

ABSORPTION MEASUREMENTS WITH RIOMETER

Data Summary Nº 8 for the period
October 1965 through December 1965

by

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Conselho Nacional de Pesquisas

Comissão Nacional de Atividades Espaciais

Laboratório de Física Espacial

São José dos Campos

São Paulo - Brasil

RIOMETER MEASUREMENTS

DATA SUMMARY Nº 8

I - INTRODUCTION

This summary is a catalogue of reduced riometer data, for the period of observations from October 1965 through December 1965.

Figure 1 shows a "quiet-day" curve for São José dos Campos station which was obtained from the available data since the riometer was set in operation at this site, on March 15, 1963.

For each month, the value of observation is tabulated for the first minute of each hour to the nearest 0.1 db, and the total number of readings for the month as well as the median and quartiles values are indicated in the same table. See for instance Tables IV through IX. Note that Fig. 2 also shows the monthly medians mentioned above.

Table I shows a listing of important flares which occurred under sunlight periods for the station, whereas the Table II contains all burst under sunlight period as published by H.A.O. - Boulder (Colorado).

The absorption events at the Riometer of São José dos Campos are listed in the Table III carrying time interval, maximum value of absorption, and maximum variation about cosmic noise level.

II - DESCRIPTION OF THE EQUIPMENT

RIOMETER : The riometer (Relative Ionospheric Opacity Meter) is a device for measuring ionospheric absorption using the cosmic noise method.

A high gain and stable receiver is switched automatically between an antenna and a noise diode at a given switching frequency (340 Hz).

The antenna, which in our station is an east-west four elements Yagi, points vertically and receives the cosmic noise. If there is a difference between the antenna power and the noise diode power, a wave at the switching frequency appears at the detector of the receiver. The detector output is a DC voltage which has an amplitude that is proportional to the difference between the antenna and the diode signal. The voltage is used to adjust the current of a servo diode in order to reduce the above mentioned difference to zero. The diode noise is proportional to the antenna noise power. The diode current is recorded in a common pen recorder.

The riometer is calibrated daily by connecting a test noise diode in place of the antenna and passing different values of current for readings of the riometer.

The frequency used of 30 MHz is low enough to be sensitive to the non deviative absorption effects of the lower ionosphere and yet it is sufficiently high so that a signal is detectable even under ionospheric disturbances.

III - MEASUREMENTS TECHNIQUE

In the noise method already mentioned, the absorption is measured by comparing the signal actually received with the signal that would be received in the same sidereal time under conditions of zero absorption.

In order to measure the absorption it is necessary to establish the local "quiet-day" curve. This curve is obtained from the riometer recording in the hours before the sunrise, when absorption is low. The values of current observed are transferred to the corresponding sidereal time. The highest reliable readings are considered points of the "quiet-day", which is assumed, as pointed before, to represent values of zero absorption condition.

Using the "quiet-day" curve, one can obtain the absorption in db at any given time by the relation :

$$A \text{ (db)} = 10 \log_{10} I_r / I_q$$

where :

I_r = noise power actually received at a given time

I_q = noise power from the "quiet-day" curve for the corresponding sidereal time.

IV - TYPE OF SCALING AND DATA REDUCTION

In reducing the riometer data, scalling TYPE I (URSI-AGI Committee 1958) has been used .

The absorption during the first minute of each hour of every day throughout a given period of absorption is recorded and then averaged . The results give a picture of the daily and seasonal variations of absorption.

The data reduction was performed in the following manner :

The "quiet-day" curve, assumed to represent zero absorption is plotted and hourly values of I_q is obtained. The actual values of current for each hour are translated to the correct sidereal time and the ratio $\frac{I_q}{I_r}$ is calculated. For the given ratio, the absorption in db is obtained from regular tables.

The following qualifying symbols have been used for values obtained indirectly from the record :

C = failure of equipment

S = interference

U = value uncertain

I = value interpolated

V - ABSORPTION EFFECTS ASSOCIATED WITH SOLAR FLARES

The Sun's ionizing radiation during solar flares is normally enhanced and reaches the lower level of the ionosphere increasing the absorption through the D-region producing the attenuation of the cosmic noise reaching the antenna. Sometimes prior to the observation of attenuation and depending on the relative position of the Sun and antenna beam an enhancement of noise current is observed as a result of the Sun's HF radio emissions, during solar bursts of intensity greater than 1.

Five flares occurred during the local sunlight hours, namely on October 1 and 2 and December 29 which could be clearly related to the absorption effects shown in the Riometer records, although the peak of absorption is relatively small in most of cases.

A large number of events of noise enhancements at the frequency used in the Riometer are correlated to radio emissions from the sun on 30 MHz, during solar burst phenomena.

TABLE I

IMPORTANT FLARES OCCURRED UNDER SUNLIT
PERIOD

| Date 1965 | Flare Importance | Time Interval (UT) | | | Remarks |
|--------------|---------------------|----------------------|--------------|------|-----------------------|
| | | Start | Max Phase | End | |
| October 1 | - | 2000 | 2013 | 2151 | Phase recorded at VLF |
| | 2 | 2025 | 2037 | 2204 | H. A. O. - Boulder |
| 2 | - | 1539 | 1557 | 1730 | Phase recorded at VLF |
| | 2 | 1612 | - | 1650 | H. A. O. - Boulder |
| December 29 | 2 | 1133 | - | 1155 | H. A. O. - Boulder |

TABLE II

BURSTS UNDER SUNLIT PERIOD AS PUBLISHED BY H. A. O.
BOULDER (COLORADO)

| DATE | B U R S T | | | |
|-----------|-----------|----------------------|---------|-------------------|
| | TYPE | TIME INTERVAL (UT) | | FREQ. RANGE (MHz) |
| 1965 | | | | |
| October 2 | III | 1612:15 | 1612:45 | 14-41 |
| | III | 1626 | 1627:30 | 8-41 |
| | III | 1735:45 | 1736:45 | 8-41 |
| | III | 1742:25 | 1744 | 8-41 |
| | III | 1848:30 | 1850:30 | 8-41 |
| | III | 1906 | 1907:15 | 8-41 |
| | III | 1910 | 1910:15 | 10-41 |
| | III | 1912:30 | 1913:15 | 8-41 |
| 3 | III | 1541:30 | 1541:45 | 23-36 |
| | III | 1549:15 | 1949:30 | 25-36 |
| | III | 1723:30 | 1724 | 21-38 |
| | III | 1743:15 | 1744:30 | 17-41 |
| | III | 1829:30 | 1829:45 | 27-41 |
| 4 | IV | 1411:30 | 2000 | 19-41 |
| | cont. | 2000 | 2140 | 23-41 |
| | III | 2007:30 | 2008 | 23-41 |
| | III | 2009:15 | 2010 | 20-41 |
| | III | 2045:45 | 2046 | 17-41 |
| | III | 2054:30 | 2055 | 24-41 |
| 5 | III | 1544 | 1544:15 | 20-41 |
| | III | 1600 | 1600:15 | 19-31 |
| | III | 1634:30 | 1635 | 21-38 |
| | III | 1736:30 | 1737:30 | 25-36 |
| | III | 1757:15 | 1757:45 | 10-41 |
| | III | 1808:15 | 1808:45 | 22-38 |
| | III | 1819 | 1819:30 | 19-41 |
| | III | 2027:45 | 2029:45 | 17-41 |
| | III | 2031:30 | 2031:45 | 22-35 |
| | III | 2038:15 | 2038:45 | 22-30 |
| | III | 2040:30 | 2041 | 16-41 |
| 6 | III | 1419:15 | 1420 | 20-41 |
| | III | 1540:30 | 1541:15 | 24-34 |

TABLE II (Cont.)

BURSTS UNDER SUNLIT PERIOD AS PUBLISHED BY H. A. O.
BOULDER (COLORADO)

| DATE | | B U R S T | | | |
|----------|---------|-----------|----------------------|---------|-------------------|
| 1965 | | TYPE | TIME INTERVAL (UT) | | FREQ. RANGE (MHz) |
| October | 6 | III | 1733:15 | 1733:45 | 24-40 |
| | | III | 1950:15 | 1950:45 | 19-34 |
| | 7 | III | 1533 | 1534:15 | 21-41 |
| | | III | 2002:45 | 2003:30 | 26-41 |
| | 8 | III | 1542 | 1542:30 | 26-41 |
| | | III | 1603:15 | 1606:45 | 16-41 |
| | 22 | III | 1711:45 | 1713:30 | 17-41 |
| November | 2 | III | 2008:15 | 2008:45 | 24-41 |
| | 4 | III | 1947:30 | 1947:45 | 24-41 |
| | 5 | III | 2118 | 2118:45 | 16-41 |
| | 6 | III | 1723:30 | 1725:25 | 25-41 |
| | 12 | III | 1640:45 | 1641:15 | 24-41 |
| | | III | 1645:15 | 1645:45 | 22-41 |
| | | III | 1654 | 1654:15 | 22-41 |
| | | III | 1741:45 | 1742 | 24-41 |
| | | III | 1747:15 | 1747:30 | 24-35 |
| | | III | 1755:30 | 1756 | 17-41 |
| | | III | 1823:45 | 1824:15 | 17-39 |
| | | III | 1833:45 | 1834:15 | 22-41 |
| | | III | 1904 | 1904:15 | 22-36 |
| | | III | 1905:45 | 1906:15 | 20-35 |
| III | 1906:45 | 1907:15 | 21-34 | | |
| III | 1916:15 | 1916:30 | 25-36 | | |
| III | 1917 | 1917:30 | 16-41 | | |
| III | 1919 | 1919:15 | 23-35 | | |
| III | 1925 | 1925:30 | 21-41 | | |
| III | 1935:45 | 1936 | 23-34 | | |
| III | 1940 | 1940:15 | 24-38 | | |
| III | 1944:45 | 1945 | 26-37 | | |
| III | 1947 | 1947:15 | 21-41 | | |
| III | 1953:30 | 1953:45 | 27-34 | | |
| III | 1954:45 | 1955:15 | 26-41 | | |
| III | 1955:45 | 1956 | 26-34 | | |
| | cont. | III | 1937 | 2135 | 21-41 |

TABLE II (Cont.)

