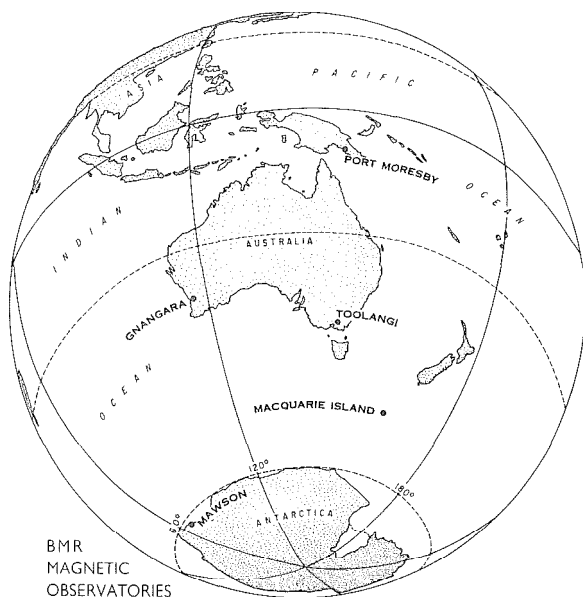




BUREAU OF MINERAL RESOURCES,
GEOLOG. & G_OPHY_CICS

GEOPHYSICAL OBSERVATORY REPORT



Volume 18, No. 12
December 1970

*Issued under the authority of
The Hon. Reginald W. Swartz, Minister for National Development*

COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

MINISTER: Hon. Reginald W. Swartz

SECRETARY: L.F. Bott

BUREAU OF MINERAL RESOURCES, GEOLOGY & GEOPHYSICS

DIRECTOR: N.H. Fisher

THIS REPORT WAS PREPARED IN THE GEOPHYSICAL BRANCH

ASSISTANT DIRECTOR: L.S. Prior

SUPERVISING GEOPHYSICIST: P.M. McGregor

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The terminology used in this report is that accepted by international convention. All times are in Universal Time. Should further information be required, explanation can be obtained by applying to:-

Assistant Director (Geophysics),
Bureau of Mineral Resources,
P.O. Box 378,
CANBERRA CITY. A.C.T. 2601.

CONTRIBUTING OBSERVATORIES

OBSERVATORY	OBSERVER IN CHARGE	GEOGRAPHIC		GEOMAGNETIC	
		LAT.	LONG.	LAT.	LONG.
GNANGARA	<i>P. J. Gregson</i>	31°47'S	115°57'E	-43.2°	185.8°
MACQUARIE I.	<i>J.R. Meath</i>	54°30'S	158°57'E	-60.7°	243.0°
MAWSON	<i>M. J. Robertson</i>	67°36'S	62°53'E	-73.2°	103.1°
PORT MORESBY	<i>I.B. Everingham</i>	9°25'S	147°09'E	-18.7°	218.0°
TOOLANGI	<i>C.A. van der Waal</i>	37°32'S	145°28'E	-46.7°	220.8°

MAGNETOGRAPHS

OBSERVATORY	TYPE	NOMINAL SCALE VALUES								
		NORMAL			SENSITIVE			RAPID RUN		
		D	H	Z	D	H	Z	D	H	Z
GNANGARA	<i>Eschenhagen</i>	1	2½	5½						
MACQUARIE I.	<i>La Cour</i>	2½	24	21				1	5½	6
MAWSON	<i>La Cour</i>	2½	21	22	1	10	10			
PORT MORESBY	<i>La Cour</i>	½	2½	3½				0.05	1½	½
TOOLANGI	<i>La Cour</i>	1	4½	5						

Scale values are in minutes of arc/mm (D) and gammas/mm (H,Z)

MAGNETOMETERS

*Absolute data are based on control observations made with QHM's, BMZ's, Askania Declinometers and Proton Precession Magnetometers.
Errors in preliminary values are not likely to exceed ±5 γ or 0.5 minutes.*

