

# OBSERVATIONS OF SOLAR RADIO NOISE AT 3,750 MC

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## I. Explanatory Notes

This paper is the summary of data which has been reported by the Sub-Committee Va, U.R.S.I. for the worldwide network on the solar radio emission.

Our station is placed at 137°22'5" E, 34°50'6" N near Nagoya in Japan and has the equipment explained in detail on the other pages of this bulletin.

Values are referred to one polarization and are calculated from the equation,

$$\text{Intensity in watts(metre)}^{-2}(\text{cycle/sec.})^{-1}.$$

$$= 0.001585 T_a \text{ (equivalent antenna temperature in degree Kelvin.)}$$

Tabulation of circulating data has been performed after that proposed by Dr. C. W. Allen, Commonwealth Observatory, Cambera, Australia. That is:

(a) Hourly values: medians, *i.e.* the intensity which is exceeded for half the time in the hourly interval.

(b) Daily values: medians of the hourly values.

(c) Maximum intensity: the difference between the highest value and the value expected without the occurrence.

(d) Starting time: when occurrence first reaches 20% of its maximum intensity.

(e) Duration: counted from the start to the last time when the difference from the level expected without the occurrence comes down to 20% of its maximum intensity.

(f) Type S: simple rise and fall of intensity.

Type C: complex variation of intensity.

Type A: appears to be part of the general activity.

Type D: distinct from (*i.e.* apparently superimposed upon) the general activity.

The time used is "Universal Time."

## II. Test Observations from April to July, 1951

Data in this period which has been reported by Sub-Committee Va, U.R.S.I. is not so accurate as those, reported monthly from November, 1951. These data are presumable to be continuous to the latter observations if all intensities are divided by 2.

The corrected daily values are shown in Fig. 1. These are medians of 9 hourly values. Outstanding occurrences are summarized in Table 1 with the remarks of associated radio fadeouts (WWV, WWVH or WNC), observed at Hiraiso, near Mito in Japan.

## III. Observation from Nov., 1951 to Jan., 1953

Daily values are shown in Fig. 2. These are medians of 3 hourly values. Outstanding occurrences are summarized in Table 2.

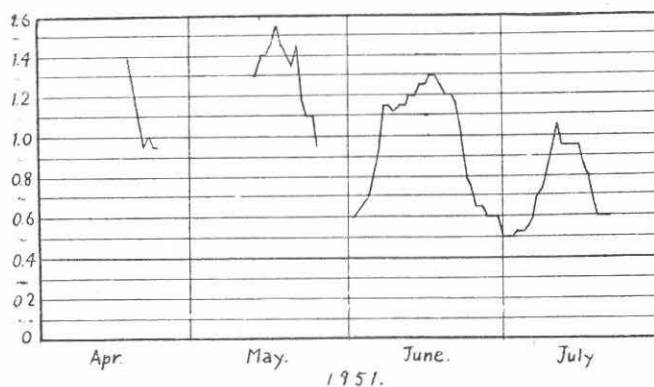


FIG. 1. Daily values, *i.e.* medians of 9 hourly values—from 2300 on the previous day to 0800—obtained from test observations. Units are  $10^{-20}$  watts(metre) $^{-2}$ (cycle/sec.) $^{-1}$ .