BURSTS UNDER SUNLIT PERIOD AS PUBLISHED BY H. A. O.
BOULDER (COLORADO)

| DATE | | B U R S T | | |
|-------------|-------|----------------------|---------|-------------------|
| 1965 | TYPE | TIME INTERVAL (UT) | | FREQ. RANGE (MHz) |
| November 13 | cont. | 1502 | 2145 | 20-41 |
| 15 | III | 1833 | 1833:30 | 24-41 |
| 18 | III | 1813 | 1813:45 | 29-41 |
| 19 | III | 1645:45 | 1646:15 | 24-41 |
| 22 | III | 1610:30 | 1610:45 | 20-41 |
| | III | 1615:45 | 1616:15 | 24-41 |
| December 4 | III | 1835:15 | 1836:15 | 23-41 |
| 12 | III | 1653:45 | 1654:15 | 21-41 |
| 17 | III | 1641 | 1641:45 | 23-41 |
| 21 | III | 1542:45 | 1543:15 | 27-38 |
| | III | 1543:30 | 1544 | 25-36 |
| | III | 1646:15 | 1647 | 26-41 |
| | III | 1650 | 1650:30 | 26-41 |
| | III | 1941:30 | 1942:45 | 24-41 |
| | III | 2007:30 | 2008:30 | 21-41 |
| 24 | III | 1739:15 | 1739:30 | 22-41 |
| | III | 1740:15 | 1740:45 | 22-41 |
| 26 | III | 1951 | 1951:30 | 23-31 |
| | III | 1954:45 | 1955:15 | 22-30 |
| 27 | III | 1510 | 1510:15 | 22-30 |
| 28 | III | 1629:30 | 1630 | 13-41 |
| | III | 1631 | 1631:30 | 27-41 |
| | III | 1750:45 | 1751:45 | 23-38 |
| | III | 1752:15 | 1752:45 | 27-38 |
| | III | 1753 | 1753:30 | 24-39 |
| | III | 1759:30 | 1800 | 22-38 |
| | III | 1800 | 1801:15 | 23-41 |
| | III | 1943:45 | 1945:15 | 15-41 |
| | III | 2030 | 2032 | 22-41 |
| | III | 2125:15 | 2125:30 | 23-41 |
| 29 | cont. | 1425 | 1700 | 22-41 |
| | II | 1507 | 1513:30 | 25-41 |
| | II | 1534 | 1540:30 | 25-41 |

TABLE III

SCNAs AT THE RIOMETER OF SJC

| DATE | A B S O R P T I O N | | | | | R E L A T E D F L A R E | | | | |
|------|---------------------|-----------|--------------------|-------------------------------|---|-------------------------------|---------------------|-----------|--------------------|-------|
| | P E R I O D (U T) | | | M A X V A L U E (d b) | M A X V A R - I A - T I O N (d b) | I M - P O R - T A N C E | P E R I O D (U T) | | | |
| | 1965 | S T A R T | M A X P H A S E | | | | E N D | S T A R T | M A X P H A S E | E N D |
| Oct. | 1 | 1300 | 1305 | 1315 | 1.07 | 0.10 | 1 ⁺ | 1251 | - | 1315 |
| | | 1755 | 1757 | 1800 | 1.70 | 0.15 | | | | |
| | | 1850 | 1852 | 1853 | 1.61 | 0.12 | | | | |
| | 2 | 1014 | 1017 | 1018 | 0.93 | 0.21 | 2 | 1612 | - | 1650 |
| | | 1617 | 1623 | 1655 | 1.70 | 0.33 | | | | |
| | 4 | 0933 | 0940 | 0943 | 0.61 | 0.12 | 1 ⁺ | 0938 | - | 1030 |
| | | 1318 | 1319 | 1320 | 0.61 | 0.20 | | | | |
| | | 1347 | 1350 | 1354 | 0.76 | 0.23 | | | | |
| | 5 | 1657 | 1700 | 1705 | 1.82 | 0.39 | | | | |
| | | 1710 | 1712 | 1720 | 1.79 | 0.18 | | | | |
| | 7 | 1450 | 1451 | 1452 | 1.64 | 0.40 | | | | |
| | 10 | 1318 | 1319 | 1320 | 1.17 | 0.20 | | | | |
| | 11 | 0913 | 0915 | 0922 | 0.83 | 0.22 | | | | |
| | | 0925 | 0930 | 0932 | 0.93 | 0.32 | | | | |
| | 12 | 1617 | 1619 | 1621 | 1.40 | 0.40 | | | | |
| | | 1623 | 1625 | 1628 | 1.30 | 0.26 | | | | |
| | 14 | 2125 | 2126 | 2127 | 1.90 | 0.47 | | | | |
| | 17 | 1344 | 1345 | 1345 | 1.14 | 0.35 | | | | |
| | 18 | 0837 | 0840 | 0842 | 0.83 | 0.34 | | | | |
| | 19 | 1130 | 1133 | 1135 | 1.07 | 0.21 | | | | |
| | 20 | 1123 | 1125 | 1129 | 1.07 | 0.24 | | | | |
| | 25 | 1435 | 1436 | 1600 | 1.46 | 0.22 | | | | |
| | 29 | 1815 | 1816 | 1817 | 1.61 | 0.37 | | | | |
| | | 1923 | 1935 | 2000 | 1.85 | 0.21 | | | | |
| | Nov. | 1 | 1256 | 1258 | 1300 | 0.79 | 0.11 | 1 | 1217 | - |
| 7 | | 1545 | 1555 | 1557 | 2.04 | 0.34 | | | | |
| | | 1603 | 1605 | 1630 | 2.25 | 0.46 | 1 | 1558 | 1606 | 1629 |
| | | 2141 | 2142 | 2143 | 1.99 | 0.31 | 1 | 2001 | 2019 | 2045 |
| 19 | | 1058 | 1059 | 1102 | 0.79 | 0.18 | | | | |
| | 1109 | 1111 | 1113 | 0.90 | 0.26 | | | | | |

TABLE III (Cont.)

SCNAs AT THE RIOMETER OF SJC

| DATE | A B S O R P T I O N | | | | | R E L A T E D F L A R E | | | |
|---------|---------------------|--------------------|-------|-------------------------------|---|-------------------------------|---------------------|--------------------|-------|
| | P E R I O D (U T) | | | M A X V A L U E (d b) | M A X V A R - I A - T I O N (d b) | I M - P O R - T A N C E | P E R I O D (U T) | | |
| | S T A R T | M A X P H A S E | E N D | | | | S T A R T | M A X P H A S E | E N D |
| 1965 | | | | | | | | | |
| Nov. 20 | 1105 | 1106 | 1108 | 0.90 | 0.22 | | | | |
| Dec. 1 | 1445 | 1447 | 1448 | 1.37 | 0.20 | | | | |
| 3 | 0823 | 0825 | 0827 | 0.72 | 0.23 | | | | |
| 4 | 0906 | 0910 | 0913 | 0.97 | 0.33 | | | | |
| 5 | 1722 | 1725 | 1730 | 1.46 | 0.42 | | | | |
| 8 | 0823 | 0825 | 0827 | 0.79 | 0.11 | | | | |
| 9 | 1625 | 1631 | 1640 | 1.37 | 0.16 | | | | |
| 12 | 0838 | 0839 | 0840 | 0.64 | 0.19 | | | | |
| | 1825 | 1827 | 1828 | 1.70 | 0.33 | | | | |
| 18 | 1745 | 1755 | 1800 | 1.99 | 0.12 | | | | |
| 19 | 1636 | 1638 | 1642 | 1.76 | 0.33 | | | | |
| | 1930 | 1935 | 1938 | 1.37 | 0.23 | | | | |
| 23 | 1221 | 1223 | 1224 | 0.45 | 0.32 | | | | |
| | 1243 | 1247 | 1249 | 0.61 | 0.28 | | | | |
| 24 | 0954 | 1000 | 1008 | 0.64 | 0.35 | | | | |
| 25 | 0835 | 0837 | 0845 | 0.53 | 0.16 | | | | |
| 29 | 1210 | 1212 | 1213 | 1.20 | 0.27 | 2 | 1133 | - | 1155 |
| 31 | 0855 | 0857 | 0858 | 0.49 | 0.12 | | | | |

VI - " QUIET-DAY " CURVE

The "quiet-day" curve for this station has been obtained from all the available data from the operation of the riometer during a period of relatively low absorption.

However in this procedure it seems that some errors have been introduced in the "quiet-day" curve, which became apparent while reduction of riometer data was performed in terms of daily absorption. They occurred as a consequence of including values obtained from hours when the absorption was low but could not be disregarded or considered equal to ZERO.

The whole "quiet-day" curve is being revised continuously using data corresponding to local time between 0300 AM and 0600 AM, when the absorption is low.

Due to equipment failure which occurred during the regular operation of the riometer, care should be taken while using the " quiet - day " curve to reduce riometer data (see Appendix I).

