

# 149699: quartz sandstone, Cornelia Range

## Location and sampling

TRAINOR (SG 51-2), NICHOLLS (3448)  
MGA Zone 51, 468195E 7272030N

Sampled on 27 May 2003

The sample was assembled from four separate blocks, over approximately two square metres of outcrop, and includes material from a stratigraphic thickness of about 50 cm. The site is at the head of a gully near the crest of the Cornelia Range at its northwestern end, about 1.8 km northwest of GSWA 149698 (Bodorkos et al., 2006), and about 64 km north-northeast of Sunday Well, at the start of the access track (now abandoned) from Glen-Ayle Station to GSWA drillhole Trainor 1.

## Tectonic unit/relations

The unit sampled is a quartz-rich, coarse-grained sandstone with minor lithic clasts, and bedding laminations defined by limonite-stained grains. The sandstone is poorly sorted, dominantly trough cross-bedded, and was probably deposited in moderate- to high-energy fluvial conditions. About 15 m of this facies is exposed at this locality, where it overlies fine- to medium-grained sandstone that was probably deposited in a tidal sand-flat setting.

GSWA 149699 was previously assigned to the Cornelia Sandstone, which has been recognized only in the Ward and Oldham Inliers in the Little Sandy Desert, and was tentatively correlated with the pre-1465 Ma Edmund Group of the Capricorn Orogen by Hocking et al. (2000). However, the data presented herein, and for samples GSWA 149698 (Bodorkos et al., 2006) and GSWA 181873 (Wingate and Bodorkos, 2007), both of which were previously attributed to the Cornelia Sandstone, all indicate maximum depositional ages in the range 1410–1279 Ma. These results suggest that the correlation proposed by Hocking et al. (2000) is incorrect, and that within the Ward and Oldham Inliers, the sandstones assigned to the Cornelia Formation may correlate with the Oldham Sandstone, which yielded a maximum depositional age of  $1338 \pm 27$  Ma (GSWA 161282; Nelson, 2004). Hocking et al. (2000) correlated the Oldham Sandstone with the post-1465 Ma Collier Group within the Capricorn Orogen.

## Petrographic description

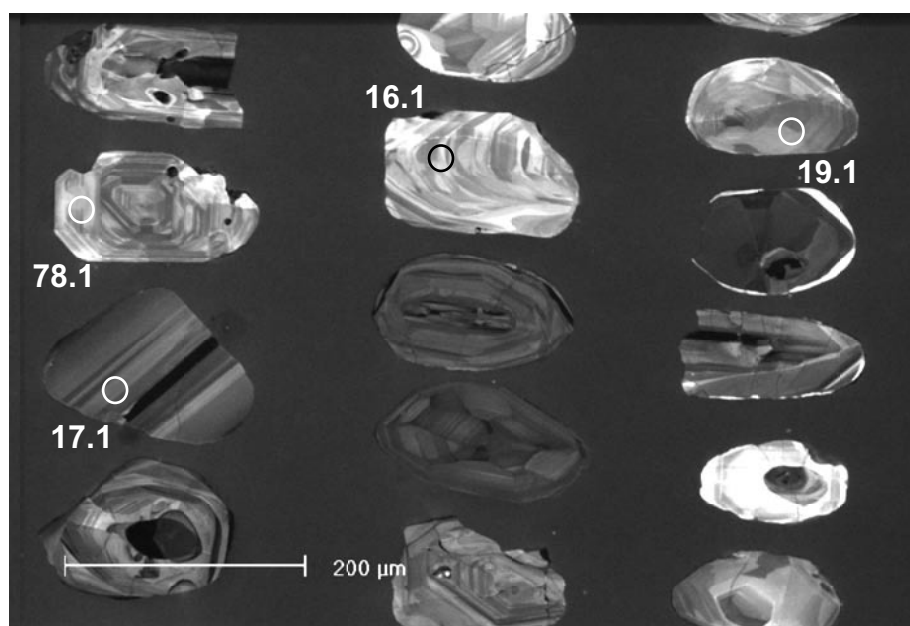
Narrow hematite- and limonite-rich lamellae appear to define bedding in this otherwise pale-coloured sandstone. The thin section comprises abundant (80%) single-crystal quartz grains, mostly 0.1–0.8 mm diameter (fine- to coarse-grained sandstone), subordinate (15%) cherty lithic fragments of similar size, and rare (<5%) sericite- and clay-rich clasts. Accessory phases include polycrystalline vein-quartz grains up to 2 mm long, rare leucoxene, opaque oxide minerals, and blue, green, and brown tourmaline. Some single-crystal quartz grains have deformation lamellae or clouding, possibly by fluid inclusions, but these are confined to detrital cores and do not extend to optically continuous overgrowths. However, other single-crystal quartz grains are characterized by optically continuous overgrowths that are poorly defined, or absent. These textures indicate diagenesis or very low-grade metamorphism.

## Zircon morphology

The zircons isolated from this sample are anhedral to subhedral, and variably rounded. Most are clear and colourless, although a few are pale brown in colour. They are up to 250  $\mu\text{m}$  long, with aspect ratios up to 4:1. The external surfaces of most zircons are pitted, consistent with sedimentary transport. Concentric growth zoning is common in most zircons, and is typically truncated at (abraded) grain boundaries. Many zircons show complex internal structures. A cathodoluminescence image of representative zircons is shown in Figure 1.

