15245

Regolith Breccia

115.5 grams

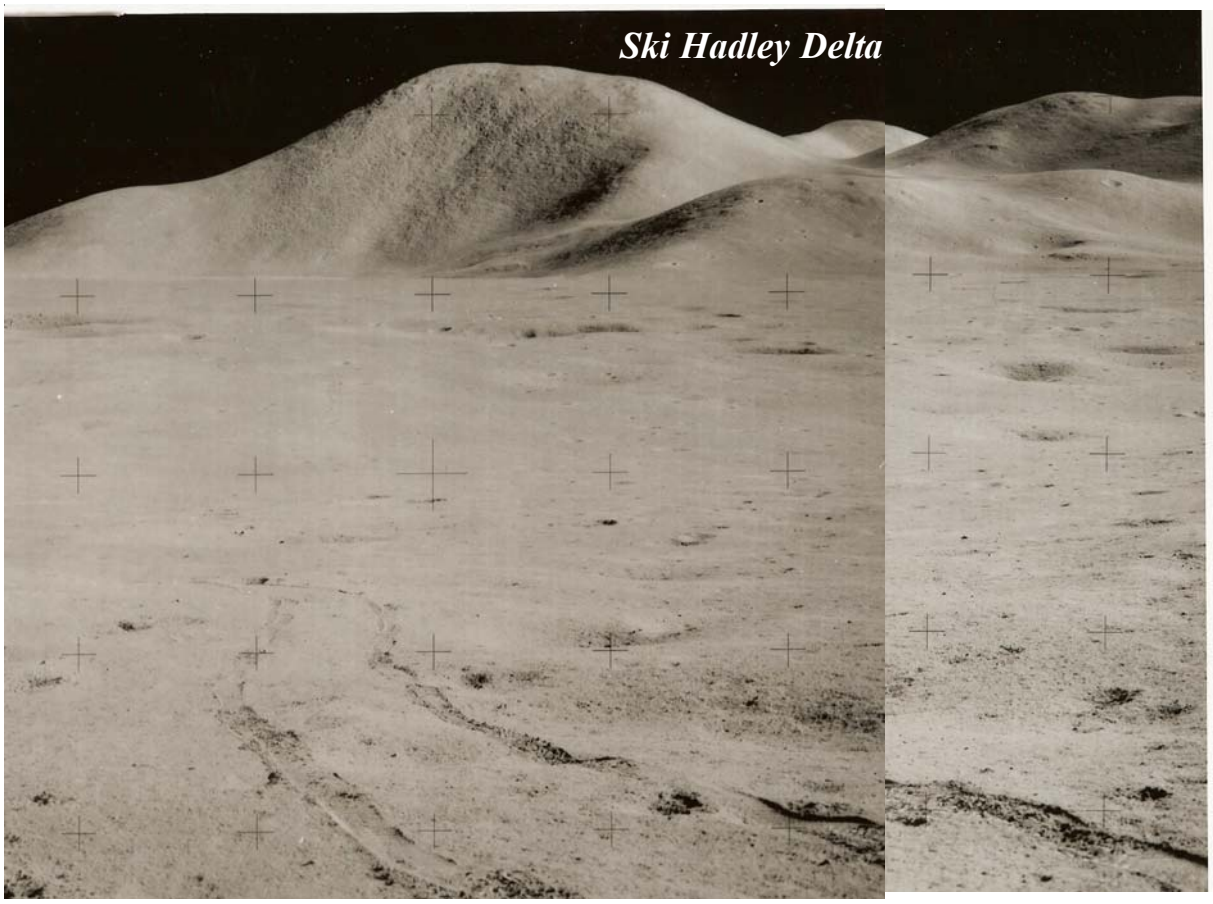


Figure 1: The first assect of the Apennine Front was an awesome event. The astronauts remarked that the scenery reminded them of Sun Valley, Idaho. This is what it looked like from station 6.

