

14220
 Drive Tube
 80.7 grams
 16.5 cm.

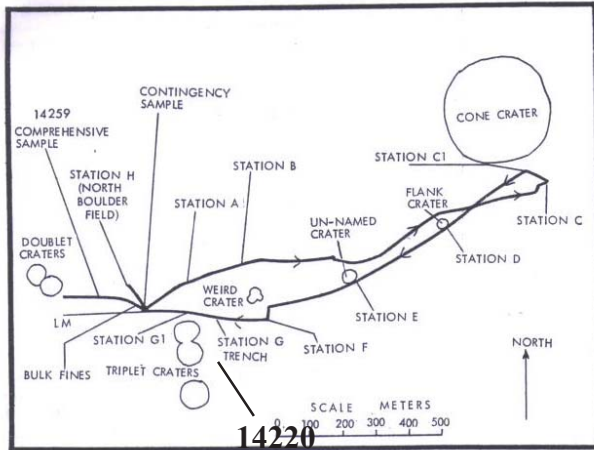


Figure 1: Traverse map of Apollo 14. Drive tube 14220 was taken on the second EVA at station G, on the return trip from Cone Crater.

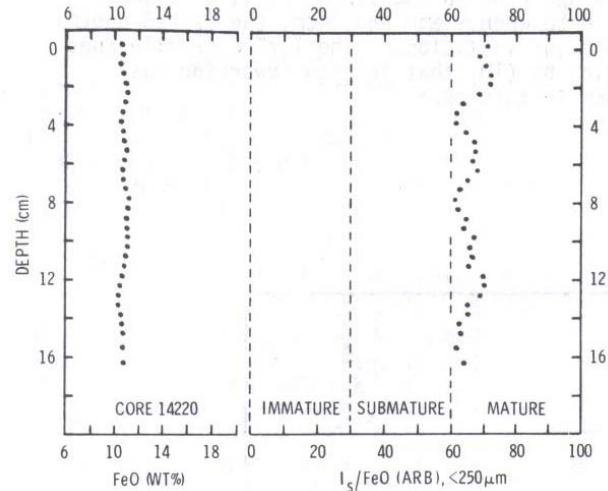


Figure 2: Matruity index as function of depth for 14220 (from Morris and Lauer 1980).

Introduction

Drive tubes 14220 and 14230 (each 2 cm dia.) were collected near the Soil Mechanics Trench at station G – see section on 14149. 14220 was only 16 cm long, because a subsurface rock was encountered (Mitchell et al. 1971). Carrier et al. (1972) report that this core was pushed in 15 cm, and hammered to less than 36 cm. Material may have been lost.

Petrography

Nagle (1980) presented the observations made during dissection of 14220. He subdivided the core into six units and five “glass rich” zones. Simon et al. (1982) studied the petrology and reported that the bottom of the core is relatively rich in lithic fragments. They also found that the agglutinate abundance seemed to decrease with depth. Morris and Lauer (1980) determined maturity along the length, find that it was uniformly homogeneous (figure 2).

Chemistry

Laul et al. (1982) determined the chemical composition of 14220 (table 1). It is very homogeneous as function of depth and similar in composition to 14230 and the trench (14149) samples (figures 3 and 4).

Mineralogical Mode for 14220

(90 – 1000 micron, from Simon et al. 1982)

Agglutinate	45.2
Mare basalt	0.2
Feldspathic basalt	0.2
ANT	5.6
Norite (recrystallized)	5.6
Breccia	
Dark	17.6
Light	0.9
xtln	5.9
Plagioclase	4
Pyroxene + olivine	2.8
Glass other	11.5

Processing

14220 was milled open lengthwise and dissected every 0.5 cm. There are six (6) thin sections, but they have apparently not been studied.

