is relatively higher than that of Kashiwadai 1.

As a consequence, obsidian is utilized for small flake core blanks (type A and B) that have higher maintainability and productivity, is suitable for the tool kits managed by foragers who would occupied for a short duration at Marukoyama site for their specific task.

Gerard Poupeau, Ludovic Bellot-Gurlet, Verane Brisotto and Olivier

Doriguel

Nouvelles données sur la provenance de l'obsidienne des sites néolithiques du Sud-Est de la France (with an extended abstract in English). *Comptes Rendus de l'Académie des Sciences*, vol. 330, 297-303, 2000.

We analyzed the chemical composition of 22 artefacts considered obsidian by PIXE in non-destructive mode. The samples were collected from 11 Neolithic stations in South-East France, between the Rhône valley and the Northern Alps. One piece appeared not to be an obsidian. Among the others, 20 came from a single source in Sardinia and one from an unknown source. These data confirm the importance of the Sardinian origin of the obsidian found in France, in particular for the Middle Neolithic.

Richet, P., and Polian, A.

Water as a Dense Icelike Component in Silicate Glasses [Report]. *Science* (1998) 281(5375):396-398.

Density and Brillouin-scattering measurements of hydrous andesite glasses at ambient conditions showed that dissolved water has a concentration-independent partial molar volume of 12 ± 0.5 cubic centimeters per mole and a bulk modulus of 18 ± 3 gigapascals. Dissolved as hydroxyl ions or as molecular water, water has volume properties similar to those of ice VII, the densest form of ice. These properties point to hydrogen bonding as an important factor in water dissolution, and they indicate that changes of water speciation are driven by the entropy and not by the volume of the system. Water in a concentration greater than 1 percent by weight also causes a marked decrease of the shear modulus of the glass.

Roth, Barbara J.

Obsidian Source Characterization and Hunter-gatherer Mobility: an Example from the Tucson Basin. *Journal of Archaeological Science* (2000) 27, 305-314.

Obsidian source characterization is another tool that can be used by archaeologists to examine hunter-gatherer mobility strategies by allowing them to reconstruct the potential geographic extent of group mobility. In this paper, data on obsidian source characterization from nine Archaic sites in the Tucson Basin of southern Arizona are used to determine whether changes in obsidian procurement ranges are associated with a reduction in residential mobility documented in the area between the Middle and Late Archaic/Early Agricultural periods. Analysis of the data reveals that not only do procurement ranges change, but procurement strategies may also have changed. It is argued that obsidian source characterization is a useful tool for examining group mobility when used in conjunction with other site data.

Sandweiss, Daniel H., McInnis, Heather, Burger, Richard L., Cano, Asuncion, Ojeda, Bernardino, Paredes, Rolando, Sandweiss, Maria del Carmen, and Glascock, Michael D.

Quebrada Jaguay: Early South American Maritime Adaptations [Report]. *Science* (1998) 281(5384):1830-1832.

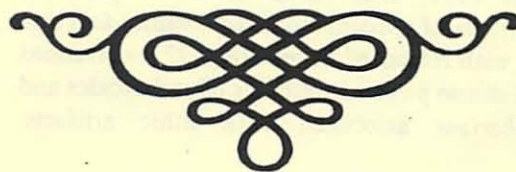
Excavations at Quebrada Jaguay 280 (QJ-280)

($16^{\circ}30'$ S) in south coastal Peru demonstrated that Paleoindian-age people of the Terminal Pleistocene (about 11,100 to 10,000 carbon-14 years before the present or about 13,000 to 11,000 calibrated years before the present) in South America relied on marine resources while resident on the coast, which extends the South American record of maritime exploitation by a millennium. This site supports recent evidence that Paleoindian-age people had diverse subsistence systems. The presence of obsidian at QJ-280 shows that the inhabitants had contact with the adjacent Andean highlands during the Terminal Pleistocene.

VanPool, Todd L., VanPool, Christine S., Antillón, Rafael Cruz, Leonard, Robert D., and Harmon, Marcel J.

Flaked Stone and Social Interaction in the Casas Grandes Region, Chihuahua, Mexico. *Latin American Antiquity* (2000) 11(2):163-174.

This analysis uses flaked stone artifacts to gain insight into the social and economic structure of the Casas Grandes region, northern Chihuahua, Mexico. It begins by considering the intrasite variation in flaked stone reduction at Galeana, a large site near the modern town of Galeana. The analysis of debitage and cores from Galeana indicates that the assemblage is primarily the product of hard hammer, generalized reduction of locally available materials. Differences within the assemblage indicate the presence of spatially distinct reduction areas, with initial core reduction occurring in open areas, and then continuing in room blocks. We then compare the Galeana assemblage with the flaked stone assemblage from the site of Paquimé assemblage is characterized by a greater proportion of cryptocrystalline silicates and obsidian than the Galeana assemblage. Furthermore, much of the raw material from Paquimé does not appear to be locally available. We conclude that the prehistoric inhabitants of Paquimé had greater access to cryptocrystalline silicates and obsidian acquired through trade than did the inhabitants of Galeana. This evidence indicates that the economic pattern evident at Paquimé did not extend to Galeana and supports the idea that Paquimé's economic and political influence over other Casas Grandes sites was limited beyond a 30-km radius.



