

169067: quartz–chlorite schist, Pincher Well

Location and sampling

YOUANMI (SH 50-4), YOUANMI (2640)

MGA Zone 50, 675230E 6821660N

Sampled on 25 October 2000.

The sample was taken from a small boulder in an area of low rocky foliated outcrops located about 2 km north of Pincher Hill and 1 km southwest of Pincher Well.

Tectonic unit/relations

This sample is from a dark grey to olive green, fine-grained, foliated homogeneous rock inferred to be derived from a felsic volcanic precursor, of the Southern Cross Granite–Greenstone Terrane, Yilgarn Craton (Stewart et al., 1983).

Petrographic description

The principal minerals present in this sample are chlorite (50 vol.%), quartz (45 vol.%), opaque oxide, and leucoxene (5 vol.%), with accessory apatite (trace). This is a massive, dark grey quartz–chlorite schist containing fresh opaque oxide, leucoxene, carbonate and rare apatite, probably derived from a mafic rather than andesitic precursor. It may have been derived from a sheared and altered quartz dolerite from a greenschist facies, chlorite-rich shear zone. In thin section, there are abundant, very irregular masses of quartz-rich material, to 1 mm in grain size, intergrown with chlorite in a heterogeneous matrix of quartz–chlorite schist. There is abundant fresh and leucoxene-altered opaque oxide to 0.3 mm in grain size, and the quartz resembles late magmatic quartz and altered granophyre inherited from a quartz dolerite. Grains and patches of carbonate and sericite occur locally and there is rare apatite in some of the quartz.

Zircon morphology

Very few zircons were recovered from this sample. The two largest zircons recovered are colourless to pale yellowish green, internally structureless, irregular-shaped fragments between $30 \times 60 \mu\text{m}$ and $50 \times 80 \mu\text{m}$ in size. A high proportion of colourless, internally structureless and irregular-shaped fragments, averaging $10 \times 15 \mu\text{m}$ in size and too small to analyse, were also recovered.

Analytical details

This sample was analysed on 10 June and 8 July 2001. The counter deadtime during both analysis sessions was 32 ns. During the first analysis session, four analyses of the CZ3 standard indicated a Pb^*/U calibration error of 0.560 (1 σ %). A calibration error of 1.0 (1 σ %) was applied to analyses of unknowns obtained during the first analysis session. Analyses 1.1 to 2.5 were obtained during the first analysis session. During the second analysis session, five analyses of the CZ3 standard indicated a Pb^*/U calibration error of 1.06 (1 σ %). Common-Pb corrections were applied assuming Broken Hill common-Pb isotopic compositions for all analyses.

Results

Twelve analyses were obtained from two zircons. Results are given in Table 56 and shown on a concordia plot in Figure 78.

Table 56. Ion microprobe analytical results for sample 169067: quartz–chlorite schist, Pincher Well

<i>Grain .spot</i>	<i>U (ppm)</i>	<i>Th (ppm)</i>	<i>Pb (ppm)</i>	<i>f206%</i>	$^{207}\text{Pb}/^{206}\text{Pb}$	$\pm 1\sigma$	$^{208}\text{Pb}/^{206}\text{Pb}$	$\pm 1\sigma$	$^{206}\text{Pb}/^{238}\text{U}$	$\pm 1\sigma$	$^{207}\text{Pb}/^{235}\text{U}$	$\pm 1\sigma$	<i>% concordance</i>	$^{207}\text{Pb}/^{206}\text{Pb}$ <i>age</i>	$\pm 1\sigma$
1.1	48	22	29	1.321	0.19849	0.00285	0.12906	0.00541	0.5156	0.0074	14.112	0.303	95	2 814	23
2.1	55	30	37	1.076	0.20560	0.00245	0.15340	0.00454	0.5551	0.0076	15.736	0.303	99	2 871	19
2.2	90	62	59	0.778	0.20080	0.00179	0.18600	0.00328	0.5316	0.0065	14.718	0.235	97	2 833	15
1.2	94	57	61	0.487	0.19686	0.00157	0.16689	0.00267	0.5440	0.0067	14.766	0.229	100	2 800	13
2.3	78	47	50	0.835	0.19943	0.00208	0.16202	0.00386	0.5347	0.0069	14.703	0.258	98	2 822	17
1.3	96	61	65	1.019	0.19700	0.00182	0.16981	0.00339	0.5579	0.0069	15.154	0.248	102	2 801	15
2.4	56	29	35	0.722	0.20247	0.00227	0.14205	0.00386	0.5374	0.0073	15.002	0.280	97	2 846	18
2.5	71	42	47	0.909	0.19532	0.00216	0.15330	0.00395	0.5464	0.0070	14.716	0.265	101	2 788	18
1.4	48	23	31	1.255	0.19864	0.00285	0.12184	0.00528	0.5480	0.0077	15.010	0.321	100	2 815	23
1.5	97	62	63	0.898	0.19710	0.00178	0.16771	0.00319	0.5361	0.0066	14.568	0.235	99	2 802	15
1.6	120	90	79	0.516	0.19676	0.00150	0.20111	0.00269	0.5373	0.0065	14.577	0.220	99	2 800	12
2.6	82	52	53	0.398	0.20310	0.00185	0.17356	0.00315	0.5416	0.0068	15.166	0.250	98	2 851	15

