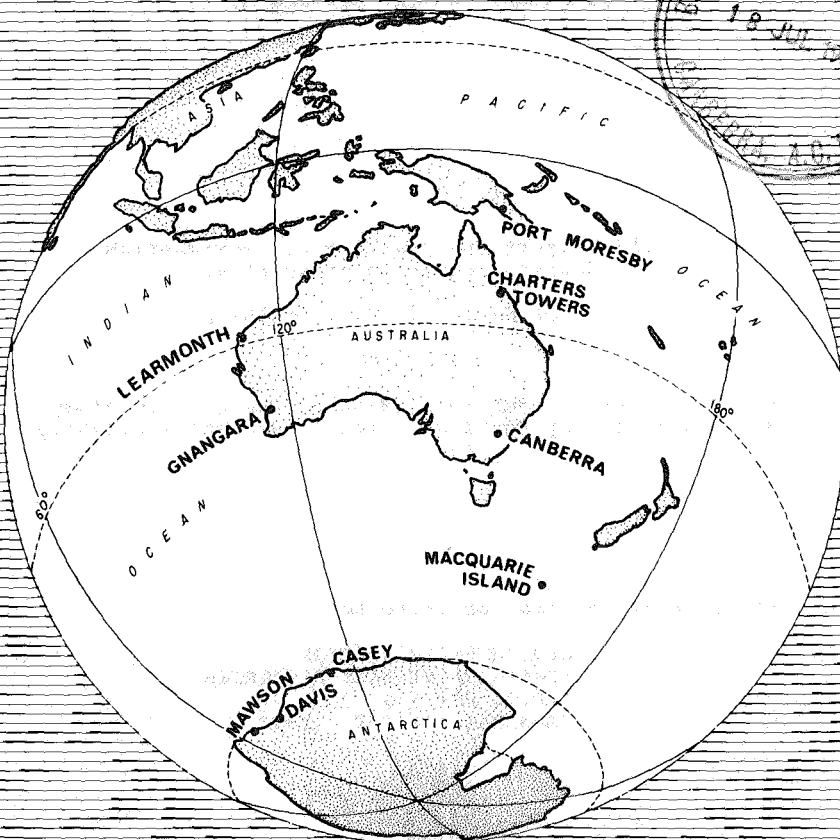
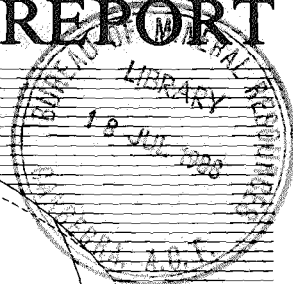


BMR PUBLICATIONS COMPACTUS
(LENDING SECTION)



GEOFYSICAL OBSERVATORY REPORT



MAGNETIC OBSERVATORIES

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VOLUME 35 No. 12
DECEMBER 1987

OF MINERAL RESOURCES, GEOLOGY & GEOPHYSICS

DEPARTMENT OF PRIMARY INDUSTRIES AND ENERGY

Minister for Resources: Senator the Hon. Peter Cook

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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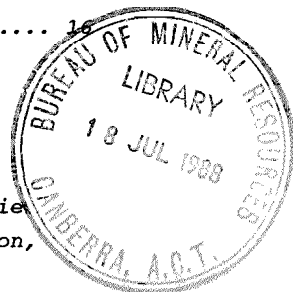
BMR PUBLICATIONS COMPACTUS (LENDING SECTION)

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The observers at Casey, Davis and Macquarie Island are officers of the Antarctic Division, Department of Science and Technology: their contributions are gratefully acknowledged. These observers and the Bureau of Mineral Resources (BMR) geophysicist at Mawson are members of the Australian National Antarctic Research Expeditions (ANARE).

Data from the Port Moresby Geophysical Observatory are contributed by the Geological Survey of Papua New Guinea.

The terminology used in this report is that accepted by International Association of Geomagnetism and Aeronomy. The unit of field intensity is nanotesla (nT). All times are in Universal Time.



