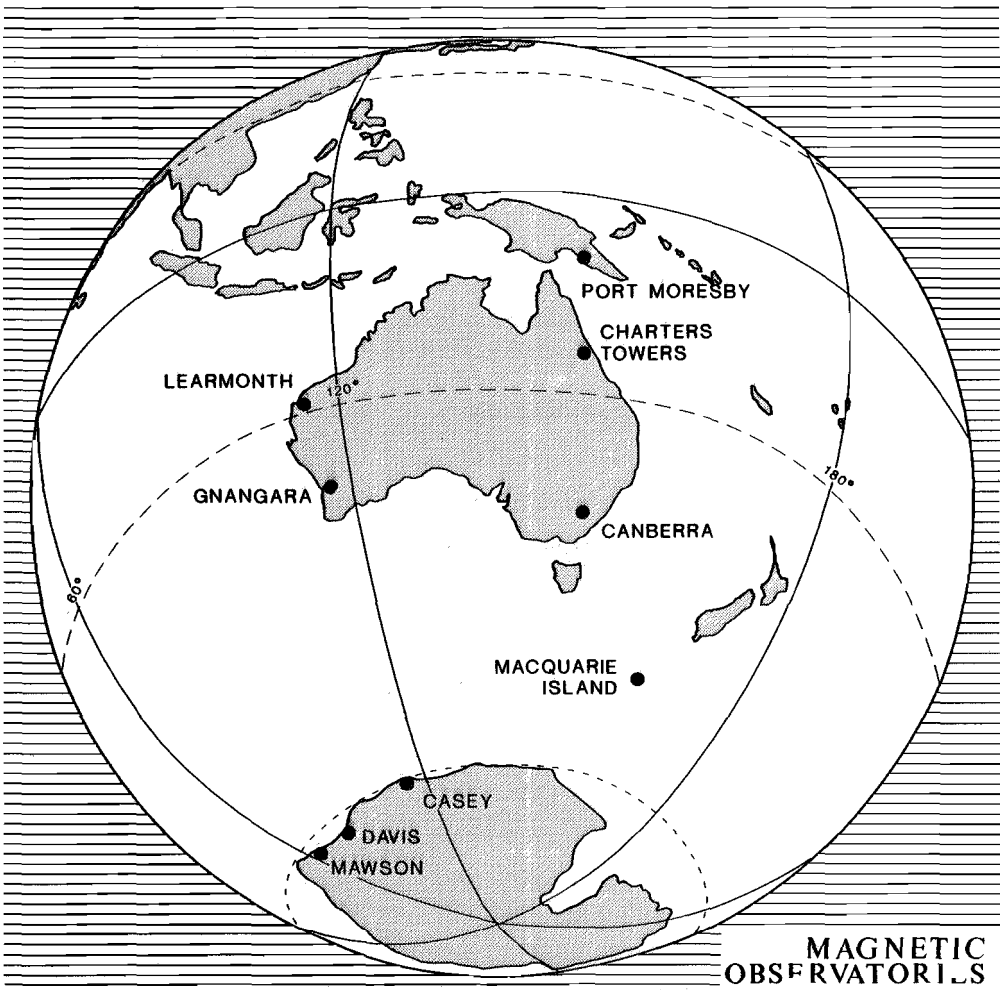
BMR PUBLICATIONS COMPACTUS (LENDING SECTION)
BUREAU OF MINERAL RESOURCES LIBRARY CANBERRA A.C.T. 2 JUL 1991

AUSTRALIA

AUSTRALIAN GEOMAGNETISM REPORT



MAGNETIC OBSERVATORIES

BMR
S550.389.5
Aus. 8
c. 2

VOLUME 39 No. 3
MARCH 1991
BUREAU OF MINERAL RESOURCES, GEOLOGY & GEOPHYSICS

DEPARTMENT OF PRIMARY INDUSTRIES AND ENERGY

Minister for Resources:

The Hon. Alan Griffiths MP

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

EXECUTIVE DIRECTOR:

R.W.R. Rutland AO

This report was prepared by:

Geomagnetism Section
Division of Geophysics

CHIEF OF DIVISION : D. Denham

For further Information write to:

