68821

Soil

220 grams

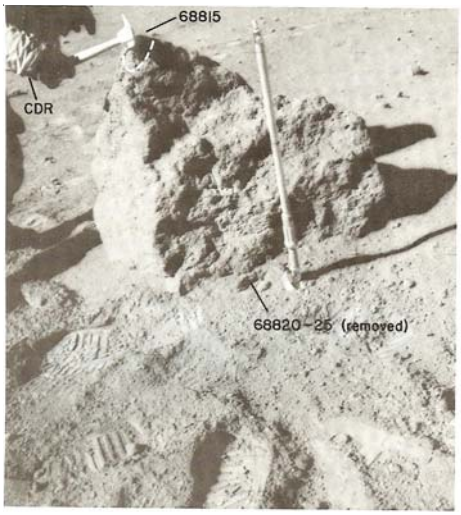

Figure 1: Photo of soil sample 68821 taken from fillet of boulder 68815. AS16-108-17701.

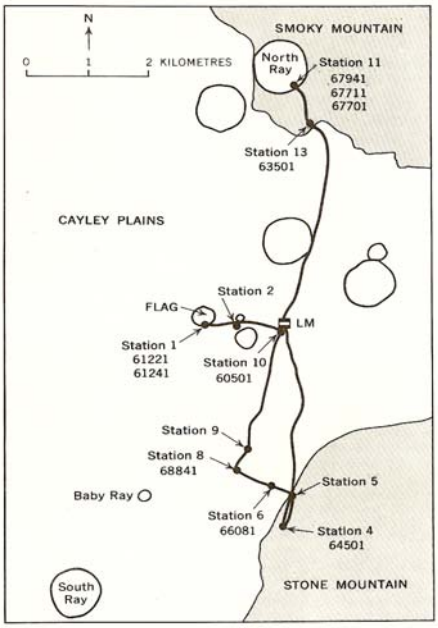

Figure 2: Map of Apollo 16 with location of station 8 on the Cayley Plain.

Introduction

Soil sample 68821 was collected adjacent to a small boulder (figure 1). It should be compared with 68841, collected nearby.

Petrography

Soil sample 68821 is a mature soil with maturity index I_s/FeO = 84. According to the soil catalog (Morris et al. 1983), the average grain size is 112 microns and the agglutinate count is 52%.

Marvin (1972) cataloged the 4 – 10 mm coarse fines and Simkin et al. (1973) studied the mineralogy of 68821.

Chemistry

Fruchter et al. (1973) and Simkin et al. (1973) reported analyses of 68821. It has the same composition as other samples on the Cayley Plain.

Moore et al. (1973) determined 200 ppm carbon for 68821 (figure 5). Moore and Lewis (1975) reported 110 ppm nitrogen (these are probably saturated values).

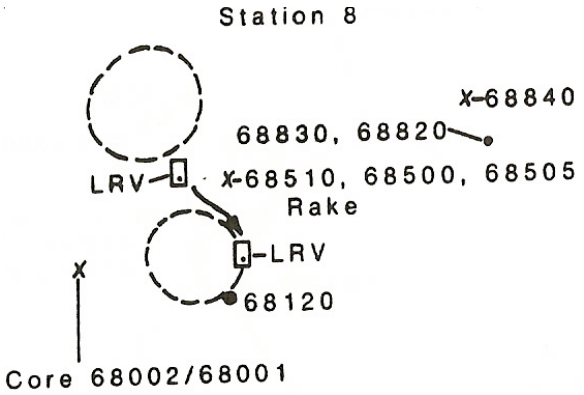

Figure 3: Map of station 8 showing location of 68821 and 68841 nearby.

Mineralogical Mode

Morris et al. 1983

Agglutinates	52 %
Anorthosite	6
Breccia	22
Pyroxene	2
Plagioclase	15
Glass	3

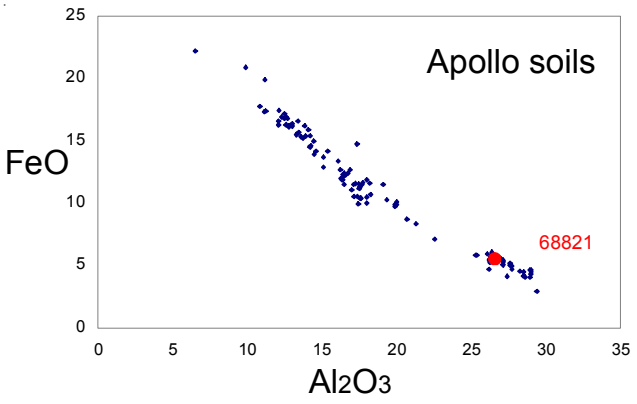

Figure 4: Composition of 68821 compared with that of other Apollo soil samples.

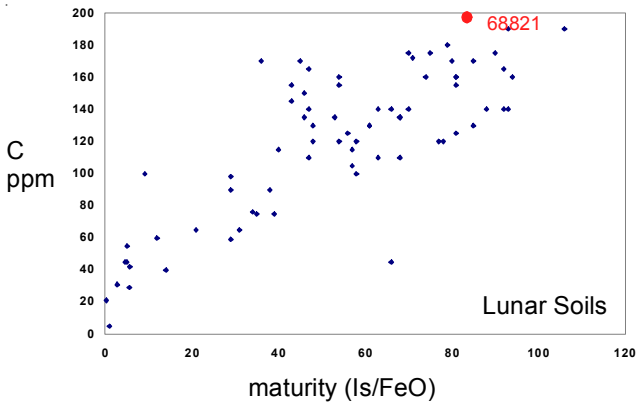

Figure 5: Carbon content and maturity index for 68821 compared with other soils.

