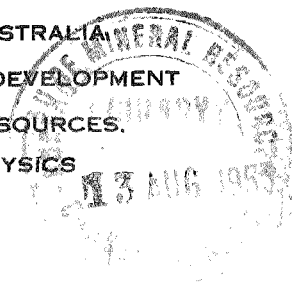


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COMMONWEALTH OF AUSTRALIA
DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES.
GEOLOGY AND GEOPHYSICS



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GEOPHYSICAL OBSERVATORY REPORT

VOL. 1

NO. 6

JUNE

1953

*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 OBSERVATORIES

WATHEROO 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
Sweeptime 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 QHM 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 QHM 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 JUNE - WATHERCO

Range for lower limit of K=9 is 350 gammas

<u>Day</u>	<u>K-Indices</u>				<u>K-Sun</u>			
1	1	1	2	1	0	1	1	08
2	3	3	5	5	5	4	5	22
3	4	4	5	2	5	3	4	28
4	3	3	4	3	2	3	2	24
5	2	3	3	3	1	2	4	20
6	3	3	2	2	2	3	1	16
7	2	1	3	2	1	2	0	12
8	0	1	0	0	1	1	0	03
9	2	3	1	3	0	1	0	10
10	1	2	2	1	0	1	2	10
11	1	1	1	2	1	1	1	11
12	2	2	1	1	1	2	4	17
13	3	3	2	1	1	1	4	10
14	1	2	2	0	2	1	3	12
15	1	2	2	0	1	0	0	06
16	1	2	2	0	0	1	1	09
17	1	1	2	1	2	3	1	12
18	1	1	0	0	1	0	1	05
19	1	2	1	1	0	1	0	07
20	1	2	2	3	5	2	4	22
21	2	2	3	1	2	1	3	16
22	1	2	2	2	3	1	1	13
23	1	2	1	0	0	0	1	06
24	1	2	0	0	0	1	2	07
25	1	1	2	1	0	1	1	08
26	0	0	0	0	0	1	0	01
27	2	3	0	0	0	1	1	08
28	1	1	0	0	0	0	0	03
29	2	1	3	5	5	5	3	28
30	5	4	4	5	4	4	1	29

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR JUNE

WATHERCO - Declination $2^{\circ} 45.9'$ west.
 Horizontal Intensity 24356 gammas.
 Vertical Intensity -52140 gammas.

MAGNETIC K-INDICES FOR JUNE - TOOLANGI

Range for lower limit of K=9 is 500 gammas

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

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR JUNE

TOOLANGI - Declination $9^{\circ} 49.2'$ east.
Horizontal Intensity 22779 gammas.
Vertical Intensity -56427 gammas.

MAGNETIC K-INDICES FOR JUNE - MACQUARIE ISLAND

Range for lower limit of K=9 is 1500 gammas

<u>Day</u>	<u>K-Indices</u>				<u>K-Sum</u>			
1	0	1	2	2	0	1	1	08
2	1	4	5	5	6	5	4	35
3	3	4	6	3	(5)	(4)	(4)	3 (32)
4	3	3	5	4	4	3	3	27
5	1	3	4	4	1	1	5	21
6	3	3	3	5	3	3	1	0 21
7	1	1	3	3	1	3	0	1 13
8	(0)	(0)	(1)	(1)	(1)	(1)	(0)	(0) (04)
9	0	0	0	3	2	1	0	0 06
10	1	2	4	3	1	1	1	1 14
11	0	1	3	3	3	0	0	2 12
12	0	0	1	1	1	2	3	3 11
13	3	1	3	3	3	1	3	1 18
14	2	1	3	1	2	1	0	1 11
15	0	0	0	1	2	1	0	0 04
16	X	X	X	X	X	X	X	X XX
17	0	0	2	1	4	2	1	1 11
18	1	1	1	1	2	1	0	1 08
19	0	0	0	1	2	0	0	0 03
20	0	1	1	3	7	4	3	3 22
21	1	3	3	3	3	1	3	1 18
22	1	1	3	4	4	3	1	1 18
23	0	0	0	0	0	0	0	1 01
24	1	1	2	0	2	2	2	0 10
25	0	0	1	1	1	1	0	0 04
26	0	0	0	0	0	0	0	0 00
27	0	0	0	0	1	0	0	1 02
28	0	0	0	0	0	0	0	0 00
29	0	0	4	7	6	5	4	4 30
30	5	4	5	7	6	6	3	3 39

() Indicates doubtful.