G N A N G A R A

MAGNETIC K-INDICES - DECEMBER 1970

Range for lower limit of K=9 is 350 gammas

<u>Day</u>	<u>K-Indices</u>								<u>K-Sum</u>	<u>C</u>
1	0	0	0	1	0	0	0	1	02	0
2	2	1	0	0	2	2	3	2	12	0
3	2	1	1	1	1	2	1	2	11	0
4	2	0	1	2	1	1	2	2	11	0
5	2	2	2	2	2	3	1	2	16	0
6	2	1	2	2	3	2	1	2	15	0
7	2	1	1	2	2	1	3	4	16	1
8	4	3	3	3	4	2	2	2	23	1
9	2	1	1	2	1	1	0	1	09	0
10	1	1	1	1	2	2	1	1	10	0
11	0	1	1	1	0	0	1	0	04	0
12	1	1	0	2	2	0	1	1	08	0
13	3	1	0	1	0	2	2	2	11	0
14	4	4	6	6	4	3	5	5	37	2
15	5	1	2	4	3	1	1	1	18	1
16	1	0	1	1	0	2	0	1	06	0
17	1	1	0	1	1	0	1	0	05	0
18	1	0	1	0	0	1	0	2	05	0
19	2	2	1	3	1	2	3	4	18	1
20	2	3	3	2	1	0	1	1	13	0
21	1	1	1	2	0	0	1	2	08	0
22	1	0	1	1	2	1	1	2	09	0
23	2	1	2	2	2	2	1	1	13	0
24	4	3	2	2	3	2	3	2	21	1
25	1	1	1	1	2	3	3	3	15	0
26	2	1	1	1	0	1	2	2	10	0
27	2	2	2	2	3	3	3	4	21	1
28	3	4	2	2	2	4	5	2	24	1
29	2	2	2	1	2	3	3	3	18	1
30	3	3	2	2	2	4	1	2	19	1
31	1	1	0	1	2	1	1	2	09	0

M A C Q U A R I E I S L A N D

MAGNETIC K-INDICES - DECEMBER 1970

Range for lower limit of K=9 is 1500 gammas

<u>Day</u>					<u>K-Indices</u>				<u>K-Sum</u>	<u>C</u>
1	2	2	1	0	0	1	1	2	9	0
2	2	1	1	0	1	1	2	2	10	0
3	2	2	3	1	2	-	-	-	-	-
4	2	2	2	1	1	1	2	2	13	0
5	2	3	4	2	3	5	1	1	21	1
6	2	2	4	4	6	5	1	1	25	1
7	2	2	3	2	3	1	4+	-	-	-
8	5	5	6	4	6	2	2+	1+	31+	1
9	2	3	3	4	1	0	-	2+	-	-
10	-	-	1	3	3	2	1	2	-	-
11	2	1	1	1	0	1	1	1	8	0
12	2	2	1	4	4	0	1	2	16	0
13	2	2	1	2	0	1	1	2	11	0
14	3	7	7	6	4	5	6	5	43	2
15	4	4	4	5	5+	5+	2	1	30+	1
16	2	2	2	2	2	1	2	1	14	0
17	3	3	1	3	2	1	1	1	15	0
18	2	2	2	0	1	1	1	2	11	0
19	3	3	3	4	0	1	2	3	19	1
20	2	3	4	4	4	1	1	0	19	1
21	2	3	2	4	2	0	1	1	15	0
22	2	3	2	3	3	2	1	2	18	0
23	2	2	3	4	3	4	1	3	22	1
24	4	5	3	3	4	4	2	2	27	1
25	2	1	1	1	1	3	2	2	13	0
26	2	3	3	2	1	2	1	2	16	0
27	-	-	2	2	5	5	2	3	-	-
28	3	4	3	5	4	6	7	2	34	2
29	3	3	3	2	3	3	3	3	23	1
30	-	-	-	2	2	5	2	2	-	-
31	2	2	1	1	0	0	1	2	9	0