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

BMR
GEOLOGY AND
GEOPHYSICS
AUSTRALIA

Published for the B.M.R.G. & G. by the
Australian Government Publishing Service

ISSN 1035-1515

©Commonwealth of Australia 1991

CONTENTS

Page

Contributing Observatories & Instrumentation ... 4

K-Indices 5

Principal Magnetic Storms 9

Preliminary Monthly Mean Values 10

International Quiet & Disturbed Days 10

Sudden Storm Commencements and
Solar Flare Effects 11

~~~~~~~~~~~*****~~~~~~~~~~~

The observers at Casey, Davis and Macquarie Island are officers of the Antarctic Division, The Department of the Arts, Sport, the Environment, Tourism and Territories. 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 the International Association of Geomagnetism and Aeronomy (IAGA). The unit of field intensity is the nanoTesla (nT). All times are in Universal Time (UT).
~~~~~~~~~~~

CONTRIBUTING OBSERVATORIES

OBSERVATORY	OBSERVER IN CHARGE	GEOGRAPHIC LAT.	GEOGRAPHIC LONG.	GEOMAGNETIC* LAT.	GEOMAGNETIC* LONG.
PORT MORESBY	I.D.Ripper	9° 25´S	147° 09´E	-18.1°	219.8°
CHARTERS TOWERS	J.M.Millican	20° 05´S	146° 15´E	-28.7°	220.3°
LEARMONTH	M.W.McMullan	22° 13´S	114° 06´E	-33.2°	185.5°
GNANGARA	P.J.Gregson	31° 47´S	115° 57´E	-42.7°	188.0°
CANBERRA	P.A.Hopgood	35° 19´S	149° 22´E	-43.3°	226.6°
MACQUARIE IS.	P.Barnaart	54° 30´S	158° 57´E	-60.4°	244.7°
MAWSON	M.A.DeDeuge	67° 36´S	62° 53´E	-73.2°	106.3°
DAVIS	L. Symons	68° 35´S	77° 58´E	-76.8°	124.0°
CASEY	P.Roberts	66° 17´S	110° 32´E	-77.3°	182.7°

* Geomagnetic co-ordinates based on the 1980 DGRF Geomagnetic North pole position of 78.8°N, 70.9°W

MAGNETOGRAPHS

OBSERVATORY	CODE	MODEL (TYPE/RES.)	ELEMENT/SCALE-VALUE		
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 IS.	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 = digital, 1 minute readings, 1 nT resolution
D/.1 = digital, 1 minute 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, proton vector magnetometers 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 - MARCH 1991

Range for lower limit of K=9 is 300nT

DAY	K-INDICES								K-SUM
01	3	2	2	2	3	2	2	3	19
02	3	2	2	2	3	2	2	1	17
03	2	2	3	2	1	1	2	2	15
04	2	2	2	1	1	3	3	3	17
05	2	3	4	5	4	4	2	3	27
06	3	3	4	4	4	4	3	3	28
07	3	2	3	2	4	4	4	4	26
08	4	3	3	4	3	3	3	3	26
09	3	3	4	4	4	2	3	4	27
10	3	4	3	3	3	3	2	1	22
11	1	1	2	2	2	1	1	2	12
12	1	2	3	2	2	3	3	4	20
13	4	5	4	3	2	4	1	1	24
14	2	2	3	3	1	1	1	1	14
15	2	1	2	2	3	2	1	1	14
16	1	1	2	1	1	3	4	2	15
17	3	3	1	3	2	1	3	3	19
18	3	2	3	3	1	1	1	1	15
19	1	2	2	2	2	3	3	3	18
20	-	4	2	3	-	-	-	-	--
21	2	2	4	4	6	3	3	3	27
22	3	3	3	3	3	2	3	2	22
23	4	3	2	3	2	1	1	2	18
24	4	8	6	6	4	3	6	6	43
25	4	7	3	3	5	4	3	4	33
26	6	6	6	5	7	6	4	3	43
27	3	4	4	3	3	3	3	3	26
28	3	3	2	3	3	3	3	1	21
29	2	2	2	2	0	0	0	1	09
30	2	3	3	4	3	4	3	3	25
31	2	2	3	2	2	1	1	3	16

Mean of K-Sum is 21.9

Frequency of K-Indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	3	37	64	86	37	4	9	2	1	0	5