Introduction

15245 was collected from the glassy bottom of a small fresh crater (figure 3) – along with soil 15240. It was apparently picked up as a delicate glass-welded soil breccia (see transcript) which broke up into about 90 small fragments (figure 5), the largest of which was only 12 grams (figure 4).

The Apollo 11 astronauts were to first to remark on the abundance of shiny glass at the bottom of fresh craters, but this sample from Apollo 15 appears to be the best one collected and made available for study.

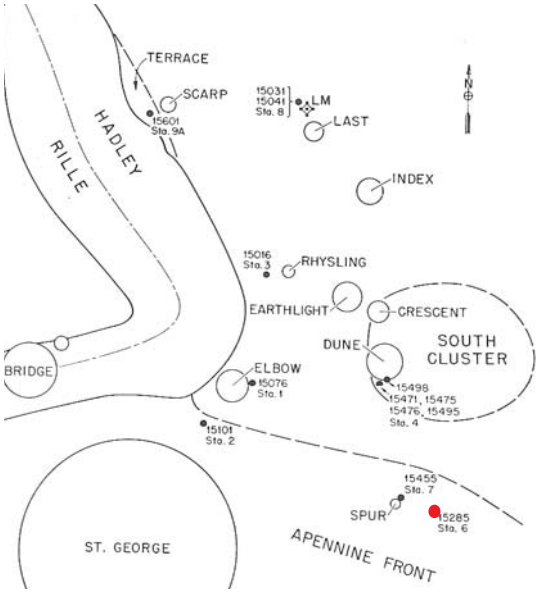


Figure 2: Location of 15245 on Apennine Front.

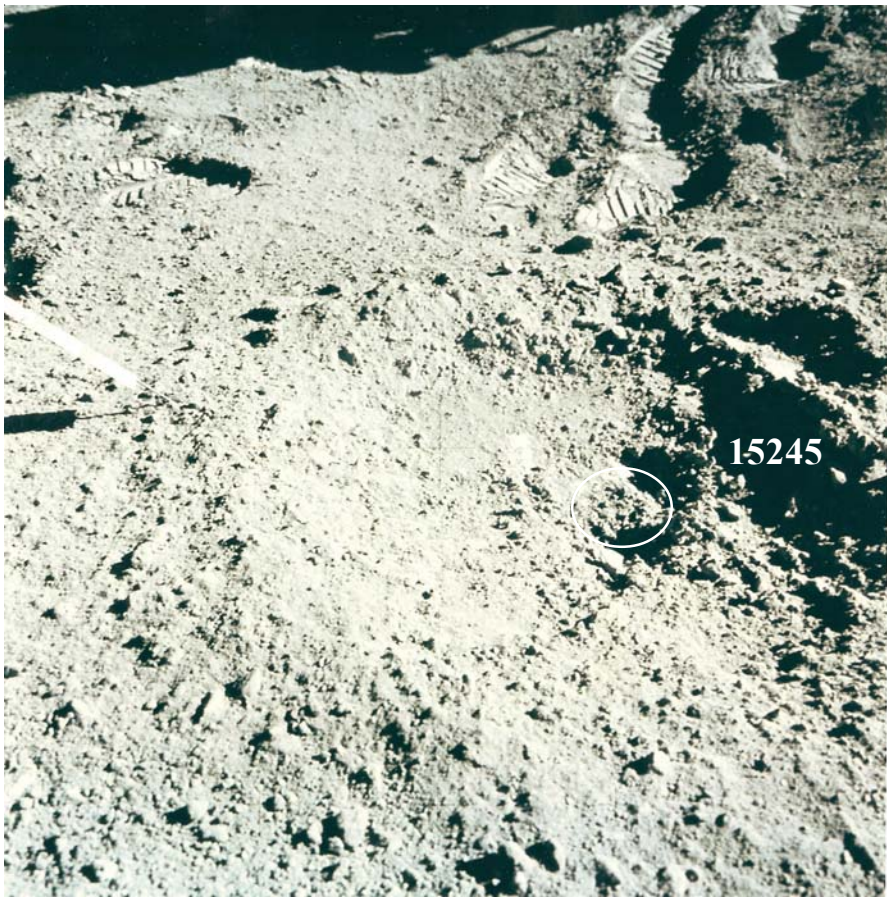


Figure 3: Small meter-sized crater where 15245 was collected. Leg of Gnomon is 50 cm. AS15-86-11614

Transcript

CDR There's one of those fresh little craters. Let's go sample that one.