During the months of October and November, 1964 the riometer records presented a distortion on the daily curve with the $\frac{I_{max}}{I_{min}}$ reduced

of 15% to 25%, This was attributed to an equipment failure rather than to an external cause, solar or ionospheric. For the above reason the data of October was considered unreliable and was not reduced to absorption.

The "quiet-day" curve "b" of Fig. IV corrected as shown in Fig. I was used in the data reduction in the period from October through December 1965.

The time scale in the "quiet day" curve is the sidereal hour (referred to the first point of Aries). The sidereal time corresponding to 0000 GMT for the middle of each month is given in the table in Appendix II.

VII - CONCLUSION

Except for very strong interference produced by thunder storms, typical of the summer period in this latitude, this station is placed in a very quiet location.

The riometer records are quiet free from man made interferences.

Due to the reasons mentioned before, the results on the absorption deduced from the "quiet-day" curve as it stands now, should be considered qualitative rather than quantitative information.

More results with consistent operation of the riometer are needed and provide data for a detailed study of the seasonal variation of non-deviative absorption.

This station will continue its operation and will provide data on

ionospheric absorption in a cooperative program for the International Quiet Sun Year (1964 - 1965).

Data will be sent to the World Data Center, as established in the Guide to International Data Exchange, CIG - IQSY Committee. The recordings are reproduced in the AFCRL publication Geophysics and Space Data Bulletin.

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P. R. - CNPq.
 Comissão Nacional de Atividades Espaciais
 São José dos Campos - SP - Brasil

MEAN VALUE OF ABSORPTION DURING THE FIRST MINUTE OF EACH HOUR

| | | | | | |
|----------------|---------|----------------|------------|-------------------------|---------|
| Station | SJ | Lat. | 23912'43"S | Freq. | 30 MHz |
| Month | October | Long. | 45951'35"W | Bandwidth | 30 KHz |
| Year | 1965 | DIP | 22.59S | Diode Load Resist. | 750 ohm |
| Riometer | Mark II | Mag. Lat. | 11.79S | Audio Threshold | 3 |
| | | Alt. | 623 m | Int. Time | 4 sec |
| | | | | ACG Time | 4 sec |

TABLE IV

| Hour Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 1.04 | 0.72 | 0.49 | 0.53 | 0.61 | 0.61 | 0.45 | 0.72 | 0.76 | 0.57 | 0.86 | 0.83 | 0.93 | 1.00 | 1.27 | 1.52 | 1.58 | 1.58 | 1.52 | 1.24 | 1.24 | 1.07 | 0.86 | 0.76 |
| 2 | 0.79 | 0.72 | 0.45 | 0.49 | 0.61 | 0.64 | 0.76 | 0.76 | 0.79 | 0.79 | 0.86 | 0.83 | 0.93 | 1.04 | 1.14 | 1.40 | 1.55 | 1.14 | 1.24 | 1.46 | 1.46 | 1.40 | 1.40 | 1.58 |
| 3 | 1.14 | 1.00 | 0.57 | 0.49 | 0.61 | 0.64 | 0.49 | 0.53 | 0.68 | 0.57 | 0.61 | 0.83 | 0.72 | 0.86 | 0.90 | 0.97 | 1.14 | 1.17 | 0.83 | 0.64 | 0.68 | 0.64 | 0.49 | 0.76 |
| 4 | 0.79 | 0.64 | 0.53 | 0.45 | 0.61 | 0.64 | 0.25 | 0.41 | 0.49 | 0.49 | 0 | 0.5 | 0.17 | 0.41 | 0.83 | 0.93 | 1.21 | 1.17 | 1.49 | 1.43 | 1.24 | 1.10 | 1.24 | 1.27 |
| 5 | 0.79 | 0.97 | 0.76 | 0.53 | 0.61 | 0.64 | 0.49 | 0.45 | 0.49 | 0.57 | 0.61 | 0.83 | 0.97 | 1.04 | 1.14 | 1.43 | 1.72 | 1.90 | 1.70 | 1.61 | 1.58 | 1.52 | 1.24 | 1.33 |
| 6 | 0.86 | 0.93 | 0.72 | 0.53 | 0.61 | 0.64 | 0.53 | 0.49 | 0.72 | 0.57 | 0.61 | 0.86 | 0.79 | 0.93 | 0.97 | 1.30 | 1.61 | 1.93 | 1.90 | 2.01 | 1.64 | 1.46 | 1.52 | 1.58 |
| 7 | 1.00 | 1.00 | 0.72 | 0.68 | 0.61 | 0.93 | 0.53 | 0.61 | 0.49 | 0.57 | 0.61 | 0.64 | 0.79 | 0.97 | 1.04 | 1.33 | 1.85 | 1.90 | 1.70 | 1.85 | 1.87 | 1.46 | 1.27 | 1.37 |
| 8 | 0.76 | 0.17 | 0.45 | 0.68 | 0.86 | 0.93 | 0.79 | 0.61 | 0.72 | 0.61 | 0.61 | 0.64 | 0.79 | 1.00 | 1.04 | 1.14 | 1.00 | 1.17 | 1.17 | 1.14 | 1.00 | 0.83 | 1.43 | 1.87 |
| 9 | 1.04 | 1.00 | 0.64 | 0.64 | 0.61 | 0.64 | 0.83 | 0.64 | 0.53 | 0.61 | 0.61 | 0.64 | 0.72 | 0.79 | 0.93 | 0.83 | 1.17 | 1.35 | 1.24 | 1.58 | 1.14 | 1.10 | 1.24 | 1.17 |
| 10 | 0.79 | 0.86 | 0.86 | 0.93 | 0.86 | 0.93 | 0.61 | 0.90 | 0.76 | 0.61 | 0.61 | 0.64 | 0.83 | 1.04 | 1.04 | 0.86 | 1.10 | 2.33 | 1.07 | 1.30 | 1.43 | 1.58 | 1.79 | 1.27 |
| 11 | 0.53 | 0.86 | 0.61 | 0.61 | 0.86 | 0.93 | 0.86 | 0.68 | 0.76 | 0.61 | 0.83 | 0.90 | 0.83 | 0.76 | 0.90 | 1.10 | 1.52 | 1.58 | 1.43 | 1.43 | 1.27 | 1.07 | 1.10 | 1.27 |
| 12 | 1.00 | 0.61 | 0.33 | 0.37 | 0.61 | 0.68 | 0.64 | 0.72 | 0.53 | 0.49 | 0.49 | 0.57 | 0.76 | 0.68 | 0.72 | 0.83 | 0.97 | 1.17 | 1.10 | 1.04 | 1.10 | 1.30 | 1.30 | 1.10 |
| 13 | 0.86 | 0.68 | 0.33 | 0.37 | 0.61 | 0.45 | 0.64 | 0.61 | 0.53 | 0.49 | 0.61 | 0.57 | 0.79 | 0.93 | 0.97 | 1.21 | 1.61 | 1.70 | 1.90 | 1.90 | 1.90 | 2.01 | 1.83 | 1.27 |
| 14 | 0.90 | 0.68 | 0.57 | 0.64 | 0.61 | 0.49 | 0.68 | 0.76 | 0.53 | 0.61 | 0.61 | 0.49 | 0.79 | 0.76 | 1.21 | 1.27 | 1.46 | c | c | 1.46 | 1.87 | 1.82 | 1.33 | 1.04 |
| 15 | 0.57 | 0.53 | 0.53 | 0.61 | 0.61 | 0.72 | 0.68 | 0.64 | 0.57 | 0.49 | 0.49 | 0.49 | 0.68 | 0.61 | 0.79 | 0.86 | 1.14 | 1.37 | 1.67 | 1.87 | 1.61 | 1.49 | 1.30 | 1.30 |

