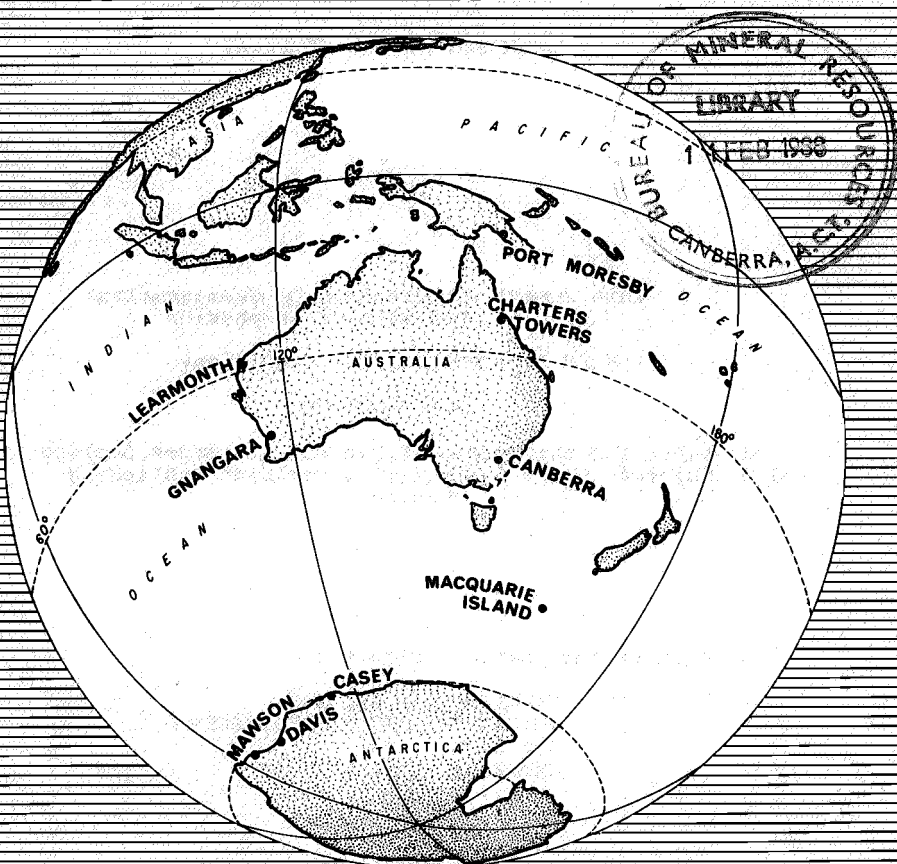


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GEOFYSICAL OBSERVATORY REPORT



MAGNETIC OBSERVATORIES

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VOLUME 35 No. 6
JUNE 1987

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DEPARTMENT OF RESOURCES AND ENERGY

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BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

DIRECTOR: R.W.R. Rutland

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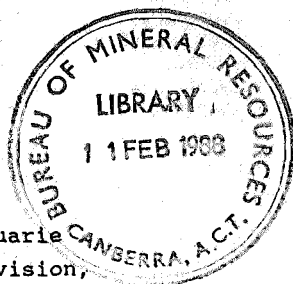
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The observers at Casey Davis and Macquarie Island are officers of the Antarctic Division, Department of Science and Technology: their contributions are gratefully acknowledged. These observers and the Bureau of Mineral Resources (BMR) geophysicist at Mawson are members of the Australian National Antarctic Research Expeditions (ANARE).

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 Association of Geomagnetism and Aeronomy. The unit of field intensity is nanotesla (nT). All times are in Universal Time.

### CONTRIBUTING OBSERVATORIES

| <u>OBSERVATORY</u> | <u>OBSERVER<br/>IN CHARGE</u> | <u>GEOGRAPHIC</u> |             | <u>GEOMAGNETIC</u> |             |
|--------------------|-------------------------------|-------------------|-------------|--------------------|-------------|
|                    |                               | <u>LAT</u>        | <u>LONG</u> | <u>LAT</u>         | <u>LONG</u> |
| PORT MORESBY       | I.D.Ripper                    | 9° 25' S          | 147° 09' E  | -18.2°             | 219.6°      |
| CHARTERS TOWERS    | J.M.Millican                  | 20° 05' S         | 146° 15' E  | -28.8°             | 220.2°      |
| LEARMONTH          | M.W.McMullan                  | 22° 13' S         | 114° 06' E  | -33.4°             | 185.5°      |
| GNANGARA           | P.J.Gregson                   | 31° 47' S         | 115° 57' E  | -42.9°             | 187.8°      |
| CANBERRA           | P.A.Hopgood                   | 35° 19' S         | 149° 22' E  | -43.5°             | 226.4°      |
| MACQUARIE I        | I.G.Jacobsen                  | 54° 30' S         | 158° 57' E  | -60.6°             | 244.6°      |
| MAWSON             | S.D.Dennis                    | 67° 36' S         | 62° 53' E   | -73.3°             | 105.9°      |
| DAVIS              | P. Williams                   | 68° 35' S         | 77° 58' E   | -76.9°             | 123.5°      |
| CASEY              | R.A.Rachinger                 | 66° 17' S         | 110° 32' E  | -77.5°             | 182.4°      |

