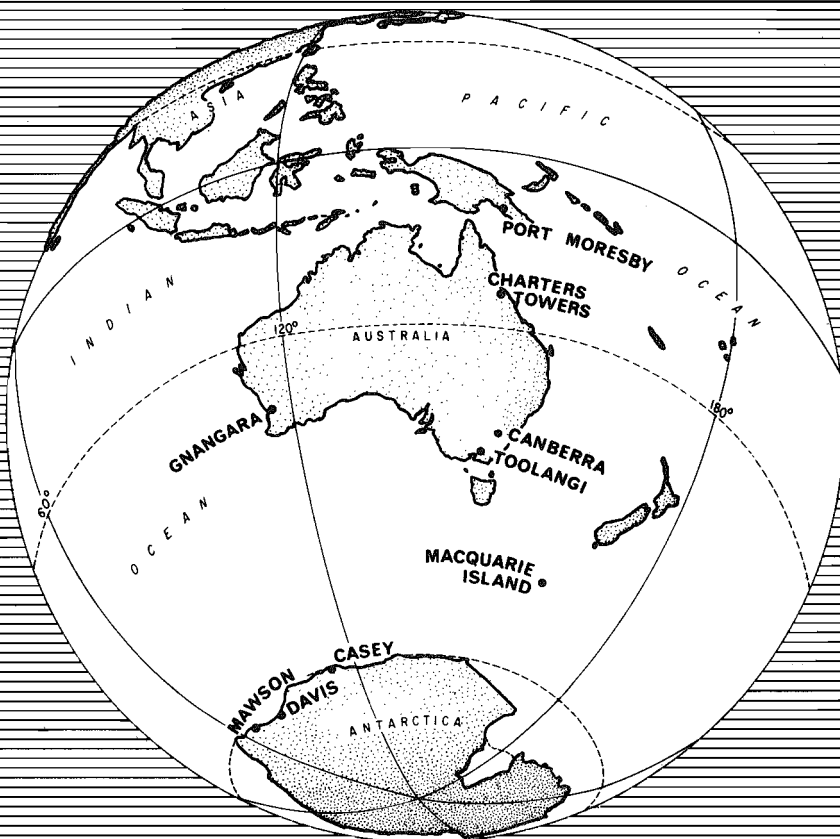


BMR PUBLICATIONS CONTACTUS
(LENDING SECTION)



GEOPHYSICAL OBSERVATORY



MAGNETIC OBSERVATORIES

BMR
\$550
\$389.5
AUS. 8
copy 2

VOLUME 32. NO. 12
DECEMBER 1984

BUREAU OF MINERAL RESOURCES, GEOLOGY & GEOPHYSICS

DEPARTMENT OF RESOURCES AND ENERGY

Minister: Senator The Hon. Peter Walsh

SECRETARY: A J Woods

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

DIRECTOR: R W R Rutland

THIS REPORT WAS PREPARED IN THE DIVISION OF GEOPHYSICS

CHIEF OF DIVISION: M W McElhinny

HEAD, GEOMAGNETISM SECTION: C E Barton

ISSN 0433-5015



Published for the Bureau of Mineral Resources,
Geology and Geophysics by the Australian Government
Publishing Service.

© Commonwealth of Australia 1984.

CONTENTS

	Page
Contributing Observatories.....	4
Macquarie Island-cessation of K-indices.....	5
K-indices.....	6
Principal Magnetic Storms.....	10
Monthly Mean Values, Sudden Commencements and Other Rapid Variations.....	11
Summary Monthly Mean Values, 1984 (and Charters Towers 1983).....	12
Summary of all elements 1984.....	17

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

The 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 IAGA. The units of field intensity, nanotesla (nT), are those of the SI system. All times are in Universal Time. Should further Information be required, apply to:

GEOMAGNETISM SECTION
BUREAU OF MINERAL RESOURCES
G.P.O. Box 378
CANBERRA A.C.T. 2601

CONTRIBUTING OBSERVATORIES

OBSERVATORY	OBSERVER IN CHARGE	<u>GEOGRAPHIC</u>		<u>GEOMAGNETIC</u>	
		LAT	LONG	LAT	LONG
PORT MORESBY	I.D. Ripper	9 25'S	147 09'E	-18.6	217.9
CHARTERS TOWERS	J.M. Millican	20 05'S	146 15'E	-29.3	218.4
GNANGARA	P.J. Gregson	31 47'S	115 57'E	-43.3	185.8
CANBERRA	P.A. Hopgood	35 19'S	149 22'E	-44.0	224.7
MACQUARIE I	P. Barnaart	54 30'S	158 57'E	-61.1	243.1
MAWSON	P.G. Crosthwaite	67 36'S	62 53'E	-73.1	102.9
DAVIS	P.F.B. Williams	68 35'S	77 58'E	-76.7	119.9
CASEY	B.J. Whiteley	66 17'S	110 32'E	-77.8	179.1

