DR2004016

DATA REPOSITORY ITEMS

ISOTOPIC AGES, WHOLE-ROCK CHEMISTRY, AND PALEOMAGNETIC POLES FOR ROCKS OF THE WARAKURNA LARGE IGNEOUS PROVINCE

TABLE DR1: ISOTOPIC AGES

No.*	Rock unit	Rock type	Isotopic age (Ma)†	Reference
SHRIMP U-Pb				
1	Glenayle Dolerite	dolerite sill	1063 ± 21	Wingate (2003)
2	Glenayle Dolerite	"	1068 ± 20	"
3	western BSG sills	"	1071 ± 8	Wingate *et al*. (2002)
4	western BSG sills	"	1067 ± 14	"
5	western BSG sills	"	1068 ± 22	"
6	NW Yilgarn dikes	dolerite dike	1075 ± 10	Wingate (2003)
7	GC Smoke Hill Volcanics	rhyolite	1078 ± 5	Sheraton and Sun (1997)
8	GC Bell Rock intrusion	granophyric pegmatite	1078 ± 3	Sun *et al*., (1996)
9	GC Hinckley Range	recrystallized gabbro	1073 ± 5	"
10	GC Champ de Mars	gabbronorite dike	1058 ± 14	"
11	GC Hinckley Range	rapakivi granite dike	1068 ± 6	"
12	GC Hinckley Range	porphyritic granite dike	1052 ± 11	"
Sm-Nd				
13	GC Wingellina Hills	leucogabbro	1047 ± 28	Sun *et al*., (1996)
14	GC Wingellina Hills	leucogabbro	1077 ± 32	"
15	Stuart Pass Dolerite	dolerite dike	1076 ± 33	Zhao & McCulloch (1993a)
16	Alcurra (Kulgera) sills	dolerite sill	1090 ± 32	Zhao & McCulloch (1993a)
Rb-Sr§				
17	Alcurra (Kulgera) sills	dolerite sill	1054 ± 16	Camacho *et al*. (1991)
18	Prenti Dolerite	basalt sill	1050 ± 50	Compston (1974)
19	western BSG	altered rhyolite	1075 ± 42	Gee *et al*. (1976)
20	western BSG	shale baked by sill	1060 ± 80	Compston & Arriens (1968)
21	eastern Musgrave Block	granite gneiss	1077 ± 62	Webb (1985)
22	GC Tollu Volcanics	rhyolite	~1050	Compston & Nesbitt (1967)
23	Beda Volcanics	amygdaloidal basalt	1076 ± 34	Webb & Coats (1980)
24	Olympic Dam dolerite	dolerite dike	1070 ± 74	Drexel *et al*. (1993)
K-Ar				
25	Empress 1A drill hole	basalt	1058 ± 13	Stevens & Apak (1999)
26	Prenti Dolerite	basalt sill	~1050	Preiss *et al*. (1975)
27	NE BSG (Manganese Gp)	glauconite in sandstone baked by sill	~1050	Goode & Hall (1981)

Note: BSG = Bangemall Supergroup; GC = Giles Complex

*Numbers refer to Fig. 1B.

†Ages are listed with 95% or 2σ uncertainties.

§Rb-Sr ages are recalculated using $\lambda^{87}Rb = 1.42 \times 10^{-11}\ a^{-1}$.

