

70135
Ilmenite Basalt
446 grams



Figure 1: Photo of 70135. Sample is about 10 cm across. NASA S72-56380. Note the dirty surface.

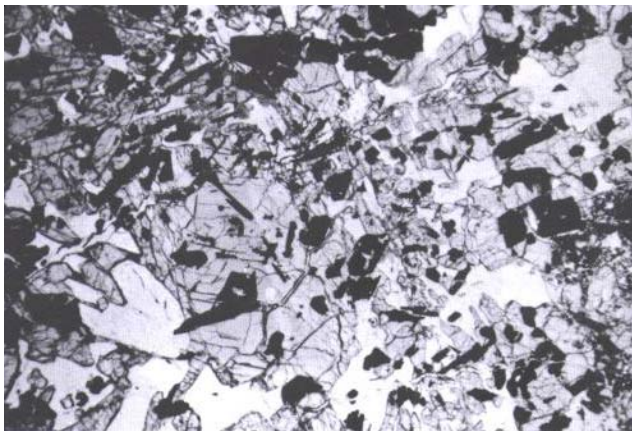


Figure 2: Photomicrograph of thin section of 70135 from Wolfe et al. (1981). Field of view is 6 mm.

Introduction

70135 was collected from Geophone Rock, along with other smaller pieces (70136 to 70158) (figure 3). Geophone Rock was about 3 meters high and was

located at the ALSEP station about 150 m from the LM. It is a vesicular high-Ti basalt typical of the Apollo 17 site with a crystallization age of about 3.7 b.y. and an exposure age of about 110 m.y.

Part of the interest in Geophone Rock was that it was expected that it would be covered with the mysterious “dark mantle”, but the astronauts were unable to recognize such (see transcript).

Petrography

Brown et al. (1975) and others described 70135 as “plagioclase-poikilitic” (figure 4). Small olivine grains are found poikilitically enclosed in pyroxene and plagioclase. Rare armalcolite is found poikilitically enclosed in pyroxene. Roedder and Weiblen (1975) studied the silicate melt inclusions found trapped in ilmenite. Metallic iron and troilite are found in the mesostasis.



Figure 3: Geophone Rock, located at the ALSEP site, about 150 meters from the LM, is ~ 3 meters high. Samples 70135 to 70155 were from the area indicated. NASA photo S17-147-22536.

LMP Bag 10 echo (70135) is a sample of a very large boulder that's just beyond geophone 3. It's the same kind of rock I saw near the LM – and the Gabbro – I'm beginning to lean towards 50% plagioclase, though. I see no clear alignment of plagioclase or pyroxene in it. That's the one with the parting in it. It looks as if – integrating what I've seen here and over at the big rock – the geophone rock – that the layering or the foliation or the parting, whichever it is, is the result of variations in vesicle concentrations. The sample 10 echo (70135) is a sample of the more coarsely vesicular rock. I could not get one of the finer – more finely or nonvesicular fragments. But I got pictures of it.

Neal et al. (1989) and Neal and Taylor (1993) reported on the mineralogy and petrography of the smaller samples from this same basaltic boulder.

Mineralogy

Pyroxene: Although mineral chemistry for 70135 is unknown, Neal et al. (1989) and Neal and Taylor (1993) reported pyroxene compositions of some of the smaller fragments (summarized in figure) that were also sampled from Geophone Rock.

