

### Section 3. Radio Astronomy

Compilation and critical analysis of world-wide solar radio data are performed at the Analysis Center for Solar Radio Emission (WDC-C2 Toyokawa) for the period of 1977, and published on the Quarterly Bulletin on Solar Activity of IAU. A TELEX terminal (04322-310 TYKW J) was opened in August 1978, which has enabled us to gain a very quick access to information on the solar-terrestrial phenomena through the URSIGRAM network or directly from other observatories. Daily forecast of solar activity or pieces of information on solar active regions in microwaves in URALR code is also transmitted via Radio Research Laboratories at Kokubunji to regional warning centers.

An improvement of the sensitivity and the phase stability of the  $\lambda$  8-cm radioheliograph has started as a two-year project of fiscal year 1978 and 1979, which was funded by the Scientific Research Grant of Ministry of Education (342004). In the new system the present branching waveguide network is replaced by a combination of 51 sets of low-noise, phase-stable front-end, and low-loss, phase-stable coaxial cable, which is buried 1.5 m below the ground level, to transmit reference signals of phase-locked oscillators and IF return signals to and from the front-ends. The overall phase error of the new system is expected to be less than  $5^\circ$  (Ishiguro et al., 1979; Naito, 1979).

A review of short-term flare forecasting activities at Toyokawa is to be presented at the Workshop of Solar-Terrestrial Prediction at Boulder, which will be held in April 1979 (Enome, 1979).

Shibasaki et al. (1979) have found a new type of negative bursts, which have much shorter time scale than previously observed bursts that are classified as 'absorption' or 'post burst decrease'. Detailed observational features at microwaves are described.

Morita (1979) has studied 5-minute oscillatory components in microwave emission from the global Sun obtained by the full-automatic radiopolarimeters (Torii et al., 1979; Shibasaki et al., 1979).

Analysis of data string of more than 600 hours has revealed that there is no stationary oscillatory component of 5 minutes with 95% confidence limits of 2.7, 5.1, 13, and 53 K at 9.4, 3.75, 2, and 1 GHz respectively.

Ishiguro examined image reconstruction techniques, when the visibility function is incomplete and noisy. He studied a non-negativity constraint in the iterative reconstruction techniques. He has shown that it is very effective when the negative values in image are multiplied by some negative factor rather than replaced by zero, and when the source distribution consists of isolated point-like sources. In the cases where the above technique is not applicable, Ishiguro and Ishiguro (1979) have proposed a new model-fitting method, in which they used Akaike's Information Criterion (AIC) to determine the optimum number of Gaussian components in the fitted model.

H. Tanaka, the Director of Nobeyama Radio Observatory, Tokyo Astronomical Observatory, University of Tokyo, keeps his directorship on radio astronomy at Toyokawa.

A design study of the array configuration for the 10-m $\phi$  5-element super-synthesis telescope was completed (Ishiguro, 1979). The outline of Large Radio Telescope Project in Japan was presented at Commission J, URSI General Assembly held at Helsinki in August 1978, and at 1978 International Symposium on Antennas and Propagation, Japan held at Sendai in August 1978 (Tanaka et al., 1978a,b).

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#### Publications

- Enome, S.: *A Review of Short-Term Flare Forecasting Activities at Toyokawa*, Proceedings of the Workshop on Prediction of Solar-Terrestrial Activities, held at Boulder in April 1979.
- Ishiguro, M.: *On the Non-Negativity Constraint in Iterative Reconstruction of Astronomical Images*, Proc. Res. Inst. Atmospherics, Nagoya Univ., 26 (1979).
- Ishiguro, M. and Ishiguro, M.: *Fitting a Gaussian Model to Aperture Synthesis Data by Akaike's Information Criterion (AIC)*, in Forma-

- tion of Images from Spatial Coherence Functions in Astronomy* (C. Van Schooneveld, ed.) IAU Coll. No. 49. Reidel Publ. Co., Dordrecht, Netherlands. (1979).
- Ishiguro, M., Torii, C., Shibasaki, K., Enome, S., and Tanaka, H.: *A Project to Improve the Sensitivity and the Phase Stability of the  $\lambda$  8-cm Radioheliograph at Toyokawa*, Proc. Res. Inst. Atmospheric, Nagoya Univ., 26 (1979).
- Ishiguro, M.: *A Design Study of the Array Configuration for the 10-m $\phi$  5-Element Super-Synthesis Telescope*, in preparation (1979).
- Morita, K-I.: *A Search for 5-min Oscillation in Total Microwave Flux of the Sun Observed at Toyokawa*, Proc. Res. Inst. Atmospheric, Nagoya Univ., 26 (1979).
- Naito, Y.: *Phase Stability of the New Local Oscillator System for the  $\lambda$  8-cm Radioheliograph*, Proc. Res. Inst. Atmospheric, Nagoya Univ., 26 (1979).
- Quarterly Bulletin on Solar Activity (radio part)*, Tokyo Astronomical Observatory, University of Tokyo, Nos 197 - 200 for 1977.
- Shibasaki, K., Ishiguro, M., Enome, S., and Tanaka, H.: *A Coronal Hole Observed with a  $\lambda$  8-cm Radioheliograph*, Publ. Astron. Soc. Japan 30, 589 (1978).
- Shibasaki, K., Enome, S., Takayanagi, T., and Ishiguro, M.: *Microwave Activities of the Sun Observed at Toyokawa*, Summary of Japanese IMS Observations 1 - 3 and 10 - 12 December 1977, presented at IMS Working Conference, held at Innsbruck in May 1978.
- Shibasaki, K., Ishiguro, M., Enome, S., Takayanagi, T., and Torii, C.: *Sudden Decrease of Microwave Solar Radio Emission*, Proc. Res. Inst. Atmospheric, Nagoya Univ., 26 (1979).
- Shibasaki, K., Ishiguro, M., and Enome, S.: *Solar Radio Data Acquisition and Communication System (SORDACS) of Toyokawa Observatory*, Proc. Res. Inst. Atmospheric, Nagoya Univ., 26 (1979).
- Shibasaki, K., Ishiguro, M., Enome, S., and Nakajima, H.: *Microwave Activities Associated with McMath Regions 14943 and 14979*, Solar Terrest. Env. Res. in Japan 2, 56 (1978).
- Tanaka, H., Akabane, K., Morimoto, M., Kaifu, N., and Ishiguro, M.: *Large Radio Telescope Project in Japan*, presented at Commission J, URSI General Assembly, held at Helsinki in August 1978 (1978a).
- Tanaka, H., Akabane, K., Morimoto, M., Kaifu, N., and Ishiguro, M.: *Large Radio Telescope Project in Japan*, Summaries of Papers, 1978 International Symposium on Antennas and Propagation, Japan, held at Sendai in August 1978 (1978b).
- Torii, C., Tsukiji, Y., Kobayashi, S., Yoshimi, N., Tanaka, H., and Enome, S.: *Full-Automatic Radiopolarimeters for Solar Patrol at*

*Microwave Frequencies*, Proc. Res. Inst. Atmospheric, Nagoya Univ.,  
26 (1979).