

**U-Pb zircon CA-ID-TIMS data table**

- (a) /1, /2 etc. are labels for the different single zircon grain analyses; all analyses were annealed and chemically abraded following a method modified after Mattinson (2005). Analyses shown in bold were used in the weighted mean  $^{206}\text{Pb}/^{238}\text{U}$  date calculations.
- (b) Nominal fraction weights measured after chemical abrasion. Weights that are shown in square brackets represent grains that were too small to be accurately weighed using the available balance. These weights may therefore be inaccurate.
- (c) Nominal U and total Pb concentrations subject to the uncertainty in zircon weights. Concentration values for grains too small to be weighed accurately are likely to be inaccurate.
- (d) Model Th/U ratio calculated from the radiogenic  $^{208}\text{Pb}/^{206}\text{Pb}$  ratio and  $^{206}\text{Pb}/^{238}\text{U}$  date.
- (e)  $\text{Pb}^*$  and  $\text{Pb}_c$  represent radiogenic and common Pb respectively.
- (f) Measured ratio corrected for tracer and fractionation only. Pb and U mass fractionation were controlled online using the  $^{202}\text{Pb}/^{205}\text{Pb}$  and  $^{233}\text{U}/^{235}\text{U}$  ratios of the EARTHTIME isotopic tracer respectively.
- (g) Corrected for fractionation, tracer, and common Pb. All common lead was attributed to the analytical blank and corrected using:  $^{206}\text{Pb}/^{204}\text{Pb} = 18.30 \pm 0.26$ ,  $^{207}\text{Pb}/^{204}\text{Pb} = 15.47 \pm 0.32$ ,  $^{208}\text{Pb}/^{204}\text{Pb} = 37.60 \pm 0.74$  (all uncertainties  $2\sigma$  absolute).  $^{206}\text{Pb}/^{238}\text{U}$  and  $^{207}\text{Pb}/^{206}\text{Pb}$  ratios corrected for initial disequilibrium in  $^{230}\text{Th}/^{238}\text{U}$  using Th/U [magma] of 4.
- (h) Error correlation between  $^{207}\text{Pb}/^{235}\text{U}$  and  $^{206}\text{Pb}/^{238}\text{U}$  ratios.
- (i) Calculations are based on the decay constants of Jaffey *et al.* (1971).  $^{206}\text{Pb}/^{238}\text{U}$  and  $^{207}\text{Pb}/^{206}\text{Pb}$  dates are corrected for initial disequilibrium in  $^{230}\text{Th}/^{238}\text{U}$  using Th/U [magma] of 4.
- (j) Date uncertainties are  $2\sigma$  absolute (Ma), propagated using the algorithms of Schmitz & Schoene (2007) and Crowley *et al.* (2007).
- (k) Discordance =  $100 - (100 \times (^{206}\text{Pb}/^{238}\text{U} \text{ date} / ^{207}\text{Pb}/^{206}\text{Pb} \text{ date}))$ .

