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COMMONWEALTH OF AUSTRALIA
DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS

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GEOPHYSICAL OBSERVATORY REPORT

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DEPARTMENT OF NATIONAL DEVELOPMENT
Minister - SENATOR THE HON. W. H. SPOONER.
Secretary - H. G. RAGGATT.

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Unless otherwise stated all times are given in
Greenwich Mean Time.

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

Chief Geophysicist,
Bureau of Mineral Resources,
Geology and Geophysics,
485 Bourke Street,
Melbourne, C.1.
AUSTRALIA.

CONTRIBUTING OBSERVATORIESWATHEROO MAGNETIC OBSERVATORY

Geographic Latitude $30^{\circ}19'S$
 Geomagnetic Latitude -41.8°

Longitude $115^{\circ}53'E$
 Longitude 185.6°

Instruments

Magnetic Equipment - D.T.M. C.I.W. Magnetometer No.7.
 D.T.M. C.I.W. Earth Inductor No.2.
 Eschenhagen pattern D,H,Z, recording variometers, normal sensitivity, 20mm/hour recorder.
 La Cour pattern D,H,Z, recording variometers, normal sensitivity quick run (180mm/hour) recorder.

Ionospheric Equipment - C.S.I.R.O. pattern 1-16Mc/s
 Sweep time 2 minutes.

TOOLANGI MAGNETIC OBSERVATORY

Geographic Latitude $37^{\circ}32'S$
 Geomagnetic Latitude -46.7°

Longitude $145^{\circ}28'E$
 Longitude 220.8°

Instruments

Askania pattern Magnetometer No.508813.
 Schulze Earth Inductor No.49.
 La Cour pattern D,H,Z, recording variometers, normal sensitivity 15mm/hour recorder.

MACQUARIE ISLAND MAGNETIC OBSERVATORY

Geographic Latitude $54^{\circ}30'S$
 Geomagnetic Latitude -61°

Longitude $158^{\circ}57'E$
 Longitude 243°

Instruments

La Cour pattern QHMs Nos.177,178,179.
 La Cour pattern BMZ No.64.
 La Cour pattern D,H,Z, recording variometers low sensitivity 15mm/hour recorder.

HEARD ISLAND MAGNETIC OBSERVATORY

Geographic Latitude $53^{\circ}02'S$
 Geomagnetic Latitude -61°

Longitude $73^{\circ}22'E$
 Longitude 129°

Instruments

La Cour pattern QHMs Nos.172,173,174.
 La Cour pattern BMZ No.62.
 La Cour pattern D,H,Z, recording variometers low sensitivity 15mm/hour recorder.

MAGNETIC K-INDICES FOR MAY - WATHEROC

Range for lower limit of K=9 is 350 gammas

<u>Day</u>	<u>K Indices</u>				<u>K-Sum</u>			
1	3	1	1	2	0	1	0	08
2	3	1	0	2	1	0	0	08
3	1	1	1	0	2	0	1	07
4	1	2	1	2	0	1	0	08
5	1	3	3	3	2	1	3	18
6	4	2	4	6	5	4	3	32
7	3	4	4	4	4	2	1	23
8	3	3	4	3	2	3	4	24
9	3	4	2	4	4	3	2	25
10	1	1	2	2	3	3	1	14
11	2	2	1	2	1	1	0	09
12	2	1	1	0	0	1	0	05
13	2	2	0	1	0	0	0	05
14	2	2	1	0	0	0	0	06
15	2	3	3	2	5	5	5	31
16	5	4	4	6	6	5	5	41
17	5	4	3	1	0	2	2	19
18	2	3	3	4	3	3	2	22
19	3	3	3	6	3	2	3	26
20	3	3	4	3	2	2	3	21
21	3	2	2	2	0	3	2	15
22	2	3	1	2	2	2	5	20
23	1	2	2	3	2	1	1	13
24	1	0	0	1	2	1	3	08
25	1	1	2	1	0	3	0	08
26	0	0	2	2	0	0	2	07
27	3	3	4	5	2	3	0	21
28	2	2	1	2	2	2	1	12
29	1	1	1	0	2	1	0	06
30	2	2	2	0	0	1	0	07
31	1	1	1	2	0	1	4	11

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR MAY

WATHEROC - Declination $2^{\circ} 46.5'$ west.
 Horizontal Intensity 24841 gammas.
 Vertical Intensity -52131 gammas.