MAGNETOGRAPHS

OBSERVATORY	CODE	TYPE	ELEMENT/SCALE		VALUE
PORT MORESBY	PMG	La Cour (A)	H/3	D/5	Z/4
CHARTERS TOWERS	CTA	EDA/ELSEC digital (D1/1)			
GNANGARA	GNA	Eschenhagen (A)	H/3	D/7	Z/6
CANBERRA	CNB	Elsec digital (D1/0.1)			
MACQUARIE I	MCQ	Photo-electronic magnetometer (D1/0.1)			
MAWSON	MAW	La Cour (A)	H/21	D/13	Z/22

Scale values are in nT/mm

A = analogue, 20 mm/hr

D1/0.1,1 = digital, 1 min readings, 0.1 or 1 nT resolution

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.

MACQUARIE ISLAND-CESSATION OF K-INDICES

Since October 1984 the geomagnetic variations at Macquarie Island have been recorded digitally. As a result of this routine scaling of K-indices have ceased.

PORT MORESBY

MAGNETIC K-INDICES - DECEMBER 1984

Range for lower limit of K = 9 is 300 nT.

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

Mean of K-Sum is 20.2

Frequency of K-indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	0	27	89	108	22	2	0	0	0	0	0

GNANGARA

MAGNETIC K-INDICES - DECEMBER 1984

Range for lower limit of K = 9 is 450 nT.

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

Mean of K-Sum is 21.0

Frequency of K-indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	6	36	64	88	44	10	0	0	0	0	0

CANBERRA

MAGNETIC K-INDICES - DECEMBER 1984

Range for lower limit of K = 9 is 450 nT.

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

Mean of K-Sum is 18.7

Frequency of K-indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	6	51	73	90	26	2	0	0	0	0	0

MAWSON

MAGNETIC K-INDICES - DECEMBER 1984

Range for lower limit of K = 9 is 1500 nT.

<u>DAY</u>	<u>K-INDICES</u>								<u>K-SUM</u>
01	3	5	5	4	3	2	3	7	32
02	6	6	6	4	3	5	8	6	44
03	4	5	3	4	5	6	5	4	36
04	4	4	5	4	4	5	6	6	38
05	6	4	4	4	4	4	5	5	36
06	4	5	4	4	4	4	7	6	38
07	5	5	5	4	4	5	5	3	36
08	4	5	3	3	2	2	4	6	29
09	5	3	2	2	2	3	4	4	25
10	3	4	4	3	3	3	4	3	27
11	3	5	3	3	4	4	5	6	33
12	5	5	3	4	3	3	4	5	32
13	5	7	5	5	4	5	6	5	42
14	4	3	3	4	4	4	4	6	32
15	5	4	3	4	5	3	6	7	37
16	5	5	5	5	4	5	7	7	43
17	4	5	5	4	5	6	7	5	41
18	5	5	4	4	4	5	3	5	35
19	4	3	2	3	3	2	5	3	25
20	4	4	2	2	3	3	3	3	24
21	2	4	3	2	4	3	4	4	26
22	4	3	3	2	3	3	5	5	28
23	3	5	5	4	3	4	6	6	36
24	3	3	2	1	2	2	2	3	18
25	3	5	4	2	2	1	1	2	20
26	4	6	4	6	5	6	6	6	43
27	4	3	2	4	5	5	5	7	35
28	6	5	5	4	5	5	7	6	43
29	5	5	5	4	4	4	5	6	38
30	5	5	5	4	4	3	6	6	38
31	6	5	4	5	5	6	6	6	43

Mean of K-Sum is 33.9

Frequency of K-indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	0	3	21	48	68	67	31	9	1	0	0

DECEMBER 1984
PRINCIPAL MAGNETIC STORMS

OBSERVATORY	Commencement				SSC	AMPLITUDES			MAX 3h	K-INDEX	RANGES			UT END	
	d	h	min	TYPE	D(')	H(nT)	Z(nT)	d (3h-PERIOD)	K	D(')	H(nT)	Z(nT)	d	h	
10. Port Moresby								Nil							
Charters Towers								Nil							
Gnangara								Nil							
Canberra								Nil							