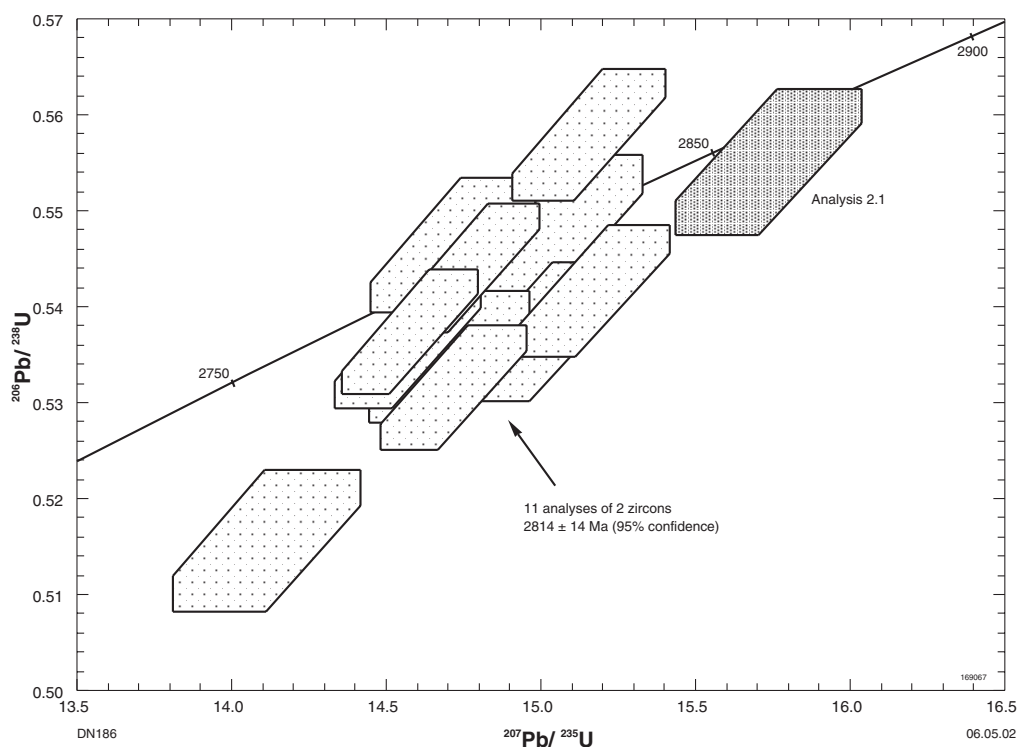


Figure 78. Concordia plot for sample 169067: quartz-chlorite schist, Pincher Well

Interpretation

The analyses are concordant to slightly discordant, with the discordance pattern consistent with a recent dominant episode of radiogenic-Pb loss. Eleven analyses of two zircons have $^{207}\text{Pb}/^{206}\text{Pb}$ ratios defining a single population indicating a weighted mean $^{207}\text{Pb}/^{206}\text{Pb}$ date of 2814 ± 14 Ma (chi-squared = 1.55). Concordant analysis 2.1 indicates a substantially older $^{207}\text{Pb}/^{206}\text{Pb}$ date than the main population.

The date of 2814 ± 14 Ma indicated by the weighted mean $^{207}\text{Pb}/^{206}\text{Pb}$ ratio of 11 analyses of two zircons is tentatively interpreted as the age of igneous crystallization of the andesitic precursor to the quartz-chlorite schist. Analysis 2.1, which indicates a slightly higher $^{207}\text{Pb}/^{206}\text{Pb}$ ratio than the main population, is interpreted to be of an analysis site that has gained some radiogenic Pb.

STRATIGRAPHIC REFERENCE:

STEWART, A. J., WILLIAMS, I. R., and ELIAS, M., 1983, Youanmi, W.A.: Australia BMR, 1:250 000 Geological Series Explanatory Notes, 58p.

Recommended reference for this publication:

NELSON, D. R., 2002, 169067: quartz-chlorite schist, Pincher Well; in Compilation of geochronology data, 2001: Western Australia Geological Survey, Record 2002/2, p. 213–215.

OR

NELSON, D. R., 2002, 169067: quartz-chlorite schist, Pincher Well; Geochronology dataset 105; in Compilation of geochronology data, June 2006 update: Western Australia Geological Survey.

Data obtained: 08/07/2001; Data released: 26/06/2002