## Analytical details

This sample was analysed on 28–29 January 2005, using SHRIMP-A. Eighteen analyses of the CZ3 standard were obtained during the session, and indicated an external spot-to-spot (reproducibility) uncertainty of 1.43% (1 $\sigma$ ) and a  $^{238}\text{U}/^{206}\text{Pb}^*$  calibration uncertainty of 0.36% (1 $\sigma$ ). Common-Pb corrections were applied using contemporaneous common-Pb isotopic compositions determined by the method of Stacey and Kramers (1975).



**Figure 1. Cathodoluminescence image of representative zircons from sample 149699: quartz sandstone, Cornelia Range. Numbered circles represent approximate positions of analysis sites**

## Results

Eighty-one analyses were obtained from 80 zircons, with one grain (56) analysed twice. Results are listed in Table 1, and shown in concordia diagrams (Figs 2 and 3) and a probability density diagram (Fig. 4).

## Interpretation

The analyses are concordant to strongly discordant, and yield dates in the range 3415–1407 Ma (Fig. 2). Four analyses are characterized by moderate to strong discordance ( $>10\%$ ), or high common-Pb contents ( $f_{204} > 1\%$ ). The dates obtained from these four analyses (Group D; Table 1) are imprecise or unreliable, and are not considered geologically significant. The remaining 77 analyses can be divided into two groups based on their  $^{207}\text{Pb}^*/^{206}\text{Pb}^*$  ratios.

Group 1 comprises three analyses of three zircons (Table 1), which yielded a weighted mean  $^{207}\text{Pb}^*/^{206}\text{Pb}^*$  date of  $1410 \pm 30$  Ma (MSWD = 0.07).

Group 2 comprises 74 analyses of 73 zircons (Table 1), which yielded  $^{207}\text{Pb}^*/^{206}\text{Pb}^*$  dates of 3415–1499 Ma.

It is possible that all analyses represent unmodified detrital zircons, in which case the  $^{207}\text{Pb}^*/^{206}\text{Pb}^*$  date of  $1407 \pm 20$  Ma ( $1\sigma$ ) for analysis 59.1 represents a maximum age for deposition of the sandstone. However,

the date of  $1410 \pm 30$  Ma for the three analyses in Group 1 represents a more robust estimate of the maximum depositional age.

The 74 analyses in Group 2 indicate  $^{207}\text{Pb}^*/^{206}\text{Pb}^*$  dates that define major age components (based on three or more data points) at c. 1670 and c. 1779 Ma, and several minor components spanning the range 3415–1499 Ma (Fig. 4). These are interpreted as the ages of zircon-bearing rocks in the detrital source region(s) of the sandstone.

## References

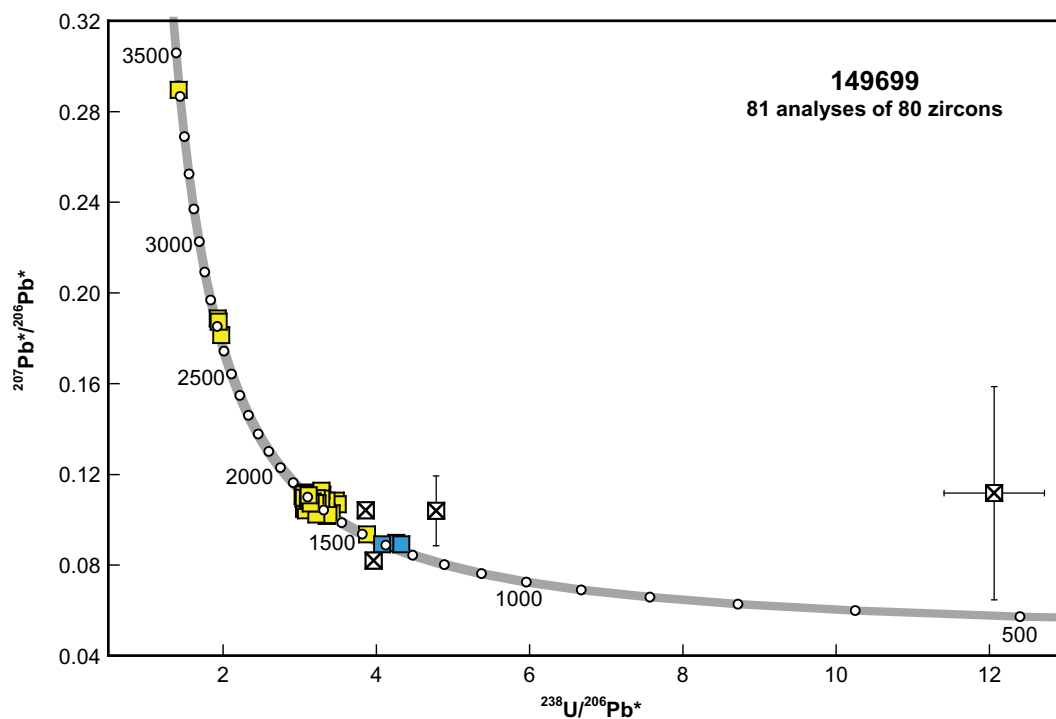
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Table 1. Ion microprobe analytical results for zircons from sample 149699: quartz sandstone, Cornelia Range

