Figure 1: Photo of 14169 with pitted surface. Sample is about 7 cm long. NASA S71-29224.

14169 – 78.66 g
14170 – 26.34 g
14171 – 37.79 g
14172 – 32.10 g
14173 – 19.59 g
14174 – 11.62 g
14175 – 7.48 g
Crystalline-matrix Breccia

Figure 2: Photo of 14170. NASA S71-25285. Sample is about 4 cm long.

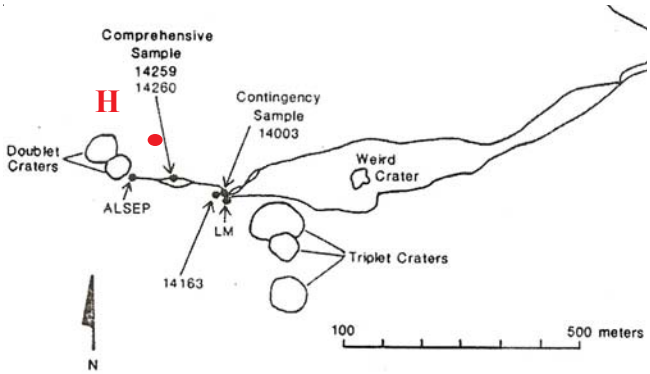


Figure 3: Front and back of 14171. Sample is about 4 cm across. NASA S71-30349 and 30351.

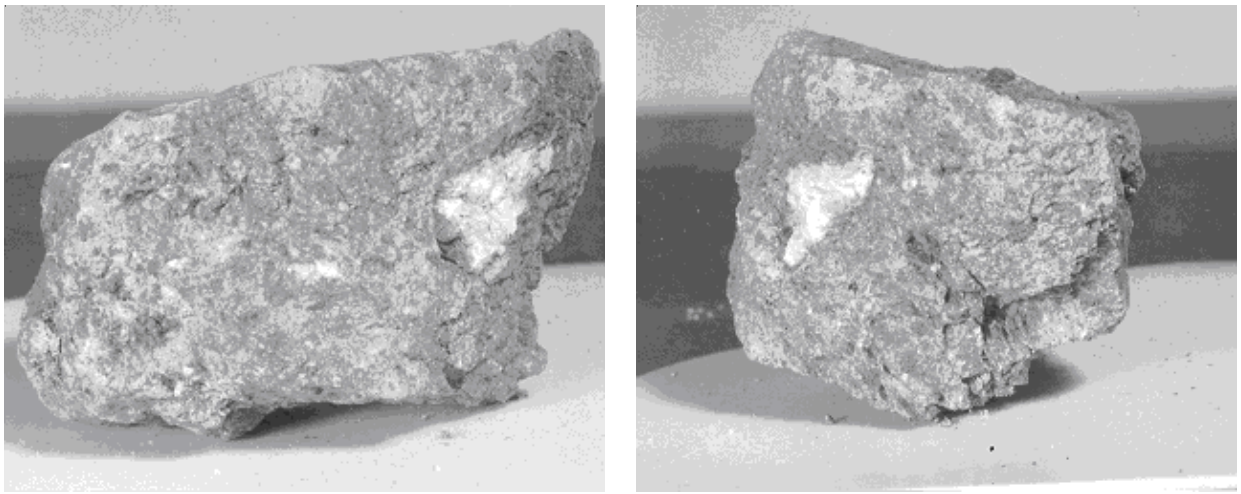


Figure 4: Two views of 17172, showing white clast. Sample is 4 cm long. NASA S71-25279 and 25282.

Figure 5: Photo of 14173 showing zap on its exterior surface. S71-25288. One cm cube for scale.

Figure 6: Photo of 14174 showing outer sufrace rounded by micrometeorite bombardment. S71-25294. Sample is 2 cm across.

Figure 7: Photo of 14275. S71-26851. Sample is 2 cm across.

Introduction

These 7 samples were returned in weigh bag 1027, which was apparently brought back outside of the ALSRC. According to Swann et al. (1977) part of the comprehensive sample from station H, was put in this bag, and football-sized rocks 14303, 14305 were added later because they wouldn't fit in the ALSRC. Phinney et al. (1975) concluded that samples 14169 – 14188 are all part of 14303 which broke apart during packing and transport. They based this judgment on "1) all of the smaller samples 14149 through 14188 are identical in lithology, and similar to that of 14303 and 2) all of the small samples display freshly fractured surfaces with no patina or zap pits: Most have only a very limited amount on their surfaces."

On the other hand, if one looks closely at the shapes and surfaces of these small sample (figure 1 to 7), it seems clear that they have more rounded and patina cover surfaces than the Phinney et al. team reported. Most rocks at Apollo 14 have similar lithology, so that's not an argument either. So, some of these rocks from bag 1027 may indeed be part of the "comprehensive suite" (Swann et al. 1971) and should in fact be considered as individual samples.

Petrography

These small breccias samples haven't been studied, perhaps because of the observations by Phinney et al. who exclaimed that they were part of 14303.

Low-magnification photomicrographs of these rock fragments are reproduced here (figure 8 to 15) to show the overall texture of these rocks. They all have a seriate fragmental clast population and seriate grain size distribution of the matrix. A number of the broken clasts appear to be basaltic. Carlson and Kramer (1978) noted that there was glass in the matrix of some fragments in this suite (not consistent with CMB term).

Simonds et al. (1977) and Warren et al. (1980) reported composition of 3 clasts in these samples (table 1). Warren et al. make cogent arguments why the clast they studied in 14172 is actually the same clast as one in 14305 (same bag).