Composition Analysis of an Obsidian Artifact from Pubenza, Colombia

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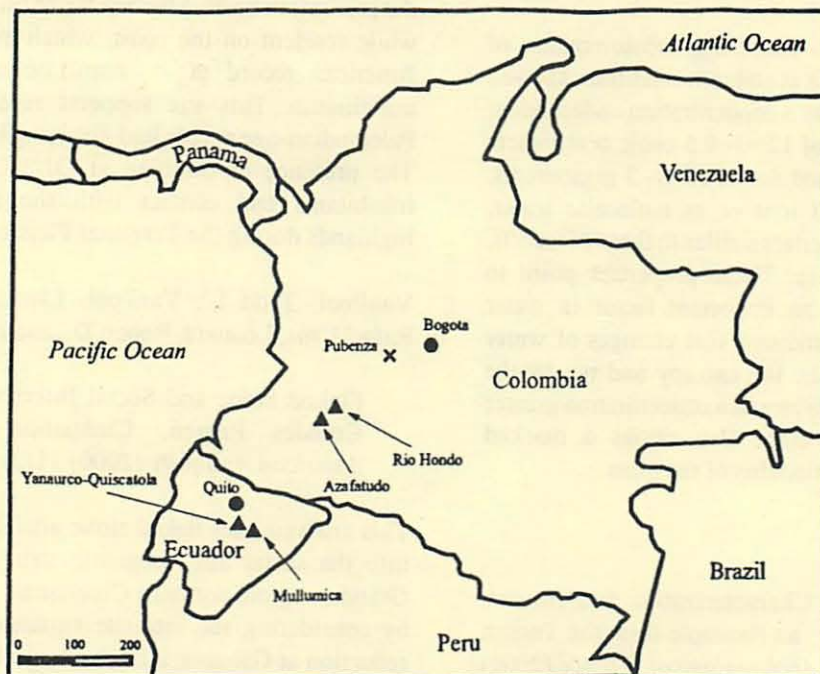


Fig 1. Map showing the locations of Pubenza and the obsidian sources in Colombia and Ecuador

Colombia has a long history of research focused on the time between the Tardiglacial and Holocene periods, roughly 14,300-11,000 B.P. The project entitled "The Pleistocene Environment and Prehistoric Man in Colombia" conducted by Correal between 1969-1979, had three areas of emphasis. They were (i) the reconstruction of the paleo-environment in the Savannah of Bogota; (ii) documentation of human presence by 12,000 B. P., and (iii) identification of a simple lithic industry in which simple percussion prevailed and the absence of projectile points on the Atlantic Coast, the Magdalena Valley and the Altiplano of the Eastern mountain range. Although these sites did not present direct evidence of an association of artifacts to megafauna, the existence of these associations in North and South America suggested that they existed in Colombia. (Figure 1).

In 1981, excavations at Tibito produced associations of remains from *Haplomastodons* and *Equus* with retouched flakes. In 1992, excavations at El Tutumo produced remains of proboscides and *Megatherium* associated with lithic artifacts.

Excavations at Pubenza, in 1993, revealed the remains of mastodons, also associated with artifacts (Correal 1993). In this note we will present the results of a geochemical analysis of an obsidian artifact recovered from Pubenza. Determination of the trace element concentrations of the artifact allows us to compare its chemical signature to the signatures to the obsidian flows at Yanaurco-Quiscatola and Mullumica in Ecuador and the previously measured Azafatudo and Rio Hondo sources in Colombia.

The site of Pubenza is located near modern day Bogota in the valley separating the Central Occidental mountain ranges, at an altitude of 289 meters above sea level. The upper portion of the valley is characterized by rolling hills accompanied by a dry tropical forest. The lower region of the valley consists of wide grasslands and floodplains formed by alluvial processes. The dominant geological materials in this area are clays and sands derived from the degeneration of tertiary-age formations, volcanic ash produced from the many nearby volcanoes, and limestone banded with chert.

networks may have existed in earlier times.