Sample ID	Compositional Parameters						Radiogenic Isotope Ratios								Isotopic Dates (Ma)						Discordance (%)	
	Wt. (mg)	U (ppm)	Pb (ppm)	Th U	$\text{Pb}^*$ $\text{Pb}_c$	$\text{Pb}_c$ (pg)	$^{206}\text{Pb}/^{204}\text{Pb}$	$^{208}\text{Pb}/^{206}\text{Pb}$	$^{207}\text{Pb}/^{206}\text{Pb}$	$\pm$ (2 $\sigma$ , %)	$^{207}\text{Pb}/^{235}\text{U}$	$\pm$ (2 $\sigma$ , %)	$^{206}\text{Pb}/^{238}\text{U}$	$\pm$ (2 $\sigma$ , %)	$\rho$	$^{207}\text{Pb}/^{206}\text{Pb}$	$\pm$ (2 $\sigma$ , abs)	$^{207}\text{Pb}/^{235}\text{U}$	$\pm$ (2 $\sigma$ , abs)	$^{206}\text{Pb}/^{238}\text{U}$		$\pm$ (2 $\sigma$ , abs)
(a)	(b)	(c)	(c)	(d)	(e)	(e)	(f)	(g)	(g)	(g)	(g)	(g)	(g)	(h)	(i)	(j)	(i)	(j)	(i)	(j)	(k)	
<b>W1 (Anhée Nord: 50.3170°N, 4.8760°E, WGS 84)</b>																						
W1/1	[0.001]	229	13.3	0.461	20.3	0.62	1247	0.146	0.05304	0.37	0.3916	0.40	0.05355	0.05	0.584	330.7	8.5	335.55	1.15	336.25	0.17	-1.7
W1/3	0.0044	142	8.2	0.507	37.5	0.93	2265	0.160	0.05334	0.18	0.3937	0.20	0.05354	0.04	0.500	343.1	4.2	337.09	0.57	336.22	0.12	2.0
W1/4	0.0041	494	32.2	1.009	33.2	3.87	1774	0.318	0.05328	0.23	0.3940	0.25	0.05363	0.05	0.488	340.8	5.3	337.28	0.72	336.77	0.16	1.2
W1/5	0.0033	290	16.5	0.508	51.6	1.04	3109	0.160	0.05330	0.13	0.3932	0.16	0.05351	0.08	0.601	341.7	3.0	336.73	0.47	336.01	0.28	1.7
W1/6	0.0044	95	5.5	0.494	19.5	1.18	1193	0.156	0.05332	0.34	0.3936	0.37	0.05354	0.04	0.639	342.3	7.7	337.00	1.05	336.23	0.13	1.8
W1/7	0.0016	447	25.5	0.507	46.5	0.86	2807	0.160	0.05319	0.15	0.3927	0.17	0.05355	0.04	0.473	337.0	3.4	336.35	0.47	336.26	0.13	0.2
W1/8	0.0025	688	38.2	0.443	85.9	1.10	5252	0.140	0.05320	0.08	0.3928	0.10	0.05355	0.05	0.574	337.4	1.9	336.43	0.29	336.29	0.16	0.3
W1/9	0.0013	523	31.7	0.702	29.3	1.36	1686	0.222	0.05325	0.24	0.3930	0.26	0.05352	0.05	0.486	339.5	5.5	336.55	0.75	336.12	0.17	1.0
<b>W8 (Anhée Nord: 50.3170°N, 4.8760°E, WGS 84)</b>																						
W8/4	0.0022	73	5.4	0.990	5.3	1.89	301	0.313	0.05346	1.40	0.3938	1.50	0.05343	0.11	0.900	348.4	31.8	337.15	4.31	335.52	0.36	3.7
W8/5	0.0009	169	15.2	1.000	2.3	4.10	143	0.316	0.05461	3.13	0.4048	3.35	0.05376	0.22	0.974	396.4	70.2	345.14	9.79	337.58	0.73	14.8
W8/6	[0.001]	96	7.2	0.948	5.0	1.20	287	0.299	0.05352	1.59	0.3951	1.70	0.05354	0.14	0.838	351.1	35.9	338.08	4.90	336.19	0.45	4.2
W8/7	0.0018	107	8.5	0.959	3.6	3.35	210	0.303	0.05414	2.02	0.3988	2.15	0.05343	0.15	0.945	376.9	45.3	340.81	6.24	335.55	0.48	11.0
W8/8	0.0019	42	3.3	1.132	5.2	1.01	286	0.357	0.05427	1.55	0.4007	1.66	0.05356	0.13	0.872	382.2	34.8	342.18	4.82	336.31	0.41	12.0