Chemistry

Eldridge et al. (1972) reported the K, U and Th for 14169 and 14170 – confirming that these samples are like 14303. Otherwise we don't know much about these samples.

Cosmogenic isotopes and exposure ages

Eldridge et al. (1972) determined the cosmic-ray induced activity of ^{22}Na = 54 dpm/kg and ^{26}Al = 82 dpm/kg for 14169 and ^{22}Na = 39 dpm/kg and ^{26}Al = 88 dpm/kg for 14170.

scale = 2.8 mm across

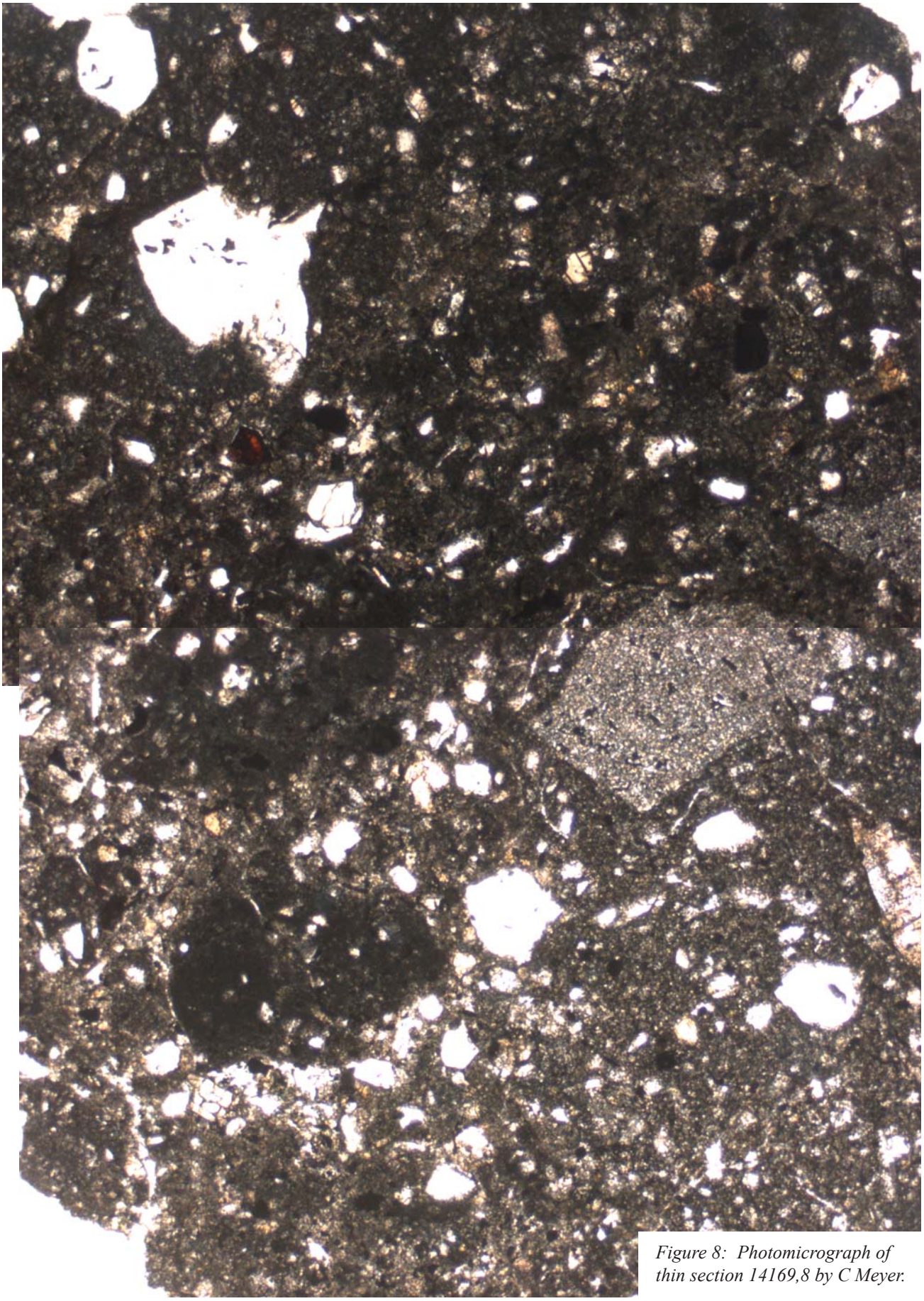


Figure 8: Photomicrograph of thin section 14169,8 by C Meyer.

