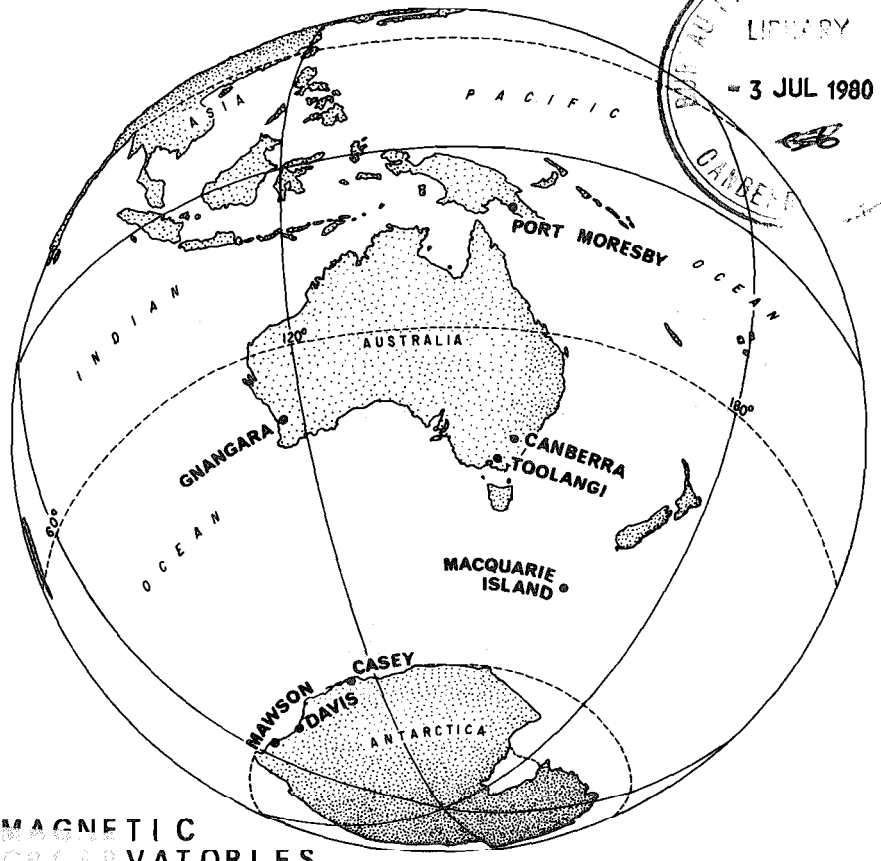
BUREAU OF MINERAL RESOURCES,
GEOL Y & PH SIC

# GEOPHYSICAL OBSERVATORY REPORT






MAGNETIC OBSERVATORIES



Volume 28, No 2
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DEPARTMENT OF NATIONAL DEVELOPMENT AND ENERGY

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The observers at Casey and Davis are physicists of the Antarctic Division (Department of Science and the Environment) and their contributions are gratefully acknowledged: they and the BMR geophysicists at Macquarie Island and Mawson are members of the Australian National Antarctic Research Expeditions (ANARE).

The data from the Port Moresby geophysical observatory are contributed by the Geological Survey of Papua New Guinea.


The terminology used in this report is that accepted by international convention. The units of field intensity, nanotesla (nT), are those of the SI system. All times are in Universal Time. Should further information be required, apply to:


GEOPHYSICAL OBSERVATORY SUBSECTION
BUREAU OF MINERAL RESOURCES
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CANBERRA CITY, A.C.T. 2601

## CONTRIBUTING OBSERVATORIES

| OBSERVATORY | OBSERVER IN CHARGE | GEOGRAPHIC | | GEOMAGNETIC | |
|---|---|---|---|---|---|
| | | LAT | LONG | LAT | LONG |
| PORT MORESBY | I.D. Ripper | 9°25'S | 147°09'E | -18.6° | 217.9° |
| GNANGARA | P.J. Gregson | 31°47'S | 115°57'E | -43.3° | 185.8° |
| CANBERRA | R.S. Smith | 35°19'S | 149°22'E | -44.0° | 224.7° |
| *TOOLANGI | R.S. Smith | 37°32'S | 145°28'E | -46.7° | 220.8° |
| MACQUARIE I | P.M. Davies | 54°30'S | 158°57'E | -61.1° | 243.1° |
| MAWSON | B.A. Gaull | 67°36'S | 62°53'E | -73.1° | 102.9° |
| DAVIS | P. Murrell | 68°35'S | 77°58'E | -76.7° | 119.9° |
| CASEY | K. Lewis | 66°17'S | 110°32'E | -77.8° | 179.1° |