### MAGNETOGRAPHS

| <u>OBSERVATORY</u> | <u>CODE</u> | <u>TYPE</u>     | <u>ELEMENT/SCALE-VALUE</u> |     |     |  |
|--------------------|-------------|-----------------|----------------------------|-----|-----|--|
| PORT MORESBY       | PMG         | La cour (A)     | H/3                        | D/5 | Z/4 |  |
| CHARTERS TOWERS    | CTA         | EDA/ELSEC (D/1) | X                          | Y   | Z   |  |
| LEARMONTH          | LRM         | EDA/ELSEC (D/1) | X                          | Y   | Z   |  |
| GNANGARA           | GNA         | Eschenhagen (A) | H/3                        | D/7 | Z/6 |  |
| CANBERRA           | CNB         | ELSEC (D/.1)    | D                          | I   | F   |  |
| MACQUARIE ISLAND   | MCQ         | PEM (D/.1)      | X                          | Y   | Z   |  |
| MAWSON             | MAW         | PEM (D/.1)      | X                          | Y   | Z   |  |

A = analogue, 20mm/hr, scale values in nT/mm  
 D/1 = ditigal, 1 min readings, 1 nT resolution  
 D/.1 = ditigal, 1 min readings, 0.1 nT resolution  
 PEM = BMR Photo-electronic magnetograph.

### MAGNETOMETERS

Absolute data are based on observations made with QHM's, BMZ's, fluxgate-theodolites, declinometers and proton precession magnetometers.

Errors in preliminary values obtained from magnetograms are not likely to exceed 5 nT or 0.5 minutes of arc.

PORT MORESBY

MAGNETIC K-INDICES - JUNE 1987

Range for lower limit of K=9 is 300nT

| DAY | K-INDICES |   |   |   |   |   |   |   | K-SUM |
|-----|-----------|---|---|---|---|---|---|---|-------|
| 01  | 2         | 2 | 2 | 2 | 2 | 1 | 2 | 2 | 15    |
| 02  | 3         | 2 | 2 | 2 | 1 | 1 | 1 | 1 | 13    |
| 03  | 1         | 2 | 1 | 1 | 1 | 1 | 2 | 2 | 11    |
| 04  | 3         | 2 | 2 | 2 | 2 | 1 | 1 | 2 | 15    |
| 05  | 1         | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 14    |
| 06  | 2         | 2 | 6 | 5 | 5 | 3 | 2 | 2 | 27    |
| 07  | -         | 1 | 3 | 4 | 3 | 2 | 2 | 2 | --    |
| 08  | 1         | 2 | 2 | 1 | 2 | 1 | 1 | 1 | 11    |
| 09  | 1         | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 09    |
| 10  | 2         | 1 | 2 | 1 | 2 | 1 | 1 | 1 | 11    |
| 11  | 2         | 1 | 2 | 3 | 2 | 3 | 2 | 1 | 16    |
| 12  | 2         | 2 | 2 | 4 | 2 | 3 | 2 | 1 | 18    |
| 13  | 1         | 2 | 2 | 2 | 2 | 1 | 1 | 1 | 12    |
| 14  | 2         | 2 | 3 | 2 | 1 | 1 | 1 | 2 | 14    |
| 15  | 1         | 1 | 1 | 1 | 0 | 2 | 1 | 1 | 08    |
| 16  | 2         | 1 | 3 | 2 | 1 | 2 | 2 | 1 | 14    |
| 17  | 2         | 2 | 1 | 1 | 2 | 1 | 1 | 2 | 12    |
| 18  | 2         | 1 | 2 | 2 | 2 | 2 | 1 | 1 | 13    |
| 19  | 3         | 3 | 4 | 4 | 3 | 2 | 1 | 3 | 23    |
| 20  | 2         | 2 | 1 | 3 | 3 | 2 | 3 | 3 | 19    |
| 21  | 2         | 2 | 2 | 1 | 2 | 1 | 1 | 2 | 13    |
| 22  | 1         | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 10    |
| 23  | 2         | 2 | 2 | 1 | 1 | 1 | 2 | 1 | 12    |
| 24  | 2         | 2 | 3 | 2 | 1 | 1 | 2 | 2 | 15    |
| 25  | 1         | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 12    |
| 26  | 2         | 3 | 1 | 1 | 1 | 2 | 2 | 2 | 14    |
| 27  | 2         | 2 | 2 | 3 | 2 | 1 | 1 | 2 | 15    |
| 28  | 1         | 2 | 1 | 2 | 1 | 1 | 2 | 1 | 11    |
| 29  | 1         | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 08    |
| 30  | 2         | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 08    |

