

**TABLE S2: GHR1 LA-ICPMS U-Pb ZIRCON GEOCHRONOLOGY**

Zircon #	Composition									Ages							
	U	206Pb/ 204Pb	U/Th	206Pb/ 207Pb	2 $\sigma$ (%)	207Pb/ 235U	2 $\sigma$ (%)	206Pb/ 238U	2 $\sigma$ (%)	error corr.	206Pb/ 238U	2 $\sigma$ (Ma)	207Pb/ 235U	2 $\sigma$ (Ma)	206Pb/ 207Pb	2 $\sigma$ (Ma)	% Disc.
<b>GHR1 no CA Run 1</b>																	
GHR1-1	811	2601	2.53	19.193	8.3	0.0547	8.9	0.00762	3.2	0.354	48.9	1.5	54.1	4.7	288.9	190.2	83.1
GHR1-2	611	154552	2.82	18.515	7.5	0.0592	8.2	0.00795	3.2	0.386	51.0	1.6	58.4	4.6	370.5	169.5	86.2
GHR1-3	545	2172	2.52	24.084	8.3	0.0452	9.4	0.00790	4.4	0.469	50.7	2.2	44.9	4.1	NA	NA	NA
GHR1-4	598	2838	2.88	21.982	9.3	0.0470	10.9	0.00749	5.5	0.511	48.1	2.7	46.6	4.9	NA	NA	NA
GHR1-6	927	4515	2.47	20.423	9.8	0.0474	10.1	0.00703	2.5	0.244	45.2	1.1	47.1	4.6	145.1	230.0	68.9
GHR1-7	559	31877	2.84	16.347	8.5	0.0659	9.3	0.00782	3.8	0.409	50.2	1.9	64.8	5.9	644.4	183.4	92.2
GHR1-8	433	2256	3.16	17.840	14.4	0.0612	15.3	0.00792	5.4	0.353	50.8	2.7	60.3	9.0	453.5	319.0	88.8
GHR1-9	460	25984	2.78	20.051	7.8	0.0543	9.7	0.00790	5.7	0.587	50.7	2.9	53.7	5.1	188.1	182.6	73.0
GHR1-10	937	9604	2.21	20.134	4.9	0.0487	5.6	0.00711	2.8	0.495	45.7	1.3	48.3	2.6	178.4	113.9	74.4
GHR1-11	907	7573	1.78	21.798	5.2	0.0485	6.4	0.00768	3.6	0.564	49.3	1.8	48.1	3.0	NA	NA	NA
GHR1-13	569	6404	2.67	21.794	6.2	0.0482	7.2	0.00763	3.7	0.515	49.0	1.8	47.8	3.4	NA	NA	NA
GHR1-14	509	3155	2.45	24.171	7.0	0.0437	11.2	0.00767	8.7	0.783	49.3	4.3	43.5	4.8	NA	NA	NA
GHR1-15	256	10569	2.22	14.121	16.2	0.0798	17.5	0.00818	6.7	0.384	52.5	3.5	78.0	13.1	951.2	331.1	94.5
<b>GHR1 no CA Run 1 (discordant)</b>																	
GHR1-5	363	471	3.14	9.387	29.2	0.1201	30.0	0.00818	3.4	0.226	52.5	3.6	115.2	32.7	1740.1	538.8	97.0
GHR1-12	470	3975	3.31	25.522	5.6	0.0495	55.6	0.00917	27.7	0.995	58.8	32.4	49.1	26.6	NA	NA	NA
<b>GHR1 no CA Run 2</b>																	
GHR1 1	1314	174251	1.71	21.055	2.5	0.0519	3.2	0.0079	2	0.614	50.9	1	51.4	1.6	73.1	60.5	30.4
GHR1 10	429	5000	3.54	23.07	11	0.0464	11.2	0.0078	2.1	0.183	49.8	1	46	5.1	500	1	90.0
GHR1 11	720	5000	2.17	22.739	5	0.0461	5.5	0.0076	2.4	0.426	48.8	1.2	45.7	2.5	500	1	90.2
GHR1 12	288	25194	2.94	14.014	20.1	0.0765	20.4	0.0078	3.6	0.177	50	1.8	74.9	14.7	966.8	410.6	94.8
GHR1 13	764	49893	2.94	21.036	3.8	0.0513	4.9	0.0078	3.1	0.64	50.3	1.6	50.8	2.4	75.2	89.4	33.1
GHR1 14	415	31514	3.29	20.768	5.4	0.0492	5.8	0.0074	1.9	0.333	47.6	0.9	48.8	2.7	105.6	128.4	54.9