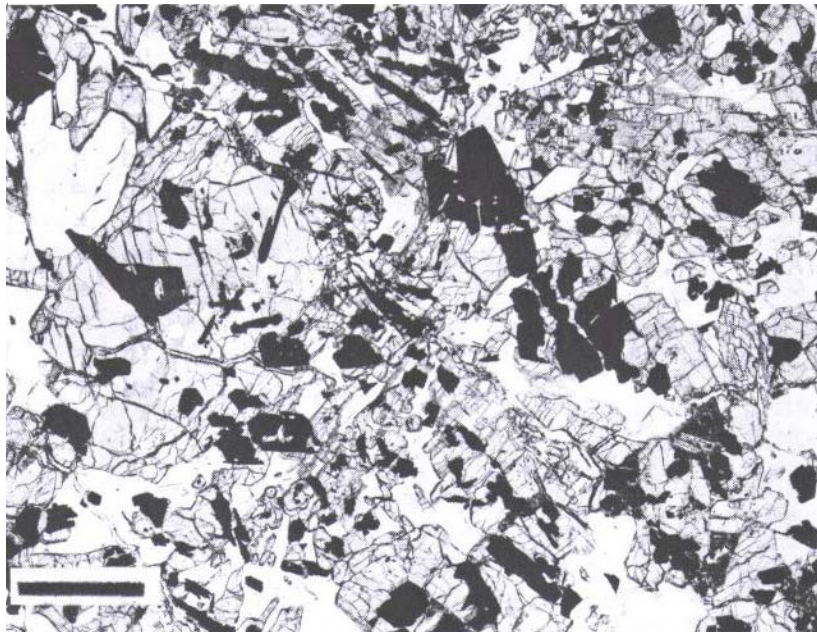


Figure 4: Photomicrograph of thin section of 70135 (from Lofgren and Lofgren 1981). Scale is 1 mm.

Opagues: El Goresy and Ramdohr (1975) studied the subsolidus reduction of ilmenite and chromite. Analyses of metallic iron are not given.

Rutile: El Goresy and Ramdohr (1975) gave analyses of rutile in 70135 (table 4) and noted that Zr was enriched. Neal et al. (1989) also reported rutile in 70138. It apparently forms by exsolution from early formed ilmenite.

Chemistry

Rhodes et al. (1976), Laul et al. (1974), Rose et al. (1975), Shih et al. (1975), Korotev and Haskin (1975), and Dickinson et al. (1989) found widely variable results (table 1). Something is wrong (figure 7). Either the samples included the soil seen attached in figure 1, or there was a mistake in sample numbers. Korotev and Haskin (1975) discussed the sample size limitations. The only satisfactory resolution would be to prepare a large clean sample, and create a powder for carefully planned analyses.

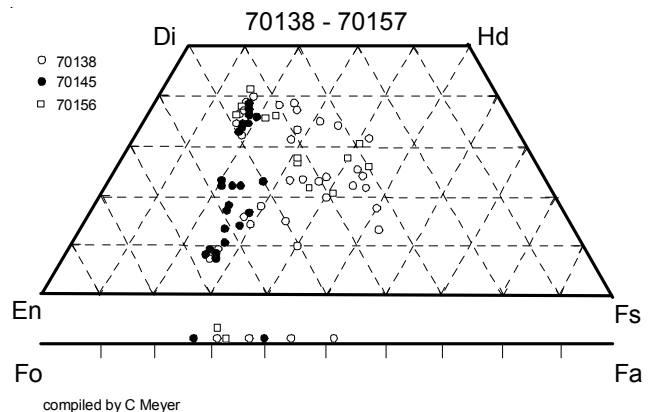


Figure 5: Composition of olivine and pyroxene in samples of Geophone Rock (from Neal and Taylor 1993).

Ma et al. (1979) and Neal et al. (1990) analyzed the smaller fragments also chipped from Geophone Rock (table 2). These analyses were consistent, and may give the best value for Geophone Rock. It is interesting

Mineralogical Mode of 70135

	Roedder and Weiblen 75	Brown et al. 1975	(70138) Neal et al. 1989	(70139) Neal et al. 1989	(70145) Neal et al. 1989
Olivine	3.8	2.8	3	2.5	2
Pyroxene	51.6	46.2	49.7	35.8	42.5
Plagioclase	23	28.4	22.2	41.6	32.5
Oxides	19.4	21.9	24.1	15.8	24.1
Metal	0.2		1	2.4	1.3
Silica	0.6	0.3		1.9	
Mesostasis	1.4	0.4			

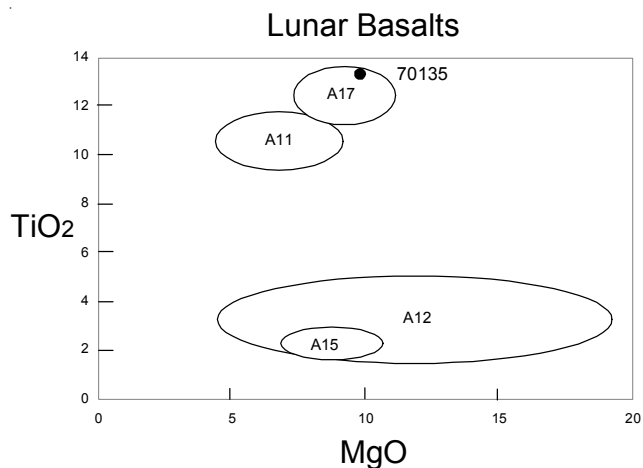


Figure 6: Chemical composition of Apollo basalts with 70135.

