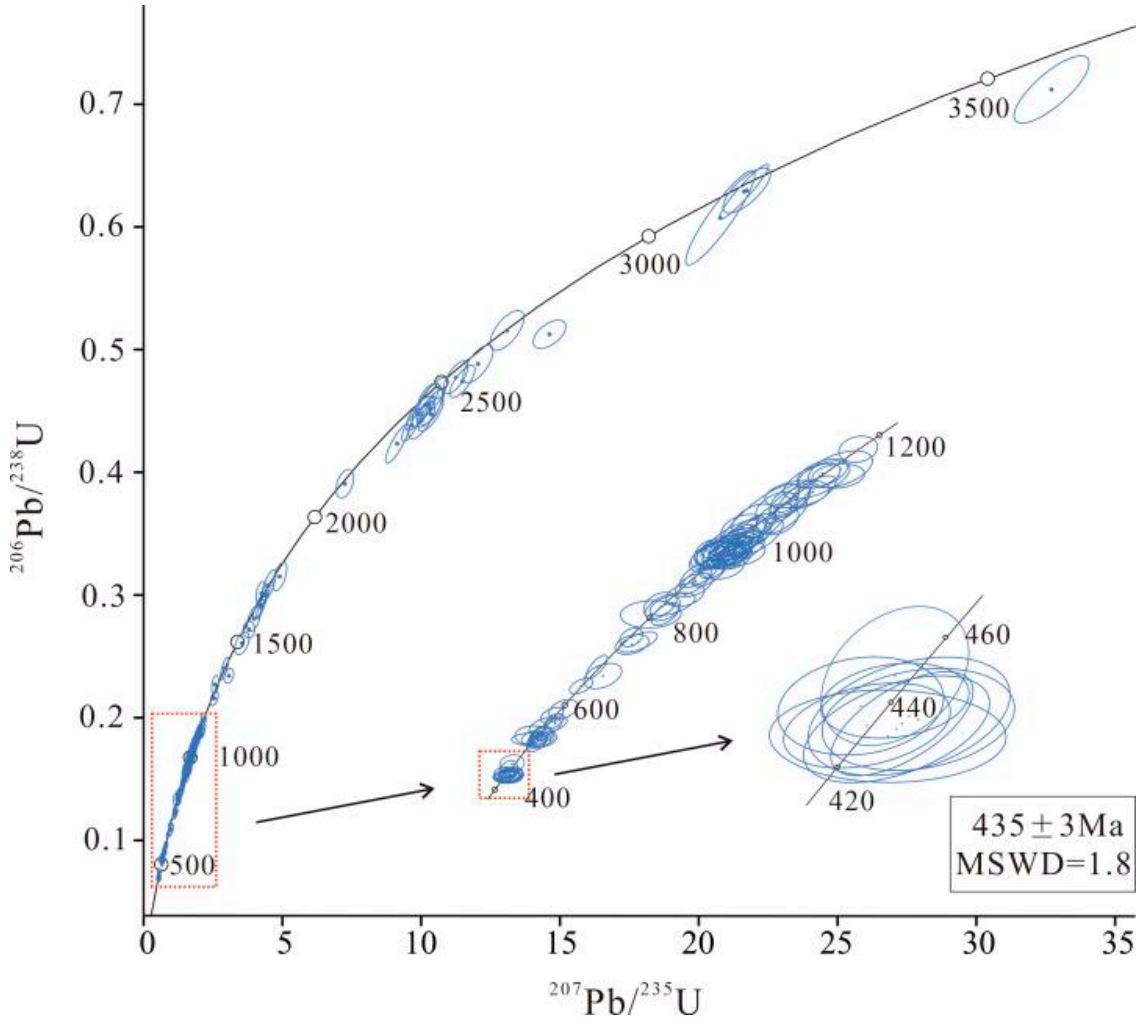


Figure S1. U-Pb concordia for the detrital zircons.

Table S1. Semiquantitative analysis results (wt.%) of Xiangcaowa karstic bauxite samples

Sample	Diaspore	Kaolinite	Anatase	Pyrite
X-1	59.6	39.6	0.8	/
X-2	73.7	25.3	1.0	/
X-3	71.4	27.1	1.5	/
X-4	79.7	19.1	1.2	/
X-5	72.5	26.7	0.8	/
X-6	73.4	25.6	1.0	/
X-7	77.6	20.8	1.6	/
X-8	59.9	38.7	1.4	/
X-9	62.1	32.9	1.1	3.9

“/”：not detected.

Table S2

Trace elements compositions (ppm) of detrital zircons in samples X-2 and X-8.

	Sm(147)	Yb(173)	Y(89)	Nb(93)	Ta(181)	Hf(179)	Th(232)	U(238)	Th/U	U/Yb	Nb/Ta	Yb/Sm	REE	LREE	HREE
X-2-1	3.1612	345.3707	831.1293	1.4205	0.5807	7732.7691	122.6988	145.0124	0.8461	0.4199	2.4461	109.2534	1655.3045	30.2375	1625.0670
X-2-2	3.3946	136.6021	617.0139	1.1555	1.1394	12323.3337	99.3707	595.1811	0.1670	4.3570	1.0141	40.2409	1116.6247	6.2174	1110.4073
X-2-3	3.0687	6.2754	150.8452	1.3317	1.8382	12330.8283	12.2972	709.6964	0.0173	113.0926	0.7244	2.0449	473.7043	4.0126	469.6916
X-2-4	4.1636	299.7970	872.5197	1.0656	1.7842	10719.8077	78.0268	766.3151	0.1018	2.5561	0.5972	72.0036	1822.1521	10.2693	1811.8828
X-2-5	3.0817	749.7369	1565.6280	2.2880	1.6174	10957.4488	68.4838	236.2389	0.2899	0.3151	1.4146	243.2874	3142.9103	8.2621	3134.6482
X-2-6	2.5711	34.0062	367.3872	0.7875	1.2443	11856.0026	11.0359	858.4170	0.0129	25.2430	0.6329	13.2264	714.9808	3.4847	711.4960
X-2-7	3.0726	285.0796	723.8336	2.9469	2.1773	8456.6783	172.2726	460.5432	0.3741	1.6155	1.3534	92.7822	1394.9118	14.1483	1380.7635
X-2-8	0.3748	166.9070	262.9036	0.4864	0.5213	10573.3549	75.2986	310.7589	0.2423	1.8619	0.9330	445.3442	599.8342	5.2246	594.6096
X-2-9	7.2567	286.9291	939.7048	3.4521	2.2510	9230.5049	174.2834	174.9258	0.9963	0.6096	1.5335	39.5399	1660.2676	20.9124	1639.3552
X-2-10	9.6137	548.7703	1743.5131	5.7690	2.4662	10167.3525	180.7616	118.6312	1.5237	0.2162	2.3392	57.0822	3042.0339	40.3665	3001.6675
X-2-11	22.1786	696.9638	2540.7308	6.8300	2.9015	7308.7171	226.5505	328.6259	0.6894	0.4715	2.3540	31.4251	4310.6327	45.3613	4265.2715
X-2-12	1.3476	263.2828	685.7037	3.7652	2.9443	12254.5098	79.1845	408.6982	0.1937	1.5523	1.2788	195.3668	1390.9342	6.0895	1384.8447
X-2-13	2.8583	150.2468	433.8698	2.6909	0.7424	7908.9516	106.0286	124.2786	0.8532	0.8272	3.6247	52.5652	841.9785	15.0811	826.8974
X-2-14	1.6754	420.4955	736.2671	2.9911	1.3452	9152.8046	90.6328	464.4862	0.1951	1.1046	2.2236	250.9859	1604.4833	11.6285	1592.8548
X-2-15	3.9083	207.7998	626.7399	3.5337	2.0916	9590.6766	189.4033	158.1675	1.1975	0.7612	1.6895	53.1692	1151.3334	24.2173	1127.1161
X-2-16	3.7828	414.6447	903.3216	4.1476	1.7518	10295.8935	250.5956	288.3292	0.8691	0.6954	2.3676	109.6118	1785.1703	33.1920	1751.9784
X-2-17	3.4609	405.5965	1067.6253	0.7468	1.0638	10541.3790	126.3875	444.7854	0.2842	1.0966	0.7020	117.1945	1968.1346	9.0589	1959.0757
X-2-18	3.1030	114.9581	421.9667	1.0400	0.6226	11221.0739	81.9874	187.0212	0.4384	1.6269	1.6705	37.0469	834.1768	6.9489	827.2280
X-2-19	2.3173	201.5986	744.8295	2.3081	2.6702	11446.4499	52.8964	495.2256	0.1068	2.4565	0.8644	86.9971	1315.8554	4.0091	1311.8463
X-2-20	15.0875	457.0303	1786.2720	2.2280	1.3556	9983.3223	329.8183	342.9611	0.9617	0.7504	1.6436	30.2919	3080.4335	32.4492	3047.9843
X-2-21	5.2170	325.4478	991.4818	1.6887	1.1849	9950.1622	137.1224	283.5642	0.4836	0.8713	1.4252	62.3819	1788.9586	12.8890	1776.0696
X-2-22	9.7186	291.1043	872.3213	2.1924	0.6619	7267.3697	489.1163	285.2273	1.7148	0.9798	3.3123	29.9532	1855.8540	85.0516	1770.8024
X-2-23	1.7082	211.2090	462.0425	0.5721	0.4196	8562.0553	68.6173	95.5495	0.7181	0.4524	1.3632	123.6426	972.4486	17.9682	954.4803
X-2-24	3.3548	191.4635	495.5591	1.9384	1.0802	8732.0189	77.2699	200.6530	0.3851	1.0480	1.7945	57.0724	946.8395	9.2583	937.5812
X-2-25	4.0233	382.8590	984.8046	1.8823	0.9922	8570.1227	56.9493	101.1347	0.5631	0.2642	1.8971	95.1594	1946.0019	9.1364	1936.8655
X-2-26	2.8072	276.6612	710.8118	1.1908	0.8923	9371.1507	131.8764	199.8904	0.6597	0.7225	1.3345	98.5524	1391.9343	15.9788	1375.9555
X-2-27	14.7258	488.1498	1636.5360	1.1976	1.0453	7628.4606	116.6983	61.8551	1.8866	0.1267	1.1457	33.1492	2868.5254	37.8671	2830.6583
X-2-28	2.7288	170.9398	574.2186	0.5288	0.3308	11052.2354	149.5739	481.4607	0.3107	2.8166	1.5983	62.6436	1062.1850	8.2981	1053.8869
X-2-29	5.6035	137.5438	453.8914	2.0504	0.7575	9609.7400	95.2756	74.8774	1.2724	0.5444	2.7067	24.5461	903.7666	17.1987	886.5680
X-2-30	9.9097	159.0990	585.8635	1.7871	0.6468	6641.2101	284.7212	210.7649	1.3509	1.3247	2.7632	16.0549	1073.2529	43.5570	1029.6959