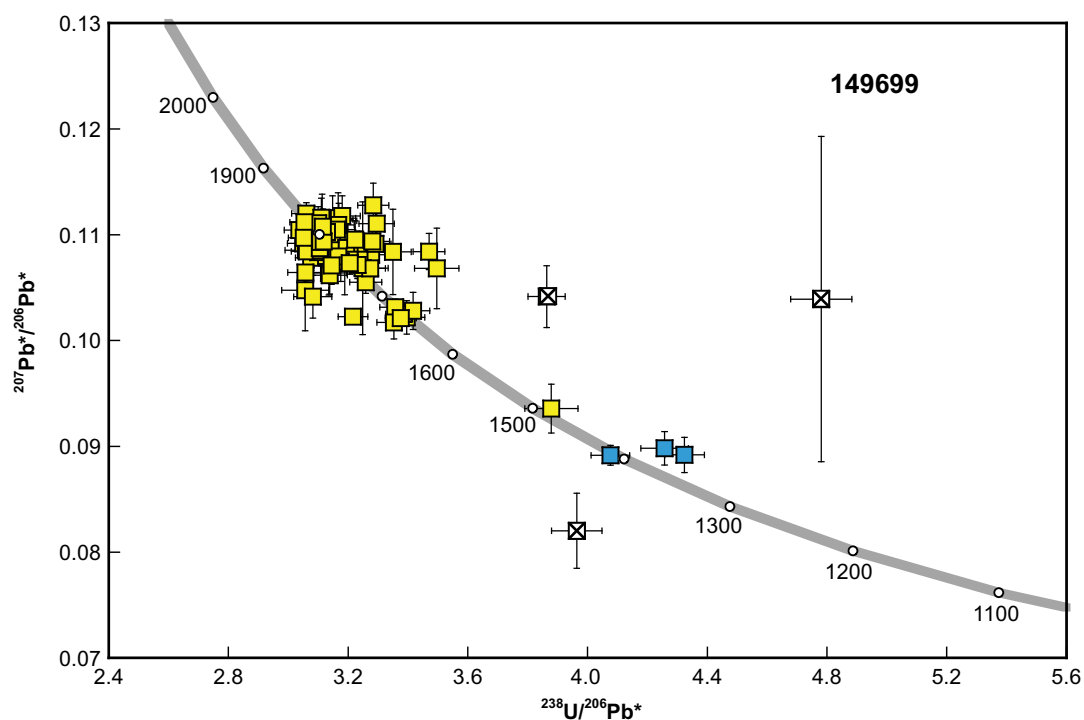
Grp no.	Spot no.	Grain .spot	$^{238}\text{U}$ (ppm)	$^{232}\text{Th}$ (ppm)	$\frac{^{232}\text{Th}}{^{238}\text{U}}$	$f_{204}$ (%)	$^{238}\text{U}/^{206}\text{Pb}$ $\pm 1\sigma$	$^{207}\text{Pb}/^{206}\text{Pb}$ $\pm 1\sigma$	$^{238}\text{U}/^{206}\text{Pb}^*$ $\pm 1\sigma$	$^{207}\text{Pb}^*/^{206}\text{Pb}^*$ $\pm 1\sigma$	$^{238}\text{U}/^{206}\text{Pb}^*$ date (Ma) $\pm 1\sigma$	$^{207}\text{Pb}^*/^{206}\text{Pb}^*$ date (Ma) $\pm 1\sigma$	Disc (%)
1	60	59.1	144	90	0.64	0.099	4.073 $\pm$ 0.064	0.08998 $\pm$ 0.00086	4.077 $\pm$ 0.065	0.08914 $\pm$ 0.00094	1414 $\pm$ 20	1407 $\pm$ 20	-0.5
1	80	79.1	284	208	0.76	1.300	4.268 $\pm$ 0.065	0.10031 $\pm$ 0.00068	4.324 $\pm$ 0.066	0.08919 $\pm$ 0.00166	1341 $\pm$ 18	1408 $\pm$ 36	4.8
1	10	10.1	48	38	0.82	0.140	4.252 $\pm$ 0.080	0.09101 $\pm$ 0.00158	4.258 $\pm$ 0.080	0.08981 $\pm$ 0.00159	1360 $\pm$ 23	1422 $\pm$ 34	4.3
2	14	14.1	21	12	0.58	-0.064	3.882 $\pm$ 0.089	0.09302 $\pm$ 0.00230	3.879 $\pm$ 0.089	0.09357 $\pm$ 0.00230	1478 $\pm$ 30	1499 $\pm$ 47	1.4
2	44	44.1	77	131	1.76	0.175	3.348 $\pm$ 0.057	0.10322 $\pm$ 0.00143	3.354 $\pm$ 0.057	0.10170 $\pm$ 0.00155	1682 $\pm$ 25	1655 $\pm$ 28	-1.6
2	61	60.1	199	32	0.16	0.036	3.375 $\pm$ 0.052	0.10243 $\pm$ 0.00073	3.376 $\pm$ 0.052	0.10212 $\pm$ 0.00073	1672 $\pm$ 23	1663 $\pm$ 13	-0.6
2	1	1.1	66	68	1.07	0.131	3.392 $\pm$ 0.060	0.10332 $\pm$ 0.00131	3.397 $\pm$ 0.060	0.10219 $\pm$ 0.00158	1664 $\pm$ 26	1664 $\pm$ 29	0.0
2	68	67.1	230	146	0.65	0.016	3.216 $\pm$ 0.049	0.10239 $\pm$ 0.00068	3.216 $\pm$ 0.049	0.10226 $\pm$ 0.00069	1745 $\pm$ 23	1666 $\pm$ 12	-4.8
2	17	17.1	100	136	1.40	-0.010	3.384 $\pm$ 0.058	0.10242 $\pm$ 0.00103	3.384 $\pm$ 0.058	0.10250 $\pm$ 0.00103	1669 $\pm$ 25	1670 $\pm$ 19	0.1
2	8	8.1	137	131	0.99	-0.020	3.388 $\pm$ 0.054	0.10239 $\pm$ 0.00090	3.387 $\pm$ 0.054	0.10256 $\pm$ 0.00097	1668 $\pm$ 23	1671 $\pm$ 17	0.2
2	48	48.1	100	25	0.26	0.643	3.395 $\pm$ 0.055	0.10838 $\pm$ 0.00125	3.417 $\pm$ 0.056	0.10280 $\pm$ 0.00176	1655 $\pm$ 24	1675 $\pm$ 32	1.2
2	39	39.1	232	27	0.12	0.113	3.354 $\pm$ 0.051	0.10413 $\pm$ 0.00068	3.357 $\pm$ 0.051	0.10315 $\pm$ 0.00074	1681 $\pm$ 23	1682 $\pm$ 13	0.1