TABLE DR2: WHOLE-ROCK CHEMISTRY

	DL*	Method†	BSG	Glenayle	Beda	Alcurra	91988021	91988086
n			25	27	40	5	1	1
SiO_2	0.01	XRF	50.96	52.62	47.48	50.90	49.90	49.35
TiO_2	0.005	XRF	2.02	1.91	2.23	1.77	0.78	0.85
Al_2O_3	0.005	XRF	13.15	13.54	13.42	14.65	14.92	14.83
Fe_2O_3	0.005	XRF	14.69	13.39	14.29	13.6	11.78	11.97
MnO	0.005	XRF	0.19	0.18	0.31	0.22	0.16	0.16
MgO	0.01	XRF	4.91	4.86	7.71	4.87	8.61	8.53
CaO	0.005	XRF	9.04	8.25	5.10	7.74	10.82	11.04
Na_2O	0.01	XRF	2.39	2.50	3.82	2.41	2.24	2.34
K_2O	0.005	XRF	1.15	1.49	1.51	1.90	0.57	0.56
P_2O_5	0.005	XRF	0.24	0.22	0.23	0.34	0.14	0.11
LOI	0.01	GRAV	1.77	1.04	4.33	1.86	0.75	0.77
Total			100.51	99.99	100.43	101.04	100.67	100.51
<u>Trace elements and rare earth elements (ppm)</u>								
As	0.5	ICP-MS	2.1	1.7	-	3.3		1.5
Ba	10	XRF	344	489	247	640	380	264
Cr	2	XRF	95	55	110	152	267	384
Cs	0.01	ICP-MS	2.00	4.08	20.00	3.60	0.06	0.06
Cu	1	XRF	167	125	96	118	80	33
Ga	0.2	ICP-MS	22.2	21.6	-	22.3	16.5	16.7
Hf	0.1	ICP-MS	4.7	5.4	-	3.2	2.1	2.2
Mo	0.1	ICP-MS	0.8	1.3	-	1.5	0.9	2.6
Nb	0.1	ICP-MS	11.6	10.7	11.9	11.3	2.9	3.0
Ni	2	XRF	99	83	88	72	247	205
Pb	0.5	ICP-MS	7.5	14.1	-	140.1	3.9	3.4
Rb	1	XRF	39	56	70	77	12	15
Sc	2	XRF	29	29	38	-	39	38
Sr	1	XRF	240	273	105	203	221	160
Ta	0.1	ICP-MS	0.7	0.8	-	0.0	0.0	0.0
Th	0.1	ICP-MS	4.8	8.6	2.8	10.6	0.8	1.6
U	0.1	ICP-MS	0.7	1.2	2.3	1.3	0.1	0.1
V	5	XRF	331	304	333	285	278	299
Y	0.5	ICP-MS	36.0	33.5	26.1	40.6	22.6	22.9
Zn	1	XRF	110	100	-	163	81	80
Zr	1	XRF	181	192	152	175	86	86
La	0.02	ICP-MS	21.11	27.37	20.00	30.33	10.95	11.92
Ce	0.1	ICP-MS	45.9	58.9	39.4	50.7	24.9	25.7
Pr	0.01	ICP-MS	6.00	7.17	-	7.42	2.73	2.93
Nd	0.01	ICP-MS	26.19	28.87	15.20	27.58	12.10	12.35
Sm	0.01	ICP-MS	6.27	6.85	-	6.53	2.70	2.93
Eu	0.001	ICP-MS	1.939	1.947	-	2.075	0.919	0.902
Gd	0.01	ICP-MS	6.40	6.58	-	6.80	3.72	3.72
Tb	0.01	ICP-MS	1.04	1.03	-	0.97	0.65	0.66
Dy	0.01	ICP-MS	6.19	6.44	-	6.15	3.62	3.74
Ho	0.01	ICP-MS	1.26	1.23	-	1.28	0.79	0.79
Er	0.01	ICP-MS	3.35	3.51	-	3.43	2.28	2.23
Tm	0.01	ICP-MS	0.45	0.43	-	0.52	-	-
Yb	0.01	ICP-MS	2.87	3.02	-	3.10	2.20	2.19
Lu	0.01	ICP-MS	0.43	0.44	-	0.47	-	-
mg#			39.6	41.4	51.7	39.0	54.5	59.4
FeO/MgO			2.85	2.65	1.67	2.51	1.23	1.26
Th/Nb			0.4	0.7	0.2	0.9	0.3	0.5
$(La/Yb)_{CN}$§			5.27	6.50	-	7.02	3.57	3.90
$(Gd/Yb)_{CN}$			1.85	1.87	-	1.81	1.40	1.41
$(La/Sm)_{CN}$			2.17	2.51	-	3.00	2.62	2.63

Note: BSG and Glenayle, sills in western Bangemall Supergroup and Glenayle Dolerite (this study); Beda, Beda Volcanics (Cowley, 1991); Alcurra, Alcurra dykes (C. Edgoose, unpubl. data); 91988021 & 91988086, Musgrave dykes (samples from Glikson *et al.*, 1996, re-analysed during this study).

*DL, detection level (values and methods are for BSG, Glenayle, and Musgrave dyke analyses)

†XRF = x-ray fluorescence spectrometry; ICP-MS = inductively coupled plasma mass spectrometry; GRAV = gravimetric.