GNANGARA

MAGNETIC K-INDICES - MARCH 1991

Range for lower limit of K=9 is 450nT

DAY	K-INDICES								K-SUM
01	4	3	2	2	3	3	3	5	25
02	3	2	2	2	3	2	3	1	18
03	3	1	2	1	1	1	3	3	15
04	2	1	1	2	0	2	3	3	14
05	3	2	4	4	4	4	3	2	26
06	3	3	3	3	4	4	3	2	25
07	3	2	3	3	5	3	4	4	27
08	4	3	2	3	2	4	3	3	24
09	4	3	3	4	5	3	2	3	27
10	5	4	3	3	2	3	1	1	22
11	1	1	1	2	2	1	1	2	11
12	2	2	3	2	2	3	4	3	21
13	5	3	4	2	2	3	2	1	22
14	3	2	3	2	1	1	1	2	15
15	2	1	1	1	2	2	1	1	11
16	3	0	0	1	1	3	4	2	14
17	4	3	2	2	2	2	2	3	20
18	3	3	3	2	1	1	0	1	14
19	2	2	3	3	3	3	4	3	23
20	3	3	3	2	2	2	1	2	18
21	2	2	3	3	6	3	2	3	24
22	3	3	3	3	3	2	3	4	24
23	2	2	2	3	1	2	2	2	16
24	4	8	6	5	5	4	6	8	46
25	6	6	4	4	7	5	4	5	41
26	6	6	5	5	7	6	4	5	44
27	3	5	4	3	4	5	4	4	32
28	3	3	3	3	3	4	4	3	26
29	1	1	2	1	0	1	0	3	09
30	1	4	2	4	3	3	3	5	25
31	3	2	2	2	0	0	1	4	14

Mean of K-Sum is 22.4

Frequency of K-Indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	8	36	62	80	35	15	8	2	2	0	0

CANBERRA

MAGNETIC K-INDICES - MARCH 1991

Range for lower limit of K=9 is 450nT

DAY	K-INDICES								K-SUM
01	2	2	2	2	3	2	3	3	19
02	2	3	3	1	2	2	3	1	17
03	2	0	2	1	0	0	1	2	08
04	1	0	0	1	1	2	3	2	10
05	1	2	4	4	3	4	2	3	23
06	3	3	3	3	2	4	3	3	24
07	3	2	4	4	4	3	3	4	27
08	3	2	2	3	2	3	2	2	19
09	3	2	2	4	4	2	2	4	23
10	2	3	1	3	2	3	1	0	15
11	0	0	1	1	2	1	1	2	08
12	1	3	3	2	2	3	3	5	22
13	5	5	4	2	2	3	1	0	22
14	1	1	2	2	0	0	1	0	07
15	1	0	0	1	2	2	0	1	07
16	2	0	0	1	0	2	3	2	10
17	3	3	3	3	2	1	3	3	21
18	3	3	2	2	0	0	0	0	10
19	2	3	2	2	2	3	4	1	19
20	2	4	2	2	2	1	1	1	15
21	1	2	3	3	5	1	2	2	19
22	3	4	3	3	3	2	1	4	23
23	3	3	1	3	1	0	1	2	14
24	2	7	6	6	4	4	6	7	42
25	5	7	3	4	6	4	4	5	38
26	5	6	6	5	7	5	4	4	42
27	3	4	4	3	4	4	4	4	30
28	3	4	3	3	3	5	5	1	27
29	1	1	1	0	0	0	0	2	05
30	0	2	3	4	4	4	3	5	25
31	1	2	2	2	0	0	0	3	10

Mean of K-Sum is 19.4

Frequency of K-Indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	31	39	63	60	33	12	6	4	0	0	0