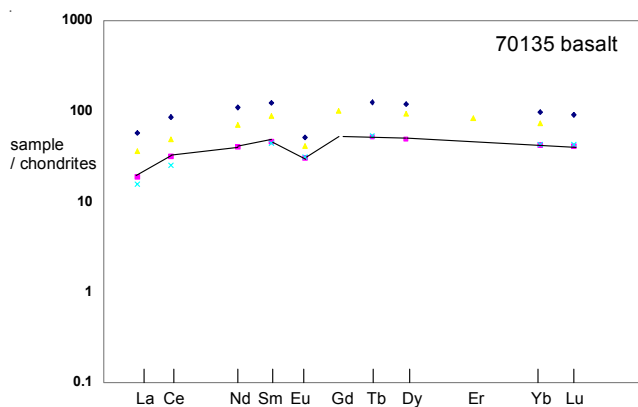


Figure 7: Normalized rare-earth-element diagram for splits of Geophone Rock (table 1 and 2).

to note that classification of these basalt samples varied from type A to type B!

Gibson et al. (1976) reported 1680 ppm sulfur in 70135. Jovanovic and Reed (1975 on) reported on halogens, Ru and Os.

Radiogenic age dating

Nyquist et al. (1975, 1979) dated 70135 by Rb-Sr and Sm-Nd internal mineral isochrons (figures 9 and 10). Paces et al. (1991) reported an age for 70139 from the same rock, as well as whole rock data for 70138 (also from Geophone Rock).

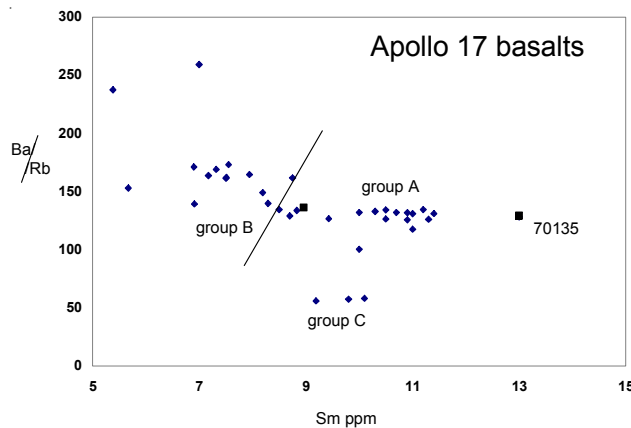


Figure 8: Trace element diagram for Apollo 17 basalts.

Cosmogenic isotopes and exposure ages

Cosmic-ray induced activity of $^{22}\text{Na} = 33$ dpm/kg., $^{26}\text{Al} = 38$ dpm/kg., $^{54}\text{Mn} = 56$ dpm/kg., $^{56}\text{Co} = 56$ dpm/kg. and $^{46}\text{Sc} = 32$ dpm/kg. was determined by radiation counting of 70135 (O'Kelley et al. 1974). Interestingly this high activity could be traced to intense bombardment by solar wind protons on Aug 4-9, 1972, prior to the Apollo 17 mission.

The exposure age by ^{81}Kr was reported as 106 m.y. by Arvidson et al. (1974).

Other Studies

Brecher (1977) and Cisowski (1983) reported on the magnetic properties of 70135. This magnetic data is interesting in light of the reduced iron found in this rock.

Processing

A small slab (1 cm thick) was cut from one end of 70135 (figure 11). There are 10 thin sections.

Summary of Age Data for 70135

	Rb/Sr	Sm/Nd
Nyquist et al. 1975	3.75 ± 0.09 b.y.	
Nyquist et al. 1979		3.77 ± 0.06
Paces et al. 1991		3.71 ± 0.12

Caution: Beware changing decay constants!