Table S2 (continued)

	Sm(147)	Yb(173)	Y(89)	Nb(93)	Ta(181)	Hf(179)	Th(232)	U(238)	Th/U	U/Yb	Nb/Ta	Yb/Sm	REE	LREE	HREE
X-2-31	4.7850	171.8705	433.8107	0.6528	0.2421	6790.1482	117.6213	138.4945	0.8493	0.8058	2.6963	35.9186	919.6915	34.1994	885.4921
X-2-32	16.9094	660.3930	1746.7083	0.8845	0.8164	6759.6647	213.9032	285.8094	0.7484	0.4328	1.0835	39.0547	3293.9377	44.7186	3249.2191
X-2-33	4.9037	275.3750	624.0170	1.6888	0.8579	7110.5501	112.0232	202.0986	0.5543	0.7339	1.9685	56.1570	1228.9785	21.3665	1207.6121
X-2-34	2.4955	222.8187	535.0053	6.7847	2.5951	8747.3269	171.1872	191.1817	0.8954	0.8580	2.6144	89.2874	1029.1467	25.6488	1003.4979
X-2-35	6.3954	582.2838	1223.5738	1.7603	0.5262	7889.4810	345.4740	336.7180	1.0260	0.5783	3.3454	91.0469	2447.7300	54.7177	2393.0123
X-2-36	8.6737	391.5884	1036.3076	16.7000	6.4826	10095.0804	356.5094	350.9356	1.0159	0.8962	2.5761	45.1466	1968.6577	50.0211	1918.6366
X-2-37	2.3916	210.4997	565.6000	7.6285	3.4859	9554.5793	123.9573	228.3439	0.5429	1.0848	2.1884	88.0170	1060.4334	16.3525	1044.0808
X-2-38	4.3639	465.7470	1073.8494	1.6176	0.9658	9026.0318	48.5610	120.4923	0.4030	0.2587	1.6749	106.7265	2089.5039	20.5934	2068.9105
X-2-39	8.2235	438.8890	1355.9390	10.1237	3.4657	6158.3097	163.6714	165.9227	0.9864	0.3781	2.9211	53.3703	2403.5665	40.4556	2363.1109
X-2-40	16.0726	577.2323	1876.0176	4.3034	1.7612	8728.3906	171.7445	163.8416	1.0482	0.2838	2.4435	35.9141	3305.3284	39.4449	3265.8835
X-2-41	4.1988	417.8904	941.6551	5.6338	1.7494	9409.1917	283.0503	527.1645	0.5369	1.2615	3.2205	99.5264	1823.0108	29.3732	1793.6376
X-2-42	12.0640	1252.8550	3556.0204	44.6563	15.4235	9520.6393	327.2142	555.7390	0.5888	0.4436	2.8954	103.8506	6276.6635	66.5465	6210.1170
X-2-43	5.2859	387.0976	1050.1996	0.9479	0.9335	10753.0672	97.5030	176.8499	0.5513	0.4569	1.0154	73.2314	1965.7095	14.7426	1950.9670
X-2-44	3.2652	283.5227	760.7973	3.0388	1.8788	9750.5575	259.3778	516.7471	0.5019	1.8226	1.6174	86.8305	1419.9605	23.6259	1396.3346
X-2-45	3.4409	238.9113	736.0912	2.1511	1.4855	12639.7765	152.7256	268.3001	0.5692	1.1230	1.4481	69.4323	1380.4944	13.1224	1367.3719
X-2-46	3.5877	211.5949	659.6264	4.1132	2.2840	8975.3150	122.4120	318.7699	0.3840	1.5065	1.8009	58.9773	1179.2663	13.3420	1165.9242
X-2-47	3.5622	30.0544	207.3627	0.9335	0.9015	12861.2423	96.3862	472.9791	0.2038	15.7375	1.0356	8.4371	386.2840	6.2276	380.0563
X-2-48	8.2726	632.8176	1758.2645	1.9920	1.5735	8519.7654	358.5226	438.6551	0.8173	0.6932	1.2660	76.4953	3233.5649	42.5807	3190.9842
X-2-49	3.7843	97.1944	305.5863	2.3765	1.4437	8834.7463	389.0668	448.5210	0.8674	4.6147	1.6461	25.6833	602.2936	36.6761	565.6176
X-2-50	2.3858	246.2445	645.3489	2.9169	2.4048	10672.7662	192.5506	364.2714	0.5286	1.4793	1.2130	103.2143	1190.8832	9.3356	1181.5475
X-2-51	0.4082	225.7893	331.5709	7.2379	7.4955	10195.5841	35.6464	561.2863	0.0635	2.4859	0.9656	553.1951	727.3810	2.3361	725.0449
X-2-52	9.4666	275.7713	718.2208	2.9787	0.8360	8724.3458	480.0124	537.1245	0.8937	1.9477	3.5631	29.1311	1561.6540	62.2908	1499.3631
X-2-53	2.5801	212.2812	600.9521	5.9526	2.8199	8481.4825	48.6553	184.2828	0.2640	0.8681	2.1109	82.2763	1088.1124	10.6192	1077.4932
X-2-54	1.8239	215.8144	458.6064	1.2309	0.4151	7458.3580	75.5560	155.3320	0.4864	0.7197	2.9652	118.3235	915.4182	20.6944	894.7239
X-2-55	3.4281	276.1322	740.9573	2.0019	0.9830	9872.3160	107.7148	121.4164	0.8872	0.4397	2.0365	80.5488	1367.6534	9.2767	1358.3767
X-2-56	8.4690	428.5037	1110.0105	2.1417	1.3891	8434.8259	94.2375	159.2708	0.5917	0.3717	1.5418	50.5968	2125.4547	78.5871	2046.8676
X-2-57	7.5991	358.6377	1041.3315	3.2772	1.6779	9673.7794	309.0164	371.4232	0.8320	1.0357	1.9531	47.1949	1949.7347	29.0480	1920.6867
X-2-58	1.2536	271.7573	588.3990	2.6796	2.0006	9079.3609	86.7922	185.6831	0.4674	0.6833	1.3394	216.7754	1161.4954	11.5858	1149.9096
X-2-59	8.8447	551.4020	1688.8762	0.4284	0.9561	10314.0036	177.5284	424.2086	0.4185	0.7693	0.4481	62.3425	3086.0865	16.5163	3069.5701
X-2-60	2.1349	186.7413	405.2496	4.8864	2.8435	10134.1885	403.0054	754.4576	0.5342	4.0401	1.7184	87.4698	799.0951	18.9747	780.1204
X-2-61	4.1909	133.2893	385.6620	0.9689	0.2505	7529.8770	127.4046	130.9548	0.9729	0.9825	3.8682	31.8044	742.6573	31.1011	711.5562

Table S2 (continued)