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR JUNE

MACQUARIE ISLAND - Declination $24^{\circ}13.7'$ east.
Horizontal Intensity 13361 gammas.
Vertical Intensity -64535 gammas.

C O R R I G E N D U M

The K-Indices for 15th May 1953 have been rescaled and
now read:-

<u>K-Indices</u>				<u>K-Sum</u>
1	1	3	2	8 7 7 5 34

MAGNETIC K-INDICES FOR JUNE - 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	0	0	2	3	1 09
2	2	4	4	4	6	4	6	6 36
3	6	3	5	3	3	4	6	3 33
4	4	4	3	2	3	3	2	2 23
5	1	3	3	3	2	3	5	3 23
6	2	3	2	2	2	3	3	1 18
7	2	1	3	3	1	1	1	1 13
8	1	1	0	1	1	0	0	1 05
9	1	1	1	X	1	0	1	1 XX
10	1	3	X	2	1	1	3	2 XX
11	1	1	2	1	1	2	2	3 13
12	X	1	1	0	1	3	5	6 XX
13	4	3	2	2	1	1	5	3 21
14	3	2	2	1	1	1	4	2 16
15	1	1	0	1	0	0	1	2 06
16	0	0	0	0	0	2	2	1 05
17	1	1	2	1	1	2	1	3 12
18	1	1	1	0	0	0	2	2 07
19	0	1	0	0	0	0	0	0 01
20	0	1	1	2	3	2	5	5 19
21	3	2	2	2	1	1	4	4 19
22	1	2	1	1	2	1	3	3 14
23	1	1	0	0	0	0	1	2 05
24	1	2	1	0	0	0	3	2 09
25	2	1	1	1	0	0	2	1 08
26	0	1	0	0	0	0	2	0 03
27	0	1	0	0	0	0	1	2 04
28	0	1	0	1	0	0	0	2 04
29	1	0	2	4	5	7	4	7 30
30	7	4	4	4	3	3	5	4 34

PRELIMINARY MEAN VALUES OF THE MAGNETIC ELEMENTS FOR JUNE

HEARD ISLAND - Declination 50 08.1' west.
 Horizontal Intensity 18482 gammas.
 Vertical Intensity -47189 gammas.

C O R R I G E N D U M

The K-Indices for 8th March 1953 have been rescaled and now read:-

<u>K-Indices</u>				<u>K-Sum</u>
2	2	1	1	2 5 7 8 28

PRINCIPAL MAGNETIC STORMS AT WATHEROO DURING JUNE

<u>Began at</u> d h m	<u>Ended at</u> d h	<u>Intensity</u>	<u>Maximum</u> <u>K-Index</u>
02 02 20	04 23	Moderate	5
29 07 24	storm still in progress at end of month	Moderate	5

SUDDEN COMMENCEMENTS AT WATHEROO DURING JUNE

nil.

PRINCIPAL MAGNETIC STORMS AT TOOLANGI DURING JUNE

<u>Began at</u> d h m	<u>Ended at</u> d h	<u>Intensity</u>	<u>Maximum</u> <u>K-Index</u>
02 05 40	05 12	Moderately severe	6
29 07 12	01 16	Moderately severe	6

SUDDEN COMMENCEMENTS AT TOOLANGI DURING JUNE

<u>Day</u>	<u>Time</u> h m	<u>Type</u>
15	13 08	Polar Sudden Commencement
15	14 11	Polar Sudden Commencement
20	13 43	Polar Sudden Commencement