Table 4: Rutile (ElGoresy and Ramdohr 1975)

TiO ₂	97.8	98.9	97	98.6	97.9	98.3	99.5	99.8
FeO	0.93	0.81	0.72	0.59	0.72	0.86	0.79	0.81
MgO	0.04	0.04	0.03	0.06	0.03		0.05	0.07
Cr ₂ O ₃	0.23	0.23	0.38	0.23	0.38	1.54	0.27	0.34
ZrO ₂	0.82	0.65	0.64	0.32	1.09	1.31	0.84	0.91

Table 1a. Chemical composition of 70135.

reference weight	Rhodes76	Laul 74 231 mg	Rose75	Duncan75	Shih75 Wiesmann 76	Dickinson89	O'Kelly Eldridge74	Korotev75 averages	finer	coarse
SiO2 %	37.85	(a)	38.6	(c) 37.68	(a)					
TiO2	13.34	(a) 13.8	(b) 13.33	(c) 13.83	(a)					
Al2O3	7.34	(a) 7	(b) 8.88	(c) 7.53	(a)					
FeO	19.68	(a) 21.8	(b) 18.97	(c) 19.74	(a)	14.7	16.3	(b)	19	18.7 (b)
MnO	0.29	(a) 0.27	(b) 0.29	(c) 0.26	(a)					
MgO	9.29	(a) 9	(b) 9.45	(c) 10	(a)					
CaO	10.18	(a) 8.7	(b) 9.82	(c) 9.8	(a)	11.5	10.4	(b)		
Na2O	0.34	(a) 0.4	(b) 0.36	(c) 0.4	(a)	0.31	0.34	(b)		
K2O	0.09	(a) 0.11	(b) 0.06	(c) 0.051	(a) 0.09	(d)		0.06	(e) 0.406	0.397 (b)
P2O5	0.07	(a)	0.04	(c) 0.077	(a)					
S %	0.15	(a)		0.191	(a)					
sum										
Sc ppm		82	(b) 86	(c)	81.7	(d) 77	75	(b)	79.4	84.3 (b)
V		120	(b) 65	(c) 127	(a)	339	480	(b)		
Cr	3760	(a) 3462	(b) 3350	(c) 4351	(a)	4300	3700	(b)	4515	4730 (b)
Co		20	(b) 29	(c) 20	(a) 16.6	(d) 15	17	(b)	22.7	19 (b)
Ni			<1	(c)						
Cu			32	(c)						
Zn			4.1	(c)						
Ga			7	(c)		16		(b)		
Ge ppb						1	2	(b)		
As										
Se										
Rb			<1	(c) <1.4	(a) 0.819	(d)				
Sr			152	(c) 165	(a) 186	(d)				
Y			99	(c) 103	(a)					
Zr			230	(c) 299	(a) 319	(d)	190	(b)		
Nb			<10	(c) 26.3	(a)					
Mo										
Ru										
Rh										
Pd ppb										
Ag ppb										
Cd ppb										
In ppb										
Sn ppb										
Sb ppb										
Te ppb										
Cs ppm										
Ba		210	(b) 210	(c) 113	(a) 105	(d)	86	(b)		
La		12.6	(b) <10	(c)	8.49	(d) 3.8	7.5	(b)	3.64	4.94 (b)
Ce		52	(b)		29.4	(d) 12	25	(b)	15.1	19.2 (b)
Pr										
Nd		50	(b)		31.6	(d) 32	23	(b)		
Sm		18	(b)		13	(d) 6.3	11	(b)	6.48	8.16 (b)
Eu		2.84	(b)		2.3	(d) 1.3	1.8	(b)	1.72	1.72 (b)
Gd					19.6	(d)				
Tb		4.5	(b)			1.9	3	(b)	1.94	2.46 (b)
Dy		29	(b)		22.6	(d)				
Ho										
Er					13.2	(d) 0.59		(b)		
Tm						1.5	0.63	(b)		
Yb		16	(b) 10	(c)	11.9	(d) 6.9	9.3	(b)	7.02	7.92 (b)
Lu		2.2	(b)			1.1	1.5	(b)	1.04	1.06 (b)
Hf		14	(b)			8.9	8.6	(b)	1.04	7.4 (b)
Ta		2.6	(b)			1.4	1.8	(b)	1.66	1.56 (b)
W ppb										
Re ppb										
Os ppb										
Ir ppb										
Pt ppb										
Au ppb										
Th ppm		0.3	(b)			1.7	0.44	(b) 0.31	(e)	
U ppm								0.12	(e)	

technique: (a) XRF, (b) INAA, (c) mixed, (d) IDMS, (e) radiation counting

Table 1b. Chemical composition of 70135.

