

Lawton and Molina Supplementary Data References

Gehrels, G.E., Valencia, V.A., and Ruiz, J., 2008, Enhanced precision, accuracy, efficiency, and spatial resolution of U-Pb ages by laser ablation–multicollector–inductively coupled plasma–mass spectrometry: *Geochemistry, Geophysics, Geosystems*, v. 9, p. Q03017, doi:10.1029/2007GC001805.

Stacey, J.S., and Kramers, J.D., 1975, Approximation of terrestrial lead isotope evolution by a two-stage model: *Earth and Planetary Science Letters*, v. 26, p. 207-221.

Table S1. Point-counting parameters*

Symbol	Definition
Qm	Monocrystalline quartz
Qp	Polycrystalline quartz
Cht	Chert
K	Potassium feldspar. Includes sanidine
P	Plagioclase feldspar
Lv	Volcanic lithic grains [= felsite and hypabyssal rhyolite porphyry (Lvf)+vitric (Lv) +microlitic (Lvm)+lathwork (Lvl) grains]
Lm	Metamorphic lithic grains: quartz-mica and quartz-feldspar aggregates, some with foliated texture
Ls	Sedimentary lithic grains: volcaniclastic siltstone, hematitic argillite
Qt	Total quartzose grains (= Qm+Qpq+Cht)
F	Total feldspar (= K+P)
L	Total unstable lithic grains (= Lv+Lm+Ls)
Lt	Total lithic grains (= L+Qp)
Recalculated Parameters	
QtFL%Qt	= $100Qt/(Qt+F+L)$
QtFL%F	= $100F/(Qt+F+L)$
QtFL%L	= $100L/(Qt+F+L)$
QmFLt%Qm	= $100Qm/(Qm+F+Lt)$
QmFLt%F	= $100F/(Qm+F+Lt)$
QmFLt%Lt	= $100Lt/(Qm+F+Lt)$
LmLvLs%Lm	= $100Lm/(Lm+Lv+Ls)$
LmLvLs%Lv	= $100Lv/(Lm+Lv+Ls)$
LmLvLs%Ls	= $100Ls/(Lm+Lv+Ls)$
QmKP%Qm	= $100Qm/Qm+K+P$)
QmKP%K	= $100K/Qm+K+P$)
QmKP%P	= $100P/Qm+K+P$)

TABLE S2. Normalized point-count modal data, Nazas, La Casita and Carbonera Formations on the Villa Juarez anticlinorium, Durango

Sample	QtFL%			QmFLt%			QmPK%			LmLvLs%		
	Qt	F	L	Qm	F	Lt	Qm	P	K	Lm	Lv	Ls
Carbonera Formation												
08NR02	41	21	36	36	23	41	62	17	21	3	92	5
La Casita Formation												
08NR03	81	13	6	75	13	12	86	1	13	NA	NA	NA
08NR01	19	21	60	15	21	64	42	33	25	0	100	0
Nazas Formation												
08NR06	2	40	58	1	40	59	2	85	13	0	100	0
MEAN	36	24	40	32	24	44	48	34	18	NA	NA	NA
STANDARD DEVIATION	34	11	25	32	11	24	36	36	6	NA	NA	NA

Table S3. U-Pb geochronologic analyses of Jurassic sandstones and ignimbrites near Villa Juarez, Durango, Mexico.

Analysis	U (ppm)	Isotope ratios										Apparent ages (Ma)										207/20 8 Conc	207/23 5Conc
		206Pb 204Pb	U/Th	206Pb*	±	207Pb*	±	206Pb*	±	error	206Pb*	±	207Pb*	±	206Pb*	±	Best age	±					
		207Pb*	(%)	235U*	(%)	238U	(%)	corr.	238U*	(Ma)	235U	(Ma)	207Pb*	(Ma)	(Ma)	(Ma)	(%)						
08NR06 Nazas Formation Litharenite 13R 636726 2822266 (103° 338.39'W 25° 30.78'N)																							
08NR06-95	129	2828	2.3	9.6389	78.9	0.3449	79.2	0.0241	6.4	0.08	153.6	9.6	300.9	209.1	1692.2	264.6	153.6	9.6	9.1	51.0			
08NR06-75	284	11828	2.4	20.2739	2.9	0.1811	3.6	0.0266	2.1	0.58	169.4	3.5	169.0	5.5	163.3	67.5	169.4	3.5	103.8	100.2			
08NR06-90	78	3540	2.6	21.0909	15.1	0.1747	15.4	0.0267	3.1	0.20	170.0	5.2	163.5	23.2	70.1	359.7	170.0	5.2	242.5	104.0			
08NR06-17	127	6420	1.6	21.2958	7.1	0.1733	8.5	0.0268	4.7	0.55	170.2	7.8	162.3	12.7	47.0	169.3	170.2	7.8	361.9	104.9			
08NR06-68	309	11880	2.0	20.0999	4.2	0.1844	4.7	0.0269	2.1	0.44	171.0	3.5	171.8	7.4	183.4	98.1	171.0	3.5	93.2	99.5			
08NR06-71	314	15116	2.8	20.5177	2.9	0.1813	3.2	0.0270	1.4	0.43	171.6	2.3	169.1	5.0	135.2	67.6	171.6	2.3	126.9	101.4			
08NR06-91	131	6416	2.3	21.5854	8.6	0.1725	8.7	0.0270	1.4	0.16	171.8	2.3	161.6	13.0	14.7	207.3	171.8	2.3	1170.5	106.3			
08NR06-89	354	5296	1.1	18.7279	8.0	0.1992	8.1	0.0271	1.4	0.17	172.1	2.4	184.4	13.6	345.7	180.4	172.1	2.4	49.8	93.3			
08NR06-66	119	4280	1.5	22.4001	10.2	0.1680	10.3	0.0273	1.3	0.12	173.6	2.2	157.7	15.0	-75.1	249.7	173.6	2.2	-231.1	110.1			
08NR06-96	174	3864	1.9	18.6423	12.7	0.2019	14.1	0.0273	6.0	0.42	173.6	10.2	186.7	24.0	356.0	288.6	173.6	10.2	48.8	93.0			
08NR06-31	187	6308	1.7	20.7209	3.2	0.1817	4.0	0.0273	2.3	0.58	173.7	3.9	169.5	6.2	112.0	76.5	173.7	3.9	155.0	102.4			
08NR06-72	312	12044	2.1	20.6699	4.1	0.1822	4.7	0.0273	2.3	0.49	173.7	4.0	170.0	7.4	117.8	97.1	173.7	4.0	147.4	102.2			
08NR06-21	138	5812	1.7	20.9752	5.2	0.1798	5.8	0.0274	2.4	0.42	174.0	4.1	167.9	8.9	83.2	124.6	174.0	4.1	209.2	103.6			
08NR06-74	86	4524	2.0	21.9864	12.3	0.1718	13.7	0.0274	6.1	0.44	174.2	10.4	161.0	20.4	-29.8	299.2	174.2	10.4	-585.6	108.2			
08NR06-86	90	3832	2.1	21.8937	9.6	0.1728	9.9	0.0274	2.3	0.23	174.5	4.0	161.8	14.8	-19.5	232.8	174.5	4.0	-894.0	107.8			
08NR06-92	306	9656	2.2	20.3626	2.5	0.1860	3.2	0.0275	2.1	0.65	174.7	3.6	173.2	5.2	153.0	57.8	174.7	3.6	114.1	100.9			
08NR06-70	272	6660	1.9	19.1886	5.0	0.1983	6.5	0.0276	4.2	0.65	175.5	7.3	183.7	11.0	290.4	113.4	175.5	7.3	60.4	95.5			
08NR06-73	168	7988	2.1	19.3855	5.1	0.1964	5.2	0.0276	1.2	0.22	175.6	2.0	182.0	8.7	267.0	116.3	175.6	2.0	65.7	96.4			
08NR06-59	136	4936	1.3	21.3751	6.3	0.1782	7.7	0.0276	4.5	0.58	175.7	7.7	166.5	11.9	38.2	151.4	175.7	7.7	460.3	105.5			
08NR06-84	248	7452	1.2	20.1874	3.2	0.1887	3.7	0.0276	1.9	0.50	175.7	3.2	175.6	5.9	173.3	74.0	175.7	3.2	101.4	100.1			
08NR06-6	118	3984	2.0	21.2020	6.4	0.1799	6.8	0.0277	2.3	0.34	175.9	4.0	168.0	10.6	57.6	153.7	175.9	4.0	305.5	104.7			
08NR06-22	162	5396	1.2	20.9179	4.4	0.1826	5.1	0.0277	2.5	0.49	176.1	4.4	170.3	8.0	89.6	105.4	176.1	4.4	196.5	103.4			
08NR06-37	128	4264	1.5	21.2883	7.0	0.1794	8.0	0.0277	3.9	0.49	176.1	6.8	167.6	12.4	47.9	167.3	176.1	6.8	367.8	105.1			
08NR06-58	231	6784	2.2	19.9917	3.9	0.1913	4.5	0.0277	2.2	0.49	176.3	3.8	177.7	7.3	195.9	91.5	176.3	3.8	90.0	99.2			
08NR06-77	144	5296	2.6	20.4317	3.1	0.1873	3.4	0.0278	1.5	0.43	176.5	2.6	174.3	5.4	145.1	71.6	176.5	2.6	121.6	101.2			
08NR06-35	724	21856	1.1	20.1580	1.2	0.1900	3.2	0.0278	2.9	0.92	176.6	5.1	176.6	5.1	176.6	28.8	176.6	5.1	100.0	100.0			
08NR06-93	206	11360	1.8	20.3106	1.8	0.1892	2.3	0.0279	1.4	0.63	177.2	2.5	175.9	3.7	159.0	41.6	177.2	2.5	111.4	100.7			
08NR06-33	187	6488	1.4	20.9348	5.6	0.1837	5.9	0.0279	2.0	0.33	177.4	3.4	171.3	9.4	87.7	133.1	177.4	3.4	202.2	103.6			
08NR06-8	434	12572	1.0	20.2016	2.9	0.1906	3.4	0.0279	1.7	0.49	177.5	2.9	177.1	5.5	171.6	68.5	177.5	2.9	103.4	100.2			
08NR06-65	1135																						

