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APPENDIX 1. ANALYTICAL METHODS

Zircon U-Pb isotopic analysis by LA-ICP-MS

Zircon U-Pb dating (MRS-1, MRS-24 and MRS-27) was carried out by LA-ICP-MS in the State Key Laboratory of Isotope Geochemistry (SKLIG), Guangzhou Institute of Geochemistry, Chinese Academy of Sciences (GIGCAS). Laser ablation was accomplished using a pulsed Resonetic 193 nm ArF excimer laser, operated at a constant energy of 80 mJ, with a repetition rate of 8 Hz and spot diameter of 31 um. The ablated aerosol was carried to an Agilent 7500a ICP-MS by He gas via a Squid system to smooth signals (Liang et al., 2009; Tu et al., 2011). Data were acquired for 30s with the laser off, and 40s with the laser on, giving ~100 mass scans. NIST SRM 610 glass (Gao et al., 2002; Pearce et al., 1997) and Temora zircon standards (Black et al., 2003) are used as external standards. Each block of 5 unknowns was bracketed by analyses of standards. Off-line inspection and integration of background and analytic signals, and time-drift correction and quantitative calibration for trace element analyses and U-Pb dating were performed using ICPMSDataCal (Liu et al., 2008, 2010).

Zircon U-Pb isotopic analysis by SIMS

Secondary ion mass spectrometry (SIMS) zircon U-Pb analyses (CT16–3, CT16–4 and CT16–5) were conducted using a CAMECA IMS1280-HR system at the SKLIG, GIGCAS. Analytical procedure is similar to that described by Li et al. (2009). The O_2^- primary ion beam with an intensity of ~10 nA was accelerated at −13kV. The ellipsoidal spot is ~20 μm × 30 μm in size. The aperture illumination mode (Kohler illumination) was used with a 200 μm primary beam mass filter (PBMF) aperture to produce even sputtering over the entire analyzed area. Oxygen flooding was used to increase the O_2 pressure to 5×10^{-6} Torr in the sample chamber, enhancing Pb^+ sensitivity to a value of ~25 cps/nA/ppm for zircon. This great enhancement of Pb^+ sensitivity is crucial to improve precision of $^{207}Pb/^{206}Pb$ zircon measurement. Positive secondary ions were extracted with a 10 kV potential. In the secondary ion beam optics, a 60 eV energy window was used, together with a mass resolution of ~5400. Rectangular lenses were activated in the secondary ion optics to increase the transmission at high mass resolution. A single electron multiplier was used in ion-counting mode to measure secondary ion beam intensities by the peak jumping sequence: 196 ($^{90}Zr_2{}^{16}O$, matrix reference), 200 ($^{92}Zr_2{}^{16}O$), 200.5 (background), 203.81 ($^{94}Zr_2{}^{16}O$, for mass calibration), 203.97 (Pb), 206 (Pb), 207 (Pb), 208 (Pb), 209 ($^{177}Hf^{16}O_2$), 238 (U), 248 ($^{232}Th^{16}O$), 270 ($^{238}U^{16}O_2$), and 270.1 (reference mass). The integration time for these mass are1.04, 0.56, 4.16, 0.56, 6.24, 4.16, 6.24, 2.08, 1.04, 2.08, 2.08, 2.08, and 0.24 s, respectively. Each measurement consisted of seven cycles, and the total analytical time per measurement was ~12 min. Calibration of Pb/U ratios is relative to the standard zircon Plesovice (337.13 Ma) (Sláma et al., 2008), which was analyzed once every four unknowns, based on an observed linear relationship between *ln* ($^{206}Pb/^{238}U$) and *ln* ($^{238}U^{16}O_2/^{238}U$) (Whitehouse et al., 1997). A long-term uncertainty of 1.5% (1 RSD) for $^{206}Pb/^{238}U$ measurements of the standard zircons was propagated to the unknowns, despite that the measured $^{206}Pb/^{238}U$ error in a specific session is generally around 1% (1 RSD) or less. U and Th concentrations of unknowns were also calibrated relative to the standard zircon Plesovice, with Th and U concentrations of 78 and 755ppm, respectively (Sláma et al., 2008). Measured compositions were corrected for common Pb using non-radiogenic ^{204}Pb. Common Pb is very low, and is largely derived from laboratory contamination introduced during sample preparation (Ireland and Williams, 2003). An average of present-day crustal composition (Stacey and Kramers, 1975) is used for the common Pb. A secondary standard zircon Qinghu (Li at al., 2013) were analyzed as unknown to monitor the reliability of the whole procedure. 8 analytical spots conducted during the course of this study yield a concordia age of 159.70 ± 0.76 Ma, identical to its recommended value. Uncertainties on single analyses are reported at the 1σ level; mean ages for pooled U-Pb analyses are quoted with a 95% confidence interval. The data reduction is carried out by use of the Geochronology software developed at NORDSIM by Dr. Martin Whitehouse. The data processing concept is equivalent to SQUID. The plotting program Isoplot 3.6 software (Ludwig, 2008) were used to calculate ages, uncertainties, weighted means, and the generation of U-Pb concordia plots.