Mean of K-Sum is 13.5

Frequency of K-Indices

|     |   |     |     |    |   |   |   |   |   |   |   |
|-----|---|-----|-----|----|---|---|---|---|---|---|---|
| K : | 0 | 1   | 2   | 3  | 4 | 5 | 6 | 7 | 8 | 9 | - |
| f : | 2 | 105 | 102 | 23 | 4 | 2 | 1 | 0 | 0 | 0 | 1 |

GNANGARA

MAGNETIC K-INDICES - JUNE 1987

Range for lower limit of K=9 is 450nT

| DAY | K-INDICES |   |   |   |   |   |   |   | K-SUM |
|-----|-----------|---|---|---|---|---|---|---|-------|
| 01  | 2         | 1 | 1 | 2 | 2 | 1 | 2 | 1 | 12    |
| 02  | 3         | 3 | 3 | 2 | 0 | 0 | 0 | 1 | 12    |
| 03  | 1         | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 10    |
| 04  | 1         | 1 | 1 | 3 | 2 | 1 | 2 | 1 | 12    |
| 05  | 0         | 1 | 1 | 1 | 2 | 3 | 2 | 2 | 12    |
| 06  | 1         | 2 | 4 | 5 | 6 | 3 | 4 | 3 | 28    |
| 07  | 3         | 1 | 2 | 3 | 3 | 2 | 3 | 2 | 19    |
| 08  | 1         | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 05    |
| 09  | 1         | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 04    |
| 10  | 1         | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 06    |
| 11  | 1         | 1 | 2 | 2 | 2 | 1 | 1 | 1 | 11    |
| 12  | 1         | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 14    |
| 13  | 1         | 2 | 2 | 1 | 2 | 2 | 1 | 1 | 12    |
| 14  | 1         | 1 | 3 | 2 | 0 | 0 | 0 | 1 | 08    |
| 15  | 1         | 1 | 1 | 0 | 0 | 2 | 2 | 1 | 08    |
| 16  | 1         | 1 | 2 | 1 | 1 | 2 | 2 | 1 | 11    |
| 17  | 2         | 1 | 1 | 1 | 2 | 0 | 0 | 1 | 08    |
| 18  | 1         | 2 | 1 | 1 | 1 | 2 | 1 | 0 | 09    |
| 19  | 3         | 4 | 3 | 4 | 4 | 1 | 1 | 4 | 24    |
| 20  | 1         | 1 | 1 | 2 | 3 | 3 | 3 | 3 | 17    |
| 21  | 2         | 2 | 1 | 0 | 1 | 1 | 2 | 1 | 10    |
| 22  | 1         | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 05    |
| 23  | 0         | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 03    |
| 24  | 0         | 1 | 1 | 1 | 0 | 1 | 1 | 2 | 07    |
| 25  | 0         | 1 | 1 | 0 | 0 | 2 | 2 | 4 | 10    |
| 26  | 3         | 2 | 1 | 0 | 1 | 1 | 2 | 1 | 11    |
| 27  | 1         | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 08    |
| 28  | 1         | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 04    |
| 29  | 1         | 1 | 1 | 1 | 0 | 2 | 1 | 0 | 07    |
| 30  | 1         | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 02    |

Mean of K-Sum is 10.3

Frequency of K-Indices

|     |    |     |    |    |   |   |   |   |   |   |   |
|-----|----|-----|----|----|---|---|---|---|---|---|---|
| K : | 0  | 1   | 2  | 3  | 4 | 5 | 6 | 7 | 8 | 9 | - |
| f : | 51 | 109 | 52 | 19 | 7 | 1 | 1 | 0 | 0 | 0 | 0 |