M A W S O N

MAGNETIC K-INDICES - DECEMBER 1970

Range for lower limit of K=9 is 1500 gammas

<u>Day</u>	<u>K-Indices</u>				<u>K-Indices</u>				<u>K-Sum</u>	<u>C</u>
1	3	2	2	1	1	1	2	2	14	0
2	3	2	3	2	3	3	4	3	23	1
3	5	4	2	2	2	3	2	4	24	1
4	3	2	2	2	3	2	4	4	22	1
5	4	4	3	3	4	4	2	2	26	1
6	4	3	3	3	5	4	4	4	30	1
7	4	4	3	3	4	3	3	4	28	1
8	6	6	4	5	5	3	4	4	37	2
9	3	4	3	4	4	3	2	3	26	1
10	3	3	2	3	3	2	4	3	23	1
11	3	2	2	2	2	2	2	2	17	0
12	4	3	2	3	4	2	2	3	23	1
13	4	4	3	2	1	3	3	4	24	1
14	6	7	7	7	5	3	7	6	48	2
15	4	4	4	4	5	3	3	4	31	1
16	4	5	4	2	1	3	3	4	26	1
17	3	4	3	2	2	2	2	3	21	1
18	2	2	3	2	2	1	1	2	15	0
19	3	3	3	3	2	2	3	4	23	1
20	4	4	3	4	3	2	2	2	24	1
21	5	3	4	2	2	1	2	4	23	1
22	4	4	5	3	2	2	4	4	28	1
23	4	4	3	3	4	3	2	3	26	1
24	7	7	4	3	4	3	4	4	36	2
25	3	2	3	2	3	3	4	3	23	1
26	4	4	4	2	2	3	2	3	24	1
27	3	5	3	3	4	4	4	5	31	1
28	4	6	4	3	4	5	5	4	35	2
29	4	4	4	3	3	4	4	6	32	1
30	5	5	3	2	2	4	3	3	27	1
31	3	3	2	2	3	3	2	2	20	1

P O R T M O R E S B Y

MAGNETIC K-INDICES - DECEMBER 1970

Range for lower limit of K=9 is 300 gammas

<u>Day</u>					<u>K-Indices</u>				<u>K-Sum</u>	<u>C</u>
1	0	0	1	1	0	0	0	0	02	0
2	1	0	0	1	3	3	3	1	12	0
3	1	0	1	0	0	0	1	1	04	0
4	0	0	1	2	2	1	2	2	10	0
5	1	2	2	3	3	3	1	1	16	0
6	2	0	2	3	3	2	1	0	13	0
7	1	0	0	1	2	1	3	3	11	0
8	2	3	3	3	4	1	2	1	19	1
9	1	0	1	2	1	1	1	1	08	0
10	0	0	1	1	3	1	0	0	06	0
11	0	1	0	0	0	0	1	1	03	0
12	1	0	1	1	2	0	1	1	07	0
13	2	0	0	0	0	1	1	3	07	0
14	4	4	7	5	4	4	4	5	37	2
15	3	1	2	1	2	2	1	2	14	0
16	1	0	0	1	1	1	1	1	06	0
17	1	0	0	1	0	0	0	0	02	0
18	1	1	0	0	0	0	0	3	05	0
19	-	-	-	-	-	-	-	-	-	-
20	4	3	2	1	2	0	1	0	13	0
21	1	0	0	1	0	0	1	0	03	0
22	0	1	0	1	1	0	2	2	07	0
23	2	2	1	2	3	2	2	2	16	0
24	2	1	2	1	3	2	1	1	13	0
25	1	0	0	1	2	2	3	1	10	0
26	0	1	1	1	0	1	1	1	06	0
27	1	1	1	1	3	3	1	2	13	0
28	3	3	1	2	2	2	3	2	18	0
29	1	1	2	1	1	3	3	4	16	0
30	3	3	2	1	1	3	2	2	17	0
31	1	1	0	2	1	0	1	2	08	0

