TABLE A8.4. Statistical summary of the database for concentrations of frequently determined siderophile elements in mare basalts (MBAS) and in soils and regolith breccias (S&RB) (see section 8.6, Fig. 8.20).

	Fe wt.%	Co µg/g	Ni µg/g	Ge ng/g	Mo ng/g	W ng/g	Re ng/g	Os ng/g	Ir ng/g	Au ng/g
Apollo 11 MBAS										
N	79	10		2	1	3			7	6
Average	15.2	20.6		60	129	357			0.027	0.056
Std. dev.	1.0	9.9				83			0.027	0.035
Minimum	12.8	5.7		60		240			0.005	0.015
Maximum	16.8	38.5		60		430			0.090	0.120
Apollo 12 MBAS										
N	21	31	23	17	4	11	11		2917	
Average	15.7	45.3	46.7	31.8	42.5	161	0.0098		0.060	0.024
Std. dev.	1.0	12.9	39.7	40.5	8.3	55	0.0151		0.051	0.019
Minimum	13.4	25	1	0.7	30	104	0.0004		0.00190.	.0046
Maximum	17.2	69	150	100	50	290	0.056		0.20	0.072
Apollo 14 MBAS										
N	3	2	2	3		2	2	1	3	3
Average	12.8	28.9	21.5	428		350	0.00580	.011	0.021	0.186
Std. dev.	0.8			192					0.018	0.082
Minimum	12.1	28.7	4	175		150	0.0051		0.00150	.11
Maximum	13.9	29.0	39	640		550	0.0066		0.0440	.30
Apollo 15 MBAS										
N	14	22	23	28	1	6	23	3	29	29
Average	15.9	49.6	57.5	11.0	21	342	0.022	0.026	0.043	0.073
Std. dev.	1.7	13.5	28.5	10.2		403	0.072	0.005	0.044	0.082
Minimum	12.9	34.4	16	2.8		59	0.00060	.020	0.0043	0.005
Maximum	18.8	89	150	50		1200	0.36	0.032	0.144	0.36
Apollo 16 MBAS (clast in breccia 60639)										
N	1	1		1			1		1	1
Average	15.55	20		2.53			0.0057		0.048	0.04
Std. dev.										
Minimum										
Maximum										
Apollo 17 MBAS										
N	15	15	6	6	1	10	3		5	9
Average	14.5	19.7	2.0	2.78	39	83.4	0.0018		0.053	0.079
Std. dev.	0.7	2.9	1.1	1.49		16.2	0.0010		0.049	0.088
Minimum	12.6	13.7	1.0	1.27		60	0.0007		0.003	0.007
Maximum	15.5	22.5	3.6	5.7		120	0.0031		0.140	0.26
Luna 16 MBAS										
N	4	4	1							
Average	14.7	18.2	79							
Std. dev.	0.6	2.0								
Minimum	14.0	17.0								
Maximum	15.7	21.7								
Luna 24 MBAS										
N	12	12	5			1				
Average	16.3	40.7	43.0			30				
Std. dev.	0.9	6.3	26.8							
Minimum	14.7	36.0	15							
Maximum	17.4	59.3	80							

TABLE A8.4. (continued).

