

SUPPLEMENTARY DATA TABLES
GSA REPOSITORY

TABLE DR1. NEW Rb-Sr DATA FROM THE GAMBACORTA FORMATION
AND THE SERPAN GNEISS

Sample	Rb	Sr	Rb/Sr(wt)	$^{87}\text{Rb}/^{86}\text{Sr}$	$^{87}\text{Sr}/^{86}\text{Sr}$	$^{87}\text{Sr}/^{86}\text{Sr}_{501}$
<u>Gambacorta Formation</u>						
R.4720.9	120.05	113.13	1.0618	3.0774	0.725456	0.703485
R.4720.10	72.72	390.80	0.1862	0.5390	0.712362	0.708514
R.4722.3	64.15	129.47	0.4958	1.4365	0.721266	0.711010
R.4722.4	86.16	159.34	0.5411	1.5668	0.716213	0.705027
R.4723.1	78.21	268.84	0.2909	0.8421	0.713627	0.707615
R.4723.2	75.79	281.29	0.2696	0.7805	0.713476	0.707904
R.4723.3	84.98	230.36	0.3689	1.0681	0.714941	0.707315
R.4723.4	116.39	212.43	0.5479	1.5868	0.717648	0.706319
R.4723.5	94.83	251.08	0.3777	1.0936	0.715407	0.707599
R.4723.6	77.13	267.17	0.2887	0.8358	0.713514	0.707547
R.4723.7	114.94	158.74	0.7241	2.0979	0.722022	0.707044
R.4723.8	121.42	148.42	0.8186	2.3726	0.725555	0.708616
R.4723.9	101.96	130.30	0.7830	2.2689	0.722994	0.706795
R.4723.10	76.15	304.69	0.2501	0.7240	0.712721	0.707552
R.4723.11	80.10	285.59	0.2806	0.8124	0.713636	0.707836
R.4726.1	101.39	118.26	0.8579	2.4865	0.725065	0.707312
R.4726.2	126.40	112.89	1.1197	3.2467	0.730210	0.707030
R.4726.3	126.88	114.08	1.1122	3.2252	0.730902	0.707875
R.4726.4	113.82	135.13	0.8423	2.4415	0.726467	0.709036
R.4726.5	133.28	124.91	1.0670	3.0935	0.728937	0.706851
R.4726.6	130.43	117.86	1.1075	3.2112	0.730099	0.707172
R.4726.7	139.76	129.56	1.0795	3.1300	0.729815	0.707468
R.4726.8	105.50	128.84	0.8189	2.3732	0.724446	0.707502
R.4729.1	117.87	161.63	0.7298	2.1143	0.721658	0.706563
R.4729.6	266.21	62.78	4.2437	12.3660	0.780749	0.692461
R.4729.7	285.60	72.95	3.9175	11.4156	0.780910	0.699408
R.4736.2	86.02	114.67	0.7506	2.1745	0.720387	0.704862

R.4736.4	132.89	89.39	1.4875	4.3129	0.729463	0.698671
R.4736.17	178.55	83.17	2.1485	6.2453	0.755840	0.711251

Serpan Gneiss

R.4728.2	169.49	228.2	0.7432	2.1536	0.723328	0.707952
R.4728.3	79.53	671.98	0.1184	0.3427	0.709758	0.707311
R.4728.7	127.70	356.06	0.3589	1.0382	0.706161	0.698749
R.4728.8	159.81	413.54	0.3867	1.1198	0.717045	0.709050
R.4728.9	148.44	491.44	0.3023	0.8751	0.712993	0.706745

Note: Rb-Sr analysis was carried out following methods described in Millar and Pankhurst (1987). Rb/Sr ratios are precise to 0.5% (1 σ). ⁸⁷Sr/⁸⁶Sr ratios are precise to 0.01% (1 σ). Concentrations in ppm.