scale = 2.8 mm across

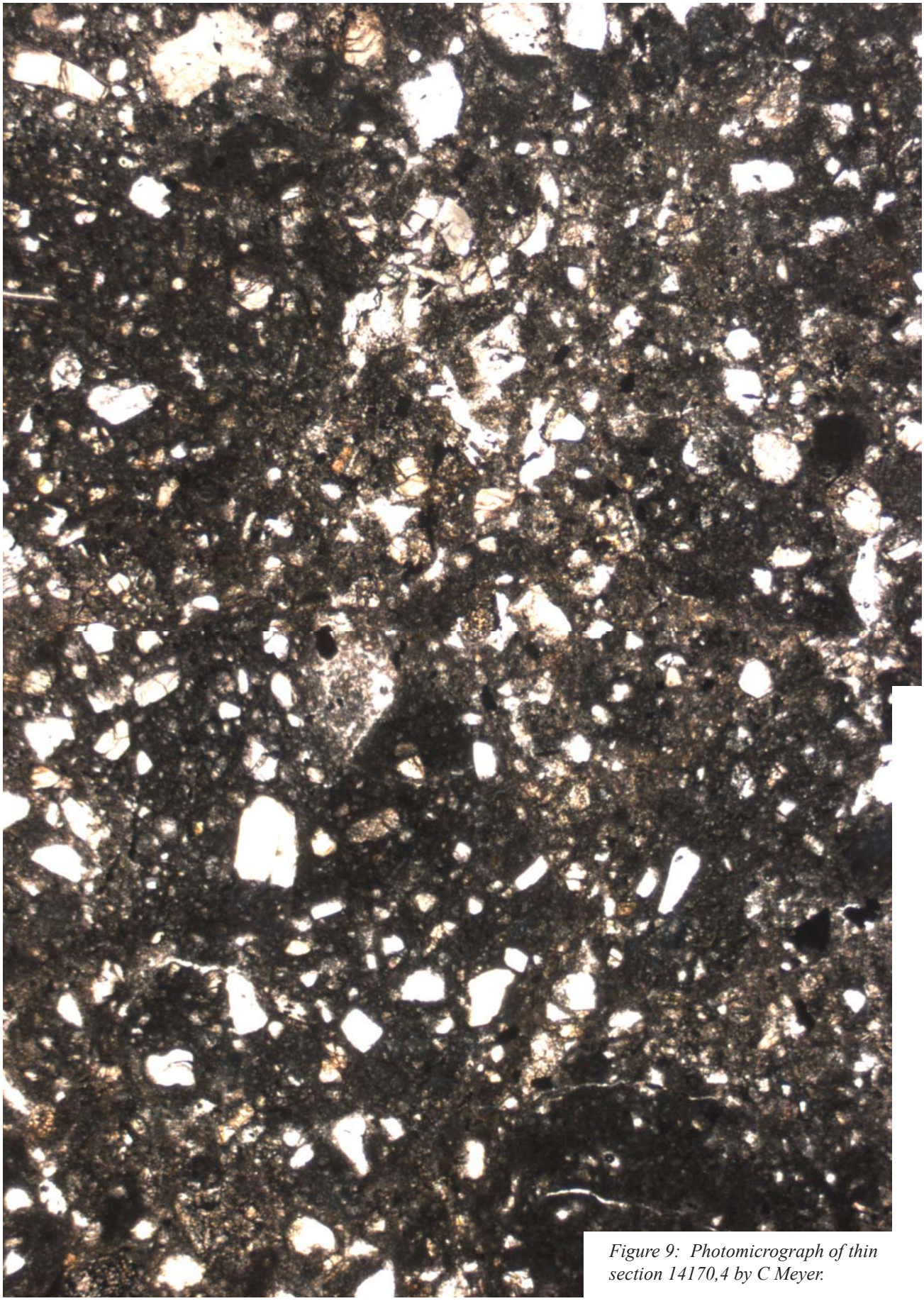


Figure 9: Photomicrograph of thin section 14170,4 by C Meyer.

