ACTIVITY REPORT

Section 1 Propagation of atmospherics and ELF radio noise

Cooperative observations of slow tails between U.S. and Japan were carried out three times this year as given below. Our measuring technique was also improved so that it is not difficult to identify waveforms on both records associated with the same atmospheric. By the use of slow tail waveforms which were definitely identified, the attenuation rate and the phase velocity for long distance propagation were derived by W. L. Taylor of E. S. S. A.. At the same time, a peculiar radiation belonging to the slow tail frequency range from lightning discharge were found. This work will be published elsewhere. Other cooperative observations of slow tails were made on 1~4 September 1968 by both H. G. Hughes belonging to other organization and our research group simultaneously. As is shown in Fig. 1, although identification of waveforms on respective records at Hawaii, Arizona and Tottori sites was successful and encouraging, discrepancies of frepuency characteristics between respective receivers were found.

Study of the Schumann resonance has been continued, and cooperative observations were carried out during the World Geophysical Interval of every month in cooperation with Professor C. Polk of U. R. I.. Variations of the field intensity accompanied by the special events have been discussed. Besides, we cooperated with the world wide cooperative observation of the Schumann resonance phenomena which was proposed by R. Gendrin of C. N. E. T. in France. Results of the first trial on 2~8 May 1968 observed at many sites in the world are very interesting and important for all scientists in this field of study.

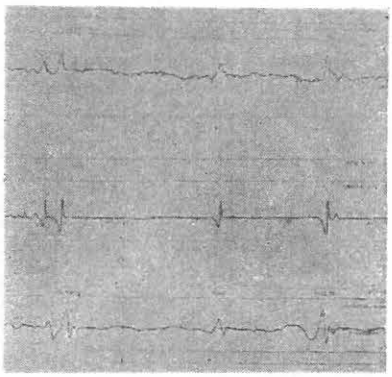

Fig. 1. A sample of recorded waveforms of slow tail at three stations.

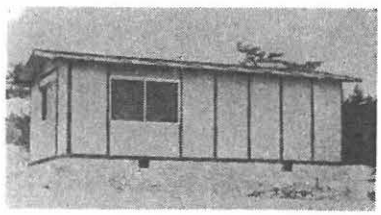

Fig. 2. New observation hut (No. 4).

A new observation hut (No. 4) shown in Fig. 2 was built which is of better quality than before to maintain the apparatus continuously. We have four huts altogether on the campus of the Sand Dune Laboratory of Tottori University. Routine observations are the integrated field intensity at frequencies ranging from 7.2 Hz to 570 Hz in the ELF band.

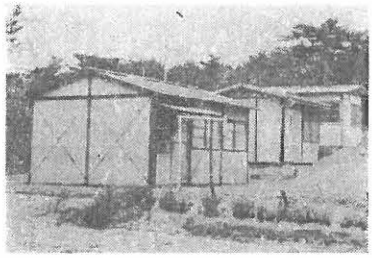

Fig. 3. Old prefab (No.1～No.3)

Theoretically, propagation characteristics of ELF radio waves, the reflection coefficient of the ionosphere taking the existence of the ion into consideration, and the conductivity of the ionoshere in the VLF band were investigated and will be published elsewhere.

Table. 1 Schedule for cooperative observations of slow tails

Year Month	Date	Hour	Start min. (duration)	Aerial used	Additional record	Remarks
Dec. 1967	7 9 12 14	08 JST (16 MST) (23 UT)	00min 10min 20min 30min 40min 50min (30sec)	15m vertical rod, vertical loop	uni-directional signal, time signal	(Daytime propagation)
Mar. 1968	13 14 15 16 18 19 20 21	(1) 08 JST (16 MST) (23 UT) (2) 22 JST (06 MST) (23 UT)	00min 10min 20min 30min 40min 50min (30sec)	15m vertical rod, vertical loop	uni-directional signal, time signal	Higher sensitivity (Daytime propagation) Lower sensitivity (Nighttime propagation)
Nov. 1968	14 15 16 19 20 21	(1) 08 JST (16 MST) (23 UT) (2) 12 JST (20 MST) (03 UT)	00min 10min 20min 30min 40min 50min (30sec)	15m vertical rod	uni-directional signal, time signal	(Daytime propagation) (Partly sunset propagation)

Routine observations of the integrated field intensity of atmospherics at frequencies of 5, 10, 16, 17.4, 18.6, 19.8, 27 and 40 kHz in the VLF band were moved to the Sakusima Observatory, and data are automatically printed out under the programmed time schedule.

Since it was found that whistlers and VLF emissions were often disturbed by strong atmospherics at Antarctic Station, we intended to investigate the direction of arrival and the occurrence frequency of atmospherics in Antarctica. For this purpose, a newly designed direction finder of atmospherics at a frequency of 10 kHz was built, and the observation is to start in March 1969 by the 10th Japanese Antarctic Research Expedition. The radio noise which seems to appear by the motion of the vehicle in the ionospheric plasma was found in the analysis of the results of the rocket observation. Although the existence of such artificial noise was confirmed theoretically, further studies are required in future.

— Kazuo SAO —
— Tetsuo KAMADA —

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