Table DR1: U-Th disequilibrium zircon analyses

analysis designation	sample	grain	width* µm	depth µm	(^{238}U)/(^{232}Th)	±	(^{230}Th)/(^{232}Th)	±	U ppm	zircon-melt slope	±	age (ka)	+	-
pumice														
C	TBJ-C	1	65	0.3-4.2	7.61	0.09	2.36	0.58	123	0.137	0.095	16.1	12.7	-11.4
C	TBJ-C	2	55	0.3-4.2	7.57	0.09	1.80	0.94	123	0.047	0.154	5.2	19.2	-16.3
C	TBJ-C	3	60	0.3-4.2	8.45	0.15	1.42	1.14	75	-0.015	-0.163	-1.6	-16.3	19.1
C	TBJ-C	4 spot A	85	0.3-2.7	7.42	0.10	0.956	1.512	109	-0.095	-0.254	-9.9	-22.8	28.9
C	TBJ-C	5	105	0.3-4.2	10.7	0.1	1.07	1.69	77	-0.049	-0.182	-5.2	-17.5	20.8
C	TBJ-C	4 spot B	85	0.3-2.2	7.31	0.09	1.76	1.24	111	0.042	0.212	4.7	27.3	-21.8
C	TBJ-C	m-2 1	-	0.2-11.7	9.26	0.37	8.22	1.12	60	0.861	0.149	215	∞	-79
2012_04_08Apr\ Ilo_C_pixie@2.ais	TBJ-C	2	50	rim	8.62	0.22	1.58	0.39	319	0.009	0.055	1.0	6.2	-5.9
2012_04_08Apr\ Ilo_C_pixie@1.ais	TBJ-C	1	60	rim	7.99	0.15	2.17	0.48	175	0.100	0.074	11.6	9.4	-8.7
2012_04_08Apr\ Ilo_C_pixie@1B.ais	TBJ-C	1	60	rim	8.08	0.15	1.28	2.45	313	-0.035	-0.371	-3.8	-33.5	48.5
2012_04_08Apr\ Ilo_C_pixie@2B.ais	TBJ-C	2	50	rim	10.4	0.2	1.63	0.45	146	0.013	0.050	1.4	5.7	-5.4
2012_05_22May\ L_TBJF@1.ais	TBJ-F	1	50	rim	7.33	0.05	1.86	0.26	128	0.059	0.045	6.6	5.3	-5.1
2012_05_22May\ L_TBJF@2.ais	TBJ-F	2	55	rim	6.23	0.04	1.97	0.20	197	0.095	0.042	10.8	5.2	-5.0
2012_05_22May\ L_TBJF@3.ais	TBJ-F	3	60	rim	7.77	0.07	2.19	0.44	81	0.107	0.069	12.4	8.9	-8.2
2012_05_22May\ L_TBJB@1.ais	TBJ-B	1	90	rim	7.49	0.05	2.09	0.42	81	0.096	0.071	11.0	8.9	-8.2
2012_05_22May\ L_TBJB@2.ais	TBJ-B	2	110	rim	7.97	0.10	2.23	0.45	69	0.109	0.069	12.6	8.8	-8.1
2012_05_22May\ L_TBJB@3.ais	TBJ-B	3	75	rim	7.28	0.05	1.94	0.38	92	0.073	0.065	8.3	7.9	-7.4
2012_05_22May\ L_TBJB@4.ais	TBJ-B	4	80	rim	7.25	0.04	2.10	0.28	138	0.101	0.048	11.6	6.0	-5.7
2012_05_22May\ L_TBJE@3.ais	TBJ-E	3	65	rim	8.91	0.09	3.07	0.88	40	0.209	0.119	25.5	17.7	-15.3
2012_05_22May\ L_TBJB@6.ais	TBJ-B	6	60	rim	7.90	0.09	2.30	0.44	73	0.122	0.069	14.2	8.9	-8.3
2012_05_22May\ L_TBJF@5.ais	TBJ-F	5	45	rim	7.36	0.05	3.05	0.19	218	0.260	0.032	32.8	4.9	-4.7
ash														
2012_12_24Dec\ Sheets@10.ais	TBJ-Sheets	10	45	rim	8.56	0.12	1.82	0.38	69	0.042	0.054	4.7	6.4	-6.0
2012_12_24Dec\ Sheets@17.ais	TBJ-Sheets	17	40	rim	9.69	0.15	4.32	0.26	216	0.341	0.032	45.5	5.4	-5.1
2012_12_24Dec\ Sheets@18.ais	TBJ-Sheets	18	45	rim	7.94	0.11	2.09	0.23	106	0.089	0.036	10.2	4.4	-4.2
2012_12_24Dec\ Sheets@19.ais	TBJ-Sheets	19	45	rim	7.36	0.18	3.51	0.21	164	0.338	0.037	45.0	6.3	-5.9
2012_12_24Dec\ Sheets@20.ais	TBJ-Sheets	20	50	rim	8.69	0.13	2.58	0.42	82	0.147	0.058	17.3	7.6	-7.1
2012_12_24Dec\ Sheets@2.ais	TBJ-Sheets	2	35	rim	11.1	0.1	10.1	0.4	148	0.893	0.041	244	52	-35
2012_12_24Dec\ Sheets@3.ais	TBJ-Sheets	3	40	rim	6.75	0.14	2.26	0.23	126	0.140	0.044	16.5	5.7	-5.4
2012_12_24Dec\ Sheets@8.ais	TBJ-Sheets	8	35	rim	12.1	0.2	3.83	0.38	121	0.218	0.036	26.9	5.1	-4.9
2012_12_24Dec\ Sheets@9.ais	TBJ-Sheets	9	30	rim	9.42	0.12	2.42	0.38	78	0.113	0.048	13.1	6.1	-5.8
2012_12_24Dec\ TBJ_distal@1.ais	TBJ-Chavez	1	45	rim	10.1	0.2	10.5	0.5	147	1.030	0.059	∞	∞	∞
2012_12_24Dec\ TBJ_distal@10.ais	TBJ-Chavez	10	45	rim	8.46	0.12	1.62	0.32	88	0.014	0.045	1.6	5.1	-4.9
2012_12_24Dec\ TBJ_distal@2.ais	TBJ-Chavez	2	35	rim	8.71	0.13	1.93	0.25	109	0.056	0.035	6.3	4.1	-4.0
2012_12_24Dec\ TBJ_distal@3.ais	TBJ-Chavez	3	35	rim	9.13	0.14	1.60	0.28	108	0.011	0.037	1.2	4.1	-4.0
2012_12_24Dec\ TBJ_distal@4.ais	TBJ-Chavez	4	45	rim	8.31	0.11	2.47	0.34	90	0.139	0.049	16.4	6.4	-6.1
2012_12_24Dec\ TBJ_distal@5.ais	TBJ-Chavez	5	35	rim	8.60	0.12	1.85	0.35	82	0.047	0.049	5.3	5.7	-5.4
2012_12_24Dec\ TBJ_distal@8.ais	TBJ-Chavez	8	50	rim	9.35	0.19	1.98	0.35	97	0.059	0.044	6.6	5.2	-5.0
2012_12_24Dec\ TBJ_distal@9.ais	TBJ-Chavez	9	35	rim	9.42	0.17	2.10	0.46	68	0.073	0.058	8.3	7.1	-6.7
2012_12_24Dec\ TBJ_distal@11.ais	TBJ-Chavez	11	50	rim	11.6	0.2	2.36	0.34	103	0.083	0.033	9.5	4.0	-3.9

