Table DR1. TH-234 data.

	CORE	upper	lower	days before analysis*		tot. Th-234	1 sigma	supp Th-234**	1 sigma	xs Th-234	1 sigma
		cm	cm			(dpm/g)	(dpm/g)	(dpm/g)	(dpm/g)	(dpm/g)	(dpm/g)
R1813A	MC1-1	0	1	44		0.36	0.14	0.27	0.22	0.32	0.94
R1813B	MC1-1	1	2	51		0.32	0.16	0.27	0.22	0.21	1.19
R1825A	MC1-4	0	1	60		0.23	0.14	0.27	0.22	-0.22	1.47
R1825B	MC1-4	1	2	62		0.22	0.11	0.27	0.22	-0.31	1.47
R1825C	MC1-4	2	3	38		0.21	0.13	0.27	0.22	-0.17	0.77
R1825Z	MC1-4	25	26	34		0.15	0.13	0.27	0.22	-0.33	0.69
R1816A	MC2-A	0	2	44		0.47	0.18	0.27	0.22	0.70	1.01
R1817A	MC3-1	0	1	41		1.00	0.14	0.27	0.22	2.36	0.85
R1820A	MC4-1	0	1	41		8.15	0.46	0.27	0.22	25.63	1.68
R1820B	MC4-1	1	2	43		4.98	0.29	0.27	0.22	16.20	1.25
R1821A	MC4-3	0	1	31		***8.44***	***0.46***	0.27	0.22	***19.94***	***1.24***
R1821B	MC4-3	1	2	39		2.82	0.23	0.27	0.22	7.83	0.97
R1821C	MC4-3	2	3	70		0.52	0.17	0.27	0.22	1.88	2.11
R1821D	MC4-3	3	4	72		0.63	0.10	0.27	0.22	2.88	1.94
R1821F	MC4-3	5	6	8		0.19	0.13	0.27	0.22	-0.10	0.33
R1821J	MC4-3	9	10	17		-0.04	0.13	0.27	0.22	-0.50	0.42
R1822A	GC1	0	2	53		0.99	0.17	0.27	0.22	3.30	1.28
R1822B	GC2	0	2	57		0.50	0.14	0.27	0.22	1.16	1.36
R1822C	GC3	0	2	57		1.14	0.17	0.27	0.22	4.47	1.43
R1822D	GC4	0	2	62		0.61	0.14	0.27	0.22	2.03	1.58
R1822E	GC5	0	2	63		0.37	0.16	0.27	0.22	0.61	1.67
R1822F	GC6	0	2	62		0.23	0.15	0.27	0.22	-0.23	1.61
R1822G	GC7	0	2	62		0.62	0.15	0.27	0.22	2.10	1.60
R1822H	GC8	0	2	61		0.47	0.13	0.27	0.22	1.13	1.49
R1822I	GC9	0	2	62		0.44	0.18	0.27	0.22	0.98	1.69
R1822J	GC10	0	2	63		1.09	0.17	0.27	0.22	5.02	1.73
R1822K	GC11	0	2	64		0.65	0.14	0.27	0.22	2.39	1.65
R1822L	GC 12	0	2	67		0.84	0.14	0.27	0.22	3.90	1.81

Radionuclide measurements were carried by Dr. Richard Bopp at Rensselear Polytechnique Institute in Troy, New York using a gamma counter with an intrinsic germanium detector (ORTEC GWL-120) and a multichannel analyzer. Blank corrections were applied to each sample based on the analysis of empty sample containers. Background corrections were applied to each radionuclide based on the sample count rate at energies just above and just below each peak of interest. Detector efficiency was calibrated using an NBS sediment standard (River sediment NBS 4350B), a liquid NBS standard (NBS 4953-C) that was used to prepare spiked sediments (G-standards), USDOE Uranium standard CRM 101-A, and secondary standards (D-standard; LGP standard) prepared at the Lamont-Doherty Earth Observatory and calibrated to NBS standards. Data on samples is reported with a standard deviation based on counting statistics. Counting errors associated with nuclide peaks, background regions, and blanks are all included in the calculation of the reported standard deviations.

* xs Th-234 values are reported for all samples that were counted within three half lives (72 days) of collection.
Longer times between sample collection and analysis result in larger relative standard deviations of xs Th-234 results.
The reported xs Th-234 activities have been decay corrected to the dates of core collection.

** The value for supported Th-234 used for all samples was the average from "event-associated" samples counted more than 120 days (5 half lives) after collection. Th-234 data from those analyses are shown on the following worksheet.
Despite the use of only "event-associated samples," there was a significant range of measured Th-234 activity, from less than 0.1 to greater than 0.7 dpm/g, as reflected by the large standard deviation in the average value that was applied to the samples above (0.27 ± 0.22 dpm/g).

BOLD ITALICS - The 0-1 cm sample did not have sufficient mass to fill a counting tube. Total Th-234 activity was quantified based on "partially full" standards. Counting efficiency was adjusted on the basis of partially full Pb-210 standards based on the fact that the full tube efficiencies determined for the two nuclides was almost identical, a result consistent with the fact that the gamma rays rays used in quantification are close in energy.

	CORE	Comment	upper	lower	days before analysis		tot. Th-234	1 sigma
R1821E	MC4-3		4	5	121		0.162	0.133
R1821K	MC4-3		10	11	122		0.230	0.142
R1821P	MC4-3		15	16	120		0.246	0.107
R1822C2	GC3 dup	dup for supp Th-234	0	2	148		0.378	0.155
R1822G2	GC7 dup	dup for supp Th-234	0	2	145		0.410	0.146
R1822J2	GC10 dup	dup for supp Th-234	0	2	141		0.741	0.165
R1822T2	GC 20 dup	dup for supp Th-234	0	2	137		0.743	0.108
R1825AE	MC1-4		3	4	131		0.344	0.136
R1825AJ	MC1-4		4	5	127		-0.091	0.130
R1825AN	MC1-4		5	6	137		0.144	0.139
R1825AT	MC1-4		10	11	136		0.385	0.133
R1825D	MC1-4		15	16	133		0.318	0.100
R1825E	MC1-4		20	21	129		0.154	0.108
R1825F	MC1-4		30	31	139		0.211	0.141
R1825K	MC1-4		35	36	128		0.106	0.144
R1825P	MC1-4		40	41	140		0.074	0.147
R1825U	MC1-4		45	46	135		0.036	0.138
							Ave.	**Std. dev.**
							0.27	0.22

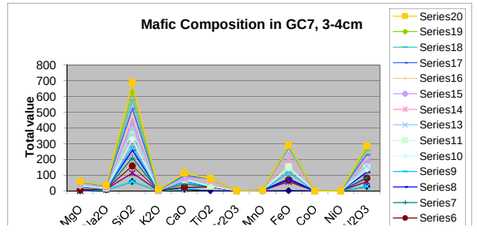
Table DR2. Microprobe data.

