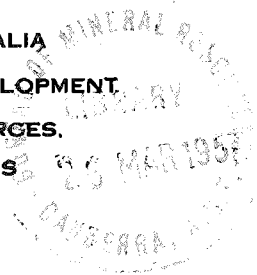


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**COMMONWEALTH OF AUSTRALIA
DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES,
GEOLOGY AND GEOPHYSICS**



GEOPHYSICAL OBSERVATORY REPORT

VOL. 4

No. 11

NOVEMBER

1956

*Issued under the authority of Senator The Hon. W. H. Spooner,
Minister for National Development*

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DEPARTMENT OF NATIONAL DEVELOPMENT

Minister - SENATOR The HON. W. H. SPOONER

Secretary - H. G. RAGGATT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

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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 A.F. TILLOTT, Observer-in-Charge.

Geographic Latitude 30°19'S Longitude 115°53'E
 Geomagnetic Latitude -41.8° Longitude 185.6°

Instruments

Magnetic Equipment - Askania pattern Magnetometer No.508810.
 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 1-16 Mc/s
 Sweeptime 2 minutes.

TOOLANGI MAGNETIC OBSERVATORY I.B. EVERINGHAM, Observer-in-Charge.

Geographic Latitude 37°32'S Longitude 145°28'E
 Geomagnetic Latitude -46.7° Longitude 220.8°

Instruments

Ruska pattern Magnetometer No.4813.
 La Cour pattern QHMs Nos.288,289,290.
 Schulze Earth Inductor No.49.
 La Cour pattern BMZ No.119.
 La Cour pattern D,H,Z, recording variometers, normal sensitivity 15mm/hour recorder.

MACQUARIE ISLAND MAGNETIC OBSERVATORY J.R. CLEARY,
Observer-in-Charge.

Geographic Latitude 54°30'S Longitude 158°57'E
 Geomagnetic Latitude -61° 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.

MAWSON MAGNETIC OBSERVATORY P.M. MCGREGOR, Observer-in-Charge.

Geographic Latitude 67°35.7'S Longitude 62°54.0'E
 Geomagnetic Latitude -73.1° Longitude 103.4°

Instruments

La Cour pattern QHMs Nos.300,301,302.
 La Cour pattern BMZ No.115.
 La Cour pattern D,H,Z, recording variometers low sensitivity 15mm/hour recorder.

MAGNETIC K-INDICES FOR NOVEMBER - WATHEROO

Range for lower limit of K=9 is 350 gammas

<u>Day</u>	<u>K-Indices</u>								<u>K-Sum</u>
1	3	3	2	1	4	3	1	2	19
2	2	2	2	2	2	3	2	4	19
3	4	4	2	3	3	2	2	3	23
4	3	2	2	2	0	2	1	2	14
5	1	1	1	1	0	0	0	1	05
6	1	2	2	2	1	3	2	3	16
7	2	1	1	1	1	1	1	1	09
8	2	2	1	0	1	1	1	1	09
9	1	1	2	1	1	3	4	5	18
10	6	4	4	3	5	4	5	5	36
11	5	5	4	5	5	3	5	7	39
12	5	3	5	4	6	6	4	4	37
13	3	3	2	1	2	1	1	2	15
14	4	4	3	4	2	4	5	5	31
15	5	4	5	6	5	4	5	4	38
16	4	5	5	5	3	3	4	5	34
17	3	3	3	3	3	4	3	2	24
18	4	3	3	2	2	2	2	1	19
19	3	2	3	2	2	1	1	2	16
20	4	1	2	2	4	4	3	4	24
21	3	3	4	3	4	2	3	4	26
22	3	3	3	2	4	3	4	5	27
23	5	2	3	3	4	4	2	1	24
24	3	2	1	2	4	3	3	3	21
25	2	2	2	3	7	4	3	2	25
26	4	3	2	2	1	1	1	2	16
27	4	3	4	3	2	1	3	5	25
28	5	3	4	3	2	3	3	3	26
29	4	4	3	3	1	3	4	4	26
30	5	4	3	2	2	2	2	4	24

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR NOVEMBER

WATHEROO - Declination $2^{\circ} 43.5'$ west.
 Horizontal Intensity 24845 gammas.
 Vertical Intensity -52230 gammas.

