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An Energy-Dispersive X-Ray Fluorescence Analysis of Obsidian Artifacts from Two Sites on the Coles Sam Road Project, Naval Weapons Station China Lake, Inyo County, California

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Author

Shackley, M. Steven

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GEOARCHAEOLOGICAL XRF LAB

GEOARCHAEOLOGICAL X-RAY FLUORESCENCE SPECTROMETRY LABORATORY

8100 Wyoming Blvd., Ste M4-158
USA

Albuquerque, NM 87113

LETTER REPORT

AN ENERGY-DISPERSIVE X-RAY FLUORESCENCE ANALYSIS OF OBSIDIAN ARTIFACTS FROM TWO SITES ON THE COLES SAM ROAD PROJECT, NAVAL WEAPONS STATION CHINA LAKE, INYO COUNTY, CALIFORNIA

11 December 2014

Simone Schinsing
Epsilon Systems Solutions
901 Heritage Drive, Ste 204
Ridgecrest, CA 93555

Dear Simone:

I have taken the liberty of sending a letter report in the interest of time. The mix of sources is similar to the previous projects, with somewhat more obsidian procured from Sugarloaf dome in the Coso Volcanic Field (Table 1, Figure 1; Shackley 2014a, 2014 b). I refer you to the previous report for more detailed discussion of sources and source assignment (Shackley 2014a; see Tables 1 and 2, 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 Ericson and Glascock (2004) and Hughes (1988). Again, since I have no source standard library at this lab, the correlation is a bit variable, but likely the source assignments are accurate. 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

VOICE: 510-393-3931
INTERNET: shackley@berkeley.edu
<http://www.swxrflab.net/>

REFERENCES CITED

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2004 Subsource Characterization: Obsidian Utilization of Subsources of the Coso Volcanic Field, Coso Junction, California, USA. *Geoarchaeology* 19:779-805.

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1988 The Coso Volcanic Field Reexamined: Implications for Obsidian Sourcing and Hydration Dating Research. *Geoarchaeology* 3:253-265.

Shackley, M.S.

2005 *Obsidian: Geology and Archaeology in the North American Southwest*. University of Arizona Press, Tucson.

2014a Source Provenance of Obsidian Artifacts from Five Sites on the Naval Weapons Station China Lake, Inyo, Kern, and San Bernardino Counties, California. Report prepared for Epsilon Systems Solutions, Inc., Ridgecrest, California.

2014b An Energy-Dispersive X-Ray Fluorescence Analysis of Obsidian Artifacts from Nine Sites on the Naval Weapons Station China Lake, Inyo, Kern, And San Bernardino Counties, California. Report prepared for Epsilon Systems Solutions, Inc., Ridgecrest, California.

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

Sample	Site	Ti	Mn	Fe	Zn	Rb	Sr	Y	Zr	Nb	Pb	Th	Source
7	INY-9639	466	25	1149	79	23	13	50	115	44	30	34	Sugarloaf
			9	5		4							
8	INY-9639	422	29	1174	75	25	10	51	115	43	35	32	Sugarloaf
			8	7		5							
9	INY-9639	448	28	1214	79	27	16	58	142	49	32	37	West Sugarloaf
			1	7		7							
10A	INY-9639	415	31	1241	98	28	14	48	124	45	34	35	West Cactus Pk
			7	5		6							
10B	INY-9639	657	30	1307	11	25	19	47	157	41	31	37	West Sugarloaf
			9	1	2	2							
10C	INY-9639	654	28	1261	20	23	18	44	147	41	33	33	West Sugarloaf
			5	4	1	0							
4	INY-8300	346	27	1135	68	24	12	49	110	47	30	35	Sugarloaf
			2	7		5							
5A	INY-8300	486	28	1167	16	24	12	49	105	46	28	36	Sugarloaf
			1	8	6	6							
5B	INY-8300	565	32	1221	13	27	13	54	115	45	39	43	Sugarloaf
			8	5	7	2							
6	INY-8300	406	30	1179	94	25	12	50	113	43	34	33	Sugarloaf
			7	3		1							
15	INY-8300	431	27	1122	61	23	12	49	109	42	29	27	Sugarloaf
			7	1		5							
14A	INY-8300	391	29	1176	64	26	14	52	119	49	32	28	Sugarloaf
			8	2		4							
14B	INY-8300	404	27	1134	55	24	9	47	116	42	30	33	Sugarloaf
			6	4		2							
16A	INY-8300	682	30	1330	11	24	19	51	165	39	31	35	West Sugarloaf
			5	9	7	5							
16B	INY-	397	26	1145	70	23	11	50	107	36	32	28	Sugarloaf