scale = 2.8 mm across

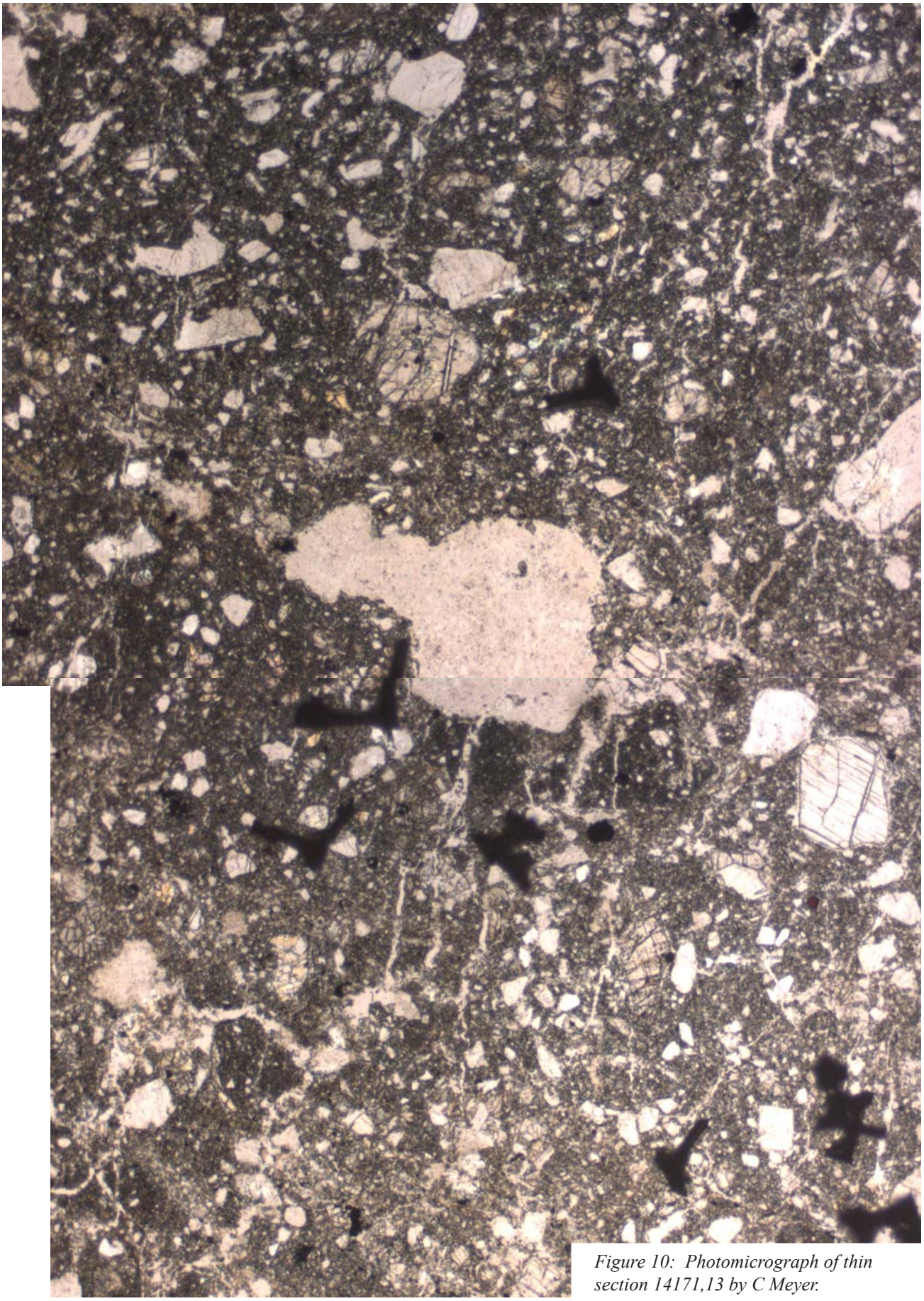


Figure 10: Photomicrograph of thin section 14171,13 by C Meyer.

scale = 2.8 mm across

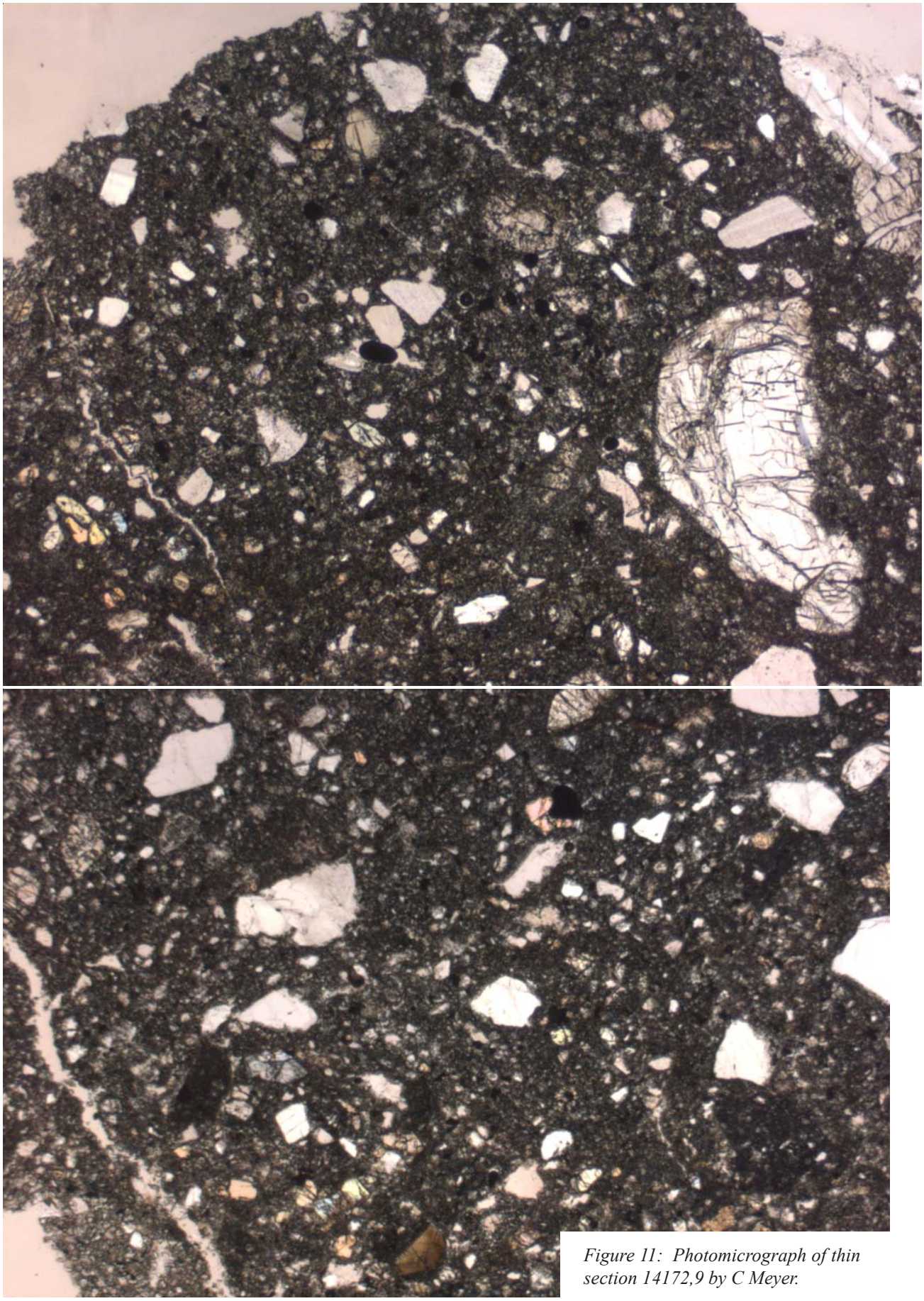


Figure 11: Photomicrograph of thin section 14172,9 by C Meyer.

