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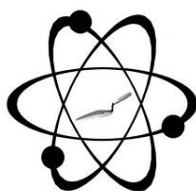
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Publication Date

2018-04-04



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LETTER REPORT

AN ENERGY-DISPERSIVE X-RAY FLUORESCENCE ANALYSIS OF OBSIDIAN ARTIFACTS FROM LA 104416, SOUTHEAST NEW MEXICO

18 April 2018

Dr. William Whitehead
SWCA Environmental Consultants
5647 Jefferson Street, NE
Albuquerque, NM 87109

Dear Bill:

All the artifacts were produced from the Cerro Toledo Rhyolite source from the Jemez Mountains, northern New Mexico, although the obsidian is available as secondary deposits in Rio Grande Quaternary alluvium (Church 2000; Shackley 2012; Table 1 and Figure 1 here).

Specific instrumental methods can be found at <http://www.swxrflab.net/analysis.htm>, and Shackley (2005). Source assignment was made by comparison to source standard data in the laboratory. Analysis of the USGS RGM-1 standard indicates high machine precision for the elements of interest (Table 1 here).

Sincerely,

M. Steven Shackley, Ph.D.
Director

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<http://www.swxrflab.net/>

REFERENCES CITED

- Church, T.
2000 Distribution and Sources of Obsidian in the Rio Grande Gravels of New Mexico. *Geoarchaeology* 15:649-678.
- Davis, K.D., T.L. Jackson, M.S. Shackley, T. Teague, and J.H. Hampel
2011 Factors Affecting the Energy-Dispersive X-Ray Fluorescence (EDXRF) Analysis of Archaeological Obsidian. In *X-Ray Fluorescence Spectrometry (XRF) in Geoarchaeology*, edited by M.S. Shackley, pp. 45-64. Springer, New York.
- Shackley, M.S.
2005 *Obsidian: Geology and Archaeology in the North American Southwest*. University of Arizona Press, Tucson.
- 2012 The Secondary Distribution of Archaeological Obsidian in Rio Grande Quaternary Sediments, Jemez Mountains to San Antonito, New Mexico: Inferences for Prehistoric Procurement and the Age of Sediments. Poster presentation at the Society for American Archaeology, Annual Meeting, Memphis, Tennessee.

Table 1. Elemental concentrations for the archaeological samples and USGS RGM-1 rhyolite standard. All measurements in parts per million (ppm).

Sample	Ti	Mn	Fe	Rb	Sr	Y	Zr	Nb	Source
125-1	895	566	11778	240	10	66	193	94	Cerro Toledo Rhy
125-2	863	570	10950	221	10	62	169	88	Cerro Toledo Rhy
125-3	978	587	11236	209	12	61	155	79	Cerro Toledo Rhy*
158-1	929	477	8806	186	13	59	156	86	Cerro Toledo Rhy
158-2	821	591	11668	230	9	63	176	92	Cerro Toledo Rhy
121-1	596	522	10521	210	9	70	193	100	Cerro Toledo Rhy
121-2	671	471	9330	204	11	62	168	86	Cerro Toledo Rhy*
118	1205	636	12462	229	9	62	171	90	Cerro Toledo Rhy
151	784	511	10655	221	9	63	176	93	Cerro Toledo Rhy*
156	1125	559	11523	226	12	65	166	83	Cerro Toledo Rhy*
153	1020	560	10725	224	11	63	167	88	Cerro Toledo Rhy*
120	813	441	8781	190	13	60	164	82	Cerro Toledo Rhy*
RGM1-H2	1455	286	13218	146	110	28	216	14	standard

* These samples are small and outside the source standard data, but quite close at 95% confidence (Davis et al. 2011; see Figure here).

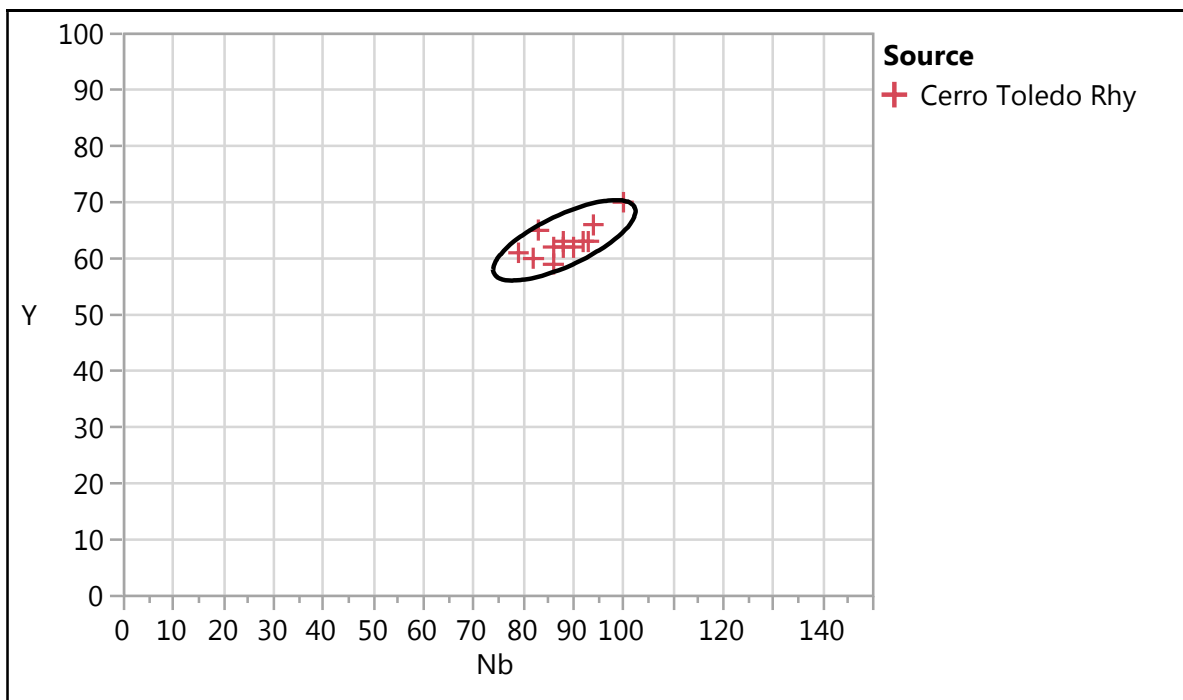


Figure 1. Nb versus Y bivariate plot of the samples. Ellipsis at 95% confidence.