GHR1 15	527	1320048	2.99	20.648	6.6	0.0507	7.3	0.0076	3.1	0.429	48.7	1.5	50.2	3.6	119.3	155.6	59.2
GHR1 16	613	37708	2.63	20.556	3.6	0.0505	4.7	0.0075	3	0.639	48.4	1.4	50	2.3	129.8	84.9	62.7
GHR1 17	313	23025	3.41	21.116	7.6	0.0494	8.2	0.0076	3.1	0.38	48.6	1.5	48.9	3.9	66.3	180	26.7
GHR1 18	189	58098	4.85	21.432	9.9	0.0486	10.7	0.0076	4.1	0.385	48.5	2	48.1	5	30.8	236.3	-57.5
GHR1 19	713	25986	2.21	21.417	6.2	0.0503	7.9	0.0078	5	0.626	50.2	2.5	49.8	3.9	32.5	148.1	-54.5
GHR1 2	395	73238	3.64	21.251	6.4	0.0481	7.5	0.0074	4	0.53	47.7	1.9	47.7	3.5	51	151.9	6.5
GHR1 20	429	219893	3.4	21.29	5.5	0.0481	6.1	0.0074	2.7	0.439	47.8	1.3	47.7	2.9	46.6	131.3	-2.6
GHR1 21	173	5000	6.78	22.379	13	0.0464	13.4	0.0075	3.3	0.243	48.4	1.6	46	6	73.9	318.9	34.5
GHR1 22	246	5000	3.01	21.936	12.3	0.0463	12.8	0.0074	3.7	0.288	47.3	1.7	45.9	5.8	25.2	297.4	-87.7
GHR1 23	198	5000	3.66	23.543	13.2	0.0461	13.6	0.0079	3.2	0.235	50.5	1.6	45.7	6.1	500	1	89.9
GHR1 24	866	24084	2.01	21.183	4.2	0.0536	5.1	0.0082	2.9	0.574	52.9	1.5	53	2.6	58.7	99.7	9.9
GHR1 25	317	5000	3.45	22.459	11.3	0.0468	11.6	0.0076	2.8	0.241	48.9	1.4	46.4	5.3	82.6	276.5	40.8
GHR1 26	1416	5000	1.95	11.486	8	0.1009	8.5	0.0084	2.8	0.335	54	1.5	97.6	7.9	1361	154.2	96.0
GHR1 27	302	31821	3.2	20.593	5.7	0.0509	6.6	0.0076	3.2	0.494	48.9	1.6	50.4	3.2	125.6	134.1	61.1
GHR1 28	503	5000	2.64	22.533	11.1	0.0477	11.4	0.0078	2.7	0.241	50.1	1.4	47.3	5.3	90.7	271.4	44.8

GHR1 29	1801	75664	0.91	21.243	3.2	0.0542	4.1	0.0084	2.5	0.62	53.6	1.3	53.6	2.1	52	76.1	-3.1
GHR1 3	681	97174	1.88	20.843	3.6	0.0513	3.8	0.0078	1.4	0.369	49.9	0.7	50.8	1.9	97	84.3	48.6
GHR1 30	328	84945	3.45	17.456	6.3	0.0603	7	0.0076	3	0.43	49	1.5	59.4	4	501.6	139	90.2
GHR1 4	356	5000	2.18	11.876	21.2	0.0886	21.4	0.0076	2.8	0.131	49	1.4	86.2	17.7	1296	414	96.2
GHR1 5	821	5000	3.4	22.774	10.7	0.0474	11.1	0.0078	2.8	0.253	50.3	1.4	47	5.1	116.8	263.7	56.9
GHR1 6	441	5000	2.54	21.912	11.3	0.0472	11.6	0.0075	2.7	0.236	48.2	1.3	46.8	5.3	22.5	273.9	-114.2
GHR1 7	556	31439	2.73	17.767	7	0.0559	7.7	0.0072	3.3	0.426	46.3	1.5	55.2	4.1	462.6	154.6	90.0
GHR1 8	545	46147	3.08	21.433	5.4	0.0485	6.5	0.0075	3.6	0.55	48.4	1.7	48	3.1	30.6	130.4	-58.2
GHR1 9	221	21737	3.07	20.198	8	0.0509	8.6	0.0075	3.3	0.383	47.9	1.6	50.4	4.2	171	186.3	72.0

Composition										Ages							
Zircon	U	206Pb/	U/Th	206Pb/	2σ	207Pb/	2σ	206Pb/	2σ	error	206Pb/	2σ	207Pb/	2σ	206Pb/	2σ	%