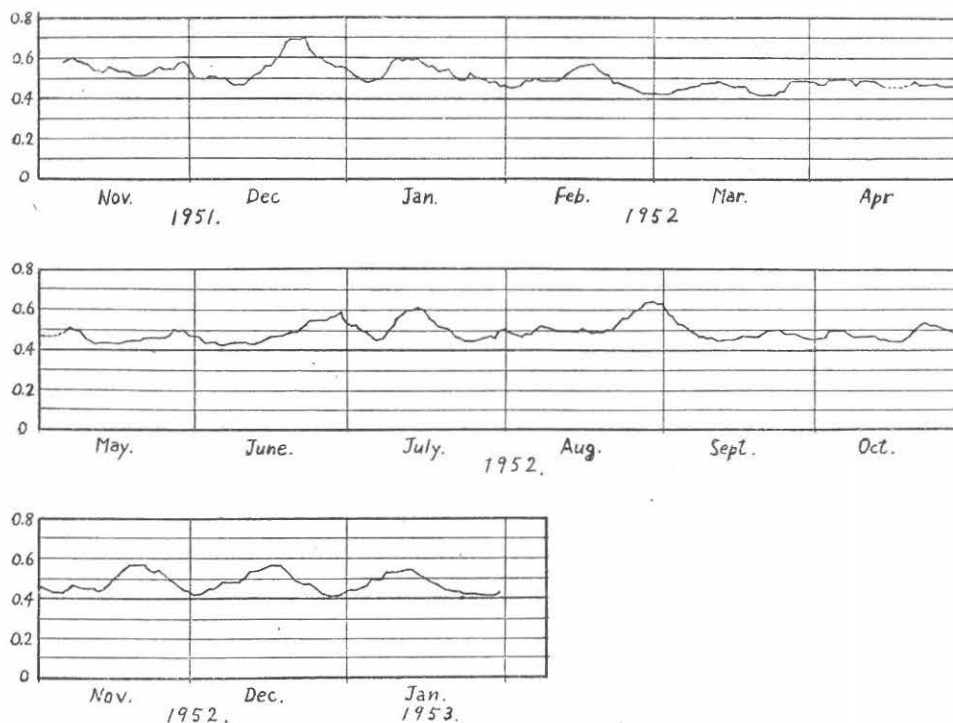


FIG. 2. Daily values, *i.e.* medians of 3 hourly values—from 0000 to 0300—obtained from continuous observations. Units are  $10^{-20}$  watts(metre) $^{-2}$ (cycle/sec.) $^{-1}$ .

TABLE 1. Outstanding Occurrences Obtained from Test Observations with the Corresponding Data of Radio Fadeouts.