2012_12_24Dec\ TBJ_distal@12.ais	TBJ-Chavez	12	45	rim	6.98	0.13	1.86	0.17	164	0.061	0.031	6.9	3.6	-3.5
2012_12_24Dec\ TBJ_distal@13.ais	TBJ-Chavez	13	75	rim	8.97	0.17	2.25	0.36	83	0.098	0.048	11.3	6.0	-5.7
2012_12_24Dec\ TBJ_distal@14.ais	TBJ-Chavez	14	50	rim	9.08	0.12	1.69	0.38	88	0.022	0.050	2.5	5.7	-5.5
2012_12_24Dec\ TBJ_distal@15.ais	TBJ-Chavez	15	50	rim	9.05	0.12	2.78	0.31	106	0.167	0.041	19.9	5.6	-5.3
2012_12_24Dec\ TBJ_distal@16.ais	TBJ-Chavez	16	25	rim	7.82	0.11	1.87	0.16	168	0.055	0.025	6.2	2.9	-2.8
2012_12_24Dec\ TBJ_distal@17.ais	TBJ-Chavez	17	30	rim	8.77	0.12	1.76	0.25	95	0.033	0.035	3.6	4.0	-3.8
2012_12_24Dec\ TBJ_distal@18.ais	TBJ-Chavez	18	35	rim	8.08	0.11	2.38	0.30	65	0.131	0.046	15.3	5.9	-5.6
El Chichón Unit D#														
2012_12_24Dec\ ElChichon@1.ais	El Chichón Unit D	1	55	rim	8.21	0.12	2.01	0.10	408	0.141	0.014	16.7	1.7	-1.7
2012_12_24Dec\ ElChichon@10.ais	El Chichón Unit D	10	60	rim	7.43	0.12	1.93	0.09	432	0.147	0.014	8.7	1.8	-1.8
2012_12_24Dec\ ElChichon@11.ais	El Chichón Unit D	11	65	rim	6.46	0.09	1.68	0.07	480	0.126	0.014	18.3	1.9	-1.9
2012_12_24Dec\ ElChichon@13.ais	El Chichón Unit D	13	75	rim	7.33	0.10	1.45	0.17	311	0.073	0.026	69.0	4.0	-3.8
2012_12_24Dec\ ElChichon@14.ais	El Chichón Unit D	14	65	rim	18.2	0.4	12.7	0.4	541	0.685	0.027	18.0	3.8	-3.7
2012_12_24Dec\ ElChichon@2.ais	El Chichón Unit D	2	75	rim	4.71	0.07	1.27	0.06	497	0.077	0.015	5.7	1.9	-1.8
2012_12_24Dec\ ElChichon@3.ais	El Chichón Unit D	3	75	rim	9.39	0.21	2.28	0.12	526	0.154	0.014	17.4	1.8	-1.8
2012_12_24Dec\ ElChichon@6.ais	El Chichón Unit D	6	130	rim	8.05	0.14	4.29	0.12	658	0.469	0.019	14.8	1.7	-1.7
2012_12_24Dec\ ElChichon@8.ais	El Chichón Unit D	8	60	rim	7.44	0.11	1.97	0.19	198	0.152	0.029	8.3	3.1	-3.1
2012_12_24Dec\ ElChichon@9.ais	El Chichón Unit D	9	100	rim	6.83	0.11	1.29	0.09	409	0.051	0.016	126	9.9	-9.0
pottery														
2012_04_08Apr\ 16_031@1.ais	MAR-16	ts31	20†	in-situ	6.79	0.13	6.27	0.23	835	0.894	0.049	245	68	-42
2012_04_08Apr\ 16_028@1.ais	MAR-16	ts28	15†	in-situ	5.68	0.15	5.36	0.16	2509	0.914	0.050	268	95	-50
2012_04_08Apr\ 16_021@1.ais	MAR-16	ts21	10§	in-situ	5.44	0.23	5.81	0.55	468	1.082	0.154	∞	∞	∞	
2012_04_08Apr\ 16_001@1.ais	MAR-16	ts1	20†	in-situ	5.63	0.11	5.12	0.18	1596	0.866	0.048	219	49	-34
2012_05_22May\ L_MAR016@1.ais	MAR-16	l1	60	rim	6.06	0.07	6.01	0.17	874	0.979	0.039	424	∞	-116
2012_05_22May\ L_MAR016@3.ais	MAR-16	l3	55	rim	6.53	0.08	7.05	0.24	405	1.095	0.051	∞	∞	∞	
2012_05_22May\ L_MAR016@4.ais	MAR-16	l4	70	rim	9.87	0.10	10.3	0.4	315	1.041	0.049	∞	∞	∞	
2012_05_22May\ L_MAR016@5.ais	MAR-16	l5	55	rim	8.75	0.06	8.88	0.22	485	1.012	0.032	∞	∞	∞	
2012_05_22May\ L_MAR016@6.ais	MAR-16	l6	50	rim	7.04	0.46	9.19	0.85	485	1.378	0.191	∞	∞	∞	
2012_05_22May\ L_MAR016@7.ais	MAR-16	l7	55	rim	8.06	0.05	7.78	0.35	297	0.951	0.054	330	∞	-82
2012_05_22May\ L_MAR016@8.ais	MAR-16	l8	60	rim	6.56	0.09	6.92	0.22	457	1.063	0.047	∞	∞	∞	
2012_05_22May\ L_MAR016@9.ais	MAR-16	l9	60	rim	7.57	0.07	7.71	0.23	499	1.016	0.040	∞	∞	∞	
2012_05_22May\ L_MAR016@10.ais	MAR-16	l10	55	rim	4.63	0.02	5.02	0.22	137	1.108	0.071	∞	∞	∞	
2012_05_22May\ L_MAR016@11.ais	MAR-16	l11	55	rim	6.88	0.06	7.14	0.26	500	1.039	0.050	∞	∞	∞	
2012_05_22May\ L_MAR016@12.ais	MAR-16	l12	75	rim	7.94	0.10	8.31	0.15	2057	1.050	0.029	∞	∞	∞	
2012_05_22May\ S_MAR016@1.ais	MAR-16	s1	45	rim	5.37	0.07	5.81	0.18	884	1.101	0.050	∞	∞	∞	
2012_05_22May\ S_MAR016@2.ais	MAR-16	s2	45	rim	8.96	0.06	9.00	0.20	867	1.000	0.028	869	∞	-481
2012_05_22May\ S_MAR016@3.ais	MAR-16	s3	55	rim	4.33	0.04	4.51	0.17	749	1.046	0.062	∞	∞	∞	
2012_05_22May\ S_MAR016@4.ais	MAR-16	s4	40	rim	6.50	0.07	6.56	0.28	1034	1.003	0.058	∞	∞	∞	
2012_05_22May\ S_MAR016@5.ais	MAR-16	s5	50	rim	5.73	0.04	5.92	0.17	499	1.035	0.041	∞	∞	∞	
2012_05_22May\ S_MAR016@6.ais	MAR-16	s6	45	rim	2.05	0.02	2.18	0.03	3220	1.146	0.078	∞	∞	∞	
2012_05_22May\ S_MAR016@7.ais	MAR-16	s7	50	rim	5.76	0.03	6.07	0.28	663	1.062	0.066	∞	∞	∞	
2012_05_22May\ S_MAR016@8.ais	MAR-16	s8	45	rim	5.87	0.03	5.90	0.16	927	0.998	0.037	688	∞	-334
2012_05_22May\ S_MAR016@9.ais	MAR-16	s9	50	rim	7.23	0.07	7.09	0.20	687	0.968	0.036	377	∞	-83
2012_05_22May\ S_MAR016@10.ais	MAR-16	s10	50	rim	6.07	0.03	6.47	0.20	717	1.078	0.045	∞	∞	∞	