TIME - UT

Month: October
Year: 1965

TABLE V

| Hour Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 16 | 0.72 | 0.64 | 0.53 | 0.61 | 0.61 | 0.72 | 0.79 | 0.64 | 0.57 | 0.49 | 0.61 | 0.61 | 0.61 | 0.72 | 0.83 | 1.04 | 1.17 | 1.17 | 1.30 | 1.37 | 1.17 | 0.79 | 0.90 | 0.86 |
| 17 | 0.68 | 0.45 | 0.49 | 0.37 | 0.64 | 0.76 | 0.49 | 0.68 | 0.57 | 0.49 | 0.61 | 0.61 | 0.64 | 0.76 | 0.86 | 1.07 | 1.40 | 1.43 | 1.33 | 1.21 | 1.17 | 0.93 | 0.83 | 0.72 |
| 18 | 0.49 | 0.45 | 0.49 | 0.61 | 0.64 | 0.76 | 0.53 | 0.68 | 0.57 | 0.49 | 0.61 | 0.64 | 0.68 | 0.90 | 0.97 | 1.14 | 1.27 | 1.17 | 1.24 | 1.37 | 1.14 | 1.52 | 1.49 | 0.86 |
| 19 | 0.64 | 0.21 | 0.72 | 0.86 | 0.64 | 1.04 | 0.79 | 0.68 | 0.57 | 0.61 | 0.61 | 0.76 | 0.90 | 0.90 | 0.93 | 1.10 | 1.30 | 1.37 | 1.55 | 1.49 | 1.55 | 1.76 | 1.40 | 0.79 |
| 20 | 0.41 | 0.49 | 0.45 | 0.61 | 0.90 | 1.04 | 0.79 | 0.68 | 0.61 | 0.61 | 0.64 | 0.97 | 0.90 | 0.93 | 1.24 | 1.40 | 1.82 | 1.82 | 1.61 | 1.58 | 1.76 | 1.95 | 1.76 | 0.90 |
| 21 | 0.72 | 0.49 | 0.68 | 0.86 | 0.90 | 0.79 | 0.73 | 0.72 | 0.61 | 0.61 | 0.64 | 0.76 | 0.72 | 0.97 | 1.04 | 1.07 | 1.40 | 1.30 | 1.40 | 1.14 | 1.04 | 1.52 | 2.04 | 1.07 |
| 22 | 0.90 | 0.72 | 0.68 | 0.61 | 0.93 | 1.07 | 0.86 | 0.72 | 0.61 | 0.61 | 0.64 | 0.79 | 0.97 | 1.04 | 1.19 | 1.37 | 1.49 | 1.70 | 1.30 | c | c | c | c | c |
| 23 | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c | c |
| 24 | 0.90 | 0.64 | 0.64 | 0.61 | 0.64 | 0.57 | 0.64 | 0.72 | 0.61 | 0.61 | 0.86 | 0.79 | 0.79 | 0.76 | 1.24 | 1.46 | 1.58 | 1.76 | 1.43 | 1.00 | 0.90 | 0.93 | 0.97 | 0.93 |
| 25 | 1.21 | 0.86 | 0.93 | 0.86 | 0.93 | 0.83 | 0.58 | 0.53 | 0.61 | 0.61 | 0.86 | 0.83 | 1.04 | 1.04 | 1.21 | 1.30 | 1.61 | 1.82 | 1.76 | 1.72 | 1.64 | 1.72 | 1.90 | 1.40 |
| 26 | 1.21 | 0.86 | 0.90 | 0.86 | 0.93 | 0.86 | 0.93 | 0.76 | 0.61 | 0.61 | 0.64 | 0.72 | 0.86 | 1.07 | 1.10 | 1.17 | 1.76 | 1.85 | 1.79 | 1.61 | 1.33 | 1.24 | 1.27 | 1.04 |
| 27 | 1.17 | 0.83 | 0.61 | 0.61 | 0.93 | 0.64 | 0.61 | 0.53 | 0.49 | 0.61 | 0.57 | 0.37 | 0.68 | 0.76 | 0.97 | 1.37 | 1.67 | 1.79 | 1.79 | 2.09 | 1.95 | 1.30 | 1.55 | 1.00 |
| 28 | 0.79 | 0.57 | 0.64 | 0.90 | 0.97 | 0.93 | 0.97 | 0.53 | 0.61 | 0.61 | 0.57 | 0.57 | 0.72 | 0.97 | 1.04 | 1.27 | 1.24 | 1.27 | 1.37 | 1.40 | 1.27 | 1.24 | 1.52 | 1.30 |
| 29 | 0.68 | 0.33 | 0.37 | 0.37 | 0.45 | 0.68 | 0.76 | 0.76 | 0.61 | 0.61 | 0.61 | 0.79 | 0.64 | 0.76 | 0.49 | 0.88 | 0.93 | 1.17 | 1.24 | 1.30 | 1.67 | 1.93 | 1.99 | 1.24 |
| 30 | 0.68 | 0.53 | 0.61 | 0.61 | 0.72 | 0.68 | 0.64 | 0.57 | 0.49 | 0.49 | 0.61 | 0.41 | 0.68 | 0.79 | 0.90 | 1.10 | 1.40 | 1.64 | 1.52 | 1.46 | 1.43 | 1.70 | 1.79 | 1.21 |
| 31 | 1.14 | 0.76 | 0.61 | 0.61 | 0.72 | 0.45 | 0.64 | 0.45 | 0.49 | 0.49 | 0.61 | 0.61 | 0.72 | 0.64 | 0.76 | 1.10 | 1.30 | 1.46 | 1.52 | 1.43 | 1.43 | 1.61 | 2.04 | 2.09 |
| Count | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| IQ | 1.04 | 0.86 | 0.72 | 0.68 | 0.90 | 0.93 | 0.79 | 0.72 | 0.68 | 0.61 | 0.64 | 0.83 | 0.90 | 0.97 | 1.10 | 1.30 | 1.61 | 1.82 | 1.76 | 1.61 | 1.64 | 1.72 | 1.79 | 1.37 |
| Median | 0.86 | 0.68 | 0.61 | 0.61 | 0.64 | 0.72 | 0.64 | 0.68 | 0.57 | 0.61 | 0.61 | 0.68 | 0.79 | 0.90 | 0.97 | 1.14 | 1.40 | 1.58 | 1.49 | 1.46 | 1.43 | 1.46 | 1.40 | 1.24 |
| IQ | 0.68 | 0.49 | 0.49 | 0.49 | 0.61 | 0.64 | 0.53 | 0.53 | 0.53 | 0.49 | 0.61 | 0.61 | 0.68 | 0.76 | 0.86 | 1.07 | 1.21 | 1.17 | 1.24 | 1.24 | 1.17 | 1.07 | 1.24 | 0.90 |

TIME - UT

P. R. - CNPq.
 Comissão Nacional de Atividades Espaciais
 São José dos Campos - SP - Brasil

MEAN VALUE OF ABSORPTION DURING THE FIRST MINUTE OF EACH HOUR

Station - SJ
 Month - November
 Year - 1965
 Riometer - Mark II
 Lat. - 23°12'43"S
 Long. - 45°51'35"W
 DIP - 22.59S
 Mag. Lat. - 11.79 S
 Alt. - 623 m
 Freq. - 30 MHz
 Bandwidth - 30 KHz
 Diode Load Resist - 750 ohm
 Audio Threshold - 3
 Int. Times - 4 sec
 ACG Time - 4 sec

TABLE VI

| Hour Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 1.37 | 1.00 | 0.86 | 0.90 | 1.00 | 0.76 | 0.68 | 0.57 | 0.61 | 0.61 | 0.61 | 0.64 | 0.96 | 0.68 | 0.90 | 1.14 | 1.14 | 1.33 | 1.37 | 1.43 | 1.70 | 2.33 | 2.06 | 1.40 |
| 2 | 1.07 | 0.76 | 0.61 | 0.64 | 0.76 | 0.68 | 0.57 | 0.49 | 0.53 | 0.64 | 0.49 | 0.49 | 0.61 | 0.92 | 0.90 | 1.21 | 1.24 | 1.40 | 1.46 | 1.46 | 1.55 | 1.82 | 1.97 | 1.37 |
| 3 | 0.79 | 0.72 | 0.61 | 0.90 | 0.76 | 0.79 | 0.49 | 0.49 | 0.40 | 0.53 | 0.64 | 0.49 | 0.64 | 0.76 | 0.97 | 1.27 | 1.27 | 1.43 | 1.61 | 1.43 | 1.24 | 0.97 | 0.97 | 0.97 |
| 4 | 0.76 | 0.68 | 0.61 | 0.64 | 0.76 | 0.79 | 0.45 | 0.49 | 0.49 | 0.53 | 0.64 | 0.90 | 0.93 | 1.24 | 1.14 | 1.37 | 1.40 | 1.55 | 1.46 | 1.64 | 1.83 | 1.76 | 1.37 | 1.07 |
| 5 | 0.97 | 0.68 | 0.86 | 0.90 | 0.79 | 0.83 | 0.83 | 0.57 | 0.49 | 0.53 | 0.76 | 0.72 | 0.97 | 1.04 | 1.07 | 1.14 | 1.33 | 1.40 | 1.30 | 1.37 | 1.21 | 0.97 | 1.30 | 0.93 |
| 6 | 0.97 | 0.68 | 0.61 | 0.64 | 0.79 | 0.64 | 0.49 | 0.49 | 0.29 | 0.53 | 0.49 | 0.45 | 0.57 | 0.76 | 0.93 | 1.21 | 1.33 | 1.55 | 1.46 | 1.10 | 1.33 | 1.79 | 1.21 | 0.64 |
| 7 | 0.68 | 0.93 | 1.04 | 0.64 | 1.07 | 0.86 | 0.72 | 0.61 | 0.61 | 0.64 | 0.68 | 0.61 | 0.61 | 0.97 | 1.14 | 1.37 | 1.61 | 1.96 | 1.58 | 1.58 | 1.93 | 1.96 | 1.24 | 1.24 |
| 8 | 0.61 | 0.64 | 0.61 | 0.64 | 0.57 | 0.90 | 0.72 | 0.61 | 0.49 | 0.57 | 0.49 | 0.79 | 1.00 | 1.17 | 1.17 | 1.30 | 1.52 | 1.46 | 1.55 | 1.52 | 1.67 | 1.79 | 1.40 | 1.49 |
| 9 | 0.61 | 0.64 | 0.61 | 0.97 | 0.86 | 0.90 | 0.76 | 0.61 | 0.61 | 0.64 | 0.72 | 0.64 | 0.86 | 0.86 | 1.10 | 1.21 | 1.24 | 1.33 | 1.04 | 0.93 | 0.97 | 1.37 | 1.10 | 0.97 |
| 10 | 0.61 | 0.64 | 0.90 | 0.97 | 0.86 | 0.93 | 0.57 | 0.61 | 0.61 | 0.64 | 0.72 | 0.69 | 0.72 | 0.72 | 0.90 | 1.04 | 1.21 | 1.43 | 1.40 | 1.33 | 1.37 | 1.70 | 1.27 | 1.21 |
| 11 | 0.57 | 0.61 | 0.61 | 0.93 | 0.90 | 0.93 | 0.76 | 0.61 | 0.61 | 0.68 | 0.76 | 0.90 | 0.96 | 0.83 | 0.97 | 1.27 | 1.46 | 1.33 | 1.40 | 1.21 | 1.52 | 1.55 | 1.21 | 1.17 |
| 12 | 0.57 | 0.64 | 0.61 | 0.72 | 0.68 | 0.53 | 0.76 | 0.61 | 0.61 | 0.68 | 0.76 | 0.93 | 0.97 | 1.04 | 1.27 | 1.17 | 1.27 | 1.37 | 1.52 | 1.37 | 1.24 | 1.46 | 1.30 | 1.04 |
| 13 | 0.79 | 0.64 | 0.90 | 0.97 | 1.00 | 1.00 | 0.76 | 0.83 | 0.61 | 0.68 | 0.79 | 0.76 | 0.83 | 0.93 | 1.33 | 1.52 | 1.85 | 2.04 | 1.87 | 1.85 | 1.61 | 1.49 | 1.45 | 1.17 |
| 14 | 1.07 | 0.86 | 0.90 | 1.00 | 0.93 | 1.00 | 0.79 | 0.83 | 0.61 | 0.68 | 0.79 | 0.79 | 0.86 | 0.97 | 1.24 | 1.37 | 1.21 | 1.33 | 1.64 | 2.04 | 2.04 | 1.61 | 0.86 | 0.68 |
| 15 | 0.79 | 0.61 | 0.61 | 0.72 | 0.97 | 1.00 | 0.79 | 0.83 | 0.61 | 0.72 | 0.83 | 0.83 | 0.90 | 1.21 | 1.17 | 1.40 | 1.46 | 1.46 | 1.49 | 1.52 | 1.46 | 1.52 | 1.43 | 1.43 |