	Co µg/g	Ni µg/g	Ge ng/g	Sb ng/g	W ng/g	Ru ng/g	Pd ng/g	Re ng/g	Os ng/g	Ir ng/g	Au ng/g
Apollo 11 S&RB											
N	7	5	7		1		4	4	3	9	11
Average	31.0	199	511		220		10.5	0.74	7.83	8.6	2.9
Std. dev.	3.0	48	367				2.3	0.07	0.21	1.9	1.9
Minimum	27.2	150	240				7	0.67	7.6	5.4	1.4
Maximum	34.8	280	1400				13	0.85	8.1	11.6	8.5
Apollo 12 S&RB											
N	21	10	4		5	3	3	7	5	15	18
Average	40.8	260	247		592	47	9.7	0.44	5.2	5.6	2.4
Std. dev.	4.4	165	63		104	30	2.9	0.13	1.6	2.1	1.1
Minimum	34	130	200		450	5.5	6.5	0.25	3.8	2.7	0.82
Maximum	55	730	355		740	71	13.5	0.67	7.5	11	5.7
Apollo 14 S&RB											
N	25	29	8	8	8	2	2	12	1	19	18
Average	34.6	411	671	3.01	1331	19.5	24	1.13	12.0	12.5	6.2
Std. dev.	3.3	101	68	1.13	509			0.14		2.8	2.0
Minimum	27.5	273	590	2	500	17	20	0.86		7.3	2.3
Maximum	43.5	700	790	5.7	1950	22	28	1.34		19	11
Apollo 15 S&RB											
N	51	52	27	8	15	7	2	18	8	38	36
Average	44.6	216	340	1.67	628	15.9	6.5	0.61	6.3	6.4	3.0
Std. dev.	6.5	52	127	0.66	473	6.1	0.3	0.20	1.0	1.8	1.5
Minimum	35.4	90	120	0.85	130	5	6.2	0.2	4.0	2.1	1.0
Maximum	66	360	790	2.7	1800	25	6.8	1.2	7.3	11	8
Apollo 16 S&RB											
N	40	44	33	9	4	8	3	18	6	50	51
Average	27	378	763	1.93	209	18.1	13.3	0.9	5.9	11.6	7.8
Std. dev.	10	151	364	0.94	119	7.4	4.7	0.6	1.4	4.9	3.5
Minimum	9	80	245	0.73	74	9	8.4	0.37	4.5	2.8	1.5
Maximum	59	693	1630	4.23	350	34	19.6	2.6	8.5	26	16.6
Apollo 17 S&RB											
N	69	68	23	8	13	6	3	14		47	59
Average	33.8	211	346	0.93	203	13.3	8.3	0.56		9.7	4.1
Std. dev.	6.7	83	133	0.39	110	5.5	2.4	0.28		4.5	2.5
Minimum	24.5	64	105	0.55	88	3	5	0.052		0.021	0.7
Maximum	68	550	625	1.81	520	19	10	1.07		25	13
Luna 16 S&RB											
N	7	3	2	2		1	1	2		2	4
Average	35.2	174	1300	3.8		20	10.2	3.6		9.7	2.5
Std. dev.	10.3	30									0.5
Minimum	26	132	1300	3.3				3.4		9.6	1.7
Maximum	57.3	200	1300	4.2				3.7		9.8	2.9
Luna 20 S&RB											
N	3	3	3	2	1			2		3	5
Average	30.0	252	448	5.7	100			1.04		9.51	5.4
Std. dev.	2.9	16	26							0.01	2.0
Minimum	27	230	430	1.5				1.04		9.5	3.29
Maximum	34	267	485	9.8				1.04		9.52	7.8

TABLE A8.4. (continued).

	Co µg/g	Ni µg/g	Ge ng/g	Sb ng/g	W ng/g	Ru ng/g	Pd ng/g	Re ng/g	Os ng/g	Ir ng/g	Au ng/g
Luna 24 S&RB											
N	14	13			1	1			1	2	2
Average	49.4	158			53	6.2			7.7	6.9	7.0
Std. dev.	4.1	65									
Minimum	42	90								5.7	5.9
Maximum	60	350								8	8
AMET S&RB											
N	4	4	4		1			4	4	4	4
Average	18.6	159	291		<130			0.53	8.1	6.1	2.8
Std. dev.	1.5	29	83					0.10	0.8	0.7	1.5
Minimum	17	121	200					0.42	7	5	1.07
Maximum	21	198	402		<130			0.66	9	6.8	5.1

Note that data for the highland monomict rocks (HMCT) and polymict breccias (BX) show so much scatter that statistics are practically meaningless. Even among the MBAS and S&RB categories, standard deviations are often very large, and statistical data should be used with caution. For the data listed, standard deviations are not given in those categories where the number of analyses (N) is <3. Abbreviations: g/g = micrograms per gram (parts p million), ng/g = nanograms per gram (parts per billion), N = number of samples, Std. dev. = standard deviation, MBAS = mare basalts, S&RB = soil and regolith breccias, AMET = Antarctic lunar meteorites.