List of potted-butts, thin sections, 14220.

depth	PB	TS
0 - 2.8 cm	,1007	,1013
2.8 - 5.8	,1008	,1014
5.8 - 8.5	,1009	,1015
8.5 - 11.5	,1010	,1016
11.5 - 14	,1011	,1017
14 - 16.3	,1012	,1018

Table 1. Chemical composition of 14220.

reference	Laul82					
weight	1 cm	5 cm	11 cm	16 cm	ave.	
SiO ₂ %						
TiO ₂	1.7	1.6	1.6	1.6	1.62	(a)
Al ₂ O ₃	17.6	17.9	17.2	17.6	17.6	(a)
FeO	11.2	10.1	10.3	10.5	10.5	(a)
MnO	0.14	0.135	0.125	0.13	0.132	(a)
MgO	10	9.4	9.5	9.5	9.6	(a)
CaO	10.1	11.5	11	11.6	11	(a)
Na ₂ O	0.74	0.77	0.73	0.76	0.75	(a)
K ₂ O	0.52	0.52	0.52	0.64	0.56	(a)
Cr ₂ O ₃	0.205	0.185	0.185	0.185	0.19	(a)
S %						
sum						
Sc ppm	24	21.6	21.7	21.7	22.2	(a)
V	45	40	45	40	42.5	(a)
Cr						
Co	32	31.9	34.4	35	33.3	(a)
Ni	450	390	420	420	420	(a)
Cu						
Zn						
Ga						
Ge ppb						
As						
Se						
Rb						
Sr	180	180	170	170	175	(a)
Y						
Zr	780	660	700	770	730	(a)
Nb						
Mo						
Ru						
Rh						
Pd ppb						
Ag ppb						
Cd ppb						
In ppb						
Sn ppb						
Sb ppb						
Te ppb						
Cs ppm						
Ba	880	800	800	800	820	(a)
La	65	64.4	67	65	65	(a)
Ce	180	180	190	180	182	(a)
Pr						
Nd	110	105	110	100	106	(a)
Sm	29	28	29.1	28.5	28.6	(a)
Eu	2.4	2.3	2.3	2.35	2.3	(a)
Gd						
Tb	5.9	5.3	5.4	5.5	5.5	(a)
Dy						
Ho	9.4	9	8.7	8.3	8.85	(a)
Er						
Tm	3.4	3	3.2	3.2	3.2	(a)
Yb	21.8	20.5	21.5	21.5	21.3	(a)
Lu	3	2.85	3	2.9	2.94	(a)
Hf	24.1	21.4	22.5	24.9	23.2	(a)
Ta	3.3	3	3	3	3.1	(a)
W ppb						
Re ppb						
Os ppb						
Ir ppb						
Pt ppb						
Au ppb						
Th ppm	14.4	13.9	14.3	13.5	14	(a)
U ppm	4	3.5	3.4	3.5	3.6	(a)

technique: (a) INAA

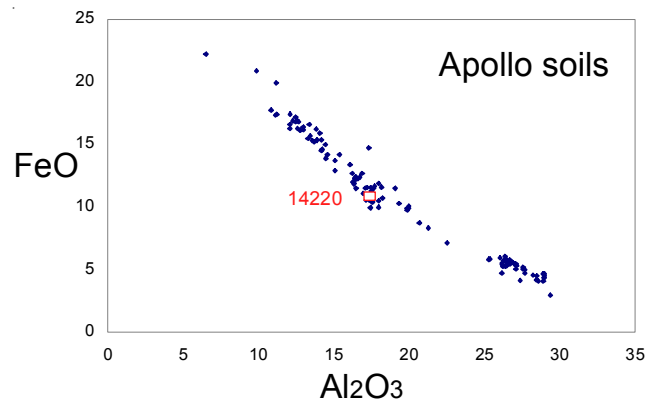


Figure 3: Composition of Apollo soils with 14220.