TIME - UT

Month: November
Year: 1965

TABLE VII

| Hour Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 16 | 0.96 | 0.86 | 1.04 | 1.14 | 1.00 | 1.04 | 0.79 | 0.83 | 0.83 | 0.93 | 1.17 | 1.04 | 1.10 | 1.07 | 1.21 | 1.21 | 1.24 | 1.24 | 1.27 | 1.33 | 1.58 | 1.24 | 0.79 | 0.79 |
| 17 | 0.76 | 0.61 | 0.64 | 0.76 | 0.76 | 1.04 | 0.57 | 0.61 | 0.61 | 0.64 | 0.68 | 0.61 | 1.10 | 1.00 | 1.04 | 1.07 | 1.24 | 1.37 | 1.27 | 1.33 | 1.33 | 1.55 | 1.61 | 1.46 |
| 18 | 0.72 | 0.88 | 0.90 | 1.04 | 1.04 | 1.30 | 0.79 | 0.61 | 0.61 | 0.76 | 0.68 | 0.83 | 0.76 | 0.97 | 1.14 | 1.27 | 1.46 | 1.43 | 1.30 | 1.17 | 1.17 | 1.27 | 1.58 | 1.30 |
| 19 | 0.68 | 0.61 | 0.90 | 1.04 | 0.83 | 1.04 | 0.61 | 0.61 | 0.61 | 0.64 | 0.72 | 0.86 | 0.79 | 0.97 | 1.14 | 1.24 | 1.27 | 1.30 | 1.17 | 1.17 | 0.97 | 0.90 | 0.97 | 0.49 |
| 20 | 0.45 | 0.61 | 0.90 | 0.53 | 0.57 | 0.83 | 0.49 | 0.49 | 0.53 | 0.64 | 0.72 | 0.68 | 0.86 | 0.72 | 1.14 | 1.27 | 1.27 | 1.21 | 1.30 | 1.21 | 1.10 | 1.30 | 1.55 | 1.40 |
| 21 | 0.97 | 1.00 | 0.93 | 0.79 | 0.64 | 0.72 | 0.61 | 0.49 | 0.53 | 0.49 | 0.57 | 0.57 | 0.76 | 0.93 | 1.07 | 1.30 | 1.40 | 1.30 | 1.27 | 1.27 | 1.52 | 1.33 | 1.24 | 1.24 |
| 22 | 0.41 | 0.61 | 0.64 | 0.57 | 1.10 | 0.64 | 0.61 | 0.61 | 0.53 | 0.68 | 0.57 | 0.76 | 0.79 | 1.14 | 1.10 | 1.30 | 1.43 | 1.46 | 1.43 | 1.43 | 1.43 | 1.14 | 0.90 | 0.29 |
| 23 | 0.64 | 0.61 | 0.68 | 0.61 | 0.68 | 0.76 | 0.61 | 0.49 | 0.53 | 0.53 | 0.61 | 0.57 | 0.86 | 0.76 | 0.86 | 0.97 | 1.24 | 1.27 | 1.10 | 0.79 | 0.68 | 0.90 | 0.90 | 0.64 |
| 24 | 0.64 | 0.61 | 0.68 | 0.61 | 0.68 | 0.76 | 0.61 | 0.49 | 0.53 | 0.53 | 0.61 | 0.57 | 0.86 | 0.76 | 0.86 | 0.97 | 1.24 | 1.27 | 1.10 | 0.79 | 0.68 | 0.90 | 0.90 | 0.64 |
| 25 | 0.64 | 0.61 | 0.68 | 0.61 | 0.68 | 0.76 | 0.61 | 0.49 | 0.53 | 0.53 | 0.61 | 0.57 | 0.86 | 0.76 | 0.86 | 0.97 | 1.24 | 1.27 | 1.10 | 0.79 | 0.68 | 0.90 | 0.90 | 0.64 |
| 26 | 0.64 | 0.61 | 0.68 | 0.61 | 0.68 | 0.76 | 0.61 | 0.49 | 0.53 | 0.53 | 0.61 | 0.57 | 0.86 | 0.76 | 0.86 | 0.97 | 1.24 | 1.27 | 1.10 | 0.79 | 0.68 | 0.90 | 0.90 | 0.64 |
| 27 | 0.64 | 0.61 | 0.68 | 0.61 | 0.68 | 0.76 | 0.61 | 0.49 | 0.53 | 0.53 | 0.61 | 0.57 | 0.86 | 0.76 | 0.86 | 0.97 | 1.24 | 1.27 | 1.10 | 0.79 | 0.68 | 0.90 | 0.90 | 0.64 |
| 28 | 0.64 | 0.61 | 0.68 | 0.61 | 0.68 | 0.76 | 0.61 | 0.49 | 0.53 | 0.53 | 0.61 | 0.57 | 0.86 | 0.76 | 0.86 | 0.97 | 1.24 | 1.27 | 1.10 | 0.79 | 0.68 | 0.90 | 0.90 | 0.64 |
| 29 | 0.61 | 0.61 | 0.72 | 0.68 | 0.76 | 0.79 | 0.61 | 0.49 | 0.53 | 0.53 | 0.61 | 0.57 | 0.86 | 0.76 | 0.86 | 0.97 | 1.24 | 1.27 | 1.10 | 0.79 | 0.68 | 0.90 | 0.90 | 0.64 |
| 30 | 0.37 | 0.61 | 0.72 | 0.68 | 0.76 | 0.79 | 0.61 | 0.49 | 0.53 | 0.53 | 0.61 | 0.57 | 0.86 | 0.76 | 0.86 | 0.97 | 1.24 | 1.27 | 1.10 | 0.79 | 0.68 | 0.90 | 0.90 | 0.64 |
| 31 | 0.37 | 0.61 | 0.72 | 0.68 | 0.76 | 0.79 | 0.61 | 0.49 | 0.53 | 0.53 | 0.61 | 0.57 | 0.86 | 0.76 | 0.86 | 0.97 | 1.24 | 1.27 | 1.10 | 0.79 | 0.68 | 0.90 | 0.90 | 0.64 |
| Count | 30 | 29 | 29 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 29 | 30 | 30 | 30 | 30 |
| UQ | 0.93 | 0.86 | 0.90 | 0.97 | 0.97 | 1.00 | 0.76 | 0.61 | 0.61 | 0.68 | 0.76 | 0.83 | 0.93 | 1.07 | 1.21 | 1.37 | 1.40 | 1.55 | 1.55 | 1.52 | 1.58 | 1.70 | 1.37 | 1.24 |
| Median | 0.68 | 0.64 | 0.68 | 0.72 | 0.76 | 0.79 | 0.61 | 0.61 | 0.61 | 0.64 | 0.68 | 0.72 | 0.83 | 0.97 | 1.10 | 1.24 | 1.27 | 1.40 | 1.43 | 1.33 | 1.33 | 1.30 | 1.14 | 0.97 |
| LQ | 0.61 | 0.61 | 0.61 | 0.64 | 0.68 | 0.72 | 0.57 | 0.49 | 0.53 | 0.53 | 0.61 | 0.61 | 0.76 | 0.79 | 0.97 | 1.14 | 1.24 | 1.30 | 1.27 | 1.21 | 1.10 | 0.97 | 0.90 | 0.61 |

