68501 and 68510

Soil and rake residue

906 and 17 grams

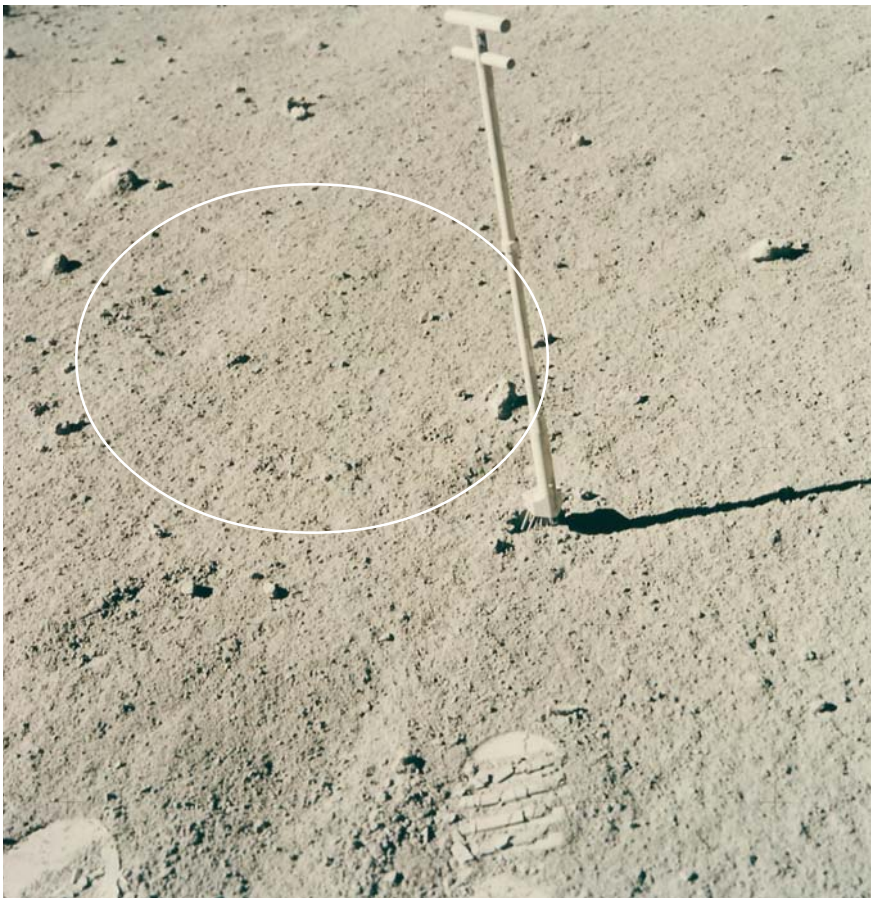


Figure 1: Close-up photo of area where 68500 and 68510 were collected. AS16-107-17528.

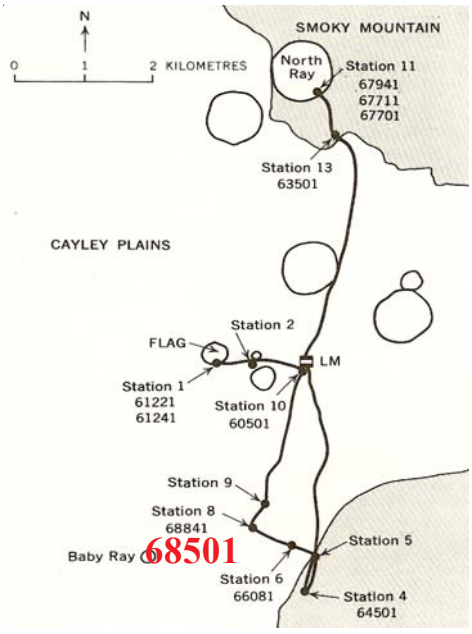


Figure 2: Map of Apollo 16 site.

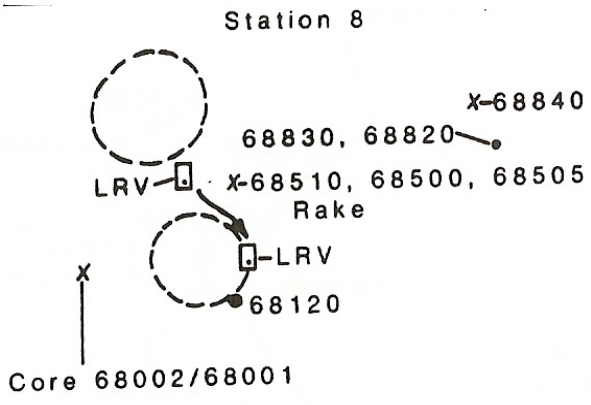


Figure 3: Map of station 8, Apollo 16.