	Sm(147)	Yb(173)	Y(89)	Nb(93)	Ta(181)	Hf(179)	Th(232)	U(238)	Th/U	U/Yb	Nb/Ta	Yb/Sm	REE	LREE	HREE
X-2-62	5.0235	449.1183	1773.0584	1.0616	0.8247	9982.2773	96.0332	256.6516	0.3742	0.5715	1.2873	89.4038	3104.9866	7.4181	3097.5686
X-2-63	7.1659	402.8012	1561.4826	0.7240	0.5178	10606.4036	96.1800	233.1164	0.4126	0.5787	1.3981	56.2110	2669.1520	10.9349	2658.2171
X-2-64	7.8812	662.8152	2107.6902	17.2511	5.1794	8069.3338	199.2007	290.9952	0.6845	0.4390	3.3307	84.1006	3606.6129	26.8632	3579.7496
X-2-65	6.7234	56.5189	430.0086	1.0513	0.6994	10546.1222	318.4482	86.7111	3.6725	1.5342	1.5032	8.4063	731.9908	14.3204	717.6704
X-2-66	2.6157	283.9715	616.5963	1.4078	0.5180	8992.6990	104.6457	134.1409	0.7801	0.4724	2.7177	108.5638	1250.9070	24.3670	1226.5400
X-2-67	11.7630	305.8516	1307.9043	1.5108	0.7431	9949.3160	297.1825	248.6343	1.1953	0.8129	2.0331	26.0012	2286.2953	22.8630	2263.4323
X-8-1	0.6084	123.3207	339.8560	2.1827	1.1698	10453.1821	54.0612	179.6691	0.3009	1.4569	1.8659	202.6907	659.6828	3.7337	655.9491
X-8-2	11.2590	614.1612	1521.9534	1.5221	0.5123	7800.1661	272.5711	305.2638	0.8929	0.4970	2.9711	54.5482	2870.2613	35.2475	2835.0138
X-8-3	1.7778	80.5070	279.0943	1.6763	0.9720	8965.1508	82.5625	141.4078	0.5839	1.7565	1.7246	45.2841	573.7126	8.0966	565.6160
X-8-4	8.3971	379.4915	1194.1545	3.5034	1.3932	8524.9715	132.3880	268.3037	0.4934	0.7070	2.5146	45.1930	2136.5271	20.6600	2115.8671
X-8-5	2.7263	292.0771	770.4585	3.5501	2.3987	11338.6501	154.2131	171.9717	0.8967	0.5888	1.4800	107.1346	1462.3299	24.5844	1437.7454
X-8-6	2.0076	215.0616	488.0657	1.6975	1.0390	10060.6870	104.0227	176.7169	0.5886	0.8217	1.6338	107.1224	987.9013	18.5141	969.3871
X-8-7	6.6395	399.9493	1026.1367	1.9949	1.1467	8536.6522	170.7531	232.5165	0.7344	0.5814	1.7397	60.2377	1933.8371	19.2085	1914.6287
X-8-8	5.9111	191.6272	505.5518	1.0306	0.9973	9147.9285	118.1999	126.6960	0.9329	0.6612	1.0334	32.4183	1067.3170	83.4545	983.8625
X-8-9	1.7552	144.0178	343.8208	0.9750	0.9953	8223.8562	192.2446	540.4532	0.3557	3.7527	0.9795	82.0534	704.6815	15.6492	689.0322
X-8-10	2.5314	310.8196	757.4519	4.7510	2.4330	10449.7245	190.3037	341.1357	0.5579	1.0975	1.9527	122.7879	1473.3009	14.8487	1458.4523
X-8-11	20.3521	1242.2110	3437.9863	2.2867	0.6395	5574.4383	165.0289	138.8167	1.1888	0.1117	3.5757	61.0361	6333.6532	67.6549	6265.9983
X-8-12	14.3145	622.9505	1954.1542	0.9581	0.8294	9498.9644	235.3996	348.5483	0.6754	0.5595	1.1552	43.5190	3540.7269	23.5663	3517.1606
X-8-13	7.6342	567.4398	1676.0104	0.8054	0.6851	9831.6412	98.9285	185.8584	0.5323	0.3275	1.1756	74.3287	3050.1827	14.1939	3035.9888
X-8-14	2.6481	363.8686	815.0369	1.1213	1.0708	7623.2614	43.0869	123.1216	0.3500	0.3384	1.0471	137.4100	1730.0506	5.9182	1724.1325
X-8-15	8.7530	275.8330	780.2150	1.2579	0.5564	7046.6167	148.7169	115.5877	1.2866	0.4190	2.2609	31.5130	1510.6170	39.2234	1471.3936
X-8-16	3.6647	451.7719	886.3327	1.0278	0.8898	7228.2196	77.2751	89.9084	0.8595	0.1990	1.1551	123.2780	1882.3815	26.2674	1856.1141
X-8-17	7.4353	204.4303	523.9169	1.2357	1.1125	8622.9130	115.6281	207.7931	0.5565	1.0165	1.1107	27.4946	1102.5810	103.3062	999.2748
X-8-18	8.0728	522.3131	1269.1419	1.3708	0.8618	7198.6357	84.5430	126.7734	0.6669	0.2427	1.5906	64.7005	2454.9066	26.8552	2428.0514
X-8-19	6.3770	119.7158	832.6747	3.0804	2.3095	12037.2577	379.8708	369.3304	1.0285	3.0851	1.3338	18.7729	1335.4656	15.7053	1319.7602
X-8-20	3.1964	246.6085	615.3155	2.6877	1.8359	8548.4268	171.1408	217.0434	0.7885	0.8801	1.4640	77.1526	1197.7061	23.4684	1174.2378
X-8-21	5.2468	383.9215	977.0438	2.0604	1.6505	8407.1100	262.1340	455.3209	0.5757	1.1860	1.2483	73.1728	1870.2751	27.5656	1842.7096
X-8-22	2.0023	56.1268	200.8802	1.5320	0.9592	9524.8822	122.6168	234.5465	0.5228	4.1789	1.5972	28.0306	407.0642	7.2771	399.7871
X-8-23	2.2212	322.5268	685.0740	1.6791	1.4182	9471.5141	235.2643	212.3515	1.1079	0.6584	1.1839	145.2065	1399.6866	23.2287	1376.4579
X-8-24	4.6866	361.8965	1121.0244	0.2275	0.3742	9832.1002	89.6069	227.1442	0.3945	0.6276	0.6079	77.2201	2020.6656	6.9279	2013.7377

Table S2 (continued)

	Sm(147)	Yb(173)	Y(89)	Nb(93)	Ta(181)	Hf(179)	Th(232)	U(238)	Th/U	U/Yb	Nb/Ta	Yb/Sm	REE	LREE	HREE
X-8-25	2.8286	375.0626	674.9582	1.4592	0.5454	7671.1599	77.6290	133.7201	0.5805	0.3565	2.6752	132.5946	1469.3159	20.1586	1449.1572
X-8-26	2.0964	214.0628	411.0607	0.5802	0.3282	7153.7487	103.8773	147.8255	0.7027	0.6906	1.7676	102.1094	899.4335	23.6758	875.7577
X-8-27	4.3155	458.9985	1229.9045	22.2713	7.8078	9643.5201	96.0182	246.1377	0.3901	0.5362	2.8524	106.3596	2216.2408	21.2811	2194.9598
X-8-28	2.5224	329.3192	715.4152	3.1060	1.6872	9334.0509	316.5863	316.8532	0.9992	0.9621	1.8409	130.5589	1443.1436	40.0112	1403.1324
X-8-29	5.6822	298.0435	894.5737	1.9828	1.5681	8422.3804	119.8087	138.0620	0.8678	0.4632	1.2644	52.4522	1617.7960	18.4049	1599.3912
X-8-30	1.5252	111.0099	253.3221	2.0427	1.7813	10325.8008	140.8883	287.6668	0.4898	2.5914	1.1468	72.7818	512.2799	17.9305	494.3493
X-8-31	8.7322	134.6177	532.3705	0.8393	0.5263	7814.3962	114.5038	67.7525	1.6900	0.5033	1.5947	15.4162	980.7607	36.0458	944.7149
X-8-32	6.5287	73.8014	535.9325	1.3682	1.1312	11406.8678	144.5381	531.0706	0.2722	7.1959	1.2095	11.3041	950.7113	9.0652	941.6461
X-8-33	2.4736	441.7525	869.2451	1.6546	0.5091	9584.5789	480.3733	383.5958	1.2523	0.8684	3.2503	178.5868	1815.9680	46.9353	1769.0327
X-8-34	15.9903	550.7319	1731.6925	6.6700	2.1640	8730.7767	627.0669	463.1628	1.3539	0.8410	3.0823	34.4416	3513.6267	69.3210	3444.3057
X-8-35	1.9940	175.3026	423.7498	1.9549	1.9883	10246.5086	335.4242	501.7780	0.6685	2.8624	0.9832	87.9156	833.5410	26.8670	806.6741
X-8-36	6.3185	306.6075	953.3249	4.3420	2.5386	9665.6372	277.4663	216.7809	1.2799	0.7070	1.7104	48.5250	1718.5634	26.6092	1691.9542
X-8-37	8.7916	352.2743	1281.1393	3.7476	1.4006	13231.6061	101.3412	101.4768	0.9987	0.2881	2.6757	40.0692	2342.2919	20.8726	2321.4193
X-8-38	6.8018	295.7962	921.8817	3.0743	2.0754	8145.1317	144.8634	252.9215	0.5728	0.8551	1.4813	43.4877	1641.6565	19.4918	1622.1647
X-8-39	3.7793	472.6225	964.7768	2.9135	1.4277	10110.0605	105.7499	353.7095	0.2990	0.7484	2.0407	125.0565	2077.5049	14.5178	2062.9871
X-8-40	11.4834	342.3736	1136.2063	2.7771	1.6532	9012.5902	239.7076	202.0334	1.1865	0.5901	1.6799	29.8146	2238.1816	47.8706	2190.3110
X-8-41	5.9771	372.5962	898.3618	4.0392	1.9126	7789.1871	207.4838	287.7803	0.7210	0.7724	2.1119	62.3377	1754.5123	20.2664	1734.2459
X-8-42	6.8969	710.2352	1952.5006	14.4261	6.4629	8299.7746	184.4018	300.9148	0.6128	0.4237	2.2322	102.9794	3495.0914	40.9880	3454.1033
X-8-43	13.0525	438.5382	1436.8799	0.5796	0.3640	7581.3906	344.6986	200.0031	1.7235	0.4561	1.5920	33.5981	2521.8886	32.5278	2489.3608
X-8-44	1.9146	115.5324	357.6806	1.8818	1.5639	10721.4919	150.4773	470.2011	0.3200	4.0699	1.2033	60.3443	726.8766	7.7255	719.1512
X-8-45	2.0181	4.4452	33.6500	2.8201	1.4801	10616.6421	42.2170	437.6157	0.0965	98.4463	1.9054	2.2027	98.8796	9.6647	89.2149
X-8-46	6.6970	140.2973	434.2998	2.1817	0.7956	7950.5506	223.2219	106.3425	2.0991	0.7580	2.7422	20.9492	907.1250	70.7724	836.3526
X-8-47	1.8201	167.1444	302.2235	0.2337	0.1487	8377.5486	123.2525	143.1833	0.8608	0.8566	1.5715	91.8310	673.8456	22.9226	650.9230
X-8-48	3.7296	330.2098	811.7925	2.7247	2.1295	8277.5239	128.1480	301.7482	0.4247	0.9138	1.2795	88.5367	1514.6308	12.0900	1502.5408
X-8-49	1.7873	304.9468	657.8171	5.7248	3.5925	10505.4281	337.0778	668.2701	0.5044	2.1914	1.5936	170.6163	1332.6552	24.1692	1308.4860
X-8-50	2.6975	362.3481	835.8407	2.6305	1.3377	7645.7882	196.7222	352.4189	0.5582	0.9726	1.9664	134.3274	1635.2905	16.0210	1619.2695
X-8-51	1.9718	310.4206	708.2639	6.3974	4.0039	9265.3375	168.6153	395.4281	0.4264	1.2738	1.5978	157.4337	1360.6111	17.9450	1342.6661
X-8-52	2.0835	102.1766	287.6644	1.2862	1.0286	8242.6482	157.5042	148.7133	1.0591	1.4555	1.2504	49.0412	568.6927	22.5715	546.1211
X-8-53	4.7713	459.7643	1324.4919	0.5907	0.6642	9880.4739	57.9434	273.6941	0.2117	0.5953	0.8894	96.3614	2451.8310	6.7456	2445.0853
X-8-54	2.2376	415.3910	880.8548	30.1600	15.0579	9432.1021	219.3742	201.0716	1.0910	0.4841	2.0029	185.6403	1738.9140	21.4488	1717.4652
X-8-55	3.3653	200.1982	505.2573	3.6062	2.0596	9629.5908	186.7184	198.5659	0.9403	0.9918	1.7509	59.4896	978.8133	22.9187	955.8946

