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

GEOPHYSICAL OBSERVATORY REPORT

VOL. 11

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DECEMBER

1963



Issued under the authority of
Senator The Hon. Sir William Spooner, KCMG, MM
Minister for National Development

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DEPARTMENT OF NATIONAL DEVELOPMENT

Minister - Senator The Hon. Sir WILLIAM SPOONER, KCMG, MM

Secretary - Sir HAROLD RAGGATT, CBE

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

J.M. RAYNER - Director

This Report was prepared in the Geophysical Branch;

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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 & Geophysics,
203 Collins Street,
MELBOURNE, C.1.,
A U S T R A L I A.

CONTRIBUTING OBSERVATORIES

GNANGARA MAGNETIC OBSERVATORY

P.M. McGregor, Observer in Charge

Geographic Latitude	31.47'S	Longitude	115°57'E
Geomagnetic Latitude	-43.2°	Longitude	185.8°

Instruments

Askania magnetometer No. 508810
Askania earthinductor No. 5111079
La Cour QHMs Nos. 291, 292, 293
La Cour BMZ No. 120
Eschenhagen D, H & Z recording variometers

Sensitivity	:	D 1.07 min/mm
		H 2.2 Y/mm
		Z 5.0 Y/mm
Recording speed	:	20 mm/hour

Askania (Eschenhagen type) H variometer with visual recorder

Sensitivity	:	3 Y/mm
Recording speed	:	20 mm/hour

La Cour rapid run variometers are being installed

MACQUARIE ISLAND MAGNETIC OBSERVATORY

P.J. Gregson, Observer in Charge

Geographic Latitude	54°30'S	Longitude	158°57'E
Geomagnetic Latitude	-60.7°	Longitude	243.0°

Instruments

La Cour QHMs Nos. 177, 178, 179
La Cour BMZ No. 64
Kew pattern magnetometer No. 158
La Cour D, H & Z recording variometers

Standard instrument : Sensitivity	:	D 2.3 min/mm
		H 24 Y/mm
		Z 21 Y/mm
Recording speed	:	15 mm/hour

Rapid-run instrument: Sensitivity

:	:	D 1.1 min/mm
		H 5.4 Y/mm
		Z 6.4 Y/mm
Recording speed	:	180 mm/hour

CONTRIBUTING OBSERVATORIES

MAWSON MAGNETIC OBSERVATORY

I.E. Black, Observer in Charge

Geographic Latitude	67°36'S	Longitude	62°53'E
Geomagnetic Latitude	-73.2°	Longitude	103.1°

Instruments

La Cour QHMs Nos. 300, 301, 302

La Cour BMZ No. 62

La Cour D, H & Z recording variometers

Normal sensitivity :	D 0.9 min/mm
	H 9.4 Y/mm
	Z 10.0 Y/mm

Recording speed :	15 mm/hour
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Low sensitivity :	D 2.4 min/mm
	H 51 Y/mm
	Z 50 Y/mm

Recording speed :	15 mm/hour
-------------------	------------

Bar fluxmeter D magnetograph

Recording speed :	5 mm/minute
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PORT MORESBY MAGNETIC OBSERVATORY

J.A. Brooks, Observer in Charge

Geographic Latitude	9°24'S	Longitude	147°09'E
Geomagnetic Latitude	-18.7°	Longitude	218.0°

Instruments

La Cour QHMs Nos. 187, 188, 189

La Cour BMZ No. 68

Askania declinometer No. 580333

Askania earthinductor No. 5111081

La Cour D, H & Z recording variometers

Standard instrument : Sensitivity :	D 0.4 min/mm
	H 2.9 Y/mm
	Z 3.1 Y/mm

Recording speed :	15 mm/hour
-------------------	------------

Rapid-run instrument: Sensitivity :	D 0.05 min/mm
	H 1.2 Y/mm
	Z 0.3 Y/mm

Recording speed :	180 mm/hour
-------------------	-------------

CONTRIBUTING OBSERVATORIES

TOOLANGI MAGNETIC OBSERVATORY

C.A. van der Waal, Observer in Charge

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

Instruments

Ruska magnetometer No.4813
Schulze earthinductor No.49
La Cour QHMs Nos. 288, 289, 290
La Cour BMZ No.119
La Cour D, H & Z recording variometers