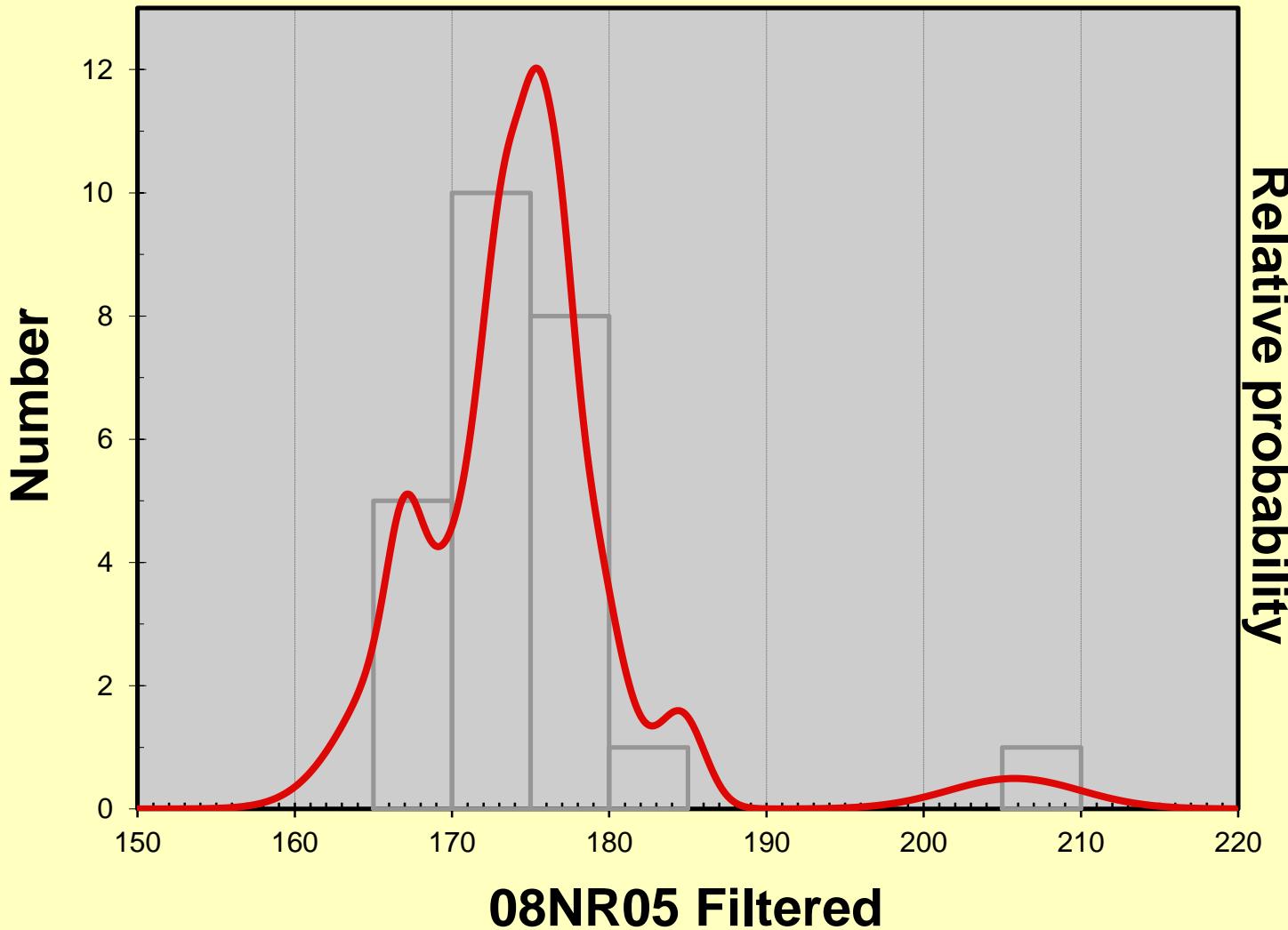
08NR06-12	67	1068	1.3	15.2752	24.5	0.2638	25.2	0.0292	5.7	0.23	185.7	10.5	237.7	53.4	789.3	521.7	185.7	10.5	23.5	78.1
08NR06-76	270	7308	1.5	19.4244	6.3	0.2078	7.0	0.0293	3.2	0.45	186.0	5.9	191.7	12.3	262.4	144.0	186.0	5.9	70.9	97.0
08NR06-79	546	15344	1.5	19.5580	4.7	0.2074	6.9	0.0294	5.1	0.73	186.9	9.4	191.4	12.1	246.7	108.7	186.9	9.4	75.8	97.7
08NR06-57	790	24304	1.3	20.1478	1.0	0.2022	2.0	0.0295	1.8	0.87	187.7	3.3	186.9	3.5	177.8	23.1	187.7	3.3	105.5	100.4
08NR06-47	252	10076	1.9	20.1545	2.5	0.2022	3.0	0.0296	1.6	0.52	187.8	2.9	187.0	5.1	177.1	59.0	187.8	2.9	106.1	100.4
08NR06-5	376	12956	0.9	19.9761	1.1	0.2053	4.0	0.0297	3.9	0.96	188.9	7.2	189.6	7.0	197.7	26.2	188.9	7.2	95.6	99.7
08NR06-49	425	10812	1.6	19.8342	1.3	0.2069	2.4	0.0298	1.9	0.82	189.0	3.6	190.9	4.1	214.3	31.1	189.0	3.6	88.2	99.0
08NR06-13	253	8776	2.7	20.4061	3.6	0.2011	5.4	0.0298	4.1	0.75	189.1	7.6	186.0	9.2	148.0	83.5	189.1	7.6	127.7	101.6
08NR06-2	525	14196	1.3	20.1625	2.7	0.2046	4.2	0.0299	3.2	0.76	190.1	6.0	189.0	7.2	176.1	63.2	190.1	6.0	107.9	100.5
08NR06-54	91	4136	2.5	22.4805	11.2	0.1848	11.3	0.0301	1.6	0.14	191.4	3.1	172.2	17.9	-83.9	275.3	191.4	3.1	-228.2	111.1
08NR06-52	158	5164	1.4	20.5744	3.8	0.2021	6.5	0.0302	5.2	0.81	191.6	9.9	186.9	11.1	128.8	90.3	191.6	9.9	148.8	102.5
08NR06-50	316	11564	1.8	20.4005	3.3	0.2040	4.4	0.0302	3.0	0.67	191.7	5.6	188.5	7.6	148.7	77.1	191.7	5.6	128.9	101.7
08NR06-40	338	8284	1.8	18.9582	8.7	0.2205	10.0	0.0303	4.9	0.49	192.6	9.3	202.4	18.4	317.9	198.9	192.6	9.3	60.6	95.2
08NR06-56	382	37796	9.9	17.1213	1.7	0.5982	3.0	0.0743	2.5	0.83	461.9	10.9	476.1	11.3	545.0	36.5	461.9	10.9	84.8	97.0
08NR06-69	258	22412	1.4	17.8162	1.7	0.5895	3.5	0.0762	3.1	0.88	473.2	14.0	470.5	13.1	457.4	36.6	473.2	14.0	103.4	100.6
08NR06-46	69	16492	4.7	14.3770	1.7	1.5228	2.3	0.1588	1.5	0.67	950.1	13.5	939.6	14.0	915.2	35.1	950.1	13.5	103.8	101.1
08NR06-67	83	17836	2.4	13.7197	1.2	1.6789	1.9	0.1671	1.5	0.79	995.9	14.0	1000.6	12.2	1010.8	23.8	1010.8	23.8	98.5	99.5
08NR06-26	44	23944	1.3	8.2216	1.5	5.9884	3.8	0.3571	3.5	0.92	1968.3	58.5	1974.2	32.7	1980.3	26.7	1980.3	26.7	99.4	99.7
08NR06-94	149	47956	3.4	5.1322	0.8	12.0908	2.9	0.4500	2.8	0.96	2395.5	56.6	2611.5	27.6	2783.5	13.1	2783.5	13.1	86.1	91.7
O8NR05 Nazas Welded Ignimbrite from Autopista Roadcut 13R 636716 2822427 (103° 38.39'W 25° 30.87'N)																				
08-NR-05-31	303	5460	1.4	20.6772	3.3	0.1731	3.8	0.0260	1.9	0.51	165.2	3.1	162.1	5.7	117.0	77.6	165.2	3.1	141.2	101.9
08NR05-8	466	19040	1.7	20.3059	2.9	0.1773	3.4	0.0261	1.8	0.54	166.1	3.0	165.7	5.2	159.6	67.4	166.1	3.0	104.1	100.3
08-NR-05-29	322	3064	1.1	20.5330	2.6	0.1762	2.7	0.0262	0.7	0.25	166.9	1.1	164.8	4.0	133.5	60.5	166.9	1.1	125.0	101.3
08-NR-05-26	266	2912	1.5	17.3900	7.4	0.2083	7.5	0.0263	1.5	0.20	167.2	2.5	192.1	13.2	510.9	162.8	167.2	2.5	32.7	87.0
08-NR-05-37	228	2324	1.1	13.1567	40.7	0.2759	40.9	0.0263	3.2	0.08	167.5	5.3	247.4	90.0	1095.2	851.5	167.5	5.3	15.3	67.7
08-NR-05-25	451	3812	1.4	15.2381	31.0	0.2383	32.0	0.0263	7.8	0.25	167.6	13.0	217.0	62.5	794.4	664.9	167.6	13.0	21.1	77.2
08NR05-11	297	12068	2.0	20.5671	6.8	0.1778	7.0	0.0265	1.7	0.24	168.7	2.7	166.2	10.8	129.6	160.6	168.7	2.7	130.2	101.6
08-NR-05-22	344	4136	1.8	14.7745	27.4	0.2475	27.6	0.0265	3.8	0.14	168.8	6.4	224.6	55.7	858.9	578.2	168.8	6.4	19.6	75.1
08NR05-9	355	12532	2.0	19.2984	7.4	0.1902	7.9	0.0266	2.7	0.35	169.3	4.6	176.8	12.8	277.4	169.7	169.3	4.6	61.1	95.8
08NR05-7	333	13684	1.9	20.2294	2.4	0.1831	3.8	0.0269	3.0	0.78	170.9	5.0	170.7	6.0	168.4	55.9	170.9	5.0	101.5	100.1
08NR05-2	475	9528	1.5	19.4482	6.1	0.1911	6.2	0.0270	0.8	0.12	171.5	1.3	177.6	10.0	259.6	140.5	171.5	1.3	66.0	96.6
08NR05-18	485	8588	2.2	13.3531	43.6	0.2787	43.9	0.0270	4.7	0.11	171.7	7.9	249.6	97.4	1065.5	922.5	171.7	7.9	16.1	68.8
08NR05-1	437	17504	1.9	20.1850	2.1	0.1845	2.6	0.0270	1.7	0.63	171.8	2.8	171.9	4.2	173.5	48.1	171.8	2.8	99.0	99.9
08NR05-3	409	16076	1.9	20.3938	3.2	0.1830	4.0	0.0271	2.4	0.60	172.1	4.1	170.6	6.4	149.5	75.7	172.1	4.1	115.2	100.9
08NR05-6	415	14380	1.2	20.4039	3.8	0.1837	4.1	0.0272	1.7	0.40	172.9	2.8	171.2	6.5	148.3	88.6	172.9	2.8	116.6	101.0
08-NR-05-21	426	9876	1.5	20.4994	3.8	0.1829	3.9	0.0272	0.8	0.21	172.9	1.4	170.5	6.2	137.3	90.4	172.9	1.4	125.9	101.4</td