FileName : haitised51210.qtiDat
Signal(s) Used : Mg Ka, Na Ka, Si Ka, K Ka, Ca Ka, Ti Ka, Cr Ka, Mn Ka, Fe Ka, Co Ka, Ni Ka, Al Ka
Spectromers Conditions : Sp1 TAP, Sp4 TAP, Sp4 TAP, Sp3 LPET, Sp3 LPET, Sp3 LPET, Sp5 PET, Sp3 LPET, Sp2 LLIF, Sp2 LLIF, Sp2 LLIF, Sp1 TAP
Full Spectromers Conditions : Sp1 TAP(2d= 25.745,K= 0.00218), Sp4 TAP(2d= 25.745,K= 0.00218), Sp4 TAP(2d= 25.745,K= 0.00218), Sp3 LPET(2d= 8.75,K= 0.000144), Sp3 LPET(2d= 8.75,K= 0.000144), Sp3 LPET(2d= 8.75,K= 0.000144), Sp5 PET(2d= 8.75,K= 0.000144), Sp3 LPET(2d= 8.75,K= 0.000144), Sp2 LLIF(2d= 4.0267,K= 0.000058), Sp2 LLIF(2d= 4.0267,K= 0.000058), Sp2 LLIF(2d= 4.0267,K=
Column Conditions : Cond 1 : 15keV 10nA
Date : 13-May-2010
User Name : sx
Setup Name : seds51210b.qtiSet
DataSet Comment : mineral-questionable-c-27cm
Comment :
Analysis Date : 12/05/2010 21:06:42
Project Name : Default Project
Sample Name : Default Sample
Pha Parameter

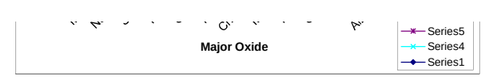
	Bias	Gain	Dtime	Blin	Wind	Mode
Sp1(Mg Ka)	1290	2619	3	560		Inte
Sp4(Na Ka)	1281	2500	3	560		Inte
Sp4(Si Ka)	1279	2563	3	560		Inte
Sp3(K Ka)	1820	799	3	560		Inte
Sp3(Ca Ka)	1819	798	3	560		Inte
Sp3(Ti Ka)	1828	799	3	560		Inte
Sp5(Cr Ka)	1289	859	3	560		Inte
Sp3(Mn Ka)	1830	765	3	560		Inte
Sp2(Fe Ka)	1800	346	3	560		Inte
Sp2(Co Ka)	1800	340	3	560		Inte
Sp2(Ni Ka)	1800	341	3	560		Inte
Sp1(Al Ka)	1290	2552	3	560		Inte

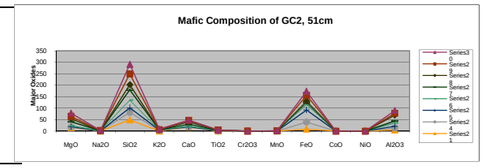
Peak Position : Sp1 38407 (-1150, 1150), Sp4 46339 (-800, 800), Sp4 27738 (750, 1.1), Sp3 42746 (-600, 600), Sp3 38390 (-950, 700), Sp3 31446 (600, 1.05), Sp5 26372 (-500, 500), Sp3 24106 (-550, 550), Sp2 48092 (950, 1.05), Sp2 44445 (-400, 400), Sp2 41189 (-550, 550), Sp1 32394 (800, 1.2)
Current Sample Position : X = 15446 Y = -26259 Z = 136
Standard Name :
Mg On MgO
Na On jd_Mckee
Si On diopside
K On kspar
Ca On Wolls
Ti On TiO2
Cr On MgCr2O4
Mn On Rhodonite
Fe On Hem_Elba
Co On CoS
Ni On NiS
Al On LakeCoPl
Standard composition :
MgO = Mg : 60.31%, O : 39.69%
jd_Mckee = Si : 27.82%, Ti : 0.02%, Al : 13.22%, Fe : 0.05%, Mn : 0.01%, Mg : 0.01%, Ca : 0.07%, Na : 11.19%, K : 0.01%, Cr : 0.01%, O : 47.6%
diopside = Si : 25.93%, Mg : 11.23%, Ca : 18.51%, O : 44.33%
kspar = O : 45.94%, Na : 0.85%, Al : 9.83%, Si : 30.1%, K : 12.39%, Ba : 0.7%
Wolls = O : 41.3203%, Si : 24.1772%, Ca : 34.5026%
TiO2 = Ti : 59.95%, O : 40.05%
MgCr2O4 = Mg : 12.64%, Cr : 54.08%, O : 33.28%
Rhodonite = Si : 21.98%, Fe : 1.8%, Ca : 1.06%, Mg : 2.36%, Mn : 35.01%, O : 37.73%
Hem_Elba = Fe : 69.94%, O : 30.06%
CoS = Co : 64.76%, S : 35.24%
NiS = Ni : 64.68%, S : 35.32%
LakeCoPl = Si : 23.95%, Ti : 0.03%, Al : 16.36%, Fe : 0.35%, Mn : 0.008%, Mg : 0.08%, Ca : 9.748%, Na : 2.56%, K : 0.15%, O : 46.764%
Calibration file name (Element intensity cps/nA) :
Mg : MgO_MgSp1_001.calDat (Mg : 1069.1 cps/nA)
Na : jd_Mckee_NaSp4_014.calDat (Na : 79.8 cps/nA)
Si : diopside_SiSp4_002.calDat (Si : 440.0 cps/nA)
K : kspar_K Sp3_007.calDat (K : 246.5 cps/nA)
Ca : Wolls_CaSp3_011.calDat (Ca : 791.0 cps/nA)
Ti : TiO2_TiSp3_005.calDat (Ti : 1628.5 cps/nA)
Cr : MgCr2O4_CrSp5_004.calDat (Cr : 301.0 cps/nA)
Mn : Rhodonite_MnSp3_007.calDat (Mn : 741.7 cps/nA)
Fe : Hem_Elba_FeSp2_010.calDat (Fe : 352.7 cps/nA)
Co : CoS_CoSp2_002.calDat (Co : 327.6 cps/nA)
Ni : NiS_NiSp2_006.calDat (Ni : 335.1 cps/nA)
Al : LakeCoPl_AlSp1_SiSp4_CaSp5_003.calDat (Al : 339.4 cps/nA)
Beam Size : 0 µm