Cosmogenic isotopes and exposure ages

Clark and Keith (1973) determined the cosmic-ray-induced activity of $^{26}Al = 240$ dpm/kg, $^{22}Na = 48$ dpm/kg, $^{56}Co = 4$ and $^{46}Sc = 5$ dpm/kg.

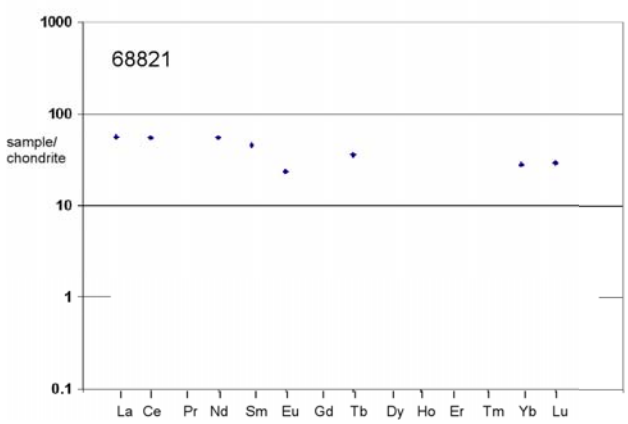

Figure 6: Normalized rare-earth-element diagram for 68821.

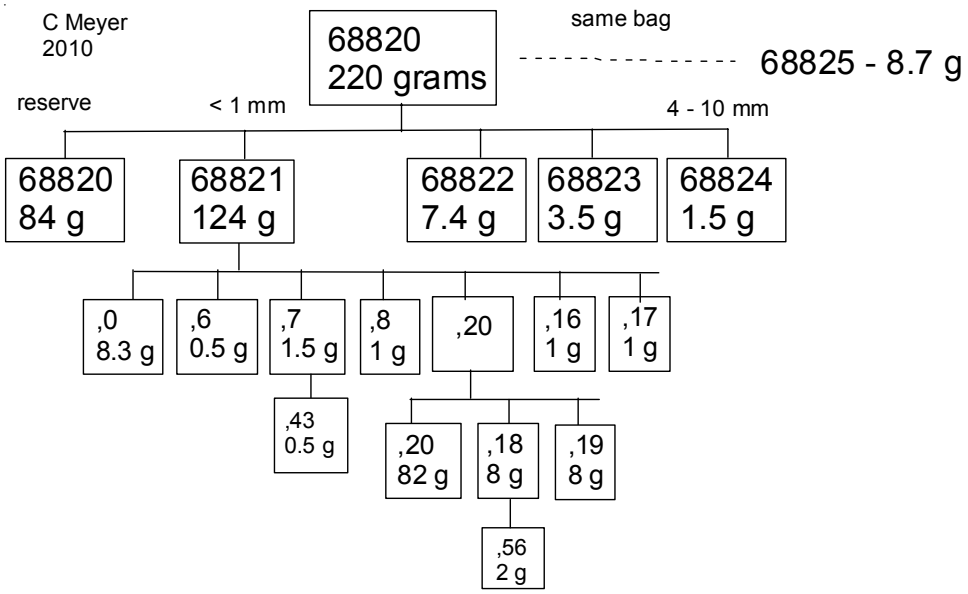

Table 1. Chemical composition of 68821.

reference	Clark73		Fruchter74		Simkin73		ave st. 8 Korotev81
weight							
SiO2 %					44.5	(d)	45.1
TiO2					0.5	(d)	0.56
Al2O3			28	(b)	26.2	(d)	26.6
FeO			5	(b)	5.4	(d)	5.35
MnO					0.12	(d)	0.07
MgO					6.13	(d)	6.3
CaO					15.3	(d)	15.3
Na2O			0.47	(b)	0.48	(d)	0.46
K2O	0.12	(a)			0.16	(d)	0.121
P2O5							
S %							
sum							
Sc ppm			9.8	(b)			9.6
V					16	(c)	14
Cr			749	(b)	790	(c)	760
Co			28.5	(b)	42	(c)	30
Ni					550	(c)	490
Cu							
Zn							
Ga					3	(c)	
Ge ppb							
As							
Se							
Rb							2.7
Sr					230	(c)	158
Y					46	(c)	48
Zr					210	(c)	194
Nb							
Mo							
Ru							
Rh							
Pd ppb							
Ag ppb							
Cd ppb							
In ppb							
Sn ppb							
Sb ppb							
Te ppb							
Cs ppm							
Ba			160	(b)	230	(c)	147
La			13.3	(b)			13.4
Ce			33.2	(b)			34
Pr							
Nd			26	(b)			
Sm			6.7	(b)			6.55
Eu			1.2	(b)			1.25
Gd							
Tb			1.2	(b)			1.27
Dy							
Ho							
Er							
Tm							
Yb			4.9	(b)			4.65
Lu			0.7	(b)			0.67
Hf			4.4	(b)			4.5
Ta			0.5	(b)			0.6
W ppb							
Re ppb							
Os ppb							
Ir ppb							
Pt ppb							
Au ppb							
Th ppm	2.33	(a)	2.5	(b)			2.4
U ppm	0.59	(a)					0.62

technique: (a) radiation count. (b) INAA, (c) ES, (d) fused-bead e-probe

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