2	47	47.1	27	48	1.83	0.424	3.069 $\pm$ 0.064	0.10782 $\pm$ 0.00192	3.082 $\pm$ 0.064	0.10414 $\pm$ 0.00202	1811 $\pm$ 33	1699 $\pm$ 36	-6.6
2	25	25.1	14	23	1.69	0.599	3.038 $\pm$ 0.078	0.10996 $\pm$ 0.00276	3.056 $\pm$ 0.079	0.10476 $\pm$ 0.00383	1825 $\pm$ 41	1710 $\pm$ 67	-6.7
2	2	2.1	102	92	0.93	-0.006	3.260 $\pm$ 0.054	0.10545 $\pm$ 0.00104	3.260 $\pm$ 0.054	0.10550 $\pm$ 0.00104	1725 $\pm$ 25	1723 $\pm$ 18	-0.1
2	33	33.1	39	34	0.90	0.305	3.129 $\pm$ 0.059	0.10883 $\pm$ 0.00160	3.139 $\pm$ 0.059	0.10618 $\pm$ 0.00178	1783 $\pm$ 29	1735 $\pm$ 31	-2.8
2	29	29.1	41	220	5.49	0.366	3.125 $\pm$ 0.059	0.10955 $\pm$ 0.00160	3.136 $\pm$ 0.060	0.10638 $\pm$ 0.00208	1784 $\pm$ 30	1738 $\pm$ 36	-2.6
2	40	40.1	48	71	1.54	0.288	3.049 $\pm$ 0.059	0.10893 $\pm$ 0.00147	3.058 $\pm$ 0.059	0.10643 $\pm$ 0.00153	1824 $\pm$ 31	1739 $\pm$ 26	-4.9
2	56	56.1	172	71	0.43	0.922	3.244 $\pm$ 0.051	0.11483 $\pm$ 0.00082	3.274 $\pm$ 0.051	0.10681 $\pm$ 0.00146	1718 $\pm$ 24	1746 $\pm$ 25	1.6
2	34	34.1	27	21	0.79	1.196	3.455 $\pm$ 0.072	0.11721 $\pm$ 0.00215	3.497 $\pm$ 0.074	0.10681 $\pm$ 0.00380	1621 $\pm$ 30	1746 $\pm$ 65	7.1
2	26	26.1	15	25	1.79	0.700	3.226 $\pm$ 0.082	0.11291 $\pm$ 0.00277	3.249 $\pm$ 0.085	0.10683 $\pm$ 0.00627	1730 $\pm$ 40	1746 $\pm$ 107	0.9
2	79	78.1	46	47	1.06	0.255	3.137 $\pm$ 0.058	0.10930 $\pm$ 0.00152	3.145 $\pm$ 0.058	0.10708 $\pm$ 0.00178	1780 $\pm$ 29	1750 $\pm$ 30	-1.7
2	75	74.1	90	92	1.06	0.230	3.225 $\pm$ 0.054	0.10913 $\pm$ 0.00193	3.232 $\pm$ 0.054	0.10713 $\pm$ 0.00128	1738 $\pm$ 25	1751 $\pm$ 22	0.8
2	24	24.1	30	50	1.75	0.569	3.170 $\pm$ 0.065	0.11224 $\pm$ 0.00110	3.189 $\pm$ 0.066	0.10729 $\pm$ 0.00298	1759 $\pm$ 32	1754 $\pm$ 51	-0.3
2	76	75.1	99	78	0.82	-0.009	3.207 $\pm$ 0.053	0.10722 $\pm$ 0.00103	3.206 $\pm$ 0.053	0.10730 $\pm$ 0.00104	1750 $\pm$ 25	1754 $\pm$ 18	0.2
2	70	69.1	50	66	1.36	0.316	3.166 $\pm$ 0.057	0.11020 $\pm$ 0.00145	3.176 $\pm$ 0.057	0.10745 $\pm$ 0.00187	1765 $\pm$ 28	1757 $\pm$ 32	-0.4
2	30	30.1	70	77	1.13	-0.003	3.239 $\pm$ 0.059	0.10761 $\pm$ 0.00124	3.239 $\pm$ 0.059	0.10764 $\pm$ 0.00124	1735 $\pm$ 28	1760 $\pm$ 21	1.4