Table S2 (continued)

	Sm(147)	Yb(173)	Y(89)	Nb(93)	Ta(181)	Hf(179)	Th(232)	U(238)	Th/U	U/Yb	Nb/Ta	Yb/Sm	REE	LREE	HREE
X-8-56	3.7577	123.7543	342.8364	1.7139	1.2266	8586.1802	269.1509	208.6917	1.2897	1.6863	1.3974	32.9336	695.0571	40.7729	654.2842
X-8-57	4.1061	405.0205	907.6618	6.0232	2.4712	9408.1967	145.5329	302.0083	0.4819	0.7457	2.4374	98.6399	1781.4412	24.3403	1757.1009
X-8-58	7.3706	237.6562	745.0682	3.1706	1.7426	8411.0286	129.4108	124.8403	1.0366	0.5253	1.8194	32.2439	1363.1644	37.2802	1325.8842
X-8-59	5.0194	648.0348	1921.1439	6.4231	2.9630	8365.2926	138.6251	185.1731	0.7486	0.2857	2.1678	129.1057	3358.5112	14.0313	3344.4800
X-8-60	4.7420	519.7491	1333.0606	7.5667	5.2886	11481.5527	1202.8007	512.0160	2.3491	0.9851	1.4308	109.6045	2430.8055	30.9430	2399.8625
X-8-61	4.0171	295.1807	727.3664	10.2154	5.4674	9201.9099	504.2720	724.6547	0.6959	2.4550	1.8684	73.4809	1392.6438	39.0178	1353.6259
X-8-62	4.6180	195.4199	611.5431	4.1374	1.6767	9061.6477	43.0058	428.4900	0.1004	2.1927	2.4675	42.3166	1211.5661	12.7230	1198.8431
X-8-63	3.9365	445.8410	1238.8445	1.8203	1.3690	11080.7008	128.2907	370.2804	0.3465	0.8305	1.3297	113.2586	2312.0999	8.6054	2303.4944
X-8-64	4.0773	449.0056	974.1933	1.8862	0.8679	8798.0856	140.2643	201.1440	0.6973	0.4480	2.1733	110.1226	1987.5322	25.6850	1961.8471
X-8-65	2.1442	338.5417	1153.8932	1.0822	0.7357	12312.9045	73.9064	446.7686	0.1654	1.3197	1.4709	157.8872	2019.8600	4.7741	2015.0859
X-8-66	34.8378	378.5536	1052.8222	3.5292	1.5967	8301.6392	73.7896	141.5470	0.5213	0.3739	2.2103	10.8662	2392.4637	449.6332	1942.8305
X-8-67	5.6670	353.2582	864.8780	3.4930	3.7508	11219.0218	207.3493	584.4454	0.3548	1.6544	0.9313	62.3363	1741.0581	20.7820	1720.2761
X-8-68	3.4965	96.4355	307.8443	0.6977	0.3589	11685.7775	329.7536	152.1672	2.1670	1.5779	1.9440	27.5808	605.5500	11.0697	594.4803

Table S3

U-Pb dating results of detrital zircons from the samples X-2 and X-8.

	Th(232)	U(238)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
	ppm	ppm		Ratio	1sigma	Ratio	1sigma	Ratio	1sigma	Age (Ma)	1sigma	Age(Ma)	1sigma	Age(Ma)	1sigma
X-2-1	122.6988	145.0124	0.8461	0.0551	0.0024	0.5614	0.0232	0.0742	0.0014	416.7150	102.7675	452.4608	15.1124	461.6511	8.6699
X-2-2	99.3707	595.1811	0.1670	0.0732	0.0013	1.5823	0.0351	0.1563	0.0019	1020.3700	37.0375	963.2698	13.8286	936.3906	10.7699
X-2-3	12.2972	709.6964	0.0173	0.0710	0.0010	1.5238	0.0253	0.1554	0.0016	966.6650	29.6325	940.0007	10.2090	931.0563	9.2011
X-2-4	78.0268	766.3151	0.1018	0.0688	0.0011	1.2711	0.0264	0.1337	0.0019	892.2800	31.4825	832.8917	11.8005	809.0303	10.5579
X-2-5	68.4838	236.2389	0.2899	0.0777	0.0016	1.9540	0.0435	0.1821	0.0026	1140.4400	44.6000	1099.8383	14.9826	1078.3746	14.4607
X-2-6	11.0359	858.4170	0.0129	0.0710	0.0012	1.4859	0.0246	0.1516	0.0015	966.6650	33.3350	924.6603	10.0712	909.8599	8.6746
X-2-7	172.2726	460.5432	0.3741	0.2749	0.0038	22.3740	0.3880	0.5891	0.0083	3334.2550	27.0075	3200.1057	16.9964	2985.9001	33.8629
X-2-8	75.2986	310.7589	0.2423	0.0766	0.0014	1.8270	0.0404	0.1726	0.0028	1110.8000	35.1850	1055.2170	14.5133	1026.3827	15.5112
X-2-9	174.2834	174.9258	0.9963	0.0748	0.0020	1.6293	0.0423	0.1578	0.0020	1062.6600	52.6200	981.5818	16.3391	944.3619	10.9956
X-2-10	180.7616	118.6312	1.5237	0.1343	0.0024	7.2477	0.1290	0.3909	0.0047	2154.6250	31.4850	2142.3968	15.9471	2127.0635	22.0168
X-2-11	226.5505	328.6259	0.6894	0.0607	0.0015	0.8815	0.0220	0.1051	0.0013	631.5000	53.6925	641.7857	11.8750	644.2312	7.3623
X-2-12	79.1845	408.6982	0.1937	0.0678	0.0014	1.4738	0.0281	0.1576	0.0022	864.8100	42.5925	919.6776	11.5407	943.6502	12.3202
X-2-13	106.0286	124.2786	0.8532	0.3329	0.0047	32.7093	0.5535	0.7122	0.0112	3630.5550	22.5550	3571.8882	16.8471	3466.7902	42.2856
X-2-14	90.6328	464.4862	0.1951	0.0549	0.0015	0.5447	0.0170	0.0720	0.0015	405.6050	67.5850	441.5216	11.1595	448.1563	8.7565
X-2-15	189.4033	158.1675	1.1975	0.0789	0.0021	2.0807	0.0605	0.1911	0.0030	1169.4450	51.8525	1142.4749	19.9463	1127.4732	16.1701
X-2-16	250.5956	288.3292	0.8691	0.0747	0.0014	1.8471	0.0377	0.1792	0.0026	1061.1150	32.4075	1062.3993	13.4565	1062.7013	14.1290
X-2-17	126.3875	444.7854	0.2842	0.0738	0.0012	1.5957	0.0325	0.1567	0.0022	1035.1900	61.1125	968.5438	12.7330	938.3440	12.1765
X-2-18	81.9874	187.0212	0.4384	0.0717	0.0016	1.5698	0.0440	0.1583	0.0024	977.4700	50.9275	958.3511	17.4094	947.4210	13.3016
X-2-19	52.8964	495.2256	0.1068	0.0718	0.0015	1.6955	0.0796	0.1700	0.0062	981.1700	47.2250	1006.8188	29.9853	1012.3103	34.2042
X-2-20	329.8183	342.9611	0.9617	0.0788	0.0014	2.1629	0.0366	0.1991	0.0021	1168.5200	66.8175	1169.2112	11.7856	1170.3413	11.3922
X-2-21	137.1224	283.5642	0.4836	0.0686	0.0016	1.4797	0.0369	0.1562	0.0019	887.0350	80.5575	922.1068	15.1165	935.6290	10.5438
X-2-22	489.1163	285.2273	1.7148	0.0612	0.0016	0.7618	0.0222	0.0902	0.0012	655.5700	57.3975	575.0691	12.8272	556.6701	7.0228
X-2-23	68.6173	95.5495	0.7181	0.0571	0.0029	0.5406	0.0272	0.0689	0.0010	494.4850	108.3175	438.8492	17.9585	429.5516	5.8342
X-2-24	77.2699	200.6530	0.3851	0.1564	0.0022	9.1348	0.1710	0.4236	0.0065	2417.5900	22.9925	2351.5973	17.2064	2276.8192	29.4362
X-2-25	56.9493	101.1347	0.5631	0.1128	0.0020	4.9033	0.1036	0.3153	0.0047	1855.5600	33.3350	1802.8197	17.8585	1766.7892	23.1148
X-2-26	131.8764	199.8904	0.6597	0.0590	0.0021	0.5640	0.0213	0.0694	0.0011	568.5500	77.7650	454.1345	13.8034	432.3877	6.3352
X-2-27	116.6983	61.8551	1.8866	0.0657	0.0033	1.2030	0.0574	0.1336	0.0022	795.9900	104.7800	801.9747	26.4841	808.1589	12.5870
X-2-28	149.5739	481.4607	0.3107	0.0751	0.0013	1.7061	0.0446	0.1646	0.0029	1072.2250	35.1825	1010.8070	16.7656	982.1109	16.0759
X-2-29	95.2756	74.8774	1.2724	0.0985	0.0025	3.5424	0.1051	0.2608	0.0038	1595.3700	48.1450	1536.7377	23.5182	1494.1269	19.4392