CA-ID-TIMS zircon U-Pb geochronology

Sample preparation, chemical processing and CA-TIMS zircon U-Pb analyses (MRS-1, MRS-24, MRS-27 and CT16–5) were carried out at the Berkeley Geochronology Center (BGC). The crystals were picked up from the previously analyzed mounts and pretreated using the method of thermal annealing at 850 °C for 48 h, followed by chemical abrasion with conc. HF in pressurized dissolution capsules at 220 °C for 8–10 h to minimize the effects from Pb loss (Mundil et al., 2004; Mattinson, 2005). Crystals were selected based on clarity and apparent absence of inherited cores, and photomicrographs were taken to make estimates of grain weight and, ultimately, U and Th concentrations. Analytical procedures follow those described in Mundil et al. (2004). Analyses reported in this study were performed using an in house tracer, details with respect to tracer use and intercalibration are given in Griffis et al. (2018). All uncertainties of CA-ID-TIMS results are reported at the 2-sigma level.

Zircon Lu-Hf isotopic analysis by LA-MC-ICP-MS

In situ zircon Lu-Hf isotopic analyses was conducted on a Neptune Plus MC-ICP-MS (Thermo Fisher Scientific, Germany) in combination with a Geolas HD excimer ArF laser ablation system (Coherent, Göttingen, Germany) at the Wuhan Sample Solution Analytical Technology Co., Ltd, Hubei, China. The Lu-Hf isotopic measurements were made on the same spots that were previously analyzed for U-Pb ages. A “wire” signal smoothing device is included in this laser ablation system, by which smooth signals are produced even at very low laser repetition rates down to 1 Hz (Hu et al., 2012a). Helium was used as the carrier gas within the ablation cell and was merged with argon (makeup gas) after the ablation cell. Small amounts of nitrogen were added to the argon makeup gas flow for the improvement of sensitivity of Hf isotopes (Hu et al., 2008). Compared to the standard arrangement, the addition of nitrogen in combination with the use of the newly designed X skimmer cone and Jet sample cone in Neptune Plus improved the signal intensity of Hf, Yb and Lu by a factor of 5.3, 4.0 and 2.4, respectively. All data were acquired on zircon in single spot ablation mode at a spot size of 44 µm. The energy density of laser ablation that was used in this study was ~7.0 J cm^{-2}. Each measurement consisted of 20 s of acquisition of the background signal followed by 50 s of ablation signal acquisition. Detailed operating conditions for the laser ablation system and the MC-ICP-MS instrument and analytical method are the same as description by Hu et al. (2012b).

Zircon trace elements analysis by LA-ICP-MS

In situ U-Pb dating and trace element analyses of zircon were simultaneously conducted on new grains by LA-ICP-MS at the Wuhan Sample Solution Analytical Technology Co., Ltd., Wuhan, China. Detailed operating conditions for the laser ablation system and the ICP-MS instrument and data reduction are the same as description by Zong et al. (2017). Laser sampling was performed using a GeolasPro laser ablation system that consists of a COMPexPro 102 ArF excimer laser (wavelength of 193 nm and maximum energy of 200 mJ) and a MicroLas optical system. An Agilent 7700e ICP-MS instrument was used to acquire ion-signal intensities. Helium was applied as a carrier gas. Argon was used as the make-up gas and mixed with the carrier gas via a T-connector before entering the ICP. A “wire” signal smoothing device is included in this laser ablation system (Hu et al., 2015). The spot size and frequency of the laser were set to 31 µm and 8 Hz, respectively, in this study. Glass NIST610 was used as external standard for trace element calibration. Each analysis incorporated a background acquisition of ~20–30 s followed by 50 s of data acquisition from the sample. An Excel-based software ICPMSDataCal was used to perform off-line selection and integration of background and analyzed signals, time-drift correction and quantitative calibration for trace element analysis (Liu et al., 2008, 2010). Analyses with light rare earth element (LREE)-rich inclusions were ruled out by monitoring the signal variations of trace elements with time.

