

74121
Soil
386 grams

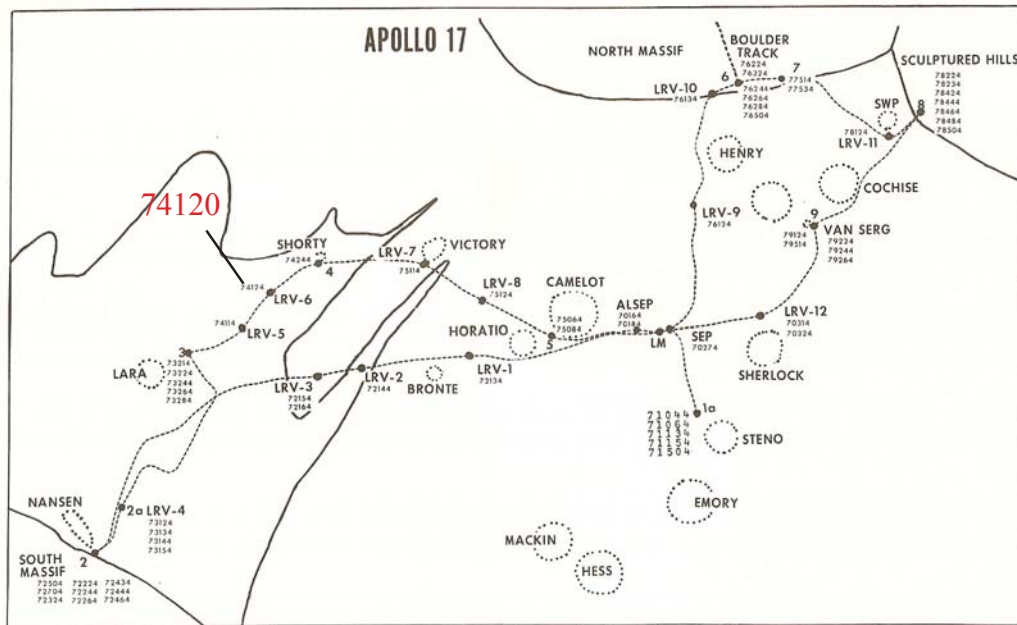


Figure 1: Location of soil sample 74120 at LRV-6 on Apollo 17 map (Meyer 1973). S73-24071

Introduction

74120-74124 was collected at LRV-6 on the light mantle (landslide off of South Massif)(figure 1). It has a high Al₂O₃ and low FeO content (figure 2) and is very mature (figure 3).

Moore et al. (1974) determined 140 ppm carbon (figure 3).

Petrography

The maturity index of 74121 is I_s/FeO = 88 and the average grain size is 47 microns (Morris 1978, Graf 1993). This is a mature soil from the upper few centimeters and contains a high percentage (52%) of agglutinates.

Cosmogenic isotopes and exposure ages

Curtis and Wasserburg (1977) determined the Gd isotopes to obtain the total exposure to cosmic rays.

Heiken and McKay (1974) reported only 2 % basalt in the 90 – 150 microns size fraction.

Modal content of soil 74121 (90-150 micron).

From Heiken and McKay 1974.

	74121
Agglutinates	51.7
Basalt	2
Breccia	24.7
Anorthosite	1.4
Norite	0.7
Gabbro	
Plagioclase	7.3
Pyroxene	4.7
Olivine	0.3
Ilmenite	0.7
Orange glass	0.3
Glass other	5.8

Chemistry

Duncan et al. (1974), Nava et al. (1974), Philpotts et al. (1974), Wanke et al. (1974), Mason et al. (1974) and others all analyzed the < 1 mm fine fraction with consistent results (see table). This soil has high Ni, Ir and Au content, consistent with its high maturity index. The Zn may be from nearby Shorty Crater.

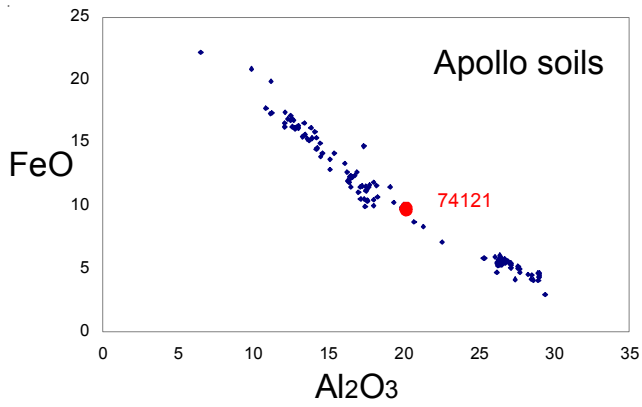


Figure 2: Composition of 74121 compared with that of other Apollo soil samples.