Table S3 (continued)

	Th(232)	U(238)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
	ppm	ppm		Ratio	1sigma	Ratio	1sigma	Ratio	1sigma	Age (Ma)	1sigma	Age(Ma)	1sigma	Age(Ma)	1sigma
X-2-30	284.7212	210.7649	1.3509	0.1600	0.0039	8.6814	0.3487	0.3911	0.0098	2457.4000	39.6625	2305.1263	36.6098	2127.7369	45.5694
X-2-31	117.6213	138.4945	0.8493	0.1676	0.0025	10.3466	0.1847	0.4476	0.0056	2600.0000	24.6900	2466.2818	16.6141	2384.5225	25.1250
X-2-32	213.9032	285.8094	0.7484	0.0570	0.0019	0.5456	0.0214	0.0693	0.0011	500.0400	74.0675	442.0855	14.0767	431.7123	6.7515
X-2-33	112.0232	202.0986	0.5543	0.0759	0.0017	1.7895	0.0396	0.1713	0.0025	1094.4450	45.8350	1041.6609	14.4487	1019.0487	13.8959
X-2-34	171.1872	191.1817	0.8954	0.0666	0.0018	1.1166	0.0318	0.1216	0.0016	833.3300	55.5550	761.3234	15.2780	739.6220	9.2885
X-2-35	345.4740	336.7180	1.0260	0.0593	0.0015	0.5796	0.0189	0.0706	0.0011	588.9150	57.3950	464.2125	12.1534	439.6360	6.5148
X-2-36	356.5094	350.9356	1.0159	0.1600	0.0025	9.8906	0.1819	0.4480	0.0056	2457.4000	27.3150	2424.6329	17.0399	2386.2766	24.9503
X-2-37	123.9573	228.3439	0.5429	0.1658	0.0029	10.3398	0.1981	0.4523	0.0062	2516.6650	28.5475	2465.6693	17.8178	2405.3719	27.7367
X-2-38	48.5610	120.4923	0.4030	0.0705	0.0021	1.5553	0.0481	0.1600	0.0020	942.5900	65.7400	952.6109	19.1329	956.6794	11.0035
X-2-39	163.6714	165.9227	0.9864	0.0676	0.0019	1.1456	0.0361	0.1225	0.0017	857.4000	62.0350	775.1585	17.1136	745.1018	9.4857
X-2-40	171.7445	163.8416	1.0482	0.0653	0.0022	0.9819	0.0357	0.1091	0.0021	783.3350	65.7350	694.5784	18.3131	667.3822	11.9530
X-2-41	283.0503	527.1645	0.5369	0.1051	0.0016	4.3545	0.0768	0.3004	0.0037	1716.6650	28.0825	1703.7559	14.6156	1693.1226	18.5855
X-2-42	327.2142	555.7390	0.5888	0.0700	0.0011	1.5431	0.0308	0.1597	0.0019	927.7750	33.3325	947.7467	12.3286	954.9692	10.4269
X-2-43	97.5030	176.8499	0.5513	0.0716	0.0019	1.5999	0.0501	0.1617	0.0020	972.2250	55.5550	970.1831	19.5966	965.9610	11.3432
X-2-44	259.3778	516.7471	0.5019	0.1132	0.0017	4.3529	0.0940	0.2785	0.0043	1850.9300	27.9350	1703.4378	17.8590	1583.7593	21.9171
X-2-45	152.7256	268.3001	0.5692	0.0716	0.0014	1.5469	0.0334	0.1566	0.0018	973.7700	6.4800	949.2426	13.3415	937.8920	9.9439
X-2-46	122.4120	318.7699	0.3840	0.2572	0.0052	19.7844	0.4401	0.5570	0.0051	3231.4800	31.7850	3080.8767	21.6023	2854.4127	20.9868
X-2-47	96.3862	472.9791	0.2038	0.0692	0.0015	1.4288	0.0365	0.1496	0.0022	903.3900	42.5925	901.0668	15.2915	898.9257	12.2561
X-2-48	358.5226	438.6551	0.8173	0.2502	0.0036	21.7302	0.3492	0.6299	0.0075	3186.1150	22.0650	3171.7481	15.7459	3149.2414	29.7628
X-2-49	389.0668	448.5210	0.8674	0.0584	0.0015	0.6932	0.0209	0.0859	0.0012	542.6300	55.5450	534.7465	12.5421	531.3073	7.2058
X-2-50	192.5506	364.2714	0.5286	0.0664	0.0014	1.2503	0.0298	0.1365	0.0019	820.3700	44.4400	823.5210	13.4711	824.8267	10.9640
X-2-51	35.6464	561.2863	0.0635	0.0703	0.0012	1.5608	0.0354	0.1609	0.0026	938.8850	35.9600	954.7665	14.0583	961.6037	14.3672
X-2-52	480.0124	537.1245	0.8937	0.0571	0.0013	0.5486	0.0164	0.0695	0.0011	494.4850	49.9950	444.0563	10.7537	433.4096	6.5705
X-2-53	48.6553	184.2828	0.2640	0.0824	0.0017	2.5770	0.0518	0.2272	0.0031	1255.2400	38.8900	1294.1387	14.7272	1319.8003	16.4465
X-2-54	75.5560	155.3320	0.4864	0.0605	0.0019	0.7983	0.0272	0.0958	0.0016	620.3900	66.6550	595.8845	15.3373	589.6304	9.5230
X-2-55	107.7148	121.4164	0.8872	0.0709	0.0020	1.5365	0.0408	0.1574	0.0021	966.6650	56.3250	945.1056	16.3372	942.2066	11.5389
X-2-56	94.2375	159.2708	0.5917	0.1023	0.0021	4.2458	0.0797	0.3015	0.0039	1666.3500	37.6525	1682.9155	15.4717	1698.9746	19.1934
X-2-57	309.0164	371.4232	0.8320	0.0729	0.0014	1.6803	0.0409	0.1670	0.0027	1012.9600	39.6625	1001.1110	15.5052	995.4672	14.7804
X-2-58	86.7922	185.6831	0.4674	0.0879	0.0016	2.9128	0.0583	0.2405	0.0036	1381.1700	35.1875	1385.2340	15.1463	1389.3025	18.7220
X-2-59	177.5284	424.2086	0.4185	0.0763	0.0014	1.9837	0.0397	0.1884	0.0020	1103.3900	37.0375	1109.9669	13.5348	1112.8757	10.9312

Table S3 (continued)