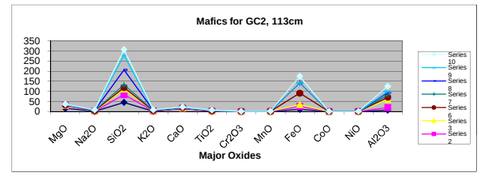
DataSet/Point	MgO	Na2O	SiO2	K2O	CaO	TiO2	Cr2O3	MnO	FeO	CoO	NiO	Al2O3	Total	X	Y	Z	Beam X	Beam Y	Comment	Distance (µ)	Mean Z	Point#	Date	Mineral
1 / 1 .	0.06968	6.31731	58.93157	0.67465	8.39826	0.05185	0.00001	0.00487	0.63415	0.02205	0.00001	26.51147	101.6159	14236	26988	104			plag-3-4cm		11.50476	1	12/5/2010 16:52	Plagiclase
2 / 1 .	0.0031	0.26425	66.48534	15.58845	0.05283	0.01862	0.0144	0.02207	0.05264	0.04551	0.03102	19.16578	101.744	13203	25411	103			Feldspar-3-4cm		11.97036	2	12/5/2010 16:56	K-Feldspar
3 / 1 .	0.01453	0.00001	94.07495	0.01623	0.12829	0.00252	0.03935	0.01382	0.03812	0.00001	0.03158	0.01226	94.37168	9909	24649	99			quartz-3-4cm		10.21792	3	12/5/2010 17:01	Quartz
4 / 1 .	0.06388	0.03003	0.89191	0.09061	0.25235	25.23046	0.11155	2.40133	57.69859	0.00001	0.00001	3.11354	89.88428	10662	25767	101			fayalite-3-4cm		17.84913	4	12/5/2010 17:05	Titano-Magnetite
5 / 1 .	0.18918	3.94211	53.04301	0.1024	13.22328	0.11329	0.0101	0.02736	0.72912	0.00001	0.00001	29.50274	100.8826	10593	25792	101			pryox?-3-4cm		11.69089	5	12/5/2010 17:09	Plagioclase
6 / 1 .	7.10732	0.0985	45.38742	1.11952	0.49211	0.13403	0.00001	0.03636	11.18232	0.04508	0.02111	22.10056	87.72434	10704	25670	101			plag2-3-4cm		10.78442	6	12/5/2010 17:13	
7 / 1 .	16.46989	0.22809	51.58336	0.00001	20.32568	0.87641	0.85542	0.16109	6.35043	0.03069	0.08445	3.69001	100.6555	9967	25443	101			MgCa-3-4cm		12.83711	7	12/5/2010 17:17	Diaposide
8 / 1 .	0.16931	2.32123	48.77227	0.02648	16.0516	0.0335	0.00001	0.02214	0.66761	0.00001	0.01556	32.96736	101.0471	9764	25268	103			highAlSi-3-4cm		11.86038	8	12/5/2010 17:21	Plagioclase
9 / 1 .	0.52796	0.06635	22.216	0.1767	0.36467	1.97381	0.08767	0.22807	41.5819	0.00001	0.06223	18.81819	86.10356	9845	24986	103			?-3-4cm		14.10394	9	12/5/2010 17:26	Fayalite
10 / 1 .	7.84828	0.25071	48.02812	0.03162	13.11515	0.97162	0.01596	0.57567	25.24263	0.00001	0.03875	1.51812	97.63665	8683	19980	93			Clast1-3-4cm		14.21766	10	12/5/2010 17:30	amphibole
11 / 1 .	7.77957	4.82498	55.97705	1.20715	2.49007	0.14511	0.00001	0.0369	10.07607	0.01461	0.06493	16.21124	98.82768	8724	19963	93			Clast2-3-4cm		11.96315	11	12/5/2010 17:34	amphibole
12 / 1 .	0.13105	1.15578	14.25979	0.0486	2.9422	0.0305	0.00001	0.00358	0.52988	0.00001	0.00001	5.90194	25.00336	8675	20006	93			Clast3-3-4cm		2.9192	12	12/5/2010 17:38	Poor Data
13 / 1 .	1.62741	1.52159	13.59062	0.20858	0.77578	25.46341	0.00617	0.30038	46.57713	0.01349	0.03052	3.78631	93.9014	8740	19986	93			Clast4-3-4cm		16.85318	13	12/5/2010 17:42	Titano-Magnetite
14 / 1 .	0.50153	2.95859	34.05154	0.33168	4.94911	2.07106	0.09516	0.061	3.48139	0.05565	0.00001	35.10335	83.66009	7332	20256	93			mafic1-3-4cm		9.79708	14	12/5/2010 17:46	plagioclase