08-NR-04-26	87	2216	1.4	23.0191	14.3	0.1679	14.8	0.0280	3.9	0.26	178.2	6.8	157.6	21.6	-142.2	356.0	178.2	6.8	-125.3	113.1
08NR04-8	146	572	1.4	18.1694	24.1	0.2153	24.1	0.0284	1.8	0.07	180.3	3.2	198.0	43.4	413.7	545.1	180.3	3.2	43.6	91.1
08NR04-15	208	36192	4.3	14.3116	2.1	1.2583	6.0	0.1306	5.6	0.93	791.3	41.9	827.1	34.0	924.6	43.8	791.3	41.9	85.6	95.7
08NR01 La Casita Formation, near Los Angeles, Durango 13R 641109 2823626 (103° 35.76'W 25° 31.49'N)																				
08NR01-3	118	3644	1.1	20.4566	10.1	0.1499	10.6	0.0222	3.2	0.30	141.8	4.5	141.8	14.1	142.2	237.9	141.8	4.5	99.7	100.0
08NR01-67	72	1808	2.1	20.2968	16.0	0.1693	16.5	0.0249	3.8	0.23	158.7	6.0	158.8	24.2	160.6	377.2	158.7	6.0	98.8	99.9
08NR01-87	126	3524	2.4	21.3966	10.2	0.1619	10.4	0.0251	2.3	0.22	160.0	3.7	152.4	14.7	35.8	243.6	160.0	3.7	447.4	105.0
08NR01-83	53	1288	1.5	20.1539	29.1	0.1735	29.1	0.0254	2.1	0.07	161.4	3.4	162.4	43.8	177.1	690.8	161.4	3.4	91.1	99.4
08NR01-58	127	4288	2.6	20.8505	11.0	0.1698	11.1	0.0257	2.0	0.18	163.5	3.2	159.3	16.4	97.3	260.2	163.5	3.2	168.0	102.6
08NR01-66	89	2128	1.8	23.3899	15.8	0.1520	16.4	0.0258	4.2	0.26	164.1	6.9	143.7	22.0	-181.9	397.2	164.1	6.9	-90.2	114.2
08NR01-73	227	5432	1.9	19.9398	8.1	0.1784	8.2	0.0258	1.1	0.14	164.2	1.8	166.7	12.6	202.0	188.2	164.2	1.8	81.3	98.5
08NR01-95	192	5292	2.0	20.1952	11.9	0.1772	12.0	0.0260	1.0	0.08	165.2	1.6	165.6	18.3	172.3	278.9	165.2	1.6	95.8	99.7
08NR01-88	455	12556	2.8	20.3732	2.4	0.1758	3.0	0.0260	1.8	0.60	165.3	3.0	164.4	4.6	151.8	56.4	165.3	3.0	108.9	100.5
08NR01-47	80	3512	2.9	21.1316	13.1	0.1701	13.2	0.0261	1.6	0.12	165.9	2.6	159.5	19.5	65.5	314.2	165.9	2.6	253.3	104.0
08NR01-5	132	1552	0.8	18.8781	18.4	0.1915	18.5	0.0262	0.7	0.04	166.9	1.1	177.9	30.1	327.5	421.8	166.9	1.1	50.9	93.8
08NR01-93	84	2184	2.4	20.8141	9.5	0.1743	9.7	0.0263	1.9	0.19	167.4	3.1	163.1	14.6	101.4	225.5	167.4	3.1	165.0	102.6
08NR01-62	323	11764	2.4	19.9512	2.9	0.1826	3.2	0.0264	1.5	0.47	168.1	2.5	170.3	5.1	200.7	66.6	168.1	2.5	83.8	98.7
08NR01-84	83	2352	2.5	23.8205	16.0	0.1530	17.1	0.0264	5.9	0.34	168.2	9.8	144.6	23.0	-227.7	405.9	168.2	9.8	-73.9	116.3
08NR01-92	176	3844	2.5	19.6457	12.3	0.1861	12.4	0.0265	1.0	0.08	168.7	1.7	173.3	19.7	236.4	285.8	168.7	1.7	71.4	97.4
08NR01-68	195	4296	1.8	20.1261	6.0	0.1818	6.1	0.0265	1.0	0.16	168.8	1.7	169.6	9.6	180.3	140.8	168.8	1.7	93.6	99.5
08NR01-33	82	3104	2.4	19.9025	9.5	0.1841	9.6	0.0266	1.7	0.18	169.1	2.8	171.6	15.2	206.3	220.0	169.1	2.8	81.9	98.5
08NR01-81	233	6864	3.6	20.6608	2.8	0.1773	3.0	0.0266	1.0	0.33	169.1	1.7	165.8	4.6	118.9	67.1	169.1	1.7	142.2	102.0
08NR01-74	153	3000	2.2	20.3789	10.5	0.1804	10.5	0.0267	1.0	0.09	169.6	1.7	168.4	16.4	151.2	246.6	169.6	1.7	112.2	100.7
08NR01-13	138	5396	2.6	19.8585	3.4	0.1853	4.4	0.0267	2.7	0.63	169.8	4.6	172.6	6.9	211.5	78.4	169.8	4.6	80.3	98.4
08NR01-86	274	8452	2.8	20.7338	4.8	0.1777	5.0	0.0267	1.6	0.31	170.0	2.6	166.1	7.7	110.6	112.2	170.0	2.6	153.8	102.4
08NR01-72	1089	19760	1.1	19.8869	1.4	0.1854	2.1	0.0267	1.6	0.76	170.1	2.7	172.7	3.3	208.1	31.8	170.1	2.7	81.7	98.5
08NR01-23	169	2156	1.1	14.4540	26.0	0.2553	26.3	0.0268	3.9	0.15	170.2	6.6	230.9	54.4	904.2	545.6	170.2	6.6	18.8	73.7
08NR01-78	149	5528	2.1	22.1614	13.0	0.1671	13.1	0.0269	1.8	0.14	170.8	3.0	156.9	19.1	-49.0	317.0	170.8	3.0	-348.8	108.9
08NR01-69	108	2808	2.0	21.1644	16.2	0.1754	16.3	0.0269	1.4	0.09	171.3	2.4	164.1	24.7	61.8	388.4	171.3	2.4	277.0	104.4
08NR01-77	152	4688	2.9	21.2749	6.9	0.1746	6.9	0.0269	1.0	0.14	171.3	1.7	163.4	10.5	49.4	163.9	171.3	1.7	346.8	104.9
08NR01-82	572	17552	3.1	20.1104	2.4	0.1848	3.1	0.0270	2.0	0.64	171.5	3.4	172.2	4.9	182.2	55.1	171.5	3.4	94.1	99.6
08NR01-56	97	2436	1.1	19.9824	12.8	0.1866	12.9	0.0270	1.7	0.13	172.0	3.0	173.7	20.7	197.0	299.1	172.0	3.0	87.3	99.0
08NR01-10	245	7852	2.2	20.4533	6.3	0.1830	7.0	0.0271	2.9	0.42	172.6	5.0	170.6	11.0	142.6	149.1	172.6	5.0	121.0	101.2
08NR01-16	122	5240	2.6	20.6495	7.7	0.1818	8.1	0.0272	2.4	0.29	173.1	4.0	169.6	12.6	120.2	181.9	173.1	4.0	144.1	102.1
08NR01-59	119	5060	2.5	20.5230	8.9	0.1829	9.0	0.0272	1.6	0.18	173.2	2.8	170.6	14.2	134.6	209.1	173.2	2.8	128.6	101.5
08NR01-91	192	6024	3.3	21.4960	8.9	0.1747	9.1	0.0272	1.5	0.17	173.3									

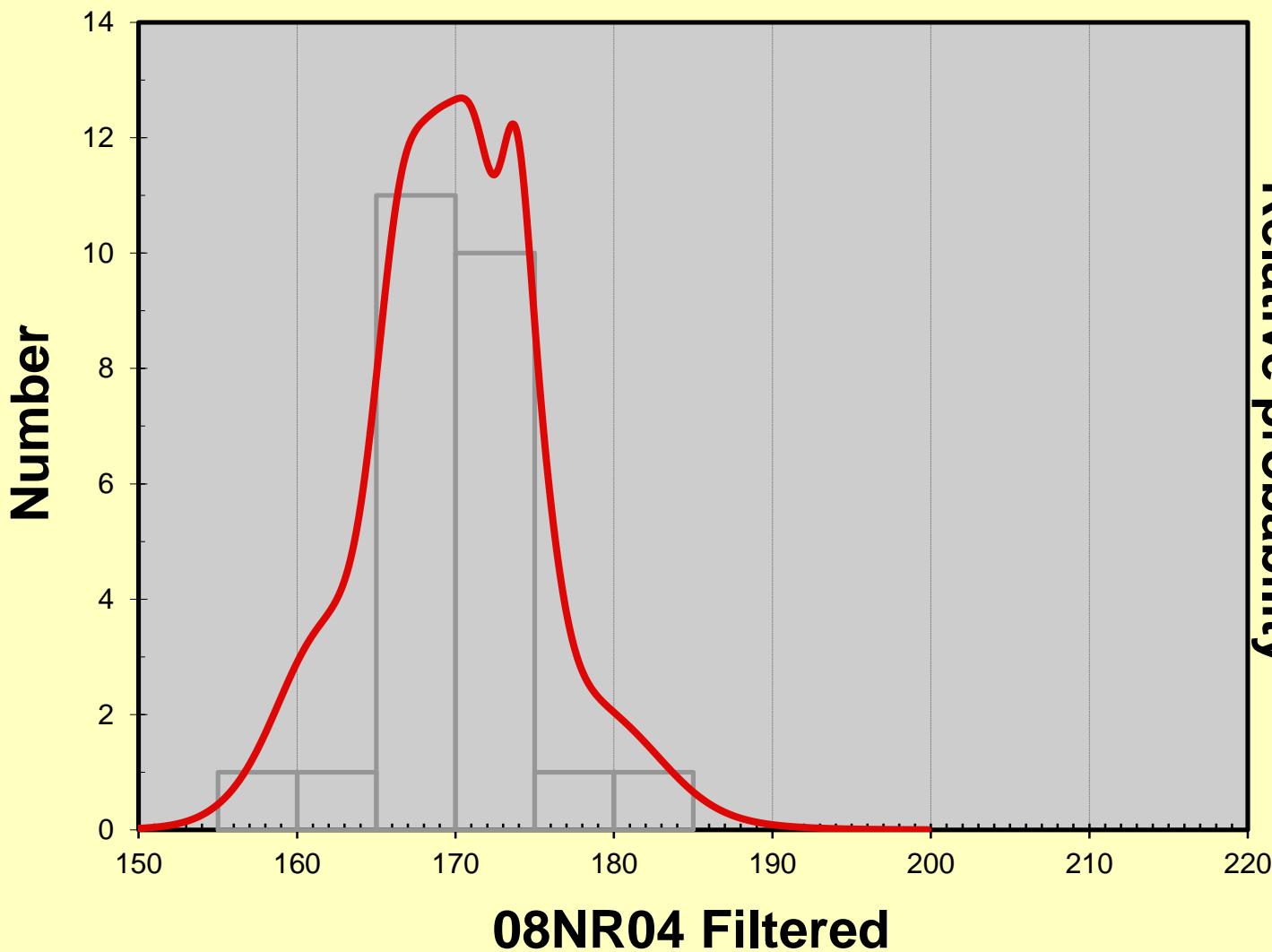
08NR01-8	264	9656	2.2	20.3171	5.0	0.1944	5.1	0.0286	0.9	0.18	182.0	1.7	180.3	8.4	158.3	117.0	182.0	1.7	115.0	100.9
08NR01-99	118	3188	2.0	21.7014	8.1	0.1826	8.3	0.0287	1.6	0.20	182.7	2.9	170.3	13.0	1.8	196.0	182.7	2.9	#####	107.3
08NR01-25	111	4872	2.1	20.6243	9.3	0.1924	9.4	0.0288	1.2	0.13	182.9	2.1	178.6	15.4	123.1	220.3	182.9	2.1	148.6	102.4
08NR01-14	118	5772	2.4	19.7087	4.4	0.2014	4.6	0.0288	1.3	0.27	183.0	2.3	186.3	7.9	229.0	102.6	183.0	2.3	79.9	98.2
08NR01-21	58	2564	2.1	21.1130	18.4	0.1884	18.5	0.0289	1.9	0.10	183.4	3.4	175.3	29.7	67.6	440.1	183.4	3.4	271.2	104.6
08NR01-43	213	11048	1.7	20.1050	4.7	0.1979	5.4	0.0289	2.6	0.48	183.4	4.7	183.4	9.0	182.8	109.7	183.4	4.7	100.4	100.0
08NR01-22	222	8880	1.4	20.2834	5.8	0.1962	5.8	0.0289	0.9	0.15	183.4	1.6	181.9	9.7	162.2	135.2	183.4	1.6	113.1	100.8
08NR01-40	57	2608	2.4	19.6260	10.3	0.2039	11.2	0.0290	4.5	0.40	184.4	8.2	188.4	19.3	238.7	238.4	184.4	8.2	77.3	97.9
08NR01-37	341	13368	2.1	19.8826	2.1	0.2044	3.0	0.0295	2.1	0.71	187.3	3.9	188.8	5.1	208.6	49.1	187.3	3.9	89.8	99.2
08NR01-20	111	4636	1.8	20.4803	9.2	0.1988	9.3	0.0295	1.0	0.10	187.6	1.8	184.1	15.6	139.5	217.1	187.6	1.8	134.4	101.9
08NR01-30	134	2692	1.9	17.7092	7.0	0.2303	7.1	0.0296	1.2	0.17	187.9	2.2	210.4	13.5	470.8	155.6	187.9	2.2	39.9	89.3
08NR01-41	94	4280	1.8	19.4383	5.3	0.2109	6.1	0.0297	2.9	0.48	188.9	5.5	194.3	10.8	260.8	122.6	188.9	5.5	72.4	97.2
08NR01-89	417	14264	2.9	19.9872	1.8	0.2075	2.1	0.0301	1.2	0.55	191.1	2.2	191.5	3.7	196.5	41.3	191.1	2.2	97.3	99.8
08NR01-19	310	14624	3.2	20.1887	9.6	0.2143	9.8	0.0314	1.8	0.18	199.2	3.5	197.2	17.5	173.1	225.0	199.2	3.5	115.1	101.0
08NR01-96	152	27136	1.1	14.0310	1.0	1.6070	1.5	0.1635	1.1	0.73	976.4	9.7	973.0	9.2	965.2	20.5	965.2	20.5	101.2	100.4
08NR03 La Casita Formation 13R 640377 2824336 (103° 36.20'W 25° 31.88'N)																				
08NR03-40	156	6264	0.9	20.9696	4.5	0.1736	4.6	0.0264	0.9	0.20	168.0	1.5	162.5	7.0	83.8	107.7	168.0	1.5	200.4	103.4
08NR03-42	196	7516	1.4	21.1160	5.7	0.1747	6.2	0.0268	2.3	0.38	170.3	3.9	163.5	9.3	67.3	135.8	170.3	3.9	253.1	104.1
08NR03-100	143	5708	2.4	21.5382	7.4	0.1715	8.0	0.0268	3.1	0.39	170.4	5.3	160.7	11.9	19.9	176.9	170.4	5.3	854.8	106.0
08NR03-20	269	10156	2.1	20.6556	5.1	0.1789	5.6	0.0268	2.2	0.39	170.5	3.6	167.1	8.6	119.5	120.8	170.5	3.6	142.7	102.0
08NR03-89	514	14164	1.3	19.7771	2.6	0.1877	3.0	0.0269	1.6	0.51	171.3	2.6	174.7	4.8	221.0	59.8	171.3	2.6	77.5	98.1
08NR03-5	176	6160	1.7	20.7589	3.0	0.1814	3.0	0.0273	0.5	0.17	173.7	0.9	169.3	4.7	107.7	70.6	173.7	0.9	161.3	102.6
08NR03-11	364	11276	1.5	20.7847	3.3	0.1812	4.6	0.0273	3.3	0.70	173.7	5.6	169.1	7.2	104.8	78.5	173.7	5.6	165.8	102.7
08NR03-78	56	1904	1.8	22.8771	13.0	0.1650	13.4	0.0274	3.0	0.22	174.1	5.1	155.0	19.2	-126.9	323.0	174.1	5.1	-137.2	112.3
08NR03-80	170	6620	1.6	21.2633	6.9	0.1809	7.4	0.0279	2.7	0.36	177.3	4.6	168.8	11.5	50.7	165.8	177.3	4.6	349.8	105.1
08NR03-48	270	8776	1.7	20.2709	1.8	0.1923	2.8	0.0283	2.2	0.77	179.7	3.9	178.6	4.6	163.6	42.1	179.7	3.9	109.9	100.6
08NR03-58	320	11716	1.8	20.8005	4.4	0.1875	4.6	0.0283	1.5	0.32	179.9	2.6	174.5	7.4	103.0	103.4	179.9	2.6	174.6	103.0
08NR03-87	178	7208	1.8	20.4251	3.6	0.1963	3.7	0.0291	0.9	0.23	184.8	1.6	182.0	6.2	145.9	85.2	184.8	1.6	126.7	101.5
08NR03-30	447	9940	1.8	19.2415	2.8	0.2089	4.7	0.0291	3.8	0.81	185.2	7.0	192.6	8.3	284.1	63.1	185.2	7.0	65.2	96.2
08NR03-47	138	8740	1.3	20.5343	4.8	0.2576	6.3	0.0384	4.0	0.63	242.6	9.5	232.7	13.0	133.3	113.9	242.6	9.5	182.0	104.3
08NR03-2	270	11236	0.9	19.7112	2.5	0.2783	2.6	0.0398	0.7	0.29	251.5	1.8	249.3	5.7	228.7	57.2	251.5	1.8	110.0	100.9
08NR03-24	281	20140	4.4	19.8015	3.2	0.2811	4.6	0.0404	3.2	0.70	255.1	8.0	251.5	10.2	218.1	75.1	255.1	8.0	117.0	101.4
08NR03-12	149	8292	2.5	20.4004	5.3	0.2770	5.5	0.0410	1.2	0.22	258.9	3.0	248.3	12.0	148.7	124.9	258.9	3.0	174.1	104.3
08NR03-19	1407	39764	4.6	18.6913	3.0	0.3190	3.3	0.0432	1.4	0.43	272.9	3.8	281.1	8.2	350.1	68.3	272.9	3.8	78.0	97.1
08NR03-50	202	16196	3.1	19.1809	2.8	0.3112	2.8	0.0433	0.6	0.20	273.2	1.5	275.1	6.8	291.3	63.0	273.2	1.5	93.8	99.3
08NR03-45	400	22508	1.1	18.8035	2.5	0.3358	5.4	0.0458	4.8	0.88	288.6	13.4	294.0	13.8	336.5	57.4	288.6	13.4	85.8	98.2
08NR03-70	538	30360	0.																	