CANBERRA

MAGNETIC K-INDICES - JUNE 1987

Range for lower limit of K=9 is 450nT

| DAY | K-INDICES |   |   |   |   |   |   |   | K-SUM |
|-----|-----------|---|---|---|---|---|---|---|-------|
| 01  | 2         | 1 | 1 | 2 | 2 | 1 | 1 | 1 | 11    |
| 02  | 2         | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 07    |
| 03  | 1         | 2 | 1 | 1 | 1 | 0 | 1 | 1 | 08    |
| 04  | 2         | 1 | 0 | 2 | 2 | 1 | 0 | 1 | 09    |
| 05  | 0         | 1 | 1 | 1 | 2 | 2 | 0 | 0 | 07    |
| 06  | 0         | 1 | 5 | 5 | 5 | 4 | 3 | 3 | 26    |
| 07  | 2         | 1 | 1 | 3 | 2 | 1 | 2 | 0 | 12    |
| 08  | 0         | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 03    |
| 09  | 1         | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 03    |
| 10  | 0         | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 02    |
| 11  | 1         | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 08    |
| 12  | 1         | 2 | 2 | 3 | 2 | 2 | 2 | 1 | 15    |
| 13  | 1         | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 08    |
| 14  | 1         | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 08    |
| 15  | 0         | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 03    |
| 16  | 0         | 1 | 2 | 0 | 0 | 1 | 1 | 1 | 06    |
| 17  | 2         | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 06    |
| 18  | 0         | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 06    |
| 19  | 1         | 2 | 4 | 4 | 4 | 0 | 1 | 3 | 19    |
| 20  | 1         | 0 | 1 | 1 | 3 | 2 | 2 | 2 | 12    |
| 21  | 2         | 1 | 0 | 0 | 0 | 1 | 1 | 1 | 06    |
| 22  | 0         | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 03    |
| 23  | 0         | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 01    |
| 24  | 0         | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 03    |
| 25  | 0         | 1 | 0 | 1 | 0 | 1 | 1 | 3 | 07    |
| 26  | 2         | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 08    |
| 27  | 1         | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 06    |
| 28  | 0         | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 00    |
| 29  | 0         | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 05    |
| 30  | 0         | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 02    |

Mean of K-Sum is 7.3

Frequency of K-Indices

|     |    |    |    |   |   |   |   |   |   |   |   |
|-----|----|----|----|---|---|---|---|---|---|---|---|
| K : | 0  | 1  | 2  | 3 | 4 | 5 | 6 | 7 | 8 | 9 | - |
| f : | 98 | 89 | 38 | 8 | 4 | 3 | 0 | 0 | 0 | 0 | 0 |

# MAWSON

## MAGNETIC K-INDICES - JUNE 1987

Range for lower limit of K=9 is 1500nT

| DAY | K-INDICES |   |   |   |   |   |   |   | K-SUM |
|-----|-----------|---|---|---|---|---|---|---|-------|
| 01  | 4         | 4 | 3 | 2 | 4 | 2 | 3 | 3 | 25    |
| 02  | 6         | 5 | 4 | 3 | 3 | 2 | 1 | 4 | 28    |
| 03  | 1         | 2 | 2 | 3 | 2 | 1 | 4 | 3 | 18    |
| 04  | 2         | 3 | 3 | 2 | 3 | 2 | 5 | 3 | 23    |
| 05  | 4         | 3 | 2 | 2 | 4 | 3 | 3 | 5 | 26    |
| 06  | 2         | 3 | 4 | 5 | 5 | 3 | 6 | 6 | 34    |
| 07  | 4         | 2 | 2 | 2 | 4 | 3 | 5 | 5 | 27    |
| 08  | 3         | 2 | 2 | 2 | 2 | 1 | 0 | 4 | 16    |
| 09  | 2         | 2 | 1 | 1 | 1 | 1 | 1 | 3 | 12    |
| 10  | 5         | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 12    |
| 11  | 2         | 1 | 2 | 3 | 2 | 1 | 4 | 3 | 18    |
| 12  | 2         | 4 | 3 | 3 | 3 | 2 | 6 | 5 | 28    |
| 13  | 3         | 4 | 5 | 3 | 3 | 2 | 1 | 5 | 26    |
| 14  | 3         | 3 | 4 | 3 | 2 | 0 | 0 | 5 | 20    |
| 15  | 3         | 1 | 0 | 0 | 0 | 2 | 1 | 4 | 11    |
| 16  | 3         | 3 | 3 | 2 | 2 | 1 | 6 | 5 | 25    |
| 17  | 5         | 2 | 1 | 0 | 2 | 1 | 0 | 6 | 17    |
| 18  | 4         | 3 | 3 | 4 | 2 | 1 | 2 | 4 | 23    |
| 19  | 5         | 5 | 4 | 5 | 3 | 2 | 1 | 7 | 32    |
| 20  | 4         | 3 | 2 | 2 | 4 | 4 | 6 | 6 | 31    |
| 21  | 5         | 4 | 3 | 1 | 1 | 2 | 4 | 5 | 25    |
| 22  | 4         | 1 | 2 | 1 | 1 | 1 | 4 | 4 | 18    |
| 23  | 3         | 3 | 1 | 0 | 1 | 0 | 5 | 3 | 16    |
| 24  | 1         | 1 | 1 | 1 | 0 | 1 | 4 | 6 | 15    |
| 25  | 3         | 2 | 0 | 0 | 1 | 1 | 5 | 5 | 17    |
| 26  | 5         | 4 | 2 | 0 | 2 | 1 | 3 | 2 | 19    |
| 27  | 4         | 2 | 2 | 3 | 3 | 1 | 1 | 2 | 18    |
| 28  | 1         | 4 | 3 | 2 | 1 | 1 | 0 | 5 | 17    |
| 29  | 2         | 3 | 2 | 2 | 1 | 1 | 2 | 5 | 18    |
| 30  | 4         | 2 | 1 | 0 | 0 | 1 | 2 | 3 | 13    |

