

144210: rhyodacite, Mount Fisher

Location and sampling

ROEBOURNE (SF 50-3)

117°27'54"E 20°55'33"S

Sampled on 2 October 1996

The sample was taken from a site located 1.5 km southeast of the ruins of Mount Fisher Homestead and about 1 km north of the Northwest Coastal Highway.

Tectonic unit/relations

The sample is from a rhyodacite unit within amphibolite facies metabasalt. This metabasalt succession is unconformably overlain (5 km southeast of Mount Fisher) by the Warambie Basalt of the Whim Creek Group (Hickman, 1997), has been intruded by the Sherlock Intrusion, and displaced by the Sholl Shear Zone.

Petrographic description

The principal mineral in this sample is plagioclase, with abundant K-feldspar and quartz, minor chlorite, and accessory opaques, epidote, leucoxene, zircon and hornblende. This sample consists of a fine-grained feldspar and quartz mosaic intergrown with lesser amounts of chlorite that forms fine flakes with a lepidoblastic foliation. The fine-grained quartz and feldspar mosaic has a strongly-banded character resulting mainly from concentrations of feldspar and quartz within discontinuous bands and lenses with variable grain sizes. Some larger quartz grains with anhedral shapes, which appear to be remnant quartz phenocrysts, are disseminated through the rock. The chlorite is a pleochroic green variety with anomalous blue birefringence. Some chlorite forms larger patches with a skeletal character which appears to be a pre-existing poikiloblastic mineral that has been completely altered to chlorite (probably altered hornblende). Epidote forms disseminated grains that tend to be intergrown with the chlorite patches. Some epidote is concentrated in a discontinuous vein oriented parallel to the foliation direction. Opaques are disseminated through the rock as small grains, generally below 0.05 mm in size. Accessory leucoxene forms finely disseminated turbid aggregates and traces of zircon form small, disseminated grains. A very small number of pleochroic green hornblende crystals were noted as inclusions within quartz grains. This is an amphibolite-facies grade metamorphic rock representing a metamorphosed rhyodacite that still retains some remnant quartz phenocrysts. The original rock probably contained hornblende and possibly biotite but both of these mafic minerals have been almost completely replaced by retrograde chlorite.

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 yellow to yellow-brown in colour. Most grains are structureless and many contain mineral inclusions.

Analytical details

This sample was analysed on 15 July 1997. The counter deadtime was 32 ns. Fourteen analyses of the CZ3 standard obtained during the analysis session indicated a Pb^*/U calibration error of 1.63

(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 35 and shown on a concordia plot in Figure 36.

Interpretation

All twenty-two analyses are concordant or slightly discordant and have a weighted mean ²⁰⁷Pb/²⁰⁶Pb ratio corresponding to a date of 3116 ± 3 Ma (chi-squared = 0.74). This is interpreted as the time of crystallization of the dacite.