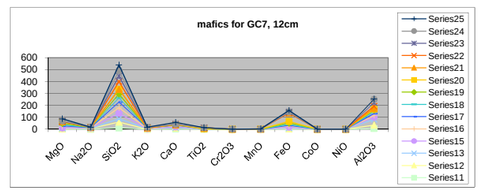


DataSet/Point	MgO	Na2O	SiO2	K2O	CaO	TiO2	Cr2O3	MnO	FeO	CoO	NiO	Al2O3	Total	X	Y	Z	Beam X	Beam Y	Comment	Distance (µ)	Mean Z	Point#	Date	Mineral
15 / 1 .	0.19358	0.29418	6.81462	0.11349	4.03725	19.70019	0.06213	1.45344	52.62147	0.00797	0.04467	3.12921	88.47221	7329	20270	93			mafic2-3-4cm		16.94186	15	12/5/2010 17:50	Titano-Magnetite
16 / 1 .	3.39392	3.48045	43.41298	0.58403	8.09326	0.18254	0.02552	0.06458	4.88181	0.00001	0.00001	19.50152	83.62062	5816	20709	93			mafic3-3-4cm		10.03966	16	12/5/2010 17:54	pryoxene
17 / 1 .	7.2116	3.17885	40.86985	0.99063	3.09908	0.18244	0.00001	0.065	10.63078	0.00001	0.06742	13.06992	79.36559	5816	20711	92			mafic4-3-4cm		9.96415	17	12/5/2010 17:59	pryoxene
18 / 1 .	0.15951	4.1361	54.31604	0.37076	11.90964	0.09061	0.00288	0.00879	1.11424	0.00001	0.03118	28.7056	100.8454	5751	20721	92			mafic5-3-4cm		11.67161	18	12/5/2010 18:03	Plagioclase
19 / 1 .	6.07923	0.64907	47.84573	1.7188	0.85315	0.51687	0.04446	0.02934	16.88981	0.02738	0.00001	13.40652	88.06038	5274	21392	93			mafic6-3-4cm		11.552	19	12/5/2010 18:07	amphibole
20 / 1 .	0.07719	0.49439	64.0483	1.31041	4.7149	0.00002	0.03052	0.00001	0.07986	0.01189	0.00001	14.8106	85.57809	6455	21859	93			mineral-3-4cm		9.58763	20	12/5/2010 18:11	Plagioclase
21 / 1 .	15.49162	0.25615	48.9898	0.02282	18.14956	0.54865	0.14681	0.23938	8.69954	0.02044	0.03238	4.79029	97.38742	-13833	23620	134			Mineral-51cm		12.5487	21	12/5/2010 18:15	Diopside
22 / 1 .	0.15478	0.08308	94.79498	0.03559	0.1367	0.00002	0.00001	0.00461	0.23799	0.01046	0.00001	3.22046	98.67868	-13448	23620	134			Felsic1-51cm		10.69413	22	12/5/2010 18:19	quartz
23 / 1 .	2.70411	0.10789	79.87463	0.36694	0.17004	0.03312	0.03554	0.00292	5.69849	0.00001	0.05699	5.36001	94.41069	-13448	23635	134			Felsic2-51cm		10.86386	23	12/5/2010 18:24	K-Feldspar
24 / 1 .	2.10057	0.1475	33.1946	3.16133	0.31514	0.58754	0.06793	0.14802	30.71411	0.014	0.01234	9.14641	79.60947	-13150	22741	134			Pryox?-51cm		12.28904	24	12/5/2010 18:28	FeAlSiO
25 / 1 .	1.84401	0.24871	19.18277	1.76473	0.30341	0.71782	0.02854	0.18199	52.6703	0.00942	0.00001	7.23979	84.1915	-13116	22749	134			Pryox?2-51cm		15.16018	25	12/5/2010 18:32	FeAlSiO
26 / 1 .	4.04821	0.80506	33.80934	1.15215	2.23144	1.62096	0.01819	0.14437	24.05739	0.04955	0.02071	14.39928	82.35664	-12845	27180	126			mafic1-51cm		11.86361	26	12/5/2010 18:36	FeAlSiO
27 / 1 .	17.90824	0.18136	44.34949	0.04457	9.39098	0.37618	0.02383	0.20409	8.7809	0.00001	0.0296	8.77998	90.06924	-12834	27274	126			mafic2-51cm		11.22144	27	12/5/2010 18:40	Diopside
28 / 1 .	12.95422	0.07367	22.37106	0.05271	10.16948	0.42416	0.08011	0.13966	6.22112	0.00001	0.00001	25.2076	77.69382	-12892	27265	126			mafic3-51cm		9.63424	28	12/5/2010 18:44	Augite
29 / 1 .	9.96619	1.01519	46.99451	0.63134	6.22544	0.37313	0.04639	0.55605	24.33148	0.00001	0.00001	8.25347	98.39321	-12652	28425	126			mafic4-51cm		13.77635	29	12/5/2010 18:49	Diopside
30 / 1 .	14.35604	0.46459	41.54247	1.98121	0.77755	0.02842	0.00269	0.13379	18.16167	0.00001	0.00001	11.88874	89.3372	-13834	29673	126			dominatemineral-51cm		11.79227	30	12/5/2010 18:53	amphibole
DataSet/Point	MgO	Na2O	SiO2	K2O	CaO	TiO2	Cr2O3	MnO	FeO	CoO	NiO	Al2O3	Total	X	Y	Z	Beam X	Beam Y	Comment	Distance (µ)	Mean Z	Point#	Date	Mineral
31 / 1 .	15.57957	0.38133	45.02894	0.39438	15.23774	0.54988	0.06287	0.22838	10.89519	0.00436	0.02245	7.16021	95.54528	-12052	-294	143			mafic1-113cm		12.43478	31	12/5/2010 18:57	Diopside
32 / 1 .	13.38102	0.97508	38.35534	1.43212	0.58373	0.9958	0.00271	0.04809	14.41046	0.00001	0.03221	12.4962	82.71278	-12023	-297	143			mafic2-113cm		10.66021	32	12/5/2010 19:01	Diopside
33 / 1 .	1.81019	1.29646	27.07497	1.69586	2.12719	1.26429	0.0083	0.108	9.32034	0.0261	0.00001	39.63042	84.36212	-12035	-269	143			mafic3-113cm		10.39601	33	12/5/2010 19:05	Al Si
34 / 1 .	0.12317	0.0923	65.99103	15.66567	0.05509	0.03758	0.02025	0.00913	0.38821	0.00001	0.00001	19.63429	102.0168	-12003	-318	143			TiMagnetite-113cm		12.03283	34	12/5/2010 19:09	K-Feldspar