2	55	55.1	155	229	1.53	0.059	3.203 $\pm$ 0.050	0.10816 $\pm$ 0.00110	3.205 $\pm$ 0.050	0.10765 $\pm$ 0.00111	1750 $\pm$ 24	1760 $\pm$ 19	0.5
2	38	38.1	119	44	0.38	0.068	3.146 $\pm$ 0.051	0.10830 $\pm$ 0.00093	3.148 $\pm$ 0.051	0.10771 $\pm$ 0.00101	1778 $\pm$ 25	1761 $\pm$ 17	-1.0
2	15	15.1	79	89	1.17	0.094	3.074 $\pm$ 0.052	0.10864 $\pm$ 0.00115	3.077 $\pm$ 0.052	0.10782 $\pm$ 0.00119	1814 $\pm$ 27	1763 $\pm$ 20	-2.9
2	74	73.1	91	118	1.35	0.057	3.166 $\pm$ 0.053	0.10844 $\pm$ 0.00109	3.167 $\pm$ 0.053	0.10795 $\pm$ 0.00113	1769 $\pm$ 26	1765 $\pm$ 19	-0.2
2	27	27.1	114	102	0.93	0.066	3.125 $\pm$ 0.051	0.10856 $\pm$ 0.00096	3.127 $\pm$ 0.051	0.10799 $\pm$ 0.00098	1789 $\pm$ 25	1766 $\pm$ 17	-1.3
2	11	11.1	43	30	0.74	-0.113	3.281 $\pm$ 0.062	0.10712 $\pm$ 0.00159	3.277 $\pm$ 0.062	0.10811 $\pm$ 0.00159	1717 $\pm$ 28	1768 $\pm$ 27	2.9
2	46	46.1	73	91	1.28	0.086	3.202 $\pm$ 0.054	0.10896 $\pm$ 0.00119	3.205 $\pm$ 0.054	0.10821 $\pm$ 0.00127	1751 $\pm$ 26	1769 $\pm$ 21	1.1
2	31	31.1	110	99	0.93	0.038	3.166 $\pm$ 0.051	0.10857 $\pm$ 0.00097	3.167 $\pm$ 0.051	0.10824 $\pm$ 0.00104	1769 $\pm$ 25	1770 $\pm$ 18	0.1
2	42	42.1	103	110	1.11	0.085	3.097 $\pm$ 0.050	0.10910 $\pm$ 0.00100	3.100 $\pm$ 0.051	0.10836 $\pm$ 0.00105	1802 $\pm$ 26	1772 $\pm$ 18	-1.7
2	57	56.2	55	43	0.80	1.712	3.293 $\pm$ 0.058	0.12328 $\pm$ 0.00222	3.350 $\pm$ 0.061	0.10837 $\pm$ 0.00404	1684 $\pm$ 27	1772 $\pm$ 68	5.0
2	3	3.1	251	217	0.90	1.591	3.415 $\pm$ 0.052	0.12226 $\pm$ 0.00074	3.471 $\pm$ 0.053	0.10841 $\pm$ 0.00170	1632 $\pm$ 22	1773 $\pm$ 29	7.9
2	54	54.1	79	80	1.05	0.075	3.060 $\pm$ 0.052	0.10908 $\pm$ 0.00115	3.062 $\pm$ 0.052	0.10843 $\pm$ 0.00136	1822 $\pm$ 27	1773 $\pm$ 23	-2.7
2	16	16.1	48	61	1.32	0.157	3.232 $\pm$ 0.060	0.10988 $\pm$ 0.00155	3.237 $\pm$ 0.060	0.10851 $\pm$ 0.00183	1735 $\pm$ 28	1775 $\pm$ 31	2.2
2	59	58.1	101	67	0.69	0.090	3.106 $\pm$ 0.051	0.10930 $\pm$ 0.00102	3.109 $\pm$ 0.051	0.10852 $\pm$ 0.00112	1798 $\pm$ 26	1775 $\pm$ 19	-1.3
2	53	53.1	44	53	1.23	0.083	3.140 $\pm$ 0.058	0.10926 $\pm$ 0.00154	3.142 $\pm$ 0.059	0.10853 $\pm$ 0.00185	1781 $\pm$ 29	1775 $\pm$ 31	-0.3
2	49	49.1	19	59	3.15	-0.024	3.060 $\pm$ 0.070	0.10833 $\pm$ 0.00290	3.059 $\pm$ 0.070	0.10854 $\pm$ 0.00291	1823 $\pm$ 36	1775 $\pm$ 49	-2.7