TABLE DR2. GEOCHEMICAL DATA FOR FELSITES FROM GAMBACORTA FORMATION
AND THIEL MOUNTAINS (V6-8A)

Sample (R)	4702.1	4702.2	4702.3	4707.8	4707.9	4719.2	4720.8	4720.10
SiO ₂	71.76	77.04	76.44	74.56	74.03	74.95	73.74	70.12
TiO ₂	0.43	0.13	0.14	0.26	0.27	0.22	0.52	0.45
Al ₂ O ₃	13.30	11.84	10.91	12.61	12.51	13.68	11.76	13.26
Fe ₂ O ₃ (T)	4.16	1.76	2.06	2.43	2.95	2.67	5.46	4.51
MnO	0.12	0.04	0.08	0.06	0.06	0.04	0.12	0.11
MgO	0.41	0.19	0.47	0.47	0.54	0.60	0.58	0.55
CaO	2.32	2.88	5.08	1.66	1.65	0.67	1.31	2.45
Na ₂ O	4.87	0.11	0.21	3.23	3.26	2.52	3.32	3.85
K ₂ O	0.84	3.19	2.10	3.56	3.53	3.36	1.34	2.24
P ₂ O ₅	0.12	0.03	0.03	0.07	0.07	0.05	0.13	0.12
LOI	2.02	2.53	2.55	1.15	1.18	1.72	1.62	2.38
TOTAL	99.9	99.6	99.9	99.8	99.8	100.2	99.4	99.6
Rb	22	120	68	101	94	146	49	72
Sr	332	416	1283	309	345	130	140	389
Y	36	38	56	41	41	41	40	37
Zr	461	189	153	182	183	273	503	452
Nb	13	14	13	12	12	13	17	15
Cr	<5	11	12	12	9	10	<5	<5
Ga	14	13	10	14	14	0	15	14
Zn	90	72	61	65	65	62	173	87
V	2	7	2	7	11	6	14	12
Pb	3	14	14	15	13	55	4	6

Sample (R)	4722.3	4723.2	4723.8	4723.9	4723.10	4723.11	4726.1	4726.6
SiO ₂	76.21	69.21	72.85	74.72	68.13	68.48	74.02	74.56
TiO ₂	0.20	0.54	0.27	0.29	0.65	0.64	0.22	0.22
Al ₂ O ₃	11.67	13.95	13.51	12.46	13.97	13.66	12.64	12.55
Fe ₂ O ₃ (T)	2.25	4.77	2.68	2.59	5.79	5.36	2.49	2.33
MnO	0.02	0.08	0.06	0.06	0.11	0.11	0.05	0.04
MgO	0.34	1.07	0.31	0.31	1.03	0.98	0.70	0.56
CaO	0.95	2.67	1.47	1.49	3.94	3.57	1.12	1.23
Na ₂ O	4.67	3.44	3.85	3.79	3.32	3.44	3.73	3.37
K ₂ O	1.34	2.88	3.95	3.29	2.21	2.19	3.29	3.74
P ₂ O ₅	0.03	0.14	0.07	0.07	0.17	0.16	0.06	0.05
LOI	1.34	1.07	1.05	0.69	0.87	1.14	1.57	0.90
TOTAL	98.8	99.3	99.8	99.5	99.6	99.2	99.6	99.3
Rb	65	76	120	103	76	79	102	133
Sr	131	281	147	129	306	288	118	119
Y	35	41	43	39	37	38	41	43
Zr	208	313	195	175	343	334	169	158
Nb	10	12	11	10	13	13	10	12
Cr	9	8	8	9	<5	5	10	10
Ga	11	17	15	16	18	20	16	16
Zn	47	82	66	56	90	93	59	62
V	0	24	13	10	37	47	3	5
Pb	0	21	43	11	8	13	10	7