35 / 1 .	0.08257	0.1389	66.69337	15.53702	0.03273	0.01037	0.00001	0.02669	0.46973	0.01178	0.0495	19.54215	102.5948	-11992	-308	143			mafic4-113cm		12.10148	35	12/5/2010 19:13	K-Feldspar
36 / 1 .	0.87959	0.14772	8.2147	0.34122	1.23552	0.72288	0.08483	0.29965	55.90192	0.00001	0.00925	10.8776	78.71489	-12775	-270	143			mafic5-113cm		14.90942	36	12/5/2010 19:17	Magnetite
37 / 1 .	1.46581	0.15473	13.25434	0.62409	1.06708	1.40826	0.07085	0.27668	50.14434	0.00001	0.00001	11.35336	79.81956	-12760	-284	143			mafic6-113cm		14.42335	37	12/5/2010 19:22	Magnetite
38 / 1 .	0.03267	2.76548	74.88928	1.71321	0.58536	0.00002	0.00726	0.00229	0.11203	0.00001	0.01858	12.61262	92.73883	-14345	199	143			mineral-113cm		10.14185	38	12/5/2010 19:26	Al Si
39 / 1 .	0.50278	1.42534	72.11053	1.09481	0.32821	0.00002	0.01161	0.02395	0.68923	0.0134	0.03722	4.41484	80.65192	-16707	870	143			Quartz-113cm		8.87204	39	12/5/2010 19:30	?
40 / 1 .	2.66833	0.73593	27.54929	1.04772	0.7435	1.71835	0.07333	0.25383	32.71589	0.02523	0.05485	25.87722	93.46346	-17437	2099	143			Spinel??-113cm		13.95016	40	12/5/2010 19:34	Al Si
41 / 1 .	1.57901	0.18445	10.73179	0.16519	1.02479	0.13879	0.00001	0.01956	2.07654	0.00438	0.02819	4.55755	20.51025	-17448	2128	143			plag-113cm		2.51742	41	12/5/2010 19:38	bad data
42 / 1 .	0.19373	5.05542	49.32062	0.22771	9.40382	0.25025	0.00001	0.03094	0.96241	0.00001	0.00001	28.88375	94.32867	13163	2510	34			HyperTi-12cm		10.79806	42	12/5/2010 19:43	Plagioclase
43 / 1 .	6.05606	0.55502	26.73717	2.786	0.63706	0.33856	0.02247	0.06907	5.98565	0.00001	0.00001	48.18108	91.36816	13164	2537	34			Ti?-12cm		10.67921	43	12/5/2010 19:47	Plagioclase
44 / 1 .	7.57674	0.53259	19.42823	0.83278	1.08342	7.31198	0.00001	0.94857	20.92487	0.00001	0.00276	36.17976	94.82174	13162	2542	21			Ti?rim-12cm		13.11831	44	12/5/2010 19:51	Plagioclase
45 / 1 .	2.45979	4.7123	47.00005	0.80676	6.68425	0.37504	0.00001	0.07322	8.10915	0.02043	0.00001	19.19285	89.43385	13152	2546	21			plag-12cm		10.97064	45	12/5/2010 19:55	Plagioclase
46 / 1 .	13.78463	0.37365	45.37747	0.05944	15.05973	1.10824	0.086	0.20156	8.59208	0.0511	0.00282	14.03612	98.73282	13099	2472	21			plagpartner-12cm		12.51971	46	12/5/2010 19:59	Diopside
47 / 1 .	2.29517	2.34968	48.04763	5.7721	1.49772	0.27942	0.02267	0.04875	4.67733	0.00001	0.06071	15.60877	80.65996	12593	2837	21			sameol'-12cm		9.67287	47	12/5/2010 20:03	bad data
48 / 1 .	8.54476	0.7364	34.64003	0.40516	0.70573	0.05845	0.04672	0.00001	9.95819	0.01599	0.06754	20.20149	75.38046	10942	2378	21			quartz-12cm		9.27286	48	12/5/2010 20:07	Plagioclase
49 / 1 .	13.39599	0.46673	33.42644	0.21703	0.69102	0.03737	0.00001	0.02317	11.26842	0.03915	0.00281	9.44229	69.01045	10957	2397	21			Fesulfide-12cm		8.70986	49	12/5/2010 20:12	amphibole
50 / 1 .	13.89908	0.78547	39.50595	0.63189	1.09858	0.03497	0.00813	0.00001	13.59386	0.00001	0.02246	8.12584	77.70626	10970	2384	21			mineral-12cm		9.9535	50	12/5/2010 20:16	amphibole
51 / 1 .	0.53864	0.11808	0.73988	0.01742	0.13925	8.95394	0.1796	0.34411	71.94746	0.0039	0.00001	7.19403	90.17632	9960	2601	21			AlTi-12cm		18.33796	51	12/5/2010 20:20	Magnetite
52 / 1 .	0.15068	0.33622	63.85816	2.07196	4.34187	0.00769	0.04497	0.00001	0.13724	0.02373	0.00001	17.42843	88.40098	9057	2866	15			elongatedmin-12cm		9.92523	52	12/5/2010 20:24	amphibole
53 / 1 .	5.50851	0.27419	46.6736	1.75021	0.39435	0.06311	0.00141	0.03288	6.52306	0.01466	0.01415	28.78627	90.03641	7913	3619	15			Curious-12cm		10.53313	53	12/5/2010 20:28	amphibole
54 / 1 .	1.77755	0.28062	46.20084	0.96684	0.67237	0.05271	0.00001	0.02178	2.53885	0.00001	0.00001	28.55421	81.0658	7903	3605	15			AlSi-12cm		9.09419	54	12/5/2010 20:33	amphibole
55 / 1 .	16.2	0.24762	47.69258	0.02814	14.16576	0.71168	0.10191	0.32715	11.025	0.03926	0.02107	2.10731	92.66748	7665	3554	15			Diopside?-12cm		12.08617	55	12/5/2010 20:37	Diopside