2012_05_22May\	S_MAR016@11.ais	MAR-16	s11	50	rim	6.99	0.04	7.46	0.23	396	1.077	0.043	∞	∞	∞	
2012_05_22May\	S_MAR016@12.ais	MAR-16	s12	35	rim	6.67	0.05	6.98	0.28	653	1.052	0.056	∞	∞	∞	
2012_05_22May\	S_MAR016@14.ais	MAR-16	s14	45	rim	5.65	0.05	5.83	0.16	902	1.031	0.041	∞	∞	∞	
2012_05_22May\	S_MAR016@15.ais	MAR-16	s15	50	rim	4.78	0.05	4.75	0.14	578	0.978	0.045		417	∞	-122
2012_05_22May\	S_MAR016@16.ais	MAR-16	s16	50	rim	6.92	0.17	7.10	0.27	424	1.025	0.059	∞	∞	∞	
2012_05_22May\	S_MAR016@17.ais	MAR-16	s17	45	rim	5.50	0.27	7.47	0.91	387	1.477	0.246	∞	∞	∞	
2012_05_22May\	S_MAR016@18.ais	MAR-16	s18	50	rim	4.70	0.10	5.44	0.22	531	1.215	0.079	∞	∞	∞	
2012_05_22May\	S_MAR016@19.ais	MAR-16	s19	45	rim	6.95	0.10	7.08	0.18	1821	1.016	0.037	∞	∞	∞	
2012_05_22May\	S_MAR016@20.ais	MAR-16	s20	50	rim	5.43	0.03	5.47	0.13	638	0.998	0.035		697	∞	-336
2012_05_22May\	S_MAR016@21.ais	MAR-16	s21	45	rim	5.61	0.03	5.73	0.13	529	1.017	0.034	∞	∞	∞	
2012_05_22May\	S_MAR016@22.ais	MAR-16	s22	60	rim	8.43	0.05	8.73	0.35	633	1.037	0.051	∞	∞	∞	
2012_05_22May\	S_MAR016@23.ais	MAR-16	s23	55	rim	9.44	0.10	9.80	0.29	1053	1.040	0.038	∞	∞	∞	
2012_05_22May\	S_MAR016@24.ais	MAR-16	s24	40	rim	6.50	0.05	6.54	0.18	282	0.998	0.037		694	∞	-338
2012_05_22May\	S_MAR016@26.ais	MAR-16	s26	50	rim	5.54	0.04	5.89	0.15	600	1.075	0.038	∞	∞	∞	
2012_05_22May\	S_MAR016@27.ais	MAR-16	s27	65	rim	4.53	0.07	4.52	0.20	640	0.984	0.069		449	∞	-181
2012_05_22May\	S_MAR016@28.ais	MAR-16	s28	45	rim	6.83	0.04	7.24	0.24	1760	1.068	0.045	∞	∞	∞	
2012_05_22May\	S_MAR016@29.ais	MAR-16	s29	45	rim	6.39	0.04	6.65	0.23	361	1.045	0.048	∞	∞	∞	
2012_05_22May\	S2_MAR016@13.ais	MAR-16	s13	40	rim	6.13	0.03	6.46	0.17	985	1.060	0.037	∞	∞	∞	
2012_12_24Dec\	MAR20@10.ais	MAR-20	10	40	rim	5.92	0.10	5.71	0.16	361	0.943	0.041		312	139	-59
2012_12_24Dec\	MAR20@11.ais	MAR-20	11	35	rim	5.69	0.27	6.06	0.53	233	1.079	0.143	∞	∞	∞	
2012_12_24Dec\	MAR20@15.ais	MAR-20	15	45	rim	10.7	0.2	10.9	0.2	375	1.024	0.032	∞	∞	∞	
2012_12_24Dec\	MAR20@16.ais	MAR-20	16	40	rim	4.70	0.08	4.44	0.18	509	0.906	0.059		258	109	-54
2012_12_24Dec\	MAR20@17.ais	MAR-20	17	40	rim	8.78	0.49	9.81	0.70	576	1.136	0.122	∞	∞	∞	
2012_12_24Dec\	MAR20@2.ais	MAR-20	2	35	rim	11.7	0.2	11.3	0.4	288	0.956	0.038		342	222	-68
2012_12_24Dec\	MAR20@4.ais	MAR-20	4	35	rim	12.3	0.2	13.1	0.4	188	1.070	0.040	∞	∞	∞	
2012_12_24Dec\	MAR20@5.ais	MAR-20	5	30	rim	6.80	0.10	6.43	0.20	314	0.922	0.042		278	85	-47
2012_12_24Dec\	MAR20@6.ais	MAR-20	6	35	rim	8.86	0.15	8.47	0.26	393	0.941	0.040		308	123	-56
2012_12_24Dec\	MAR20@7.ais	MAR-20	7	35	rim	8.19	0.32	8.64	0.40	213	1.061	0.078	∞	∞	∞	
2012_12_24Dec\	MAR20@8.ais	MAR-20	8	30	rim	10.1	0.2	9.92	0.42	252	0.975	0.056		404	∞	-130