scale = 2.8 mm across

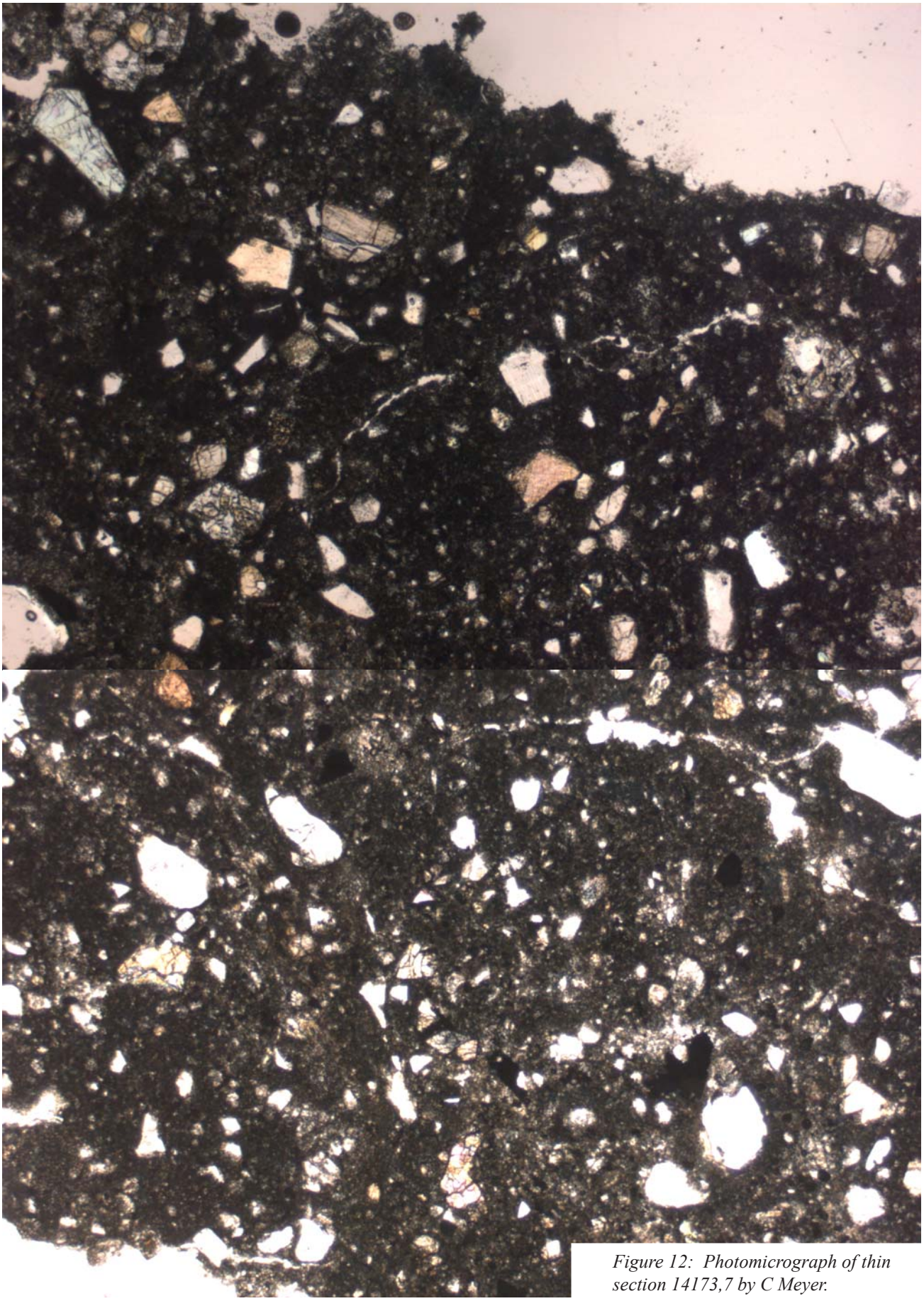