T O O L A N G I

MAGNETIC K-INDICES - DECEMBER 1970

Range for lower limit of K=9 is 500 gammas

<u>Day</u>	<u>K-Indices</u>								<u>K-Sum</u>	<u>C</u>
1	0	0	0	1	1	0	0	0	2	0
2	1	0	1	0	3	3	3	2	13	0
3	-	-	3	2	1	1	1	2	-	-
4	-	-	2	2	2	1	3	3	-	-
5	2	3	3	3	3	4	1	2	21	1
6	2	2	4	3	3	3	1	1	19	1
7	1	1	2	2	2	2	2	3	15	0
8	3	4	4	3	3	1	3	1	22	1
9	1	1	3	3	2	1	1	1	13	0
10	1	1	2	2	2	2	1	1	12	0
11	0	2	2	1	1	0	1	1	8	0
12	0	1	1	1	2	1	1	2	9	0
13	2	2	3	1	0	1	1	3	13	0
14	3	4	7	6	4	3	4	5	36	2
15	2	1	3	3	3	2	1	1	16	0
16	1	1	1	1	1	2	1	1	9	0
17	-	1	0	2	2	1	1	0	-	-
18	0	0	2	1	1	1	0	3	8	0
19	2	2	3	3	1	2	3	4	20	1
20	3	4	4	3	2	1	1	1	19	1
21	1	1	2	2	1	0	1	2	10	0
22	2	2	2	1	2	1	1	2	13	0
23	2	2	3	2	2	2	1	3	17	0
24	2	2	3	1	3	3	2	1	17	0
25	2	2	1	1	2	2	3	2	15	0
26	1	1	2	1	1	1	1	1	9	0
27	1	2	2	2	3	3	2	3	18	1
28	2	3	2	3	3	3	4	3	23	1
29	2	2	3	2	2	3	3	4	21	1
30	2	3	3	2	1	4	2	2	19	1
31	1	2	2	2	2	0	1	2	12	0

DECEMBER 1970
PRINCIPAL MAGNETIC STORMS

Observatory	Storm - time				Sudden commencement				Degree of activity	Maximal activity on K - scale 0 to 9			Ranges			
	Begin			End		Type	Amplitudes			Day	3 - hour period	K	D	H	Z	
							D	H								Z
	d	h	m	d	h		γ	γ					γ	γ	γ	
GNANGARA	14	0153	1515	ssc	-5	+14	-16	ms	14	3,4	6	26	180	260		
PORT MORESBY	14	0154	1504	ssc	-0.5	+40	+36	ms	14	3	7	9	310	150		
TOOLANGI	14	0154	1517	ssc	-4.2	+22	+6	ms	14	3	7	27	270	180		

DECEMBER 1970

PRELIMINARY MONTHLY MEAN VALUES

Based on selected quiet days

OBSERVATORY	H	D	Z
	γ	$^{\circ}$,	γ
GNANGARA	23782	03 01.3W	-53474
MACQUARIE I.	12989	27 11.2E	-64064
MAWSON	18374	62 02.3W	-47782
PORT MORESBY	36188	06 13.4E	-23176
TOOLANGI	22356	10 40.1E	-56339

SUDDEN COMMENCEMENTS AND OTHER PHENOMENA

OBSERVATORY	DAY	TIME	TYPE	SENSE OF MOVEMENT	
				H	D
GNANGARA	02	1438	ssc B	+	+
	14	0153	ssc A	+	-
	24	1427	s1 B	+	-
	29	1530	ssc B	+	+
PORT MORESBY	02	1438	ssc B	+	+
	14	0154	ssc A	+	-
	18	2144	ssc* B	+	-*
	24	1428	bps B	+	+
	29	1530	ssc B	+	0
TOOLANGI	02	1437	s1 B	+	-
	05	1455	bp A	+	-
	14	0154	ssc B	+	-
	24	1427	bp A	+	+
	29	1529	s1 B	+	0
	30	1630	bp B	+	+