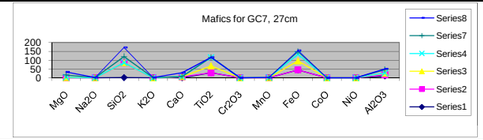




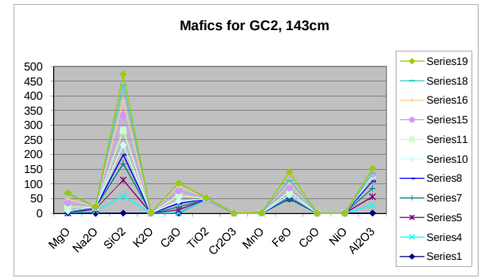




DataSet/Point	MgO	Na2O	SiO2	K2O	CaO	TiO2	Cr2O3	MnO	FeO	CoO	NiO	Al2O3	Total	X	Y	Z	Beam X	Beam Y	Comment	Distance (µ)	Mean Z	Point#	Date	Mineral
56 / 1 .	0.50837	0.24377	1.29136	0.11218	0.39256	28.59247	0.00001	0.27396	44.53661	0.00001	0.02241	10.7449	86.7186	14756	-25841	136			Clast1-a-27cm		15.99033	56	12/5/2010 20:41	Titano-Magnetite
57 / 1 .	0.24478	0.34204	82.68581	0.13353	6.10767	0.10897	0.0029	0.00001	0.76513	0.00001	0.00001	6.77866	97.16953	14728	-25865	136			Clast1-b-27cm		10.93796	57	12/5/2010 20:45	?
58 / 1 .	1.13905	0.15901	0.79743	0.05215	0.31464	38.80014	0.00001	0.7962	50.64383	0.02405	0.03548	8.12673	100.8887	14727	-25847	136			Clast1-c-27cm		18.8276	58	12/5/2010 20:49	Titano-Magnetite
59 / 1 .	1.25452	0.30567	1.52159	0.2962	0.32866	48.13365	0.00127	0.8181	37.78676	0.03092	0.00001	1.85604	92.3334	14731	-25834	136			Clast1-d-27cm		17.01002	59	12/5/2010 20:54	Titano-Magnetite
60 / 1 .	7.79071	0.24085	33.43648	0.11029	0.05213	0.01149	0.00001	0.10865	6.4163	0.03216	0.03536	3.58946	51.82391	14569	-26070	136			mineral-27cm		6.30984	60	12/5/2010 20:58	bad data
61 / 1 .	1.99011	0.16062	9.75081	0.36944	8.34695	0.28241	0.00001	0.09868	2.00459	0.00001	0.00703	33.01481	56.02547	14831	-26572	136			mineral-b-27cm		6.7486	61	12/5/2010 21:02	bad data
62 / 1 .	13.01305	0.08958	34.1481	1.51026	0.92517	0.05157	0.03654	0.03984	14.63697	0.02744	0.03501	19.29407	83.8076	15446	-26259	136			mineral-questionable-c		10.77712	62	12/5/2010 21:06	amphibole
63 / 1 .	17.48598	0.2761	51.30358	0.04885	20.39437	0.53639	0.42231	0.18426	6.71765	0.02342	0.03524	4.32488	101.753	13567	-29260	142			clastr2-a-27cm		12.93945	63	12/5/2010 21:10	amphibole



DataSet/Point	MgO	Na2O	SiO2	K2O	CaO	TiO2	Cr2O3	MnO	FeO	CoO	NiO	Al2O3	Total	X	Y	Z	Beam X	Beam Y	Comment	Distance (µ)	Mean Z	Point#	Date	Mineral
64 / 1 .	0.70888	0.02677	0.0905	0.00437	0.06636	47.71302	0.05229	0.4914	48.72612	0.00001	0.00001	0.22203	98.10177	-13753	-24157	28			mineral-1-143cm		18.77283	64	12/5/2010 21:15	Titano-Magnetite
65 / 1 .	0.00987	0.06168	100.9666	0.02938	0.01619	0.00002	0.00001	0.02767	0.06449	0.0284	0.01868	0.00362	101.2266	-14139	-24077	28			mineral-2-143cm		10.95543	65	12/5/2010 21:19	Quartz
66 / 1 .	0.41237	1.8364	56.14655	3.51413	0.84756	0.00002	0.00001	0.00294	0.69056	0.00296	0.00001	14.71848	78.17199	-14183	-23981	28			mineral-3-143cm		8.75976	66	12/5/2010 21:23	
67 / 1 .	0.01904	8.50965	57.83111	0.05742	0.0717	0.01648	0.00001	0.00001	0.00247	0.00001	0.11981	26.74024	93.36794	-15242	-23889	28			mineral-4-143cm		10.02075	67	12/5/2010 21:27	Plagioclase
68 / 1 .	0.07447	5.2202	54.88412	0.12028	11.15675	0.248	0.00001	0.06382	1.48539	0.00001	0.00425	29.12144	102.3787	-16620	-21095	72			clast1-a-143cm		11.82369	68	12/5/2010 21:31	Plagioclase
69 / 1 .	0.00068	0.00001	0.11022	0.00471	0.02689	0.03149	0.01517	0.01236	0.14283	0.00276	0.00001	0.02292	0.37006	-16626	-21112	72			clast1-b-143cm		0.06238	69	12/5/2010 21:36	bad data
70 / 1 .	0.07308	5.53997	56.13193	0.08332	10.11286	0.09684	0.00001	0.00001	0.65501	0.00001	0.00852	28.20998	100.9115	-17251	-19845	81			mineral-5-143cm		11.49477	70	12/5/2010 21:40	Plagioclase
71 / 1 .	6.32973	0.30462	29.80896	0.17576	11.89267	0.85029	0.00001	0.16219	8.88753	0.01887	0.00001	24.35072	82.78137	-17486	-19855	87			mineral-6-143cm		10.6374	71	12/5/2010 21:44	Diopside
72 / 1 .	0.05868	0.27058	0.02925	0.0198	61.68632	0.01432	0.0305	0.00001	0.03591	0.00001	0.00001	0.0055	62.15089	-18332	-19265	99			mineral-7-143cm		10.28227	72	12/5/2010 21:48	bad data
73 / 1 .	0.77221	1.10903	33.44243	0.11101	8.44339	0.03903	0.00001	0.01528	1.57136	0.00001	0.00992	19.19525	64.70893	-18471	-18766	99			mineral-8-143cm		7.62686	73	12/5/2010 21:52	Plagioclase
74 / 1 .	14.07673	0.32309	50.51636	0.00988	19.30261	0.8722	0.00839	0.31661	11.85426	0.00001	0.04629	2.92252	100.249	-18533	-18873	102			mineral-9-143cm		13.29878	74	12/5/2010 21:57	Diopside
75 / 1 .	0.03272	0.00001	93.25229	0.02563	0.08643	0.00002	0.00001	0.00001	0.08631	0.00001	0.00001	0.00002	93.48348	-19755	-19023	117			mineral-10-GN-143cm		10.11662	75	12/5/2010 22:01	Quartz
76 / 1 .	7.21238	0.12988	24.20507	1.61588	0.41997	0.19704	0.01055	0.06179	13.6579	0.00857	0.06395	7.00942	54.59239	-19759	-19107	117			mineral-11-GN-143cm		7.54026	76	12/5/2010 22:05	bad data
77 / 1 .	0.26712	0.01201	0.78413	0.00906	63.09541	0.00002	0.0116	0.07529	0.50728	0.00001	0.02744	0.20738	64.99673	-20973	-18718	134			mineral-12-GN-143cm		10.7325	77	12/5/2010 22:09	bad data
78 / 1 .	13.23465	0.3859	49.99137	0.09766	15.57028	0.92837	0.0651	0.30976	14.17038	0.00001	0.03642	2.54361	97.33353	-21754	-19786	139			mineral-13-GN-143cm		13.04233	78	12/5/2010 22:13	Diopside
79 / 1 .	13.39218	0.22979	49.59715	0.08015	16.30545	1.03555	0.08271	0.32003	15.88443	0.04045	0.05314	1.70388	98.7249	-21727	-19802	139			mineral-14-GN-143cm		13.4429	79	12/5/2010 22:18	Diopside
80 / 1 .	0.02649	0.09758	0.8283	0.0063	0.10898	0.0002	0.00847	0.0093	0.0704	0.00001	0.04809	0.35487	1.55901	-21787	-19771	139			mineral-15-GN-143cm		0.18965	80	12/5/2010 22:22	bad data
81 / 1 .	17.6406	0.24751	53.1846	0.00777	9.67183	0.22383	0.19908	0.11721	7.6714	0.00001	0.05093	2.47197	91.48672	-22187	-19553	145			dominatemineral-GN-14		11.27452	81	12/5/2010 22:26	Diopside
82 / 1 .	3.38068	0.26333	38.38327	0.88968	0.0841	0.49653	0.09809	0.01995	29.53397	0.00706	0.07036	15.46474	88.69175	-21633	-18830	144			mineral-16-GN-143cm		12.95631	82	12/5/2010 22:30	amphibole