| Date  | Starting time | Duration | Type | Maximum   |             | Radio fadeouts |
|-------|---------------|----------|------|-----------|-------------|----------------|
|       |               |          |      | Intensity | Time        |                |
| 1951  |               |          |      |           |             |                |
| April |               |          |      |           |             |                |
| 18    | 2340          | 12 m     | CD   | 0.75      | 2350 ✓      | Fade           |
| 19    | 0531          | 17 m     | CD   | 0.40      | 0547 ✓      | Fade           |
| 20    | 0051          | 2 m      | SD   | 16.15     | 0052 ✓      | Fade           |
| 20    | 2225          | 15 m     | CD   | 15.55     | 2230 ✓      | Fade           |
| 21    | 0226          | 7 m      | CD   | 0.15      | 0229        |                |
| 21    | 2311          | 1 h 08 m | CD   | 0.15      | 2314        | Fade           |
| 22    | 2258          | 2 m      | CD   | 0.05      | 2258-50 s ✓ |                |
| 22    | 2330          | 6 m      | CD   | 0.20      | 2232-30 s ✓ | Fade           |
| 23    | 0317          | 3 m      | SD   | 0.15      | 0318        |                |
| 24    | 0651          | 6 m      | SD   | 0.05      | 0654        |                |
| 25    | 0202          | 6 m      | CD   | 1.35      | 0205 ✓      | Fade           |
| 25    | 0713          | 5 m      | CD   | 0.75      | 0717 ✓      |                |
| 25    | 0838          | 8 m      | CD   | 0.60      | 0842        |                |
| May   |               |          |      |           |             |                |
| 16    | 2313          | 2 m      | SD   | 0.05      | 2314 ✓      |                |
| 17    | 2223          | 7 m      | SD   | 0.20      | 2226        |                |
| 17    | 2312          | 2 m      | SD   | 0.20      | 2312-30 s   |                |
| 18    | 0200          | 10 m     | SD   | 0.45      | 0202-30 s   |                |
| 18    | 0308          | 1 m      | SD   | 0.05      | 0308        |                |
| 18    | 0323          | 2 m      | SD   | 0.05      | 0324        |                |
| 21    | 0017          | 4 m      | CD   | 0.45      | 0017 ✓      | Fade           |
| 21    | 0208          | 30 s     | SD   | 0.20      | 0208-25 s ✓ | Fade           |
| 21    | 0350          | 2 m      | SD   | 0.15      | 0351-30 s   |                |
| 21    | 0638          | 3 m      | SD   | 0.25      | 0639        |                |
| 21-22 | 0004          | 18 m     | SD   | 0.45      | 0009 ✓      | Fade           |
| 22    | 0028          | 12 m     | SD   | 0.20      | 0034 ✓      | Fade           |
| 22    | 0054          | 12 m     | SD   | 5.20      | 0055 ✓      | Fade           |
| 23    | 0016          | 5 m      | SD   | 0.15      | 0020        |                |
| 23    | 0032          | 10 m     | SD   | 0.15      | 0033        |                |
| 23    | 0117          | 11 m     | CD   | 2.70      | 0120-30 s ✓ | Fade           |
| 24    | 0428          | 8 m      | SD   | 2.30      | 0431 ✓      | Fade           |
| 24    | 2145          | 2 m      | CD   | 1.10      | 2146-30 s   |                |
| 25    | 0022          | 1 h 45 m | CD   | 4.20      | 0129        | Fade           |
| June  |               |          |      |           |             |                |
| 7     | 0527          | 3 m      | SD   | 0.65      | 0528        |                |
| 8     | 0653          | 5 m      | SD   | 0.15      | 0654-50 s   |                |
| 9     | 0055          | 1 m      | SD   | 0.10      | 0055-15 s   |                |
| 9     | 2328          | 2 m      | SD   | 0.50      | 2328-40 s   |                |
| 13    | 0524          | 5 m      | SD   | 0.35      | 0524-30 s   |                |
| 13    | 0551          | 57 m     | CD   | 40.00     | 0620-30 s   | Fade           |
| 19    | 0248          | 7 m      | CD   | 1.60      | 0249-40 s   | Fade           |
| 19    | 0552          | 1 m      | SD   | 0.15      | 0552-10 s   |                |
| 19    | 2345          | 2 m      | SD   | 0.35      | 2345-20 s   |                |
| 20    | 0254          | 2 m      | SD   | 0.25      | 0255-40 s   |                |
| 20    | 0321          | 1 m      | SD   | 0.05      | 0321-50 s   |                |
| 21    | 0055          | 1 m      | SD   | 0.15      | 0055-30 s   |                |
| 22    | 0401          | 36 m     | CD   | 13.65     | 0419        | No Observ.     |
| 23    | 0208          | 2 m      | SD   | 0.05      | 0209        |                |
| 23    | 0526          | 7 m      | SD   | 0.30      | 0528-30 s   |                |
| 23    | 0538          | 3 m      | SD   | 0.10      | 0538-30 s   | Fade           |
| 23    | 0746          | ?        | CD   | 0.25      | 0750-20 s   |                |
| 26    | 0544          | 11 m     | CD   | 0.35      | 0545-20 s   | Fade           |
| July  |               |          |      |           |             |                |
| 10    | 0331          | 3 m      | SD   | 0.15      | 0332        |                |
| 10    | 0413          | 3 m      | SD   | 0.10      | 0414        |                |
| 10    | 0419          | 1 m 30 s | SD   | 0.05      | 0419-50 s   |                |
| 10    | 0421          | 2 m 30 s | SD   | 0.05      | 0422-30 s   |                |
| 10    | 0548          | 6 m      | SD   | 0.10      | 0550        |                |

TABLE 1 (Continued)

| Date | Starting time | Duration | Type | Maximum   |          | Radio fadeouts |
|------|---------------|----------|------|-----------|----------|----------------|
|      |               |          |      | Intensity | Time     |                |
| 12   | 0305          | 2 m      | SD   | 0.05      | 0306     | Fade           |
| 14   | 2308          | 3 m      | SD   | 0.25      | 2309     |                |
| 14   | 2329          | 3 m      | SD   | 0.50      | 2330     |                |
| 15   | 0250          | 2 m 30s  | CD   | 0.60      | 0250     |                |
| 15   | 0655          | 1 m      | SD   | 0.15      | 0655-30s |                |
| 15   | 0659          | 2 m      | SD   | 0.55      | 0700-10s |                |
| 15   | 0718          | 30s      | SD   | 0.05      | 0718-20s |                |
| 15   | 0726          | 30s      | SD   | 0.05      | 0726-10s |                |
| 15   | 2316          | 7 m      | CD   | 5.60      | 2321-50s |                |
| 16   | 0609-30s      | 1 m      | SD   | 0.10      | 0610     |                |
| 17   | 0801          | 1 m      | SD   | 0.20      | 0801-10s |                |
| 17   | 2313          | 2 m      | SD   | 0.05      | 2313-50s |                |

Units are  $10^{-20}$  watts metre<sup>-2</sup> (cycle/sec.)<sup>-1</sup>.