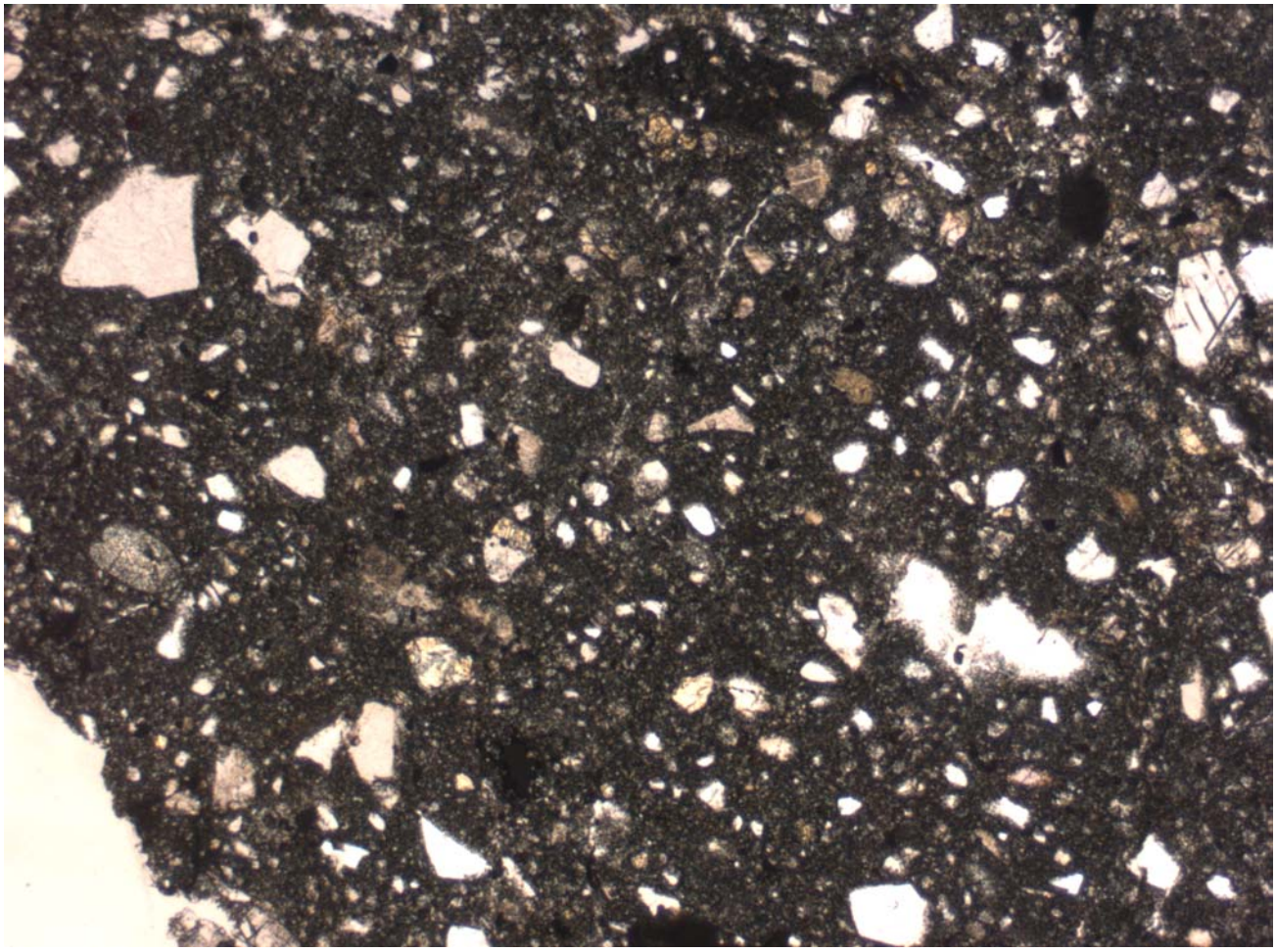
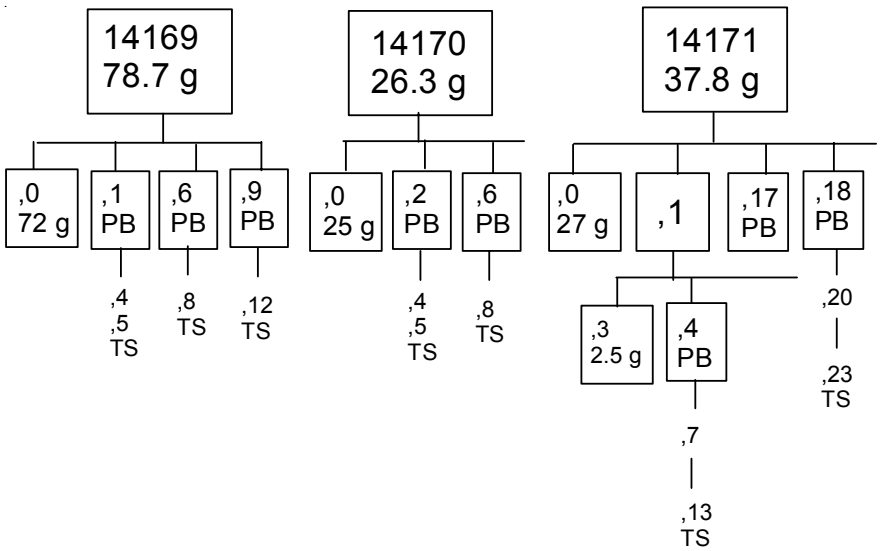