all uncertainties 1σ

decay constants used: λ_{230}: 9.1577 $\cdot 10^{-6}$ a^{-1}; λ_{232}: 4.9475$\cdot 10^{-11}$ a^{-1}; λ_{238}: 1.55125$\cdot 10^{-10}$ a^{-1}

zircon model ages calculated for melt composition (^{238}U)/(^{232}Th) = 1.47±0.02 and (^{230}Th)/(^{232}Th) = 1.52±0.004 (Garrison et al., 2012), except for El Chichón, where (^{238}U)/(^{232}Th) = 1.018 and (^{230}Th)/(^{232}Th) = 0.991 (Pickett, D. A., and Murrell, M. T., 1997, Observations of ^{231}Pa/^{235}U disequilibrium in volcanic rocks: Earth and Planetary Science Letters, v.148, p. 259-271, doi:10.1016/S0012-821X(97)00037-X) was used.

rim are analyses to ~5 µm depth
∞ secular equilibrium
* aspect ratio between ~1 and 3
† crystal with adherent glass
§ matrix hosted

#Unit D, ca. 1.25 ka: Espíndola, J. M., Macías, J. L., Tilling, R. I., and Sheridan, M. F., 2000, Volcanic history of El Chichón Volcano (Chiapas, Mexico) during the Holocene, and its impact on human activity: Bulletin of Volcanology, v. 62, p. 90-104, doi:10.1007/s004459900064.