reference Neal2001

weight

SiO₂ %

TiO₂

Al₂O₃

FeO

MnO

MgO

CaO

Na₂O

K₂O

P₂O₅

S %

sum

Sc ppm	70	(a)
V	103	(a)
Cr	3124	(a)
Co	28	(a)
Ni	3.35	(a)
Cu	36.5	(a)
Zn	75	(a)
Ga	3.32	(a)
Ge ppb		
As		
Se		
Rb	0.52	(a)
Sr	167	(a)
Y	99	(a)
Zr	256	(a)
Nb	19	(a)
Mo	30	(a)
Ru		
Rh		
Pd ppb		
Ag ppb		
Cd ppb		
In ppb		
Sn ppb		
Sb ppb	30	(a)
Te ppb		
Cs ppm		
Ba	56	(a)
La	4.28	(a)
Ce	17.1	(a)
Pr	2.87	(a)
Nd	18.6	(a)
Sm	7.94	(a)
Eu	1.72	(a)
Gd	11.8	(a)
Tb	2.17	(a)
Dy	13.7	(a)
Ho	2.76	(a)
Er	7.85	(a)
Tm	1.06	(a)
Yb	7.67	(a)
Lu	1.05	(a)
Hf	6.77	(a)
Ta	1.4	(a)
W ppb	90	(a)
Re ppb		
Os ppb		
Ir ppb		
Pt ppb		
Au ppb		
Th ppm	0.23	(a)
U ppm	0.09	(a)

technique: (a)ICP-MS

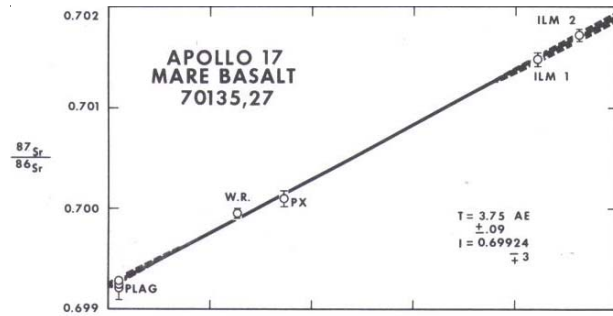


Figure 9: Rb - Sr internal isochron for 70135 (Nyquist et al. 1975).

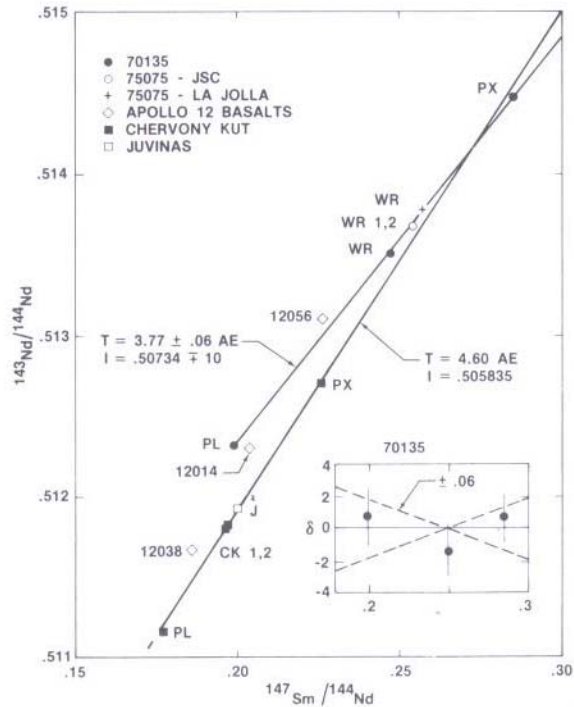


Figure 10: Sm - Nd internal mineral isochron for 70135 (Nyquist et al. 1979).