MAGNETIC K-INDICES FOR MAY - TOOLANGI

Range for lower limit of K=9 is 500 gammas

<u>Day</u>	<u>K indices</u>								<u>K-Sum</u>
1	3	2	2	2	1	1	1	2	14
2	2	1	1	2	1	1	1	1	10
3	1	2	1	2	3	2	1	2	14
4	2	1	2	3	1	1	1	2	13
5	3	3	4	3	2	1	2	3	21
6	4	3	4	5	4	3	3	3	29
7	3	4	4	4	4	3	2	2	26
8	3	3	4	3	3	3	3	3	25
9	3	4	4	5	3	2	2	3	26
10	2	3	3	3	3	3	2	1	20
11	2	2	2	3	2	2	1	2	16
12	2	2	2	1	2	2	1	1	13
13	2	2	2	2	2	1	1	1	13
14	1	2	2	1	1	1	1	1	10
15	2	3	2	3	5	5	5	5	30
16	5	4	4	5	6	4	5	5	38
17	4	4	2	2	2	2	2	3	21
18	3	4	3	4	4	2	3	3	26
19	3	3	4	6	4	2	2	3	27
20	3	3	4	3	3	1	3	2	22
21	3	3	2	3	2	3	2	3	21
22	2	3	2	2	3	3	4	3	22
23	2	2	3	3	2	1	2	1	16
24	2	2	1	2	2	1	3	1	14
25	2	1	1	2	1	3	1	2	13
26	1	2	2	3	1	1	3	2	15
27	3	4	5	5	2	3	1	2	25
28	2	2	2	2	3	3	2	2	18
29	2	1	2	2	3	1	1	2	14
30	3	2	1	2	1	2	1	2	14
31	2	1	2	2	2	2	3	1	15

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR MAY

TOOLANGI - Declination $9^{\circ} 49.0'$ east.
 Horizontal Intensity 22774 gammas.
 Vertical Intensity -56443 gammas.

MAGNETIC K-INDICES FOR MAY - MACQUARIE ISLAND

Range for lower limit of K=9 is 1500 gammas

<u>Day</u>	<u>K Indices</u>								<u>K-Surr.</u>
1	0	1	0	3	3	2	0	1	10
2	0	0	0	2	1	0	0	0	03
3	0	1	0	1	2	1	1	0	06
4	X	X	3	4	0	0	0	0	XX
5	1	2	4	4	4	1	1	2	19
6	4	3	4	7	5	4	4	4	35
7	3	5	3	6	5	4	1	1	28
8	3	4	5	5	5	4	4	2	32
9	3	4	5	6	5	5	3	2	33
10	2	1	4	4	5	3	2	1	22
11	1	2	3	4	4	1	0	0	15
12	1	1	0	1	1	0	0	0	04
13	0	1	0	2	0	1	0	0	04
14	1	0	0	1	1	0	0	1	04
15	1	1	3	2	8	7	6	5	33
16	5	6	6	7	6	8	6	5	49
17	5	4	2	1	1	3	1	2	19
18	3	3	4	5	5	2	2	3	27
19	3	3	4	7	5	3	2	3	30
20	4	4	6	5	4	2	3	2	30
21	2	3	3	5	4	3	1	1	22
22	2	2	2	2	4	3	3	3	21
23	1	X	2	4	4	2	2	1	XX
24	1	0	1	1	3	1	1	1	09
25	0	1	0	2	2	2	0	0	07
26	1	1	1	3	2	1	0	0	09
27	2	5	6	6	4	4	1	3	31
28	0	2	0	1	3	3	1	0	10
29	1	1	0	3	5	2	0	0	12
30	0	0	0	1	1	1	0	0	03
31	1	0	0	2	2	1	2	1	09

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR MAY

MACQUARIE ISLAND - Declination $24^{\circ}12.9'$ east.
Horizontal Intensity 13345 gammas.
Vertical Intensity -64539 gammas.

MAGNETIC K-INDICES FOR MAY - HEARD ISLAND

Range for lower limit of K=9 is 1000 gammas

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

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR MAY

HEARD ISLAND - Declination 50°07.6' west.
Horizontal Intensity 18473 gammas.
Vertical Intensity -47181 gammas.

PRINCIPAL MAGNETIC STORMS AT WATHEROO DURING MAY

<u>Began at</u> d h m	<u>Ended at</u> d h	<u>Intensity</u>	<u>Maximum</u> <u>K-Index</u>
06 01 40	09 20	Moderately severe	6
15 03 00	17 07	Moderately severe	6
26 17 20	22 17	Moderate	5

SUDDEN COMMENCEMENTS AT WATHEROO DURING MAY

<u>Day</u>	<u>Time</u> h m	<u>Type</u>
26	07 23	Sudden Impulse

PRINCIPAL MAGNETIC STORMS AT TOOLANGI DURING MAY

<u>Began at</u> d h m	<u>Ended at</u> d h	<u>Intensity</u>	<u>Maximum</u> <u>K-Index</u>
15 03 00	17 11	Moderately severe	6
26 07 24	27 18	Moderate	5