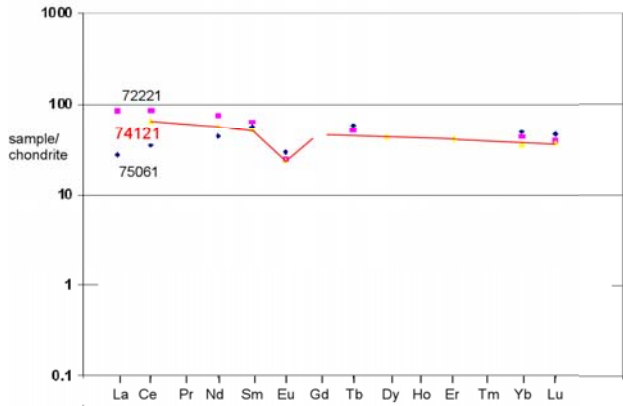


Figure 4: Normalized rare-earth-element diagram for 74121 compared with mare and highland soils samples from the Apollo missions.

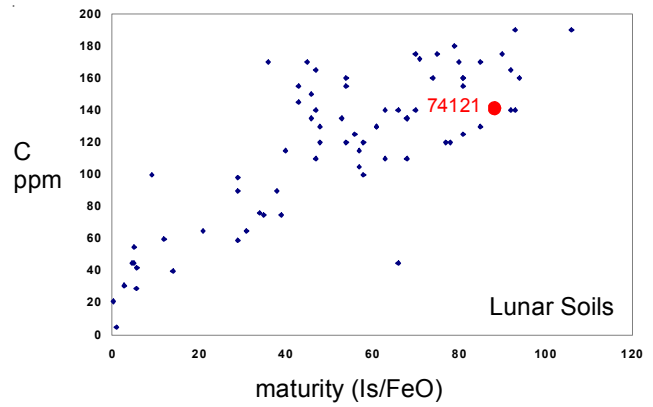
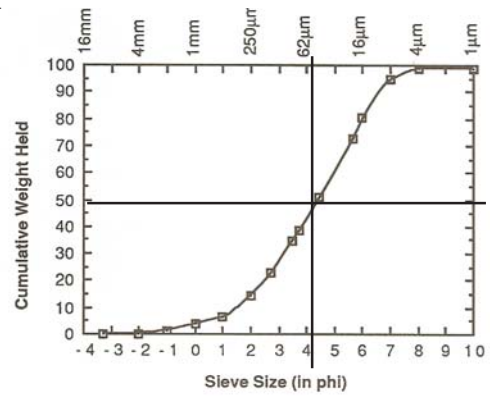


Figure 3: Carbon content and maturity index for 74121 compared with that of other Apollo soils.



average grain size = 47 microns

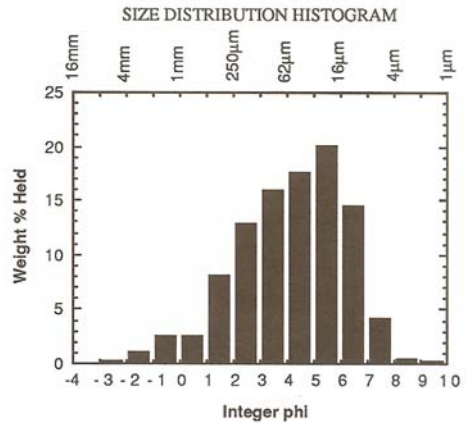


Figure 5: Grain size distribution for 74120 (Graf 1993, data from McKay).