Introduction

Station 8 was supposed to be on a ray from South Ray Crater, but material from SRC has not been identified as such.

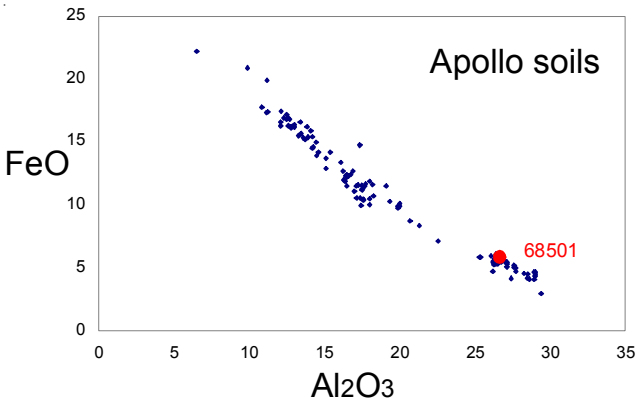


Figure 4: Composition of 68501 compared with other Apollo soil samples.

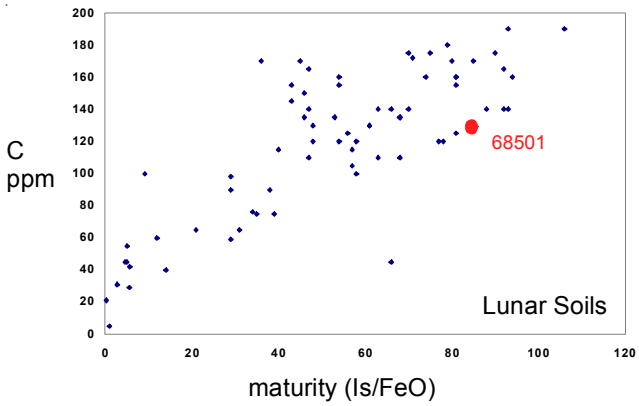


Figure 5: Carbon content and maturity index for 68501 and other Apollo soil samples.

Petrography

The maturity index for 68501 is I_s/FeO = 85, with agglutinate content of about 38 %. The average grain size is 84 microns, 104 microns or 113 microns (Heiken, vonEngelhardt or Butler)(figures 7).

The mode for 68501 is given in Heiken et al. (1973) and Houck (1982).

Smith and Steele (1972) cataloged the rake samples from 68510 and Marvin (1972) cataloged the coarse fine particles.

Chemistry

Bansal et al. (1972), Taylor et al. (1973) and Korotev (1981) determined the chemical composition of 68501 (table 1, figure 4 and 6).

Moore et al. (1973) and des Marais et al. (1973) determined 130 ppm and 82 ppm carbon for 68501 (figure), respectively. Kerridge et al. (1975) determined 134 ppm carbon and 83 ppm nitrogen.

Cosmogenic isotopes and exposure ages

Eldridge et al. (1973) determined the cosmic-ray-induced activity of ^{26}Al = 84 dpm/kg and ^{22}Na = 38 dpm/kg.

Other Studies

Hintenberger and Weber (1973) determined the rare gas content and isotopic ratios for 68501 as a function of grain size showing surface correlation.

Behrmann et al. (1973) determined the density of fossil nuclear tracks in grains from 68501 (figure 8).