CONTRIBUTING OBSERVATORIES

OBSERVATORY	OBSERVER IN CHARGE	GEOGRAPHIC		GEOMAGNETIC	
		LAT	LONG	LAT	LONG
PORT MORESBY	I.D.Ripper	9° 25' S	147° 09' E	-18.2°	219.6°
CHARTERS TOWERS	J.M.Millican	20° 05' S	146° 15' E	-28.8°	220.2°
LEARMONTH	M.W.McMullan	22° 13' S	114° 06' E	-33.4°	185.5°
GNANGARA	P.J.Gregson	31° 47' S	115° 57' E	-42.9°	187.8°
CANBERRA	P.A.Hopgood	35° 19' S	149° 22' E	-43.5°	226.4°
MACQUARIE I	G. Kowalik	54° 30' S	158° 57' E	-60.6°	244.6°
MAWSON	S.D.Dennis	67° 36' S	62° 53' E	-73.3°	105.9°
DAVIS	P. Williams	68° 35' S	77° 58' E	-76.9°	123.5°
CASEY	R.A.Rachinger	66° 17' S	110° 32' E	-77.5°	182.4°

MAGNETOGRAPHS

<u>OBSERVATORY</u>	<u>CODE</u>	<u>TYPE</u>	<u>ELEMENT/SCALE-VALUE</u>			
PORT MORESBY	PMG	La cour (A)	H/3	D/5	Z/4	
CHARTERS TOWERS	CTA	EDA/ELSEC (D/1)	X	Y	Z	
LEARMONTH	LRM	EDA/ELSEC (D/1)	X	Y	Z	
GNANGARA	GNA	Eschenhagen (A)	H/3	D/7	Z/6	
CANBERRA	CNB	ELSEC (D/.1)	D	I	F	
MACQUARIE ISLAND	MCQ	PEM (D/.1)	X	Y	Z	
MAWSON	MAW	PEM (D/.1)	X	Y	Z	

A = analogue, 20mm/hr, scale values in nT/mm

D/1 = ditigal, 1 min readings, 1 nT resolution

D/.1 = ditigal, 1 min readings, 0.1 nT resolution

PEM = BMR Photo-electronic magnetograph.

MAGNETOMETERS

Absolute data are based on observations made with QHM's, BMZ's, fluxgate-theodolites, declinometers and proton precession magnetometers.

Errors in preliminary values obtained from magnetograms are not likely to exceed 5 nT or 0.5 minutes of arc.

PORT MORESBY

MAGNETIC K-INDICES - DECEMBER 1987

Range for lower limit of K=9 is 300nT

DAY	K-INDICES								K-SUM
01	2	2	3	2	2	2	1	1	15
02	2	1	1	1	2	2	1	1	11
03	2	3	3	2	2	4	2	3	21
04	1	1	2	1	2	2	2	3	14
05	3	3	4	4	3	3	3	3	26
06	2	2	2	1	2	2	2	2	15
07	2	2	1	1	2	2	0	0	10
08	1	1	1	1	1	0	1	1	07
09	1	1	1	1	1	1	3	4	13
10	3	3	2	3	3	4	5	3	26
11	4	3	2	3	3	3	2	2	22
12	2	2	2	-	-	-	-	-	--
13	1	1	1	1	1	1	1	1	08
14	1	2	2	1	2	1	1	1	11
15	2	2	1	2	3	2	3	3	18
16	4	3	5	5	4	3	2	3	29
17	2	2	3	3	4	3	2	2	21
18	2	2	3	2	2	1	2	2	16
19	1	1	2	3	2	2	3	1	15
20	1	1	1	1	3	2	2	1	12
21	1	2	1	2	2	2	2	2	14
22	3	2	2	2	3	3	2	2	19
23	2	2	2	2	2	2	2	1	15
24	1	2	2	2	2	1	1	2	13
25	1	2	1	2	3	2	1	2	14
26	1	1	1	1	1	2	1	1	09
27	1	1	1	0	0	1	1	1	06
28	1	0	1	1	1	1	1	1	07
29	2	3	2	2	1	1	1	1	13
30	2	1	1	1	1	0	1	1	08
31	2	1	2	2	2	1	2	2	14

Mean of K-Sum is 14.7

Frequency of K-Indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	7	90	95	39	9	3	0	0	0	0	5