Even though the frequency of lithic artifacts at Pubenza is low, there is no doubt about human activity during this early period of time. The presence of the obsidian flake from Mullumica indicates movement and/or contact through the Magdalena Valley to the south. Lithic industries of simple flakes and pebbles are found in the north of Colombia, the Central Andes, the Coast of Peru and the central and eastern parts of Brazil. The research at Pubenza implies that processes of specialization and diversification of hunter-gatherer groups did not necessarily occur during the early Holocene, but rather earlier. The variation of adaptive strategies resulting from diverse ecosystems in South America calls into question the idea that adaptation was only possible in open areas coupled with a specialized economy.

References

- Bigazzi, G., Coltelli, M., Hadler Neto, J., Osorio Araya, A., Oddone, M., & Salazar, E. (1992) Obsidian-bearing lava flows and pre-columbian artifacts from the ecuadorian andes: first new multidisciplinary data. *Journal of South American Earth Sciences* 6:21-32.
- Burger, R & Asaro, F. (1977) *Trace Element Analysis of Obsidian Artifacts from the Andes: New Perspectives on Pre-Hispanic Economic Interaction in Peru and Bolivia*. University of California, Lawrence Berkeley Laboratory, Berkeley.
- Correal Urrego, G. (1993) *El Sitio Arqueológico-Paleontológico Pubenza 1, Municipio de Girardot*. Ms.
- Glascock, M.D., Braswell, G.E. and Cobean, R.H. (1998) "A Systematic Approach to Obsidian Source Characterization." in Shackley, S (Ed) *Archaeological Obsidian Studies: Method and Theory*, Plenum Press, New York.
- Gnecco, C. (1992) *Un complejo paleoindio en el noroeste de Sudamerica*. Paper presented at the VI Congress of anthropology in Colombia, Universidad de los Andes Bogota.
- (1994) *The pleistocene holocene boundary in the northern andes; an archaeological perspective*. PhD Washington University.
- Kelly, R.L & Todd, L.C. (1988) Coming into the Country: early paleoindian hunting and mobility. *American Antiquity* 53:231-244.
- Salazar, E. (1980) *Talleres Prehistórico en los Altos Andes del Ecuador*. Universidad de Cuenca-Ecuador.
- (1985) "Investigaciones Arqueológicas en Mullumica (Provincia del Pichincha)" en *Miscelanea Antropologica Ecuatoriana* 5, Cuenca-Guayaquil-Quito.
- (1992) El Intercambio de Obsidiana en el Ecuador Precolombino: Perspectivas Teorico-Methodologicas. En *Arqueologia en America Latina Hoy*. Edt Politits Banco Popular, Bogota.
- Tankersley, K. B. (1989) Patterns in Lithic exploitation in the Midwestern united States. In *Current Research in the Pleistocene* 6:38-39.

A Proposal for New Research

Maria Diakostamatiou (Ph.D. candidate)
Chemical Engineering
University of Aegean, Rhodes
Under the supervision of Professor Ioannis Liritzis

The proposed research will focus on an assemblage of samples and artifacts from Mediterranean sources and sites (e.g. Aegean Sea, Greece, Karpathian, Slovakia, Sicily and Italy). The initial stage of investigation seeks to identify the physical and the chemical properties of obsidian, as well as the mass-transport mechanism of obsidian glass. An effort will also be made to refine the OHD age equation.

At the recently established Laboratory of Archaeometry in the Aegean University, a complimentary set of experimental procedures will be performed including: ED XRF analysis, a detailed calibration of a portable spectrometer, radicals by EPR, FTIR, and radioactivity measurements (pair techniques). The Uranium and Thorium contents and radon emanation per obsidian source will be investigated, as well.

The hydration rims of the artifacts derived from the previously listed sources and sites, will be measured. Also an effort, for a more precise specification of the hydration rim, will be made. This will be approached by determining alternative procedures for specification.

Well provenienced obsidian artifacts, with secure archaeological dates, will be selected to test the reliability of the refined OHD age equation. The dates derived from the measurement values of the hydration rims will be compared to the archaeological dates.

Finally, the parameters that affect the rate of hydration will be investigated. This study serves as the first attempt to revisit OHD in Europe and we envisage the establishment of a reliable OHD method in Rhodes for OHD in Mediterranean region.

The candidate's background is in chemical engineering with a specialized knowledge of the science and technology of the materials. The proposed research was the subject of her graduation thesis.