Mineralogical Mode for 68501

	Heiken et al. 1973	Houck 1982
Agglutinate	38 %	36.7
Breccia	38.5	39.8
Anorthosite	2.5	1.3
Olivine		
Pyroxene	1.6	2.9
Plagioclase	12.3	13.5
Opaques		0.1
Glass	4.9	5.5
Basalt	0.3	0.3

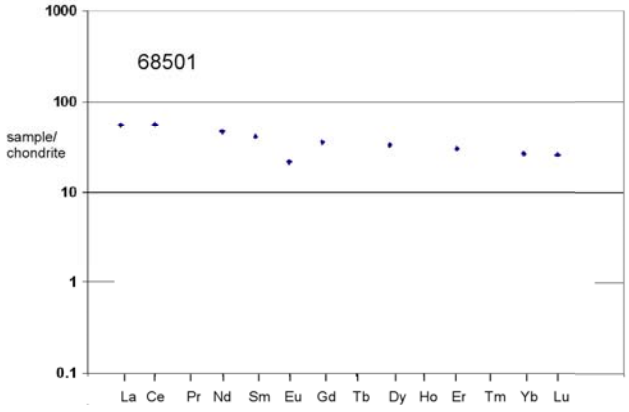
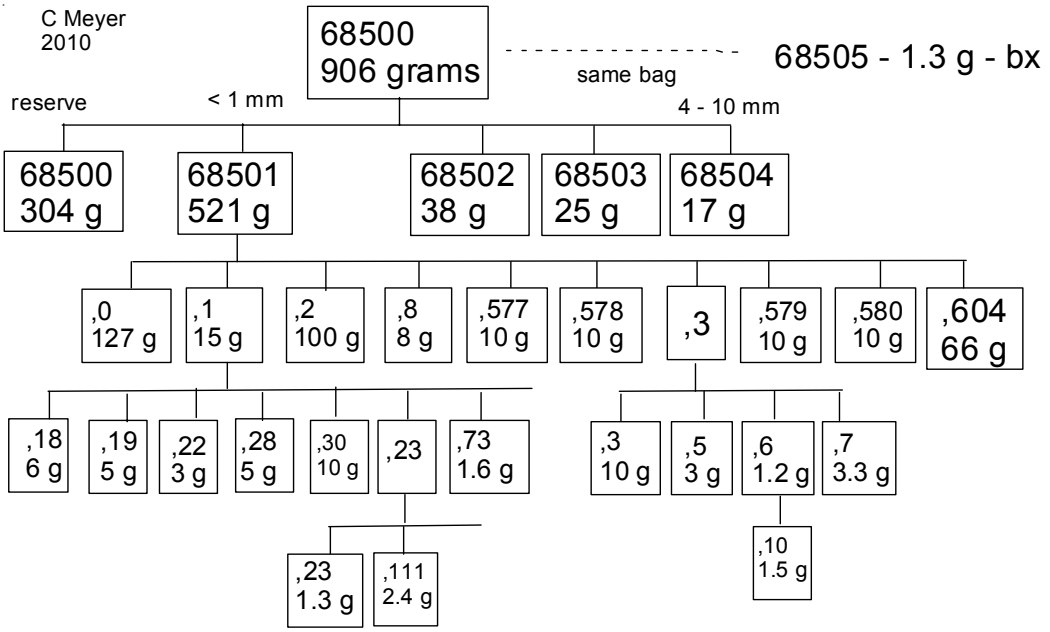
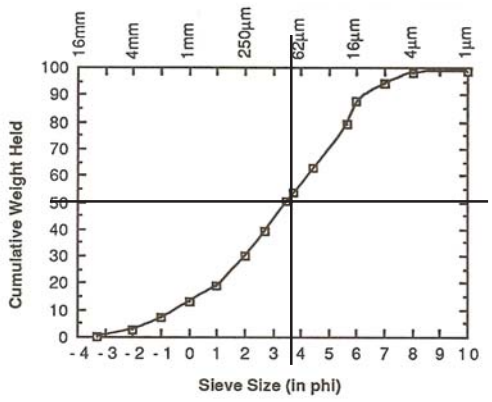
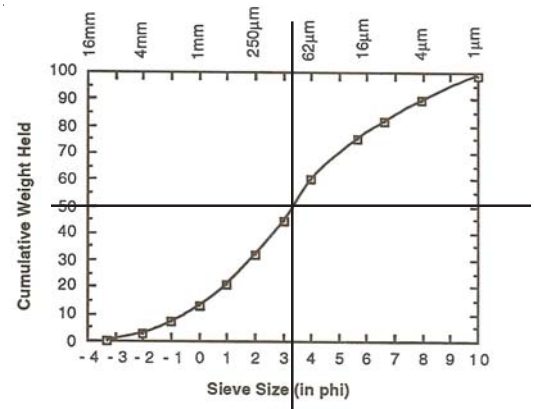