GNANGARA

MAGNETIC K-INDICES - DECEMBER 1987

Range for lower limit of K=9 is 450nT

DAY	K-INDICES								K-SUM
01	1	2	1	2	1	1	2	0	10
02	3	0	1	1	2	2	2	1	12
03	3	3	2	2	4	4	2	2	22
04	1	1	0	0	1	2	3	4	12
05	3	2	3	3	3	2	3	2	21
06	0	1	1	1	3	2	1	2	11
07	2	1	1	0	1	1	1	0	07
08	1	0	0	0	0	0	0	0	01
09	1	1	0	1	1	0	3	5	12
10	2	2	3	3	4	4	4	4	26
11	4	2	1	2	2	3	4	3	21
12	3	3	2	3	2	1	1	1	16
13	1	1	1	1	0	2	1	0	07
14	1	1	1	1	2	1	1	1	09
15	1	0	1	2	3	4	3	4	18
16	5	4	4	4	5	4	3	3	32
17	2	2	2	3	4	3	2	3	21
18	2	1	2	2	2	1	1	1	12
19	1	1	2	3	2	2	3	1	15
20	0	0	1	2	3	2	1	0	09
21	1	1	1	3	3	2	3	2	16
22	4	2	2	3	3	3	4	4	25
23	2	3	3	1	2	3	1	1	16
24	2	2	1	2	3	3	1	3	17
25	3	1	2	3	2	1	1	3	16
26	2	1	1	2	1	1	1	1	10
27	1	0	0	0	0	0	1	0	02
28	0	0	1	1	1	0	2	2	07
29	1	2	2	1	1	1	1	1	10
30	1	1	1	2	1	0	0	1	07
31	0	1	1	1	2	1	2	2	10

Mean of K-Sum is 13.8

Frequency of K-Indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	34	88	61	43	19	3	0	0	0	0	0

CANBERRA

MAGNETIC K-INDICES - DECEMBER 1987

Range for lower limit of K=9 is 450nT

DAY	K-INDICES								K-SUM
01	1	2	1	2	1	1	1	1	10
02	2	1	1	0	2	2	1	0	09
03	2	3	2	2	3	4	1	1	18
04	2	1	1	0	1	2	2	3	12
05	2	3	4	4	3	2	3	2	23
06	0	1	1	1	2	2	1	2	10
07	1	1	1	0	1	1	0	0	05
08	0	0	0	0	0	0	0	0	00
09	0	0	0	1	0	1	2	4	08
10	2	2	3	3	4	4	4	3	25
11	4	2	1	2	2	3	2	2	18
12	3	3	2	3	2	1	1	0	15
13	0	0	1	0	1	1	1	0	04
14	0	1	1	0	2	0	1	1	06
15	0	0	1	1	1	3	3	3	12
16	3	4	4	4	4	3	2	2	26
17	2	2	1	3	4	3	1	1	17
18	1	2	1	1	1	0	0	0	06
19	0	0	1	3	2	2	1	1	10
20	0	1	1	1	3	2	1	0	09
21	0	2	1	2	2	1	2	1	11
22	3	2	2	2	3	2	2	2	18
23	1	3	2	2	2	2	1	0	13
24	1	2	2	2	1	2	1	2	13
25	1	1	2	2	3	1	1	1	12
26	2	1	1	0	1	1	1	0	07
27	0	0	0	0	0	0	0	0	00
28	0	0	0	0	0	0	0	1	01
29	0	2	3	1	0	0	1	1	08
30	0	0	2	1	1	0	0	0	04
31	1	0	0	2	2	1	2	0	08

Mean of K-Sum is 10.9

Frequency of K-Indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	66	79	63	27	13	0	0	0	0	0	0

MAWSON

MAGNETIC K-INDICES - DECEMBER 1987

Range for lower limit of K=9 is 1500nT

DAY	K-INDICES								K-SUM
01	4	3	1	2	2	2	3	2	19
02	3	3	2	1	1	1	1	3	15
03	5	4	4	2	3	4	4	5	31
04	3	-	2	2	3	3	4	6	--
05	4	5	5	4	3	4	5	3	33
06	2	3	3	2	3	3	4	4	24
07	3	3	3	1	2	2	4	2	20
08	2	2	1	1	1	0	2	3	12
09	2	3	0	1	1	0	3	4	14
10	4	4	4	4	4	5	6	5	36
11	6	5	2	2	3	4	5	5	32
12	5	5	4	4	3	3	4	3	31
13	2	2	2	2	3	2	2	4	19
14	3	4	2	2	2	3	4	4	24
15	2	3	2	2	4	5	4	3	25
16	6	6	6	5	4	7	5	5	44
17	4	4	4	4	4	4	5	5	34
18	5	4	2	2	2	2	2	4	23
19	3	3	2	4	3	3	4	4	26
20	3	3	2	2	3	2	2	2	19
21	3	5	3	2	3	4	5	4	29
22	5	5	-	4	4	4	5	5	--
23	5	4	3	3	4	3	2	1	25
24	4	3	2	3	4	4	3	5	28
25	4	4	3	3	3	3	2	5	27
26	3	4	1	2	2	1	2	3	18
27	3	2	1	0	1	1	2	2	12
28	1	1	1	0	1	0	5	3	12
29	4	3	2	2	2	1	1	2	17
30	3	2	2	1	2	1	1	1	13
31	3	3	2	2	2	3	4	4	23