DECEMBER 1984
PRELIMINARY MONTHLY MEAN VALUES

OBSERVATORY	H	D		Z	F
	nT	o	'	nT	nT
PORT MORESBY	35945	06	33.6'E	-23717	43064
CHARTERS TOWERS	31791	07	42.3'E	-38278	49758
GNANGARA	23270	03	18.9'W	-53761	58581
CANBERRA	23720	12	19.1'E	-53733	58736
MACQUARIE I	12662	29	7.9'E	-63645	64892
MAWSON	18458	63	35.0'W	-46371	49910
DAVIS	16631	76	47'W	-52223	54807
CASEY	9616	91	23'W		

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			NIL			
CHARTERS TOWERS			NIL			
GNANGARA	13	SSC* B	0102	+3	+17*	+8*
CANBERRA			NIL			

Preliminary Monthly Values for 1984

Observatory	H nT	D deg min	Z nT	F nT
Port Moresby				
JANUARY	35953	06 32.9E	-23713	43069
FEBRUARY	35938	06 33.9E	-23712	43056
MARCH	35942	06 33.1E	-23712	43059
APRIL	35943	06 33.1E	-23714	43061
MAY	35932	06 33.3E	-23712	43051
JUNE	35934	06 33.4E	-23717	43055
JULY	35942	06 33.5E	-23713	43060
AUGUST	35941	06 33.5E	-23713	43059
SEPTEMBER	35938	06 33.9E	-23717	43058
OCTOBER	35942	06 33.4E	-23718	43062
NOVEMBER	35943	06 33.6E	-23718	43063
DECEMBER	35945	06 33.6E	-23717	43064
MEAN	35941	06 33.4E	-23715	43060

Preliminary Monthly Values for 1983

Observatory	H nT	D deg min	Z nT	F nT
CHARTERS TOWERS				
JULY	31802	07 40.4E	-38282	49768
AUGUST	31792	07 40.5E	-38276	49757
SEPTEMBER	31800	07 40.8E	-38275	49762
OCTOBER	31801	07 41.1E	-38279	49765
NOVEMBER	31800	07 41.0E	-38279	49764
DECEMBER	31799	07 40.9E	-38277	49763
MEAN	31799	07 40.8E	-38278	49763

Preliminary Monthly Values for 1984

Observatory	H nT	D deg min	Z nT	F nT
CHARTERS TOWERS				
JANUARY	31798	07 41.0E	-38277	49763
FEBRUARY	31790	07 41.4E	-38276	49757
MARCH	31787	07 41.5E	-38275	49755
APRIL	31792	07 41.7E	-38272	49755
MAY	31781	07 41.8E	-38278	49753
JUNE	31785	07 41.9E	-38279	49756
JULY	31784	07 42.0E	-38281	49755
AUGUST	31787	07 41.9E	-38278	49756
SEPTEMBER	31786	07 42.1E	-38277	49754
OCTOBER	31788	07 42.3E	-38278	49756
NOVEMBER	31787	07 42.6E	-38277	49757
DECEMBER	31791	07 42.3E	-38278	49758
MEAN	31788	07 41.9E	-38277	49756

Preliminary Monthly Values for 1984

Observatory	H nT	D deg min	Z nT	F nT
GNANGARA				
JANUARY	23290	03 19.2W	-53745	58574
FEBRUARY	23280	03 19.0W	-53747	58272
MARCH	23275	03 19.6E	-53743	58566
APRIL	23268	03 18.8W	-53750	58570
MAY	23267	03 18.7W	-53745	58576
JUNE	23268	03 18.1W	-53756	58565
JULY	23269	03 19.1W	-53762	58582
AUGUST	23271	03 18.8W	-53734	58557
SEPTEMBER	23267	03 19.0W	-53758	58577
OCTOBER	23274	03 18.8W	-53759	58581
NOVEMBER	23272	03 18.9W	-53763	58584
DECEMBER	23270	03 18.9W	-53761	58581
MEAN	23273	03 18.9E	-53752	58574

CANBERRA

JANUARY	23730	12 16.7E	-53744	58750
FEBRUARY	23719	12 16.9E	-53745	58746
MARCH	23719	12 17.9E	-53742	58744
APRIL	23720	12 18.2E	-53741	58743
MAY	23714	12 18.1E	-53745	58745
JUNE	23714	12 18.3E	-53743	58742
JULY	23713	12 18.3E	-53743	58742
AUGUST	23716	12 18.3E	-53740	58740
SEPTEMBER	23715	12 18.5E	-53737	58737
OCTOBER	23717	12 18.9E	-53736	58737
NOVEMBER	23716	12 19.1E	-53736	58737
DECEMBER	23720	12 19.1E	-53733	58736
MEAN	23718	12 18.2E	-53740	58742