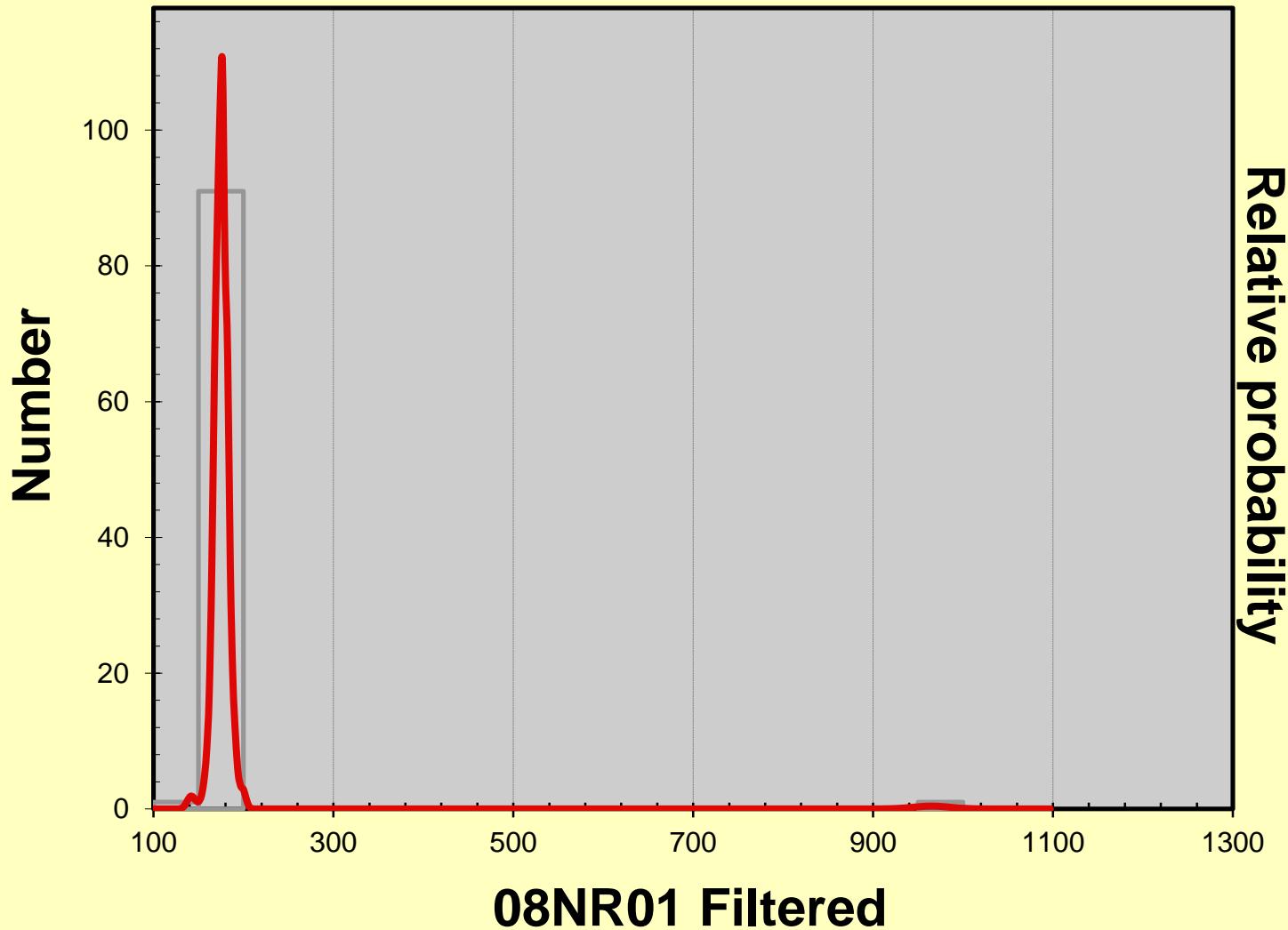
08NR03-83	216	53228	2.4	13.3067	0.9	1.8412	2.5	0.1777	2.3	0.93	1054.3	22.8	1060.3	16.5	1072.5	18.5	1072.5	18.5	98.3	99.4
08NR03-82	884	172188	4.3	13.2782	0.5	1.8453	2.6	0.1777	2.6	0.98	1054.4	25.0	1061.7	17.3	1076.8	10.8	1076.8	10.8	97.9	99.3
08NR03-65	190	52016	3.0	13.2569	1.2	1.8737	1.7	0.1801	1.2	0.70	1067.8	12.1	1071.8	11.6	1080.0	24.9	1080.0	24.9	98.9	99.6
08NR03-31	114	36172	3.1	13.2540	1.4	1.8164	3.0	0.1746	2.6	0.88	1037.4	25.2	1051.4	19.5	1080.5	28.1	1080.5	28.1	96.0	98.7
08NR03-29	90	24864	2.9	13.1575	1.8	1.8759	2.5	0.1790	1.8	0.71	1061.6	17.5	1072.6	16.6	1095.1	35.2	1095.1	35.2	96.9	99.0
08NR03-3	183	35316	4.2	13.1020	1.4	1.8568	3.2	0.1764	2.8	0.89	1047.5	27.4	1065.9	20.9	1103.6	28.4	1103.6	28.4	94.9	98.3
08NR03-51	73	25832	2.4	12.9063	1.7	2.0106	3.5	0.1882	3.1	0.88	1111.6	31.9	1119.1	24.0	1133.6	32.9	1133.6	32.9	98.1	99.3
08NR03-4	85	26512	3.6	12.8107	2.2	2.1409	2.5	0.1989	1.1	0.46	1169.5	12.2	1162.1	17.2	1148.4	43.7	1148.4	43.7	101.8	100.6
08NR03-9	163	50416	3.4	12.7690	2.5	2.0453	3.9	0.1894	3.0	0.77	1118.2	30.4	1130.7	26.4	1154.9	49.4	1154.9	49.4	96.8	98.9
08NR03-14	132	42576	2.9	12.7634	1.3	2.0699	2.6	0.1916	2.2	0.86	1130.1	22.7	1138.9	17.5	1155.7	26.2	1155.7	26.2	97.8	99.2
08NR03-54	48	13032	2.6	12.7221	2.5	2.1633	3.3	0.1996	2.1	0.64	1173.2	22.4	1169.3	22.7	1162.1	50.0	1162.1	50.0	101.0	100.3
08NR03-13	336	107244	3.0	12.7181	1.3	2.0680	3.0	0.1908	2.7	0.89	1125.5	27.4	1138.3	20.3	1162.8	26.4	1162.8	26.4	96.8	98.9
08NR03-69	178	36420	2.2	12.6617	1.0	2.1550	3.0	0.1979	2.9	0.95	1164.0	30.7	1166.7	21.1	1171.6	19.4	1171.6	19.4	99.4	99.8
08NR03-60	83	24156	2.2	12.6541	1.6	2.1521	2.2	0.1975	1.5	0.68	1161.9	15.7	1165.7	15.2	1172.8	31.9	1172.8	31.9	99.1	99.7
08NR03-28	182	51568	3.9	12.4975	1.8	2.0957	2.5	0.1900	1.7	0.70	1121.1	17.9	1147.4	17.1	1197.4	35.1	1197.4	35.1	93.6	97.7
08NR03-92	313	75036	1.5	12.3182	1.0	2.3453	1.9	0.2095	1.6	0.85	1226.3	17.9	1226.1	13.3	1225.8	19.1	1225.8	19.1	100.0	100.0
08NR03-33	59	20308	0.7	11.7456	2.2	2.5663	2.7	0.2186	1.7	0.62	1274.5	19.4	1291.1	19.9	1318.7	41.7	1318.7	41.7	96.7	98.7
08NR03-63	192	59768	2.4	10.9243	1.0	3.1550	1.9	0.2500	1.6	0.84	1438.3	20.8	1446.2	14.8	1457.8	19.8	1457.8	19.8	98.7	99.5
08NR03-75	198	73600	1.7	10.7773	1.0	3.2962	2.3	0.2576	2.1	0.91	1477.8	27.2	1480.2	17.7	1483.5	18.0	1483.5	18.0	99.6	99.8
08NR03-84	88	30868	1.0	10.6881	0.9	3.3619	2.6	0.2606	2.4	0.93	1492.9	32.0	1495.6	20.1	1499.3	17.4	1499.3	17.4	99.6	99.8
08NR03-95	218	61504	2.0	10.5991	1.0	3.3677	2.1	0.2589	1.8	0.87	1484.1	23.9	1496.9	16.1	1515.1	18.9	1515.1	18.9	98.0	99.1
08NR03-90	232	9060	1.7	10.0948	1.4	3.5011	2.1	0.2563	1.6	0.74	1471.0	20.8	1527.5	16.8	1606.5	26.7	1606.5	26.7	91.6	96.3
08NR03-21	27	11932	2.8	10.0921	1.9	3.8154	2.1	0.2793	1.0	0.46	1587.7	13.7	1596.0	17.0	1607.0	35.1	1607.0	35.1	98.8	99.5
08NR03-53	64	26708	1.7	9.8078	0.9	4.1052	2.0	0.2920	1.8	0.90	1651.6	26.5	1655.3	16.4	1660.1	15.9	1660.1	15.9	99.5	99.8
08NR03-856	90	35288	0.7	9.7348	0.7	4.1806	2.6	0.2952	2.5	0.96	1667.3	36.7	1670.2	21.3	1673.9	13.3	1673.9	13.3	99.6	99.8
08NR03-36	119	51924	2.0	9.0931	1.0	4.7265	2.6	0.3117	2.4	0.92	1749.1	36.6	1772.0	21.7	1799.0	18.4	1799.0	18.4	97.2	98.7
08NR03-77	80	62504	0.8	5.0208	1.1	15.1497	4.1	0.5517	4.0	0.97	2832.1	91.5	2824.7	39.4	2819.4	17.6	2819.4	17.6	100.5	100.3
08NR02 La Casita (Carbonera) Formation 13R 640827 2824446 (103° 35.93'W 31° 31.94'N)																				
08NR02-47	235	2276	0.4	20.5133	6.8	0.1737	6.9	0.0258	1.3	0.19	164.5	2.1	162.7	10.4	135.8	160.0	164.5	2.1	121.2	101.1
08NR02-80	143	7428	1.7	20.7416	2.9	0.1767	4.1	0.0266	2.9	0.70	169.1	4.8	165.2	6.2	109.7	69.2	169.1	4.8	154.2	102.4
08NR02-83	143	5984	2.0	20.3826	6.9	0.1874	7.0	0.0277	1.3	0.18	176.2	2.2	174.4	11.3	150.7	162.6	176.2	2.2	116.9	101.0
08NR02-100	247	8672	1.6	20.4541	2.6	0.1878	3.4	0.0279	2.3	0.66	177.2	3.9	174.8	5.5	142.5	60.3	177.2	3.9	124.3	101.4
08NR02-8	700	31148	2.7	19.9889	2.6	0.1968	3.5	0.0285	2.2	0.65	181.4	4.0	182.4	5.8	196.3	61.2	181.4	4.0	92.4	99.4
08NR02-62	150	7116	1.6	20.5346	3.3	0.1957	3.7	0.0292	1.5	0.41	185.2	2.8	181.5	6.1	133.3	78.5	185.2	2.8	138.9	102.1
08NR02-93	329	10464	1.3	20.4507	2.9	0.1982	3.3	0.0294	1.5	0.47	186.8	2.8	183.6	5.5	142.9	67.6	186.8	2.8	130.7	101.7
08NR02-34	223	9976	1.6	20.6848	3.8	0.1985	6.7	0.0298												