Mean of K-Sum is 20.9

## Frequency of K-Indices

|     |    |    |    |    |    |    |   |   |   |   |   |
|-----|----|----|----|----|----|----|---|---|---|---|---|
| K : | 0  | 1  | 2  | 3  | 4  | 5  | 6 | 7 | 8 | 9 | - |
| f : | 18 | 49 | 55 | 49 | 34 | 25 | 9 | 1 | 0 | 0 | 0 |

JUNE 1986

PRINCIPAL MAGNETIC STORMS

| OBSERVATORY     | <u>Commencement</u> |    |     | <u>SSC-amplitude</u> |      |       | <u>Max. 3hr K-index</u> |                  | <u>Ranges</u> |      |       |       | <u>UT End</u> |    |
|-----------------|---------------------|----|-----|----------------------|------|-------|-------------------------|------------------|---------------|------|-------|-------|---------------|----|
|                 | day                 | hr | min | type                 | D(') | H(nT) | Z(nT)                   | day (3hr-period) | K             | D(') | H(nT) | Z(nT) | day           | hr |
| Port Moresby    | 06                  | 06 | ..  | ...                  | ..   | ..    | ..                      | 06 (3)           | 6             | 5    | 130   | 80    | 07            | 00 |
| Charters Towers | 06                  | 07 | ..  | ...                  | ..   | ..    | ..                      | 06 (3,5)         | 6             | 8.4  | 119   | 20    | 06            | 24 |
| Gnangara        |                     |    |     |                      |      |       | NIL                     |                  |               |      |       |       |               |    |
| Canberra        | 06                  | 06 | ..  | ...                  | ..   | ..    | ..                      | 06 (3,4,5)       | 5             | 16.9 | 145   | 40    | 06            | 20 |

JUNE 1987

PRELIMINARY MONTHLY MEAN VALUES

| OBSERVATORY      | H     | D           | Z      | F     |
|------------------|-------|-------------|--------|-------|
|                  | nT    | deg min     | nT     | nT    |
| PORT MORESBY     | 35937 | 06° 35.7' E | -23716 | 43057 |
| CHARTERS TOWERS  | 31773 | 07° 45.3' E | -38270 | 49740 |
| LEARMONTH        | 29472 | 00° 37.4' W | -44423 | 53311 |
| GNANGARA         | 23228 | 03° 13.2' W | -53801 | 58601 |
| CANBERRA         | 23686 | 12° 25.4' E | -53699 | 58691 |
| MACQUARIE ISLAND | 12589 | 29° 26.9' E | -63579 | 64813 |
| MAWSON           | 18468 | 63° 57.7' W | -46195 | 49750 |
| DAVIS            | 16607 | 76° 59' W   | -52170 | 54749 |
| CASEY            | 9555  | 91° 25' W   | -64112 | 64820 |

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<br>QUALITY | TIME | SENSE AND AMPLITUDE<br>OF CHIEF MOVEMENT |       |       |
|-----------------|-----|---------------------|------|------------------------------------------|-------|-------|
|                 |     |                     |      | H(nT)                                    | D(nT) | Z(nT) |
| PORT MORESBY    |     |                     | NIL  |                                          |       |       |
| CHARTERS TOWERS |     |                     | NIL  |                                          |       |       |
| GNANGARA        |     |                     | NIL  |                                          |       |       |
| CANBERRA        |     |                     | NIL  |                                          |       |       |

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