Sensitivity	:	D 1.16 min/mm
		H 4.6 Y/mm
		Z 4.4 Y/mm
Recording speed	:	15 mm/hour

WILKES MAGNETIC OBSERVATORY

R. Whitworth, Observer in Charge

Geographic Latitude	66°15'S	Longitude	110°35'E
Geomagnetic Latitude	-77.2°	Longitude	179.2°

Instruments

C.I.W. field magnetometer and theodolite earthinductor No.28
La Cour QHMs Nos. 492, 493, 494
La Cour BMZ No. 236
Ruska D, H & Z recording variometers

Standard instrument : Sensitivity	:	D 10.6 min/mm
		H 24 Y/mm
		Z 24 Y/mm
Recording speed	:	20 mm/hour
Rapid-run instrument: Sensitivity	:	D 1.3 min/mm
		H 5.3 Y/mm
		Z 6.3 Y/mm
Recording speed	:	240 mm/hour

M A W S O N

MAGNETIC K-INDICES - DECEMBER 1963

Range for lower limit of K=9 is 1500 gammas

<u>Day</u>	<u>K-Indices</u>								<u>K-Sum</u>
1	3	3	2	3	3	2	3	4	23
2	3	5	3	3	5	4	5	4	32
3	5	5	5	4	6	6	7	7	45
4	4	5	5	4	4	5	6	7	40
5	5	5	5	4	5	7	6	5	42
6	5	4	4	4	6	6	6	5	40
7	4	5	4	4	4	5	5	5	36
8	5	5	5	3	4	5	5	5	37
9	3	3	3	4	3	3	1	1	21
10	1	1	2	1	1	0	0	1	07
11	3	2	1	1	2	1	2	3	15
12	3	2	1	1	2	2	2	5	18
13	4	5	3	2	2	3	3	4	26
14	3	5	3	2	5	4	6	3	31
15	3	3	3	3	2	4	5	4	27
16	5	4	2	2	2	3	4	5	27
17	4	2	2	1	2	2	3	3	19
18	3	3	2	1	2	2	3	3	19
19	3	2	1	1	2	2	3	5	19
20	4	4	5	3	5	4	6	5	36
21	3	3	3	2	4	4	3	6	28
22	3	5	4	3	5	4	6	5	35
23	3	4	4	2	3	4	6	5	31
24	5	4	2	1	3	3	5	4	27
25	3	3	2	3	3	2	2	2	20
26	3	4	3	2	3	3	3	5	26
27	4	4	3	1	3	2	1	2	20
28	4	3	3	2	3	3	7	5	30
29	5	5	3	4	5	6	5	5	38
30	4	4	2	2	3	2	4	4	25
31	3	3	2	2	1	1	3	4	19