Mean of K-Sum is 23.6

Frequency of K-Indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	6	27	62	59	56	29	6	1	0	0	2

DECEMBER 1987

PRINCIPAL MAGNETIC STORMS

OBSERVATORY	Commencement			SSC-amplitude			Max. 3hr K-index			Ranges			UT End		
	day	hr	min	type	D(°)	H(nT)	Z(nT)	day	(3hr-period)	K	D(°)	H(nT)	Z(nT)	day	hr
Port Moresby	09	19	40	ssc*	+0.5*	+20	+17	10	(7)	5	10	130	50	11	06
	15	18	..	...	..	..	..	16	(3,4)	5	10	120	60	17	00
Charters Towers	15	10	..	...	..	..	..	16	(3,4)	5	13.8	105	38	16	24
Gnangara	09	19	42	ssc*	0.3*	22	17*	09	(8)	5	18	110	90	11	07
	15	12	..	...	..	..	..	16	(1,5)	5	16	100	90	17	18

DECEMBER 1987

PRELIMINARY MONTHLY MEAN VALUES

OBSERVATORY	H	D	Z	F
	nT	deg min	nT	nT
PORT MORESBY	35938	06° 35.8' E	-23721	43061
CHARTERS TOWERS	31780	07° 45.7' E	-38273	49747
LEARMONTH	29509	00° 37.1' W	-44426	53333
GNANGARA	23230	03° 12.8' W	-53811	58611
CANBERRA	23691	12° 25.9' E	-53693	58688
MACQUARIE ISLAND	12641	29° 34.6' E	-63591	64835
MAWSON	18485	63° 58.7' W	-46168	49731
DAVIS	16669	76° 59.0' W	-52190	54787
CASEY	9648	91° 00.0' W	-64081	64803

The values are derived from magnetograms for selected quiet days except at Davis and Casey where they are derived from semi-weekly absolute measurements.

SUDDEN COMMENCEMENTS AND OTHER RAPID VARIATIONS

OBSERVATORY	DAY	TYPE AND QUALITY	TIME	SENSE AND AMPLITUDE OF CHIEF MOVEMENT		
				H(nT)	D(nT)	Z(nT)
PORT MORESBY	09	ssc*B	1940	+20	+05*	+17
CHARTERS TOWERS		ssc*B	1941	+22	+04*	-02
GNANGARA	02	ssc B	1242	+10	+03	+04
	09	ssc*A	1942	+22	+21*	+17*
CANBERRA	09	ssc*B	1942	+15	+18*	+03*

PRELIMINARY MONTHLY VALUES FOR 1987

PORT MORESBY	H (nT)	D deg min	Z (nT)	F (nT)	I deg min
January	35946	06 35.3	-23713	43063	-33 24.7
February	35943	06 35.1	-23714	43061	-33 24.9
March	35941	06 35.5	-23712	43058	-33 24.9
April	35939	06 35.5	-23714	43058	-33 25.1
May	35942	06 35.5	-23713	43060	-33 24.9
June	35937	06 35.7	-23716	43057	-33 25.3
July	35939	06 35.8	-23716	43059	-33 25.2
August	35929	06 35.7	-23717	43051	-33 25.7
September	35924	06 35.7	-23719	43048	-33 26.1
October	35928	06 35.6	-23722	43053	-33 26.1
November	35929	06 35.6	-23723	43054	-33 26.1
December	35938	06 35.8	-23721	43061	-33 25.6
Mean	35936	06 35.6	-23717	43057	-33 25.4