## MAGNETOGRAPHS

| OBSERVATORY | TYPE | NOMINAL SCALE VALUES | | | | | |
|---|---|---|---|---|---|---|---|
| | | NORMAL | | | SENSITIVE | | |
| | | D | H | Z | D | H | Z |
| PORT MORESBY | La Cour | 0.5 | 3 | 4 | | | |
| GNANGARA | Eschenhagen | 1 | 3 | 6 | | | |
| TOOLANGI | La Cour | 1 | 5 | 5 | | | |
| MACQUARIE I | La Cour | 2.5 | 20 | 21 | | | |
| MAWSON | La Cour | 2.5 | 21 | 22 | 1 | 10 | 10 |
| CANBERRA | Elsec digital | D | F<br>0.1nT | I | | | |

Scale values are in minutes of arc/mm (D) and nT/mm (H,Z)

## MAGNETOMETERS

Absolute data are based on observations made with QHM'S BMZ's declinometers and proton precession magnetometers.
Errors in preliminary values are not likely to exceed 5 nT or 0.5 minutes.

*From 1 July 1979 Toolangi Observatory is only a variation observatory.

PORT MORESBY

MAGNETIC K-INDICES - FEBRUARY 1980

Range for lower limit of K = 9 is 300 nT

| Day | K-Indices | | | | | | | | K-Sum |
|---|---|---|---|---|---|---|---|---|---|
| 01 | 1 | 1 | 2 | 1 | 1 | 1 | 3 | 3 | 13 |
| 02 | 2 | 2 | 4 | 2 | 2 | 1 | 0 | 0 | 13 |
| 03 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 03 |
| 04 | 1 | 2 | 4 | 2 | 1 | 0 | 0 | 0 | 10 |
| 05 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 1 | 04 |
| 06 | 0 | 4 | 6 | 4 | 5 | 5 | 5 | 3 | 32 |
| 07 | 3 | 3 | 3 | 1 | 4 | 2 | 3 | 3 | 22 |
| 08 | 3 | 1 | 2 | 4 | 4 | 3 | 1 | 3 | 21 |
| 09 | 2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 19 |
| 10 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 06 |
| 11 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 06 |
| 12 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 03 |
| 13 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 05 |
| 14 | 2 | 4 | 3 | 6 | 4 | 3 | 2 | 2 | 26 |
| 15 | 2 | 3 | 1 | 2 | 3 | 3 | 4 | 5 | 23 |
| 16 | 5 | 4 | 4 | 5 | 4 | 2 | 3 | 2 | 29 |
| 17 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 18 |
| 18 | 1 | 1 | 3 | 3 | 2 | 2 | 3 | 3 | 18 |
| 19 | 3 | 3 | 2 | 2 | 2 | 1 | 0 | 0 | 13 |
| 20 | 0 | 1 | 1 | 1 | 2 | 2 | 1 | 0 | 08 |
| 21 | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 11 |
| 22 | 2 | 2 | 2 | 1 | 0 | 1 | 0 | 2 | 10 |
| 23 | 3 | 2 | 2 | 4 | 2 | 3 | 3 | 1 | 20 |
| 24 | 2 | 1 | 0 | 2 | 3 | 2 | 0 | 0 | 10 |
| 25 | 2 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 20 |
| 26 | 3 | 2 | 2 | 2 | 4 | 3 | 2 | 3 | 21 |
| 27 | 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 21 |
| 28 | 2 | 2 | 2 | 4 | 1 | 1 | 2 | 2 | 16 |
| 29 | 2 | 1 | 0 | 1 | 2 | 2 | 1 | 1 | 10 |

GNANGARA

MAGNETIC K-INDICES - FEBRUARY 1980

Range for lower limit of K = 9 is 450 nT

| Day | K-Indices | | | | | | | | K-Sum |
|---|---|---|---|---|---|---|---|---|---|
| 01 | 1 | 1 | 2 | 2 | 2 | 2 | 4 | 3 | 17 |
| 02 | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 0 | 14 |
| 03 | 1 | 2 | 2 | 2 | 2 | 1 | 0 | 1 | 11 |
| 04 | 1 | 1 | 3 | 2 | 1 | 1 | 1 | 2 | 12 |
| 05 | 1 | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 10 |
| 06 | 1 | 3 | 4 | 3 | 5 | 5 | 5 | 3 | 29 |
| 07 | 3 | 3 | 3 | 1 | 3 | 2 | 3 | 3 | 21 |
| 08 | 3 | 3 | 3 | 4 | 3 | 4 | 1 | 4 | 25 |
| 09 | 3 | 2 | 3 | 2 | 3 | 3 | 4 | 2 | 22 |
| 10 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 2 | 07 |
| 11 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 1 | 08 |
| 12 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 03 |
| 13 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 09 |
| 14 | 1 | 4 | 3 | 5 | 3 | 3 | 2 | 2 | 23 |
| 15 | 2 | 3 | 3 | 2 | 3 | 2 | 4 | 5 | 24 |
| 16 | 5 | 4 | 3 | 4 | 4 | 2 | 3 | 3 | 28 |
| 17 | 2 | 1 | 2 | 1 | 3 | 2 | 2 | 2 | 15 |
| 18 | 2 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 17 |
| 19 | 3 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 09 |
| 20 | 1 | 1 | 1 | 2 | 2 | 2 | 0 | 1 | 10 |
| 21 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 09 |
| 22 | 2 | 1 | 1 | 1 | 1 | 2 | 0 | 1 | 09 |
| 23 | 1 | 1 | 1 | 3 | 2 | 3 | 3 | 2 | 16 |
| 24 | 2 | 1 | 1 | 2 | 3 | 3 | 0 | 0 | 12 |
| 25 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 4 | 20 |
| 26 | 4 | 2 | 2 | 3 | 4 | 3 | 2 | 3 | 23 |
| 27 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 22 |
| 28 | 3 | 2 | 2 | 3 | 1 | 1 | 2 | 3 | 17 |
| 29 | 2 | 2 | 1 | 1 | 2 | 2 | 1 | 1 | 12 |