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TABLE A1. ZIRCON LA-ICP-MS TRACE ELEMENT CONCENTRATIONS FOR THE ASH SAMPLES FROM MAOERSHAN AND CHAOTIAN SECTIONS

Sample number	Age (Ma)	Ti	Y	Nb	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	Th	U
Maoershan																						
MRS-1_1	261.5	8.36	782	7.27	0.019	12.7	0.18	3.32	6.01	0.36	24.2	7.8	83.8	29.1	121	23.2	194	37.2	7090	2.45	54.8	81.4
MRS-1_2	257.9	8.68	1698	3.97	0.122	14.2	1.02	14.57	18.06	1.12	69.0	19.4	193.7	63.7	245	44.4	353	66.0	7626	1.83	54.6	74.8
MRS-1_3	265.6	4.73	789	12.83	0.008	12.3	0.06	1.32	3.02	0.26	19.4	6.7	80.1	29.6	125	24.3	198	36.9	8552	4.22	40.9	95.9
MRS-1_4	249.0	320.39	1775	18.29	0.178	13.9	0.30	5.50	9.77	0.89	50.4	16.9	187.7	66.1	263	47.8	376	66.5	8524	4.92	75.1	132.0
MRS-1_5	265.0	5.74	731	9.57	0.029	11.2	0.11	1.63	3.69	0.38	19.0	6.3	73.7	27.0	112	21.6	181	34.2	8314	3.32	34.0	74.4
MRS-1_6	260.4	10.62	896	7.12	0.036	13.7	0.28	4.21	7.10	0.41	30.3	9.0	98.1	34.1	136	25.8	219	42.9	7986	2.77	52.7	80.8
MRS-1_7	254.5	6.43	805	10.60	0.001	12.6	0.11	2.07	3.92	0.38	21.7	7.4	80.0	29.8	125	24.1	199	37.4	8380	3.70	43.3	90.3
MRS-1_8	253.5	8.97	2324	6.72	0.383	17.6	1.21	16.99	22.06	1.41	89.6	25.1	253.4	83.2	318	56.5	454	87.1	7435	2.39	83.3	99.6
MRS-1_9	251.3	4.83	1175	19.13	0.007	17.2	0.12	1.85	5.61	0.40	27.8	10.1	120.0	44.1	186	35.0	284	51.2	8550	5.92	69.8	147.8
MRS-1_10	254.1	5.22	1610	6.78	0.036	13.4	0.39	6.76	11.42	0.90	55.5	16.7	179.0	61.0	244	43.9	346	62.2	8124	2.59	55.7	95.1
MRS-1_11	248.9	5.92	1193	9.33	0.013	11.3	0.24	3.56	6.96	0.61	34.8	11.5	128.2	45.1	183	33.6	271	49.1	8163	3.72	40.5	82.5
MRS-1_12	255.9	8.62	898	14.26	0.015	13.3	0.07	1.69	3.83	0.34	21.8	7.7	90.5	33.5	140	26.6	218	40.4	8462	4.71	48.1	109.0
MRS-1_13	248.0	7.71	1502	5.46	0.332	13.9	0.69	10.29	14.12	0.88	57.6	16.4	170.2	57.6	222	40.3	322	59.7	7897	2.10	52.5	78.1
MRS-1_14	255.2	6.26	1872	10.13	0.110	14.7	0.39	5.46	11.08	0.83	52.5	17.6	197.2	69.5	280	51.0	402	73.1	9004	3.72	72.9	131.5
MRS-1_15	253.5	8.53	1153	12.54	0.094	15.3	0.20	3.54	5.68	0.44	30.8	10.5	119.4	42.6	179	33.4	275	51.3	8622	4.28	62.7	113.4
MRS-1_16	251.5	7.64	772	8.01	0.011	10.1	0.11	3.05	5.25	0.37	24.6	7.4	83.4	28.9	118	22.3	187	35.6	8093	3.28	27.8	55.1
MRS-24_1	265.9	7.03	1774	11.78	0.262	17.6	0.51	7.36	10.56	0.82	55.4	16.7	184.7	64.6	265	48.9	404	74.6	8937	3.08	86.8	122.2