LMP Got glass in the bottom.

CDR Okay. I'll get you a bag. And, it looks to me like the best thing to do – would be to – scoop the side – scoop the center where the glass is. Oh, what a beautiful sight. You know, we're a long way from the LM. At least we can see it.

LMP And we're going to sample the glass in the middle of it.

CDR Yes. Start with the middle, and we'll pick up the rim, too.

LMP It all felt kind of welded together.

CDR Hey, get me another load.

LMP I hope it stays together for us. Like fragments all glued together. What an intricate pattern.

Figure 4: Photo of 15245,37. About 2.5 cm across. S75-33757

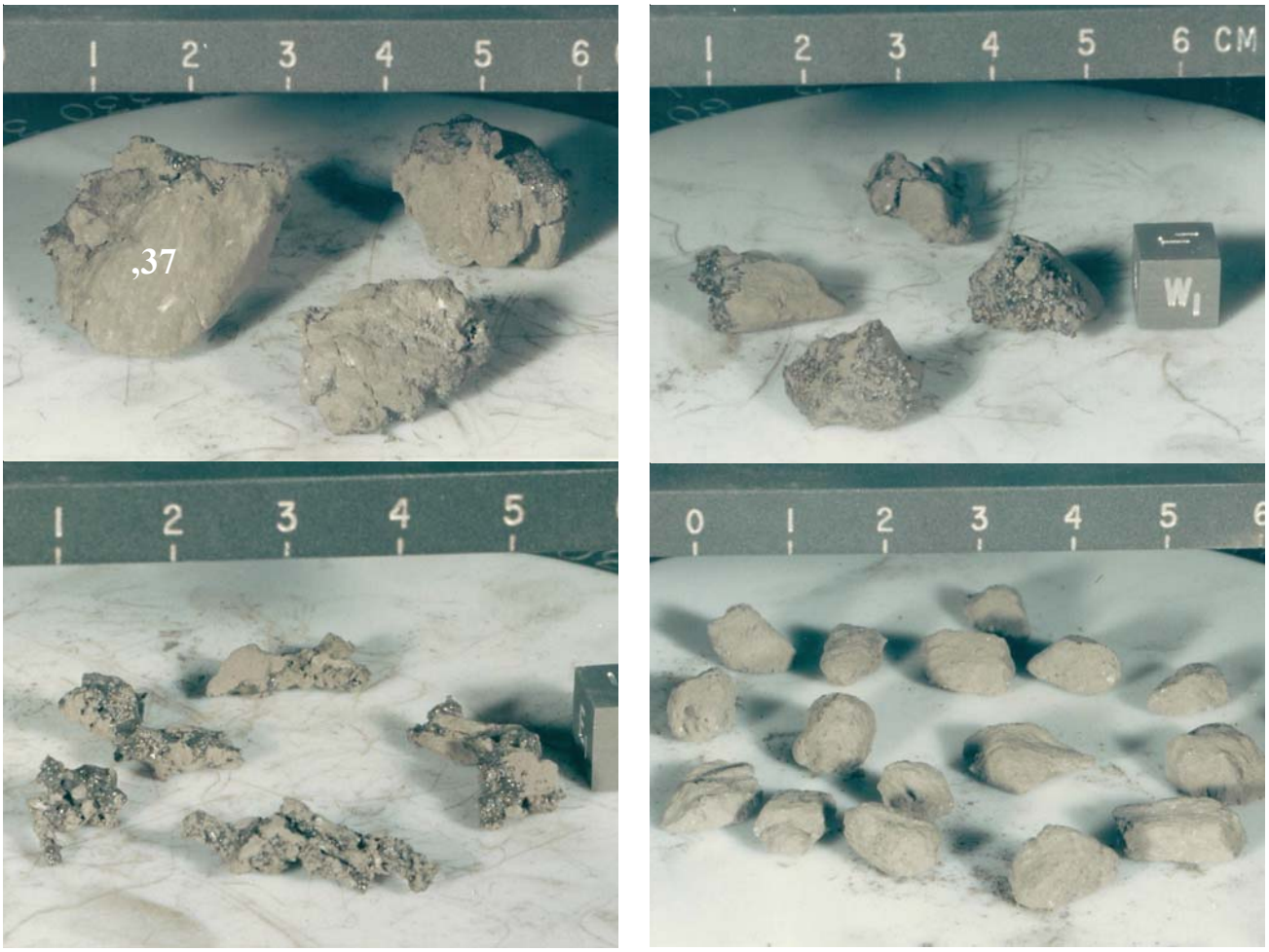


Figure 5: Photo of particles that make up 15245. Scale and cube are in cm. S71-47912, 47990, 47931, 47938

Petrography

McKay et al. (1989) reported that the maturity index for 15245 was I_s/FeO = 41. They also reported a high percentage of agglutinates.

Chemistry

Brunfelt et al. (1972), Wanke et al. (1976) and McKay et al. (1989) found that the bulk composition of 15245 was similar to that of the soil (figure 7). Moore et al. (1973) reported 132 ppm carbon (figure 8).

Other Studies

Fabel et al. (1972) reported soft x-ray studies and gave an analysis that makes no sense at all.

Megrue (1973) determined He, Ne and Ar and their isotopic ratios to identify solar and cosmogenic components.

Processing

There are only two thin sections of 15245.

Mineralogical Mode for 15245

	(McKay et al. 1989)	
	20-500 mciron	500-1000 micron
Mare Basalt	1.3 %	0 %
KREEP basalt	4	15.4
Plutonic	1	31
Breccias	6	23.1