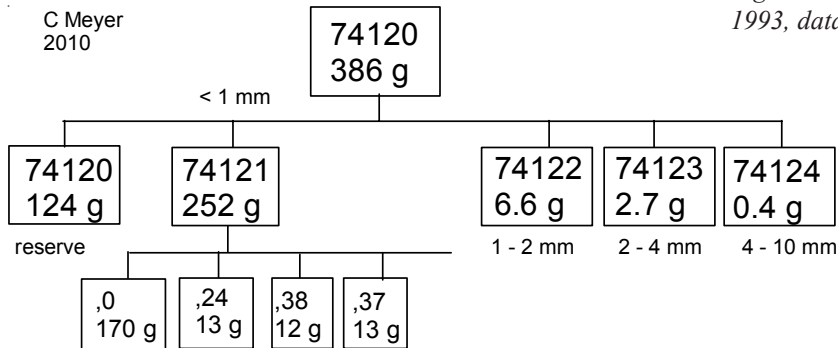


Table 1. Chemical composition of 74121.

reference weight	Duncan74	Philpotts74	Wanke74	Nava74	Brunfelt74 unpublished	Mason74	Miller74
SiO ₂ %	44.51 (a)		44.9 (c)	44.9 (d)		43.51 (g)	44.3
TiO ₂	2.56 (a)		2.57 (c)	2.47 (d)	2.28 (e)	2.58 (g)	2.3
Al ₂ O ₃	19.36 (a)		18.97 (c)	18.75 (d)	20 (e)	19.41 (g)	19.6
FeO	10.24 (a)		10.54 (c)	10.43 (d)	9.75 (e)	10 (g)	10.5
MnO	0.132 (a)		0.134 (c)	0.128 (d)	0.13 (e)	0.18 (g)	0.13
MgO	9.93 (a)		9.86 (c)	10.2 (d)	7.79 (e)	9.84 (g)	10.8
CaO	12.44 (a)		12.46 (c)	11.73 (d)	14.8 (e)	12.11 (g)	11.9
Na ₂ O	0.4 (a)		0.43 (c)	0.44 (d)	0.44 (e)	0.31 (g)	0.46
K ₂ O	0.134 (a)	0.136 (b)	0.134 (c)	0.136 (d)	0.15 (e)	0.19 (g)	
P ₂ O ₅	0.136 (a)		0.117 (c)	0.12 (d)		0.11 (g)	
S %	0.083 (a)						
sum							
Sc ppm			24.3 (c)		23.2 (e)		
V	58 (a)			1574 (d)	57 (e)	60 (f)	
Cr	1841 (a)		1700 (c)		1600 (e)	2300 (f)	
Co	33 (a)		36.4 (c)		30 (e)	46 (f)	
Ni	245 (a)		327 (c)			280 (f)	
Cu	8.4 (a)				9 (e)	9 (f)	
Zn	24.1 (a)				18 (e)	32 (f)	
Ga					4.8 (e)	6 (f)	
Ge ppb							
As							
Se							
Rb	3.6 (a)	3.24 (b)			3.2 (e)		
Sr	141 (a)	150 (b)	170 (c)		112 (e)	175 (f)	
Y	53.7 (a)						
Zr	244 (a)	213 (b)				225 (f)	
Nb	16.5 (a)						
Mo							
Ru							
Rh							
Pd ppb							
Ag ppb							
Cd ppb							
In ppb							
Sn ppb							
Sb ppb							
Te ppb							
Cs ppm					0.12 (e)		
Ba	164 (a)	167 (b)			141 (e)	125 (f)	
La			15.5 (c)		11.7 (e)		
Ce		39 (b)	37 (c)				
Pr							
Nd		25.6 (b)					
Sm		7.55 (b)	8.06 (c)		7.38 (e)		
Eu		1.33 (b)	1.28 (c)		1.35 (e)		
Gd							
Tb			1.9 (c)		1.51 (e)		
Dy		10.4 (b)	11.3 (c)		8.6 (e)		
Ho							
Er		6.44 (b)					
Tm							
Yb		5.79 (b)	6.02 (c)		6.1 (e)		
Lu		0.895 (b)	0.81 (c)		0.84 (e)		
Hf			6.02 (c)		4.3 (e)		
Ta			0.87 (c)		0.78 (e)		
W ppb					290 (e)		
Re ppb							
Os ppb							
Ir ppb			11 (c)				
Pt ppb							
Au ppb			13 (c)				
Th ppm			2.6 (c)		1.96 (e)		
U ppm					0.66 (e)		

technique: (a) XRF, (b) IDMS, (c) multiple, (d) AA, color., (e) INAA, (f) eos, (g) fused-beaad e-probe

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