MRS-24_2	255.2	7.42	1735	11.95	0.356	24.9	0.49	6.59	10.90	1.01	48.7	15.9	175.1	63.9	264	49.3	400	76.2	8968	4.36	109.8	144.4
MRS-24_3	261.4	7.96	1407	13.09	0.370	19.3	0.39	4.88	8.21	0.65	39.7	12.8	139.9	51.7	217	42.1	341	64.5	8248	3.68	109.7	145.8
MRS-24_4	263.0	6.99	1241	10.58	0.047	16.6	0.23	4.03	6.78	0.40	33.8	11.1	121.6	45.9	191	36.8	304	57.9	9468	3.95	73.3	122.6
MRS-24_5	269.6	10.08	906	20.01	0.029	15.8	0.23	3.49	6.71	0.39	27.3	8.6	93.2	33.1	142	28.1	234	44.2	8765	4.35	66.8	97.6
MRS-24_6	258.1	7.34	1661	13.89	0.098	20.1	0.27	5.32	8.20	0.62	46.5	14.9	165.9	61.2	250	48.0	393	74.2	9511	4.24	118.2	154.1
MRS-24_7	267.6	7.90	935	17.00	0.027	16.4	0.18	2.86	5.20	0.48	25.1	7.8	94.2	34.2	146	28.2	243	46.5	8306	4.16	66.6	111.7
MRS-24_8	268.5	7.17	1611	12.12	0.076	16.5	0.37	5.81	11.26	0.83	47.9	15.5	170.3	59.9	243	45.2	374	70.3	9444	3.01	88.0	109.6
MRS-24_9	258.6	5.10	986	11.32	1.271	19.0	0.60	4.10	4.87	0.36	24.4	8.3	94.4	35.7	152	29.5	250	48.2	8443	3.80	57.5	103.1
MRS-24_10	263.1	13.64	1665	12.60	0.160	15.8	0.45	6.40	11.85	0.93	50.4	16.1	171.8	62.1	253	46.2	380	70.9	8606	3.44	79.6	106.7
MRS-27_1	266.2	14.09	1550	5.91	0.077	10.7	0.51	9.30	13.46	1.84	51.8	15.1	163.9	55.9	224	41.0	335	62.0	8223	2.41	55.0	77.3
MRS-27_2	264.0	10.17	2074	27.35	1.222	41.9	0.76	7.87	11.29	0.99	55.4	18.4	210.5	75.1	309	57.0	466	84.7	8698	7.75	312.8	279.6
MRS-27_3	262.9	13.27	1298	24.76	3.304	32.6	1.34	7.39	9.14	1.02	36.9	11.7	134.9	46.7	199	38.2	316	57.7	8991	5.67	126.2	160.6
MRS-27_4	262.0	12.90	1267	4.61	0.057	9.6	0.40	5.85	8.44	1.13	37.9	11.9	132.4	46.0	182	33.7	283	53.2	8419	2.34	45.6	68.9
MRS-27_5	260.5	13.70	1626	3.94	0.086	10.9	0.64	8.97	11.88	1.96	55.9	16.5	174.7	59.7	233	44.0	352	66.0	8355	2.00	57.3	77.3
Chaotian																						
CT16-3_1	254.0	12.20	847	8.19	0.025	14.7	0.17	3.32	5.96	0.69	24.9	8.7	93.6	34.3	148	29.3	245	48.0	10123	2.93	55.3	90.6
CT16-3_2	257.9	9.95	2049	10.44	1.492	26.7	0.96	11.22	15.43	1.65	74.6	22.8	245.3	88.2	354	65.1	525	98.0	9319	4.27	130.0	170.4
CT16-3_3	254.1	10.64	2892	13.36	0.123	26.7	0.89	13.28	21.11	2.36	109.5	32.4	350.2	122.8	489	91.6	732	135.3	9147	4.95	252.5	258.9
CT16-3_4	258.2	8.45	1205	8.24	0.074	14.6	0.26	4.22	7.42	1.01	36.5	11.8	132.6	49.1	207	40.1	337	65.1	9406	3.50	79.4	125.6
CT16-3_5	252.1	10.04	1107	9.41	3.832	26.2	1.31	7.85	6.62	0.72	32.1	10.8	122.0	45.0	193	37.7	322	61.8	9264	4.02	107.4	147.6