Olivine	1	0
Pyroxene	14.7	0
Plagioclase	16.3	0
Opaques	0.7	0
Glass	13.7	15.4
Agglutinates	22	15.4

Table 1. Chemical composition of 15245.

reference	McKay89			Brunfelt72		Wanke 76	
weight							
SiO2 %						48.4	(b)
TiO2	1.45		(a)	1.24			
Al2O3	16.3		(a)	15.78		17.4	(b)
FeO	11.8	11.9	(a)	12		12	(b)
MnO	0.16		(a)	0.22		0.16	(b)
MgO	10.6		(a)	10		10.8	(b)
CaO	10.2	11.4	(a)	9.8		10.8	(b)
Na2O	0.47	0.49	(a)	0.46		0.47	(b)
K2O						0.2	(b)
P2O5							
S %							
sum							
Sc ppm	22.8	22.6	(a)	21.9	(a)	23.5	(b)
V	73		(a)	76	(a)	84	(b)
Cr	2160	2180	(a)	3295	(a)	2210	(b)
Co	38.5	37.1	(a)	39	(a)	36	(b)
Ni	229	192	(a)	180	(a)	215	(b)
Cu							
Zn							
Ga							
Ge ppb							
As							
Se							
Rb				6.3	(a)		
Sr	145	130	(a)	115	(a)	160	(b)
Y							
Zr	350	410	(a)			368	(b)
Nb							
Mo							
Ru							
Rh							
Pd ppb							
Ag ppb							
Cd ppb							
In ppb							
Sn ppb							
Sb ppb							
Te ppb							
Cs ppm	0.29	0.29	(a)	0.49	(a)	0.28	(b)
Ba	257	277	(a)	210	(a)	290	(b)
La	25.7	27.5	(a)	25	(a)	26.3	(b)
Ce	68	73	(a)			71.2	(b)
Pr							
Nd	38	40	(a)			45.6	(b)
Sm	12	13.1	(a)	12.1	(a)	11.1	(b)
Eu	1.44	1.49	(a)	1.8	(a)	1.42	(b)
Gd							
Tb	2.36	2.58	(a)	2.7	(a)	2.57	(b)
Dy				10	(a)	15.5	(b)
Ho						3.7	(b)
Er							
Tm							
Yb	8.4	8.9	(a)	10.7	(a)	8.62	(b)
Lu	1.16	1.25	(a)		(a)	1.16	(b)
Hf	9.7	10.2	(a)	10.5	(a)	8.92	(b)
Ta	1.17	1.25	(a)	1.25	(a)	1.08	(b)
W ppb							
Re ppb							
Os ppb							
Ir ppb	8.7	6.7	(a)			8	(b)
Pt ppb							
Au ppb	3.1	2	(a)				
Th ppm	4.3	4.6	(a)	3.98	(a)	4.6	(b)
U ppm	1.13	1.1	(a)	1.02	(a)		
technique:	*(a) INAA, (b) various*						