0.000058), Sp1 TAP(2d= 25.745,K= 0.00218)

Table DR3. XRF data.

MC1-4 DATA		Si	Al	Ca	Fe	Mn	Cu	Pb	Zn	Cr	Ni
Sample Name	Date	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm
MC1-4 0-1cm 4.60g	50310	15.950	5.738	11.850	7.582	0.126	142.700	8.000	89.600	113.000	89.200
MC1-4 1-2cm 4.86g	50310	16.200	5.860	12.030	7.673	0.127	141.300	7.900	92.400	120.000	99.600
MC1-4 2-3cm 3.14g	42810	16.010	5.716	12.010	7.595	0.126	140.200	8.800	91.900	114.900	89.500
MC1-4 3-4cm 3.10g	42810	16.170	5.851	11.890	7.666	0.126	143.500	8.900	92.000	108.200	88.600
MC1-4 4-5cm 3.03g	42810	15.870	5.720	11.780	7.607	0.126	138.400	8.000	91.900	118.600	87.200
MC1-4 5-6cm 3.20g	42810	16.150	5.795	11.830	7.591	0.128	144.200	8.400	91.600	114.900	91.400
MC1-4 10-11cm 3.18g	42810	16.220	5.839	11.730	7.590	0.126	141.300	8.800	92.200	109.900	88.900
MC1-4 15-16cm 3.08g	42810	16.020	5.750	11.820	7.635	0.128	142.000	8.700	92.000	119.600	90.000
MC1-4 20-21cm 3.06g	42810	16.420	5.933	11.970	7.666	0.128	137.800	9.800	91.900	114.100	88.200
MC1-4 25-26cm 3.15g	42810	16.450	5.902	12.000	7.692	0.132	142.400	9.300	93.000	121.200	91.100
MC1-4 30-31cm 3.03g	42810	16.330	5.870	12.010	7.656	0.127	143.600	9.700	92.500	114.300	92.100
MC1-4 35-36cm 3.10g	42810	17.250	6.232	12.420	7.934	0.132	144.000	9.000	95.100	118.300	93.800
MC1-4 40-41cm 3.07g	42810	16.320	5.837	12.010	7.667	0.130	141.400	9.200	94.100	115.900	92.300
MC1-4 45-46cm 3.10g	42810	16.280	5.837	12.130	7.640	0.128	137.200	8.300	91.400	113.600	88.700

Dried and ground sediment samples were analyzed for major and trace elements using a XEPOS III X-ray fluorescence spectrometer (Spectro; Kleve, Germany). Quantification was accomplished using the TurboQuant Powder software from the manufacturer. Sediment or soil standard reference materials (SRM 2702, 2704 and 2709) were analyzed regularly providing a continuous monitor of accuracy. For all elements reported here, duplicate analyses of the sediment samples agreed to within five percent.

MC4-3 DATA		Si	Al	Ca	Fe	Mn	Cu	Pb	Zn	Cr	Ni
Sample Name	Date	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm
MC4-3 0-1cm 2.32g	050610	16.480	5.711	8.257	7.146	0.141	110.900	9.900	93.200	201.100	158.600
MC4-3 1-2cm 4.30g	050610	17.380	5.996	9.530	7.508	0.143	121.700	9.700	95.000	192.300	158.000
MC4-3 2-3cm 2.03g	051010	16.620	5.841	11.010	7.336	0.142	122.100	9.600	92.000	165.400	129.300
MC4-3 3-4cm 2.09g	051011	16.520	5.819	11.780	7.346	0.144	127.100	10.100	91.300	141.700	115.200
MC4-3 4-5cm 1.58g	050610	16.070	5.697	11.900	7.270	0.136	127.500	9.100	89.100	129.100	100.200
MC4-3 5-6cm 2.22g	050610	16.170	5.752	12.170	7.440	0.139	128.800	10.200	91.400	122.500	98.100
MC4-3 6-7cm 1.88g	050610	16.340	5.794	12.240	7.466	0.137	134.500	9.100	92.000	120.900	95.500
MC4-3 8-9cm 1.74g	050610	16.000	5.693	12.390	7.421	0.137	135.100	9.500	90.900	127.600	97.400
MC4-3 9-10cm 1.91g	050610	16.090	5.710	12.470	7.427	0.142	129.900	9.500	89.800	120.900	94.400
MC4-3 10-11cm 1.74g	050610	16.190	5.767	12.470	7.452	0.140	135.000	10.100	90.900	125.400	98.100
MC4-3 10-11cm 1.74g DUP	050710b	16.240	5.770	12.400	7.375	0.138	129.500	9.900	90.600	121.200	93.300
MC4-3 15-16cm 2.09g	050610	15.760	5.644	12.750	7.597	0.140	128.100	9.500	89.200	130.200	94.300
MC4-3 20-21cm 1.78g	050610	15.390	5.306	14.050	7.312	0.147	105.800	12.300	85.400	191.900	132.600
MC4-3 25-26cm 2.08g	050610	15.470	5.132	14.490	6.290	0.341	96.800	15.700	86.400	193.700	138.400
MC4-3 29-30cm 1.91g	050610	14.340	4.629	17.770	5.529	0.101	78.300	12.000	78.000	133.400	104.600