§CN = chondrite normalised (factors from Sun and McDonough, 1989).

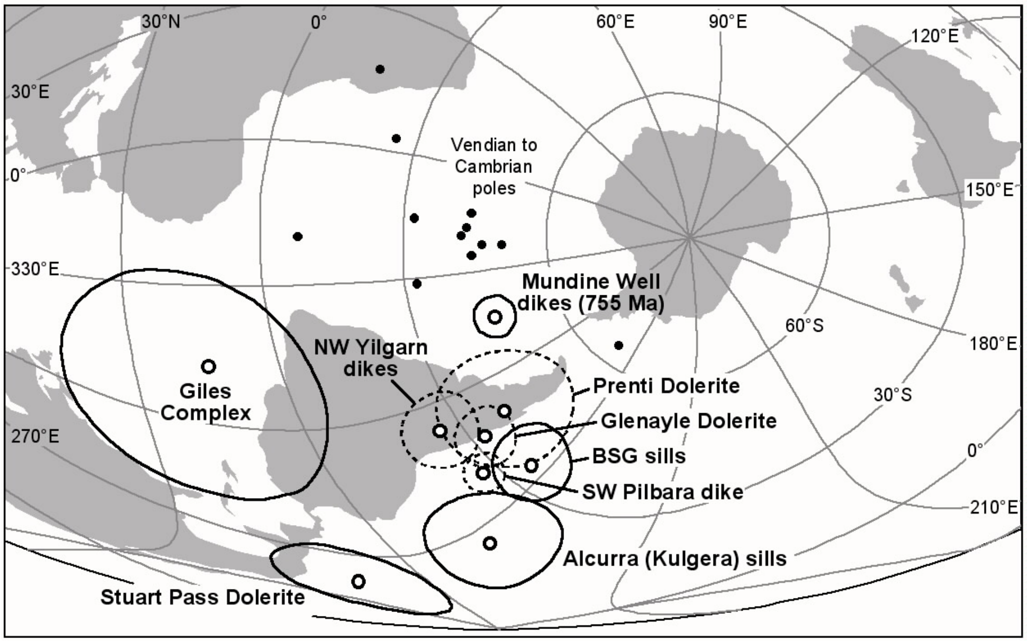

Figure DR1: Paleopoles for rocks of the Warakurna large igneous province. Four poles shown with dashed A_{95} circles are virtual geomagnetic poles (VGPs); i.e., each is based on an insufficient number of intrusions to have adequately averaged paleosecular variation of the Earth's magnetic field. Poles from the western part of the Warakurna large igneous province: BSG (Bangemall Supergroup) sills and SW Pilbara dike (Wingate *et al.*, 2002), Glenayle and Prenti Dolerites (Wingate, 2003) and NW Yilgarn dikes (Table DR3). Central Australian poles: Giles Complex (Facer, 1971; recalculated by Tanaka and Idnurm, 1994), Stuart Pass Dolerite (Idnurm and Giddings, 1988), Alcurra sills (Camacho *et al.*, 1991). The younger Mundine Well and Vendian to Cambrian poles are from Wingate and Giddings (2000).

TABLE DR3: PALEOMAGNETIC RESULTS FOR NORTHWEST YILGARN DIKES

Site	Location		N(n)†	Direction				VGP*			
	Lat. (°S)	Long. (°E)		D§ (°)	I# (°)	k**	α_{95}†† (°)	Lat. (°N)	Long. (°E)	K**	A_{95}†† (°)
MKTI	26.15	117.26	7(10)	359.1	54.7	102	6.0	29.4	107.8	--	--
MKTJ	26.16	117.04	6(8)	002.6	60.0	49	9.7	20.5	111.5	--	--
MKTK	26.16	117.07	7(8)	352.9	61.8	27	11.7	22.9	119.2	--	--
MKTM	23.16	117.74	8(12)	350.1	53.2	143	4.6	28.6	116.9	--	--
Mean of 4 dikes				356.0	57.5	248	5.8	25.4	113.9	163	7.2

*virtual geomagnetic poles.
†number of samples given unit weight in calculation of dike mean (total number of specimens).
§declination (E of N).
#inclination (positive downwards).
**k(K) = concentration parameter.
††α_{95}(A_{95}) = semi-angle of cone (radius of circle) of 95% confidence about mean direction (pole).

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