

ACTIVITY REPORT

Section 1. Propagation of Atmospherics and VLF, ELF Radio Noise

During the past year, Dr. T.Ogino joined to our research group as a research associate from the Department of Electrical Engineering of Nagoya University. Because Dr. Ogino's former interest was in the plasma physics research through computer simulation, his work here on ionospheric propagation will be done by shifting his former study slightly.

Our efforts to improve the accuracy of the location of atmospherics by single station locator (SSL) have been made at the Toknoh stock-farm. This work has another objective. Our results of locations are to be compared with those measured by a satellite operated by the Radio Research Laboratory. Though good coincidence between them are thought to be difficult, the comparison between different methods is very important and must be accomplished with patience. In connection with the improvement of SSL operation, research on the wave-impedance of electromagnetic field by ELF atmospheric is fortunately supported by a special grant for three years commencing in 1978. For this study, both ELF waveforms of H-field and E-field are recorded simultaneously at a field site that is free from artificial noise. Field site observation for the southern part of Japan is planned to be made in Kyushu in March.

Another interest is in the research on the fluctuation of ground wave propagation employing one of the Decca Navigation Systems (ca.100 kHz). This work is being made with the cooperation of Associate Professor Taguchi, Kagoshima University. As one of the experiments of examining deviations of LOP's, measurement on a boat was made last summer around the Iki Island located north of Kyushu. On this occasion, D.F.measurements of Decca stations as well as fixing of positions of the boat by optical method were also made. From those measurements, how each hyperbolic LOP is deviated, though slightly, by the effect of the existence of the island in the sea would be derived.

At Toyokawa (34°50'N, 137°22'E), we have continued with the phase-height measurement for 22.3kHz (NWC), 18.6kHz (NPG) and 11.3kHz (OMEGA station at Tsushima, Hawaii, Norway and North Dakota). At Syowa

station (69°00'S, 39°35'E), the same measurement has been continued for 17.4kHz (NDT). Judging from conditions of occurrence numbers of sudden phase anomalies from Jan. 1977 to Nov. 1978, we knew that the sun's activity is becoming more active since September 1977.

Our plasma wave-project group, which consist of Oya's group (Tohoku Univ.) and Kamada's group (Nagoya Univ.) carried out the active experiment for the artificial excitation of plasma waves in the ionospheric plasma by Japanese sounding rocket K-9M-61 on January 27, 1978. Many kinds of artificially-stimulated plasma waves were excited in the ionosphere and observed. We interpreted some of them as LHR waves, ion cyclotron waves and ion acoustic waves.

Japanese scientific satellite EXOS-B was launched successfully on Sept. 16 1978 and named "JIKIKEN". The experiment of our plasma wave-project group was carried out as planned. Many important results are beginning to appear.

Rocket experiments for the wave-phenomena in the polar ionosphere planned as IMS projects in Antarctica by our group resulted all in success.

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- Kazuo SAO -

- Tetsuo KAMADA -

Publications

- Yamashita, M.: Propagation of tweek atmospherics. J.A.T.P. vol.40.2. pp151 - 156 (1978)
- Tokuda, S. and T. Kamada: On an improved MSK converter. Proc. Res. Inst. of Atmos. vol.25 (1978)
- Kamada, T., H.Oya, A.Morioka and T.Ono: Results of artificial VLF plasma waves by K-9M-61 rocket. Reports of Space Observation Symposium. July, 1978 in Japanese.