Table 3: Other pieces of Geophone Rock

	weight (g)
70135	446.3
70136	10.65
70137	6.16
70138	3.66
70139	3.16
70145	3.07
70146	1.71
70147	1.35
70148	0.92
70149	0.95
70155	0.77
70156	0.63
70157	0.57

Table 2: Other pieces of Geophone Rock for comparison.

	70136	70137	70138	70139	70145	70146	70147	70148	70155	70156	70157	Ave.	70135																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
reference	Ma79	Ma79	Neal90	Neal90	Neal90	Neal90	Neal90	Neal90	Neal90	Neal90	Neal90		Laul74																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
weight	Warner79																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
SiO2 %														TiO2	11.3	12	12.5	13.1	13.5	13.1	13	12.5	12.4	13.4	13.4	12.7	13.8	Al2O3	11.1	9.2	8.5	8.3	7.8	7.6	8.4	8.1	10.2	9.5	9.8	9	7	FeO	17.2	18	17.9	17.6	19	19.6	17.9	18.2	17.2	18	17.1	18	21.8	MnO	0.218	0.226	0.24	0.23	0.256	0.255	0.231	0.237	0.232	0.239	0.237	0.24	0.27	MgO	9	10	8.2	9.6	8.5	8.8	8.8	8.8	8.7	9.8	9.1	9	9	CaO	10.1	10.3	9.5	10	9.2	9.7	9.2	9.7	9.6	10.5	11.1	9.9	8.7	Na2O	0.486	0.421	0.39	0.36	0.36	0.36	0.39	0.36	0.44	0.39	0.44	0.4	0.4	K2O	0.045	0.048	0.05	0.04	0.08	0.05	0.06	0.05	0.03	0.05	0.06	0.05	0.11	P2O5														S %														sum														Sc ppm	72	77	77	80	82	85	77	79	72	82	77	78	82	V	128	132	134	143	130	126	131	132	130	149	136	134	120	Cr	3366	3654	3430	3810	3440	3450	3530	3720	3380	3910	3670	3580	3462	Co			19.8	26.2	18.4	21.6	22.8	21.6	21.3	21.6	19.3	21.4	20	Ni			4	31	19	5	6	9	78	42	39	26		Cu														Zn														Ga														Ge ppb														As														Se														Rb														Sr			170	180	240		140	170	210	170	130			Y														Zr			230	160	180	250	210	110	130		170			Nb														Mo														Ru														Rh														Pd ppb														Ag ppb														Cd ppb														In ppb														Sn ppb														Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14	
TiO2	11.3	12	12.5	13.1	13.5	13.1	13	12.5	12.4	13.4	13.4	12.7	13.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Al2O3	11.1	9.2	8.5	8.3	7.8	7.6	8.4	8.1	10.2	9.5	9.8	9	7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
FeO	17.2	18	17.9	17.6	19	19.6	17.9	18.2	17.2	18	17.1	18	21.8																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
MnO	0.218	0.226	0.24	0.23	0.256	0.255	0.231	0.237	0.232	0.239	0.237	0.24	0.27																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
MgO	9	10	8.2	9.6	8.5	8.8	8.8	8.8	8.7	9.8	9.1	9	9																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
CaO	10.1	10.3	9.5	10	9.2	9.7	9.2	9.7	9.6	10.5	11.1	9.9	8.7																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Na2O	0.486	0.421	0.39	0.36	0.36	0.36	0.39	0.36	0.44	0.39	0.44	0.4	0.4																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
K2O	0.045	0.048	0.05	0.04	0.08	0.05	0.06	0.05	0.03	0.05	0.06	0.05	0.11																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
P2O5														S %														sum														Sc ppm	72	77	77	80	82	85	77	79	72	82	77	78	82	V	128	132	134	143	130	126	131	132	130	149	136	134	120	Cr	3366	3654	3430	3810	3440	3450	3530	3720	3380	3910	3670	3580	3462	Co			19.8	26.2	18.4	21.6	22.8	21.6	21.3	21.6	19.3	21.4	20	Ni			4	31	19	5	6	9	78	42	39	26		Cu														Zn														Ga														Ge ppb														As														Se														Rb														Sr			170	180	240		140	170	210	170	130			Y														Zr			230	160	180	250	210	110	130		170			Nb														Mo														Ru														Rh														Pd ppb														Ag ppb														Cd ppb														In ppb														Sn ppb														Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																															
S %														sum														Sc ppm	72	77	77	80	82	85	77	79	72	82	77	78	82	V	128	132	134	143	130	126	131	132	130	149	136	134	120	Cr	3366	3654	3430	3810	3440	3450	3530	3720	3380	3910	3670	3580	3462	Co			19.8	26.2	18.4	21.6	22.8	21.6	21.3	21.6	19.3	21.4	20	Ni			4	31	19	5	6	9	78	42	39	26		Cu														Zn														Ga														Ge ppb														As														Se														Rb														Sr			170	180	240		140	170	210	170	130			Y														Zr			230	160	180	250	210	110	130		170			Nb														Mo														Ru														Rh														Pd ppb														Ag ppb														Cd ppb														In ppb														Sn ppb														Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																													