Figure 6: Normalized rare-earth-element diagram for 68501.





average grain size = 104 microns



average grain size = 84 microns

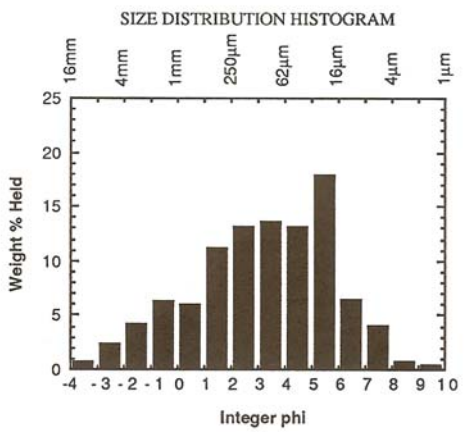


Figure 7a: Grain size distribution for 68501 (Graf 1993, data by Heiken et al.).

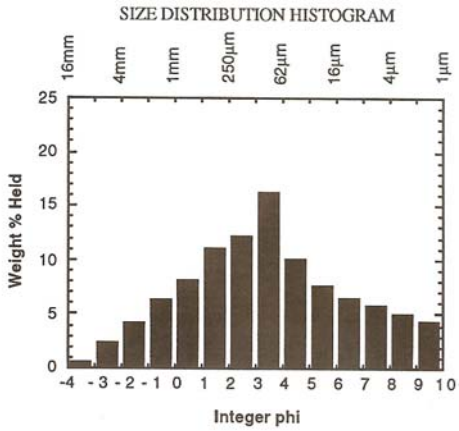
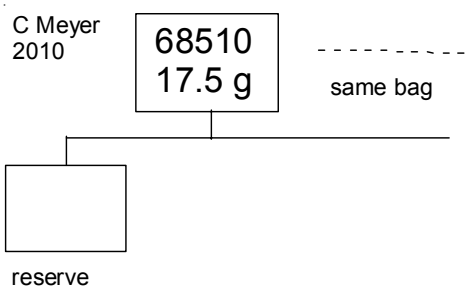


Figure 7b: Grain size distribution for 68501 (Graf 1993, data by vonEngelhardt).



68515 - 336 g - bx
68516 - 34 g
68517 - 13 g
68518 - 30 g
68519 - 10.6 g
68525 - 39 g
68526
68527
68528
68529
68535
68536
68537

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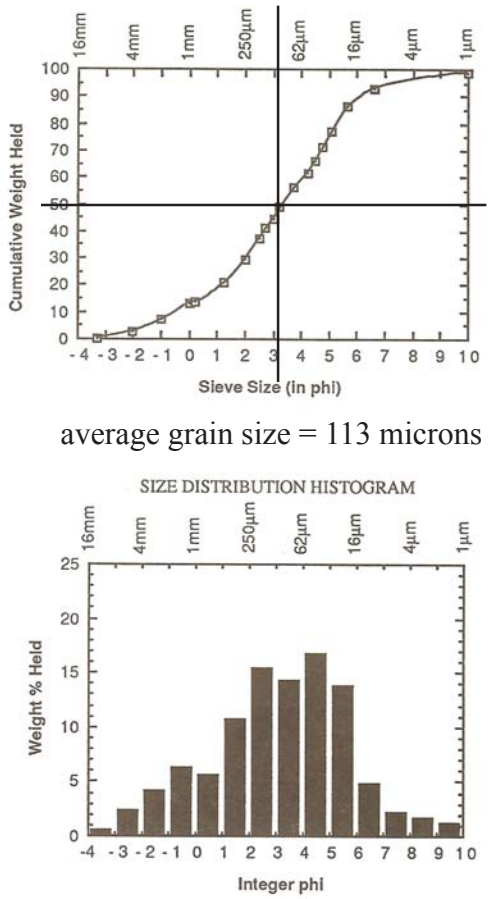

Figure 7c: Grain size distrbution for 68501 (Graf 1993, data from Butler et al. 1973).