Table 1. (continued)

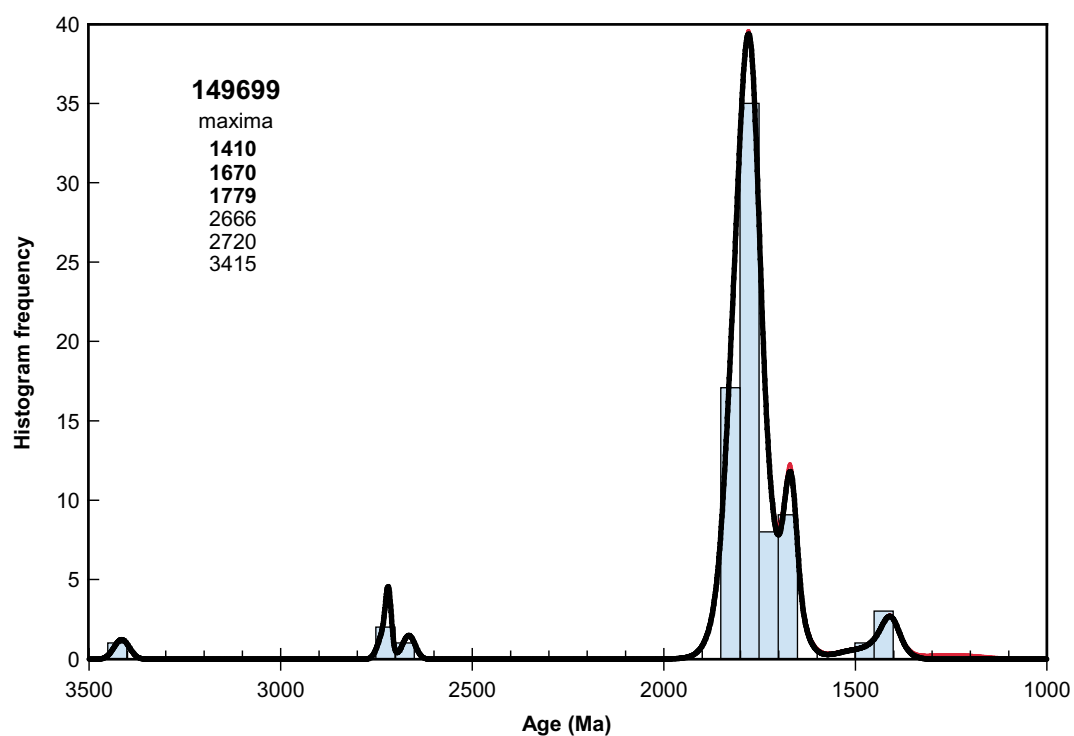
Grp no.	Spot no.	Grain .spot	$^{238}\text{U}$ (ppm)	$^{232}\text{Th}$ (ppm)	$^{232}\text{Th}/^{238}\text{U}$ (%)	$^{238}\text{U}/^{206}\text{Pb}$ $\pm 1\sigma$	$^{207}\text{Pb}/^{206}\text{Pb}$ $\pm 1\sigma$	$^{238}\text{U}/^{206}\text{Pb}^*$ $\pm 1\sigma$	$^{207}\text{Pb}^*/^{206}\text{Pb}^*$ $\pm 1\sigma$	$^{238}\text{U}/^{206}\text{Pb}^*$ date (Ma) $\pm 1\sigma$	$^{207}\text{Pb}^*/^{206}\text{Pb}^*$ date (Ma) $\pm 1\sigma$	Disc (%)
2	19	19.1	82	86	1.09	3.232 $\pm$ 0.057	0.10883 $\pm$ 0.00115	3.233 $\pm$ 0.057	0.10865 $\pm$ 0.00115	1737 $\pm$ 27	1777 $\pm$ 19	2.2
2	66	65.1	151	137	0.94	3.105 $\pm$ 0.049	0.10883 $\pm$ 0.00083	3.105 $\pm$ 0.049	0.10872 $\pm$ 0.00089	1800 $\pm$ 25	1778 $\pm$ 15	-1.2
2	52	52.1	155	108	0.72	3.192 $\pm$ 0.050	0.10910 $\pm$ 0.00083	3.193 $\pm$ 0.050	0.10873 $\pm$ 0.00084	1756 $\pm$ 24	1778 $\pm$ 14	1.2
2	7	7.1	112	150	1.38	3.147 $\pm$ 0.051	0.10953 $\pm$ 0.00099	3.149 $\pm$ 0.051	0.10898 $\pm$ 0.00103	1778 $\pm$ 25	1782 $\pm$ 17	0.2
2	32	32.1	175	180	1.06	3.200 $\pm$ 0.050	0.11329 $\pm$ 0.00106	3.291 $\pm$ 0.052	0.10914 $\pm$ 0.00309	1710 $\pm$ 24	1785 $\pm$ 52	4.2
2	41	41.1	66	49	0.77	3.052 $\pm$ 0.053	0.10870 $\pm$ 0.00124	3.051 $\pm$ 0.053	0.10918 $\pm$ 0.00130	1828 $\pm$ 27	1786 $\pm$ 22	-2.4
2	72	71.1	97	164	1.75	3.105 $\pm$ 0.051	0.10982 $\pm$ 0.00105	3.107 $\pm$ 0.051	0.10931 $\pm$ 0.00111	1799 $\pm$ 26	1788 $\pm$ 19	-0.6
2	71	70.1	66	116	1.81	3.246 $\pm$ 0.057	0.11884 $\pm$ 0.00135	3.281 $\pm$ 0.058	0.10937 $\pm$ 0.00233	1715 $\pm$ 26	1789 $\pm$ 39	4.1
2	78	77.1	74	115	1.60	0.231 $\pm$ 0.053	0.11139 $\pm$ 0.00120	3.119 $\pm$ 0.053	0.10937 $\pm$ 0.00175	1793 $\pm$ 27	1789 $\pm$ 29	-0.2
2	73	72.1	51	48	0.97	3.215 $\pm$ 0.058	0.11175 $\pm$ 0.00148	3.223 $\pm$ 0.059	0.10951 $\pm$ 0.00180	1742 $\pm$ 28	1791 $\pm$ 30	2.8
2	67	66.1	107	112	1.07	0.020 $\pm$ 0.051	0.10989 $\pm$ 0.00099	3.052 $\pm$ 0.051	0.10972 $\pm$ 0.00100	1827 $\pm$ 27	1795 $\pm$ 17	-1.8
2	35	35.1	143	186	1.34	-0.027 $\pm$ 0.050	0.10953 $\pm$ 0.00087	3.147 $\pm$ 0.050	0.10977 $\pm$ 0.00090	1779 $\pm$ 25	1796 $\pm$ 15	0.9
2	9	9.1	291	157	0.56	0.317 $\pm$ 0.048	0.11253 $\pm$ 0.00062	3.120 $\pm$ 0.048	0.10977 $\pm$ 0.00081	1792 $\pm$ 24	1796 $\pm$ 13	0.2