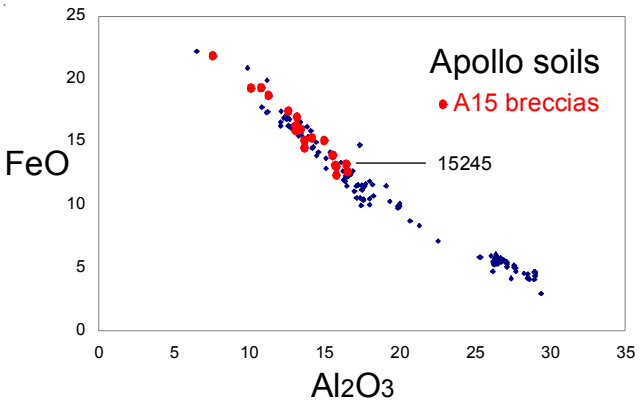


Figure 6: Composition of 15245 compared with that of Apollo soils and Apollo 15 breccias.

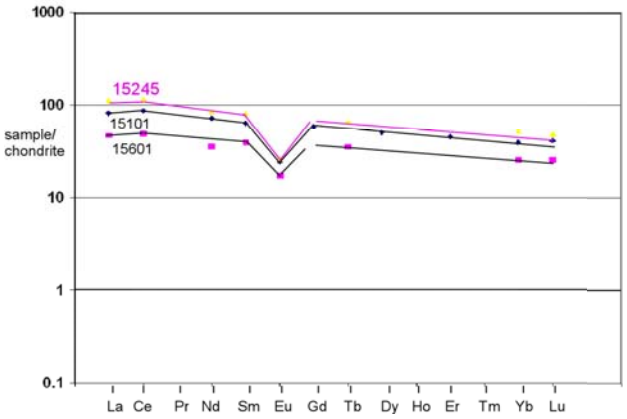
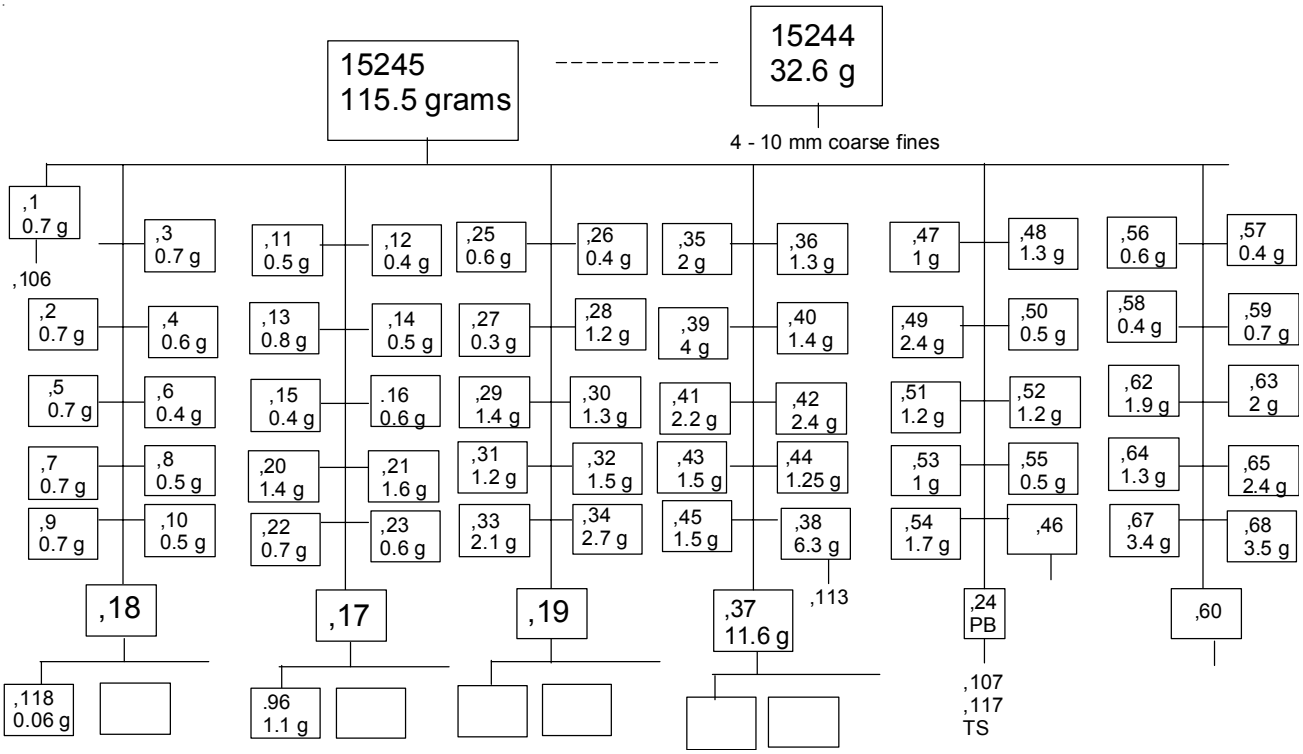