PRELIMINARY MONTHLY MEAN VALUES

Based on 10 selected quiet days

1963	H	D	Z
	Y	°	Y
December	18364	60 52.2W	-48513

W I L K E S

MAGNETIC K-INDICES - DECEMBER 1963

Range for lower limit of K=9 is 2500 gammas

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

PRELIMINARY MONTHLY MEAN VALUES

Based on 10 selected quiet days

1963	H	D	Z
	Y	°	Y
December	9230	85 37.0W	-64814

MACQUARIE ISLAND

MAGNETIC K-INDICES - DECEMBER 1963

Range for lower limit of K=9 is 1500 gammas

<u>Day</u>	<u>K-Indices</u>								<u>K-Sum</u>
1	0	1	0	0	1	3	0	1	06
2	1	2	4	1	6	6	3	3	26
3	3	3	6	6	6	5	3	3	35
4	3	3	4	4	6	5	2	2	29
5	3	3	4	4	6	6	3	2	31
6	2	4	4	5	6	4	4	2	31
7	2	3	5	5	6	4	1	1	27
8	1	3	4	6	5	5	1	0	25
9	1	1	4	5	4	2	0	0	17
10	-	-	-	-	-	-	-	-	--
11	0	0	0	1	0	0	0	0	01
12	0	1	0	1	0	0	0	1	03
13	1	2	1	3	3	3	0	1	14
14	1	1	1	1	5	4	1	1	15
15	1	2	2	5	5	3	1	1	20
16	1	1	0	0	3	2	0	1	08
17	0	0	1	0	1	1	0	0	03
18	0	0	1	2	0	0	0	0	03
19	0	0	0	0	0	1	1	3	05
20	2	3	4	4	6	3	3	3	28
21	1	0	3	2	5	3	2	2	18
22	0	3	4	4	6	3	3	1	24
23	1	2	4	4	0	4	3	1	19
24	1	0	0	0	4	2	2	1	10
25	0	1	0	4	2	0	0	0	07
26	0	1	0	1	0	1	0	0	03
27	0	0	0	0	4	0	0	0	04
28	0	1	2	0	3	2	1	1	10
29	1	0	1	6	6	6	2	1	23
30	2	1	1	0	4	4	0	0	12
31	0	0	0	0	1	0	0	0	01

PRELIMINARY MONTHLY MEAN VALUES

Based on 10 selected quiet days

1963	H	D	Z
	Y	°	Y
December	13181	26 10.4E	-64317

T O O L A N G I

MAGNETIC K-INDICES - DECEMBER 1963

Range for lower limit of K=9 is 500 gammas

<u>Day</u>	<u>K-Indices</u>								<u>K-Sum</u>
1	1	2	1	0	2	2	1	2	11
2	2	3	3	2	4	4	2	3	23
3	3	4	4	4	4	3	3	3	28
4	2	4	3+	2+	3+	3+	1+	3+	21+
5	2	3	3	3	4	4	3	3	25
6	3	3	3	2	5	4	3	3	26
7	2	3	3	3	3	3	1	1	19
8	2	2	2	3	3	3	2	1	18
9	1	2	3	3	2	3	1	1	16
10	0	1	1	1	0	0	0	0	03
11	0	1	1	1	1	0	0	1	05
12	0	0	1	1	1	0	1	1	05
13	1	4	1	1	2	2	1	1	13
14	1	2	3	2	4	4	3	3	22
15	3	3	3	2	2	2	2	1	18
16	1	2	0	1	1	2	1	1	09
17	1	1	1	0	1	2	1	2	09
18	1	1	1	2	1	1	0	1	08
19	0	0	0	0	1	2	2	3	08
20	3	4	5	3	3	3	3	2	26
21	1	1	3	2	3	3	1	3	17
22	1	2	3	1	4	2	3	2	18
23	2	2	4	2	0	3	3	3	19
24	2	2	1	0	3	3	2	2	15
25	0	1	2	3	1	0	0	1	08
26	1	3	2	1	0	1	0	2	10
27	1	1	2	0	2	1	1	1	09
28	0	2	4	2	2	2	3	3	18
29	2	2	3	4	3	4	2	2	22
30	2	2	2	0	3	3	1	1	14
31	0	0	1	1	2	1	0	0	05

T O O L A N G I

PRELIMINARY MONTHLY MEAN VALUES

Based on 10 selected quiet days

1963	H Y	D, °	Z Y
December	22583	10 27.6E	-56392

PRINCIPAL MAGNETIC STORMS - DECEMBER 1963

NIL

SUDDEN COMMENCEMENTS AND OTHER PHENOMENA - DECEMBER 1963

<u>Day</u>	<u>Time</u> h m	<u>Type</u>	Sense of Movement		
			H	D	Z
01	12 22	pt B			
01	15 02	bp C	+	+	+
01	23 23	si C	+	+	
02	13 41	pt C			
02	14 25	bp B	+	+	+
02	21 14	ssc C	+	+	
06	11 51	bp B	+		+
06	14 34	bp B	-	+	-
07	08 47	pt C			
08	09 31	bp C	+		+
13	13 54	bp C	+	-	+
14	12 14	pt A			
17	13 40	pt B			
17	14 49	pt B			
18	07 16	pt A			
19	13 32	pt A			
20	12 25	bp C	+	-	+
22	13 13	bp B	+	-	+
23	16 17	bp B	+		+
24	12 50	pt C			
25	09 44	pt B			
27	11 24	pt B			
28	07 57	bs C	+		+
29	15 45	bp A	+	+	+
30	14 28	bp B	+		+
31	12 51	pt B			

