

Obsidian Studies Workshop

Sponsored by:

Association of Oregon Archaeologists (AOA) and Portland State University (PSU)

Saturday, November 2, 2019

9:00 am to 4:00 pm

At Portland State University, Cramer Hall Room 53

Presentation Abstracts

An Overview of Obsidian Sourcing using EDXRF

Alex Nyers, Northwest Research Obsidian Studies Laboratory, Corvallis, Oregon

Obsidian, a naturally occurring volcanic glass, has been a highly sought after resource for people for thousands of years due to its ease of being made into extremely sharp stone tools. Because of its value in stone tool production, archaeologists have documented obsidian being carried sometimes many hundreds of miles from its point of origin. Over the last few decades obsidian "sourcing" has become a valuable tool in archaeologists' quest to understand the movements of past peoples. In this presentation, we will discuss our methods for determining the source location of obsidian artifacts as well as some new research in patterns of source utilization across the region.

Obsidian Hydration Rim Measurement

Jennifer "Pips" Thatcher, Willamette Analytics, Corvallis, Oregon

For more than 50 years, obsidian hydration analysis, in conjunction with XRF source analysis, has proven to be a useful tool in understanding the prehistoric use of obsidian through time and space. The obsidian hydration dating method was first introduced to the archaeological community in 1960 by Irving Friedman and Robert Smith of the U. S. Geological Survey (Friedman and Smith 1960). The potential of the method in archaeological chronologic studies was quickly recognized and research concerning the effect of different variables on the rate of hydration has continued to the present day. While technological advances have been made in the process of using hydration to determine age, the newer non-optical methods (such as secondary ion mass spectrometry, or SIMS) still remain out of reach for the average researcher. This talk focuses on the optical methodology of obsidian hydration analysis and presents the practical applications of hydration analysis as a relative dating method.

Obsidian Hydration Dating

Alexander (Sandy) Rogers, Maturango Museum, Ridgecrest, California

This workshop will provide insight into the theory and methods of obsidian hydration dating (OHD), to enable the archaeologist to perform OHD analyses and the manager to ask the right questions. The workshop will cover the principles of obsidian hydration and models employed in dating; how to compute effective hydration temperature (EHT); methods of computing a hydration rate; methods for computing age; and guidelines for data analysis and reporting. An Excel spreadsheet with numerical models for conducting an OHD analysis will be provided. Mathematics cannot be avoided but will be kept to a minimum.

Creating Geographically Expansive Effective Hydration Temperature Maps for the Production of Source Specific Hydration Rates

Jason Cowan, Archaeological Investigations Northwest, Inc. (AINW), Portland, Oregon

Controlling for variation in factors that alter the speed at which obsidian hydrates is a crucial component in building hydration rates from artifacts found in multiple locations. Some factors can be mitigated by restricting rate estimates to individual obsidian sources, but other factors like the ambient temperature the artifact experiences as it undergoes hydration is unique to the artifact's provenience. By interpolating climate temperature data and adjusting it for elevation differences using air temperature lapse rates, large high-resolution spatial maps of Effective Hydration Temperature (EHT) can be created. This data can then be used to standardize hydration rim/dated time period pairings of artifacts found across the geographical expanse of the spatial map for the purpose of creating source specific hydration rates.

Telling Time in Southcentral Oregon: A Convergence of Hobos, iButtons, and Obsidian

Tom and Janine Origer, Origer's Obsidian Laboratory, Rohnert Park, California

Southcentral Oregon sites including Paisley Five Mile Point Caves, Connley Caves, and Rimrock Draw Rockshelter, have received much attention of late due to their antiquity as determined by the presence of temporally sensitive artifacts and radiocarbon dates. Rigorous research requires multiple lines of evidence; in this instance, obsidian hydration dating is being employed to enhance the dating techniques being applied. Fundamental issues of dating volcanic glass revolve around source-specific obsidian hydration rates, and the effect of ground temperature (EHT) on the development of hydration bands. In this research, temperature is a bit tricky as the sites are partially protected from direct solar exposure much of the day, and seasonally. We will describe the challenges, how we are grappling with them, and touch on preliminary results.

Strategic Sampling of Flake Scars for Obsidian Hydration

Terry Ozbun, Archaeological Investigations Northwest, Inc. (AINW), Portland, Oregon

Ancient people sometimes used artifacts at older archaeological sites as sources of raw material, such as obsidian. This ancient recycling practice has implications for interpretation of the archaeological record and obsidian hydration analysis offers a means for detecting it. Once an obsidian artifact is flaked, water from the atmosphere begins diffusing into the freshly exposed surface, eventually forming a rind that has an even thickness across all of the flaked surfaces. Hundreds or thousands of years later, if that same artifact is picked up and partially reworked creating new flake scars, those fresh flake scars will begin hydrating anew while the older flake scars will continue to hydrate and the rind will get thicker. In these cases, different flake scars on the same artifact will have different hydration rind thicknesses. This presentation explores means for detecting and interpreting differential hydration rind thicknesses based on technological attributes of flake scars and breaks. Case studies illustrate the interpretive power of strategic sampling of specific facets on flaked obsidian artifacts for hydration studies.