TIME - UT

P. R. - CNFC.
 Comissão Nacional de Atividades Espaciais
 São José dos Campos - SP - Brasil

MEAN VALUE OF ABSORPTION DURING THE FIRST MINUTE OF EACH HOUR

| | | | | | |
|----------|----------|-----------|--------------|--------------------|-----------|
| Station | - ST | Lat. | - 23°12'43"S | Freq. | - 30 MHz |
| Month | December | Long. | - 45°51'35"W | Bandwidth | - 30 KHz |
| Year | 1965 | DIP | - 22.5°S | Diode Load Resist. | - 750 ohm |
| Riometer | Mark II | Mag. Lat. | - 11.7°S | Audio Threshold | - 3 |
| | | Alt. | - 623 m | Int. Time | - 4 sec |
| | | | | ACG Time | - 4 sec |

| Hour Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1 | 0.76 | 0.76 | 0.72 | 0.72 | 0.72 | 0.68 | 0.72 | 0.72 | 0.72 | 0.83 | 0.72 | 0.83 | 1.04 | 1.17 | 1.07 | 1.24 | 1.30 | 1.21 | 1.43 | 1.46 | 1.21 | 1.09 | 0.90 | 0.90 |
| 2 | 1.04 | 0.49 | 0.76 | 0.76 | 0.57 | 0.57 | 0.49 | 0.53 | 0.61 | 0.53 | 0.68 | 0.79 | 1.07 | 1.27 | 1.21 | 1.30 | 1.40 | 1.30 | 0.97 | 1.49 | 1.14 | 0.90 | 0.83 | 0.61 |
| 3 | 0.49 | 0.49 | 0.76 | 0.76 | 0.57 | 0.57 | 0.49 | 0.53 | 0.41 | 0.57 | 0.49 | 0.90 | 0.90 | 1.14 | 1.24 | 1.30 | 1.40 | 1.43 | 1.55 | 1.33 | 1.37 | 1.37 | 0.93 | 0.86 |
| 4 | 0.76 | 0.76 | 0.79 | 0.79 | 0.79 | 0.68 | 0.61 | 0.61 | 0.64 | 0.57 | 0.92 | 0.68 | 0.97 | 1.17 | 1.10 | 1.24 | 1.24 | 1.27 | 1.30 | 1.33 | 1.27 | 0.86 | 0.79 | 0.61 |
| 5 | 0.49 | 0.49 | 0.79 | 0.79 | 0.57 | 0.57 | 0.49 | 0.49 | 0.45 | 0.61 | 0.76 | 0.90 | 1.00 | 1.04 | 1.00 | 1.07 | 1.10 | 1.14 | 1.27 | 1.45 | 1.07 | 0.83 | 0.49 | 0.57 |
| 6 | 0.49 | 0.49 | 0.57 | 0.57 | 0.61 | 0.49 | 0 | 0 | 0 | 0 | 0 | 0.53 | 0.79 | 1.14 | 1.21 | 1.24 | 1.27 | 1.10 | 1.27 | 1.17 | 0.99 | 0.72 | 0.49 | 0.45 |
| 7 | 0.49 | 0.53 | 0.61 | 0.61 | 0.49 | 0.49 | 0.29 | 0.33 | 0.49 | 0.37 | 0.41 | 0.45 | 0.53 | 0.72 | 1.10 | 0.93 | 1.07 | 0.90 | 1.14 | 1.10 | 1.00 | 1.04 | 0.72 | 0.83 |
| 8 | 0.76 | 0.79 | 0.61 | 0.61 | 0.61 | 0.61 | 0.61 | 0.64 | 0.68 | 0.68 | 0.68 | 0.68 | 0.93 | 1.04 | 0.97 | 1.21 | 1.29 | 1.30 | 1.43 | 1.33 | 1.14 | 1.27 | 0.79 | 0.83 |
| 9 | 0.76 | 1.07 | 1.00 | 1.00 | 1.07 | 0.93 | 0.93 | 0.57 | 0.37 | 0.25 | 0.72 | 0.53 | 0.97 | 1.10 | 1.14 | 1.27 | 1.43 | 1.27 | 1.37 | 1.33 | 1.07 | 1.24 | 0.64 | 0.57 |
| 10 | 0.76 | 0.83 | 0.90 | 0.53 | 0.86 | 0.72 | 0.93 | 0.57 | 0.41 | 0.09 | 0.57 | 0.79 | 0.72 | 0.90 | 0.97 | 1.07 | 1.21 | 1.14 | 1.37 | 1.43 | 1.10 | 1.24 | 0.61 | 0.61 |
| 11 | 0.49 | 0.53 | 0.68 | 0.68 | 0.53 | 0.49 | 0.49 | 0.33 | 0.13 | 0 | 0.53 | 0.57 | 0.72 | 0.79 | 0.90 | 1.07 | 1.17 | 1.21 | 1.30 | 1.37 | 1.17 | 0.99 | 0.61 | 0.40 |
| 12 | 0.49 | 0.53 | 0.72 | 0.72 | 0.64 | 0.61 | 0.49 | 0.37 | 0.17 | 0 | 0.57 | 0.61 | 0.83 | 0.90 | 0.93 | 1.07 | 1.14 | 1.17 | 1.37 | 1.46 | 1.33 | 1.17 | 0.57 | 0.79 |
| 13 | 0.49 | 0.68 | 0.72 | 0.72 | 0.64 | 0.72 | 0.61 | 0.57 | 0.57 | 0.53 | 0.61 | 0.64 | 0.79 | 0.93 | 0.90 | 1.10 | 1.21 | 1.40 | 1.46 | 1.67 | 1.07 | 0.79 | 0.57 | 0.49 |
| 14 | 0.49 | 0.57 | 0.53 | 0.53 | 0.53 | 0.49 | 0.49 | 0.37 | 0.49 | 0.41 | 0.49 | 0.57 | 0.68 | 0.93 | 1.04 | 1.24 | 1.24 | 1.30 | 1.37 | 1.10 | 0.90 | 0.68 | 0.53 | 0.40 |
| 15 | 0.49 | 0.45 | 0.41 | 0.41 | 0.57 | 0.49 | 0.49 | 0.37 | 0.29 | 0.41 | 0.37 | 0.79 | 0.79 | 0.99 | 1.07 | 1.24 | 1.37 | 1.37 | 1.55 | 1.49 | 1.00 | 0.90 | 0.90 | 0.72 |