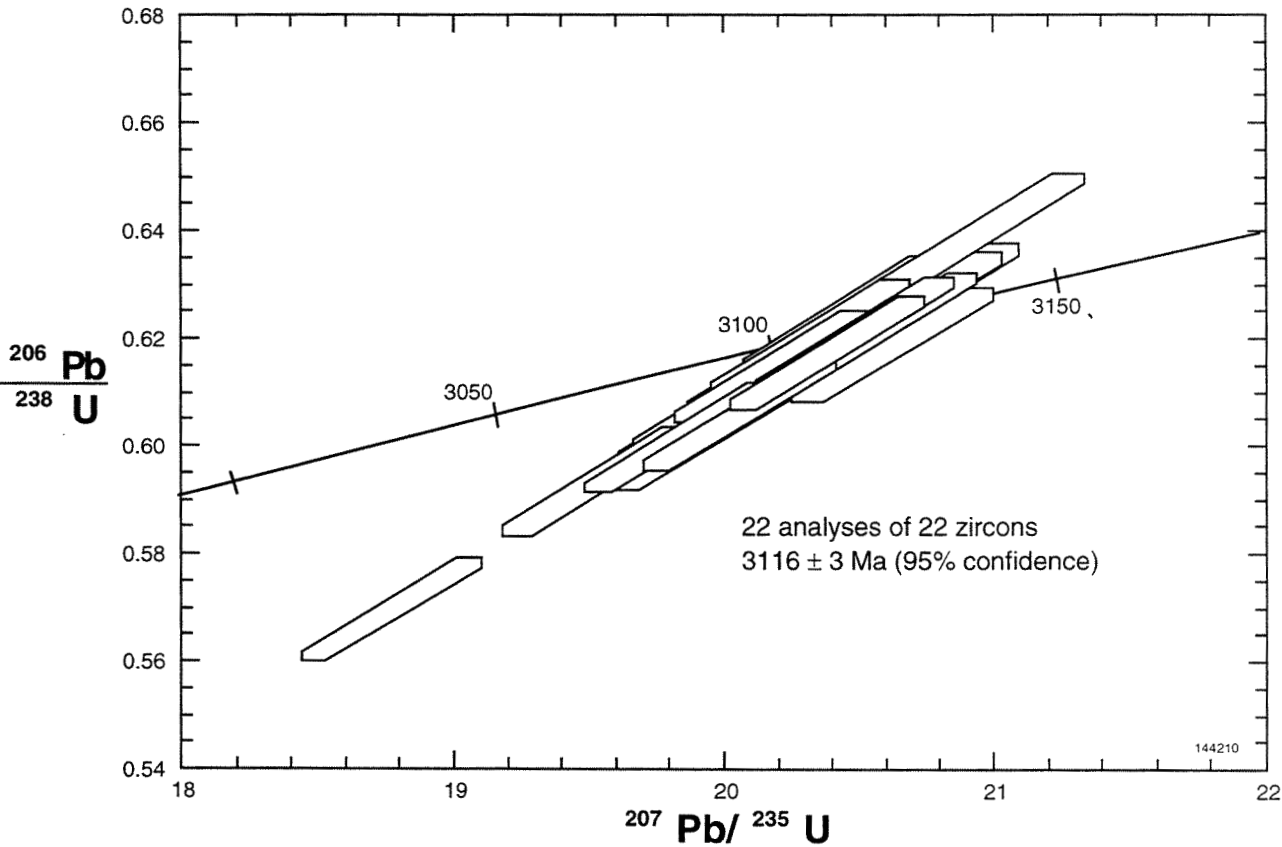


Figure 36. Concordia plot for sample 144210: rhyodacite, Mount Fisher

Table 35. Ion microprobe analytical results for sample 144210: rhyodacite, Mount Fisher

<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	203	124	145	0.117	0.23901	0.00107	0.16019	0.00135	0.5929	0.0101	19.538	0.353	96	3 113	7
2.1	126	62	91	0.444	0.23926	0.00153	0.12877	0.00223	0.6063	0.0105	20.000	0.385	98	3 115	10
3.1	104	42	73	0.130	0.24019	0.00143	0.10320	0.00159	0.6017	0.0106	19.927	0.383	97	3 121	9
4.1	113	44	80	0.138	0.23934	0.00134	0.10048	0.00146	0.6124	0.0106	20.209	0.382	99	3 116	9
5.1	125	62	90	0.084	0.23883	0.00129	0.13188	0.00155	0.6087	0.0105	20.045	0.376	98	3 112	9
6.1	265	195	184	0.126	0.23919	0.00093	0.17425	0.00117	0.5692	0.0095	18.773	0.331	93	3 115	6
7.1	122	50	87	0.134	0.23851	0.00129	0.10637	0.00140	0.6158	0.0106	20.250	0.379	99	3 110	9
8.1	157	84	116	0.134	0.24211	0.00114	0.13937	0.00134	0.6181	0.0106	20.633	0.377	99	3 134	7
9.1	214	141	158	0.036	0.24050	0.00095	0.17310	0.00112	0.6052	0.0102	20.068	0.357	98	3 123	6
10.1	179	111	133	0.072	0.23844	0.00102	0.16304	0.00125	0.6141	0.0104	20.188	0.364	99	3 110	7
11.1	201	156	147	0.077	0.23952	0.00100	0.17221	0.00123	0.6009	0.0101	19.846	0.355	97	3 117	7
12.1	185	117	136	0.037	0.23978	0.00104	0.16164	0.00135	0.6101	0.0104	20.170	0.364	98	3 118	7
13.1	249	195	191	0.052	0.23986	0.00086	0.20440	0.00109	0.6167	0.0104	20.394	0.359	99	3 119	6
14.1	173	96	128	0.088	0.23932	0.00110	0.14783	0.00138	0.6166	0.0105	20.346	0.369	99	3 115	7
15.1	179	116	134	0.062	0.23792	0.00101	0.16621	0.00117	0.6197	0.0105	20.329	0.366	100	3 106	7
16.1	150	81	110	0.149	0.23860	0.00116	0.14305	0.00140	0.6176	0.0105	20.317	0.372	100	3 111	8
17.1	193	115	144	0.093	0.23966	0.00101	0.15910	0.00122	0.6202	0.0105	20.494	0.368	100	3 118	7
18.1	138	73	103	0.076	0.23999	0.00122	0.13760	0.00146	0.6263	0.0107	20.723	0.383	100	3 120	8
19.1	151	74	112	0.095	0.23989	0.00116	0.12795	0.00128	0.6247	0.0107	20.662	0.378	100	3 119	8
20.1	173	90	131	0.041	0.23806	0.00102	0.13798	0.00109	0.6389	0.0109	20.970	0.379	102	3 107	7
21.1	184	109	138	0.080	0.24035	0.00104	0.16046	0.00125	0.6210	0.0105	20.580	0.370	100	3 122	7
22.1	119	45	86	0.242	0.23797	0.00137	0.09727	0.00169	0.6238	0.0108	20.466	0.386	101	3 106	9

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, 144210: rhyodacite, Mount Fisher; in Compilation of SHRIMP U–Pb zircon geochronology data, 1997: Western Australia Geological Survey, Record 1998/2, p. 117–119.

OR

NELSON, D. R., 1998, 144210: rhyodacite, Mount Fisher; Geochronology dataset 269; in Compilation of geochronology data, June 2006 update: Western Australia Geological Survey.

Data obtained: 15/07/1997; Data released: 25/06/1998