W8/9	0.0010	132	9.3	0.940	7.0	1.17	392	0.297	0.05344	1.06	0.3938	1.14	0.05345	0.08	0.941	347.5	24.0	337.14	3.27	335.64	0.27	3.4
W8/11	[0.001]	123	8.6	0.861	7.1	1.06	405	0.272	0.05349	1.06	0.3953	1.14	0.05359	0.09	0.852	349.8	24.1	338.21	3.27	336.53	0.29	3.8
W8/12	[0.001]	155	10.7	0.891	8.6	1.11	486	0.281	0.05364	0.88	0.3961	0.95	0.05355	0.08	0.875	356.1	20.0	338.79	2.75	336.27	0.26	5.6
W8/14	0.0020	70	4.8	0.940	8.5	1.02	475	0.297	0.05339	0.88	0.3943	0.95	0.05356	0.07	0.899	345.3	20.0	337.49	2.72	336.35	0.23	2.6

Sample ID	Wt. (mg)	Compositional Parameters					Radiogenic Isotope Ratios							$\rho$	Isotopic Dates (Ma)					Discordance (%)		
		U (ppm)	Pb (ppm)	Th U	Pb* Pb <sub>c</sub>	Pb <sub>c</sub> (pg)	$\frac{^{206}\text{Pb}}{^{204}\text{Pb}}$	$\frac{^{208}\text{Pb}}{^{206}\text{Pb}}$	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	$\pm$ (2 $\sigma$ , %)	$\frac{^{207}\text{Pb}}{^{235}\text{U}}$	$\pm$ (2 $\sigma$ , %)	$\frac{^{206}\text{Pb}}{^{238}\text{U}}$		$\pm$ (2 $\sigma$ , %)	$\frac{^{207}\text{Pb}}{^{206}\text{Pb}}$	$\pm$ (2 $\sigma$ , abs)	$\frac{^{207}\text{Pb}}{^{235}\text{U}}$	$\pm$ (2 $\sigma$ , abs)		$\frac{^{206}\text{Pb}}{^{238}\text{U}}$	$\pm$ (2 $\sigma$ , abs)
(a)	(b)	(c)	(c)	(d)	(e)	(e)	(f)	(g)	(g)	(g)	(g)	(g)	(g)	(h)	(i)	(j)	(i)	(j)	(i)	(j)	(k)	
<b>W12 (Anhée Sud: 50.2940°N, 4.8936°E, WGS 84)</b>																						
W12/2	[0.001]	265	18.8	0.700	4.6	3.36	280	0.221	0.05336	1.51	0.3902	1.61	0.05304	0.12	0.869	344.0	34.1	334.55	4.59	333.18	0.39	3.2
W12/3	0.0020	439	27.6	0.839	21.5	2.45	1205	0.265	0.05319	0.34	0.3882	0.36	0.05293	0.04	0.631	337.1	7.6	333.05	1.03	332.47	0.13	1.4
W12/4	[0.001]	257	16.5	0.654	8.3	1.77	496	0.206	0.05337	0.84	0.3882	0.90	0.05275	0.07	0.798	344.7	19.1	333.02	2.56	331.36	0.24	3.9
W12/5	[0.001]	386	26.0	0.668	6.0	3.71	364	0.211	0.05337	1.15	0.3897	1.22	0.05296	0.09	0.867	344.7	25.9	334.17	3.48	332.66	0.30	3.5
W12/6	0.0024	143	9.3	0.696	8.4	2.37	499	0.220	0.05333	0.85	0.3892	0.91	0.05294	0.08	0.743	342.8	19.2	333.81	2.59	332.52	0.27	3.0
W12/7	0.0009	550	36.7	1.105	22.7	1.40	1192	0.349	0.05318	0.34	0.3884	0.37	0.05297	0.05	0.586	336.4	7.7	333.18	1.04	332.71	0.15	1.1
W12/8	0.0014	412	24.6	0.626	19.8	1.65	1169	0.198	0.05329	0.37	0.3877	0.40	0.05276	0.08	0.490	341.3	8.3	332.66	1.13	331.43	0.25	2.9
W12/9	0.0009	367	25.9	0.731	4.8	4.00	291	0.231	0.05346	1.44	0.3897	1.54	0.05287	0.11	0.880	348.3	32.6	334.16	4.39	332.13	0.37	4.6
W12/11	0.0015	84	5.7	0.723	6.5	1.14	384	0.228	0.05373	1.15	0.3927	1.23	0.05301	0.11	0.714	359.9	25.9	336.37	3.51	332.98	0.36	7.5