IONOSPHERIC DATA - WATHEROO

MEDIAN 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		300	240			3.5	1.6	11.0	3.2
01		290	250			3.5	+	11.5	3.2
02		280	240			3.6	+	11.4	3.2
03		270	240			3.6	2.1	12.2	3.4
04		270	235			3.6	+	12.2	3.4
05		250	220			3.5	+	12.3	3.5
06		260	225			3.1	1.7	10.0	3.3
07		250	210			3.5	+	12.6	3.5
08	*	250	220	2.0	*	4.8	2.1	18.2	3.7
09	210	250	240	2.5	3.5	5.4	3.1	19.8	3.6
10	220	260	250	2.8	4.0	5.8	3.2	20.5	3.5
11	210	265	260	3.0	4.1	6.1	3.2	21.3	3.6
12	210	270	260	3.0	4.2	6.0	3.5	21.3	3.5
13	200	275	270	3.0	4.2	6.3	3.6	20.4	3.4
14	210	260	255	2.9	4.0	5.9	3.6	20.4	3.5
15	220	270	260	2.6	3.7	6.0	3.2	20.8	3.5
16	230	250	240	2.3	3.3	6.0	3.5	21.0	3.6
17		250	220	1.9		5.6	3.1	19.2	3.6
18		250	215			3.8	3.2	13.4	3.5
19		260	230			2.9	3.0	9.1	3.3
20		290	240			2.9	2.6	9.4	3.2
21		280	240			3.1	2.6	10.2	3.2
22		290	240			3.2	2.1	10.8	3.3
23		300	245			3.4	2.0	10.8	3.2

+ Indicates fEs median below lowest frequency recorded.

* Insufficient values.

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	-	-	14	1.6	28
01	-	-	14	+	29
02	-	-	21	+	29
03	-	-	13	2.1	30
04	-	-	10	+	30
05	-	-	23	+	30
06	-	-	17	1.7	29
07	-	-	10	+	29
08	-	-	21	2.1	28
09	-	3	70	3.1	30
10	-	-	(89)	3.2	28(1G)
11	-	-	(83)	3.2	29(2G)
12	3	7	100	3.5	29
13	-	7	97	3.6	29
14	-	7	(82)	3.6	28(1G)
15	-	3	73	3.2	30
16	-	10	86	3.5	29
17	-	7	69	3.1	29
18	-	-	79	3.2	29
19	-	-	59	3.0	29
20	-	-	39	2.6	28
21	-	-	28	2.6	29
22	-	-	21	2.1	29
23	-	-	21	2.0	28

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

+ Indicates fEs median below lowest frequency recorded.

- Indicates zero percentage.

PROVISIONAL SUMMARY OF AURORAE FOR JUNE - MACQUARIE ISLAND

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

<u>Day</u>	<u>Cloud</u>	<u>First</u>	<u>Time of</u>	<u>Last</u>	<u>Time</u>	<u>Intensity</u>	<u>Remarks</u>
	<u>Cover</u>	<u>Seen</u>	<u>Maximum</u>	<u>Seen</u>	<u>End</u>		
		h m	h m	h m	h m		
03	8	10 20	11 15		14 40	4	Additional maximum at 13h 45m.
07	8	07 00	unknown		10 00	3	
10	8	08 40	unknown	19 40	unknown	3	
15	8	13 30	unknown	13 50	unknown	2	
16	8	09 00	unknown	14 00	unknown	1	
18	8	12 15	12 36		14 00	3	
* 20	8	unknown	13 45	20 10	unknown	4	
21	8	09 15	unknown	09 30	unknown	3	
22	8	07 15	unknown	14 00	unknown	2	Additional maximum at time unknown.
25	6	09 00	unknown	09 00	unknown	1	

FINAL ANNUAL MEAN VALUES OF MAGNETIC ELEMENTSWATHEROO 1948

<u>Month</u>	<u>Declination</u>	<u>Horizontal Intensity</u> (gammas)	<u>Vertical Intensity</u> (gammas)
January	-2° 52.2'	24816	-51884
February	-2° 52.2'	24815	-51881
March	-2° 51.8'	24805	-51888
April	-2° 51.6'	24809	-51894
May	-2° 51.4'	24802	-51907
June	-2° 51.1'	24821	-51922
July	-2° 50.6'	24823	-51915
August	-2° 50.7'	24801	-51912
September	-2° 50.9'	24814	-51922
October	-2° 50.9'	24803	-51933
November	-2° 50.9'	24824	-51946
December	-2° 50.5'	24831	-51941
Mean	-2° 51.2'	24814	-51912

PRINCIPAL MAGNETIC STORMS AT HEARD ISLAND DURING 1952

The magnetic observatory at Heard Island came into full scale operation in March 1952. The principal magnetic storms for the period March-December 1952 are listed hereunder.

