

Proceedings of the Research Institute of Atmospherics,  
Nagoya University, vol. 19 (1972) —Activity Report—

## Section 6. Solar Emissions and Related Terrestrial Phenomena

### 1. Sugadaira Observatory.

In July 1971, we completed the third station at Sugadaira in Nagano Prefecture. Thus the triangular arrangement of receivers with side lengths of 131 km (Toyokawa-Fujigane), 126 km (Fujigane-Sugadaira) and 207 km (Toyokawa-Sugadaira) has been completed. Three stations are now operated for the simultaneous observations of the interplanetary scintillation for studying the solar wind. The new antenna is a 256-element square dipole array, which is the same as that at Fujigane.

### 2. Improvement of the receiving system.

First, we have enlarged the array at Toyokawa in an east-west direction to double its effective area. It now consists of 512 ( $32 \times 16$ ) dipoles.

Second, the phasing network has been connected to the antenna at each station. It produces 16 independent beams in declination and we can observe radio sources in the declination range  $0^\circ \sim +70^\circ$  with a beam-selecting switch every day. Therefore, it has become possible to study the three-dimensional structure of the solar wind. This phasing network was designed by Dr. P. A. Dennison, Adelaide University, Australia, who visited us for three months in summer 1970.

Third, we have replaced a 2-track magnetic tape-recorder with a 4-track recorder to minimize the time error. The following four signals are recorded at each station; the signal output of IF amplifier of the phase-switching receiver, the reference voltage for the phase-sensitive detector, JJY time signal and 1 kHz clock pulses. Reproducing of the recorded tapes is made at Toyokawa and the synchronization of observations at three stations is made by JJY time signal and 1 kHz clock pulses, as described in the last proceedings.

### 3. Observations.

As described in the last proceedings, we planned to make observations of the interplanetary scintillation during IASY for studying the solar wind in the active period of the sun. It has been delayed by financial difficulties and we have just started the observation. But we still hope that we can study the effect of solar activity on the solar wind in the present solar cycle.

We have observed the interplanetary scintillation of 3C48, Tau A, 3C147, 3C186, 3C196, 3C225, 3C263.1, 3C273, 3C286, 3C295, 3C298 and 3C318 since the end of July. Results of these observations are now being analysed and will be published elsewhere with the details of the equipment.

Dennison and Wiseman suggested that some daily variations of scintillation index might be caused by corotating streams about the sun. Recently, Houminer obtained clear evidence of corotating features with daily observations of four radio sources during Jan. and Feb. 1971. We also observed 3C48 during the same period at two stations, Toyokawa and Fujigane, and obtained the similar variations of scintillation index (not absolute, but relative values in our case). We have noticed that peaks of the velocity enhancement are 2~3 days behind those of scintillation index. It may be considered to be due to the structure of corotating stream in the direction normal to the ecliptic plane. We have also compared our results of observations with those obtained by Pioneer 6, 8 and Vella satellite. Variations of wind velocity obtained by the scintillation method are compatible with those observed by space probes. This seems to show that the effects of the integration along the line of sight and random changes of the diffraction pattern are small.

The study of dynamic spectra of interplanetary scintillation has been continued. The results show that there are some cases where the strong scintillation takes place intermittently and also instances where the frequency of maximum intensity drifts slowly. This means that the scintillation is not always statistically stationary. Therefore, we have to select for analysis the portion of record in which the scintillation is regarded as uniform.

December 20, 1971

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### Publication

Watanabe, T., Washimi, H., Kakinuma, T., Kojima, M., Maruyama, K. and Ishida, Y. :  
Preliminary Observations of Interplanetary Scintillation at 69.3 MHz., Proc. Res. Inst.  
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