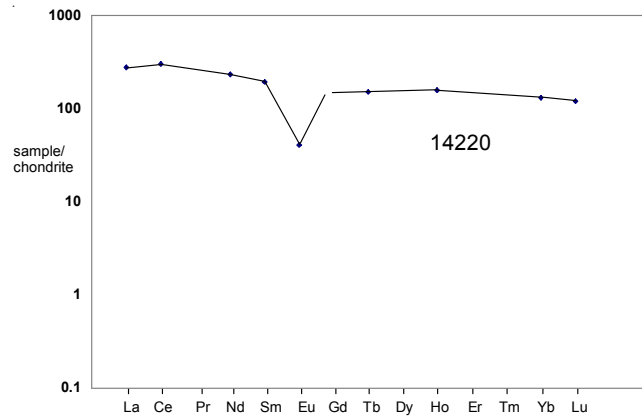


Figure 4: Normalized rare-earth-element diagram for 14220.

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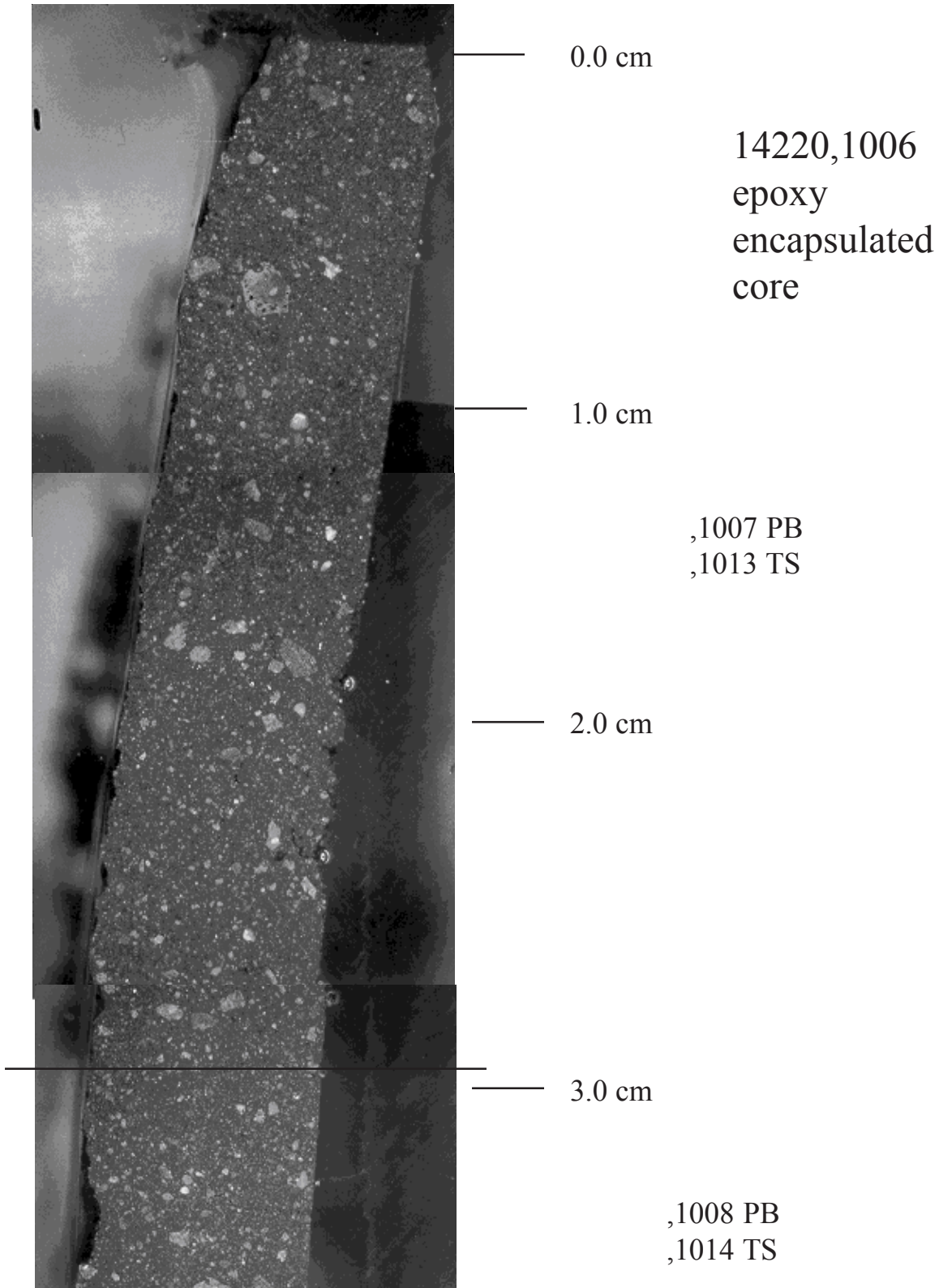
Swann G.A., Bailey N.G., Batson R.M., Eggleton R.E., Hait M.H., Holt H.E., Larson K.B., Reed V.S., Schaber G.G., Sutton R.L., Trask N.J., Ulrich G.E. and Wilshire H.G. (1977) Geology of the Apollo 14 landing site in the Fra Mauro highlands. U.S. Geological Survey Professional Paper 880