	Th(232)	U(238)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
	ppm	ppm		Ratio	1sigma	Ratio	1sigma	Ratio	1sigma	Age (Ma)	1sigma	Age(Ma)	1sigma	Age(Ma)	1sigma
X-2-60	403.0054	754.4576	0.5342	0.0574	0.0010	0.6833	0.0142	0.0862	0.0011	509.3000	34.2550	528.7550	8.5972	533.0955	6.7446
X-2-61	127.4046	130.9548	0.9729	0.0552	0.0019	0.5289	0.0192	0.0695	0.0009	420.4200	77.7700	431.0893	12.7513	432.8544	5.3634
X-2-62	96.0332	256.6516	0.3742	0.0712	0.0014	1.6809	0.0414	0.1710	0.0026	964.8100	40.7425	1001.3065	15.6848	1017.3998	14.4688
X-2-63	96.1800	233.1164	0.4126	0.0703	0.0018	1.6011	0.0560	0.1644	0.0029	938.8850	52.9350	970.6380	21.8649	981.2007	15.8850
X-2-64	199.2007	290.9952	0.6845	0.1708	0.0028	11.2455	0.1759	0.4776	0.0055	2565.7350	28.2425	2543.6956	14.6886	2516.6458	23.8405
X-2-65	318.4482	86.7111	3.6725	0.0655	0.0025	1.4201	0.0517	0.1578	0.0025	790.7400	84.2525	897.4031	21.6941	944.5961	14.1188
X-2-66	104.6457	134.1409	0.7801	0.0573	0.0022	0.5526	0.0233	0.0699	0.0012	505.5950	85.1750	446.7190	15.2095	435.6788	7.4667
X-2-67	297.1825	248.6343	1.1953	0.1633	0.0028	10.4141	0.2135	0.4618	0.0064	2490.4300	29.1700	2472.3010	19.0656	2447.2848	28.3379
X-8-1	54.0612	179.6691	0.3009	0.0704	0.0020	1.5266	0.0469	0.1575	0.0021	938.8850	59.2600	941.1177	18.8414	942.8979	11.8262
X-8-2	272.5711	305.2638	0.8929	0.1045	0.0019	4.2043	0.1025	0.2919	0.0045	1705.5550	33.3350	1674.8556	20.0342	1650.9873	22.3236
X-8-3	82.5625	141.4078	0.5839	0.0732	0.0019	1.5345	0.0414	0.1525	0.0021	1018.2100	53.7075	944.3027	16.5944	915.2077	11.5465
X-8-4	132.3880	268.3037	0.4934	0.2622	0.0038	19.6683	0.5375	0.5432	0.0110	3260.1800	22.0675	3075.1892	26.4880	2796.7209	46.0812
X-8-5	154.2131	171.9717	0.8967	0.0707	0.0020	1.5321	0.0484	0.1573	0.0020	949.9950	58.4875	943.3332	19.4195	941.7049	11.3657
X-8-6	104.0227	176.7169	0.5886	0.0624	0.0025	0.6144	0.0255	0.0715	0.0010	700.0100	80.5475	486.3024	16.0523	445.0449	6.1563
X-8-7	170.7531	232.5165	0.7344	0.1062	0.0018	4.5117	0.1040	0.3083	0.0051	1735.4900	31.4800	1733.1332	19.1926	1732.4155	25.0839
X-8-8	118.1999	126.6960	0.9329	0.0721	0.0021	1.5594	0.0456	0.1575	0.0025	987.9650	63.8925	954.2326	18.0974	942.6944	13.7707
X-8-9	192.2446	540.4532	0.3557	0.1618	0.0024	10.1413	0.2027	0.4550	0.0074	2475.9200	25.0000	2447.7427	18.5487	2417.5029	32.5941
X-8-10	190.3037	341.1357	0.5579	0.0594	0.0014	0.6714	0.0178	0.0820	0.0012	583.3600	49.9900	521.5614	10.8391	507.9174	7.2317
X-8-11	165.0289	138.8167	1.1888	0.0580	0.0023	0.5578	0.0222	0.0698	0.0011	531.5200	85.1700	450.0990	14.4407	434.7118	6.4406
X-8-12	235.3996	348.5483	0.6754	0.0738	0.0016	1.7870	0.0401	0.1758	0.0025	1036.1150	43.6750	1040.7272	14.6423	1044.1790	13.7850
X-8-13	98.9285	185.8584	0.5323	0.0722	0.0017	1.6697	0.0467	0.1675	0.0025	992.2800	46.3025	997.0774	17.7678	998.1181	13.7755
X-8-14	43.0869	123.1216	0.3500	0.0718	0.0021	1.6428	0.0469	0.1665	0.0027	988.8900	61.1150	986.8039	18.0205	992.8528	15.0655
X-8-15	148.7169	115.5877	1.2866	0.1638	0.0029	10.2888	0.1924	0.4559	0.0068	2495.3700	29.6300	2461.0985	17.3825	2421.4432	30.3096
X-8-16	77.2751	89.9084	0.8595	0.1026	0.0023	3.9748	0.0970	0.2810	0.0043	1672.2150	46.4500	1629.0677	19.8289	1596.2905	21.5372
X-8-17	115.6281	207.7931	0.5565	0.0719	0.0016	1.6065	0.0410	0.1621	0.0029	983.3350	46.6075	972.7383	15.9914	968.3048	15.9000
X-8-18	84.5430	126.7734	0.6669	0.0668	0.0019	1.2548	0.0344	0.1366	0.0023	831.4800	63.8875	825.5536	15.4905	825.5407	13.0657
X-8-19	379.8708	369.3304	1.0285	0.0683	0.0017	1.4728	0.0368	0.1564	0.0024	879.6300	47.2225	919.2585	15.1063	936.4679	13.1961
X-8-20	171.1408	217.0434	0.7885	0.0560	0.0016	0.6554	0.0203	0.0847	0.0011	450.0450	67.5850	511.8100	12.4402	524.2442	6.5744
X-8-21	262.1340	455.3209	0.5757	0.2475	0.0037	20.7711	0.5090	0.6075	0.0128	3168.8300	24.0725	3127.9727	23.8345	3060.1328	51.4860

Table S3 (continued)

	Th(232)	U(238)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
	ppm	ppm		Ratio	1sigma	Ratio	1sigma	Ratio	1sigma	Age (Ma)	1sigma	Age(Ma)	1sigma	Age(Ma)	1sigma
X-8-22	122.6168	234.5465	0.5228	0.0693	0.0017	1.5056	0.0363	0.1576	0.0021	907.1000	54.6325	932.6428	14.7371	943.4404	11.5970
X-8-23	235.2643	212.3515	1.1079	0.0723	0.0014	1.5902	0.0334	0.1594	0.0021	994.4450	38.8925	966.3645	13.1215	953.6144	11.5176
X-8-24	89.6069	227.1442	0.3945	0.0721	0.0015	1.6065	0.0372	0.1613	0.0019	990.7400	42.1350	972.7484	14.4884	963.7230	10.7622
X-8-25	77.6290	133.7201	0.5805	0.0751	0.0023	1.8801	0.0607	0.1813	0.0022	1072.2250	67.5950	1074.1096	21.3956	1074.1858	12.1727
X-8-26	103.8773	147.8255	0.7027	0.0541	0.0019	0.5254	0.0191	0.0704	0.0010	375.9800	81.4725	428.7451	12.7206	438.8557	6.1960
X-8-27	96.0182	246.1377	0.3901	0.1839	0.0029	13.0919	0.2501	0.5158	0.0066	2687.9650	26.2325	2686.2956	18.1122	2681.2499	28.2296
X-8-28	316.5863	316.8532	0.9992	0.0579	0.0017	0.7466	0.0219	0.0935	0.0012	527.8150	64.8075	566.2318	12.7249	576.2755	7.2420
X-8-29	119.8087	138.0620	0.8678	0.0764	0.0020	1.9715	0.0626	0.1868	0.0031	1105.5550	57.8700	1105.8129	21.3882	1104.0980	16.6489
X-8-30	140.8883	287.6668	0.4898	0.0597	0.0017	0.7069	0.0181	0.0861	0.0012	590.7700	59.2475	542.9006	10.7722	532.5824	7.0243
X-8-31	114.5038	67.7525	1.6900	0.0581	0.0038	0.6716	0.0394	0.0851	0.0017	600.0250	174.9775	521.6616	23.9622	526.6008	10.0792
X-8-32	144.5381	531.0706	0.2722	0.0715	0.0013	1.4725	0.0307	0.1490	0.0019	972.2250	4.6300	919.1466	12.6375	895.5943	10.4417
X-8-33	480.3733	383.5958	1.2523	0.0558	0.0017	0.5446	0.0171	0.0707	0.0008	442.6400	66.6600	441.4819	11.2165	440.5152	4.7355
X-8-34	627.0669	463.1628	1.3539	0.0587	0.0014	0.5264	0.0123	0.0650	0.0008	566.7000	49.9900	429.3966	8.2088	406.1474	4.9928
X-8-35	335.4242	501.7780	0.6685	0.0595	0.0014	0.6843	0.0164	0.0834	0.0011	587.0650	19.4400	529.3909	9.8912	516.3559	6.4156
X-8-36	277.4663	216.7809	1.2799	0.0797	0.0020	2.0711	0.0494	0.1884	0.0020	1190.7400	49.5325	1139.3042	16.3453	1112.9096	10.7018
X-8-37	101.3412	101.4768	0.9987	0.0848	0.0023	2.1861	0.0629	0.1868	0.0029	1322.2200	50.7725	1176.6270	20.0496	1103.9330	15.6199
X-8-38	144.8634	252.9215	0.5728	0.0854	0.0019	2.5463	0.0581	0.2159	0.0024	1324.9950	43.6725	1285.3650	16.6658	1260.4013	12.7087
X-8-39	105.7499	353.7095	0.2990	0.0921	0.0024	2.8908	0.1364	0.2251	0.0066	1533.3350	48.1475	1379.5215	35.6098	1308.7225	34.5003
X-8-40	239.7076	202.0334	1.1865	0.0950	0.0022	3.0698	0.0713	0.2343	0.0024	1528.0900	44.2900	1425.1968	17.8040	1357.1144	12.7684
X-8-41	207.4838	287.7803	0.7210	0.0702	0.0016	1.2251	0.0352	0.1269	0.0030	933.0200	52.7800	812.0907	16.0767	770.3181	16.9749
X-8-42	184.4018	300.9148	0.6128	0.2068	0.0034	14.6219	0.2405	0.5128	0.0047	2881.1700	26.5450	2790.9550	15.7490	2668.3669	20.1475
X-8-43	344.6986	200.0031	1.7235	0.0700	0.0017	1.3625	0.0365	0.1413	0.0019	927.7750	56.4825	872.9418	15.6898	851.8555	10.7073
X-8-44	150.4773	470.2011	0.3200	0.0650	0.0013	1.1131	0.0217	0.1244	0.0015	775.9300	42.5875	759.6495	10.4319	755.8213	8.6833
X-8-45	42.2170	437.6157	0.0965	0.0698	0.0013	1.4111	0.0295	0.1468	0.0021	921.9100	38.8900	893.6308	12.4278	883.0213	11.8261
X-8-46	223.2219	106.3425	2.0991	0.0583	0.0023	0.7147	0.0302	0.0890	0.0015	542.6300	91.6525	547.5109	17.9076	549.3465	8.9862
X-8-47	123.2525	143.1833	0.8608	0.0568	0.0028	0.5413	0.0262	0.0693	0.0009	483.3750	107.3950	439.2740	17.2820	431.6853	5.5405
X-8-48	128.1480	301.7482	0.4247	0.1790	0.0027	12.0503	0.2211	0.4885	0.0063	2643.5200	25.0000	2608.3300	17.2952	2564.3859	27.1881
X-8-49	337.0778	668.2701	0.5044	0.0615	0.0011	0.9540	0.0200	0.1127	0.0019	657.4200	38.8850	680.1664	10.4096	688.3171	11.0314
X-8-50	196.7222	352.4189	0.5582	0.2494	0.0031	21.6294	0.3629	0.6289	0.0091	3181.1700	19.7500	3167.2333	16.4260	3145.4338	36.2393
X-8-51	168.6153	395.4281	0.4264	0.0753	0.0012	1.8703	0.0334	0.1803	0.0026	1076.8550	32.5600	1070.6426	11.8249	1068.3721	14.1165

