

127378: welded tuff, Woodbrook Homestead

Location and sampling

ROEBOURNE (SF 50-3)

117°05'03"E 20°55'10"S

Sampled on 1 June 1996

The sample was taken from a site located 2.5 km west-southwest of Woodbrook Homestead.

Tectonic unit/relations

The sample is from the Woodbrook Formation, which immediately underlies the Whundo Group (Hickman, 1997).

Petrographic description

This sample consists principally of devitrified felsic glass, with abundant chlorite, minor quartz and feldspar and accessory leucoxene, ?titanite, zircon, carbonate and sericite/clay. This is a volcanic agglomerate composed of well-packed, randomly-orientated fragments of devitrified felsic glass up to 2 cm across, some with quartz and/or feldspar phenocrysts. Fragments commonly consist of very fine to cryptocrystalline mosaics. Some contain poorly-crystallized plagioclase microliths. Others are distinctly banded or eutaxitic and this banding is commonly deformed. Many are pumiceous and at least one has perlitic structures. Some have felsic spherulites. The rock may have been welded when soft as there is little fine interstitial material. The felsic fragments are sieved with varying amounts of fine chlorite, leucoxene and minor sericite/clay. Chlorite commonly fills vacuoles in pumice fragments. A few vacuoles have cores of quartz. Chlorite and leucoxene form convoluted films following the interstices between the devitrified glassy fragments. The feldspar phenocrysts are highly deformed and show no evidence of albite twinning. They are commonly cloudy with brown dust and may be K-feldspar. Some glassy fragments appear to contain leucoxene-altered titanite. Carbonate porphyroblasts are scattered throughout and have commonly partly replaced feldspar phenocrysts. This rock does not appear to have undergone much metamorphism as the igneous textures are well preserved. It has undergone weak to moderate chlorite, leucoxene, carbonate and sericite/clay alteration. One euhedral and unzoned zircon about 0.1 mm in diameter is locked within a devitrified glassy fragment with a quartz phenocryst.

Zircon morphology

The zircons extracted from this sample are euhedral and irregular in shape, ranging in size from $25 \times 50 \mu\text{m}$ to $100 \times 20 \mu\text{m}$, and are yellow-brown to pink-brown. Most grains are structureless and many contain mineral inclusions.

Analytical details

This sample was analysed on 4 July 1997. The counter deadtime was 32 ns. Thirteen analyses of the CZ3 standard obtained during the analysis session indicated a Pb*/U calibration error of 2.21