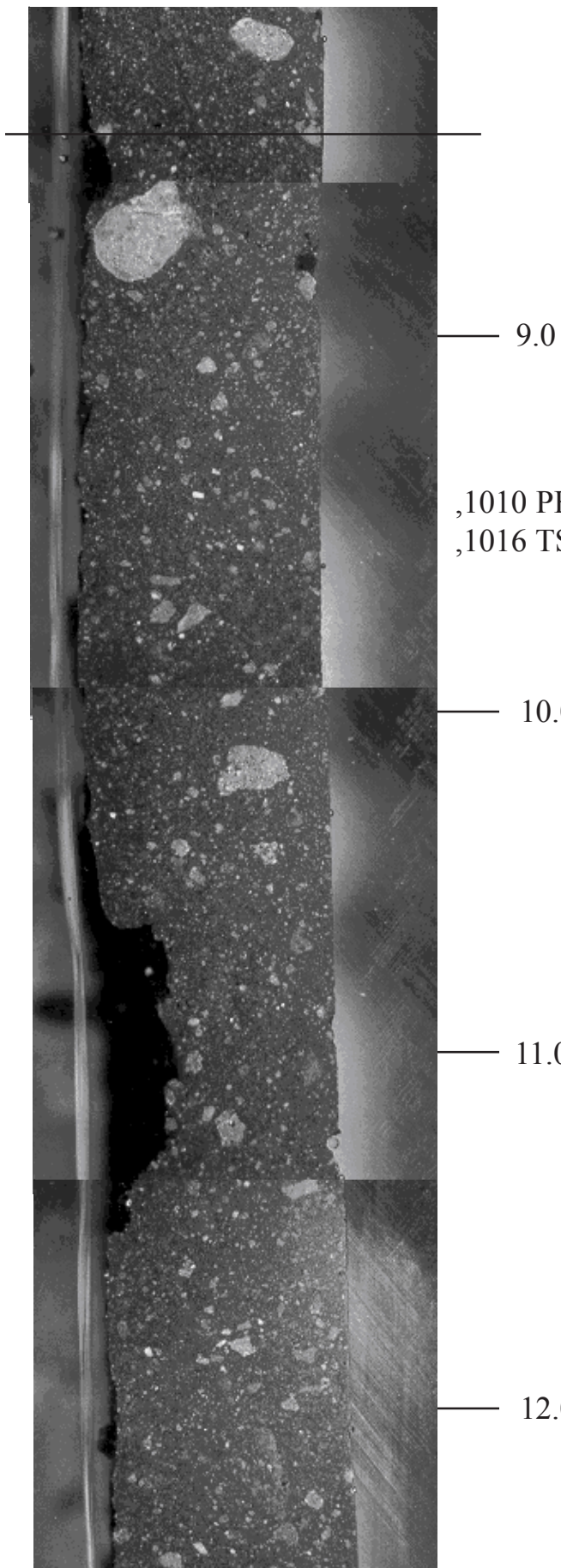
