SOME NOTES ON THE SOLAR RADIO EMISSION AT CENTIMETRE REGION AROUND THE PERIOD OF SUNSPOT MINIMUM

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The solid line in Fig. 1 indicates the daily variation of the solar flux at 3750 MC observed at Toyokawa Japan during the last two years. In Fig. 1, also, the solid

Fig. 1. Daily values of solar radio flux density placing the sun at unit astronomical distance.

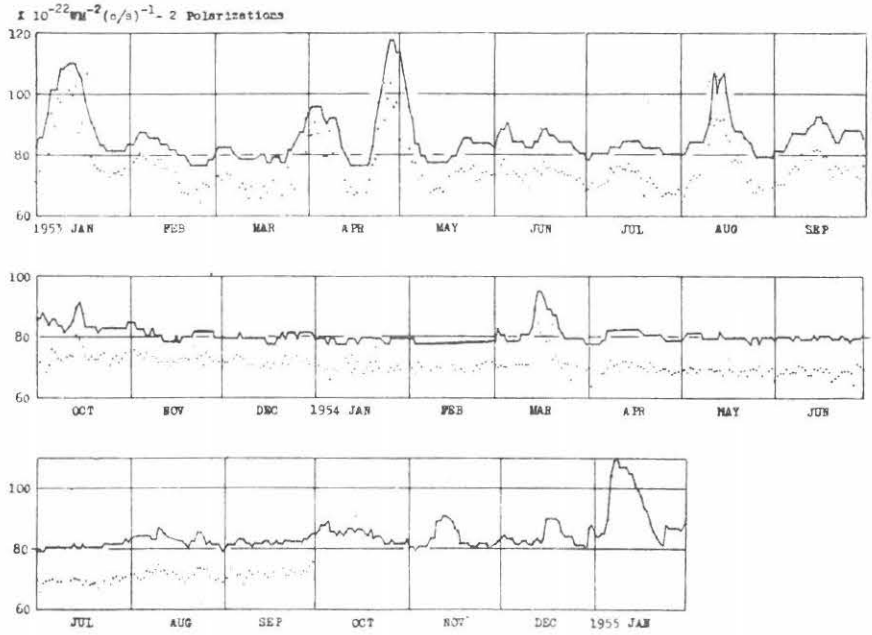
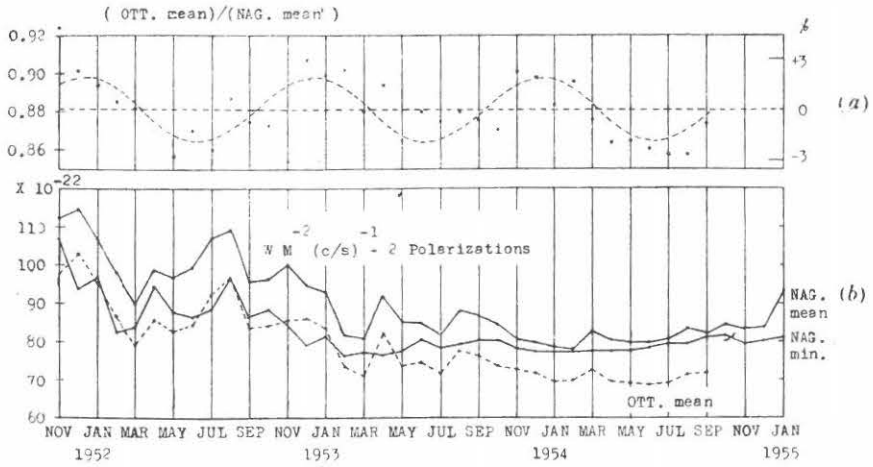


Fig. 2. Monthly mean values and intercomparison.



circles indicate the solar flux observed at Ottawa Canada at 2800 MC. It is remarkable that these two series of observations show good agreement. The author will mention here that corrections have been made for both series of observations by placing the sun at unit astronomical distance to learn the more exact solar activity. Fig. 2(b) is a plot of the monthly mean and minimum values at Toyokawa station during the last three years. The monthly mean values at Ottawa station are also plotted in Fig. 2(b).

Before discussing the subject, we must first know the accuracy of observations. According to Fig. 2(a), the ratio between the monthly mean values at Ottawa and at Toyokawa is almost constant within ± 3 percent. However, a more precise inspection shows that there is an annual periodic variation of these ratio around the mean value. The broken line in Fig. 2(a) has been drawn according to the method of least squares, and the result of a statistical test shows that this curve fitting is "significant". By this comparison it is quite undecided which series of observations contains the source of this systematic error, but the most probable cause is that a constant sky temperature was used as the background level at Ottawa station according to the informations kindly given by Dr. A. E. Covington. It may be concluded as a result of intercomparison that the monthly values at Toyokawa station have an accuracy of at least ± 2 percent because the standard deviation around the periodic curve is about 1 percent.

On the above basis, we may say that the minimum of monthly mean values appeared in February, 1954 because the increase of monthly mean values in the period between May and June is "significant". The fact that Ottawa station observed the minimum in the latter period may be ascribed to the periodic error.

The minimum of daily values can be estimated at $77.3\ 10^{-22}$ W $M^{-2}(c/s)^{-1}$ (± 1.5 percent) observed several times during the period from February, 1953 to January, 1954. Though a slight tendency toward a gradual increase throughout this period can be perceived, there is no absolute proof of increase.

By referring to the observations made by use of an 8-element interferometer, we can find that the increased flux above the minimum value is largely due to radio spots on the sun even when the sun is optically spotless, but a small amount must be attributed to the increase of general activity in the solar atmosphere. For example, the lower envelope of the superimposed records obtained by the interferometer

during December, 1954 corresponds to the flux of 79.7 and the minimum flux during the month was 80.1 in the same unit described above. Then we can presume that the flux of 80.1 consists of three components, (1) the flux 77.3 due to the quiet sun, (2) the flux 2.4 due to the increased general activity and (3) the flux 0.4 due to the radio spot.

Finally we must note that revised data were used in this paper for both series of observations. For Ottawa station, the revised data were distributed by letter in 1954 and for Toyokawa station, they are tabulated at the end of these Proceedings (page 145).

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