sum														Sc ppm	72	77	77	80	82	85	77	79	72	82	77	78	82	V	128	132	134	143	130	126	131	132	130	149	136	134	120	Cr	3366	3654	3430	3810	3440	3450	3530	3720	3380	3910	3670	3580	3462	Co			19.8	26.2	18.4	21.6	22.8	21.6	21.3	21.6	19.3	21.4	20	Ni			4	31	19	5	6	9	78	42	39	26		Cu														Zn														Ga														Ge ppb														As														Se														Rb														Sr			170	180	240		140	170	210	170	130			Y														Zr			230	160	180	250	210	110	130		170			Nb														Mo														Ru														Rh														Pd ppb														Ag ppb														Cd ppb														In ppb														Sn ppb														Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																											
Sc ppm	72	77	77	80	82	85	77	79	72	82	77	78	82																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
V	128	132	134	143	130	126	131	132	130	149	136	134	120																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Cr	3366	3654	3430	3810	3440	3450	3530	3720	3380	3910	3670	3580	3462																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Co			19.8	26.2	18.4	21.6	22.8	21.6	21.3	21.6	19.3	21.4	20																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Ni			4	31	19	5	6	9	78	42	39	26																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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Zn														Ga														Ge ppb														As														Se														Rb														Sr			170	180	240		140	170	210	170	130			Y														Zr			230	160	180	250	210	110	130		170			Nb														Mo														Ru														Rh														Pd ppb														Ag ppb														Cd ppb														In ppb														Sn ppb														Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																													
Ga														Ge ppb														As														Se														Rb														Sr			170	180	240		140	170	210	170	130			Y														Zr			230	160	180	250	210	110	130		170			Nb														Mo														Ru														Rh														Pd ppb														Ag ppb														Cd ppb														In ppb														Sn ppb														Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																											
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Mo														Ru														Rh														Pd ppb														Ag ppb														Cd ppb														In ppb														Sn ppb														Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																									
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In ppb														Sn ppb														Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Sn ppb														Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Sb ppb														Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Te ppb														Cs ppm			0.11	0.02	0.11	0.07	0.04	0.11	0.11	0.16	0.12	0.08		Ba			65	67	103	104	76	67	35	65	82	60	210	La	4	4	5.1	3.1	6.2	6.3	4.8	3.7	3	3.1	4.4	4.3	12.6	Ce	15	17	24	13	32	29	22	16	12	14	16	19	52	Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Pr														Nd	18	19	20	15	25	26	18	14	13	14	18	18	50	Sm	6.7	7	7.6	4.8	9.5	9.5	7.1	5.6	4.8	5.2	6.8	6.8	18	Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84	Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Eu	1.85	1.63	1.9	1.4	2.1	2	1.7	1.6	1.7	1.5	1.9	1.7	2.84																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Gd														Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5	Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29	Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
Tb	1.6	1.6	2.1	1.5	2.4	2.7	2.1	1.5	1.7	1.6	1.9	1.9	4.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Dy	11	11	15.8	9.7	18.5	17.4	13.2	11.2	10.5	11.3	13.4	12	29																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
Ho														Er														Tm														Yb	6.2	6.6	7.5	5.4	9.2	9.4	7.2	6.1	5.3	5.6	6.8	6.8	16	Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2	Hf	6.7	6.7	7.3	5.7	8.7	8.8	6.9	6.2	5.4	5.6	6.7	6.8	14	Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6	W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Lu	0.85	0.93	1.12	0.81	1.35	1.33	1.07	0.92	0.78	0.85	0.99	1	2.2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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Ta	1.4	1.5	1.6	1.2	1.7	1.8	1.4	1.4	1.2	1.2	1.4	1.4	2.6																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
W ppb														Re ppb														Os ppb														Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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Ir ppb														Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Pt ppb														Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Au ppb														Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3	U ppm			0.2	0.1	0.5	0.1	0.1	0.3	0.2	0.1		0.14																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
Th ppm			0.1	0.3	0.3	0.1	0.2	0.1	0.1	0.1	0.2	0.14	0.3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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technique: (b) INAA