In classifying the principal magnetic storms, the frequent short term disturbances which were associated with aurorae and which usually occurred about 16 hours and 22 hours G.M.T., were omitted though K-Indices as high as 7 were sometimes recorded during these periods.

<u>Month</u>	<u>Began at</u> d h m	<u>Ended at</u> d h	<u>Intensity</u>	<u>Maximum</u> <u>K-Index</u>
March	03 07 29	12 24	Severe	9
	15 14 00	17 19	Severe	8
	21 04 00	26 04	Severe	9
	30 13 00	10 06	Severe	9
April	18 16 00	20 01	Moderately severe	7
	21 12 00	23 14	Severe	8
	28 00 00	08 22	Severe	9
May	17 23 59	19 20	Moderately severe	7
	26 08 00	31 24	Severe	8
June	08 05 00	11 10	Moderately severe	6
	14 04 00	15 09	Moderately severe	6
	22 07 00	25 00	Moderately severe	7
	29 19 01	30 12	Severe	8
July	05 02 00	06 13	Severe	8
	20 07 00	22 12	Moderately severe	6
August	17 01 24	19 06	Moderately severe	6
	29 14 00	30 09	Moderately severe	7
	31 18 47	04 06	Moderately severe	7
September	07 17 00	10 15	Moderately severe	7
	13 22 00	15 03	Moderate	5
	25 18 00	26 09	Moderately severe	7
	27 03 00	27 18	Moderate	5
	28 - -	01 06	Severe	8
October	03 14 00	06 19	Severe	8
	21 10 10	22 09	Moderately severe	7
	25 17 00	27 06	Moderately severe	7
	29 11 00	02 03	Moderately severe	7
November	20 22 00	22 21	Moderately severe	6
	26 09 00	29 21	Moderately severe	7
December	01 12 00	05 14	Moderately severe	7
	13 00 00	13 15	Moderately severe	6
	24 01 15	26 03	Moderately severe	7
	27 16 00	03 03	Severe	8

SUDDEN COMMENCEMENTS AT HEARD ISLAND MARCH - DECEMBER 1952

<u>Month</u>	<u>Day</u>	<u>Time</u> h m	<u>Type</u>
March		N I L	
April	24	16 25	Polar Sudden Commencement
May	17	23 59	Storm Sudden Commencement (small initial impulse)
June	02	18 51	Polar Sudden Commencement
	11	21 21	Polar Sudden Commencement
	29	19 01	Polar Sudden Commencement
July	01	20 34	Storm Sudden Commencement
	27	22 10	Polar Sudden Commencement
August	02	22 40	Polar Sudden Commencement
	15	20 04	Storm Sudden Commencement
	17	01 24	Storm Sudden Commencement
	31	18 47	Polar Sudden Commencement
September	04	18 33	Polar Sudden Commencement
	07	07 12	Sudden Impulse
October	02	18 57	Polar Sudden Commencement
	10	16 37	Polar Sudden Commencement
	10	19 17	Polar Sudden Commencement
	11	17 17	Polar Sudden Commencement
	21	10 10	Storm Sudden Commencement (small initial impulse)
November	06	17 49	Polar Sudden Commencement
December	05	19 30	Polar Sudden Commencement
	14	21 39	Storm Sudden Commencement (small initial impulse)
	24	01 15	Storm Sudden Commencement (small initial impulse)

ISOGONIC MAP OF AUSTRALIA - EPOCH 1955.5

A provisional isogonic map of Australia and New Guinea showing predicted values for the epoch of 1955.5 has been prepared in the Geophysical Section of the Bureau of Mineral Resources, Geology and Geophysics. The map shows only the smoothed isogonals which are drawn without regard to local disturbances produced by magnetic rocks. It was based on observations made at 475 stations throughout the area during the periods 1911-23, 1936-37, 1944-45 and 1952.

A small scale reproduction of this map appears on the following page to indicate its form only and not to provide a map of practical value. Copies of the full size map together with explanatory text are available on application to the Chief Geophysicist, Bureau of Mineral Resources, Geology and Geophysics.