Table DR2: U-Pb zircon analyses

analysis designation	sample	grain	width* µm	Age (Ma) $^{206}Pb/^{238}U$	±	Age (Ma) $^{207}Pb/^{235}U$	±	Age (Ma) $^{207}Pb/^{206}Pb$	±	% Radiogenic ^{206}Pb	$^{206}Pb/^{238}U$	±	$^{207}Pb/^{235}U$	±	$^{207}Pb/^{206}Pb$	±	Pb-U error correlation	$^{232}Th/^{238}U$ atomic	U ppm
pottery																			
2012_05_27May\ S_MAR016_UPb@1.ais	MAR-16	s1	45	19.8	1.1	15.7	1.9	-	-	98.6	0.003082	0.000168	0.01560	0.00188	0.037	0.004	0.50	0.632	1626
2012_05_27May\ S_MAR016_UPb@10.ais	MAR-16	s10	50	21.7	1.3	19.1	2.5	-	-	99.5	0.003373	0.000200	0.01895	0.00254	0.041	0.005	0.49	0.493	764
2012_05_27May\ S_MAR016_UPb@11.ais	MAR-16	s11	50	21.6	1.3	25.1	5.0	-	-	92.3	0.003358	0.000206	0.02507	0.00502	0.054	0.010	0.42	0.470	380
2012_05_27May\ S_MAR016_UPb@12.ais	MAR-16	s12	35	18.7	1.1	18.0	2.3	-	-	99.6	0.002899	0.000172	0.01790	0.00233	0.045	0.005	0.48	0.516	717
2012_05_27May\ S_MAR016_UPb@13.ais	MAR-16	s13	40	23.9	2.0	23.7	4.3	-	-	99.7	0.003713	0.000308	0.02365	0.00428	0.046	0.007	0.50	0.462	1205
2012_05_27May\ S_MAR016_UPb@14.ais	MAR-16	s14	45	17.5	1.7	20.3	4.2	-	-	98.8	0.002717	0.000264	0.02023	0.00419	0.054	0.009	0.56	0.548	830
2012_05_27May\ S_MAR016_UPb@15.ais	MAR-16	s15	50	22.3	1.2	16.9	3.2	-	-	94.7	0.003466	0.000179	0.01681	0.00317	0.035	0.006	0.32	0.443	354
2012_05_27May\ S_MAR016_UPb@16.ais	MAR-16	s16	50	27.5	1.3	25.0	5.6	-	-	97.7	0.004272	0.000208	0.02493	0.00569	0.042	0.009	0.36	0.682	309
2012_05_27May\ S_MAR016_UPb@17.ais	MAR-16	s17	45	551	33	544	31	-	-	99.9	0.089280	0.005650	0.70920	0.05150	0.058	0.002	0.84	0.241	266
2012_05_27May\ S_MAR016_UPb@18.ais	MAR-16	s18	50	18.2	1.2	10.2	4.8	-	-	89.3	0.002828	0.000182	0.01012	0.00480	0.026	0.012	0.32	0.815	582
2012_05_27May\ S_MAR016_UPb@19.ais	MAR-16	s19	45	20.1	1.0	21.8	1.8	-	-	100.3	0.003130	0.000150	0.02171	0.00180	0.050	0.003	0.60	0.482	1334
2012_05_27May\ S_MAR016_UPb@2.ais	MAR-16	s2	45	17.7	1.3	16.3	2.1	-	-	99.4	0.002744	0.000197	0.01616	0.00206	0.043	0.004	0.61	0.380	1280
2012_05_27May\ S_MAR016_UPb@20.ais	MAR-16	s20	50	17.9	0.9	16.6	2.5	-	-	97.7	0.002779	0.000138	0.01650	0.00254	0.043	0.006	0.40	0.506	394
2012_05_27May\ S_MAR016_UPb@21.ais	MAR-16	s21	45	19.8	1.1	19.2	2.9	-	-	96.5	0.003078	0.000174	0.01905	0.00290	0.045	0.006	0.42	0.503	841
2012_05_27May\ S_MAR016_UPb@22.ais	MAR-16	s22	60	15.6	1.3	18.8	2.4	-	-	99.8	0.002419	0.000203	0.01871	0.00241	0.056	0.006	0.64	0.314	855
2012_05_27May\ S_MAR016_UPb@23.ais	MAR-16	s23	55	28.0	1.9	28.0	3.5	-	-	98.4	0.004358	0.000303	0.02793	0.00357	0.046	0.005	0.59	0.294	918
2012_05_27May\ S_MAR016_UPb@24.ais	MAR-16	s24	40	19.5	1.1	20.0	2.8	-	-	99.7	0.003034	0.000164	0.01992	0.00280	0.048	0.006	0.45	0.406	313
2012_05_27May\ S_MAR016_UPb@25.ais	MAR-16	s25	35	35.6	22.8	40.5	99.4	-	-	80.4	0.005530	0.003550	0.04068	0.10200	0.053	0.123	0.42	0.717	1042
2012_05_27May\ S_MAR016_UPb@26.ais	MAR-16	s26	50	17.5	1.3	14.8	4.9	-	-	98.6	0.002724	0.000201	0.01467	0.00488	0.039	0.012	0.39	0.525	1685
2012_05_27May\ S_MAR016_UPb@28.ais	MAR-16	s28	65	16.8	1.1	16.5	4.9	-	-	96.9	0.002612	0.000175	0.01638	0.00489	0.045	0.013	0.35	0.441	329
2012_05_27May\ S_MAR016_UPb@29.ais	MAR-16	s29	45	26.1	2.1	29.1	6.5	-	-	99.4	0.004054	0.000321	0.02907	0.00656	0.052	0.011	0.46	0.401	577
2012_05_27May\ S_MAR016_UPb@3.ais	MAR-16	s3	55	20.6	1.4	16.4	4.4	-	-	97.9	0.003207	0.000211	0.01627	0.00443	0.037	0.009	0.41	0.606	505
2012_05_27May\ S_MAR016_UPb@30.ais	MAR-16	s30	45	1.7	20.5	1.7	19.6	-	-	85.2	0.000271	0.003180	0.00163	0.01930	0.044	0.038	1.00	0.397	690
2012_05_27May\ S_MAR016_UPb@4.ais	MAR-16	s4	40	13.8	0.8	14.8	2.7	-	-	99.2	0.002145	0.000130	0.01472	0.00273	0.050	0.009	0.22	0.589	563