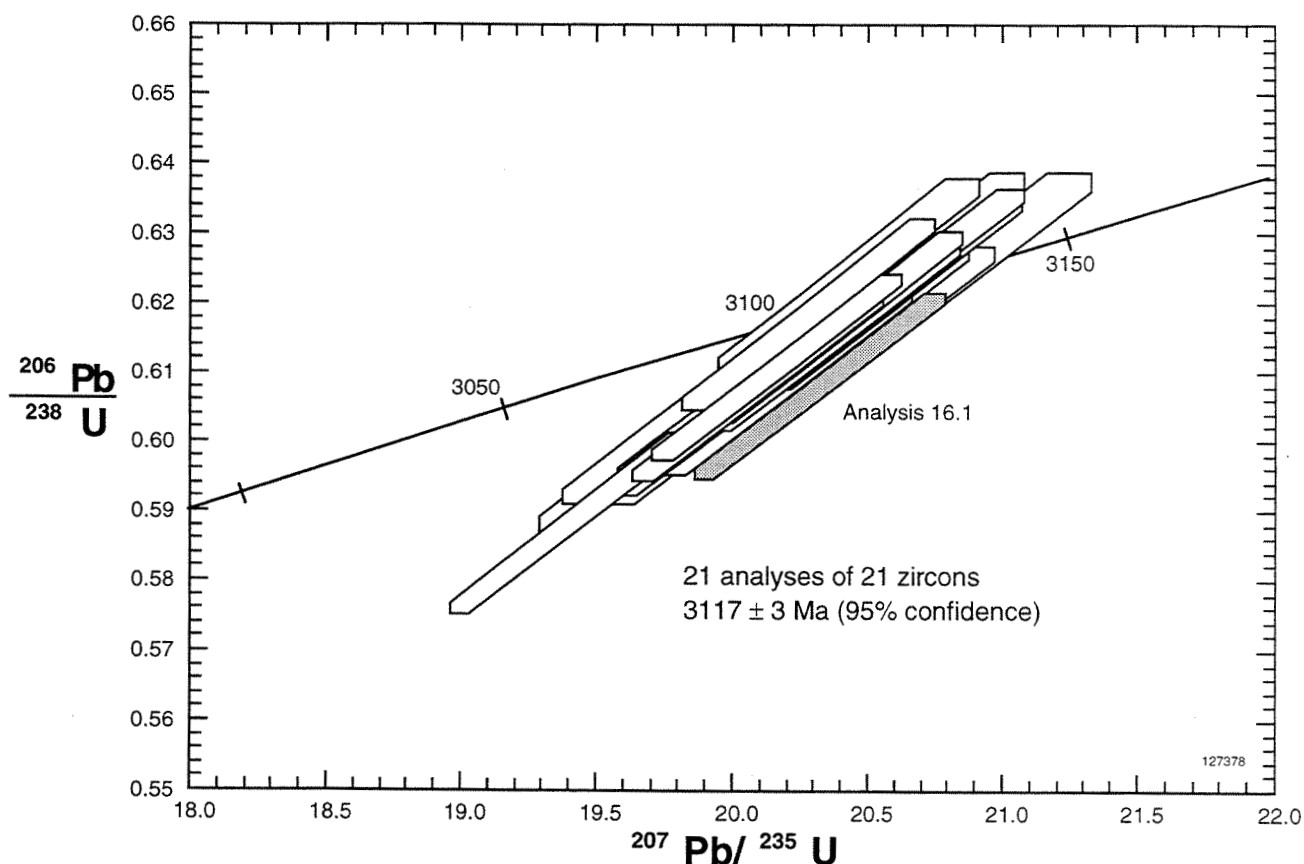


Figure 34. Concordia plot for sample 127378: welded tuff, Woodbrook Homestead

(1σ). Common-Pb corrections were made assuming Broken Hill common Pb for all unknown analyses.

Results

Twenty-two analyses were obtained from 22 zircons. Results are given in Table 33 and shown on a concordia plot in Figure 34.

Interpretation

Twenty-one concordant analyses have a weighted mean $^{207}\text{Pb}/^{206}\text{Pb}$ ratio corresponding to a date of $3117 \pm 3 \text{ Ma}$ (chi-squared = 0.98). This is interpreted as the time of crystallization of the volcanic rock. Analysis 16.1 indicates a slightly higher $^{207}\text{Pb}/^{206}\text{Pb}$ ratio than the main population and this analysis may be of a xenocryst zircon.

Table 33. Ion microprobe analytical results for sample 127378: welded tuff, Woodbrook Homestead