G N A N G A R A

MAGNETIC K-INDICES - DECEMBER 1963

Range for lower limit of K=9 is 350 gammas

<u>Day</u>	<u>K-Indices</u>				<u>K-Indices</u>				<u>K-Sum</u>
1	1	1	1	1	2	2	2	2	12
2	2	2	2	2	4	3	3	4	22
3	4	4	4	4	4	5	3	3	31
4	3	4	3	2	3	4	4	4	27
5	4	2	2	3	4	5	4	3	27
6	3	2	2	2	6	4	3	3	25
7	2	2	2	3	3	3	2	3	20
8	2	2	2	3	3	3	2	2	19
9	2	2	3	3	3	2	1	0	16
10	1	0	1	1	1	0	0	0	04
11	0	0	1	1	1	0	1	1	05
12	0	0	1	2	1	1	2	1	08
13	2	3	2	1	2	1	2	1	14
14	1	2	2	2	4	4	2	3	20
15	2	2	2	2	2	3	2	2	17
16	2	2	1	2	2	2	2	1	14
17	2	0	1	0	1	1	1	1	07
18	1	1	0	1	1	1	1	0	06
19	0	0	0	0	2	2	2	4	10
20	3	2	3	3	3	4	4	2	24
21	2	2	2	2	3	3	2	4	20
22	2	2	3	2	4	3	4	3	23
23	2	1	3	2	0	4	4	3	19
24	3	1	2	1	2	3	3	2	17
25	1	1	2	2	0	1	1	1	09
26	1	2	1	2	1	1	1	1	10
27	1	1	2	1	1	1	1	1	09
28	0	1	3	2	2	2	4	2	16
29	2	2	2	4	4	5	3	2	24
30	2	2	1	0	4	2	1	2	14
31	0	0	0	1	1	0	0	1	03

G N A N G A R A

PRELIMINARY MONTHLY MEAN VALUES

Based on 5 selected quiet days

1963	H Y	D, Y	Z Y
December	23930	2 51.8W	-53501

PRINCIPAL MAGNETIC STORMS - DECEMBER 1963

date	storm time		sudden				act- iv- ity	max. activity			Ranges		
			commencements					0 to 9					
	begin	end	type	amplitudes				day	3-hr per.	K			
				D	H	Z							
	h m	d h		↑	Y	Y					↑	Y	Y
02	2117	0700	ssc	+1	+7	+7	m	6	5	6	20	69	103

SUDDEN COMMENCEMENTS AND OTHER PHENOMENA - DECEMBER 1963

<u>Day</u>	<u>Time</u> h m	<u>Type</u>	Sense of Movement		
			H	D	Z
01	12 25	pt A			
01	15 05	bps A	+		+
02	14 24	bp A	+	-	-
02	21 17	ssc B	+	+	+
10	08 36	pt A			
11	18 22	pt B			
13	13 35	pt B			
17	13 37	pt A			
19	13 22	pt A			
23	16 15	bp A	+	-	-
28	07 56	si A			
29	15 40	b A	+	-	-
30	14 30	bp A	+	-	-

P O R T M O R E S B Y

MAGNETIC K-INDICES - DECEMBER 1963

Range for lower limit of K=9 is 300 gammas

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

P O R T M O R E S B Y

PRELIMINARY MONTHLY MEAN VALUES

Based on 10 selected quiet days

1963	H Y	D °	Z Y
December	36369	06 07.3E	-22963

PRINCIPAL MAGNETIC STORMS - DECEMBER 1963

date	storm time		sudden			act- iv- ity	max. activity			Ranges			
			commencements				0 to 9						
	begin	end	type	amplitudes			day	3-hr per.	K				
				D	H					Z	D	H	Z
	h m	d h			Y	Y					Y	Y	
02	2116	0717	sc	+0.1	+5	+3	m	3	3	5	10	94	68
29	1034	3006	..	--	--	--	m	29	4	5	3	60	51