CHARTERS TOWERS	H (nT)	D deg min	Z (nT)	F (nT)	I deg min
January	31787	07 44.8	-38269	49748	-50 17.2
February	31784	07 44.9	-38267	49745	-50 17.3
March	31774	07 45.4	-38266	49738	-50 17.7
April	31779	07 45.5	-38268	49742	-50 17.5
May	31786	07 45.6	-38265	49745	-50 17.1
June	31773	07 45.3	-38270	49740	-50 18.0
July	31780	07 45.4	-38267	49743	-50 17.5
August	31769	07 45.5	-38271	49739	-50 18.2
September	31763	07 45.8	-38273	49736	-50 18.6
October	31766	07 46.2	-38272	49737	-50 18.5
November	31776	07 45.6	-38271	49743	-50 17.9
December	31781	07 45.7	-38273	49747	-50 17.7
Mean	31776	07 45.5	-38269	49742	-50 17.8

PRELIMINARY MONTHLY VALUES FOR 1987

LEARMONTH	H (nT)	D deg min	Z (nT)	F (nT)	I deg min
January	29481	-00 37.5	-44411	53306	-56 25.4
February	29481	-00 37.4	-44414	53307	-56 25.5
March	29473	-00 37.6	-44414	53303	-56 25.9
April	29479	-00 37.6	-44414	53307	-56 25.6
May	29481	-00 37.2	-44414	53308	-56 25.5
June	29472	-00 37.4	-44423	53311	-56 26.3
July	29483	-00 37.5	-44424	53317	-56 25.7
August	29473	-00 37.5	-44426	53314	-56 26.4
September	29467	-00 37.5	-44427	53311	-56 26.7
October	29471	-00 37.5	-44429	53315	-56 26.6
November	29522	-00 37.2	-44427	53342	-56 23.8
December	29509	-00 37.1	-44426	53333	-56 24.4
Mean	29483	-00 37.4	-44421	53314	-56 25.6

GNANGARA	H (nT)	D deg min	Z (nT)	F (nT)	I deg min
January	23241	-03 14.9	-53805	58610	-66 38.3
February	23235	-03 14.5	-53802	58605	-66 38.5
March	23228	-03 14.1	-53804	58604	-66 39.0
April	23228	-03 13.5	-53800	58600	-66 38.9
May	23237	-03 13.6	-53795	58599	-66 38.3
June	23228	-03 13.2	-53801	58601	-66 38.9
July	23232	-03 13.4	-53806	58607	-66 38.8
August	23223	-03 13.1	-53804	58602	-66 39.2
September	23213	-03 13.0	-53814	58607	-66 40.0
October	23215	-03 12.9	-53818	58612	-66 40.0
November	23223	-03 12.6	-53812	58609	-66 39.4
December	23230	-03 12.8	-53811	58611	-66 39.0
Mean	23228	-03 13.5	-53806	58606	-66 39.0

PRELIMINARY MONTHLY VALUES FOR 1987

CANBERRA	H (nT)	D deg min	Z (nT)	F (nT)	I deg min
January	23701	12 23.9	-53704	58701	-66 11.2
February	23707	12 24.2	-53698	58698	-66 10.8
March	23691	12 24.7	-53702	58695	-66 11.7
April	23691	12 24.9	-53696	58690	-66 11.6
May	23696	12 25.0	-53695	58691	-66 11.3
June	23686	12 25.4	-53699	58691	-66 12.0
July	23692	12 25.3	-53694	58688	-66 11.5
August	23683	12 25.6	-53697	58688	-66 12.0
September	23678	12 25.8	-53699	58687	-66 12.3
October	23677	12 26.0	-53699	58687	-66 12.4
November	23689	12 25.9	-53694	58687	-66 11.6
December	23691	12 25.9	-53693	58688	-66 11.5
Mean	23690	12 25.2	-53697	58691	-66 11.7

MACQUARIE IS.	H (nT)	D deg min	Z (nT)	F (nT)	I deg min
January	12585	29 26.0	-63588	64821	-78 48.3
February	12601	29 26.0	-63588	64825	-78 47.5
March	12599	29 29.0	-63599	64835	-78 47.7
April	12578	29 27.0	-63580	64812	-78 48.6
May	12583	29 24.0	-63577	64810	-78 48.3
June	12589	29 26.9	-63579	64813	-78 48.0
July	12592	29 25.2	-63573	64808	-78 47.9
August	12586	29 27.1	-63580	64814	-78 48.2
September	12580	29 26.2	-63594	64826	-78 48.6
October	12579	29 26.5	-63573	64806	-78 48.5
November	12604	29 23.2	-63581	64818	-78 47.2
December	12641	29 34.6	-63591	64835	-78 45.4
Mean	12593	29 26.8	-63584	64819	-78 47.8