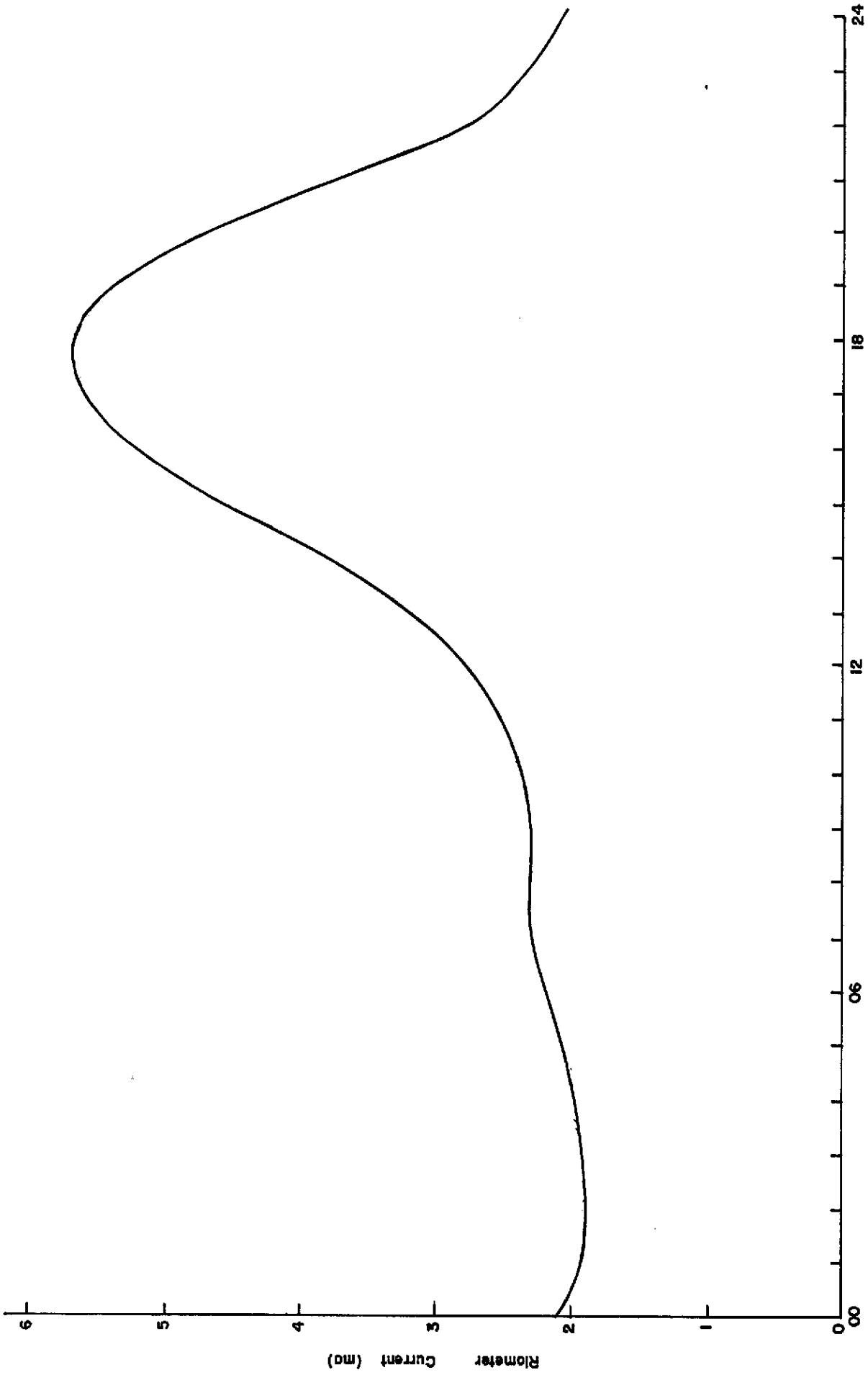
TIME - UT

Month: December
Year: 1965

TABLE IX

| Hour Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 16 | 0.72 | 0.61 | 0.53 | 0.53 | 0.57 | 0.61 | 0.61 | 0.97 | 0.53 | 0.45 | 0.41 | 0.53 | 0.79 | 0.79 | 1.00 | 1.14 | 1.21 | 1.24 | 1.30 | 1.40 | 1.17 | 1.00 | 0.90 | 0.76 |
| 17 | 0.76 | 0.40 | 0.49 | 0.79 | 0.68 | 0.49 | 0.49 | 0.61 | 0.53 | 0.45 | 0.45 | 0.86 | 1.07 | 1.49 | 1.17 | 1.30 | 1.37 | 1.79 | 1.40 | 1.64 | 1.14 | 0.93 | 0.86 | 0.76 |
| 18 | 0.76 | 0.61 | 0.76 | 0.79 | 0.68 | 0.61 | 0.61 | 0.64 | 0.57 | 0.53 | 0.64 | 0.76 | 1.00 | 1.07 | 1.17 | 1.33 | 1.46 | 1.40 | 1.82 | 1.55 | 1.14 | 0.79 | 0.86 | 0.40 |
| 19 | 0.37 | 0.64 | 0.53 | 0.57 | 0.57 | 0.61 | 0.53 | 0.64 | 0.37 | 0.53 | 0.68 | 0.97 | 1.24 | 1.37 | 1.40 | 1.40 | 1.55 | 1.40 | 1.64 | 1.46 | 1.33 | 0.90 | 0.61 | 0.40 |
| 20 | 0.76 | 0.90 | 0.79 | 0.57 | 0.61 | 0.49 | 0.72 | 0.45 | 0.41 | 0.41 | 0.57 | 0.68 | 0.90 | 0.90 | 1.17 | 1.21 | 1.40 | 1.43 | 1.43 | 1.07 | 0.83 | 0.76 | 0.45 | 0.40 |
| 21 | 0.37 | 0.33 | 0.37 | 0.40 | 0.49 | 0.49 | 0.33 | 0.33 | 0.33 | 0.33 | 0.33 | 0.45 | 0.64 | 1.14 | 1.17 | 1.24 | 0.97 | 1.07 | 1.49 | 1.07 | 0.61 | 0.13 | 0.21 | 0.13 |
| 22 | 0.41 | 0.29 | 0.41 | 0.37 | 0.49 | 0.29 | 0.64 | 0.45 | 0.37 | 0.25 | 0.37 | 0.45 | 0.61 | 0.68 | 0.79 | 0.83 | 0.79 | 0.86 | 0.90 | 0.93 | 0.57 | 0.13 | 0.17 | 0.33 |
| 23 | 0.41 | 0.29 | 0.41 | 0.41 | 0.29 | 0.29 | 0.21 | 0.17 | 0.21 | 0.09 | 0.09 | 0.13 | 0.17 | 0.61 | 0.61 | 0.86 | 0.97 | 1.17 | 1.61 | 1.14 | 0.61 | 0.45 | 0.41 | 0.49 |
| 24 | 0.53 | 0.57 | 0.41 | 0.49 | 0.49 | 0.29 | 0.33 | 0.41 | 0.25 | 0.29 | 0.68 | 0.57 | 0.13 | 0.83 | 0.97 | 1.04 | 1.10 | 1.10 | 0.93 | 0.79 | 1.00 | 0.64 | 0.41 | 0.49 |
| 25 | 0.53 | 0.61 | 0.64 | 0.64 | 0.49 | 0.49 | 0.57 | 0.49 | 0.45 | 0.49 | 0.49 | 0.53 | 0.45 | 0.40 | 0.79 | 1.17 | 1.10 | 1.10 | 0.93 | 0.79 | 1.00 | 0.64 | 0.41 | 0.49 |
| 26 | 0.41 | 0.17 | 0.25 | 0.41 | 0.49 | 0.29 | 0.33 | 0.25 | 0.29 | 0.37 | 0.57 | 0.41 | 0.76 | 0.90 | 1.10 | 1.17 | 0.93 | 0.97 | 1.17 | 0.93 | 0.61 | 0.33 | 0.13 | 0.33 |
| 27 | 0.41 | 0.17 | 0.37 | 0.21 | 0.21 | 0.21 | 0.09 | 0.17 | 0 | 0 | 0.25 | 0.57 | 0.79 | 0.93 | 0.97 | 1.14 | 1.43 | 0.93 | 1.04 | 0.90 | 0.72 | 0.09 | 0.13 | 0.33 |
| 28 | 0.45 | 0.64 | 0.49 | 0.53 | 0.49 | 0.49 | 0.57 | 0.57 | 0.53 | 0.45 | 0.53 | 0.68 | 0.83 | 1.07 | 1.14 | 1.21 | 1.37 | 1.30 | 0.37 | 0.67 | 0.79 | 0.57 | 0.37 | 0.40 |
| 29 | 0.57 | 0.68 | 0.53 | 0.53 | 0.61 | 0.49 | 0.61 | 0.57 | 0.57 | 0.49 | 0.57 | 0.86 | 0.83 | 1.10 | 1.14 | 0.93 | 1.17 | 1.04 | 1.30 | 0.61 | 0.45 | 0.57 | 0.37 | 0.40 |
| 30 | 0.86 | 0.68 | 0.53 | 0.45 | 0.29 | 0.29 | 0.37 | 0.29 | 0.25 | 0.29 | 0.41 | 0.41 | 0.61 | 0.76 | 0.86 | 0.93 | 0.97 | 0.97 | 0.86 | 0.57 | 0.45 | 0.53 | 0.49 | 0.33 |
| 31 | 0.49 | 0.72 | 0.76 | 0.57 | 0.49 | 0.49 | 0.61 | 0.53 | 0.45 | 0.41 | 0.13 | 0.29 | 0.61 | 0.61 | 0.64 | 0.72 | 0.86 | 0.97 | 1.21 | 0.83 | 0.90 | 0.90 | 0.76 | 1.00 |
| Count | 31 | 31 | 31 | 31 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| UQ | 0.77 | 0.68 | 0.76 | 0.72 | 0.64 | 0.61 | 0.61 | 0.61 | 0.57 | 0.53 | 0.68 | 0.79 | 0.97 | 1.14 | 1.17 | 1.24 | 1.37 | 1.30 | 1.46 | 1.46 | 1.14 | 0.97 | 0.93 | 0.76 |
| Median | 0.49 | 0.57 | 0.61 | 0.57 | 0.57 | 0.49 | 0.53 | 0.49 | 0.45 | 0.41 | 0.57 | 0.61 | 0.79 | 0.93 | 1.07 | 1.17 | 1.21 | 1.21 | 1.30 | 1.33 | 1.00 | 0.83 | 0.57 | 0.49 |
| LQ | 0.49 | 0.49 | 0.49 | 0.49 | 0.49 | 0.49 | 0.37 | 0.33 | 0.29 | 0.25 | 0.41 | 0.45 | 0.64 | 0.79 | 0.97 | 1.07 | 1.10 | 1.04 | 1.17 | 0.93 | 0.72 | 0.57 | 0.41 | 0.49 |

TIME - UT



Sidereal Time --(hr)

Fig: I - QUIET-DAY CURVE

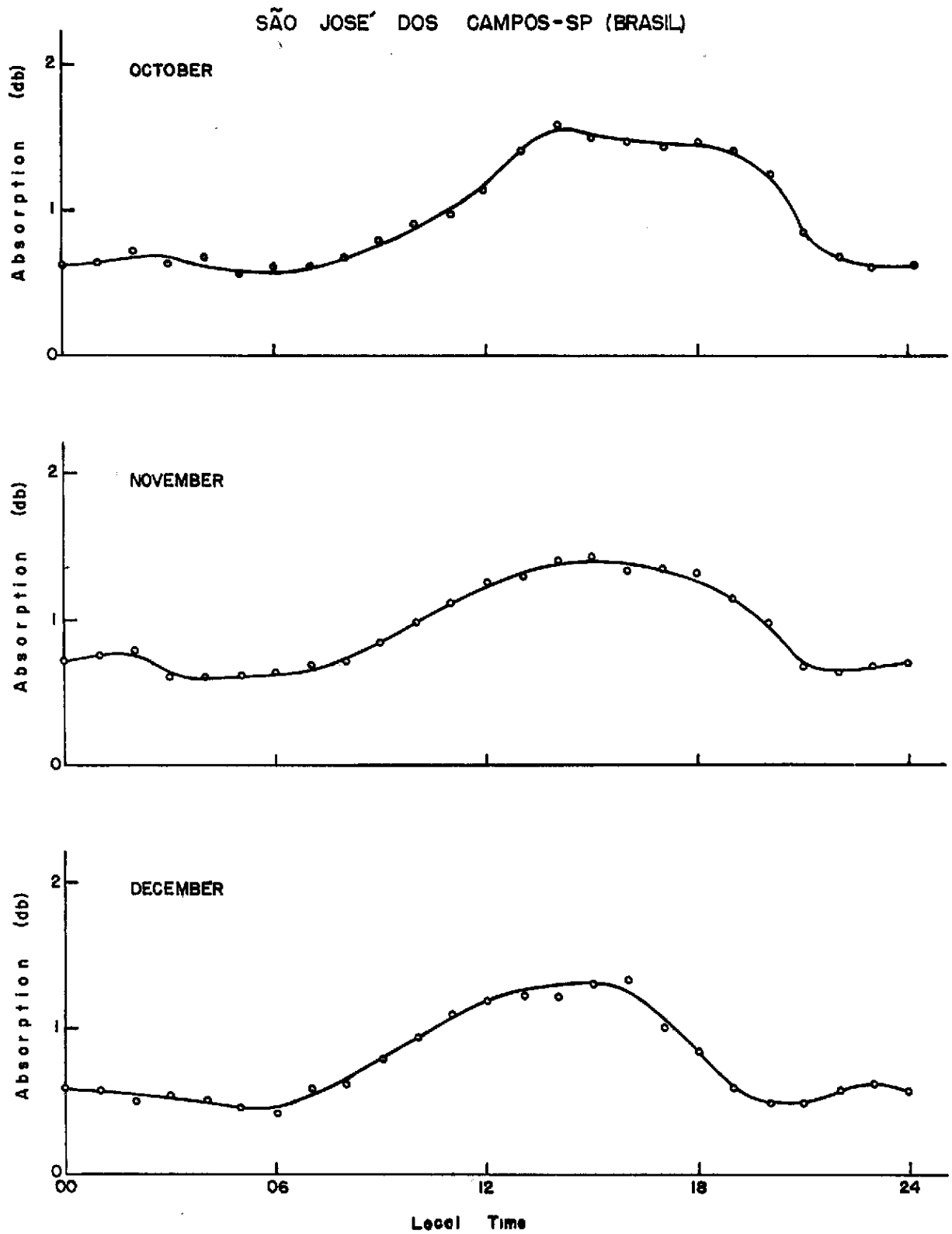


Fig:II MEDIAN MONTHLY ABSORPTION CURVES (October-December 1965)