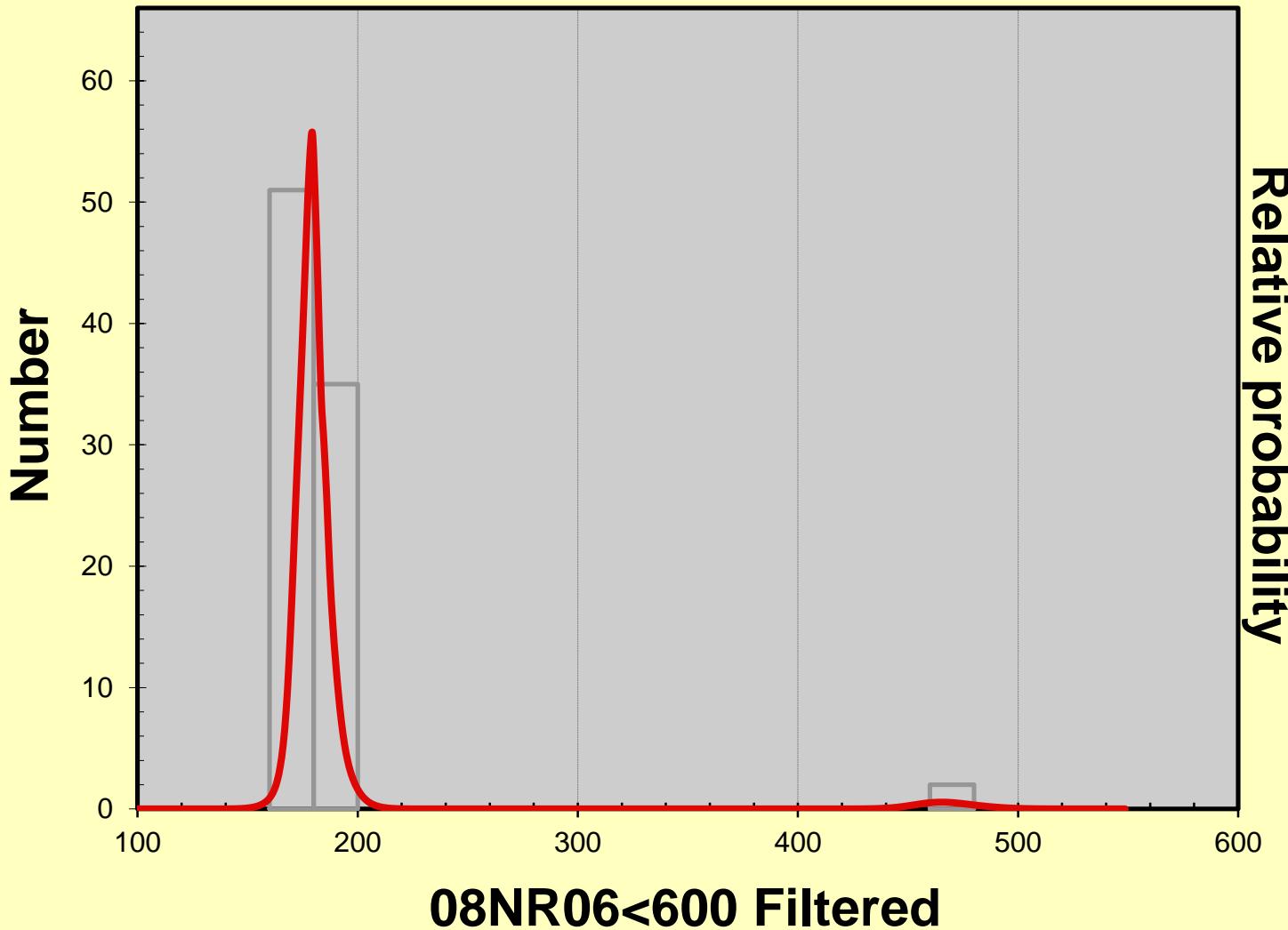
08NR02-3	156	59372	4.3	13.4299	1.2	1.8666	2.4	0.1818	2.1	0.86	1076.9	20.8	1069.3	16.1	1054.0	24.8	1054.0	24.8	102.2	100.7
08NR02-18	98	30604	1.2	13.3966	1.1	1.8298	3.2	0.1778	3.0	0.94	1054.9	29.4	1056.2	21.2	1059.0	23.0	1059.0	23.0	99.6	99.9
08NR02-53	272	62032	3.0	13.3907	0.7	1.7930	1.2	0.1741	0.9	0.81	1034.9	9.0	1042.9	7.6	1059.8	13.7	1059.8	13.7	97.6	99.2
08NR02-57	111	30124	1.1	13.3723	1.4	1.8699	2.2	0.1814	1.7	0.77	1074.3	16.4	1070.5	14.3	1062.6	28.0	1062.6	28.0	101.1	100.4
08NR02-52	111	28436	2.6	13.3034	1.8	1.7872	2.9	0.1724	2.3	0.79	1025.6	21.9	1040.8	19.0	1073.0	36.0	1073.0	36.0	95.6	98.5
08NR02-65	256	59716	1.8	13.2946	0.9	1.9012	3.7	0.1833	3.6	0.97	1085.1	35.6	1081.5	24.4	1074.3	17.3	1074.3	17.3	101.0	100.3
08NR02-63	61	15832	2.3	13.2713	1.6	1.9316	4.2	0.1859	3.9	0.92	1099.2	39.3	1092.1	28.2	1077.9	32.3	1077.9	32.3	102.0	100.7
08NR02-89	167	52388	1.2	13.1598	0.9	1.9420	1.8	0.1854	1.6	0.87	1096.1	15.9	1095.7	12.2	1094.8	18.2	1094.8	18.2	100.1	100.0
08NR02-95	433	95292	3.0	13.1160	1.0	1.9665	3.4	0.1871	3.2	0.96	1105.5	32.9	1104.1	22.8	1101.4	19.6	1101.4	19.6	100.4	100.1
08NR02-75	494	85000	1.9	13.1106	0.9	1.9181	1.6	0.1824	1.3	0.83	1080.0	12.9	1087.4	10.5	1102.3	17.6	1102.3	17.6	98.0	99.3
08NR02-58	156	30148	1.8	13.0093	3.4	1.9138	3.7	0.1806	1.7	0.45	1070.1	16.6	1085.9	25.0	1117.8	66.9	1117.8	66.9	95.7	98.5
08NR02-24	111	8728	1.5	12.9412	2.0	1.5215	6.6	0.1428	6.3	0.95	860.5	50.7	939.1	40.6	1128.2	40.8	1128.2	40.8	76.3	91.6
08NR02-54	283	60944	3.4	12.9104	0.8	1.9959	2.3	0.1869	2.2	0.94	1104.5	22.3	1114.1	15.8	1133.0	15.7	1133.0	15.7	97.5	99.1
08NR02-7	81	30452	1.7	12.7938	1.0	2.1036	3.0	0.1952	2.8	0.94	1149.4	29.8	1150.0	20.6	1151.0	19.5	1151.0	19.5	99.9	100.0
08NR02-55	78	26664	2.2	12.7336	1.2	2.1295	2.5	0.1967	2.2	0.87	1157.4	22.8	1158.4	17.0	1160.4	23.6	1160.4	23.6	99.7	99.9
08NR02-38	296	86468	1.9	12.6409	0.8	2.1812	3.5	0.2000	3.4	0.97	1175.2	36.6	1175.0	24.4	1174.8	15.4	1174.8	15.4	100.0	100.0
08NR02-98	235	61328	2.2	12.5864	0.9	2.2217	2.5	0.2028	2.3	0.94	1190.4	25.2	1187.9	17.3	1183.4	17.0	1183.4	17.0	100.6	100.2
08NR02-11	142	40520	3.4	12.5824	1.3	2.2100	3.1	0.2017	2.8	0.90	1184.3	29.9	1184.2	21.3	1184.0	25.7	1184.0	25.7	100.0	100.0
08NR02-35	537	68196	9.1	12.4125	1.7	2.2165	7.2	0.1995	7.0	0.97	1172.8	75.4	1186.3	50.6	1210.8	32.7	1210.8	32.7	96.9	98.9
08NR02-68	54	21984	1.9	12.2345	2.4	2.3312	3.7	0.2069	2.9	0.77	1212.0	31.6	1221.8	26.4	1239.2	46.5	1239.2	46.5	97.8	99.2
08NR02-17	169	60496	2.7	12.1337	0.9	2.4265	2.1	0.2135	1.9	0.91	1247.6	21.9	1250.5	15.2	1255.4	16.8	1255.4	16.8	99.4	99.8
08NR02-20	84	28632	2.9	12.0898	2.5	2.4290	2.6	0.2130	0.8	0.30	1244.7	9.1	1251.2	18.9	1262.5	48.9	1262.5	48.9	98.6	99.5
08NR02-4	127	66144	3.7	12.0031	1.2	2.4824	4.9	0.2161	4.8	0.97	1261.2	54.8	1266.9	35.7	1276.5	23.4	1276.5	23.4	98.8	99.6
08NR02-76	184	70644	2.5	11.7360	1.4	2.6542	3.8	0.2259	3.5	0.93	1313.1	41.6	1315.8	27.7	1320.2	26.6	1320.2	26.6	99.5	99.8
08NR02-50	437	131188	1.7	11.7035	1.2	2.6977	4.2	0.2290	4.0	0.96	1329.2	48.3	1327.8	31.0	1325.6	22.3	1325.6	22.3	100.3	100.1
08NR02-42	42	15284	3.0	11.5885	2.4	2.8151	2.8	0.2366	1.3	0.49	1369.0	16.5	1359.6	20.7	1344.7	46.6	1344.7	46.6	101.8	100.7
08NR02-97	62	21780	1.7	11.4743	1.3	2.8377	2.1	0.2362	1.7	0.81	1366.7	21.3	1365.6	16.1	1363.8	24.3	1363.8	24.3	100.2	100.1
08NR02-28	64	27184	1.3	10.9725	1.9	3.1482	3.9	0.2505	3.4	0.87	1441.2	43.5	1444.6	29.7	1449.5	35.8	1449.5	35.8	99.4	99.8
08NR02-64	42	18424	2.4	10.6191	1.8	3.4239	3.4	0.2637	2.9	0.85	1508.7	38.5	1509.9	26.4	1511.5	33.1	1511.5	33.1	99.8	99.9
08NR02-19	48	19896	0.9	10.5751	1.3	3.4306	2.2	0.2631	1.8	0.82	1505.8	24.4	1511.4	17.5	1519.3	24.3	1519.3	24.3	99.1	99.6
08NR02-87	122	36936	1.5	10.3289	3.5	2.8361	7.9	0.2125	7.1	0.90	1241.9	80.3	1365.1	59.7	1563.6	66.2	1563.6	66.2	79.4	91.0
08NR02-5	62	32204	1.2	10.0016	1.2	3.9987	2.2	0.2901	1.9	0.85	1641.8	27.0	1633.9	17.8	1623.8	21.6	1623.8	21.6	101.1	100.5
08NR02-16	282	114312	2.2	9.8631	2.2	3.7822	4.0	0.2706	3.3	0.83	1543.6	44.9	1589.0	31.8	1649.7	41.2	1649.7	41.2	93.6	97.1
08NR02-92	100	53928	1.0	9.8311	0.9	4.1318	1.9	0.2946	1.7	0.89	1664.5	25.1	1660.6	15.8	1655.7	16.5	1655.7	16.5	100.5	100.2
08NR02-44	75	36716	2.3	9.8130	1.1	4.1176	2.8	0.2931	2.6	0.91	1656.8	37.3	1657.8	22.8	1659.1	20.9	1659.1	20.9	99.9	99.9
08NR02-82	88	43140	4.1	9.7013	1.4	4.1150</td														