W12/12	[0.001]	166	11.8	0.763	4.7	2.06	284	0.241	0.05353	1.50	0.3912	1.61	0.05300	0.12	0.837	351.4	34.0	335.24	4.58	332.91	0.40	5.3
W12/13	0.0021	383	22.5	0.623	28.8	1.59	1696	0.197	0.05315	0.20	0.3876	0.23	0.05289	0.05	0.664	335.3	4.6	332.61	0.66	332.22	0.16	0.9
W12/14	0.0040	72	4.7	0.787	10.6	1.62	611	0.248	0.05337	0.67	0.3898	0.71	0.05297	0.06	0.884	344.6	15.1	334.22	2.03	332.73	0.18	3.4
W12/15	0.0009	217	15.5	0.825	5.1	2.27	303	0.260	0.05361	1.44	0.3921	1.54	0.05304	0.12	0.816	354.8	32.5	335.91	4.40	333.18	0.40	6.1
W12/16	0.0024	171	10.1	0.684	45.1	0.53	2600	0.216	0.05322	0.15	0.3885	0.17	0.05294	0.05	0.660	338.3	3.3	333.26	0.49	332.54	0.15	1.7
W12/17	0.0025	164	9.7	0.705	40.2	0.59	2307	0.223	0.05322	0.17	0.3879	0.19	0.05287	0.03	0.617	338.1	3.9	332.86	0.54	332.11	0.10	1.8
<b>W13 (Anhée Sud: 50.2940°N, 4.8936°E, WGS 84)</b>																						
W13/1	<b>0.0156</b>	<b>138</b>	<b>8.2</b>	<b>0.711</b>	<b>46.1</b>	<b>2.72</b>	<b>2639</b>	<b>0.224</b>	<b>0.05312</b>	<b>0.14</b>	<b>0.3875</b>	<b>0.16</b>	<b>0.05292</b>	<b>0.04</b>	<b>0.516</b>	<b>333.7</b>	<b>3.3</b>	<b>332.57</b>	<b>0.46</b>	<b>332.41</b>	<b>0.14</b>	<b>0.4</b>
W13/2	<b>0.0130</b>	<b>77</b>	<b>4.6</b>	<b>0.702</b>	<b>40.1</b>	<b>1.45</b>	<b>2306</b>	<b>0.222</b>	<b>0.05308</b>	<b>0.24</b>	<b>0.3872</b>	<b>0.26</b>	<b>0.05291</b>	<b>0.06</b>	<b>0.346</b>	<b>332.1</b>	<b>5.5</b>	<b>332.32</b>	<b>0.73</b>	<b>332.35</b>	<b>0.19</b>	<b>-0.1</b>
W13/3	0.0116	35	2.0	0.627	30.4	0.76	1781	0.198	0.05318	0.18	0.3889	0.22	0.05304	0.05	0.847	336.4	4.0	333.58	0.62	333.17	0.17	1.0
W13/4	<b>0.0110</b>	<b>27</b>	<b>2.0</b>	<b>0.678</b>	<b>4.0</b>	<b>4.33</b>	<b>246</b>	<b>0.214</b>	<b>0.05364</b>	<b>1.71</b>	<b>0.3917</b>	<b>1.83</b>	<b>0.05297</b>	<b>0.12</b>	<b>0.975</b>	<b>356.0</b>	<b>38.6</b>	<b>335.64</b>	<b>5.23</b>	<b>332.71</b>	<b>0.39</b>	<b>6.5</b>
W13/5	<b>0.0099</b>	<b>19</b>	<b>1.3</b>	<b>0.896</b>	<b>9.1</b>	<b>1.28</b>	<b>511</b>	<b>0.283</b>	<b>0.05318</b>	<b>0.88</b>	<b>0.3884</b>	<b>0.94</b>	<b>0.05297</b>	<b>0.08</b>	<b>0.790</b>	<b>336.3</b>	<b>19.9</b>	<b>333.19</b>	<b>2.68</b>	<b>332.74</b>	<b>0.27</b>	<b>1.1</b>
W13/6	<b>0.0112</b>	<b>62</b>	<b>3.6</b>	<b>0.664</b>	<b>48.3</b>	<b>0.82</b>	<b>2797</b>	<b>0.210</b>	<b>0.05317</b>	<b>0.12</b>	<b>0.3881</b>	<b>0.14</b>	<b>0.05294</b>	<b>0.03</b>	<b>0.640</b>	<b>335.8</b>	<b>2.8</b>	<b>332.97</b>	<b>0.41</b>	<b>332.56</b>	<b>0.11</b>	<b>1.0</b>

## References

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