

# A SURVEY OF SOVIET OBSERVATIONS OF THE RADIO EMISSION FROM THE SUN DURING SOLAR ECLIPSES

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Soviet scientists working in the domain of radio astronomy carried out a number of observations of the radio emission from the sun during solar eclipses. The first observation was obtained by Prof. S. E. Khaikin and the author during the eclipse of 20 May 1947 at a wave-length of 1.5 metres. The solar eclipse of 25 February 1952 was observed in Archman, Turkmenian S.S.R., on wave-lengths of 3.2 and 10 cm. by V. S. Troitzky, and on 1, 1.5, 2 and 2.6 metres by the author and by V. V. Vitkevitch. The eclipse of 30 June 1954 was observed in Novomoskovsk, Ukrainian S.S.R., on 3.2 and 10 cm. by V. S. Troitzky, and on 10 and 23 cm. by V. V. Vitkevitch. It was also observed in the Caucasus on a wave-length of 3.2 cm. by A. P. Moltchanov. All the above observations were carried out in places located in the vicinity of the central path of the totality. The eclipse of 30 June 1954 was observed also outside the path of totality on the southern shore of the Crimea by a group of Dr Vitkevitch's colleagues on wave-lengths of 1, 1.5 and 3.5 metres. The maximum phase in this place was 92 %.

The following table shows the minimum values of the intensity of solar radio emission obtained during these eclipses, expressed as a percentage of the intensity of radio emission from the uncovered sun observed on the day of the eclipse.

Eclipse	λ (cm.)							
	3.2	10	23	100	150	200	260	350
20 May 1947	—	—	—	—	40	—	—	—
25 February 1952	5.2	15	—	32	36	40	50	—
30 June 1954	0.71 0.98	5.94 6.9	9.9	20*	25*	—	—	43*

Two values are given for 3.2 and 10 cm. for the eclipse of 30 June 1954. The upper figures were obtained by V. S. Troitzky, the lower figure on

3·2 cm. by A. P. Molchanov and on 10 cm. by V. V. Vitkevitch. The figures obtained outside the path of totality are marked with asterisks.

A quite obvious conclusion which might be made on examining the table is that in the course of these several years a compression of the solar corona and the chromosphere has taken place. Such a compression may be considered as a manifestation of periodic variations of solar activity.

It may be noted that the observation of the solar eclipse of 1947 gave the first experimental proof of the coronal origin of solar radio emission in the metre wave-lengths.

The minimum intensities of radio emission from the sun at the solar eclipses of 1952 and 1954 were observed at moments close to the maximum phase of the eclipse. The only exceptions were the 2 and 2·6 metre waves, on which the minima were observed 18<sup>m</sup> and 30<sup>m</sup> later, respectively. The eclipse curves for these waves showed a strong asymmetry with respect to the time of total phase. An analysis of the curves makes it possible to conclude that the intensity of radio emission from the coronal region above the large filament, which was located in the western part of the sun on 25 February 1952, was considerable. The curve for the eclipse on 2·6 metre wave-length also shows an appreciable radio emission of coronal rays, which were partly covered by the moon in the course of the eclipse.

#### *Discussion*

Hagen: Perhaps I may point out that I share with Khaikin and Tchikhatchev the honour of having made the first radio observation of a solar eclipse in 1947.