GC 2 DATA			Si	Al	Ca	Fe	Mn	Ti	Cu	Pb	Zn	Cr	Ni
Sample Name	plot	Date	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm
GC2 0-2cm 4.82g	1	050710b	15.320	5.533	11.640	7.492	0.120	0.958	135.900	8.400	92.000	114.100	89.800
GC2 0-2cm 2.42g DUP	1	050710b	15.900	5.756	11.760	7.643	0.123	0.983	141.000	8.700	94.300	118.500	93.000
GC2 3-4cm 1.49g	3.5	050710	15.980	5.764	11.860	7.688	0.122	0.988	134.000	8.200	92.900	113.400	93.900
GC2 5-6cm 2.15g	5.5	050710	16.200	5.883	11.450	7.670	0.124	0.977	140.000	6.800	91.700	109.400	88.500
GC2 10-11cm 2.51g	10.5	050710	16.260	5.850	11.700	7.629	0.124	0.949	147.800	8.800	93.500	111.600	92.500
GC2 15-16cm 2.92g	15.5	050710	16.190	5.834	11.980	7.650	0.127	0.975	141.000	8.400	91.700	115.700	90.700
GC2 20-21cm 2.42g	20.5	050710	16.500	5.967	11.920	7.669	0.124	0.980	142.900	8.600	92.200	113.500	92.000
GC2 20-21cm 2.42g DUP	20.5	050710b	16.660	6.019	11.890	7.648	0.123	0.974	141.400	8.800	93.200	119.600	90.400
GC2 25-26cm 3.42g	25.5	050710	16.230	5.880	11.990	7.691	0.130	0.993	141.400	8.100	91.400	116.700	92.700
GC2 30-31cm 3.54g	30.5	050710	16.080	5.793	11.980	7.692	0.126	0.991	137.700	9.400	92.800	117.000	89.900
GC2 35-36cm 3.70g	35.5	050710	15.680	5.639	12.070	7.653	0.129	0.982	136.300	8.700	91.800	116.000	89.500
GC2 40-41cm 4.07g	40.5	050710	15.990	5.757	12.240	7.683	0.128	1.013	133.700	8.700	91.600	123.500	88.700
GC2 45-46cm 3.93g	45.5	050710	16.240	5.881	12.710	7.936	0.135	1.049	138.400	8.000	91.900	123.300	90.100
GC2 50-51cm 2.31g	50.5	050710	13.310	4.738	13.350	7.517	0.112	1.013	126.100	6.300	73.600	120.200	77.000
GC2 54-55cm 3.18g	54.5	42910	12.640	4.222	19.370	5.471	0.258	0.754	81.300	8.300	76.200	97.900	86.500
GC2 57-58cm 3.64g	57.5	42910	13.250	4.414	19.020	5.534	0.127	0.761	89.600	6.300	76.000	94.200	80.000
GC2 59-60cm 3.84g	59.5	42910	13.670	4.497	17.210	6.532	0.087	0.777	88.300	6.000	78.500	100.400	81.200
GC2 65-66cm 3.35g	65.5	42910	14.030	4.781	16.480	6.215	0.096	0.819	108.700	5.800	81.300	91.800	82.000
GC2 70-71cm 3.02g	70.5	42910	14.590	5.000	15.860	6.500	0.099	0.823	115.600	5.500	84.300	93.300	81.600
GC2 75-76cm 2.08g	75.5	42910	14.530	4.972	15.990	6.405	0.102	0.816	114.900	5.600	82.800	98.100	81.500
GC2 80-81cm 2.27g	80.5	42910	14.910	5.126	15.960	6.566	0.104	0.836	119.800	5.300	84.500	88.400	81.300
GC2 85-86cm 2.61g	85.5	42910	14.670	5.016	15.650	6.585	0.104	0.830	123.400	5.800	84.300	100.100	83.900
GC2 90-91cm 3.00g	90.5	42910	15.260	5.266	15.990	6.712	0.109	0.851	120.300	5.900	85.700	99.300	82.100
GC2 90-91 3.00g DUP	90.5	050710b	14.490	4.978	15.440	6.491	0.105	0.816	117.100	4.800	82.500	89.700	80.000
GC2 96-97cm 2.45g	96.5	42910	15.120	5.229	16.080	6.786	0.112	0.866	120.900	5.500	85.600	99.900	81.700
GC2 100-101cm 3.03g	100.5	42910	14.620	5.028	15.560	6.696	0.111	0.858	121.700	4.200	84.300	95.600	80.200
GC2 105-106cm 2.15g	105.5	42910	14.910	5.155	16.250	6.778	0.109	0.911	112.500	5.600	82.100	104.800	77.900
GC2 109-110cm 3.98g	109.5	043010	13.180	4.523	16.950	6.376	0.111	0.896	102.800	5.700	77.800	100.600	74.400
GC2 115-116cm 3.19g	115.5	043010	11.720	3.888	21.640	4.882	0.166	0.700	70.800	7.400	70.000	89.600	77.500
GC2 118-119cm 3.22g	118.5	043010	12.630	4.180	19.170	6.169	0.241	0.780	65.700	6.100	72.800	101.400	83.600
GC2 121-122cm 2.13g	121.5	050710	13.400	4.561	18.990	5.898	0.146	0.817	93.900	5.500	77.600	92.700	79.500
GC2 129-130cm 3.34g	129.5	043010	12.230	3.982	21.650	5.208	0.121	0.697	70.700	6.700	70.200	102.800	81.500
GC2 133-134cm 2.76g	133.5	043010	13.460	4.377	18.670	5.907	0.109	0.717	99.900	6.500	75.900	89.500	77.800
GC2 133-134 2.76g DUP	133.5	050710b	13.400	4.346	18.690	5.893	0.108	0.723	105.300	5.600	75.400	96.000	82.100
GC2 135-136cm 3.19g	135.5	043010	14.520	4.845	15.670	6.475	0.106	0.803	120.500	3.300	84.300	92.700	79.100

GC2 140-141cm 4.39g	140.5	043010	14.860	5.029	15.110	6.794	0.105	0.864	115.300	4.100	82.600	102.400	78.000
GC2 144-145cm 3.15g	144.5	043010	10.920	3.569	23.260	4.319	0.127	0.650	59.800	6.400	64.600	102.200	75.300
GC2 149-150cm 3.78g	149.5	043010	14.360	4.644	17.270	6.371	0.107	0.788	85.100	6.600	82.500	103.500	88.100
GC2 155-156cm 2.86g	155.5	043010	14.960	5.048	17.800	6.257	0.111	0.811	104.800	5.700	82.500	96.300	83.800
GC2 160-161cm 4.32g	160.5	043010	13.900	4.608	17.220	6.086	0.107	0.786	105.100	5.900	82.500	95.800	86.300

GC 2 Elemental Abundances