TABLE 2. Outstanding Occurrences Obtained from Continuous Observations

| Date  | Starting time | Duration | Type | Maximum              |                        | Radio fadeouts |  |
|-------|---------------|----------|------|----------------------|------------------------|----------------|--|
|       |               |          |      | Intensity            | Time                   |                |  |
| 1951  |               |          |      |                      |                        |                |  |
| Nov.  |               |          |      |                      |                        |                |  |
| Dec.  |               |          |      |                      |                        |                |  |
| 1     | 0151-20 s     | 1 m 10s  | SD   | 0.08                 | 0151-40 s              | Fade           |  |
| 21    | 0120          | 1 m 30s  | SD   | 0.26                 | 0120-40 s              |                |  |
| 21    | 0145-20 s     | 2 m 10s  | SD   | 0.06                 | 0146-20 s              |                |  |
| 25-26 | 2358          | 3 m 30s  | SD   | 0.06                 | 0000-20 s              |                |  |
| 27    | 0251-10 s     | 2 m 30s  | SD   | 0.04                 | 0252-30 s              |                |  |
| 1952  |               |          |      |                      |                        |                |  |
| Jan.  |               |          |      |                      |                        |                |  |
| Feb.  |               |          |      |                      |                        |                |  |
| Mar.  |               |          |      |                      |                        |                |  |
| Apr.  |               |          |      |                      |                        |                |  |
| 9     | 0120          | 5 m      | SD   | 0.01                 | 0121-15 s              |                |  |
| 14    | 0032          | 6 m      | SD   | 0.01                 | 0035-30 s              |                |  |
| May   |               |          |      |                      |                        |                |  |
| June  |               |          |      |                      |                        |                |  |
| 23    | 0249          | 28 m     | SD   | 0.03                 | 0302                   |                |  |
| July  |               |          |      |                      |                        |                |  |
| 13    | 0126-20 s     | 1 m      | SD   | 0.10                 | 0126-50 s              |                |  |
| 15    | 0132          | 3 m      | SD   | 0.04                 | 0132-50 s              |                |  |
| 29    | 0056          | 7 m 30s  | SD   | 0.03                 | 0057-20 s              |                |  |
| 31    | 0031          | 20s      | SD   | 0.02                 | 0031-40 s              |                |  |
| 31    | 0249          | 45s      | SD   | 0.13                 | 0249-50 s              |                |  |
| Aug.  |               |          |      |                      |                        |                |  |
| 23    | 0259          | 3 m      | CD   | 1st 0.05<br>2nd 0.05 | 0306-20 s<br>0311-15 s |                |  |
| 28    | 0240-20 s     | 4 m      | CD   | 1st 0.06<br>2nd 0.53 | 0240-50 s<br>0243-15 s |                |  |
| 29    | 0506          | 50 m     | F    | 0.02-0.03            |                        |                |  |
| 30    | 0552-15 s     | 45s      | SD   | 0.03                 | 0552-35 s              |                |  |
| 30    | 0025          | 4 m      | F    | 0.02                 |                        |                |  |
| 30    | 0111          | 4 m      | F    | 0.02                 |                        |                |  |
| 30    | 0305          | 2 h 18 m | F    | 0.02-0.03            |                        |                |  |
| 30    | 0556          | 4 m      | F    | 0.02                 |                        |                |  |
| 31    | 0246-05 s     | 1 m 55s  | SD   | 0.03                 | 0247-55 s              |                |  |
| 31    | 0323-30 s     | 1 m 10s  | SD   | 0.02                 | 0324                   |                |  |
| 31    | 0517-35 s     | 1 m 15s  | SD   | 0.05                 | 0518-25 s              |                |  |