APPENDIX I

" EXPLANATION ON THE USE OF THE "QUIET - DAY" CURVE TO REDUCE THE RIOMETER DATA FROM SÃO JOSÉ DOS CAMPOS".

During the regular operation of the riometer at this site which started in March 1963, some equipment failure occurred for short periods. After each time the equipment failed, it was recalibrated and re set, but the output did not repeat exactly the former characteristics, presenting a different level on the daily recorded current. In order to reduce the current to absorption, an adequate "quiet-day" curve, must be used for the different periods of operation of the riometer.

For the period April 1 to July 24, 1963, the "quiet-day" curve is shown in Fig. IV curve a. It was obtained with data acquired during the first few months of operation and should be considered as an approximation to the "quiet-day" curve.

Curve b in Fig. IV was obtained with more data of regular operation of the riometer. It can be considered as the basic "quiet-day" curve for our station (São José dos Campos).

Corrections should be introduced in this curve in order to compensate for the different levels of current which occurred after each time the equipment failed.

The adequate correction factor for the different periods of operation is indicated in the table below:

| Period | Correction |
|---------------------------|--|
| Aug. 1 - Dec. 31 1963 | Add 0.25 MA to the values of the "quiet-day" curve, Fig. IV curve b. |
| Jan. 1 - May 4 1964 | Curve b of Fig. IV is adequated for this period . |
| May 6 - Sept. 5 1964 | Divide the values of curve b in Fig. IV by the factor 1.12 MA . |
| Sept. 7 - Sept. 8 1964 | Divide the values of curve b in Fig. IV by the factor 1.15 MA . |

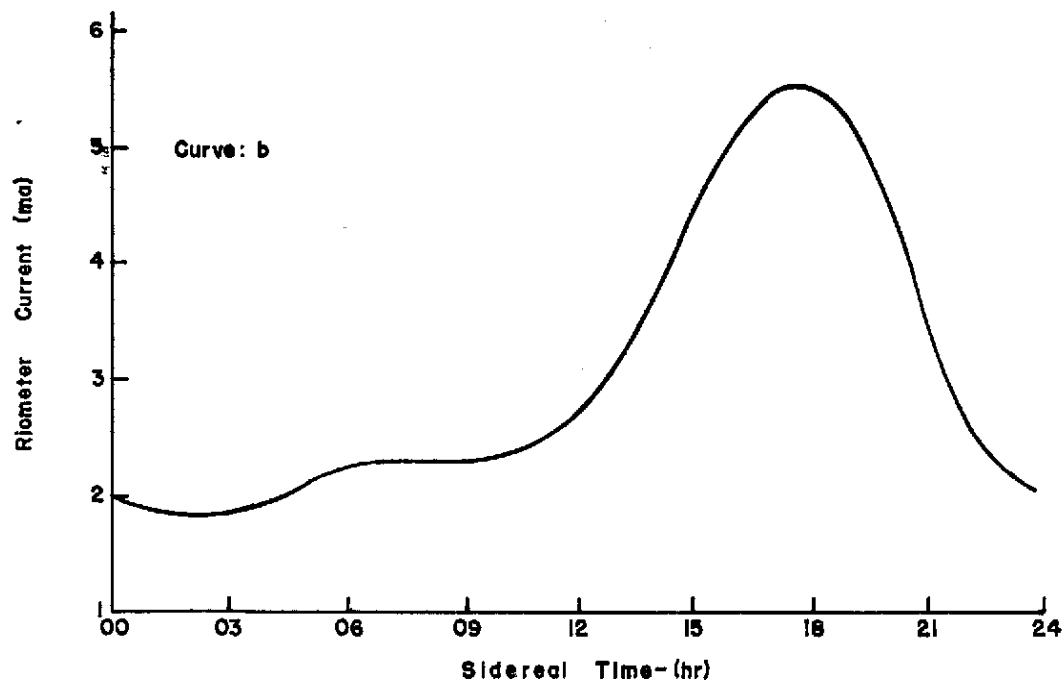
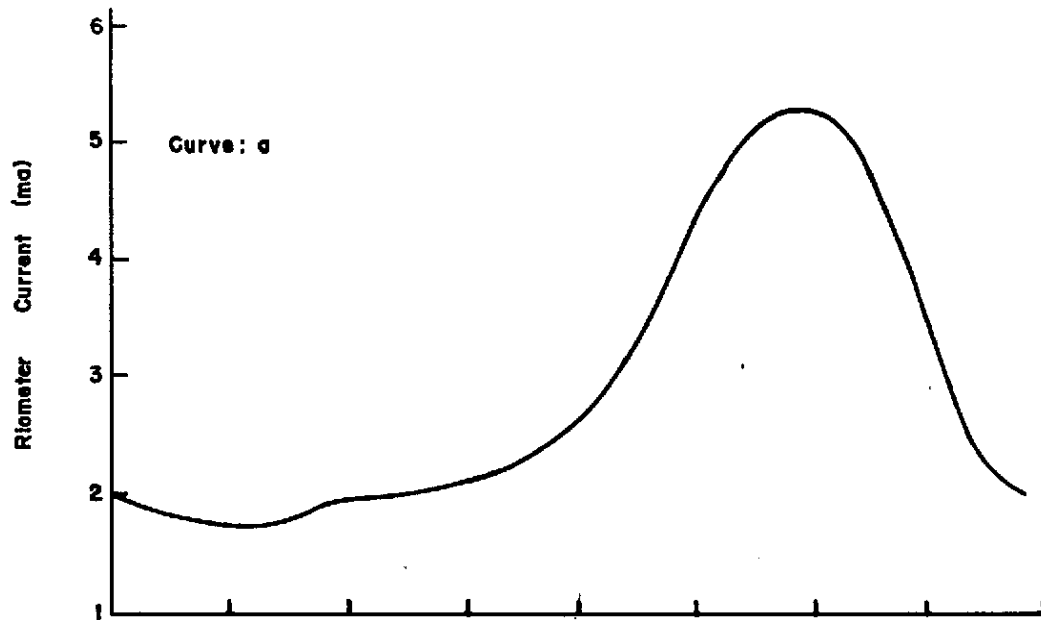


Fig: IV — QUIET-DAY CURVE

APPENDIX II

" NOTE ON THE TIME SCALE OF THE "QUIET-DAY" CURVE ,
PRESENTED IN THE ABSORPTION MEASUREMENTS WITH RIO-
METER DATA SUMMARY : REPORT Nº LAFE 9,12,16,17,22,28."

In order to reduce the time scale of the "quiet-day" curve to the true sidereal time (referred to the first point of Aries) one should add 17h 36 m to the hours indicated in the figure showing the " quiet-day " curve. That is, the maximum value of the curve corresponds approximately to the sidereal hour 17h 36 m or SHA = 96° .

The table below indicates the sidereal time corresponding to 00:00 GMT for the middle of each month starting on 1963.

| GMT hour | Month | Sidereal Time | | | | | |
|-------------|------------|---------------|------|--------|------|--------|-----|
| | | 1963 | | 1964 | | 1965 | |
| h...m... | | h..... | m... | h..... | m... | h..... | m.. |
| 00:00 | Jan. , 15 | 04 | 33 | 04 | 33 | 04 | 36 |
| " | Feb. , 15 | 06 | 35 | 06 | 35 | 06 | 38 |
| " | March, 15 | 08 | 26 | 08 | 29 | 08 | 28 |
| " | April, 15 | 10 | 28 | 10 | 30 | 10 | 30 |
| " | May, 15 | 12 | 26 | 12 | 30 | 12 | 27 |
| " | June, 15 | 14 | 28 | 14 | 30 | 14 | 29 |
| " | July, 15 | 16 | 26 | 16 | 28 | 16 | 27 |
| " | Aug. , 15 | 18 | 31 | 18 | 34 | 18 | 33 |
| " | Sept. , 15 | 20 | 33 | 20 | 36 | 20 | 35 |
| " | Oct. , 15 | 22 | 31 | 22 | 34 | 22 | 33 |
| " | Nov. , 15 | 24 | 33 | 24 | 36 | 24 | 35 |
| " | Dec. , 15 | 02 | 31 | 02 | 34 | 02 | 33 |