PRELIMINARY MONTHLY VALUES FOR 1987

MAWSON	H	D	Z	F	I
	(nT)	deg min	(nT)	(nT)	deg min
January	18469	-63 52.4	-46234	49786	-68 13.5
February	18477	-63 50.9	-46224	49780	-68 12.7
March	18467	-63 54.7	-46216	49769	-68 13.2
April	18471	-63 55.8	-46207	49762	-68 12.7
May	18470	-63 55.8	-46193	49749	-68 12.4
June	18468	-63 57.7	-46195	49750	-68 12.6
July	18462	-63 58.0	-46189	49742	-68 12.8
August	18468	-63 58.3	-46183	49739	-68 12.3
September	18462	-63 59.0	-46193	49746	-68 12.9
October	18464	-63 59.1	-46191	49745	-68 12.7
November	18479	-63 59.1	-46179	49739	-68 11.4
December	18485	-63 58.7	-46168	49731	-68 10.8
Mean	18470	-63 56.6	-46198	49753	-68 12.5

DAVIS	H	D	Z	F	I
	(nT)	deg min	(nT)	(nT)	deg min
January	16651	-76 53.0	-52193	54785	-72 18.4
February	16668	-76 50.0	-52110	54711	-72 15.8
March	16636	-76 57.0	-52159	54748	-72 18.6
April	16628	-76 57.0	-52174	54760	-72 19.4
May	16623	-76 59.0	-52150	54735	-72 19.2
June	16607	-76 59.0	-52170	54749	-72 20.5
July	16620	-77 07.0	-52160	54744	-72 19.6
August	16612	-77 08.0	-52150	54732	-72 19.9
September	16619	-77 06.0	-52170	54753	-72 19.8
October	16632	-77 03.0	-52120	54709	-72 18.1
November	16641	-77 05.0	-52097	54690	-72 17.1
December	16669	-76 59.0	-52190	54787	-72 17.2
Mean	16634	-77 00.2	-52154	54742	-72 18.6

PRELIMINARY MONTHLY VALUES FOR 1987

CASEY	H (nT)	D deg min	Z (nT)	F (nT)	I deg min
January	9653	-91 02.0	-64072	64795	-81 25.9
February	9635	-91 17.0	-64072	64792	-81 26.9
March	9640	-91 17.0	-64076	64797	-81 26.7
April	9564	-91 16.0	-64136	64845	-81 31.1
May	9564	-91 29.0	-64105	64815	-81 30.9
June	9555	-91 25.0	-64112	64820	-81 31.4
July	9561	-91 30.0	-64106	64815	-81 31.0
August	9535	-91 35.0	-64074	64780	-81 32.1
September	9585	-91 28.0	-64120	64832	-81 29.9
October	9567	-91 17.0	-64107	64816	-81 30.7
November	9647	-91 07.0	-64106	64827	-81 26.5
December	9648	-91 00.0	-64081	64803	-81 26.3
Mean	9596	-91 18.6	-64097	64811	-81 29.1

Preliminary Annual Mean Values of the Magnetic Elements 1987

OBSERVATORY	D deg min	I deg min	H (nT)	X (nT)	Y (nT)	Z (nT)	F (nT)
Port Moresby*	06 35.6E	-33 25.4	35936	35698	4126	-23717	43057
Charters Towers	07 45.5E	-50 17.8	31776	31485	4290	-38269	49742
Learmonth	00 37.4W	-56 25.6	29483	29481	- 321	-44421	53314
Gnangara	03 13.5W	-66 39.0	23228	23191	- 1307	-53806	58606
Canberra	12 25.2E	-66 11.7	23690	23136	5095	-53697	58691
Macquarie Island**	29 26.8E	-78 47.8	12593	10966	6191	-63584	64819
Mawson	63 56.6W	-68 12.5	18470	8113	-16593	-46198	49753
Davis**	77 00.2W	-72 18.6	16634	3741	-16208	-52154	54742
Casey**	91 18.6W	-81 29.1	9596	- 219	- 9593	-64097	64811

* Port Moresby results were provided by the PNG Geological Survey

** The Annual means for Casey, Davis and Macquarie Island were obtained graphically from the periodic observations; they are better estimates than the arithmetic means.

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