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Southeastern Arizona

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X-RAY FLUORESCENCE (XRF) ANALYSIS OF OBSIDIAN ARTIFACTS FROM
AZ AA:8:20 (ASM), SOUTHEASTERN ARIZONA

by

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Introduction

The following is a report of a x-ray fluorescence analysis of three obsidian artifacts from AZ AA:8:20 (ASM) in southeastern Arizona. The analysis indicates that one projectile point is from the Superior (Picketpost Mountain) source in central Arizona and the remaining two artifacts are from the Saucedo Mountains locality in southwestern Arizona. The source provenience is similar to Classic Hohokam contexts in central Arizona (see Shackley 1986a and 1986b).

Methodology

All obsidian debitage, and projectile points were subjected to the same analytic conditions. Melt incompatible trace elements were used to determine the source.

The samples were analyzed for rubidium (Rb), strontium (Sr), zirconium (Zr) using the semi-quantitative rapid scan method (Jack and Carmichael 1969) on a manual Philips PW 1410 wavelength x-ray spectrometer with a Philips power supply, ratemeter and teletype in the Chemistry Department at Arizona State University. A tungsten (W) x-ray tube, scintillation counter and LiF (200) crystal were used operated in a vacuum path at 45Kv and 45mA for 80 live-seconds per element. The intensity values for all elements were computed for ratios of RbKa, SrKa, ZrKa radiation lines. The data were reduced through specific programs with a Zenith Z-161 Data Systems microprocessor. The elemental proportions are divided by the rubidium peak intensity and summed. These results are then divided by the summed intensities and the resulting element ratios are plotted in a ternary system for comparison to known obsidian sources in the Southwest (see Table 1 and Figure 1). The solid incompatible elements Rb, Sr, Zr, and Nb are quite sensitive in separating rhyolite glass sources (Cann 1983; Cox et al. 1979; Zielinski et al. 1977). Niobium (Nb) is normally utilized when strontium values are low. In this study, niobium was used in the analysis of all three artifacts (Figure 2).

Discussion

The morphology of the complete projectile point produced from Superior obsidian suggests a Sedentary (Sacaton) style. Two points with similar morphology were the only Superior

source material recovered from the Marana Hohokam Complex; the majority was also from the Saucedo locality (Shackley 1986a). Saucedo Mountain obsidian is common in many Classic Hohokam period contexts as well as Archaic through late sites in Arizona (Shackley 1986b, 1986c).

The Saucedo source (located about 30 km south of Gila Bend) is chemically bimodal (previous Unknown a and b; Shackley 1986a). The nodules are mixed within a conglomerate and alluvium near the Saucedo rhyolite and perlite/vitrophyre domes (Shackley 1986c). The nodules at the rhyolite domes were completely expended prehistorically, and archaeological assemblages tend to be more heterogeneous exhibiting more of one mode than the other.

The sample from this site is too small to generate a confident synthesis.

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SOUTHWEST XRF PAPER

Table 1. X-ray fluorescence net intensity ratios for archaeological obsidian from AZ AA:8:11.

SAMPLE NO.	Rb/Rb	Sr/Rb	Zr/Rb	SUM	Rb	Sr	Zr	PROBABLE SOURCE
755	1.00	0.0763	1.0564	2.1327	0.4689	0.0358	0.4953	Superior (Picketpost Mtn)
746	1.00	0.7110	1.9123	3.6233	0.2760	0.1962	0.5278	Sauceda Mts
860	1.00	0.6684	1.7123	3.3807	0.2958	0.1977	0.5065	Sauceda Mts
	Rb/Rb	Nb/Rb	Zr/Rb	SUM	Rb	Nb	Zr	
755	1.00	0.2694	1.0564	2.3258	0.4300	0.1158	0.4542	Superior (Picketpost Mtn)
746	1.00	0.0000	1.9123	2.9123	0.3434	0.0000	0.6566	Sauceda Mts
860	1.00	0.0071	1.7123	2.7194	0.3677	0.0026	0.6297	Sauceda Mts

Figure 1. Ternary plot of Zr, Sr, Rb net intensity ratios for archaeological obsidian from AZ AA:8:20 and selected Arizona obsidian sources.