Table 6

	U ppm	Th ppm	K ppm	Rb ppm	Sr ppm	Nd ppm	Sm ppm
Eldridge 74	0.12	0.31					
Shih 75				0.82	186	31.6	13
Nyquist 75				0.82	186		
Nyquist 79						31.8	13
Paces 91						27.8	11.5
				0.65	182	12.3	5.3
average small	0.14	0.14	500	0.28	146	18	6.8
Korotev 75							6.5
							8.2

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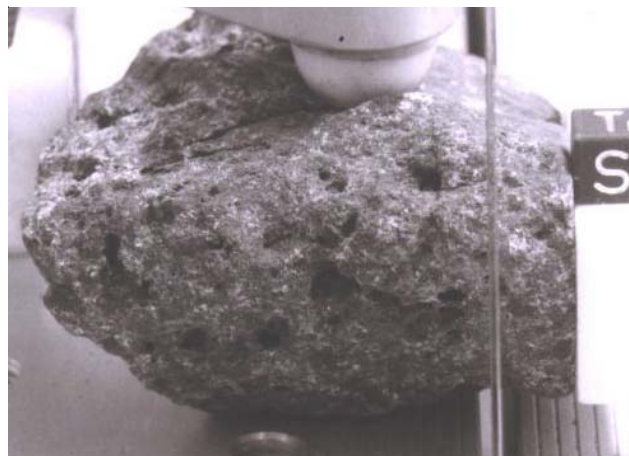


Figure 11: Processing photo of 70135 showing second cut used to prepare slab. Cube is 1 cm.

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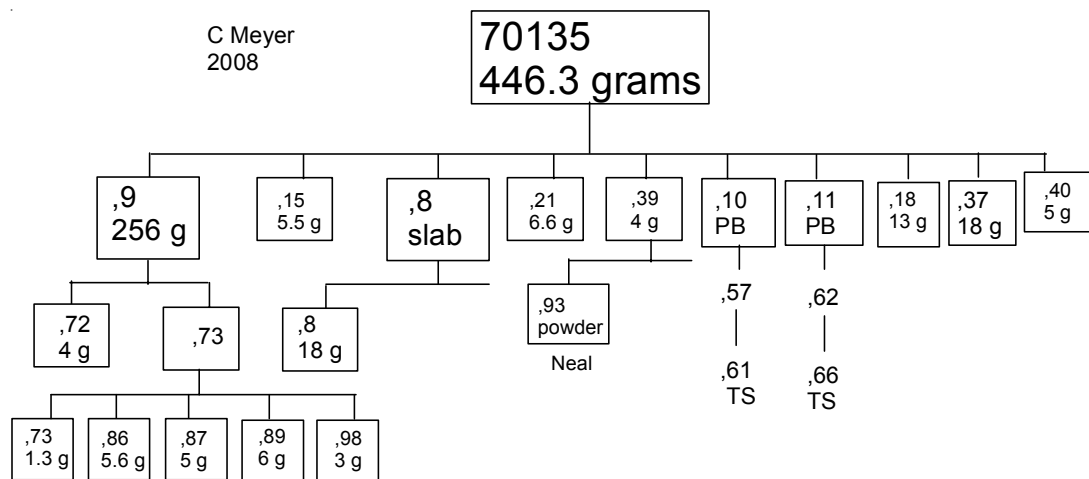
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