MAGNETIC K-INDICES FOR NOVEMBER - TOOLANGI

Range for lower limit of K=9 is 500 gammas

<u>Day</u>	<u>K-Indices</u>								<u>K-Sum</u>
1	4	3	3	1	4	4	3	2	24
2	4	4	2	3	3	3	3	4	26
3	4	4	3	4	3	2	3	3	26
4	3	3	2	2	2	2	3	3	20
5	3	2	2	1	1	0	3	2	14
6	2	3	3	3	3	4	2	4	24
7	3	2	2	2	2	1	3	2	17
8	2	3	2	1	2	2	3	2	17
9	3	2	3	2	2	4	4	5	25
10	5	5	4	4	5	5	5	5	38
11	3	4	5	5	4	3	4	6	34
12	5	3	5	4	6	5	4	4	36
13	4	2	3	2	3	2	2	3	21
14	4	4	4	4	4	3	6	5	34
15	4	5	6	7	6	4	4	4	40
16	4	6	5	5	3	3	3	2	31
17	2	4	3	4	3	4	3	3	26
18	3	3	4	1	3	2	2	3	21
19	2	2	2	2	2	1	1	2	14
20	2	2	3	2	4	4	4	3	24
21	3	3	3	4	4	2	3	4	26
22	3	3	3	2	5	3	3	5	27
23	5	4	3	4	5	4	2	3	30
24	1	3	2	3	3	3	3	2	20
25	2	2	3	3	7	4	3	3	27
26	3	3	2	2	1	1	2	2	16
27	2	2	2	3	1	2	3	4	19
28	5	4	4	3	2	3	3	3	27
29	3	2	3	3	2	3	4	4	24
30	3	3	3	3	2	2	3	3	22

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR NOVEMBER

TOOLANGI - Declination 10°04.1' east.
Horizontal Intensity 22725 gammas.
Vertical Intensity -56444 gammas.

MAGNETIC K-INDICES FOR NOVEMBER - MACQUARIE ISLAND

Range for lower limit of K=9 is 1500 gammas

<u>Day</u>	<u>K-Indices</u>								<u>K-Sum</u>
1	3	4	2	1	6	5	2	2	25
2	2	2	1	5	4	3	4	3	24
3	3	3	3	5	4	3	2	2	25
4	3	3	3	2	2	2	2	1	18
5	2	1	2	1	0	1	1	3	11
6	3	3	2	4	4	5	3	2	26
7	3	2	1	1	1	1	1	(2)	12
8	(2)	3	3	1	3	1	1	1	15
9	2	2	1	2	3	5	4	(4)	23
10	6	6	7	5	7	7	8	5	51
11	7	7	7	5	6	6	6	7	51
12	5	4	5	5	7	7	7	3	43
13	6	5	2	4	5	2	1	2	27
14	6	6	5	5	5	5	6	5	43
15	7	7	7	6	6	4	5	4	46
16	6	6	6	6	4	4	4	3	39
17	2	3	4	3	6	6	4	4	32
18	5	5	6	4	5	3	3	1	32
19	2	1	1	1	4	2	1	1	13
20	2	1	3	4	6	6	4	2	28
21	5	4	7	5	5	4	4	3	37
22	3	3	3	5	6	6	6	5	37
23	5	4	5	5	5	6	4	1	35
24	2	3	2	4	4	6	6	2	29
25	2	3	5	5	7	6	3	3	34
26	3	3	1	1	1	1	1	1	12
27	1	2	2	1	1	3	4	4	18
28	4	3	5	4	3	2	2	3	26
29	3	3	3	1	2	4	6	3	25
30	4	(3)	3	5	3	3	3	3	27

() Doubtful

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR NOVEMBER

MACQUARIE ISLAND - Declination 24°56.6' east.
Horizontal Intensity 13321 gammas.
Vertical Intensity -64496 gammas.

MAGNETIC K-INDICES FOR NOVEMBER - MAWSON

Range for lower limit of K=9 is 1500 gammas

<u>Day</u>	<u>K-Indices</u>								<u>K-Sum</u>
1	6	5	4	1	4	5	2	4	31
2	4	3	3	3	2	3	3	5	26
3	5	5	4	5	4	2	6	5	36
4	5	5	4	3	3	3	5	5	33
5	4	4	3	2	1	2	5	5	26
6	4	5	3	3	3	5	4	5	32
7	5	5	3	3	3	2	2	3	26
8	4	3	3	2	4	2	3	3	24
9	4	4	3	3	3	4	6	6	33
10	6	7	7	6	6	7	6	8	53
11	6	7	6	6	5	6	6	6	48
12	5	5	X	X	X	X	X	X	XX
13	X	6	3	4	4	4	X	X	XX
14	X	6	8	6	X	6	7	6	XX
15	5	7	6	6	6	3	5	6	44
16	6	7	7	7	4	4	7	5	47
17	4	3	5	4	5	5	4	5	35
18	4	6	6	4	5	4	4	4	37
19	3	2	3	3	4	2	4	3	24
20	4	3	4	3	5	5	5	4	33
21	6	6	5	5	4	4	6	6	42
22	5	6	4	5	5	5	6	6	42
23	6	7	6	5	6	5	X	X	XX
24	X	4	2	4	5	5	5	5	XX
25	4	4	4	4	7	4	3	3	33
26	6	5	5	3	1	3	5	5	33
27	5	5	2	2	2	2	3	3	24
28	4	5	6	4	3	3	4	3	32
29	4	4	4	3	2	4	5	4	30
30	5	6	5	4	3	4	4	4	35

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR NOVEMBER

MAWSON - Declination 59°04.1' west.
 Horizontal Intensity 18296 gammas.
 Vertical Intensity -49006 gammas.