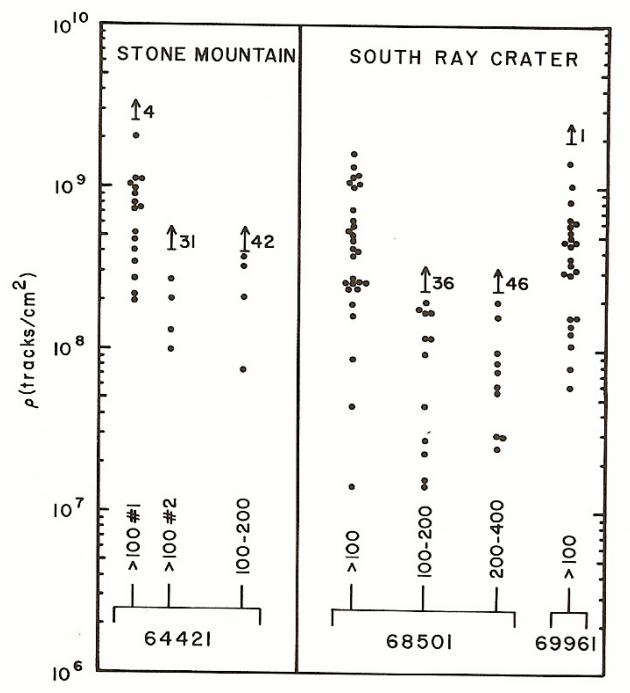

Figure 8: Density of nuclear tracks etched in grains from Apollo 16 soils (Behrmann et al. 1973).

Table 1. Chemical composition of 68501.

								Hubbard73		ave st. 8
reference	Korotev81			Taylor73		Eldridge73		Bansal72		Korotev81
weight	C	F						Wiesmann76		
SiO2 %				44.9	(b)			45.2	(d)	45.1
TiO2				0.56	(b)			0.58	(d)	0.56
Al2O3				26.9	(b)			26.65	(d)	26.6
FeO	5.57	5.34	(a)	5.32	(b)			5.48	(d)	5.35
MnO										0.07
MgO				6.27	(b)			6.28	(d)	6.3
CaO				15.1	(b)			15.36	(d)	15.3
Na2O	0.491	0.48	(a)	0.36	(b)			0.47	(d)	0.46
K2O				0.16	(b)	0.116	(c)	0.116	(e)	0.121
P2O5								0.12		
S %								0.08		
sum										
Sc ppm	9.2	9.2	(a)	10	(b)					9.6
V				27	(b)					14
Cr	795	905	(a)	850	(b)			737	(e)	760
Co	34.7	22.6	(a)	34	(b)					30
Ni	560	375	(a)	420	(b)					490
Cu				4.5	(b)					
Zn										
Ga										
Ge ppb										
As										
Se										
Rb				2.3	(b)			2.7	(e)	2.7
Sr								169	(e)	158
Y				49	(b)					48
Zr				220	(b)			185	(e)	194
Nb				14.9	(b)					
Mo										
Ru										
Rh										
Pd ppb										
Ag ppb										
Cd ppb										
In ppb										
Sn ppb										
Sb ppb										
Te ppb										
Cs ppm				0.09	(b)					
Ba				185	(b)			140	(e)	147
La	13.6	14.4	(a)	15.7	(b)			12.9	(e)	13.4
Ce	35.5	36.5	(a)	41.5	(b)			33.6	(e)	34
Pr				5.54	(b)					
Nd				21.6	(b)			20.9	(e)	
Sm	6.2	6.45	(a)	6.32	(b)			5.96	(e)	6.55
Eu	1.2	1.19	(a)	1.29	(b)			1.19	(e)	1.25
Gd				7.57	(b)			7	(e)	
Tb	1.28	1.28	(a)	1.23	(b)					1.27
Dy				8.35	(b)			7.99	(e)	
Ho				1.92	(b)					
Er				5.45	(b)			4.71	(e)	
Tm				0.75	(b)					
Yb	4.4	4.45	(a)	4.95	(b)			4.27	(e)	4.65
Lu	0.62	0.62	(a)	0.73	(b)			0.621	(e)	0.67
Hf	4.5	4.5	(a)	4	(b)					4.5
Ta	0.8	0.8	(a)							0.6
W ppb										
Re ppb										
Os ppb										
Ir ppb										
Pt ppb										
Au ppb										
Th ppm	2.4	2.3	(a)	2.45	(b)	2.28	(c)			2.4
U ppm				0.63	(b)	0.58	(c)	0.6	(e)	0.62

technique: (a) INAA, (b) SSMS, (c) radiation count. (d) XRF, (e) IDMS

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