COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

GEOPHYSICAL OBSERVATORY REPORT

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DECEMBER

1953

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DEPARTMENT OF NATIONAL DEVELOPMENT

Minister - SENATOR The HON. W. H. SPOONER

Secretary - H. G. RAGGATT

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C O N T E N T S

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:-

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

CONTRIBUTING OBSERVATORIES

WATHEROO MAGNETIC OBSERVATORY

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 1-16Mc/s
Sweeptime 2 minutes.

TOOLANGI MAGNETIC OBSERVATORY

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

HEARD ISLAND MAGNETIC OBSERVATORY

Geographic Latitude 53°02'S Longitude 73°22'E
Geomagnetic Latitude -61° 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 DECEMBER - WATHEROO

Range for lower limit of K=9 is 350 gammas

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

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR DECEMBER

WATHEROO - Declination 2° 46.9' west.
Horizontal Intensity 24874 gammas.
Vertical Intensity -52150 gammas.

MAGNETIC K-INDICES FOR DECEMBER - TOOLANGI

Range for lower limit of K=9 is 500 gammas

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

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR DECEMBER

TOOLANGI - Declination 9° 51.1' east.
Horizontal Intensity 22791 gammas.
Vertical Intensity -56431 gammas.

MAGNETIC K-INDICES FOR DECEMBER - MACQUARIE ISLAND

Range for lower limit of K=9 is 1500 gammas

Day	K-Indices								K-Sum
1	0	0	0	2	2	1	2	0	07
2	1	2	2	2	2	2	1	1	13
3	1	2	0	4	4	2	1	2	16
4	2	2	0	1	2	1	2	1	11
5	2	3	2	1	2	1	1	0	12
6	2	1	1	1	5	3	2	2	17
7	2	2	1	2	3	2	1	1	14
8	2	2	1	1	2	3	2	2	15
9	2	1	1	1	2	3	2	2	14
10	1	2	1	3	2	1	2	2	14
11	2	3	3	5	7	5	5	3	33
12	3	4	5	5	5	6	3	2	33
13	1	2	1	3	4	2	2	1	16
14	2	2	2	1	3	2	1	1	14
15	1	1	2	1	3	1	3	2	14
16	2	1	3	2	2	2	1	1	14
17	2	2	2	0	3	2	2	1	14
18	2	1	2	2	3	2	1	1	14
19	1	1	1	3	3	3	2	1	15
20	1	1	2	1	2	2	1	1	11
21	1	1	1	1	2	2	2	1	11
22	1	2	2	1	3	4	2	1	16
23	2	1	1	1	2	1	2	0	10
24	2	2	3	4	3	2	2	1	19
25	1	2	2	3	4	2	2	2	18
26	2	0	1	2	2	1	2	2	12
27	2	1	2	1	2	3	2	2	15
28	3	2	1	3	4	3	2	1	19
29	2	1	1	2	3	3	2	2	16
30	2	2	2	3	5	2	2	1	19
31	2	2	3	1	2	1	2	1	14

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR DECEMBER

MACQUARIE ISLAND - Declination 24°18.1' east.
Horizontal Intensity 13367 gammas.
Vertical Intensity -64513 gammas.

MAGNETIC K-INDICES FOR DECEMBER - HEARD ISLAND

Range for lower limit of K=9 is 1000 gammas

Day	K-Indices								K-Sum
1	0	2	2	0	1	0	0	1	06
2	1	2	2	1	1	1	1	1	10
3	2	2	1	1	2	1	1	3	13
4	5	2	1	2	2	2	4	2	20
5	2	3	1	2	1	2	1	0	12
6	1	1	1	2	3	2	2	3	15
7	3	2	2	1	0	0	1	2	11
8	1	2	2	1	2	2	3	3	16
9	3	2	2	1	1	2	4	2	17
10	1	1	1	2	1	2	0	2	10
11	2	3	3	3	6	6	7	6	36
12	3	3	3	3	3	5	4	4	28
13	4	1	2	2	3	2	6	3	23
14	1	2	2	1	2	2	2	2	14
15	1	1	1	2	1	1	3	3	13
16	2	1	1	1	1	2	2	2	12
17	2	2	1	1	1	2	1	2	12
18	1	1	2	1	1	2	2	2	12
19	1	1	1	1	2	3	3	3	15
20	2	1	2	1	2	2	4	2	16
21	2	2	2	1	1	0	1	3	12
22	2	2	3	2	2	3	3	2	19
23	1	1	1	1	1	1	4	2	12
24	2	2	2	1	1	0	1	1	10
25	2	2	2	2	1	3	2	3	17
26	2	1	1	2	1	1	2	4	14
27	3	2	1	2	1	1	4	5	19
28	3	2	1	2	2	3	3	2	18
29	3	0	2	1	2	3	3	4	18
30	2	2	1	3	2	2	2	1	15
31	1	2	3	2	1	0	1	1	11

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR DECEMBER

HEARD ISLAND - Declination 50°12.8' west.
Horizontal Intensity 18496 gammas.
Vertical Intensity -47231 gammas.