Preliminary Monthly Values for 1984

Observatory	H nT	D deg min	Z nT	F nT
MACQUARIE ISLAND				
JANUARY	12647	28 59.1E	-63644	64888
FEBRUARY	12634	29 00.2E	-63644	64886
MARCH	12632	29 02.0E	-63650	64891
APRIL	12633	29 02.3E	-63657	64898
MAY	12632	29 03.0E	-63655	64896
JUNE	12631	29 03.9E	-63652	64893
JULY	12630	29 03.6E	-63647	64888
AUGUST	12631	29 04.5E	-63651	64892
SEPTEMBER	12631	29 04.8E	-63645	64886
OCTOBER *	12619	29 03.9E	-63655	64894
NOVEMBER *	12701	29 08.8E	-63659	64914
DECEMBER *	12662	29 07.9E	-63645	64892
MEAN	12640	29 03.7E	-63650	64893

(*) Values are derived from weekly absolute measurements rather than Quiet days only.

MAWSON				
JANUARY	18437	63 29.7W	-46426	49953
FEBRUARY	18445	63 29.2W	-46438	49967
MARCH	18448	63 32.0W	-46424	49955
APRIL	18448	63 32.3W	-46426	49957
MAY	18445	63 31.5W	-46412	49943
JUNE	18436	63 33.8W	-46410	49938
JULY	18430	63 34.4W	-46393	49920
AUGUST	18451	63 34.2W	-46386	49921
SEPTEMBER	18443	63 35.1W	-46390	49922
OCTOBER	18450	63 35.6W	-46388	49922
NOVEMBER	18458	63 34.4W	-46387	49924
DECEMBER	18458	63 35.0W	-46371	49910
MEAN	18446	63 33.1W	-46404	49936

Preliminary Monthly Values for 1984

Observatory	H nT	D deg min	Z nT	F nT
DAVIS				
JANUARY	16640	76 18 W	-52428	55005
FEBRUARY	16521	76 17 W	-52309	54856
MARCH	16522	76 34 W	-52362	54907
APRIL	16610	76 42 W	-52357	54928
MAY	16586	76 41 W	-52400	54962
JUNE	16558	76 46 W	-52403	54957
JULY	16559	76 41 W	-52412	54966
AUGUST	16574	76 42 W	-52394	54953
SEPTEMBER	16547	76 52 W	-52351	54904
OCTOBER	16605	76 40 W	-52278	54852
NOVEMBER	16623	76 41 W	-52252	54832
DECEMBER	16631	76 47 W	-52222	54806
MEAN*	16600	76 40 W	-52350	54920

CASEY

JANUARY	9670	91 01 W	Not Available
FEBRUARY	9652	90 26 W	Not Available
MARCH	9708	90 29 W	Not Available
APRIL	9621	90 49 W	Not Available
MAY	9626	90 47 W	Not Available
JUNE	9636	90 58 W	Not Available
JULY	9607	90 51 W	Not Available
AUGUST	9602	90 58 W	Not Available
SEPTEMBER	9604	91 02 W	Not Available
OCTOBER	9589	91 03 W	Not Available
NOVEMBER	9580	90 42 W	Not Available
DECEMBER	9617	91 23 W	Not Available
MEAN*	9640	90 50 W	

(*) The annual means for Casey and Davis were obtained graphically from the periodic observations; they are better estimates than the arithmetic means.

Preliminary Annual Mean Values of the Magnetic Elements 1984

	D Deg Min	I Deg Min	H nT	X nT	Y nT	Z nT	F nT
Port Moresby	06 33.4E	-33 25.1	35941	35706	4104	-23715	43060
Charters Towers	07 41.9E	-50 17.5	31788	31501	4258	-38277	49756
Gangara	03 18.9E	-66 35.3	23273	23234	1346	-53752	58574
Canberra	12 18.2E	-66 11.2	23718	23173	5054	-53740	58742
Macquarie Island	29 03.7E	-78 46.1	12640	11049	6140	-63650	64893
Mawson	63 33.1W	-68 19.3	18446	8216	16515	-46404	49936
Davis	76 40.0W	-72 24.4	16600	3828	16153	-52350	54920
Casey	90 50.0W		9640	-140	9639		

GEOPHYSICAL OBSERVATORY REPORT VOLUME 32. NO. 12 DECEMBER 1984

R84/258(6) Cat. No. 85 1132 2