Sample (R)	4726.7	4729.1	4729.2	4729.3	4729.6	4729.7	4736.2	4736.7	4736.4	V6-8A
SiO ₂	74.34	71.32	69.58	72.87	76.91	76.73	77.06	78.18	77.28	69.78
TiO ₂	0.22	0.39	0.51	0.31	0.09	0.09	0.15	0.17	0.11	0.63
Al ₂ O ₃	12.61	13.21	14.27	12.73	11.88	12.10	12.27	11.39	11.82	14.13
Fe ₂ O ₃ (T)	2.30	3.53	4.51	3.08	1.01	1.33	2.76	1.34	2.12	3.90
MnO	0.03	0.07	0.07	0.06	0.01	0.01	0.04	0.01	0.01	0.07
MgO	0.25	0.50	0.31	0.16	0.36	0.36	0.09	0.09	0.93	1.05
CaO	1.36	1.96	1.37	1.19	1.00	0.59	0.60	0.72	0.77	1.95
Na ₂ O	3.55	3.30	3.74	3.16	0.93	1.23	2.93	2.88	1.03	2.69
K ₂ O	3.78	3.61	3.96	4.42	5.95	5.93	3.06	3.93	3.43	4.01
P ₂ O ₅	0.05	0.11	0.14	0.08	0.02	0.03	0.03	0.03	0.03	0.17
LOI	0.76	2.04	1.82	1.54	1.65	1.19	1.20	0.77	2.30	1.58
TOTAL	99.0	99.7	99.8	99.3	99.7	99.5	99.9	99.4	99.6	99.96
Rb	142	123	128	122	274	0	89	183	137	167
Sr	130	163	103	97	62	75	118	86	91	144
Y	44	42	37	38	42	48	52	53	44	57
Zr	164	244	308	202	103	104	256	107	204	333
Nb	12	13	16	13	16	18	19	15	15	16
Cr	10	7	<5	<5	14	12	9	14	9	11
Ga	13	16	14	12	9	12	15	6	13	12
Zn	57	80	51	37	24	36	68	41	47	41
V	3	18	36	11	2	5	2	0	0	35
Pb	14	9	6	12	15	15	8	18	5	6

Note: Major elements in weight % measured by standard XRF methods at University of Keele, UK using fused discs. Trace elements in ppm by XRF on pressed pellets.

TABLE DR3. RARE EARTH ELEMENT DATA

Sample (R)	Gambacorta Formation		Serpan Gneiss	Thiel Mts
	4720.10	4723.2	4728.7	V6-8A
La	107.00	59.40	44.20	47.12
Ce	206.00	114.00	92.40	98.67
Nd	84.90	53.00	39.50	46.95
Sm	12.50	10.50	8.00	9.88
Eu	2.76	2.29	1.39	1.59
Tb	1.33	1.32	1.28	N.D.*
Yb	3.52	3.69	3.26	3.80
Lu	0.59	0.61	0.48	0.61
Th	12.60	10.50	18.10	N.D.*
Ta	0.99	1.11	2.11	N.D.*
Hf	11.00	8.60	5.39	N.D.*

Note: Trace elements by INAA at Open University, UK

*N.D. = not determined

TABLE DR4. NEW Sm-Nd DATA FROM THE GAMBACORTA FORMATION,
SERPAN GNEISS AND THIEL MOUNTAINS

Sample number	Sm	Nd	$^{147}\text{Sm}/^{144}\text{Nd}$	$^{143}\text{Nd}/^{144}\text{Nd}$	$^{143}\text{Nd}/^{144}\text{Nd}_{(501)}$	$\Sigma\text{Nd}_{(501)}$	T_{CHUR}	T_{DM}
<u>Gambacorta Formation</u>								
R.4720.10	12.42	84.43	0.0889	0.512140	0.511848	-2.8	708	1075
R.4723.2	10.96	58.21	0.1138	0.512135	0.511761	-4.5	929	1321
R.4729.1	9.74	51.42	0.1145	0.512147	0.511771	-4.3	914	1313
<u>Serpan Gneiss</u>								
R.4728.3	6.62	35.20	0.1137	0.512245	0.511872	-2.4	726	1170
R.4728.7	7.32	36.45	0.1214	0.512223	0.511825	-3.3	844	1289
<u>Thiel Mountains</u>								
R.2217.1	10.105	47.410	0.1288	0.512298	0.511874	-2.28	764	1334
R.2219.2	9.285	43.137	0.1301	0.512331	0.511903	-1.72	703	1298
R.2201.1	10.885	52.051	0.1264	0.512299	0.511883	-2.11	736	1298
R.2225.2	8.972	48.057	0.1129	0.512279	0.511908	-1.63	653	1165