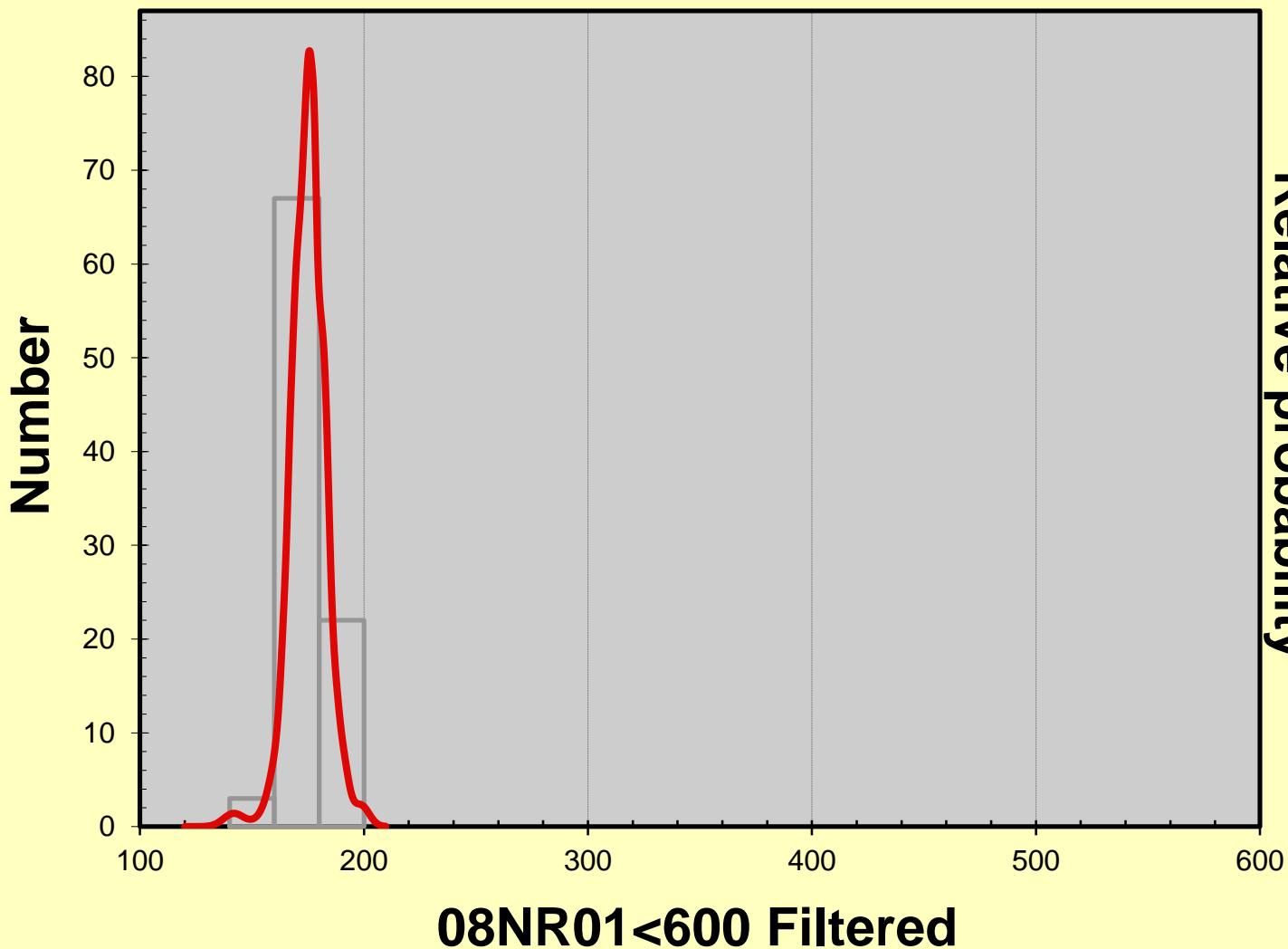
Relative probability



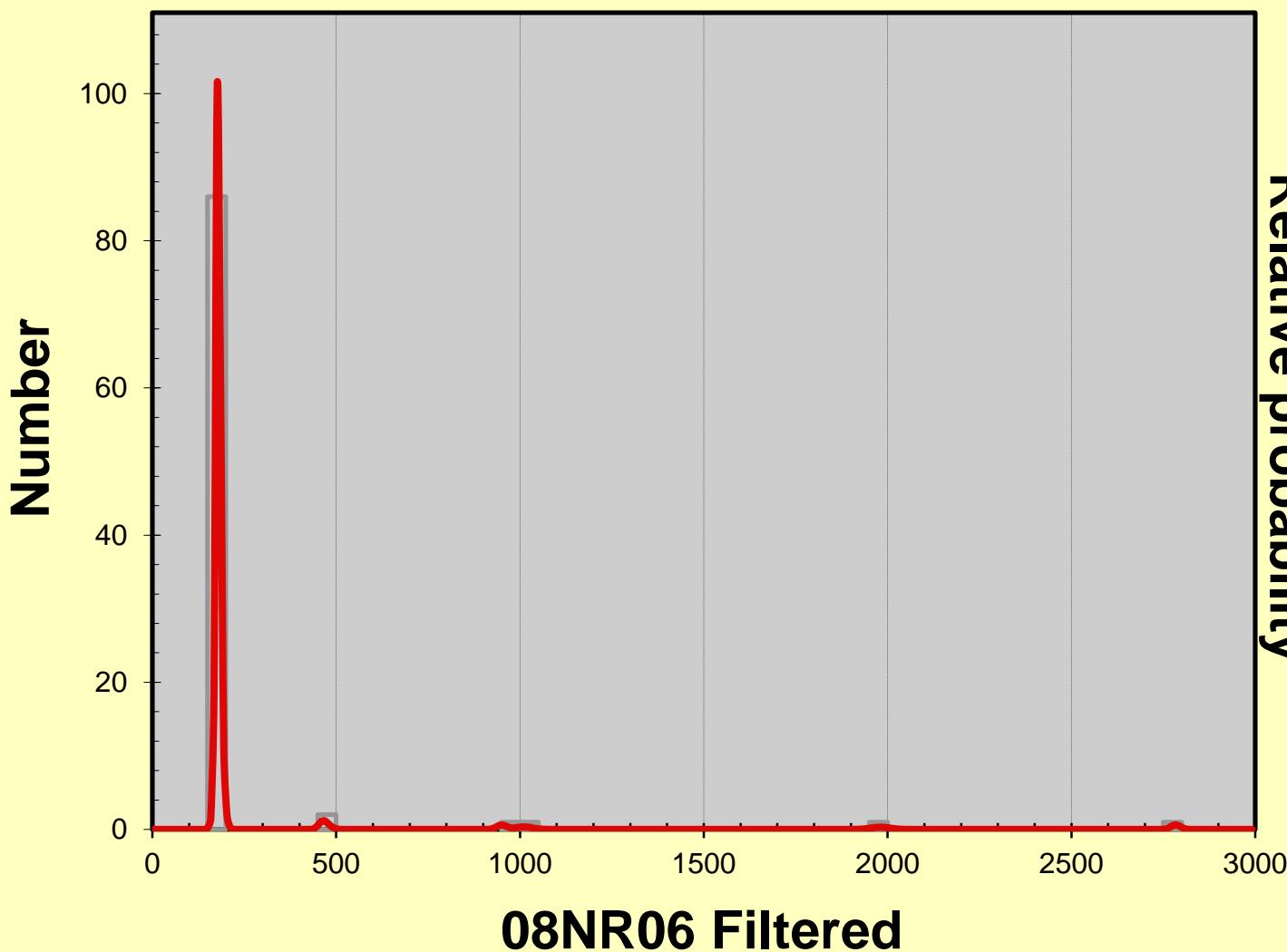




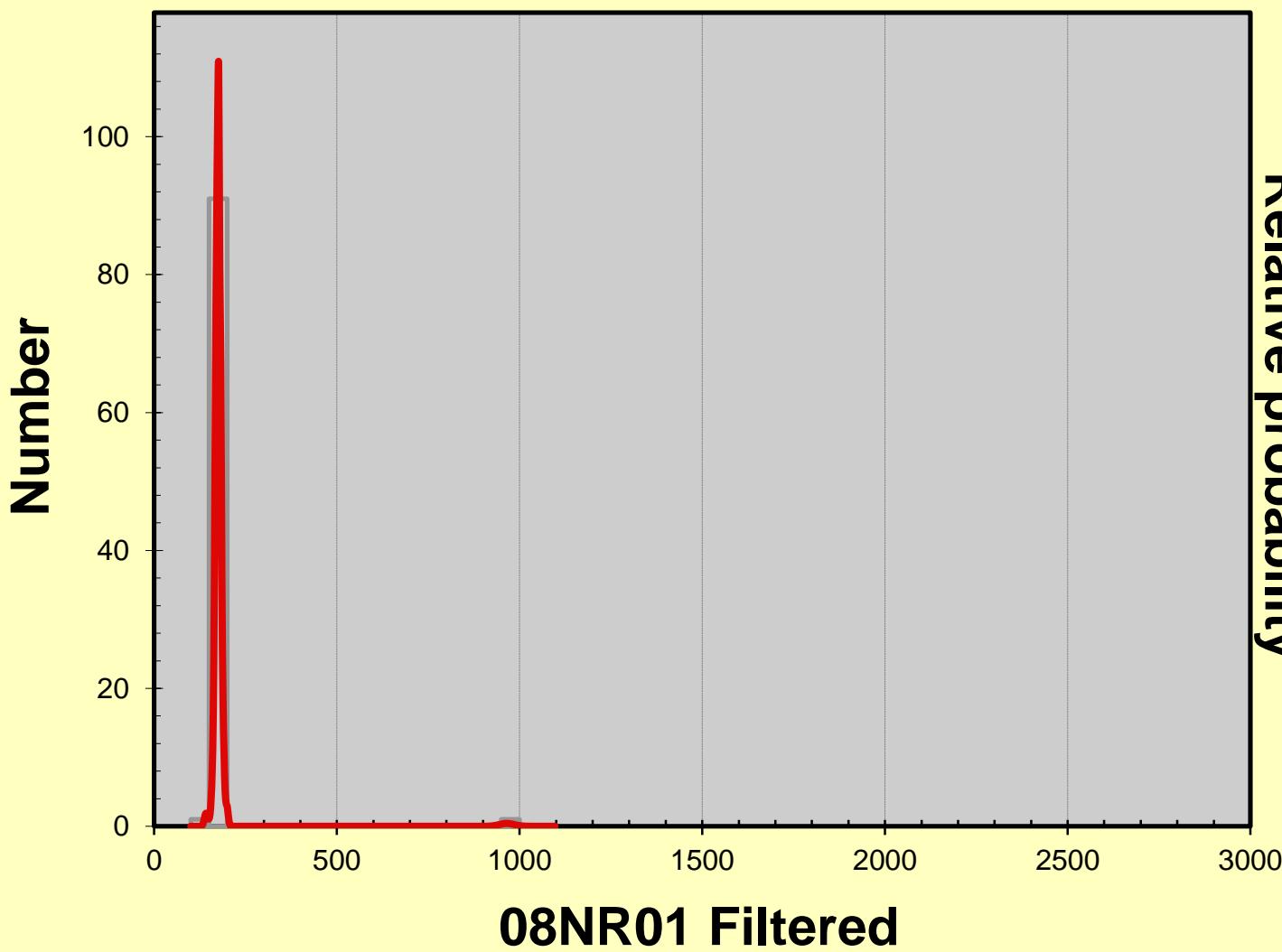
Relative probability

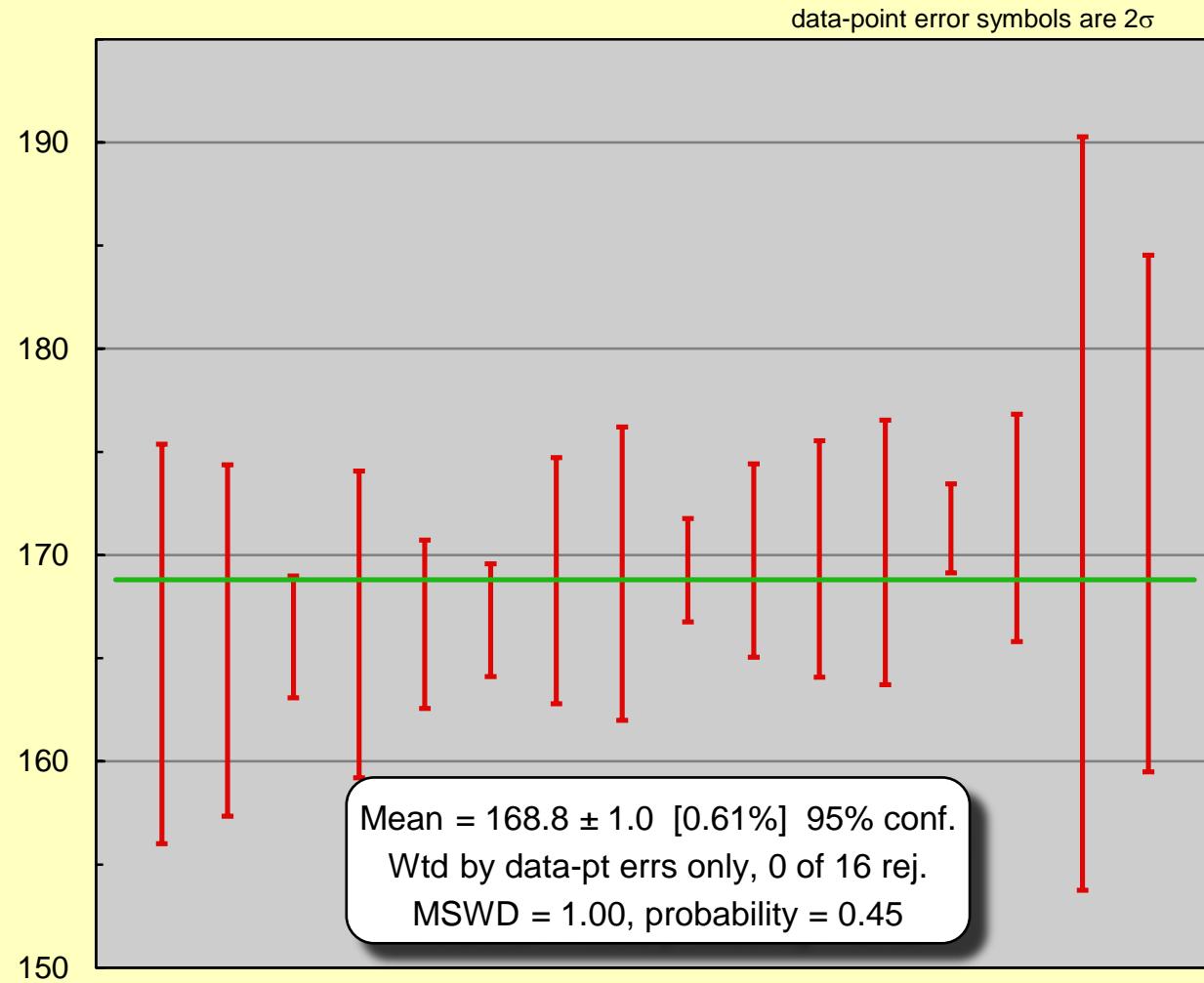


Relative probability



Relative probability





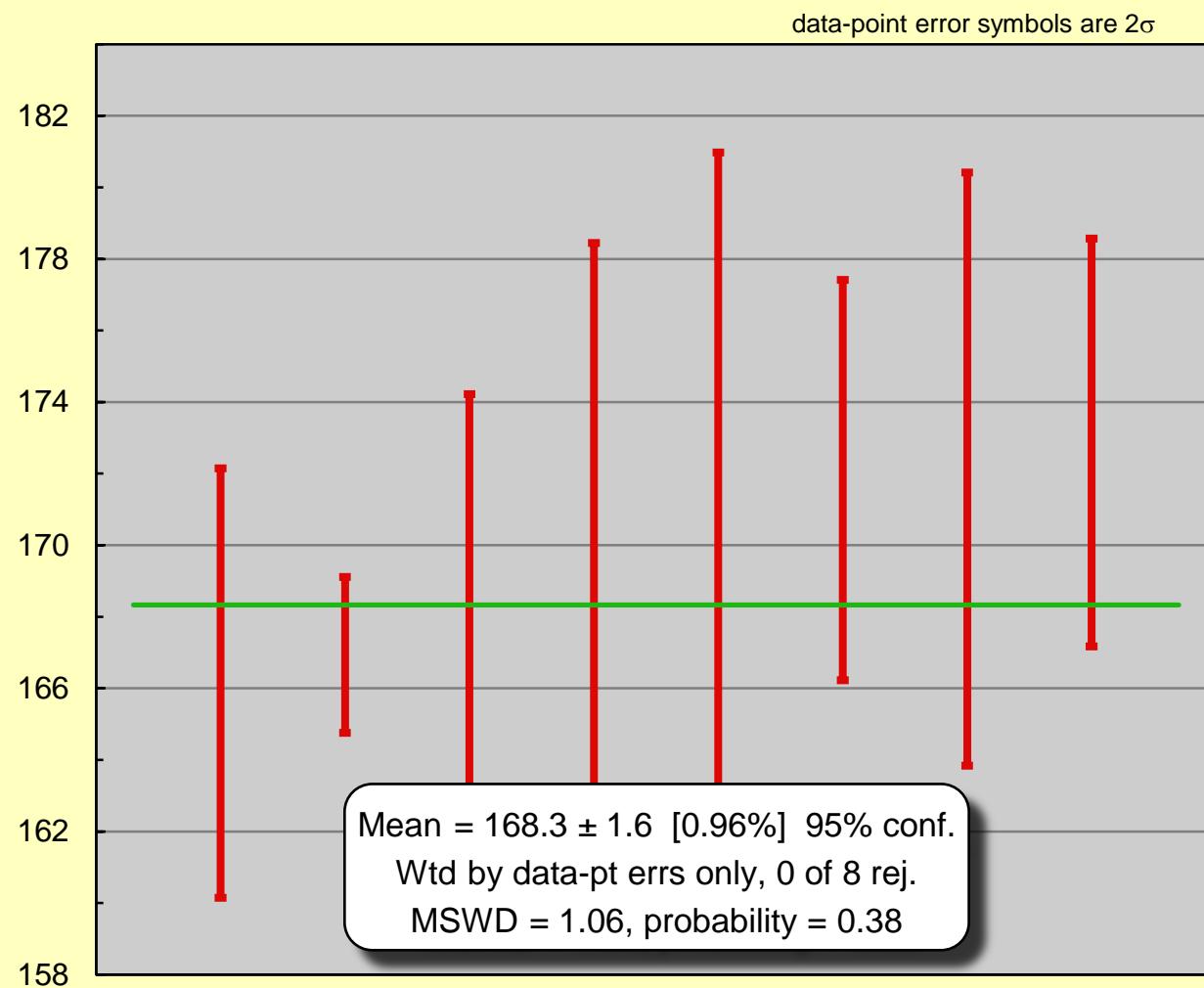


Table S4. Weighted mean ages, 08NR05 (excluding youngest grain)

Number	Grains	Wt Mean Age, Ma	Error, Ma	MSWD	Probability	Type of Error
1		166.1	3	-	-	$\pm 1s$
2		166.8	2	0.240	0.810	95%
3		167.1	1.9	0.24	0.790	95%
4		167.2	1.8	0.24	0.870	95%
5		167.3	1.8	0.31	0.870	95%
6		167.7	1.7	0.72	0.61	95%
7		167.9	1.7	0.78	0.59	95%
8		168.3	1.6	1.06	0.38	95%
9		169.5	2.3	1.9	0.5	95%
10		169.7	2.1	1.9	0.53	95%
11		170.4	2.1	2.3	0.01	95%
12		170.8	2	2.4	0.006	95%
13		171.2	1.9	2.5	0.003	95%
14		171.5	1.8	2.6	0.001	95%
15		171.6	1.8	2.5	0.002	95%
16		172.6	1.7	3.3	0.000	95%
17		172.8	1.7	3.4	0.000	95%
18		173.7	1.7	4.2	0.000	95%
19		173.7	1.6	4	0.000	95%
20		173.9	1.6	4.1	0.000	95%
21		174.1	1.6	4.2	0.000	95%
22		174.2	1.6	4.3	0.000	95%
23		174.8	1.8	6.3	0.000	95%
24		175.1	2.1	8.3	0.000	95%

Age Pick 2 Peaks: 167 Ma, n = 11; 176 Ma, n = 18
 TuffZirc Age 172.95 Ma +1.19 Ma -2.06 Ma (n=13)

Notes: MSWD, Mean square of weighted deviates

Bold, Best age estimate (MSWD nearest 1.0)

Underline at n = 10 is 5% probability cutoff (e.g., Dumitru et al., 2010)

Oldest grain in sample excluded due to lack of statistical overlap with next youngest grain