CT16-3_6	255.7	9.27	726	5.21	1.769	16.8	0.69	4.35	4.02	0.65	20.6	7.1	79.2	28.9	123	24.5	211	41.4	9480	2.45	44.0	75.8
CT16-4_1	262.7	11.02	944	5.79	4.599	20.3	1.49	8.78	6.31	0.63	30.3	9.5	105.1	38.2	157	30.1	259	48.7	9708	2.97	57.1	94.8
CT16-4_2	252.3	13.64	1330	8.62	0.019	14.9	0.28	4.21	7.59	0.97	37.3	12.5	142.2	53.2	228	43.8	378	74.9	8732	3.82	159.8	186.2
CT16-4_3	268.2	14.52	880	10.70	0.107	10.6	0.47	5.35	7.02	1.05	31.4	9.1	99.8	35.5	145	28.3	236	44.5	8569	2.72	52.0	80.2
CT16-4_4	250.6	7.29	1769	9.23	0.067	14.3	0.43	6.15	11.60	1.83	58.6	18.4	203.9	72.1	298	55.0	455	87.5	8471	3.89	114.0	167.8
CT16-4_5	244.2	12.14	3557	15.51	0.219	30.1	1.08	15.43	26.59	2.77	131.9	40.0	425.8	148.1	594	107.8	852	155.4	8516	5.34	266.7	290.1
CT16-4_6	250.2	14.23	741	4.86	0.009	9.3	0.13	1.84	4.08	0.67	21.8	7.0	80.3	29.7	125	24.4	205	39.9	9099	2.40	39.4	67.3
CT16-4_7	248.9	13.10	1629	3.90	0.135	11.8	0.66	9.89	12.87	2.15	60.8	18.2	193.8	66.0	263	47.6	387	72.3	8704	2.32	67.9	92.5
CT16-4_8	267.2	11.95	1127	4.94	0.060	9.9	0.32	4.96	7.40	1.18	36.9	11.3	125.2	43.9	180	34.2	277	52.8	8267	2.64	51.4	79.5
CT16-4_9	266.0	11.10	910	5.11	0.019	9.9	0.18	2.85	5.24	0.69	27.3	8.9	97.2	35.3	148	28.0	234	45.7	8472	2.34	46.8	75.6
CT16-4_10	268.6	10.65	1513	3.94	0.108	11.0	0.41	6.69	11.78	1.57	54.7	16.4	174.1	61.1	243	45.6	363	67.7	9096	1.88	59.9	80.5
CT16-4_11	261.6	10.01	783	5.27	0.004	9.7	0.10	1.93	3.86	0.48	20.8	6.8	83.5	30.9	130	25.8	219	42.6	9763	2.43	51.3	90.4
CT16-4_12	268.8	12.26	2710	7.85	0.123	17.0	0.91	12.00	19.89	2.45	98.5	29.5	322.3	113.7	444	81.7	658	121.3	8207	3.60	149.8	180.2
CT16-5_1	266.4	7.54	1025	12.48	0.035	23.2	0.22	3.48	5.77	0.46	27.4	9.1	104.6	39.0	171	34.6	299	58.8	7602	4.05	65.9	116.7
CT16-5_2	262.6	4.92	812	9.45	0.103	18.6	0.14	2.30	4.18	0.50	21.1	7.4	83.9	31.4	133	27.2	231	44.4	7374	4.03	37.7	76.8
CT16-5_3	262.6	7.61	861	10.07	0.014	24.1	0.14	2.69	4.54	0.54	23.5	7.6	91.2	32.2	142	28.4	243	47.5	7948	3.76	58.4	97.6
CT16-5_4	271.1	8.36	873	9.50	3.968	28.4	1.19	6.36	5.94	0.62	23.7	8.0	88.6	32.5	140	27.8	242	47.6	7760	3.68	43.7	78.2
CT16-5_5	266.8	15.73	1130	10.62	4.083	37.1	2.24	11.49	8.00	0.91	31.3	10.4	114.4	41.7	181	36.1	315	60.7	7187	3.72	89.0	115.0
CT16-5_6	259.1	10.81	1596	14.08	4.516	34.3	1.48	10.90	10.46	0.73	46.7	14.8	166.1	60.0	250	47.5	388	75.1	7595	4.28	201.2	191.5
CT16-5_7	279.6	13.91	891	8.51	0.657	14.3	0.30	3.38	4.86	0.40	24.3	8.1	89.3	32.7	142	27.3	228	43.7	7810	2.95	43.2	81.6