MAWSON

MAGNETIC K-INDICES - MARCH 1991

Range for lower limit of K=9 is 1500nT

DAY	K-INDICES								K-SUM
01	5	5	5	3	3	3	5	5	34
02	5	6	4	3	3	3	4	3	31
03	4	3	3	2	2	1	4	5	24
04	4	5	3	2	2	2	5	5	28
05	5	6	5	6	3	4	3	3	35
06	3	4	6	5	3	6	6	4	37
07	6	4	5	4	3	5	6	5	38
08	5	5	4	3	4	4	5	5	35
09	5	6	5	5	4	4	3	6	38
10	5	6	4	4	3	3	2	1	28
11	2	2	2	2	3	2	1	4	18
12	4	5	5	4	4	4	6	5	37
13	7	6	6	3	2	3	2	1	30
14	4	5	3	3	2	1	1	1	20
15	3	2	2	3	3	3	0	0	16
16	1	5	2	2	1	3	5	2	21
17	4	6	5	3	1	1	5	6	31
18	6	6	4	3	1	1	0	1	22
19	1	5	4	3	4	4	5	4	30
20	4	5	5	4	2	1	3	2	26
21	3	2	4	3	5	3	3	5	28
22	4	4	4	4	3	2	3	5	29
23	4	5	3	4	3	3	3	3	28
24	4	9	8	6	5	6	6	9	53
25	5	7	5	5	5	6	6	6	45
26	6	6	7	6	6	4	5	5	45
27	5	6	6	4	6	5	6	5	43
28	5	6	5	5	4	5	4	2	36
29	2	3	2	1	1	1	1	4	15
30	4	6	6	5	6	4	6	6	43
31	5	5	4	4	1	1	1	3	24

Mean of K-Sum is 31.2

Frequency of K-Indices

K :	0	1	2	3	4	5	6	7	8	9	-
f :	3	23	26	47	48	57	38	3	1	2	0

PRINCIPAL MAGNETIC STORMS - MARCH 1991

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	13	00	..	...	..	..	..	13(2)	5	6	110	60	13	10
	21	06	00	ssc*	+0.8*	+24*	+23*	21(5)	6	5	160	90	21	16
	24	03	42	ssc*	-0.9*	+120	+61	24(2)	8	13	500	220	27	00
Gnangara	24	03	41	ssc*	-22*	-100	-84*	24(2,8)	8	60	430	390	28	18
Canberra	12	19	..	...	..	..	..	12(8);13(1,2)	5	12.7	129	27	13	13
	24	03	42	ssc*	-9.0	+50*	+10	24(2,8);25(2); 26(5)	7	47.0	494	145	26	18

MARCH 1991

PRELIMINARY MONTHLY MEAN VALUES

OBSERVATORY	H	D		Z	F
	nT	deg	min	nT	nT
PORT MORESBY	35915	06°	35.7′ E	-23698	43029
CHARTERS TOWERS	31731	07°	47.3′ E	-38249	49698
LEARMONTH	29518	00°	27.2′ W	-44426	53339
GNANGARA	23172	03°	02.9′ W	-53788	58567
CANBERRA	23638	12°	31.4′ E	-53650	58626
MACQUARIE IS.	12582	29°	45.7′ E	-63501	64735
MAWSON	18491	64°	27.3′ W	-45971	49551
DAVIS	16674	77°	26.7′ W	-51950	54560
CASEY	9662	92°	07.0′ W	-63884	64611

The values are derived from magnetograms over the Quietest 5 International Days, except at Mawson, Davis and Casey, where the locally quietest days are used.

INTERNATIONAL QUIET AND DISTURBED DAYS

Quietest days (1- 5):	29	11	15	03	14
Quietest days (6-10):	16	18	04	31	02
Most Disturbed days :	24	25	26	27	30

SUDDEN STORM COMMENCEMENTS (ssc): MARCH 1991

Observatory	Day	Type and Quality	U.T.	Sense and Amplitude of Chief Movement H(nT)	D(nT)	Z(nT)
PORT MORESBY	09	ssc*B	2245	+29	-19*	+16
	21	ssc*B	0600	+24	+8*	+23*
	24	ssc*B	0342	+120	-9*	+61
GNANGARA	24	ssc*A	0341	-100	-160*	-84*
CANBERRA	09	ssc*B	2245	-39*	-37*	+12*
	21	ssc*B	0600	+30*	+5	+2
	24	ssc*A	0342	+50*	-61	+10

SOLAR FLARE EFFECTS (sfe): MARCH 1991

Observatory	------ U.T. of sfe -----				Con-firmed.	Sense & Amplitude		
	Day	Began	Max.	Ended		H(nT)	D(nT)	Z(nT)
PORT MORESBY	16	0045	0050	0110		+19	-1	+15
	19	0157	0159	0215		+17	-2	+8
	22	2243	2245	2304		+25	-37	+20
GNANGARA	Nil	sfe's	reported					
CANBERRA	05	0500	0509	0525	*	+5	+10	0
	16	0045	0051	0100	*	-18	-7	+3
	19	0156	0158	0207	*	-6	-3	0
	22	2243	2245	2315	*	-17	-38	+8