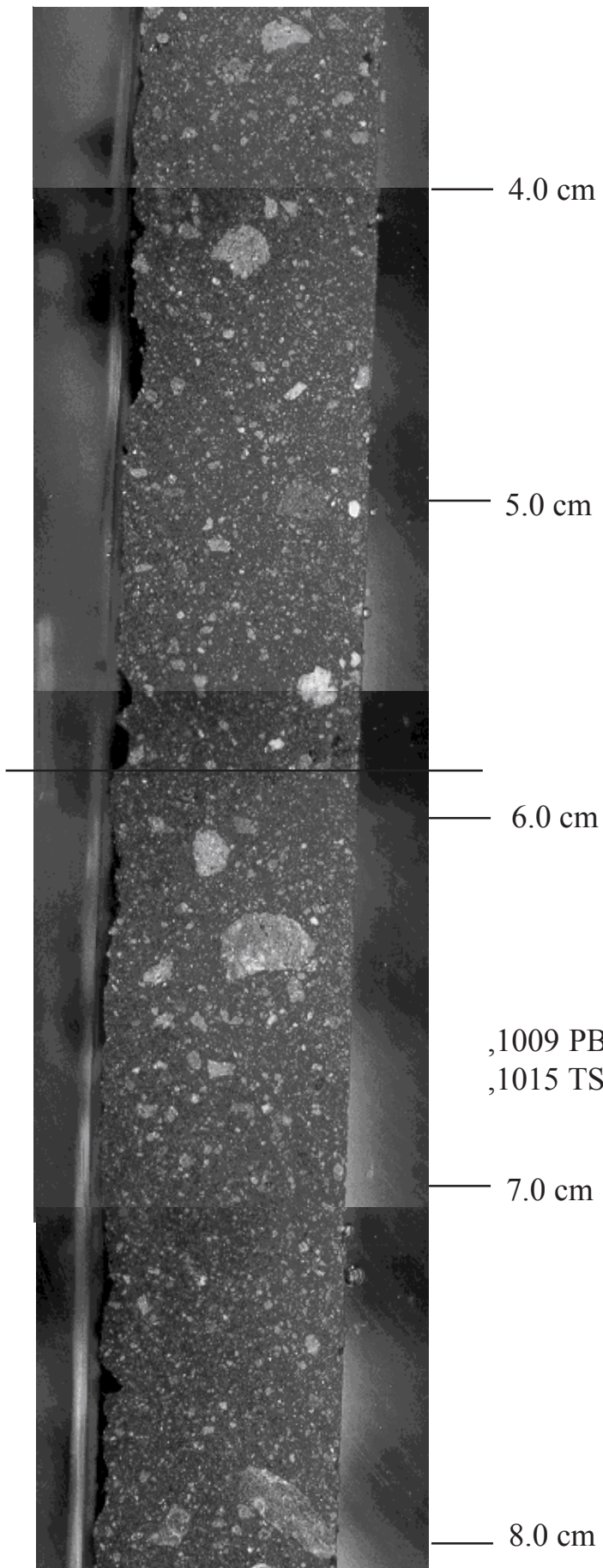
Dissection intervals of 14220.