2	18	18.1	80	86	1.10	-0.003 $\pm$ 0.054	0.11020 $\pm$ 0.00117	3.172 $\pm$ 0.054	0.11023 $\pm$ 0.00117	1767 $\pm$ 25	1803 $\pm$ 17	2.0
2	63	62.1	115	24	0.22	3.128 $\pm$ 0.050	0.11069 $\pm$ 0.00095	3.130 $\pm$ 0.050	0.11025 $\pm$ 0.00102	1787 $\pm$ 25	1804 $\pm$ 17	0.9
2	64	63.1	94	138	1.52	0.014 $\pm$ 0.050	0.11057 $\pm$ 0.00106	3.038 $\pm$ 0.050	0.11045 $\pm$ 0.00107	1835 $\pm$ 26	1807 $\pm$ 18	-1.5
2	62	61.1	44	85	1.99	0.047 $\pm$ 0.059	0.11089 $\pm$ 0.00155	3.163 $\pm$ 0.059	0.11048 $\pm$ 0.00162	1771 $\pm$ 29	1807 $\pm$ 27	2.0
2	28	28.1	23	48	2.18	-0.143 $\pm$ 0.068	0.10926 $\pm$ 0.00215	3.113 $\pm$ 0.069	0.11051 $\pm$ 0.00332	1796 $\pm$ 35	1808 $\pm$ 55	0.7
2	81	80.1	38	12	0.34	-0.008 $\pm$ 0.060	0.11070 $\pm$ 0.00166	3.116 $\pm$ 0.060	0.11077 $\pm$ 0.00166	1794 $\pm$ 30	1812 $\pm$ 27	1.0
2	51	51.1	88	38	0.45	3.169 $\pm$ 0.053	0.11055 $\pm$ 0.00110	3.167 $\pm$ 0.053	0.11092 $\pm$ 0.00115	1769 $\pm$ 26	1815 $\pm$ 19	2.5
2	4	4.1	75	73	1.00	0.085 $\pm$ 0.059	0.11178 $\pm$ 0.00123	3.296 $\pm$ 0.059	0.11104 $\pm$ 0.00140	1708 $\pm$ 27	1817 $\pm$ 23	6.0
2	50	50.1	56	42	0.78	-0.046 $\pm$ 0.055	0.11069 $\pm$ 0.00134	3.101 $\pm$ 0.055	0.11108 $\pm$ 0.00155	1802 $\pm$ 28	1817 $\pm$ 25	0.8
2	65	64.1	123	67	0.56	0.063 $\pm$ 0.049	0.11172 $\pm$ 0.00093	3.054 $\pm$ 0.049	0.11117 $\pm$ 0.00106	1826 $\pm$ 26	1819 $\pm$ 17	-0.4
2	20	20.1	37	62	1.73	-0.410 $\pm$ 0.062	0.10773 $\pm$ 0.00170	3.167 $\pm$ 0.062	0.11131 $\pm$ 0.00267	1769 $\pm$ 30	1821 $\pm$ 44	2.8
2	21	21.1	26	78	3.12	-0.156 $\pm$ 0.068	0.11010 $\pm$ 0.00211	3.149 $\pm$ 0.068	0.11146 $\pm$ 0.00223	1778 $\pm$ 34	1823 $\pm$ 36	2.5
2	22	22.1	57	91	1.65	-0.044 $\pm$ 0.056	0.11118 $\pm$ 0.00139	3.169 $\pm$ 0.056	0.11156 $\pm$ 0.00141	1768 $\pm$ 28	1825 $\pm$ 23	3.1
2	45	45.1	35	51	1.50	0.084 $\pm$ 0.060	0.11233 $\pm$ 0.00172	3.111 $\pm$ 0.061	0.11160 $\pm$ 0.00184	1797 $\pm$ 31	1826 $\pm$ 30	1.6
2	37	37.1	40	95	2.44	0.153 $\pm$ 0.060	0.11309 $\pm$ 0.00165	3.181 $\pm$ 0.060	0.11176 $\pm$ 0.00191	1762 $\pm$ 29	1828 $\pm$ 31	3.6
2	5	5.1	116	119	1.06	0.064 $\pm$ 0.049	0.11255 $\pm$ 0.00097	3.061 $\pm$ 0.049	0.11199 $\pm$ 0.00103	1822 $\pm$ 26	1832 $\pm$ 17	0.5