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SOLAR FLARE EFFECTS

Observatory	Day	Time			Amp H	(Gammas)	
		Begin	Max.	End		D	Z
Gnangara	11	1028	1032	1035	-2	-7	-5
	12	0903	0905	0910	+5	-5	-2
	26	0839	0841	0842	-2	-4	-3
Port Moresby	08	0426	0431	0435	+6	+1	+6

PRELIMINARY MONTHLY MEAN VALUES

Based on selected quiet days

OBSERVATORY	H γ	D ° ' "	Z γ
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GNANGARA

JANUARY	23801	2 58.8	-53484*
FEBRUARY	23808	2 58.9	-53477
MARCH	23791	2 59.1	-53483
APRIL	23786	2 58.9	-53481
MAY	23793	2 59.7	-53474
JUNE	23783	2 59.1	-53481
JULY	23781	2 59.8	-53474
AUGUST	23771	2 59.8	-53469
SEPTEMBER	23779	2 59.9	-53470
OCTOBER	23784	3 00.2	-53466
NOVEMBER	23780	3 00.4	-53472
DECEMBER	23782	3 01.3	-53474
MEAN 1970	23786	2 59.7	-53475

* correction to previously published value

MACQUARIE I.

JANUARY	13016	27 05.8	-64077
FEBRUARY	13008	27 06.8	-64074
MARCH	12999	27 09.1	-64091
APRIL	12993	27 09.3	-64084
MAY	13002	27 09.5	-64098
JUNE	12994	27 10.0	-64083
JULY	12989	27 10.2	-64080
AUGUST	12992	27 10.2	-64083
SEPTEMBER	12990	27 11.3	-64069
OCTOBER	12994	27 11.0	-64066
NOVEMBER	12992	27 10.7	-64066
DECEMBER	12989	27 11.2	-64064
MEAN 1970	12996	27 09.6	-64078

PRELIMINARY MONTHLY MEAN VALUES

Based on selected quiet days

OBSERVATORY	H γ	D ° ,	Z γ
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MAWSON

JANUARY	18348	61 56.0	-47889
FEBRUARY	18365	61 57.0	-47873
MARCH	18353	61 58.9	-47884
APRIL	18359	61 59.2	-47886
MAY	18355	62 00.0	-47846
JUNE	18355	62 00.3	-47835
JULY	18338	62 02.9	-47834
AUGUST	18351	62 02.1	-47829
SEPTEMBER	18358	62 03.3	-47809
OCTOBER	18364	62 01.6	-47808
NOVEMBER	18381	62 02.0	-47800
DECEMBER	18374	62 02.3	-47782
MEAN 1970	18358	62 00.5	-47840

PORT MORESBY

JANUARY	36228	6 12.6	-23146
FEBRUARY	36223	6 12.7	-23147
MARCH	36206	6 12.6	-23152
APRIL	36196	6 13.0	-23154
MAY	36201	6 13.1	-23156
JUNE	36196	6 13.2	-23158
JULY	36194	6 13.3	-23162
AUGUST	36190	6 13.2	-23163
SEPTEMBER	36191	6 13.4	-23163
OCTOBER	36196	6 13.1	-23166
NOVEMBER	36196	6 13.3	-23171
DECEMBER	36188	6 13.4	-23176
MEAN 1970	36200	6 13.1	-23160

PRELIMINARY MONTHLY MEAN VALUES

Based on selected quiet days

OBSERVATORY	H γ	D ° ,	Z γ
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TOOLANGI

JANUARY	22392	10 39.0	-56341
FEBRUARY	22390	10 39.0	-56333
MARCH	22377	10 39.6	-56338
APRIL	22374	10 40.2	-56341
MAY	22377	10 40.0	-56340
JUNE	22371	10 40.1	-56348
JULY	22367	10 40.1	-56350
AUGUST	22365	10 40.2	-56342
SEPTEMBER	22365	10 40.8	-56339
OCTOBER	22366	10 40.2	-56334
NOVEMBER	22366	10 40.0	-56330
DECEMBER	22356	10 40.1	-56339
MEAN 1970	22372	10 39.9	-56339