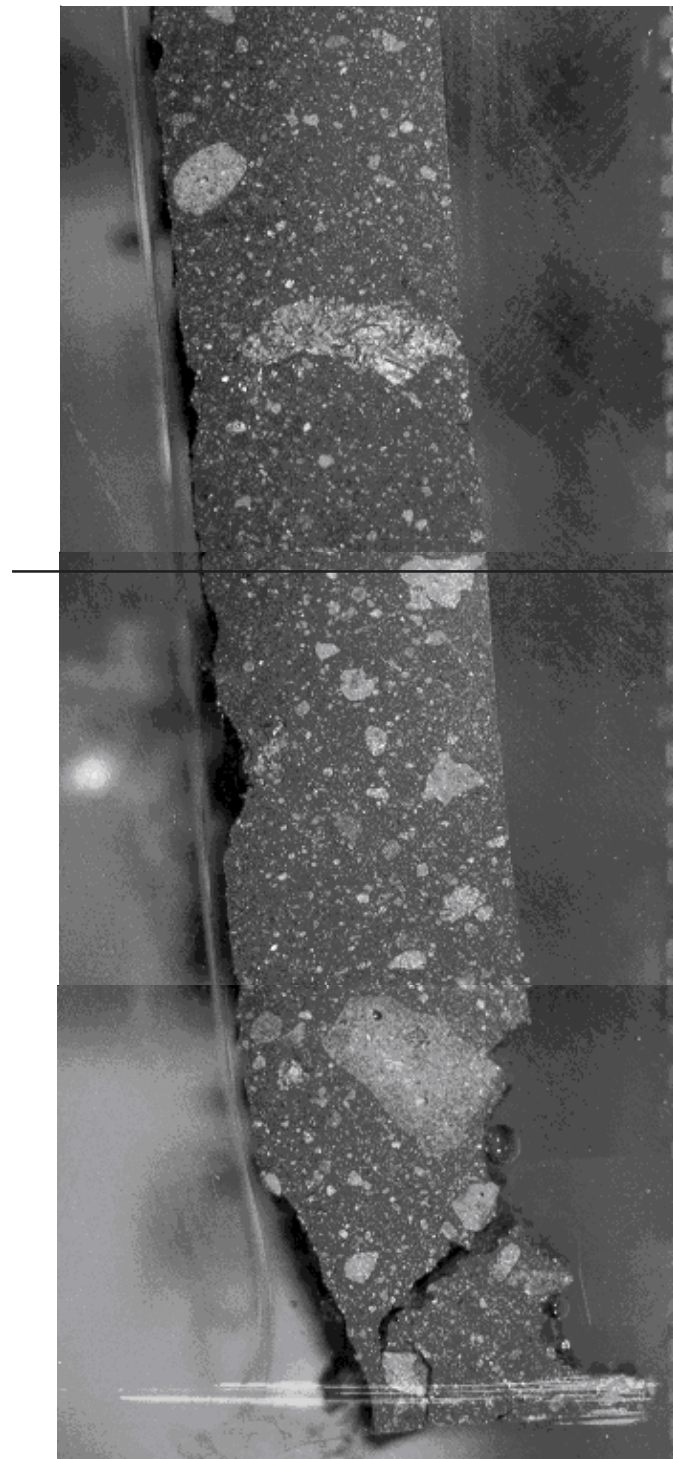
depth cm	split < 1 mm	weight grams
0 - 0.5	,7	1
0.5 - 1	,9	1.2
1 - 1.5	,11	1.3
1.5 - 2	,13	1.4
2 - 2.5	,15	1.5
2.5 - 3	,17	1.3
3 - 3.5	,19	1.3
3.5 - 4	,21	1.6
4 - 4.5	,23	1.3
4.5 - 5	,25	1.3
5 - 5.6	,27	1.7
5.6 - 6	,29	1.3
6 - 6.5	,31	1.6
6.5 - 7	,33	1.4
7 - 7.5	,35	1.5
7.5 - 8	,37	1.5
8 - 8.5	,39	1.5
8.5 - 9	,41	1.5
9 - 9.5	,43	1.7
9.5 - 10	,45	1.5
10 - 10.5	,47	1.3
10.5 - 11	,49	1.1
11 - 11.5	,51	1.3
11.5 - 12	,53	1.6
12 - 12.5	,55	1.2
12.5 - 13	,57	1.3
13 - 13.5	,59	1.4
13.5 - 14	,61	1.5
14 - 14.5	,63	1.3
14.5 - 15	,65	1.2
15 - 15.9	,67	2.1

W₁

14220
Drive Tube







,1011 PB
,1017 TS

— 13.0 cm

— 14.0 cm

,1012 PB
,1018 TS

— 15.0 cm

— 16.0 cm