TABLE A2. ZIRCON LA-MC-ICP-MS Lu-Hf ISOTOPIC DATA FOR THE ASH SAMPLES FROM MAOERSHAN AND CHAOTIAN SECTIONS

Sample number	Age (Ma)	$^{176}Yb/^{177}Hf$	2s	$^{176}Lu/^{177}Hf$	2s	$^{176}Hf/^{177}Hf$	2s	$^{176}Hf/^{177}Hf_i$	$\varepsilon_{Hf(0)}$	$\varepsilon_{Hf(t)}$	T_{DM} (Ma)
Maoershan											
MRS-1_1	258.12	0.038934	0.000315	0.000866	0.000005	0.282742	0.000012	0.282738	-1.1	4.5	721
MRS-1_2	258.12	0.041016	0.000597	0.000910	0.000009	0.282772	0.000013	0.282767	0.0	5.5	680
MRS-1_3	258.12	0.038316	0.000247	0.000837	0.000003	0.282751	0.000013	0.282747	-0.7	4.8	707
MRS-1_4	258.12	0.037707	0.000100	0.000825	0.000001	0.282738	0.000011	0.282734	-1.2	4.3	725
MRS-1_5	258.12	0.073867	0.001446	0.001656	0.000032	0.282821	0.000014	0.282813	1.7	7.1	622
MRS-1_6	258.12	0.033055	0.000085	0.000727	0.000001	0.282764	0.000010	0.282761	-0.3	5.3	687
MRS-1_7	258.12	0.047263	0.000303	0.001018	0.000004	0.282745	0.000013	0.282740	-1.0	4.5	719
MRS-1_8	258.12	0.044707	0.000659	0.000984	0.000012	0.282812	0.000013	0.282807	1.4	6.9	625
MRS-1_9	258.12	0.038550	0.000389	0.000865	0.000005	0.282755	0.000014	0.282751	-0.6	4.9	702
MRS-1_10	258.12	0.031425	0.000130	0.000794	0.000003	0.282813	0.000015	0.282809	1.5	7.0	619
MRS-1_11	258.12	0.036056	0.000233	0.000788	0.000003	0.282811	0.000012	0.282807	1.4	6.9	623
MRS-1_12	258.12	0.053624	0.000395	0.001106	0.000006	0.282793	0.000011	0.282788	0.8	6.2	652
MRS-1_13	258.12	0.050708	0.000188	0.001059	0.000001	0.282817	0.000012	0.282812	1.6	7.1	618
MRS-1_14	258.12	0.035623	0.000108	0.000783	0.000003	0.282754	0.000013	0.282750	-0.6	4.9	702
MRS-1_15	258.12	0.045965	0.000268	0.001024	0.000003	0.282764	0.000013	0.282759	-0.3	5.2	692
MRS-1_16	258.12	0.095390	0.000974	0.002154	0.000018	0.282839	0.000018	0.282829	2.4	7.7	605
MRS-1_17	258.12	0.058881	0.000863	0.001346	0.000016	0.282778	0.000013	0.282772	0.2	5.7	678
MRS-1_18	258.12	0.050569	0.001194	0.001180	0.000031	0.282796	0.000014	0.282791	0.9	6.3	650
MRS-1_19	258.12	0.030815	0.000102	0.000694	0.000001	0.282688	0.000012	0.282684	-3.0	2.6	794
MRS-1_20	258.12	0.033466	0.000371	0.000732	0.000006	0.282776	0.000014	0.282772	0.1	5.7	671
MRS-27_1	258.82	0.055823	0.001179	0.001205	0.000029	0.282772	0.000012	0.282766	0.0	5.5	685
MRS-27_2	258.82	0.040287	0.000331	0.000900	0.000005	0.282758	0.000011	0.282753	-0.5	5.0	699