PRINCIPAL MAGNETIC STORMS AT WATHEROO DURING NOVEMBER

<u>Began at</u> d h m	<u>Ended at</u> d h	<u>Intensity</u>	<u>Maximum</u> <u>K-Index</u>
09 20 30	13 06	Moderately severe	7
13 21 38	16 24	Moderately severe	6
22 12 10	23 18	Moderate	5
25 08 50	25 19	Moderately severe	7

SUDDEN COMMENCEMENTS AT WATHEROO DURING NOVEMBER

<u>Day</u>	<u>Time</u> h m	<u>Type</u>
9	20 30	Storm Sudden Commencement ^{3*}
13	21 38	Storm Sudden Commencement

PRINCIPAL MAGNETIC STORMS AT TOOLANGI DURING NOVEMBER

<u>Began at</u> d h m	<u>Ended at</u> d h	<u>Intensity</u>	<u>Maximum</u> <u>K-Index</u>
09 20 29	13 04	Moderately severe	6
13 21 38	16 20	Moderately severe	7

SUDDEN COMMENCEMENTS AT TOOLANGI DURING NOVEMBER

<u>Day</u>	<u>Time</u> h m	<u>Type</u>
1	14 08	Polar Sudden Commencement
9	15 50	Polar Sudden Commencement
9	20 29	Storm Sudden Commencement ^{3*}
13	21 38	Storm Sudden Commencement
25	11 39	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		420	320			7.2	3.6	18.7	2.6
01		445	305			6.8	3.1	17.2	2.5
02		450	310			6.4	2.7	15.8	2.4
03		460	320			6.2	2.7	15.6	2.4
04		445	325			6.0	2.6	15.0	2.5
05		400	315	1.8		6.0	G	16.0	2.6
06	270	360	260	2.6	*	7.1	2.8	20.0	2.8
07	250	380	255	3.2	4.6	8.8	3.7	23.2	2.7
08	230	400	430	3.6	5.8	9.5	4.0	23.7	2.6
09	235	410	430	3.9	6.4	9.5	4.5	24.0	2.6
10	235	440	440	4.0	6.4	9.5	4.5	25.3	2.5
11	250	440	410	4.2	6.6	10.8	4.9	27.0	2.5
12	240	450	430	4.2	6.5	9.8	5.3	26.5	2.5
13	240	465	430	4.1	6.5	10.2	4.6	25.0	2.4
14	250	460	450	4.1	6.3	9.8	4.4	24.6	2.4
15	240	450	420	4.0	6.4	9.6	4.2	24.6	2.5
16	250	430	410	3.7	6.2	9.5	3.9	24.2	2.5
17	260	410	385	3.2	5.6	9.0	3.4	23.6	2.6
18	280	405	270	2.4		9.0	2.7	23.2	2.5
19		395	280	1.6		8.7	2.2	22.8	2.6
20		430	280			8.4	2.7	21.0	2.5
21		435	300			8.2	2.2	20.3	2.5
22		430	315			7.6	2.9	18.3	2.4
23		450	310			7.1	3.0	18.5	2.5

* Denotes insufficient numerical values.

G Denotes fEs ≤ f_oE.

IONOSPHERIC DATA - WATHEROOSUMMARY SPORADIC E

120° Mean Time	Percentage of time above			Median in Mc/s	No. of Obs.
	7 Mc/s	5 Mc/s	3 Mc/s		
00	-	8	67	3.6	24
01	-	-	52	3.1	23
02	5	5	38	2.7	21
03	-	6	44	2.7	16
04	-	-	29	2.6	17
05	-	-	22	G	18
06	-	-	(42)	2.8	24 (1G)
07	-	4	(88)	3.7	25 (3G)
08	-	15	(81)	4.0	27 (5G)
09	3	21	(79)	4.5	29 (6G)
10	15	27	(73)	4.5	26 (7G)
11	9	43	(91)	4.9	23 (2G)
12	12	59	(94)	5.3	17 (1G)
13	6	33	(94)	4.6	18 (1G)
14	6	12	(69)	4.4	16 (5G)
15	5	14	(64)	4.2	22 (8G)
16	-	4	(72)	3.9	25 (7G)
17	-	4	(78)	3.4	27 (6G)
18	-	-	48	2.7	29
19	-	-	21	2.2	19
20	-	-	41	2.7	17
21	-	6	39	2.2	18
22	-	5	48	2.9	21
23	-	-	57	3.0	21

- Indicates zero percentage.
- () Indicates doubtful.
- (G) Signifies $fEs = foE = 3.0$ Mc/s.
- G Denotes frequency below lower limit of recorder.

PROVISIONAL SUMMARY OF AURORAE FOR NOVEMBER

Reported by and published through the courtesy of the
Australian National Antarctic Research Expedition

MACQUARIE ISLAND

<u>Day</u>	<u>Began</u>	<u>First</u>	<u>Minimum</u>	<u>Geomagnetic</u>	<u>Intensity</u>	<u>Last</u>	<u>Ended</u>
		<u>Seen</u>	<u>Latitude</u>		<u>and Form</u>	<u>Seen</u>	
			Degrees	Time			
	h	m	h	m		h	m
06		11	40	62	11 40	2 D	12 30
08		11	40	61	13 00	1 C	15 30
24		11	10	61	11 30	2 HB	12 20
25		12	30	61	12 30	3 C	14 00