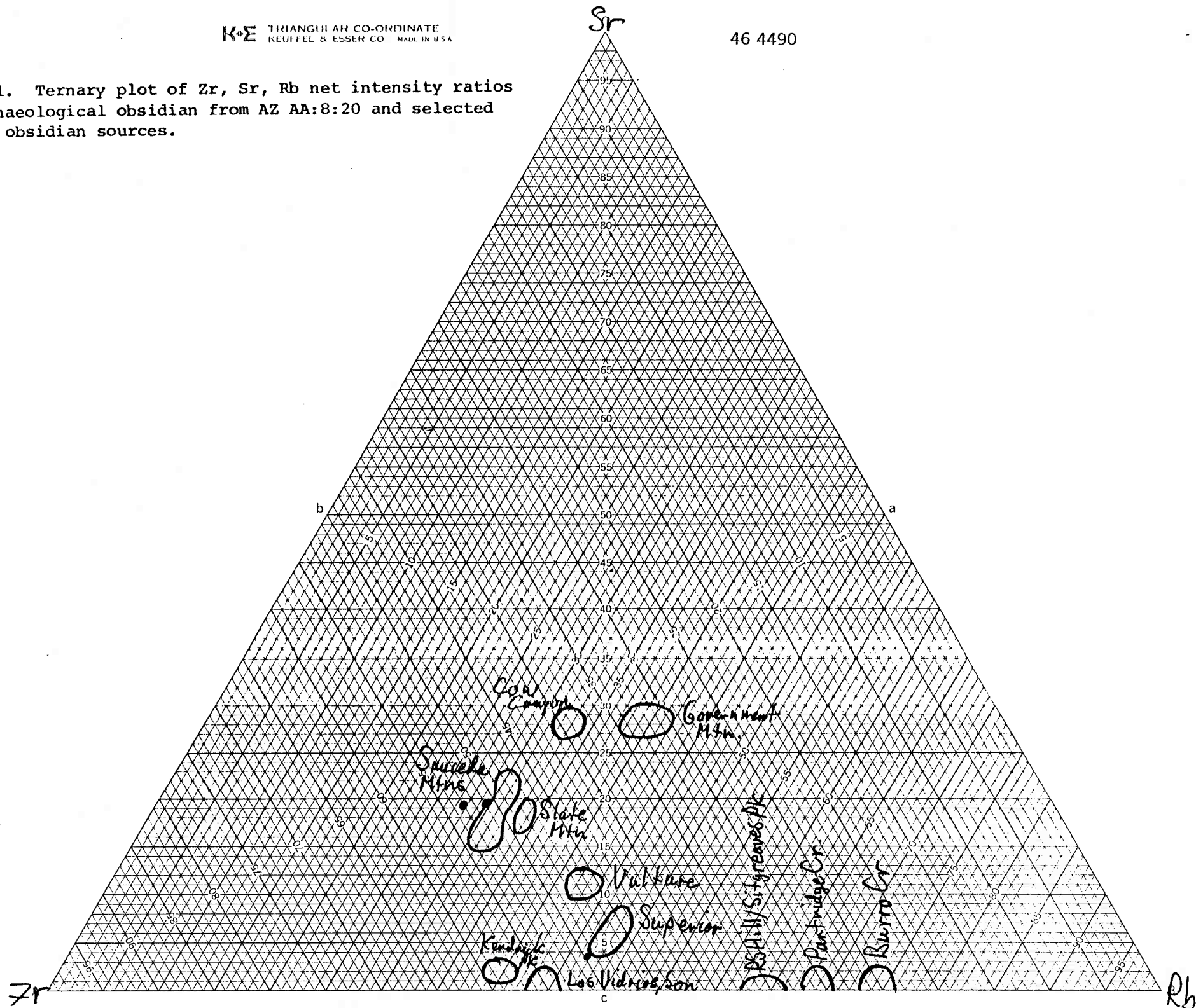


Figure 2. Ternary plot of Zr, Nb, Rb net intensity ratios for archaeological obsidian from AZ AA:8:20 and selected Arizona obsidian sources.