#	(ppm)	204Pb		207Pb	(%)	235U	(%)	238U	(%)	Corr.	238U	(Ma)	235U	(Ma)	207Pb	(Ma)	Disc.
GHR1 CA Run 1																	
GHR1-1	706	4834	2.82	22.737	4.2	0.0464	5.9	0.00766	4.2	0.709	49.2	2.0	46.1	2.7	NA	NA	NA
GHR1-2	699	4591	4.32	21.476	5.6	0.0474	7.1	0.00739	4.3	0.606	47.4	2.0	47.0	3.3	25.9	NA	-83.2
GHR1-3	790	55149	2.63	20.730	5.2	0.0546	7.3	0.00822	5.1	0.703	52.8	2.7	54.0	3.8	110.0	122.2	52.0
GHR1-4	621	2104	2.78	23.893	5.9	0.0442	7.2	0.00766	4.2	0.576	49.2	2.0	43.9	3.1	NA	NA	NA
GHR1-5	818	2492	2.54	22.116	6.8	0.0463	8.5	0.00743	5.1	0.602	47.7	2.4	46.0	3.8	NA	NA	NA
GHR1-6	632	1763	2.70	21.889	13.4	0.0493	14.2	0.00782	4.7	0.331	50.2	2.3	48.8	6.8	NA	NA	NA
GHR1-7	1106	98121	2.41	20.191	3.4	0.0520	5.3	0.00762	4.1	0.776	48.9	2.0	51.5	2.7	171.9	78.5	71.5
GHR1-8	818	2204	2.44	22.926	12.2	0.0430	12.6	0.00715	3.3	0.261	45.9	1.5	42.7	5.3	NA	NA	NA
GHR1-9	757	1581	3.28	23.145	5.6	0.0445	6.3	0.00747	3.1	0.484	48.0	1.5	44.2	2.7	NA	NA	NA
GHR1-10	772	4855	2.65	16.112	8.1	0.0671	8.6	0.00784	2.9	0.338	50.4	1.5	65.9	5.5	675.5	174.0	92.5
GHR1-11	353	1346	1.65	26.966	31.1	0.0396	31.5	0.00776	5.4	0.170	49.8	2.7	39.5	12.2	NA	NA	NA
GHR1-12	883	3212	3.21	20.659	7.6	0.0528	8.2	0.00791	2.9	0.360	50.8	1.5	52.2	4.2	118.1	179.6	57.0
GHR1-13	750	3833	2.32	18.402	10.1	0.0598	11.8	0.00798	6.1	0.517	51.2	3.1	58.9	6.8	384.3	227.7	86.7
GHR1-14	538	17286	2.61	19.472	9.1	0.0555	11.1	0.00784	6.3	0.567	50.3	3.1	54.8	5.9	255.8	209.4	80.3
GHR1-15	664	2696	2.33	21.033	9.4	0.0500	9.9	0.00763	3.2	0.320	49.0	1.6	49.5	4.8	75.6	NA	35.2
GHR1 CA Run 2																	
GHR1 1	671	5000	2.46	22.668	11.8	0.0454	12.1	0.0075	2.9	0.235	48	1.4	45.1	5.3	105.3	290	54.4
GHR1 10	794	5000	3.17	22.575	11.2	0.046	11.7	0.0075	3.5	0.294	48.3	1.7	45.6	5.2	95.2	275.8	49.3
GHR1 11	699	5000	2.73	22.931	11.7	0.0459	11.9	0.0076	2.2	0.184	49	1.1	45.6	5.3	133.8	289.2	63.4
GHR1 12	689	523758	3.16	20.991	4.6	0.0508	5.2	0.0077	2.4	0.466	49.7	1.2	50.3	2.6	80.4	110.1	38.2
GHR1 13	890	38932	2.15	21.39	4.6	0.0492	5.1	0.0076	2.3	0.445	49	1.1	48.7	2.4	35.5	110.4	-38.0
GHR1 14	763	27089	2.95	20.863	4.8	0.0509	5.6	0.0077	2.8	0.508	49.5	1.4	50.4	2.7	94.8	113.6	47.8
GHR1 15	1048	80460	2.65	20.963	5.5	0.0504	5.8	0.0077	1.9	0.32	49.2	0.9	49.9	2.8	83.5	130.2	41.1