TOOLANGI

MAGNETIC K-INDICES - FEBRUARY 1980

Range for lower limit of K = 9 is 500 nT

| Day | K-Indices | | | | | | | | K-Sum |
|---|---|---|---|---|---|---|---|---|---|
| 01 | 0 | 1 | 3 | 2 | 2 | 2 | 3 | 3 | 16 |
| 02 | 2 | 2 | 3 | 3 | 1 | 0 | 0 | 0 | 11 |
| 03 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 02 |
| 04 | 0 | 1 | 3 | 2 | 1 | 0 | 0 | 0 | 07 |
| 05 | 1 | 1 | 1 | 1 | 2 | 1 | 0 | 1 | 08 |
| 06 | 1 | 4 | 5 | 4 | 5 | 5 | 5 | 2 | 31 |
| 07 | 2 | 3 | 4 | 2 | 4 | 1 | 3 | 3 | 22 |
| 08 | 2 | 2 | 2 | 4 | 3 | 3 | 0 | 3 | 19 |
| 09 | 2 | 3 | 2 | 3 | 3 | 2 | 3 | 1 | 19 |
| 10 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 06 |
| 11 | 1 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 09 |
| 12 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 02 |
| 13 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 04 |
| 14 | 2 | 4 | 4 | 5 | 3 | 4 | 2 | 1 | 25 |
| 15 | 1 | 2 | 2 | 3 | 3 | 3 | 4 | 6 | 24 |
| 16 | 5 | 3 | 4 | 4 | 3 | 3 | 3 | 1 | 26 |
| 17 | 1 | 2 | 2 | 1 | 3 | 3 | 1 | 1 | 14 |
| 18 | 1 | - | - | - | - | - | - | 3 | -- |
| 19 | 2 | 3 | 2 | 0 | 1 | 0 | 0 | 0 | 08 |
| 20 | 0 | - | - | - | - | - | - | 0 | -- |
| 21 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 07 |
| 22 | 1 | 2 | 1 | 1 | 2 | 2 | 0 | 2 | 11 |
| 23 | 1 | 1 | 2 | 3 | 2 | 3 | 3 | 1 | 16 |
| 24 | 1 | 1 | 1 | 2 | 3 | 3 | 0 | 0 | 11 |
| 25 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 4 | 17 |
| 26 | 4 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 23 |
| 27 | 1 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 19 |
| 28 | 2 | 2 | 1 | 4 | 2 | 1 | 1 | 3 | 16 |
| 29 | 1 | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 09 |