MRS-27_3	258.82	0.103878	0.000517	0.002289	0.000019	0.282873	0.000016	0.282862	3.6	8.9	557
MRS-27_4	258.82	0.091372	0.000409	0.001939	0.000008	0.282818	0.000013	0.282809	1.6	7.0	631
MRS-27_5	258.82	0.035112	0.000069	0.000799	0.000002	0.282783	0.000012	0.282779	0.4	5.9	662
MRS-27_6	258.82	0.049218	0.000108	0.001160	0.000005	0.282708	0.000012	0.282702	-2.3	3.2	775
MRS-27_7	258.82	0.035048	0.000113	0.000743	0.000002	0.282766	0.000012	0.282763	-0.2	5.4	684
MRS-27_8	258.82	0.040472	0.000770	0.000891	0.000014	0.282790	0.000011	0.282786	0.6	6.2	653
MRS-27_9	258.82	0.028234	0.000037	0.000639	0.000002	0.282775	0.000011	0.282772	0.1	5.7	670
MRS-27_10	258.82	0.058019	0.000156	0.001225	0.000003	0.282752	0.000013	0.282746	-0.7	4.8	714
MRS-27_11	258.82	0.100946	0.000677	0.002078	0.000013	0.282854	0.000016	0.282844	2.9	8.2	582
MRS-27_12	258.82	0.051683	0.000442	0.001126	0.000008	0.282736	0.000013	0.282730	-1.3	4.2	735
MRS-27_13	258.82	0.052214	0.000377	0.001066	0.000004	0.282721	0.000012	0.282716	-1.8	3.7	754
MRS-27_14	258.82	0.041959	0.000584	0.000871	0.000008	0.282763	0.000013	0.282758	-0.3	5.2	692
MRS-27_15	258.82	0.050787	0.000074	0.001113	0.000002	0.282770	0.000011	0.282765	-0.1	5.4	685
MRS-27_16	258.82	0.029799	0.000052	0.000668	0.000003	0.282756	0.000013	0.282753	-0.6	5.0	698
MRS-27_17	258.82	0.049239	0.000457	0.001037	0.000008	0.282797	0.000012	0.282792	0.9	6.4	646
MRS-27_18	258.82	0.032523	0.000088	0.000702	0.000005	0.282808	0.000011	0.282805	1.3	6.9	624
MRS-27_19	258.82	0.083060	0.001644	0.001810	0.000032	0.282891	0.000013	0.282882	4.2	9.6	523
Chaotian											
CT16-3_1	258.5	0.069926	0.000530	0.002015	0.000015	0.282725	0.000009	0.282716	-1.7	3.7	768
CT16-3_2	258.5	0.047613	0.000952	0.001403	0.000026	0.282720	0.000011	0.282714	-1.8	3.6	762
CT16-3_3	258.5	0.028330	0.000295	0.000839	0.000009	0.282731	0.000008	0.282727	-1.4	4.1	735
CT16-3_4	258.5	0.025981	0.000260	0.000767	0.000007	0.282760	0.000009	0.282757	-0.4	5.1	693
CT16-3_5	258.5	0.026489	0.000245	0.000810	0.000008	0.282731	0.000009	0.282727	-1.5	4.1	736
CT16-3_6	258.5	0.022442	0.000157	0.000685	0.000004	0.282785	0.000009	0.282782	0.5	6.0	657
CT16-3_7	258.5	0.035067	0.000390	0.001034	0.000011	0.282738	0.000010	0.282733	-1.2	4.3	730
CT16-3_8	258.5	0.080833	0.002030	0.002325	0.000056	0.282744	0.000011	0.282733	-1.0	4.3	747