GHR1 16	875	20875	2.82	21.45	6.7	0.0487	7.1	0.0076	2.3	0.33	48.7	1.1	48.3	3.3	28.7	160.3	-69.7
GHR1 17	2765	274997	1.61	21.284	2.8	0.0502	3.3	0.0078	1.8	0.54	49.8	0.9	49.7	1.6	47.4	67.1	-5.1
GHR1 18	1016	260441	3.14	21.177	4.2	0.0499	4.8	0.0077	2.3	0.481	49.3	1.1	49.5	2.3	59.3	101	16.9
GHR1 19	915	40850	2.45	20.997	3.8	0.0504	4.9	0.0077	3.2	0.646	49.3	1.6	49.9	2.4	79.6	89.4	38.1
GHR1 2	954	32160	2.34	21.595	4.4	0.0483	5.1	0.0076	2.7	0.516	48.6	1.3	47.9	2.4	12.6	106	-285.7
GHR1 20	1266	5000	2.18	23.019	10.7	0.0451	11.1	0.0075	2.9	0.26	48.3	1.4	44.8	4.8	500	1	90.3
GHR1 21	891	5000	2.86	22.223	11.5	0.0461	11.7	0.0074	2.1	0.18	47.7	1	45.8	5.2	56.8	279.9	16.0

GHR1 22	1348	5000	2.31	21.884	10.9	0.0472	11.3	0.0075	2.9	0.255	48.1	1.4	46.8	5.2	19.5	264.8	-146.7
GHR1 23	170	5000	2.12	19.428	14.5	0.0554	15.1	0.0078	4.4	0.289	50.1	2.2	54.7	8	261	332.2	80.8
GHR1 24	1900	29517	2.13	21.086	3.5	0.0483	4.4	0.0074	2.7	0.609	47.5	1.3	47.9	2	69.5	82.6	31.7
GHR1 25	813	40469	2.34	20.627	5.9	0.0501	6.5	0.0075	2.7	0.419	48.1	1.3	49.6	3.2	121.7	140.1	60.5
GHR1 26	661	327566	2.88	21.51	5.2	0.0492	6	0.0077	3.1	0.514	49.3	1.5	48.8	2.9	22	124.5	-124.1
GHR1 27	805	5000	2.76	23.126	11.1	0.0454	11.3	0.0076	2.5	0.217	49	1.2	45.1	5	500	1	90.2
GHR1 28	341	5000	1.72	19.92	13.9	0.0551	14.6	0.008	4.6	0.317	51.2	2.4	54.5	7.8	203.2	322.1	74.8
GHR1 29	730	404631	2.39	20.1	7.1	0.0529	7.5	0.0077	2.4	0.326	49.5	1.2	52.3	3.8	182.3	165	72.8
GHR1 3	849	5000	2.55	22.146	10.8	0.0469	11.2	0.0075	2.8	0.255	48.4	1.4	46.5	5.1	48.4	262.5	0.0
GHR1 30	772	23517	2.29	21.379	4.9	0.0488	5.8	0.0076	3.2	0.55	48.7	1.6	48.4	2.8	36.7	116.8	-32.7
GHR1 4	947	53220	1.75	21.223	5.6	0.052	6.5	0.008	3.2	0.496	51.4	1.6	51.5	3.2	54.2	134.1	5.2
GHR1 5	783	67196	2.51	21.311	5.1	0.0482	5.5	0.0075	2.1	0.375	47.8	1	47.8	2.6	44.3	122.4	-7.9
GHR1 6	946	5000	2.52	22.269	10.8	0.0473	11.2	0.0076	2.8	0.246	49.1	1.3	46.9	5.1	61.8	264.1	20.6
GHR1 7	907	34448	2.66	21.465	4.6	0.0486	5.3	0.0076	2.6	0.489	48.6	1.3	48.2	2.5	27	111.3	-80.0
GHR1 8	854	35238	2.56	20.624	4.1	0.0512	5.8	0.0077	4.1	0.706	49.2	2	50.7	2.9	122.1	97.2	59.7
GHR1 9	882	190837	2.81	21.797	4.5	0.0485	5.2	0.0077	2.5	0.482	49.2	1.2	48	2.4	9.9	109.8	-397.0