Figure 7: Normalized rare-earth-element diagram for15245 compared with that of Apollo 15 soils.



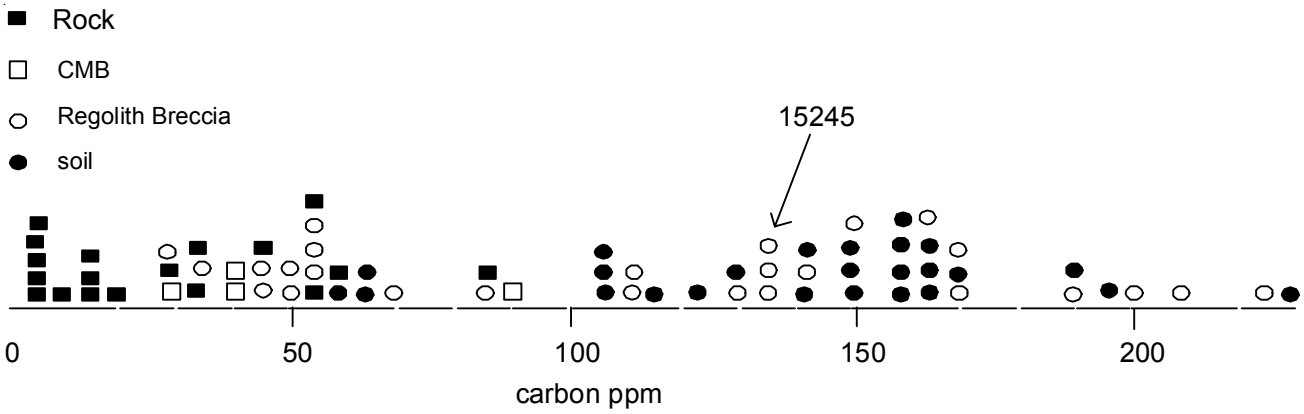


Figure 8: Carbon content of lunar soils, breccias and "rocks".

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