2012_05_27May\ S_MAR016_UPb@5.ais	MAR-16	s5	50	18.1	1.1	22.1	7.1	-	-	98.2	0.002816	0.000176	0.02198	0.00714	0.057	0.017	0.46	0.513	416
2012_05_27May\ S_MAR016_UPb@6.ais	MAR-16	s6	45	17.5	1.0	8.1	4.5	-	-	88.6	0.002721	0.000155	0.00800	0.00446	0.021	0.012	0.28	1.455	2621
2012_05_27May\ S_MAR016_UPb@7.ais	MAR-16	s7	50	34.4	1.9	28.0	9.2	-	-	94.9	0.005350	0.000300	0.02795	0.00931	0.038	0.012	0.32	0.507	797
2012_05_27May\ S_MAR016_UPb@8.ais	MAR-16	s8	45	18.8	1.0	20.1	2.7	-	-	98.9	0.002913	0.000160	0.02003	0.00266	0.050	0.006	0.44	0.526	603
2012_05_27May\ S_MAR016_UPb@9.ais	MAR-16	s9	50	21.9	1.3	16.1	3.5	-	-	97.7	0.003401	0.000200	0.01595	0.00345	0.034	0.007	0.34	0.400	616
2012_05_28May\ L_MAR016_UPb@1.ais	MAR-16	l1	60	19.8	1.6	21.0	3.1	-	-	99.8	0.003076	0.000251	0.02088	0.00307	0.049	0.006	0.58	0.628	730
2012_05_28May\ L_MAR016_UPb@10.ais	MAR-16	l10	55	23.5	3.0	8.9	12.5	-	-	87.4	0.003647	0.000461	0.00883	0.01250	0.018	0.025	0.19	0.501	158
2012_05_28May\ L_MAR016_UPb@11.ais	MAR-16	l11	55	64.6	8.1	77.7	14.0	-	-	99.1	0.010070	0.001270	0.07955	0.01490	0.057	0.008	0.70	0.543	463
2012_05_28May\ L_MAR016_UPb@12.ais	MAR-16	l12	75	25.0	2.3	33.3	10.1	-	-	94.1	0.003884	0.000354	0.03336	0.01030	0.062	0.017	0.45	0.457	1302
2012_05_28May\ L_MAR016_UPb@3.ais	MAR-16	l3	55	21.9	1.7	23.4	3.3	-	-	100.6	0.003404	0.000260	0.02333	0.00332	0.050	0.006	0.60	0.552	325
2012_05_28May\ L_MAR016_UPb@4.ais	MAR-16	l4	70	21.4	2.0	23.2	6.3	-	-	93.4	0.003325	0.000312	0.02315	0.00639	0.050	0.013	0.44	0.300	257
2012_05_28May\ L_MAR016_UPb@5.ais	MAR-16	l5	55	22.7	2.0	19.9	2.6	-	-	98.8	0.003528	0.000308	0.01975	0.00262	0.041	0.004	0.66	0.332	575
2012_05_28May\ L_MAR016_UPb@6.ais	MAR-16	l6	50	585	48	569	39	507	54	99.8	0.094970	0.008170	0.75170	0.06740	0.057	0.001	0.96	0.955	176
2012_05_28May\ L_MAR016_UPb@7.ais	MAR-16	l7	55	19.0	3.9	18.1	6.3	-	-	98.3	0.002945	0.000608	0.01795	0.00634	0.044	0.012	0.62	0.520	629
2012_05_28May\ L_MAR016_UPb@8.ais	MAR-16	l8	60	18.0	1.4	19.4	2.1	-	-	100.1	0.002796	0.000223	0.01925	0.00211	0.050	0.004	0.74	0.475	1114
2012_05_28May\ L_MAR016_UPb@9.ais	MAR-16	l9	60	22.8	1.8	23.1	2.2	-	-	99.5	0.003548	0.000282	0.02300	0.00220	0.047	0.002	0.86	0.433	1832
2012_04_08Apr\ 16_031@2UPb.ais	MAR-16	ts31	20†	13.5	1.3	n.a.	n.a.	n.a.	n.a.	29.0	0.000694	0.002090	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	732
2012_04_08Apr\ 16_028@2UPb3.ais	MAR-16	ts28	15†	11.9	1.2	n.a.	n.a.	n.a.	n.a.	73.3	0.000613	0.001843	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2185
2012_04_08Apr\ 16_021@2UPb.ais	MAR-16	ts21	10§	1324	132	n.a.	n.a.	n.a.	n.a.	87.8	0.075769	0.227996	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	575
2012_04_08Apr\ 16_001@2UPb.ais	MAR-16	ts1	20†	10.4	1.0	n.a.	n.a.	n.a.	n.a.	64.0	0.000534	0.001607	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2631
2012_12_26Dec\ MAR20_UPb@10.ais	MAR-20	10	40	358	32	351	28	303	72	99.8	0.057090	0.005250	0.41250	0.03920	0.052	0.002	0.94	0.541	497
2012_12_26Dec\ MAR20_UPb@11.ais	MAR-20	11	35	382	26	357	33	200	189	97.5	0.060960	0.004320	0.42120	0.04660	0.050	0.004	0.68	0.521	261
2012_12_26Dec\ MAR20_UPb@15.ais	MAR-20	15	45	1.74	0.17	1.1	1.6	-	-	83.3	0.000270	0.000026	0.00109	0.00153	0.029	0.041	0.22	0.262	377
2012_12_26Dec\ MAR20_UPb@16.ais	MAR-20	16	40	69.6	5.1	64.8	7.5	-	-	99.3	0.010850	0.000802	0.06593	0.00788	0.044	0.004	0.70	0.442	441
2012_12_26Dec\ MAR20_UPb@17.ais	MAR-20	17	40	583	44	619	38	-	-	99.9	0.094670	0.007420	0.84030	0.06810	0.064	0.002	0.96	0.395	490
2012_12_26Dec\ MAR20_UPb@2.ais	MAR-20	2	35	1.38	0.25	1.5	4.9	-	-	45.7	0.000214	0.000039	0.00149	0.00488	0.051	0.161	0.44	0.272	321