2	69	68.1	164	73	0.46	1.824 $\pm$ 0.050	0.12872 $\pm$ 0.00089	3.285 $\pm$ 0.052	0.11279 $\pm$ 0.00207	1713 $\pm$ 24	1845 $\pm$ 33	7.1
2	12	12.1	39	15	0.41	-0.045 $\pm$ 0.037	0.18100 $\pm$ 0.00181	1.976 $\pm$ 0.037	0.18140 $\pm$ 0.00181	2640 $\pm$ 41	2666 $\pm$ 17	1.0
2	77	76.1	182	113	0.64	0.017 $\pm$ 0.030	0.18747 $\pm$ 0.00084	1.941 $\pm$ 0.030	0.18732 $\pm$ 0.00085	2678 $\pm$ 34	2719 $\pm$ 7	1.5
2	13	13.1	57	23	0.43	0.153 $\pm$ 0.036	0.19005 $\pm$ 0.00154	1.929 $\pm$ 0.036	0.18869 $\pm$ 0.00171	2692 $\pm$ 41	2731 $\pm$ 15	1.4
2	6	6.1	14	7	0.53	0.321 $\pm$ 0.035	0.29230 $\pm$ 0.00345	1.421 $\pm$ 0.035	0.28954 $\pm$ 0.00373	3435 $\pm$ 66	3415 $\pm$ 20	-0.6
D	43	43.1	27	8	0.29	0.906 $\pm$ 0.082	0.08971 $\pm$ 0.00194	3.964 $\pm$ 0.084	0.08202 $\pm$ 0.00356	1450 $\pm$ 28	1246 $\pm$ 85	-16.4
D	58	57.1	196	154	0.81	2.208 $\pm$ 0.060	0.12331 $\pm$ 0.00205	3.864 $\pm$ 0.062	0.10415 $\pm$ 0.00292	1484 $\pm$ 21	1699 $\pm$ 52	12.7
D	36	36.1	278	266	0.99	11.009 $\pm$ 0.064	0.19938 $\pm$ 0.00703	4.781 $\pm$ 0.102	0.10391 $\pm$ 0.01537	1224 $\pm$ 24	1695 $\pm$ 273	27.8
D	23	23.1	758	654	0.89	44.431 $\pm$ 0.100	0.49813 $\pm$ 0.00142	12.065 $\pm$ 0.655	0.11170 $\pm$ 0.04701	513 $\pm$ 27	1827 $\pm$ 763	71.9



**Figure 2.** U-Pb analytical data for sample 149699: quartz sandstone, Cornelia Range. Blue squares indicate Group 1 (youngest detrital zircons); yellow squares indicate Group 2 (older detrital zircons); crossed squares indicate ungrouped analyses (discordance >10% or  $f_{204} > 1\%$ )



**Figure 3.** Expanded view of U-Pb analytical data for sample 149699: quartz sandstone, Cornelia Range. Symbols as in Figure 2



**Figure 4.** Probability density diagram and histogram for sample 149699: quartz sandstone, Cornelia Range. Heavy curve, maxima values, and frequency histogram (bin width 50 Ma) include only data with discordance <10% and  $f_{204}$  <1% (77 analyses of 76 zircons). Light curve includes all data (81 analyses of 80 zircons)

## Recommended reference for this publication

WINGATE, M. T. D., and BODORKOS, S., 2007, 149699: quartz sandstone, Cornelia Range; Geochronology dataset 680, in *Compilation of geochronology data: Western Australia Geological Survey*.

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