Figure 12: Photomicrograph of thin section 14173,7 by C Meyer.



scale = 2.8 mm across

Figure 13: Photomicrograph of thin section 14174, 7 by C Meyer.



scale = 2.8 mm across

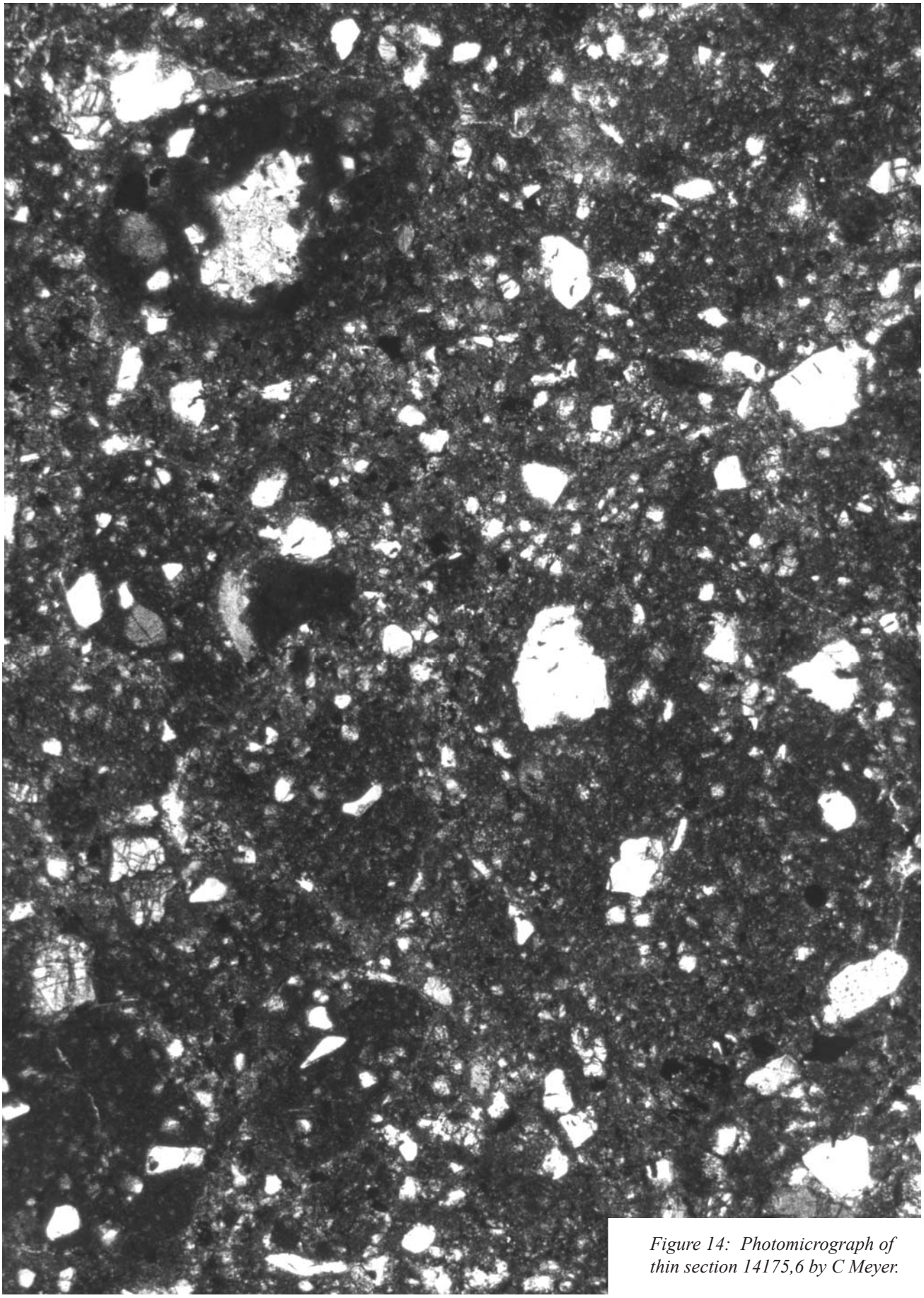


Figure 14: Photomicrograph of thin section 14175,6 by C Meyer.