Note: Sm-Nd analysis was carried out following method described in Pankhurst & Rapela (1995). $^{143}\text{Nd}/^{144}\text{Nd}$ ratios are normalised to $^{146}\text{Nd}/^{144}\text{Nd} = 0.7219$. Long-term reproducibility of $^{143}\text{Nd}/^{144}\text{Nd}$ ratios both on the La Jolla and in-house standards is better than 15ppm (1σ), but on rock standards this rises to 30-40ppm. Sm/Nd ratios on rock standards are reproducible to 0.1-0.2% (1σ). Constants used in model age calculations are as follows:

$^{147}\text{Sm}/^{144}\text{Nd}_{\text{CHUR}} = 0.1967$, $^{143}\text{Nd}/^{144}\text{Nd}_{\text{CHUR}} = 0.512638$ (DePaolo & Wasserburg, 1976);

$^{147}\text{Sm}/^{144}\text{Nd}_{\text{DM}} = 0.222$, $^{143}\text{Nd}/^{144}\text{Nd}_{\text{DM}} = 0.513114$ (Michard and others, 1985).

TABLE DR5. GEOCHEMICAL DATA FOR SERPAN GNEISS FROM SERPAN PEAK

Sample (R)	4728.2	4728.3	4728.5	4728.6	4728.7	4728.8	4728.9	4728.10
SiO ₂	75.65	56.69	73.15	72.82	70.75	70.67	61.79	70.78
TiO ₂	0.07	1.32	0.27	0.26	0.46	0.41	0.98	0.40
Al ₂ O ₃	12.97	16.61	13.62	13.63	14.43	14.10	16.40	14.28
Fe ₂ O ₃ (T)	0.60	8.03	1.90	1.89	3.08	2.85	6.17	2.86
MnO	0.02	0.12	0.04	0.04	0.05	0.06	0.10	0.07
MgO	0.13	3.45	0.62	0.64	0.87	0.79	2.16	0.82
CaO	0.64	6.38	1.71	1.86	2.05	1.74	2.96	2.16
Na ₂ O	3.18	2.64	3.00	2.64	3.09	3.03	2.90	2.93
K ₂ O	5.88	1.97	4.21	4.85	4.25	4.64	3.56	4.09
P ₂ O ₅	0.03	0.49	0.08	0.08	0.15	0.14	0.33	0.14
LOI	0.56	1.98	0.99	0.85	0.93	1.16	2.51	1.10
TOTAL	99.72	99.68	99.58	99.56	100.11	99.59	99.86	99.64
Rb	173	78	148	152	128	162	149	119
Sr	230	668	297	288	357	412	489	349
Y	24	27	16	17	38	28	37	20
Zr	91	171	121	123	196	184	346	176
Nb	9	14	9	8	16	15	18	10
Cr	16	18	15	15	12	11	9	13
Ga	11	20	13	12	16	15	19	15
Zn	12	102	34	36	52	52	98	50
V	2	187	11	14	35	38	88	32
Pb	52	12	41	32	24	29	11	21

Note: Major elements in weight % measured by standard XRF methods at University of Keele, UK using fused discs. Trace elements in ppm by XRF on pressed pellets.

TABLE DR6. LOCATION OF ANALYZED SAMPLES

Station	Latitude	Longitude	Description
R.4702	83°55'S	56°32'W	North side of ridge 5.0 km west of Mt Hawkes
R.4707	83°38'S	55°27'W	NW end of ridge on SW side of Miller Valley NW of Nelson Peak
R.4719	83°55'S	56°28'W	4 km west of Mt. Hawkes
R.4720	83°51'40"S	56°24'W	Ridge 3 km SW of Bennett Spines
R.4722	83°59'39"S	56°27'30"W	Ridge 2 km W of Wiens Peak
R.4723	83°55'S	56°15'W	Ridge 2 km W of Mt Hawkes
R.4726	84°00'S	54°40'W	East side of Hill Nunatak
R.4728	83°34'S	54°49'W	E side of Serpan Peak
R.4729	84°02'S	56°03'W	SE side of Gambacorta Peak
R.4736	84°00'30"S	56°36'W	Top of valley 3 km WSW of Wiens Peak

Note: Co-ordinates and place-names are taken from the Antarctica, 1: 250 000 Reconnaissance series map *Schmidt Hills, Antarctica* SU 21-25/13 published by the U.S. Geological Survey in co-operation with the National Science Foundation.

Supplementary references

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