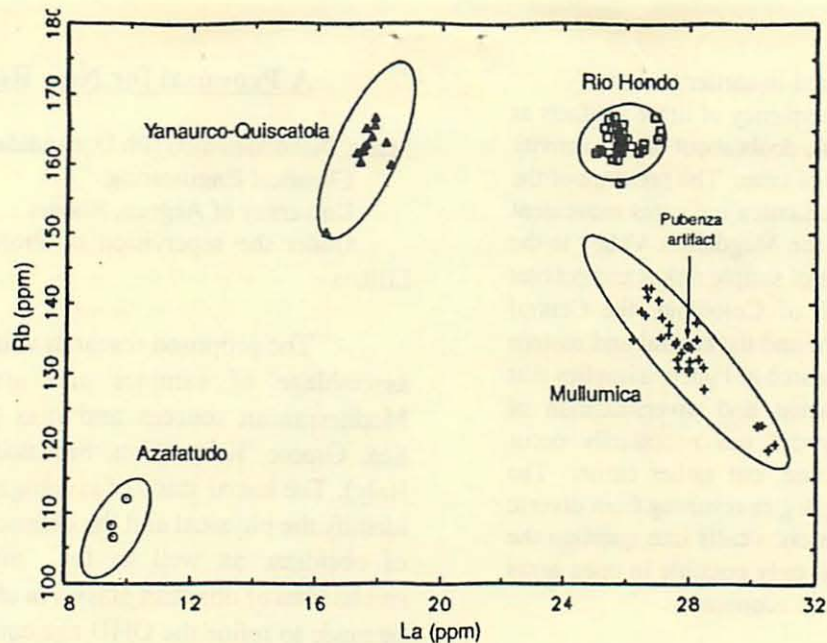


Fig. 2. Bivariate plot of La versus Rb showing the obsidian artifacts from Pubenza compared to sources in Colombia and Ecuador. Confidence ellipses at the 95% confidence interval are shown.

Interest in the site of Pubenza developed with the discovery of the skeletal remains of two mastodons interred one on top of the other. Looking to establish the presence of cultural elements, Alejandra Gudino participated in excavations of the site carried out in 1993. The excavations revealed that the site had once been located in an area characterized by lakes and marshes as indicated by the remains of crustaceans, snails, and turtles. We also found calcified plants, pollen and seeds, mastodons, armadillos, and rodents. Fragments of red ochre, resins and substantial quantities of charcoal were found, although no fire-pits were identified.

Most important was the discovery of lithic artifacts of obvious human production. The artifacts included a large scraper, 19 hammerstones produced from local chert, retouched flakes used as small scrapers similar to those found at Abra and Tequendama, the two earliest known sites on the savannah of Bogota. Also, one obsidian flake associated with wood charcoal, ochre, bones and chert flakes was found. On the dorsal surface of the artifact one can see the ridge formed from two separate blows. The ventral surface manifests a prominent percussion bulb. These features are consistent with those often seen in retouched blades.

Four samples of charcoal were analyzed at the Gronigen C14 laboratory in Holland, and the following results were obtained. The obsidian artifact was collected from level 9 and associated with an uncorrected date of 16,400 B.P. plus or minus 420 years. Ochre, resins and chert flakes were also found in the strata.

After determining the chemical signature of the artifact with neutron activation analysis at MURR (Glascok et al. 1998), we compared it to the chemical profiles of the four known characterized obsidian sources in Colombia and Ecuador (Bigazzi et al. 1992; Burger & Asaro 1977; Gnecco 1994). In Figure 2, we show a bivariate plot of lanthanum and rubidium where the artifact matches the profile of the Mullumica source in Ecuador. Thus, we can be sure that the artifact found at Pubenza originated from this flow located a great distance to the south.

The Mullumica source appears to have been the most heavily exploited source in northern Ecuador from prehistory to the time of the Conquest. This heavy exploitation can most certainly be attributed to the large quantities of high quality obsidian that it provides. In the lower part of the source valley, mining pits adjacent workshops were discovered in 1979 (Salazar 1980, 1985, and 1992). Over 70% of the debitage found at the workshop suggest that flakes occurred over a great length of time.

Although the distance between Pubenza and the Mullumica source is over 400km, long distance travel is not uncommon. Research conducted by Kelley & Todd (1988), Tankersley (1989) and many others in North America indicates that distances up to 1500 km were sometimes traveled in order to exploit non-local resources.

Another case study by Gnecco (1992) describes the existence of obsidian exchange networks linking southwestern Colombia with the northern part of Ecuador back to 11,000 B.P. This study is important because it documents the possibility that such

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
- Student member \$10.00/year or free with submission of paper to newsletter and copy of current student identification
- 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.

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.

CALL FOR ARTICLES AND INFORMATION

Submissions of articles, short reports, abstracts, or announcements for inclusion in the newsletter are always welcome. We accept electronic media on IBM-compatible diskettes in a variety of word-processing formats, but Word Perfect (up to 9.0) or Word 97 is preferred. A hard copy of the text and any figures should accompany diskettes.

Deadline for Issue No. 27 is 30 May 2001

Send Submissions to -

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To send announcements, short contributions, discuss article ideas, or make suggestions, please get in touch by e-mail:

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