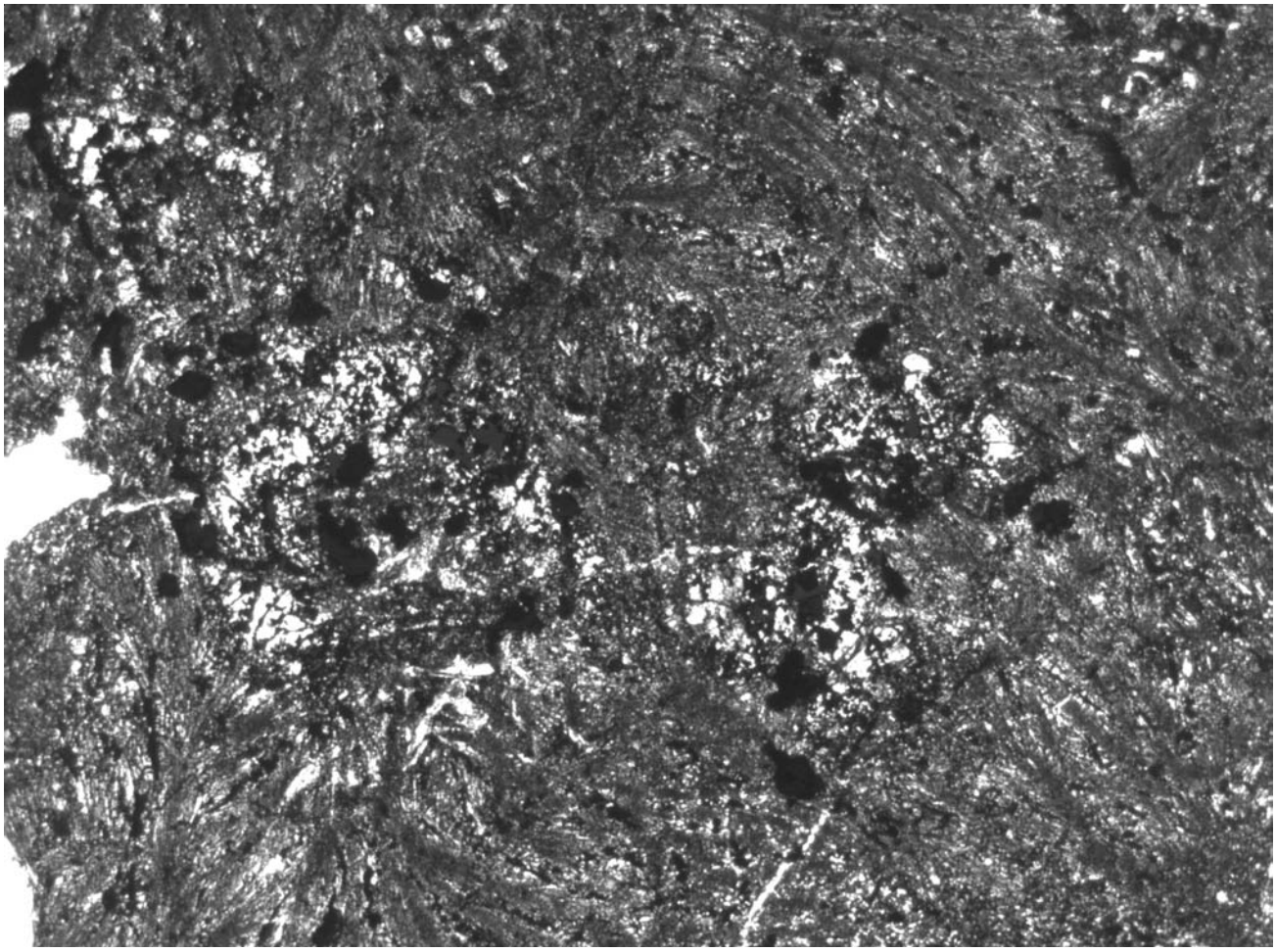
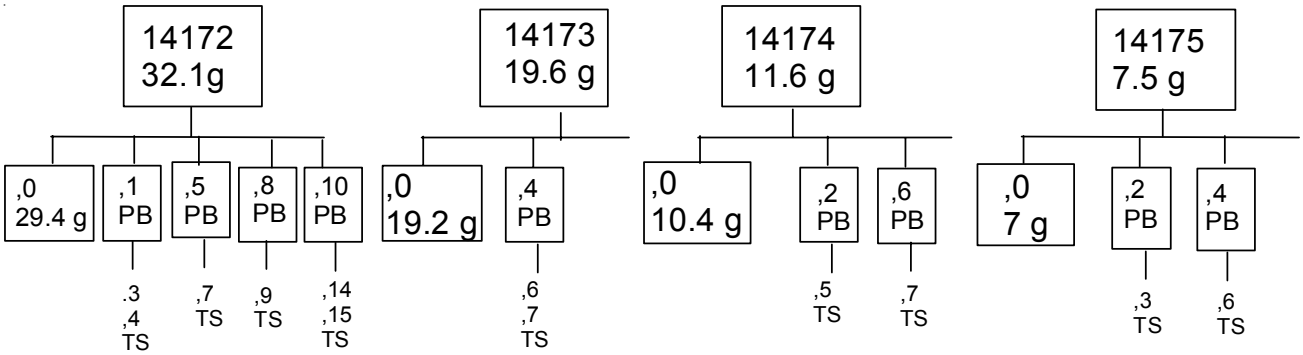


Figure 15: Photomicrograph of thin section 14175,6 by C Meyer.



Processing

14169 to 14177 were returned in bag 1027 and may be pieces of 14303 or 14305 or they may be grab samples picked up from the regolith as part of the comprehensive sample.

There are 4 thin sections of 14169, 3 thin sections of 14170, 10 thin sections of 14171, 7 thin sections of 14172, 3 thin sections of 14173, 2 thin sections of 14174, and 2 thin sections of 14175.

Table 1. Chemical composition.

	14169		14169		14170		14172		14173	
reference	Eldridge72		Simonds77		Eldridge72		Warren80		Simonds77	
weight			clast				clast		clast	
SiO2 %			47.35	(b)			43	(a)	41.78	(b)
TiO2			1.52	(b)			0.06	(a)	0.89	(b)
Al2O3			17	(b)			24.2	(a)	7.12	(b)
FeO			10.05	(b)			4.08	(a)	21.21	(b)
MnO							0.046	(a)		
MgO			10.47	(b)			15.4	(a)	22.82	(b)
CaO			10.53	(b)			12.9	(a)	5.24	(b)
Na2O			0.75	(b)			0.38	(a)	0.2	(b)
K2O	0.66	(a)	0.43	(b)	0.705	(a)	0.053	(a)	0.13	(b)
P2O5										
S %										
sum										
Sc ppm							2.99	(a)		
V										
Cr			3068	(b)			251	(a)	3626	(b)
Co							28.8	(a)		
Ni							28	(a)		
Cu										
Zn							1	(a)		
Ga										
Ge ppb							17	(a)		
As										
Se										
Rb										
Sr										
Y										
Zr							350	(a)		
Nb										
Mo										
Ru										
Rh										
Pd ppb										
Ag ppb										
Cd ppb										
In ppb										
Sn ppb										
Sb ppb										
Te ppb										
Cs ppm										
Ba							450	(a)		
La							7.9	(a)		
Ce							18.6	(a)		
Pr										
Nd							12	(a)		
Sm							2.61	(a)		
Eu							2.34	(a)		
Gd										
Tb							0.52	(a)		
Dy										
Ho										
Er										
Tm										
Yb							1.58	(a)		
Lu							0.25	(a)		
Hf							0.75	(a)		
Ta							0.18	(a)		
W ppb										
Re ppb							0.034	(a)		
Os ppb										
Ir ppb							0.07	(a)		
Pt ppb										
Au ppb							0.03	(a)		
Th ppm	14.2	(a)			14.9	(a)	0.75	(a)		
U ppm	3.9	(a)			4.1	(a)	0.13	(a)		

technique: (a) radiation counting, (b) e. probe

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