2012_12_26Dec\	MAR20_UPb@4.ais	MAR-20	4	35	1.70	0.22	-0.2	3.2	-	-	63.7	0.000264	0.000034	-0.00016	0.00319	-0.004	-0.088	0.47	0.236	172
2012_12_26Dec\	MAR20_UPb@5.ais	MAR-20	5	30	0.83	0.18	1.3	4.2	-	-	35.6	0.000129	0.000028	0.00132	0.00416	0.074	0.225	0.55	0.498	264
2012_12_26Dec\	MAR20_UPb@6.ais	MAR-20	6	35	261	23	242	25	-	-	97.0	0.041360	0.003710	0.26890	0.03150	0.047	0.004	0.75	0.571	256
2012_12_26Dec\	MAR20_UPb@7.ais	MAR-20	7	35	2.28	0.31	0.8	5.2	-	-	54.8	0.000354	0.000048	0.00075	0.00515	0.015	0.104	0.56	0.240	103
2012_12_26Dec\	MAR20_UPb@8.ais	MAR-20	8	30	1.90	0.40	8.9	7.2	-	-	27.2	0.000295	0.000062	0.00876	0.00719	0.216	0.148	0.71	0.369	338
2013_03_18Mar\	MAR017_023@1.ais	MAR-17	ts23	20†	18.9	1.4	13.3	9.7	-	-	88.0	0.002942	0.000219	0.01315	0.00965	0.032	0.023	0.45	1.318	2629
2013_08_23Aug\	MAR17_gmz@1.ais	MAR-17	1	75	18.0	0.5	18.5	3.2	-	-	99.4	0.002795	0.000077	0.01838	0.00323	0.048	0.008	0.42	0.434	294
2013_08_23Aug\	MAR17_gmz@10.ais	MAR-17	10	55	17.9	0.5	14.9	4.6	-	-	97.9	0.002787	0.000084	0.01482	0.00458	0.039	0.011	0.48	0.575	270
2013_08_23Aug\	MAR17_gmz@11.ais	MAR-17	11	70	18.7	0.5	17.9	2.9	-	-	99.3	0.002897	0.000070	0.01780	0.00288	0.045	0.007	0.40	0.436	387
2013_08_23Aug\	MAR17_gmz@12.ais	MAR-17	12	60	18.4	0.5	16.0	2.1	-	-	97.1	0.002862	0.000082	0.01583	0.00213	0.040	0.005	0.40	0.573	761
2013_08_23Aug\	MAR17_gmz@13.ais	MAR-17	13	60	17.3	0.5	16.9	1.6	-	-	99.3	0.002686	0.000074	0.01673	0.00164	0.045	0.004	0.33	0.335	789
2013_08_23Aug\	MAR17_gmz@14.ais	MAR-17	14	65	79.1	1.8	80.2	6.0	-	-	100.1	0.012350	0.000278	0.08220	0.00639	0.048	0.003	0.40	0.345	256
2013_08_23Aug\	MAR17_gmz@15.ais	MAR-17	15	65	405	8	402	7	-	-	99.5	0.064830	0.001270	0.48620	0.01080	0.054	0.001	0.84	0.928	991
2013_08_23Aug\	MAR17_gmz@16.ais	MAR-17	16	45	17.9	0.6	14.2	3.6	-	-	97.5	0.002779	0.000091	0.01410	0.00359	0.037	0.009	0.31	0.367	174
2013_08_23Aug\	MAR17_gmz@17.ais	MAR-17	17	60	17.6	0.5	18.8	4.0	-	-	100.0	0.002727	0.000080	0.01867	0.00400	0.050	0.010	0.50	0.585	314
2013_08_23Aug\	MAR17_gmz@18.ais	MAR-17	18	55	16.4	0.5	15.1	2.3	-	-	98.4	0.002545	0.000073	0.01501	0.00226	0.043	0.006	0.41	0.298	371
2013_08_23Aug\	MAR17_gmz@19.ais	MAR-17	19	30	17.5	0.5	12.7	3.3	-	-	98.1	0.002722	0.000072	0.01255	0.00324	0.033	0.008	0.50	0.509	333
2013_08_23Aug\	MAR17_gmz@2.ais	MAR-17	2	40	18.3	0.6	20.5	5.7	-	-	97.7	0.002842	0.000099	0.02038	0.00568	0.052	0.014	0.33	0.417	116
2013_08_23Aug\	MAR17_gmz@3.ais	MAR-17	3	45	16.9	0.3	16.6	1.1	-	-	99.4	0.002622	0.000052	0.01648	0.00113	0.046	0.003	0.48	0.405	1310
2013_08_23Aug\	MAR17_gmz@4.ais	MAR-17	4	55	18.5	0.5	17.1	3.0	-	-	99.2	0.002881	0.000081	0.01699	0.00303	0.043	0.007	0.43	0.449	378
2013_08_23Aug\	MAR17_gmz@5.ais	MAR-17	5	45	18.9	0.5	18.1	2.8	-	-	99.2	0.002928	0.000083	0.01796	0.00285	0.044	0.007	0.39	0.438	457
2013_08_23Aug\	MAR17_gmz@6.ais	MAR-17	6	50	18.6	0.5	21.6	2.5	-	-	99.1	0.002895	0.000077	0.02150	0.00256	0.054	0.006	0.43	0.560	335
2013_08_23Aug\	MAR17_gmz@7.ais	MAR-17	7	40	18.3	0.6	18.1	5.4	-	-	89.2	0.002836	0.000089	0.01798	0.00543	0.046	0.013	0.44	0.536	410
2013_08_23Aug\	MAR17_gmz@8.ais	MAR-17	8	40	17.1	0.5	14.3	4.9	-	-	93.6	0.002655	0.000074	0.01418	0.00492	0.039	0.013	0.48	0.384	515
2013_08_23Aug\	MAR17_gmz@9.ais	MAR-17	9	50	18.9	0.5	14.1	3.3	-	-	96.5	0.002940	0.000081	0.01395	0.00332	0.034	0.008	0.41	0.516	321
pumice																				
2011_01_06Jan\	C_4_UPb@1.ais	TBJ-C	4A >8.4	85	13.9	0.5	13.0	1.1	-	-	96.8	0.002154	0.000078	0.01284	0.00105	0.043	0.003	0.53	0.345	2297
2011_01_06Jan\	C_4_UPb@2.ais	TBJ-C	4B >8.4	85	15.5	0.6	14.8	1.5	-	-	98.5	0.002399	0.000089	0.01470	0.00153	0.044	0.004	0.45	0.321	2409
ash																				
2012_12_26Dec\	Sheets_UPb@2.ais	TBJ-Sheets	2	35	0.439	0.122	-	-	-	-	60.0	0.000088	0.000014	0.00433	0.00147	0.359	0.129	0.10	0.171	182
2012_12_26Dec\	TBJ_distal_UPb@1.ais	TBJ-Chavez	1	45	0.346	0.310	-	-	-	-	11.9	0.000321	0.000028	0.03259	0.00448	0.736	0.085	0.56	0.184	151