CT16-3_9	258.5	0.073286	0.001100	0.002131	0.000032	0.282742	0.000011	0.282732	-1.0	4.3	745
CT16-3_10	258.5	0.040786	0.000387	0.001198	0.000011	0.282738	0.000011	0.282732	-1.2	4.3	734
CT16-3_11	258.5	0.079650	0.000569	0.002282	0.000015	0.282753	0.000010	0.282742	-0.7	4.6	732
CT16-3_12	258.5	0.042533	0.000455	0.001221	0.000012	0.282734	0.000009	0.282728	-1.3	4.1	739
CT16-3_13	258.5	0.065592	0.000645	0.001894	0.000018	0.282732	0.000011	0.282723	-1.4	3.9	756
CT16-3_14	258.5	0.072822	0.000500	0.002082	0.000012	0.282729	0.000012	0.282719	-1.5	3.8	763
CT16-3_15	258.5	0.036582	0.000478	0.001030	0.000013	0.282712	0.000010	0.282707	-2.1	3.4	767
CT16-4_1	258.3	0.042489	0.000131	0.001210	0.000003	0.282768	0.000009	0.282762	-0.1	5.3	691
CT16-4_2	258.3	0.033040	0.000263	0.000945	0.000007	0.282778	0.000009	0.282774	0.2	5.7	671
CT16-4_3	258.3	0.051646	0.000699	0.001434	0.000019	0.282718	0.000009	0.282711	-1.9	3.5	766
CT16-4_4	258.3	0.087526	0.003202	0.002380	0.000085	0.282706	0.000015	0.282694	-2.3	2.9	804
CT16-4_5	258.3	0.031170	0.000487	0.000896	0.000014	0.282773	0.000013	0.282768	0.0	5.5	678
CT16-4_6	258.3	0.021885	0.000166	0.000643	0.000005	0.282787	0.000010	0.282784	0.5	6.1	654
CT16-4_7	258.3	0.028295	0.000284	0.000822	0.000008	0.282757	0.000009	0.282753	-0.5	5.0	699
CT16-4_8	258.3	0.023509	0.000090	0.000689	0.000003	0.282759	0.000008	0.282756	-0.5	5.1	693
CT16-4_9	258.3	0.021363	0.000175	0.000636	0.000004	0.282820	0.000012	0.282817	1.7	7.3	607
CT16-4_10	258.3	0.039014	0.000551	0.001095	0.000015	0.282738	0.000009	0.282733	-1.2	4.3	730
CT16-4_11	258.3	0.037795	0.000572	0.001064	0.000015	0.282795	0.000011	0.282790	0.8	6.3	650
CT16-4_12	258.3	0.058302	0.000832	0.001551	0.000020	0.282919	0.000013	0.282911	5.2	10.6	480
CT16-4_13	258.3	0.069090	0.000860	0.001914	0.000023	0.282792	0.000010	0.282783	0.7	6.0	669
CT16-4_14	258.3	0.040743	0.000533	0.001134	0.000013	0.282818	0.000010	0.282812	1.6	7.1	619
CT16-4_15	258.3	0.071284	0.000550	0.001918	0.000017	0.282732	0.000009	0.282722	-1.4	3.9	756
CT16-4_16	258.3	0.030742	0.000432	0.000879	0.000012	0.282809	0.000015	0.282805	1.3	6.8	627
CT16-5_1	257.4	0.099226	0.000633	0.002860	0.000017	0.282771	0.000010	0.282757	0.0	5.1	718
CT16-5_2	257.4	0.257061	0.002794	0.006989	0.000076	0.282809	0.000012	0.282776	1.3	5.8	747
CT16-5_3	257.4	0.034831	0.000312	0.001007	0.000010	0.282756	0.000010	0.282751	-0.6	4.9	704
CT16-5_4	257.4	0.033077	0.000227	0.000947	0.000006	0.282825	0.000011	0.282820	1.9	7.4	605
CT16-5_5	257.4	0.121478	0.001444	0.003372	0.000039	0.282782	0.000011	0.282766	0.4	5.4	711
CT16-5_6	257.4	0.055700	0.000084	0.001507	0.000003	0.282739	0.000012	0.282732	-1.2	4.2	737
CT16-5_7	257.4	0.043571	0.000544	0.001255	0.000015	0.282744	0.000011	0.282738	-1.0	4.5	725
CT16-5_8	257.4	0.041428	0.000143	0.001196	0.000004	0.282748	0.000010	0.282742	-0.8	4.6	719
CT16-5_9	257.4	0.036911	0.000513	0.001049	0.000015	0.282765	0.000010	0.282760	-0.2	5.2	692
CT16-5_10	257.4	0.033652	0.000596	0.001016	0.000017	0.282741	0.000008	0.282736	-1.1	4.4	725
CT16-5_11	257.4	0.066020	0.000236	0.001899	0.000006	0.282856	0.000009	0.282846	3.0	8.3	576
CT16-5_12	257.4	0.034271	0.000192	0.001000	0.000004	0.282722	0.000011	0.282717	-1.8	3.7	751
CT16-5_13	257.4	0.026948	0.000255	0.000770	0.000007	0.282739	0.000009	0.282735	-1.2	4.3	724
CT16-5_14	257.4	0.045445	0.000362	0.001264	0.000010	0.282757	0.000012	0.282751	-0.5	4.9	707
CT16-5_15	257.4	0.060084	0.000721	0.001640	0.000018	0.282734	0.000015	0.282726	-1.3	4.0	748
CT16-5_16	257.4	0.072714	0.000364	0.002064	0.000007	0.282692	0.000018	0.282682	-2.8	2.5	818
CT16-5_17	257.4	0.048762	0.000505	0.001369	0.000016	0.282775	0.000016	0.282769	0.1	5.5	683
CT16-5_18	257.4	0.059350	0.000585	0.001702	0.000018	0.282768	0.000010	0.282760	-0.1	5.2	699
CT16-5_19	257.4	0.026488	0.000239	0.000735	0.000006	0.282781	0.000009	0.282777	0.3	5.8	664
CT16-5_20	257.4	0.027639	0.000342	0.000743	0.000006	0.282850	0.000012	0.282846	2.8	8.3	567
CT16-5_21	257.4	0.061629	0.000356	0.001760	0.000009	0.282793	0.000011	0.282785	0.8	6.1	664
CT16-5_22	257.4	0.068698	0.000579	0.001830	0.000013	0.282772	0.000009	0.282763	0.0	5.3	697