SUDDEN COMMENCEMENTS AND OTHER PHENOMENA - DECEMBER 1963

<u>Day</u>	<u>Time</u> h m	<u>Type</u>	Sense of Movement		
			H	D	Z
01	15 04	bp B	+	+	+
01	22 25	ssc* B	+	-	+
02	14 27	bps B	+	+	+
02	21 16	ssc B	+		+
06	11 49	bps B	+	+	+
08	09 27	bp B	+		+
23	16 17	bp B	+		+
28	07 57	bs A	+	+	+
29	15 39	bs B	+		+
30	06 18	si C	-	-	-
30	14 28	bp B	+		+

P O R T M O R E S B Y

RAPID-RUN MAGNETOGRAMS - pc

DECEMBER - 1963

Day	Whole phenomenon			Special Intervals				
	Time of		Quality	Time of		Quality	Largest oscillation	
	begin	end		begin	end		period	range
01	16..	19..	C					
03	17..	?	B	Record	confused	18-24		
04	15..	21(30)	B	Record	confused	20-24		
06	Time marks uncertain							
07	Record faulty							
09	Record confused 0345-0940							
12	1535	21(30)	B					
14	Record confused 0730-2400							
15	Record confused 0525-2400							
17	1745	22..	B					
22	1740	21..	C					
23	Record confused							
29	19..	21..	B					
30	15..	20..	B					

P O R T M O R E S B Y

RAPID-RUN MAGNETOGRAMS - pt

DECEMBER - 1963

Day	Whole phenomenon			Individual series of oscillation				
	Time of		Quality	Time of		Quality	Largest oscillation	
	begin	end		begin	end		period	range
01	0815	0825	B					
01	1226	1330	B	1259		B		
				1304		B		
				1310		B		
				1320		C		
01	1505	1535	B					
01	1758	1804	B					
02	1342	15(10)	B	1351		B		
				1415		B		
				1430		B		
02	1607	17(10)	B	1651		B		
02	1800	1900	B	1823		B		
03	1304		B					
04	1412	14(50)	B	1435		B		
05	13(40)	1400	B					
06	Time marks uncertain							
07	Record faulty							
08	1448	1510	B					
09	Record confused 0345-0940							
11	0500	0507	B					
12	2306	23(30)	B					
13	0927	1015	B					
13	1204	1240	B	1226		B		
14	Record confused 0730-2400							
15	Record confused 0525-2400							
16	1158	1216	B					
16	1357	1444	B	1427		B		
16	1955	2015	B					
17	1308	1625	B	1338		B		
				1356		B		
				1433		B		
				14(45)		B		
				1553		B		
19	1348	14(50)	B	1429		B		
				1610		B		
19	1923	2005	B					
21	1710	1713	B					

P O R T M O R E S B Y

RAPID-RUN MAGNETOGRAMS - pt

DECEMBER - 1963

Day	Whole phenomenon			Individual series of oscillation				
	Time of		Quality	Time of		Quality	Largest oscillation	
	begin	end		begin	end		period	range
22	1245	1340	B	1315		B		
22	2208	2227	B	2224		B		
23	Record confused							
24	1639	1653	B					
25	1005	10(30)	B					
25	1712	1720	B					
26	0303	0315	B					
27	1241	13(10)	B					
28	1955	20(20)	B					
29	1230	1307	B					
30	1428	1500	B	1451		B		
31	1250	1305	B					
31	1805	1810	B					

PRELIMINARY ANNUAL MEAN VALUES 1963

	H Y	D °	Z Y
Mawson	18356	60 45.2W	-48562
Wilkes	9232	85 26.7W	-64848
Macquarie Island	13189	26 07.2E	-64315
Toolangi	22589	10 26.2E	-56392
Gnangara	23931	2 52.3W	-53497
Port Moresby	36379	6 06.3E	-22941