<i>Grain .spot</i>	<i>U (ppm)</i>	<i>Th (ppm)</i>	<i>Pb (ppm)</i>	<i>f206%</i>	<i>²⁰⁷Pb/²⁰⁶Pb</i>	<i>± 1σ</i>	<i>²⁰⁸Pb/²⁰⁶Pb</i>	<i>± 1σ</i>	<i>²⁰⁶Pb/²³⁸U</i>	<i>± 1σ</i>	<i>²⁰⁷Pb/²³⁵U</i>	<i>± 1σ</i>	<i>% concordance</i>	<i>²⁰⁷Pb/²⁰⁶Pb Age</i>	<i>± 1σ</i>
1.1	153	79	112	0.047	0.23932	0.00108	0.13662	0.00120	0.6155	0.0139	20.309	0.478	99	3 115	7
2.1	234	128	171	0.062	0.23967	0.00086	0.13942	0.00099	0.6171	0.0138	20.393	0.471	99	3 118	6
3.1	121	66	87	0.060	0.23852	0.00116	0.14495	0.00138	0.6009	0.0136	19.763	0.469	98	3 110	8
4.1	154	62	108	0.150	0.23800	0.00113	0.10333	0.00136	0.6050	0.0136	19.853	0.469	98	3 107	8
5.1	170	86	123	0.010	0.24049	0.00104	0.13465	0.00119	0.6093	0.0137	20.204	0.473	98	3 123	7
6.1	205	120	152	0.033	0.24012	0.00091	0.15471	0.00104	0.6157	0.0138	20.385	0.473	99	3 121	6
7.1	81	55	62	0.043	0.24159	0.00146	0.18022	0.00193	0.6253	0.0144	20.829	0.510	100	3 130	10
8.1	230	178	177	0.095	0.23775	0.00085	0.20363	0.00111	0.6189	0.0139	20.288	0.469	100	3 105	6
9.1	153	67	110	0.016	0.24059	0.00107	0.11180	0.00124	0.6152	0.0139	20.408	0.480	99	3 124	7
10.1	272	201	205	0.010	0.23939	0.00077	0.19426	0.00093	0.6112	0.0137	20.174	0.463	99	3 116	5
11.1	248	197	189	0.028	0.23970	0.00080	0.20906	0.00103	0.6083	0.0136	20.103	0.463	98	3 118	5
12.1	263	233	195	0.156	0.23915	0.00081	0.21497	0.00113	0.5886	0.0132	19.409	0.447	96	3 114	5
13.1	187	90	134	0.007	0.23976	0.00092	0.12864	0.00086	0.6060	0.0136	20.032	0.466	98	3 118	6
14.1	153	65	111	0.055	0.24015	0.00102	0.11428	0.00109	0.6221	0.0140	20.598	0.484	100	3 121	7
15.1	169	74	123	0.018	0.23989	0.00097	0.11723	0.00095	0.6232	0.0140	20.612	0.482	100	3 119	6
16.1	272	192	204	0.075	0.24235	0.00077	0.18478	0.00096	0.6085	0.0136	20.334	0.467	98	3 135	5
17.1	189	121	140	0.072	0.23907	0.00092	0.17239	0.00110	0.6083	0.0137	20.050	0.466	98	3 114	6
18.1	123	62	91	0.031	0.23735	0.00113	0.13124	0.00120	0.6245	0.0142	20.437	0.485	101	3 102	8
19.1	156	60	111	0.112	0.23937	0.00107	0.09981	0.00118	0.6143	0.0138	20.274	0.477	99	3 116	7
20.1	137	60	99	0.004	0.24173	0.00111	0.11693	0.00101	0.6150	0.0139	20.497	0.484	99	3 131	7
21.1	145	67	103	0.015	0.23978	0.00117	0.12284	0.00152	0.6050	0.0137	20.002	0.474	98	3 118	8
22.1	118	63	88	0.082	0.23890	0.00117	0.14018	0.00133	0.6254	0.0142	20.599	0.490	101	3 113	8

STRATIGRAPHIC REFERENCE:

HICKMAN, A. H., 2002, Geology of the Roebourne 1:100 000 sheet: Western Australia Geological Survey, 1:100 000 Geological Series Explanatory Notes.

Recommended reference for this publication:

NELSON, D. R., 1998, 127378: welded tuff, Woodbrook Homestead; in Compilation of SHRIMP U–Pb zircon geochronology data, 1997: Western Australia Geological Survey, Record 1998/2, p. 111–113.

OR

NELSON, D. R., 1998, 127378: welded tuff, Woodbrook Homestead; Geochronology dataset 443; in Compilation of geochronology data, June 2006 update: Western Australia Geological Survey.

Data obtained: 04/07/1997; Data released: 25/06/1998