SUDDEN COMMENCEMENTS AT TOOLANGI DURING MAY

<u>Day</u>	<u>Time</u> h m	<u>Type</u>
25	17 50	Sudden Impulse
26	07 24	Polar Sudden Commencement

IONOSPHERIC DATA - WATHEROOMEDIAN HOURLY VALUES

120° Mean Time	<u>h'F1</u> Km	<u>h_pF2</u> Km	<u>h'F2</u> Km	<u>f_oE</u> Mc/s	<u>f_oF1</u> Mc/s	<u>f_oF2</u> Mc/s	<u>fEs</u> Mc/s	<u>MUF</u> <u>3000</u> Mc/s	<u>M3000</u>
00		310	250			3.4	2.0	10.5	3.0
01		300	250			3.4	1.4	11.2	3.1
02		290	245			3.5	1.6	11.4	3.2
03		290	240			3.6	1.4	11.7	3.2
04		270	230			3.6	*	12.3	3.4
05		260	210			3.4	*	11.4	3.4
06		265	220			2.9	*	9.5	3.3
07		250	220	1.5		3.8	*	13.6	3.5
08	200	250	230	2.1	2.9	5.2	3.0	18.9	3.6
09	200	260	245	2.5	3.7	5.8	3.3	20.5	3.5
10	200	260	250	2.8	4.1	5.9	3.6	20.2	3.4
11	200	280	270	3.0	4.2	6.1	3.8	20.5	3.3
12	200	280	270	3.0	4.3	6.4	3.9	21.0	3.3
13	200	280	270	3.0	4.2	6.0	3.8	20.4	3.3
14	200	265	260	2.9	4.1	6.4	3.8	21.2	3.4
15	210	260	250	2.7	3.8	6.5	3.7	22.4	3.4
16	220	250	230	2.4	3.4	6.2	3.5	21.6	3.5
17	220	250	210	1.8	2.3	5.3	3.0	18.8	3.5
18		250	210			4.0	3.2	13.8	3.5
19		260	210			2.9	2.8	9.8	3.3
20		280	230			2.8	2.1	9.0	3.2
21		295	230			2.9	2.0	8.8	3.1
22		320	250			3.0	2.0	9.2	3.0
23		310	250			3.2	2.1	10.0	3.1

* Insufficient values.

IONOSPHERIC DATA - WATHEROOSUMMARY SPORADIC E

120° Mean Time	<u>Percentage of time above</u>			Median in Mc/s	No. of Obs.
	7 Mc/s	5 Mc/s	3 Mc/s		
00	-	-	17	2.0	29
01	-	-	14	1.4	28
02	-	-	18	1.6	28
03	-	-	21	1.4	28
04	-	-	7	+	28
05	-	-	15	+	27
06	-	-	19	+	26
07	-	-	11	+	27
08	-	-	57	3.0	28
09	-	(7)	(85)	3.3	27(1G)
10	-	(12)	(92)	3.6	26(1G)
11	-	(4)	(93)	3.8	28(2G)
12	-	(14)	(93)	3.9	29(2G)
13	-	(15)	(96)	3.8	27(1G)
14	4	11	100	3.8	27
15	-	11	96	3.7	27
16	-	11	82	3.5	28
17	-	7	59	3.0	29
18	-	-	62	3.2	26
19	-	-	41	2.8	27
20	-	-	32	2.1	25
21	-	-	26	2.0	27
22	-	-	32	2.0	28
23	-	-	21	2.1	29

G Signifies $fEs < f_oE \leq 3.0$ Mc/s.

+ Indicates fEs median below lowest frequency recorded.

- Indicates zero percentage.

PROVISIONAL SUMMARY OF AURORAE FOR MAY

Reported by and published through the courtesy
of the Australian National Antarctic Research
Expedition at Macquarie Island.

<u>Day</u>	<u>Cloud Cover</u>	<u>First Seen</u>	<u>Time of Maximum</u>	<u>Last Seen</u>	<u>Time End</u>	<u>Intensity</u>	<u>Remarks</u>
		h m	h m	h m	h m		
04	8	unknown	unknown	10 20	unknown	2	
05	2	08 00	09 00		11 30	3	
07	8	unknown	11 15	14 00	unknown	3	
08	8	07 45	unknown	10 00	unknown	2	
10	8	08 00	10 15		15 20	4	Additional maximum at 13h 45m.
11	8	07 15	unknown		14 30	4	Additional maximum at 12h 45m.
14	8	08 45	09 15	10 00	unknown	1	
15	8	09 00	09 15	20 00	unknown	3	Additional maximum at 15h 00m, 19h 30m.
21	2	08 30	10 30	15 50	unknown	2	Additional maximum at 15h 15m.
27	8	06 30	09 40	15 30	unknown	4	Additional maximum at time unknown.
29	8	13 30	unknown	13 30	unknown	1	