PRINCIPAL MAGNETIC STORMS AT WATHEROO DURING DECEMBER

Began at d h m	Ended at d h	Intensity	Maximum K-Index

n i l.

SUDDEN COMMENCEMENTS AT WATHEROO DURING DECEMBER

Day	Time h m	Type
17	16 08	Polar Sudden Commencement

PRINCIPAL MAGNETIC STORMS AT TOOLANGI DURING DECEMBER

Began at d h m	Ended at d h	Intensity	Maximum K-Index

n i l.

SUDDEN COMMENCEMENTS AT TOOLANGI DURING DECEMBER

Day	Time h m	Type
30	12 31	Polar Sudden Commencement

IONOSPHERIC DATA - WATHEROO

MEDIAN HOURLY VALUES

120° Mean Time	h'F1 Km	hpF2 Km	h'F2 Km	foE Mc/s	foF1 Mc/s	foF2 Mc/s	fEs Mc/s	MUF 3000 Mc/s	M3000
00		330	270			3.8	3.6	11.6	3.0
01		320	255			3.7	4.0	11.3	3.1
02		305	250			3.5	4.0	11.0	3.2
03		310	250			3.3	3.6	10.1	3.1
04		330	260			3.2	3.6	9.7	3.0
05	250	310	260	1.2	1.7	3.4	2.9	10.2	3.1
06	250	280	250	2.0	3.2	4.0	3.0	13.0	3.3
07	250	*	*	2.5	3.7	*	3.1	*	*
08	250	300	305	2.9	4.2	5.4	4.0	17.1	3.1
09	250	340	330	3.2	4.3	5.4	4.3	17.0	3.0
10	*	350	350	3.3	4.5	5.9	6.0	17.5	2.9
11	*	350	350	3.4	4.5	6.4	6.4	18.8	2.9
12	*	350	345	3.4	4.6	6.4	6.4	19.0	3.0
13	*	350	320	3.4	4.6	6.8	6.0	20.5	3.0
14	*	350	320	3.3	4.5	7.0	5.5	21.0	3.0
15	210	340	330	3.2	4.4	6.8	4.3	21.0	3.0
16	235	320	310	3.0	4.2	6.6	4.1	20.0	3.1
17	240	310	300	2.6	3.9	6.4	4.2	19.4	3.1
18	250	305	295	2.1	3.4	6.3	4.1	20.0	3.1
19	*	310	250	1.9	1.7	6.4	3.5	20.1	3.1
20		325	250			6.2	3.9	18.0	3.1
21		320	250			5.4	3.3	16.5	3.1
22		320	270			3.9	3.0	11.6	3.1
23		335	270			4.1	3.4	12.0	3.0

* Denotes insufficient values.

IONOSPHERIC DATA - WATHEROO

SUMMARY SPORADIC E

120° Mean Time	Percentage of time above 7 Mc/s	5 Mc/s	3 Mc/s	Median in Mc/s	No. of Obs.
00	-	7	83	3.6	29
01	3	10	80	4.0	30
02	-	-	87	4.0	30
03	3	10	73	3.6	30
04	3	7	60	3.6	30
05	3	3	50	2.9	30
06	-	7	57	3.0	30
07	-	3	83	3.1	29
08	10	23	(94)	4.0	31(1G)
09	7	34	100	4.3	29
10	33	52	100	6.0	27
11	38	65	(92)	6.4	26(2G)
12	39	75	100	6.4	28
13	38	59	100	6.0	29
14	32	54	(96)	5.5	28(1G)
15	24	41	100	4.3	29
16	17	41	100	4.1	29
17	13	33	97	4.2	30
18	7	21	90	4.1	29
19	-	3	83	3.5	29
20	-	3	69	3.9	29
21	4	4	74	3.3	27
22	-	3	52	3.0	29
23	-	-	67	3.4	30

G Signifies fEs<foE≥3.0 Mc/s.

- Indicates zero percentage.

PROVISIONAL SUMMARY OF AURORAE FOR DECEMBER

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

MACQUARIE ISLAND

Day	Cloud Cover	First Seen h m	Time of Maximum h m	Last Seen h m	Time End h m	Intensity	Remarks
03	5	14 07	14 10	14 50	unknown	2	