Main sources for data for siderophile element concentrations of rocks (including breccia clasts) and bulk-soil samples: **Fe:** refs. 1, 2, 3, 4, 5, 6, 7; **Co:** refs. 1, 2, 3, 4, 5, 6, 8; **Ni:** refs. 1, 2, 3, 4, 5, 6, 8; **Ge:** refs. 1, 2, 8; **Mo:** refs. 4, 7, 9; **Ru:** refs. 1, 10*; **Rh:** see text; **Pd:** refs. 2, 8; **Sb:** refs. 8; **W:** refs. 2, 4, 5, 11*; **Re:** refs. 1, 2, 8, 11*, 12*; **Os:** refs. 1, 8, 12*; **Ir:** refs. 1, 2 , 3 , 8, 12*; **Pt:** refs. 2; **Au:** refs. 1, 2 , 3 , 5 , 6*, 8, 12*.

References: **1.** J.T. Wasson, P.H. Warren and coworkers (a series of 17 papers published in the *Proceedings of the Lunar Science Conference*, beginning with *Wasson and Baedecker*, 1970, and ending with *Warren et al.* 1987; also several papers published elsewhere: *Wasson et al.* 1973, 1975a; *Boynton et al.* 1976a; *Boynton and Wasson*, 1977); data mostly from INAA and RNAA. **2.** H. Wänke and coworkers; data mostly from INAA and RNAA. **3.** R.A. Schmitt and coworkers (same publications cited in the footnotes to Table A8.3); data mostly from INAA. **4.** *S. R. Taylor et al.* (1971, 1972, 1973a,b); data from spark source mass spectrometry. **5.** *Brunfelt et al.* (1971, 1972a,b, 1973a,b, 1974a,b); data mostly from INAA and RNAA. **6.** H.J. Rose and coworkers (same publications cited in the footnotes to Table A8.3); data mostly from XRF spectrometry. **7.** *Turekian and Kharkar* (1970) and *Kharkar and Turekian* (1971); data mostly from INAA and RNAA. **8.** E. Anders, J.W. Morgan and coworkers (a series of 15 papers published in the *Proceedings of the Lunar Science Conference*, beginning with *Ganapathy et al.*, 1970, and ending with *Wolf et al.*, 1979, also the data of *Morgan et al.*, 1979, published elsewhere); data from RNAA. **9.** *Newsom* (1986); data from RNAA. **10.** *Reed and Jovanovic* (1971, 1972), *Reed et al.* (1972), *Jovanovic and Reed* (1973, 1974), and *Jovanovic et al.* (1978); data from RNAA. **11.** *Michel et al.* (1972); data from RNAA. **12.** *Lovering and Hughes* (1971) and *T.C. Hughes et al.* (1973); data from RNAA. For samples from the U.S.S.R. Luna missions, sources used in addition to those enumerated above are: *Barsukov et al.* (1980), *Blanchard et al.* (1978), *Bobrov et al.* (1980), *Cimbalnikova et al.* (1977), *Gangadharan et al.* (1974), *Gillum et al.* (1972), *Helmke and Haskin* (1972a,b), *Helmke et al.* (1973), *Hubbard et al.* (1977), *Jerome and Philippot* (1973), *Jerome et al.* (1972), *Kolesov and Surkov* (1980), *Kuznetsov et al.* (1979), *Laul and Schmitt* (1973a), *Laul et al.* (1978b, 1981), *Surkov and Kolesov* (1979), and *Vinogradov* (1971, 1973). Essentially all these data were obtained using either INAA or RNAA. For the Antarctic lunar meteorites, *Koeberl et al.* (1989) and *Warren et al.* (1989) list all the published sources used, which are based on INAA and RNAA analysis.

*Only data for soils and regolith breccias were used (data for other types of samples, where reported, frequently appear suspiciously high).
Only data for soils, regolith breccias, and polymict breccias were used (data for mare basalts and monomict highland rocks, where reported, frequently appear suspiciously high).