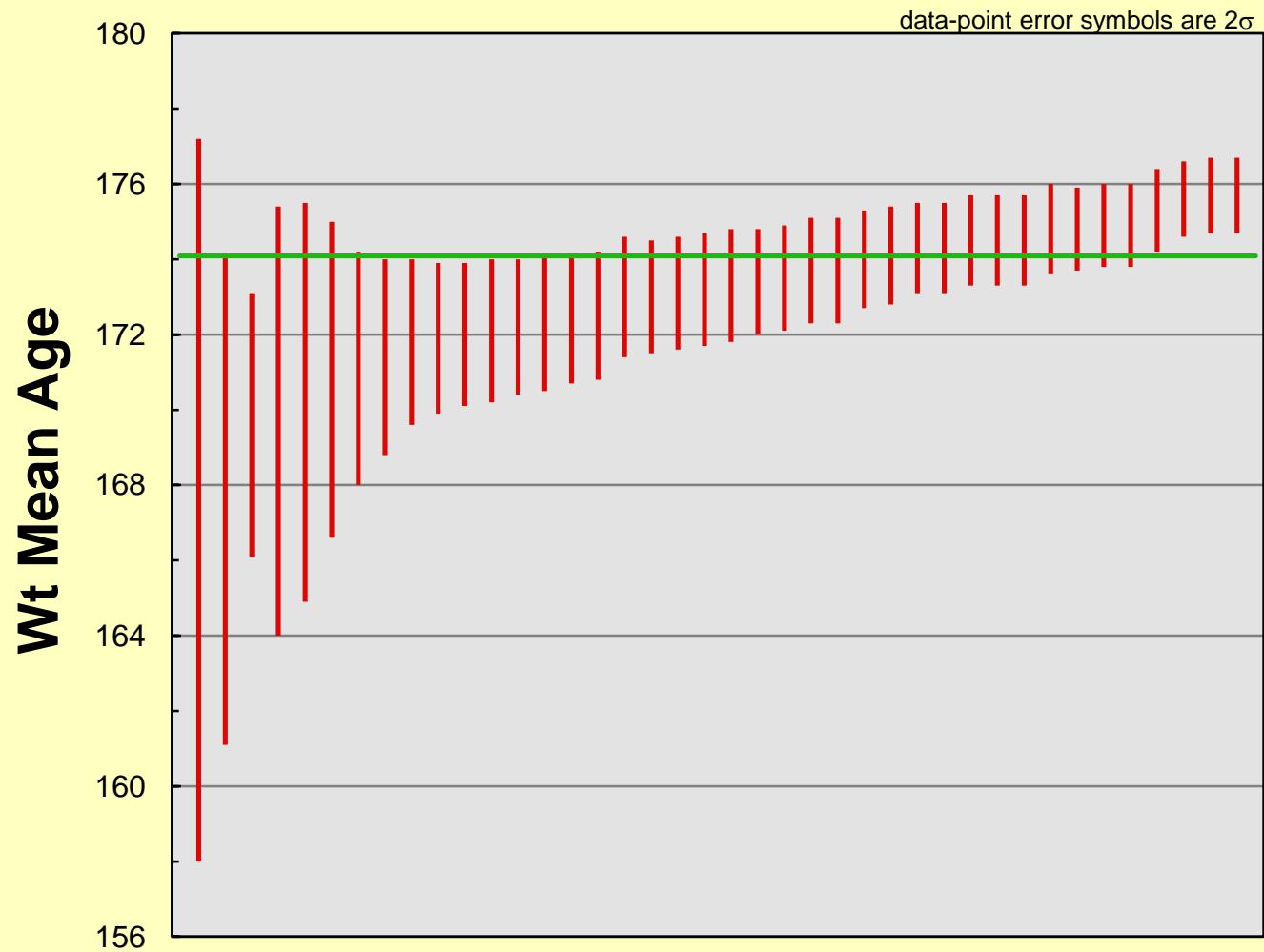


Table S5. Weighted Mean ages, 08NR04 (excluding two youngest grains)

Number	Grains	Wt Mean Age	Error	MSWD	Probability	Type of Error
1		165.7	4.8	-	-	$\pm 1s$
2		165.8	6.3	0.0006	0.980	95%
3		166	2.6	0.0027	0.997	95%
4		166.1	2.5	0.0107	0.998	95%
5		166.2	2.1	0.023	0.999	95%
6		166.5	1.7	0.044	0.999	95%
7		166.6	1.6	0.13	0.993	95%
8		166.7	1.6	0.18	0.99	95%
9		167.8	1.3	0.51	0.85	95%
10		167.6	1.3	0.55	0.84	95%
11		167.7	1.2	0.55	0.85	95%
12		167.8	1.2	0.55	0.87	95%
13		168.7	1.0	1.15	0.32	95%
14		168.8	1.0	1.13	0.33	95%
15		168.8	1.0	1.06	0.39	95%
16		168.8	1.0	1.0	0.45	95%
17		168.9	1.0	1.03	0.42	95%
18		170.2	1.4	2.4	0.001	95%
19		170.4	1.4	2.4	0.001	95%
20		170.5	1.4	2.4	0.001	95%
21		170.9	1.4	2.7	0.000	95%
22		170.9	1.4	2.7	0.000	95%
23		171.1	1.4	2.9	0.000	95%

Age Pick 2 Peaks: 171 Ma, n = 19; 174 Ma, n = 19
 TuffZirc Age 169.97 Ma +2.04 Ma -0.87 Ma (n=10)

Notes: MSWD, Mean square of weighted deviates

Bold, Best age estimate (MSWD nearest 1.0)

Underline at n = 17 is 5% probability cutoff (e.g., Dumitru et al., 2010)

Oldest grain in sample excluded due to lack of statistical overlap with next youngest grain

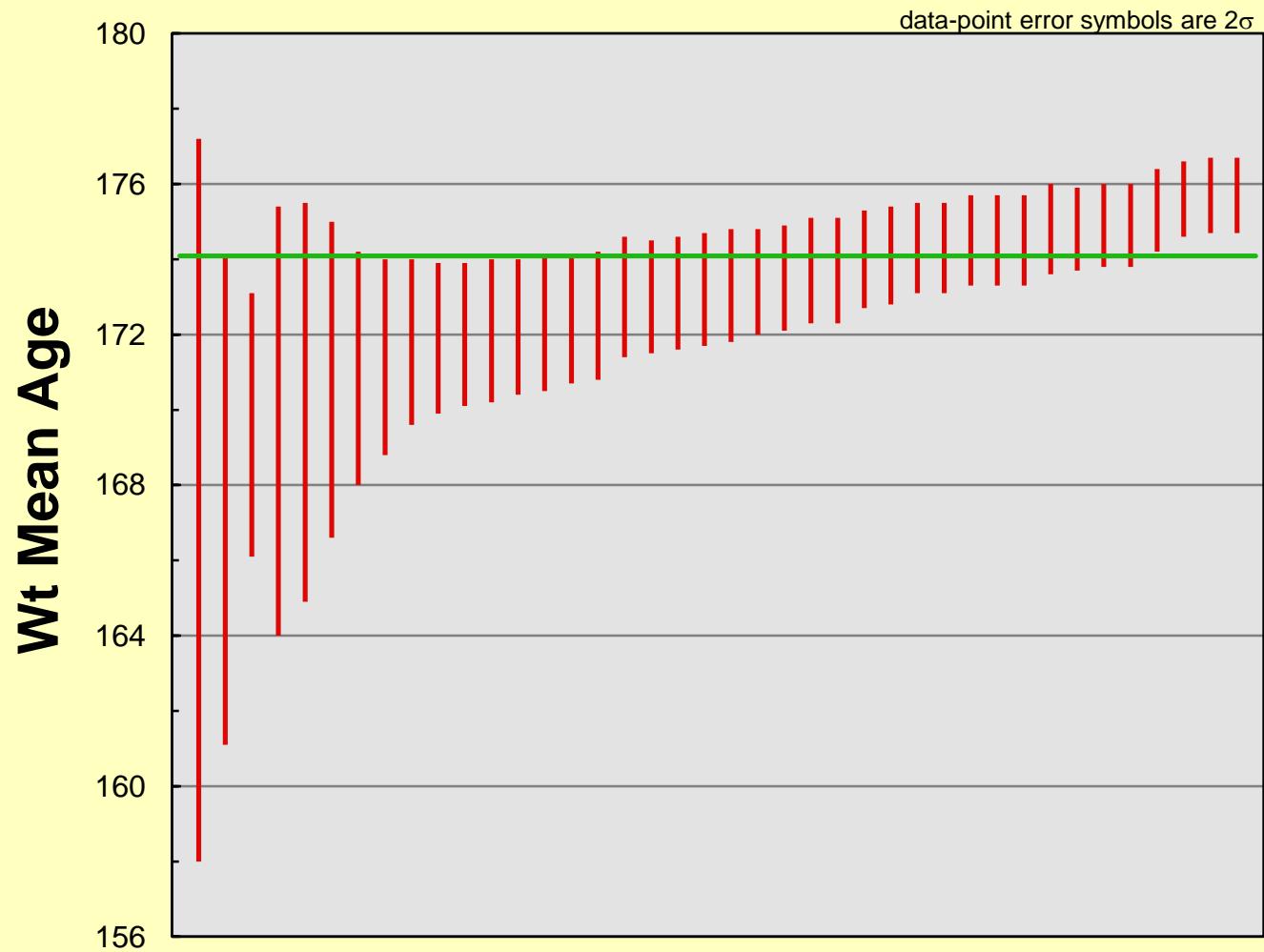


Table S6. Weighted Mean ages, 08NR06 (excluding youngest grain)

Number	Grains	Wt	Mean Age	Error	MSWD	Probability	Type of Error
1			169.4	3.5	-	-	±1s
2			169.6	5.7	0.0092	0.992	95%
3			169.7	5.4	0.0076	0.992	95%
4			170.2	4.2	0.033	0.992	95%
5			170.8	3.1	0.075	0.990	95%
6			171.1	2.6	0.084	0.995	95%
7			171.4	2.2	0.091	0.997	95%
8			171.8	2	0.20	0.990	95%
9			171.9	2	0.18	0.994	95%
10			172	1.9	0.18	0.996	95%
11			172.1	1.9	0.18	0.998	95%
12			172.2	1.8	0.18	0.998	95%
13			172.2	1.8	0.17	0.999	95%
14			172.3	1.8	0.18	0.999	95%
15			172.4	1.7	0.20	0.999	95%
16			172.5	1.7	0.20	1.000	95%
17			173.0	1.6	0.31	0.996	95%
18			173.0	1.5	0.30	0.998	95%
19			173.1	1.5	0.32	0.997	95%
20			172.2	1.5	0.33	0.997	95%
21			173.3	1.5	0.33	0.998	95%
22			173.4	1.4	0.32	0.998	95%
23			173.5	1.4	0.34	0.998	95%
24			173.7	1.4	0.38	0.997	95%
25			173.7	1.4	0.37	0.998	95%
26			174.0	1.3	0.43	0.994	95%
27			174.1	1.3	0.45	0.993	95%
28			174.3	1.2	0.48	0.990	95%
29			174.3	1.2	0.47	0.992	95%
30			174.5	1.2	0.50	0.990	95%
31			174.5	1.2	0.50	0.990	95%
32			174.5	1.2	0.49	0.992	95%
33			174.8	1.2	0.54	0.990	95%
34			174.8	1.1	0.53	0.990	95%
35			174.9	1.1	0.54	0.990	95%
36			174.9	1.1	0.54	0.990	95%
37			175.3	1.1	0.62	0.970	95%
38			175.6	1.0	0.69	0.930	95%
39			175.7	1.0	0.69	0.930	95%
40			175.9	1.0	0.72	0.900	95%
41			175.9	1.0	0.72	0.910	95%
42			175.9	1.0	0.71	0.920	95%
43			176	1.0	0.72	0.930	95%
44			176	1.0	0.70	0.920	95%
45			176	1.0	0.70	0.940	95%
46			176.6	1.0	0.89	0.690	95%
47			176.6	1.0	0.87	0.710	95%

48	176.7	1.0	0.86	0.730	95%
49	176.9	1.0	0.94	0.600	95%
50	176.9	1.0	0.92	0.630	95%
51	176.9	1.0	0.91	0.650	95%
52	177	1.0	0.91	0.660	95%
53	177.3	1.0	1.03	0.420	95%
54	177.40	1.0	1.01	0.450	95%
55	177.4	1.0	1.00	0.470	95%
56	177.5	1.0	0.99	0.490	95%
57	177.5	1.0	0.98	0.520	95%
58	177.5	1.0	0.97	0.530	95%
59	177.5	1.0	0.97	0.530	95%
60	177.5	1.0	0.97	0.540	95%
61	177.6	1.0	0.96	0.560	95%
62	177.6	1.0	1.3	0.065	95%
63	177.6	1.0	1.3	0.069	95%
64	178.3	1.0	1.3	0.063	95%
65	178.3	1.0	1.3	0.063	95%
66	178.3	1.0	1.3	0.048	95%
67	178.4	1.0	1.3	0.047	95%
68	178.4	1.0	1.3	0.046	95%
69	178.5	1.0	1.3	0.048	95%

Age Pick 1 Peak: 179 Ma, n = 69
 TuffZirc Age 179.84 Ma +0.98 Ma -1.27 Ma (n = 74)

Notes: MSWD, Mean square of weighted deviates
 Bold, Best age estimate (MSWD nearest 1.0)
 Underline at n = 65 is 5% probability cutoff (e.g., Dumitru et al., 2010)