Table S3 (continued)

	Th(232)	U(238)	Th/U	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
	ppm	ppm		Ratio	1sigma	Ratio	1sigma	Ratio	1sigma	Age (Ma)	1sigma	Age(Ma)	1sigma	Age(Ma)	1sigma
X-8-52	157.5042	148.7133	1.0591	0.0600	0.0020	0.6928	0.0265	0.0835	0.0012	605.5750	74.0625	534.4656	15.9281	516.7980	7.3413
X-8-53	57.9434	273.6941	0.2117	0.0705	0.0013	1.5775	0.0422	0.1617	0.0025	944.1300	38.8900	961.4025	16.6473	966.1805	14.0324
X-8-54	219.3742	201.0716	1.0910	0.0700	0.0015	1.4036	0.0350	0.1452	0.0019	927.7750	44.4475	890.4551	14.8021	873.8731	10.9129
X-8-55	186.7184	198.5659	0.9403	0.0764	0.0016	1.9980	0.0477	0.1894	0.0024	1105.5550	42.1300	1114.8237	16.1707	1118.3638	12.7852
X-8-56	269.1509	208.6917	1.2897	0.0599	0.0019	0.6904	0.0210	0.0837	0.0013	611.1300	100.9100	533.0117	12.6284	518.3403	7.5739
X-8-57	145.5329	302.0083	0.4819	0.1057	0.0014	4.2440	0.0729	0.2907	0.0040	1727.7750	25.9250	1682.5669	14.1593	1644.9212	19.8319
X-8-58	129.4108	124.8403	1.0366	0.1639	0.0026	10.0198	0.1929	0.4426	0.0063	2495.9900	27.6250	2436.6045	17.8510	2362.4379	28.0440
X-8-59	138.6251	185.1731	0.7486	0.0685	0.0020	1.3041	0.0429	0.1376	0.0018	883.3300	55.0925	847.5228	18.9000	831.0981	10.3251
X-8-60	1202.8007	512.0160	2.3491	0.1595	0.0020	9.6605	0.1480	0.4387	0.0054	2450.9200	20.3675	2402.9538	14.1885	2344.7558	24.3461
X-8-61	504.2720	724.6547	0.6959	0.0591	0.0011	0.6834	0.0136	0.0838	0.0009	572.2550	42.5825	528.8563	8.1946	518.8146	5.4582
X-8-62	43.0058	428.4900	0.1004	0.0602	0.0011	0.7584	0.0173	0.0912	0.0012	612.9800	42.5850	573.0912	9.9880	562.7643	6.8209
X-8-63	128.2907	370.2804	0.3465	0.0752	0.0012	1.8484	0.0389	0.1780	0.0025	1073.1500	30.3950	1062.8469	13.8913	1056.2831	13.6403
X-8-64	140.2643	201.1440	0.6973	0.1755	0.0023	11.4791	0.1864	0.4743	0.0054	2610.1850	22.2225	2562.8796	15.2632	2502.3508	23.5154
X-8-65	73.9064	446.7686	0.1654	0.0731	0.0014	1.6200	0.0374	0.1608	0.0024	1016.6650	39.3525	977.9876	14.4962	961.4600	13.4746
X-8-66	73.7896	141.5470	0.5213	0.1013	0.0022	3.7937	0.0834	0.2721	0.0028	1647.2150	41.0500	1591.4076	17.6954	1551.2879	14.4171
X-8-67	207.3493	584.4454	0.3548	0.0736	0.0017	1.6101	0.0486	0.1583	0.0024	1031.4850	46.2975	974.1348	18.9315	947.3893	13.5675
X-8-68	329.7536	152.1672	2.1670	0.0556	0.0029	0.6442	0.0343	0.0840	0.0010	435.2300	114.8025	504.9240	21.2143	520.0951	5.9712

Table S4

U-Pb dating results of detrital rutiles from the samples X-2 and X-8.

	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
	Ratio	2SE	Ratio	2SE	Ratio	2SE	Age (Ma)	2SE	Age(Ma)	2SE	Age(Ma)	2SE
X-2-1	0.0706	0.0031	1.4520	0.0649	0.1521	0.0028	889.5093	97.5045	912.4469	28.1806	911.9601	15.6182
X-2-2	0.0580	0.0025	0.8525	0.0356	0.1002	0.0025	491.5003	97.3186	623.6663	19.4830	615.3197	14.7395
X-2-3	0.0641	0.0022	0.8289	0.0361	0.0989	0.0013	705.1874	66.1527	608.3544	18.7730	607.7455	7.7720
X-2-4	0.0567	0.0026	0.6820	0.0357	0.0840	0.0021	467.3259	106.9247	524.3448	21.6811	519.7420	12.5385
X-2-5	0.0638	0.0074	0.9751	0.1078	0.1175	0.0046	513.1168	274.0311	659.7440	56.7080	715.3236	26.7301
X-2-6	0.0713	0.0054	0.7757	0.0448	0.0878	0.0022	788.0768	185.3744	575.9009	26.3364	541.9674	12.7894
X-2-7	0.0604	0.0029	0.8219	0.0448	0.0998	0.0020	569.3472	108.0607	602.0132	24.7539	613.1127	11.6457
X-2-8	0.0693	0.0053	1.0545	0.0809	0.1156	0.0038	767.7887	166.6734	725.4871	41.2673	704.6809	22.0950
X-2-9	0.0658	0.0041	0.9776	0.0790	0.1172	0.0048	711.6010	131.3796	680.0144	39.1848	713.6445	27.6876
X-2-10	0.0609	0.0010	1.0545	0.0262	0.1211	0.0022	622.8861	37.5158	729.2687	12.7268	736.8630	12.5685
X-2-11	0.0580	0.0023	0.8138	0.0308	0.0993	0.0021	489.6436	88.1755	601.3371	17.2977	609.7787	12.5261
X-2-12	0.0580	0.0017	0.6500	0.0222	0.0835	0.0012	488.3464	67.0952	505.7787	13.5124	517.0416	6.9639
X-2-13	0.0603	0.0034	0.8239	0.0509	0.1001	0.0023	565.0034	136.3786	602.9130	28.4214	614.4475	13.3857
X-2-14	0.0585	0.0025	0.8263	0.0386	0.1033	0.0021	522.1109	91.9535	605.9766	21.5816	633.2292	12.5189
X-2-15	0.0647	0.0021	1.0304	0.0499	0.1189	0.0022	730.9578	66.3044	712.3383	23.5598	724.1554	12.9382
X-2-16	0.0619	0.0021	0.8140	0.0369	0.1011	0.0019	654.0743	76.4414	600.8590	20.5779	620.9439	11.0793
X-2-17	0.0696	0.0024	1.0230	0.0273	0.1098	0.0017	881.1644	69.6082	712.2735	13.5219	671.5568	10.0963
X-2-18	0.0640	0.0029	0.8385	0.0415	0.0989	0.0022	671.3158	92.4895	618.7545	24.2090	607.7211	12.7010
X-2-19	0.0629	0.0016	0.7980	0.0240	0.0932	0.0015	675.6402	55.4088	593.0947	13.2469	574.0042	8.9190
X-2-20	0.0580	0.0018	0.6462	0.0258	0.0846	0.0013	495.5465	67.1034	503.1091	15.7785	523.2199	7.5235
X-2-21	0.0681	0.0042	1.0253	0.0657	0.1166	0.0030	766.9110	133.1009	704.4842	32.6795	710.3301	17.2472
X-2-22	0.0614	0.0018	0.8494	0.0335	0.1020	0.0016	618.4215	64.3167	620.2545	18.0560	625.9937	9.3441
X-2-23	0.0617	0.0055	0.6631	0.0587	0.0835	0.0027	515.2807	191.6346	503.8555	35.3237	516.7122	16.0569
X-2-24	0.0628	0.0017	1.0445	0.0335	0.1210	0.0019	684.6251	59.4209	722.2078	16.4977	736.0913	10.7715
X-2-25	0.0918	0.0009	2.9160	0.0752	0.2293	0.0029	1462.1941	20.2133	1380.3244	19.9704	1332.8063	14.4558
X-2-26	0.0966	0.0033	3.4630	0.1454	0.2601	0.0060	1518.9046	64.7048	1502.9968	33.0875	1488.4246	30.7085
X-2-27	0.0705	0.0062	1.0429	0.0895	0.1141	0.0036	872.2741	195.1653	721.7373	45.3564	696.2013	20.6131
X-2-28	0.0551	0.0016	0.6612	0.0188	0.0842	0.0015	391.9777	67.6326	515.8889	12.0218	520.9853	8.8656
X-2-29	0.0859	0.0008	2.5410	0.0602	0.2162	0.0027	1332.0577	18.9979	1279.3901	17.6115	1261.5533	14.3618