all uncertainties 1σ

decay constants used: λ_{232}: $4.9475 \cdot 10^{-11}$ a^{-1}; λ_{238}: $1.55125 \cdot 10^{-10}$ a^{-1}

all analyses against 91500 $^{206}Pb/^{238}U$ age = 1065 Ma and AS3 $^{206}Pb/^{238}U$ age = 1099 Ma

U calculated from $UO^+/^{94}Zr_2O^+$ relative sensitivity determined on 91500 zircon with 81.2 ppm U

common Pb composition: $^{206}Pb/^{204}Pb$ = 18.86, $^{207}Pb/^{204}Pb$ = 15.62, $^{208}Pb/^{204}Pb$ = 38.34

- = age insufficiently constrained; n.a. = not analyzed

* aspect ratio between ~1 and 3

† crystal with adherent glass

§ matrix hosted

Table DR 3: Major and trace element abundances in glass from El Pilar pottery

Sample #	Catalog #	n	SiO_2	SiO_2 ±	TiO_2	TiO_2 ±	Al_2O_3	Al_2O_3 ±	FeO_t	FeO_t ±	MnO	Mn ±	MgO	Mg ±	CaO	CaO ±	Na_2O	Na_2O ±	K_2O	K_2O ±
MAR016*	16578 F	15	77.64	1.17	0.09	0.03	13.25	0.54	1.15	0.26	0.06	0.02	0.06	0.02	0.63	0.17	2.93	0.14	4.19	0.30
MAR016†	16578 F	2	78.05	0.95	b.d.	b.d.	15.44	1.37	0.87	0.13	b.d.	b.d.	b.d.	b.d.	0.54	0.11	1.84	0.15	3.28	0.53
MAR016§	16578 F	5	78.22	0.66	b.d.	b.d.	14.21	0.44	0.81	0.21	b.d.	b.d.	b.d.	b.d.	0.50	0.09	2.30	0.47	3.97	0.18
MAR017*	16579 CE	15	78.88	0.25	0.15	0.01	12.43	0.16	0.94	0.05	0.05	0.03	0.11	0.01	1.05	0.33	2.75	0.14	3.64	0.11
MAR020*	16589 E	15	77.96	0.23	0.11	0.02	12.52	0.11	1.06	0.05	0.05	0.02	0.11	0.01	1.09	0.16	2.90	0.20	4.18	0.13

Sample #	Catalog #	Rb	Rb ±	Sr	Sr ±	Y	Y ±	Zr	Zr ±	Nb	Nb ±	Ba	Ba ±	La	La ±	Ce	Ce ±	Nd	Nd ±	Yb	Yb ±	Hf	Hf ±	Ta	Ta ±	Th	Th ±	U	U ±
MAR016	16578 F	165	13	40.0	25.2	24.6	1.3	106	21	11.1	1.1	656	365	28.4	4.1	63.4	7.3	26.0	3.4	2.35	0.42	4.14	0.67	1.08	0.21	11.9	1.3	4.63	0.58
MAR017	16579 CE	207	11	52.0	14.6	14.7	3.8	67.0	7.7	8.6	0.7	406	53	21.5	2.3	49.3	4.2	16.5	1.9	1.53	0.42	2.47	0.74	1.15	0.24	17.3	1.9	8.72	0.88
MAR020	16589 E	102	6	66.1	3.5	9.3	1.6	64.2	7.9	4.0	1.1	1110	36	12.0	1.3	24.6	2.4	7.8	1.3	0.98	0.38	1.84	0.56	0.45	0.12	4.30	0.64	2.19	0.31

*electron microprobe analysis (UCSB)
† energy dispersive X-ray analysis of glass shards adherent to zircon (UCLA)
§ energy dispersive X-ray analysis of matrix glass shards (UCLA)

Analytical details:
The EMPA mineral standards used for each element were quartz (SiO_2) for Si, jadeite ($NaAlSi_2O_6$) for Na, magnetite (Fe_3O_4) for Fe, diopside ($CaMgSi_2O_6$) for Mg and Ca, K-feldspar ($KAlSi_3O_8$) for K, apatite ($Ca_5(PO_4)_3(F,Cl,OH)$ for P, and corundum (Al_2O_3) for Al.
A beam current of 15 nA and 15 kV of accelerating voltage were used for analyses lasting 30 s, split into 15 lots of 2-second intervals to monitor volatility of Na. A sodium-loss correction was applied using CalcZafTM, and all iron is reported as FeOt.
Major elements as oxides normalized to 100 weight % and corrected for sodium loss.
Trace elements in ppm (analyzed by Adam Kent on an Inductively Coupled Plasma Mass Spectrometer with a laser ablation source at Oregon State University). Uncertainties are based on in-run statistics and comparison with NIST 612 standards.