## MACQUARIE ISLAND

## MAGNETIC K-INDICES - FEBRUARY 1980

Range for lower limit of K = 9 is 1500 nT

| Day | K-Indices | | | | | | | | K-Sum |
|---|---|---|---|---|---|---|---|---|---|
| 01 | 1 | 1 | 2 | 2 | 2 | 1 | 3 | 2 | 14 |
| 02 | 3 | 3 | 3 | 5 | 2 | 0 | 0 | 0 | 16 |
| 03 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 03 |
| 04 | 0 | 1 | 2 | 2 | 2 | 0 | 0 | 0 | 07 |
| 05 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 04 |
| 06 | 0 | 4 | 5 | 6 | 7 | 8 | 7 | 2 | 39 |
| 07 | 3 | 4 | 4 | - | - | - | - | - | -- |
| 08 | - | 4 | 3 | 6 | 5 | 5 | 2 | 2 | -- |
| 09 | 2 | 3 | 3 | 5 | 5 | 5 | 4 | 1 | 28 |
| 10 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 05 |
| 11 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 05 |
| 12 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 03 |
| 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 01 |
| 14 | 1 | 4 | 3 | 5 | 5 | 6 | 3 | 1 | 28 |
| 15 | 1 | 2 | 3 | 4 | 4 | 1 | 6 | 6 | 27 |
| 16 | 6 | 5 | 6 | 6 | 5 | 4 | 3 | 2 | 37 |
| 17 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 2 | 13 |
| 18 | 2 | 1 | 4 | 4 | 4 | 3 | 2 | 2 | 22 |
| 19 | 4 | 5 | 2 | 1 | 1 | 0 | 0 | 1 | 14 |
| 20 | 0 | 1 | 1 | 3 | 3 | 3 | 0 | 0 | 11 |
| 21 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 03 |
| 22 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 04 |
| 23 | 0 | 0 | 1 | 3 | 3 | 4 | 4 | 1 | 16 |
| 24 | 1 | 1 | 2 | 3 | 4 | 4 | 0 | 0 | 15 |
| 25 | 1 | 1 | 1 | 0 | 2 | 3 | 4 | 4 | 16 |
| 26 | 3 | 3 | 1 | 4 | 5 | 4 | 3 | 2 | 25 |
| 27 | 1 | 3 | 3 | 6 | 6 | 3 | 2 | 3 | 27 |
| 28 | 1 | 2 | 2 | 6 | 4 | 0 | 1 | 2 | 18 |
| 29 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 1 | 10 |

MAWSON

MAGNETIC K-INDICES - FEBRUARY 1980

Range for lower limit of K = 9 is 1500 nT

NOT AVAILABLE

JANUARY 1980

PRINCIPAL MAGNETIC STORMS

| OBSERVATORY | COMMENCEMENT | | | | SSC AMPLITUDES | | | MAX 3h INDEX K | | | RANGES | | | UT END | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | d | h | min | TYPE | D(') | H(nT) | Z(nT) | d (3h-PERIOD) | K | | D(') | H(nT) | Z(nT) | d | h |
| PORT MORESBY | 86 | 03 | 28 | ssc | +0.4 | +28 | +27 | 6 (3) | 6 | | 11 | +190 | 100 | 09 | 00 |
| | 14 | 03 | 09 | ssc* | +0.4 | +34* | +31* | 14 (4) | 6 | | 8 | 240 | 70 | 17 | 00 |
| GNANGARA | 06 | 03 | 20 | ssc* | -3.2* | +12 | -13* | 06 (5, 6, 7) | 5 | | 22 | 100 | 130 | 06 | 22 |
| | 15 | 12 | .. | ... | -0.9* | + 7 | - 2* | 15 (8) | 5 | | 22 | 170 | 130 | 16 | 22 |
| | | | | | | | | 16 (1) | | | | | | | |
| TOOLANGI | 06 | 03 | 21 | ssc | +1.3 | +27 | + 5 | 06 (3,5,6,7) | 5 | | 20 | 190 | 70 | 07 | 20 |
| | 14 | 03 | 09 | ssc* | +3.1 | +40* | +10 | 14 (4) | 5 | | 19 | 120 | 70 | 14 | 20 |
| | 15 | 18 | .. | ... | .. | .. | .. | 15 (8) | 6 | | 21 | 180 | 120 | 16 | 16 |

FEBRUARY 1980

PRELIMINARY MONTHLY MEAN VALUES

| OBSERVATORY | H | D | Z | F |
|---|---|---|---|---|
| | nT | o ' | nT | nT |
| PORT MORESBY | 35979 | 06 27.6E | -23627 | 43043 |
| GNANGARA | 23425 | 03 17.3W | -53642 | 58534 |
| CANBERRA | 23828 | 12 08.3E | -53775 | 58818 |
| TOOLANGI | | no absolute control | | |
| MACQUARIE I | 12731 | 28 25.8E | -63778 | 65036 |
| MAWSON | | not available | | |
| DAVIS | | not available | | |
| CASEY | | not available | | |

The values are derived from magnetograms for selected quiet days except at Davis and Casey where they are derived from semi-weekly absolute measurements.

SUDDEN COMMENCEMENTS AND OTHER RAPID VARIATIONS

| OBSERVATORY | DAY | TYPE AND QUALITY | TIME | SENSE AND AMPLITUDE OF CHIEF MOVEMENT | | |
|---|---|---|---|---|---|---|
| | | | | H(nT) | D(nT) | Z(nT) |
| PORT MORESBY | 06 | ssc B | 0320 | +28 | + 4 | +27 |
| | 14 | ssc* B | 0309 | +34* | + 4 | +31* |
| GNANGARA | 06 | ssc* B | 0320 | +12 | -22* | -13* |
| | 14 | ssc* B | 0309 | + 8 | -37* | -17* |
| TOOLANGI | 06 | ssc B | 0321 | +27 | + 8 | + 5 |
| | 14 | ssc* B | 0309 | +40* | +20 | +10 |

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