Table S4 (continued)

	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
	Ratio	2SE	Ratio	2SE	Ratio	2SE	Age (Ma)	2SE	Age(Ma)	2SE	Age(Ma)	2SE
X-2-30	0.0592	0.0025	0.6767	0.0298	0.0822	0.0016	501.5002	95.3427	520.6396	17.8180	509.0272	9.4894
X-2-31	0.0612	0.0043	0.8181	0.0583	0.1003	0.0035	590.9661	154.8032	603.0892	32.3899	615.9434	20.2427
X-2-32	0.0563	0.0021	0.8084	0.0312	0.1001	0.0019	451.8207	85.3765	598.8440	17.4132	615.0306	11.3350
X-2-33	0.0587	0.0022	0.8038	0.0314	0.1003	0.0014	489.8494	84.4445	594.4374	17.5835	615.9826	7.92731
X-2-34	0.0630	0.0020	1.2822	0.0389	0.1390	0.0029	684.9562	68.7724	835.5767	17.4849	838.78493	16.5590
X-2-35	0.0575	0.0022	0.6615	0.0293	0.0841	0.0016	479.2267	83.2099	510.9017	17.6697	520.2607	9.7838
X-2-36	0.0622	0.0028	0.6518	0.0306	0.0861	0.0019	687.4562	83.3995	508.2477	18.8453	532.2849	11.0832
X-2-37	0.0588	0.0042	0.8305	0.0611	0.1014	0.0037	531.7572	145.2155	611.8284	33.4576	622.3306	21.3240
X-2-38	0.0625	0.0039	0.8302	0.0603	0.1013	0.0025	627.7365	132.8951	605.2613	32.8416	621.9758	14.5209
X-2-39	0.0678	0.0039	1.2419	0.0942	0.1332	0.0037	790.3546	126.0241	798.1154	36.9876	805.3216	21.0110
X-2-40	0.1270	0.0146	2.1420	0.2391	0.1327	0.0085	1866.8056	227.9853	1125.8721	82.2003	800.3147	48.3726
X-2-41	0.0952	0.0071	1.2089	0.1046	0.0937	0.0024	1432.2877	161.4230	784.1334	44.3471	576.8361	13.8453
X-2-42	0.0636	0.0033	0.7507	0.0396	0.0846	0.0017	653.3371	116.6645	561.0441	22.7863	525.0579	10.7217
X-2-43	0.0689	0.0042	1.5398	0.1246	0.1566	0.0056	762.1111	131.3811	915.0774	44.7745	935.6289	30.7885
X-2-44	0.0891	0.0069	1.5820	0.1475	0.1339	0.0109	1373.0741	126.1721	953.8999	56.9146	808.5748	62.2955
X-2-45	0.1085	0.0055	3.2833	0.2215	0.2598	0.0058	1757.5392	92.0763	1469.8624	51.3250	1488.4033	29.5731
X-2-46	0.0665	0.0034	0.8395	0.0469	0.0995	0.0024	779.8138	106.5480	615.1689	25.1025	611.2185	14.3397
X-2-47	0.0626	0.0035	0.8531	0.0488	0.1007	0.0021	606.2531	128.4867	625.5462	28.9516	618.2718	12.2034
X-2-48	0.0646	0.0024	0.8381	0.0417	0.0989	0.0030	725.0947	83.0287	613.7355	22.7305	607.8096	17.4488
X-2-49	0.0637	0.0037	0.8253	0.0527	0.0943	0.0022	653.9390	126.0622	601.2977	29.3203	580.8659	12.9101
X-2-50	0.0615	0.0012	0.8403	0.0369	0.0985	0.0019	640.4328	42.8038	614.3521	19.7139	605.6379	11.0016
X-2-51	0.0623	0.0047	0.8367	0.0678	0.0998	0.0028	572.1421	177.1892	606.7789	38.6682	612.8891	16.6007
X-2-52	0.0623	0.0014	0.8410	0.0382	0.0992	0.0019	672.6968	47.6142	614.6437	19.6025	609.4691	11.1333
X-2-53	0.0582	0.0046	0.6854	0.0650	0.0867	0.0023	414.0997	206.7929	514.4333	37.8342	535.9036	13.8512
X-2-54	0.0944	0.0032	3.4536	0.1504	0.2710	0.0050	1494.1433	67.7775	1504.0262	34.2363	1544.5445	25.3455
X-8-1	0.0614	0.0011	0.7809	0.0212	0.0920	0.0010	639.1499	37.5711	583.8327	12.1355	567.4339	6.0014
X-8-2	0.0580	0.0011	0.7709	0.0223	0.0966	0.0012	524.9817	41.9870	579.7314	13.2954	594.0642	7.3170
X-8-3	0.0638	0.0033	0.8450	0.0358	0.0970	0.0016	636.8613	110.5900	618.9809	20.3621	596.7219	9.6770
X-8-4	0.0599	0.0029	0.6587	0.0396	0.0824	0.0018	518.9282	110.9443	511.5708	24.3511	509.9767	10.6103

Table S4 (continued)

	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$	
	Ratio	2SE	Ratio	2SE	Ratio	2SE	Age (Ma)	2SE	Age(Ma)	2SE	Age(Ma)	2SE
X-8-5	0.0569	0.0025	0.6983	0.0326	0.0883	0.0020	466.4809	94.0382	534.3274	19.4307	545.4627	11.6462
X-8-6	0.0742	0.0030	1.7993	0.0861	0.1752	0.0040	988.8663	87.8442	1031.4860	30.5645	1039.6416	22.16145
X-8-7	0.0831	0.0013	2.0834	0.0512	0.1919	0.0050	1267.5968	29.6365	1141.3325	16.9175	1130.5859	26.9574
X-8-8	0.0595	0.0026	0.6747	0.0355	0.0823	0.0014	512.4581	85.4870	517.4717	19.8377	509.6629	8.1584
X-8-9	0.0714	0.0066	1.2151	0.1131	0.1382	0.0072	823.1198	217.0886	793.6682	50.9927	832.7978	40.9656
X-8-10	0.0620	0.0021	0.9705	0.0648	0.1158	0.0030	647.2052	71.6032	679.7073	32.5784	706.1571	17.1116
X-8-11	0.0585	0.0026	0.8793	0.0375	0.1074	0.0019	464.0001	95.2292	637.5336	20.5304	657.1761	11.1948
X-8-12	0.0540	0.0025	0.6456	0.0329	0.0852	0.0015	300.7737	102.0451	502.4809	20.6753	526.9180	8.7401
X-8-13	0.0639	0.0025	1.3572	0.0598	0.1497	0.0031	676.0864	86.6752	860.3952	25.4336	898.5289	17.2729
X-8-14	0.0635	0.0029	1.2332	0.0572	0.1333	0.0031	700.8067	90.9509	815.6870	24.4522	809.4638	16.4505
X-8-15	0.0633	0.0023	1.2027	0.0440	0.1320	0.0021	691.6053	76.0496	799.2002	20.1138	799.3824	12.1675
X-8-16	0.0810	0.0012	1.4868	0.0349	0.1532	0.0024	1218.6858	27.9024	924.4543	14.1919	919.0328	13.3257
X-8-17	0.0546	0.0013	0.6466	0.0182	0.0849	0.0013	368.0656	54.7187	504.6094	11.0517	524.8737	7.6589
X-8-18	0.0622	0.0021	1.2347	0.0443	0.1337	0.0038	675.3916	75.0641	814.0850	19.7949	808.7394	21.6846
X-8-19	0.0688	0.0079	0.6951	0.0726	0.0842	0.0027	835.9820	211.8548	526.5521	44.4656	520.6757	15.9520
X-8-20	0.0560	0.0022	0.8019	0.0313	0.1037	0.0022	386.8323	91.1723	593.3588	17.6471	635.6117	12.6887
X-8-21	0.0587	0.0040	1.1804	0.0858	0.1345	0.0030	502.8895	173.7976	783.2803	39.8682	813.1567	17.0385
X-8-22	0.0575	0.0022	0.6424	0.0544	0.0803	0.0029	454.6794	71.6798	498.6643	31.7794	497.0255	17.2245
X-8-23	0.0606	0.0026	0.8409	0.0373	0.1021	0.0020	577.2399	85.5870	616.4441	20.7712	626.1180	11.4225
X-8-24	0.0561	0.0024	0.6499	0.0317	0.0833	0.0014	407.6660	103.4677	502.8848	19.5381	515.3601	8.3454
X-8-25	0.0658	0.0022	0.9003	0.0390	0.0984	0.0017	768.4716	71.0342	645.5710	20.7973	604.6818	9.8975
X-8-26	0.0816	0.0029	1.0129	0.0535	0.1128	0.0027	1223.0408	71.2113	707.9005	26.4672	688.8628	15.6273