	8300		8	4		8								
16C	INY- 8300	532	30 7	1189 1	10 7	25 9	13	51	112	45	29	36	Sugarloaf	
RGM1- S4		151 5	29 0	1369 1	39	14 9	10 5	23	217	8	17	11	standard	

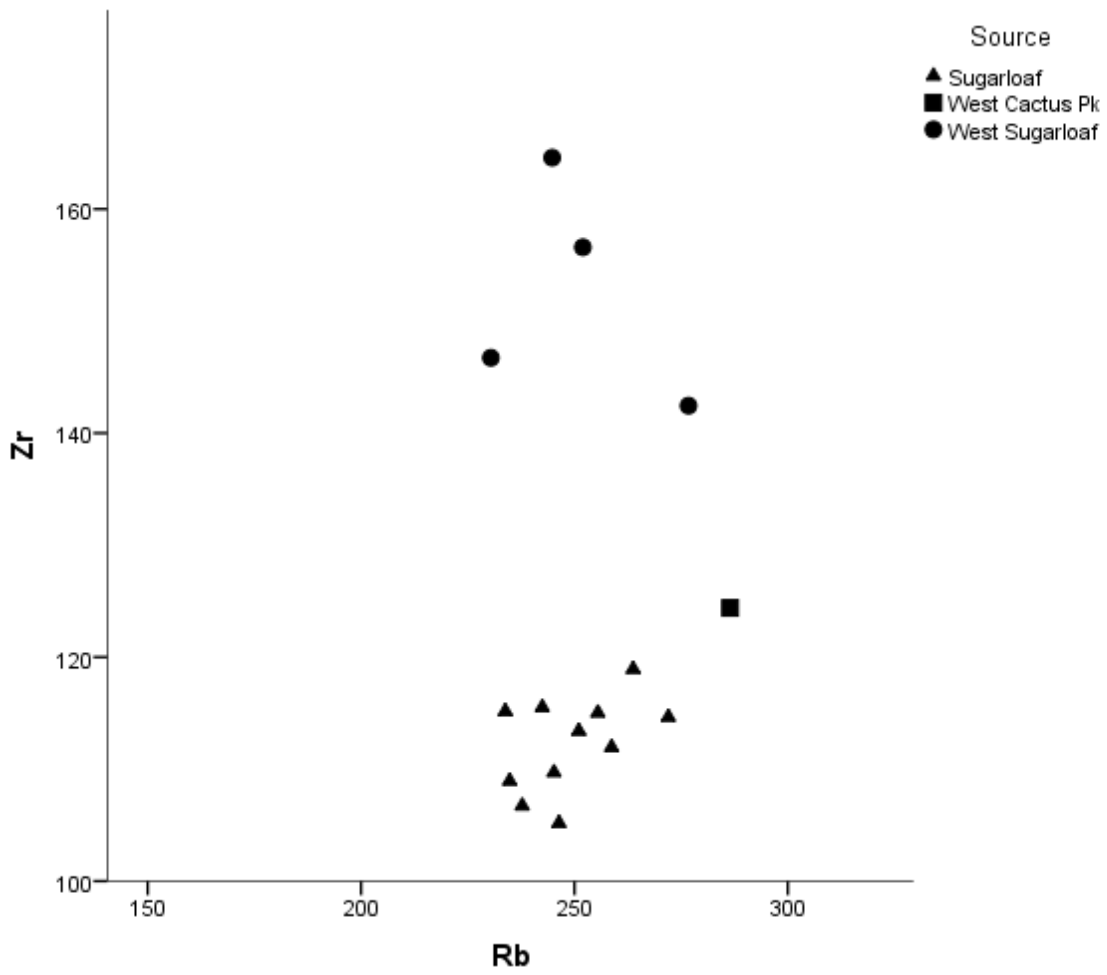


Figure 1. Rb versus Zr bivariate plot of archaeological samples (after Hughes 1988).