TABLE 2 (Continued)

| Date  | Starting time | Duration | Type | Maximum               |                        | Radio fadeouts |
|-------|---------------|----------|------|-----------------------|------------------------|----------------|
|       |               |          |      | Intensity             | Time                   |                |
| 31    | 0521          | 1 m      | SD   | 0.02                  | 0521-30 s              |                |
| Sept. |               |          |      |                       |                        |                |
| 1     | 0002-50 s     | 1 m      | SD   | 0.02                  | 0003-05 s              |                |
| 1     | 0011          | 3 m      | F    | 0.01                  |                        |                |
| 1     | 0338          | 4 m      | CD   | 1st 0.04<br>2nd 0.03  | 0338-40 s<br>0340-55 s |                |
| 16    | 0039-05 s     | 1 m      | SD   | 0.02                  | 0039-10 s              |                |
| Oct.  |               |          |      |                       |                        |                |
| 2     | 0036          | 30 m     | SD   | 0.02                  | 0042-20 s              |                |
| 3     | 0124-10 s     | 1 m      | SD   | 0.02                  | 0124-35 s              | Fade           |
| 4     | 0232-50 s     | 20 s     | SD   | 0.03                  | 0232-55 s              |                |
| 6     | 0142-25 s     | 10 s     | SD   | 0.03                  | 0142-30 s              |                |
| 7     | 0118-25 s     | 2 m      | CD   | 1st 0.13<br>2nd 0.08  | 0118-25 s<br>0119-25 s |                |
| 7     | 0215-50 s     | 3 m      | SD   | 0.46                  | 0216-20 s              |                |
| 25    | 0110-30 s     | 24 m     | CD   | 1st 0.01<br>2nd 0.03  | 0110-50 s<br>0121-30 s |                |
| Nov.  |               |          |      |                       |                        |                |
| 8     | 0020          | 17 m     | SD   | 0.02                  | 0024                   |                |
| 17    | 0058-20 s     | 1 m 10 s | SD   | 0.02                  | 0058-25 s              |                |
| 19    | 0021          | 25 m     | CD   | 1st 0.02<br>2nd 0.04  | 0026-30 s<br>0036-10 s |                |
| 19    | 0138          | 1 h 10 m | CD   | 1st 0.02<br>2nd 0.095 | 0147-30 s<br>0216-20 s |                |
| 20    | 0047-20 s     | 1 m 40 s | SD   | 0.03                  | 0047-35 s              |                |
| 22    | 0241          | 3 m      | SD   | 0.02                  | 0242-40 s              |                |
| 22    | 0331          | 30 s     | SD   | 0.02                  | 0331-15 s              | Fade           |
| 22*   |               |          |      |                       |                        |                |
| 26    | 0154          | 6 m      | SD   | 0.03                  | 0158-20 s              |                |
| 28    | 0223          | 4 m      | CD   | 1st 0.03<br>2nd 0.04  | 0223-30 s<br>0226-30 s |                |
| Dec.  |               |          |      |                       |                        |                |
| 8     | 0147          | 1 m      | SD   | 0.03                  | 0147-30 s              |                |
| 10    | 0138-10 s     | 50 s     | SD   | 0.02                  | 0138-30 s              |                |
| 13    | 0224-10 s     | 50 s     | SD   | 0.03                  | 0224-40 s              |                |
| 17    | 0335-10 s     | 13 m     | CD   | 1st 0.03<br>2nd 0.03  | 0335-45 s<br>0339-30 s |                |
| 1953  |               |          |      |                       |                        |                |
| Jan.  |               |          |      |                       |                        |                |
| 9     | 0055-45 s     | 2 m      | SD   | 0.02                  | 0055-45 s              |                |
| 14    | 0000-15 s     | 5 m      | CD   | 1st 0.03<br>2nd 0.06  | 0000-40 s<br>0003-55 s |                |
| 14    | ?             | 2 m ?    | SD   | 0.03                  | 0201-30 s              |                |
| 24    | 0009          | 1 m 10 s | F    | 0.04                  |                        |                |
| 30    | 0203-05 s     | 10 s     | SD   | 0.02                  | 0203-05 s              |                |

\* Flux increase above 0.57,  
0000 0030 0100 0130  
0.24 0.09 0.04 0.01

Presumable to be end of large outburst.

Type "F" means fluctuate.

Units are  $10^{-20}$  watts(metre) $^{-2}$ (cycle/sec.) $^{-1}$ .