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ACTIVITY REPORT

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

Phase and amplitude of OMEGA signals(10.2 and 13.6 kHz) were recorded at several sites in Japan which showed sometimes rapid phase changes of one cycle (jump). Especially, signals of OMEGA Hawaii frequently jumped at Kagoshima over five years. It was found that cycle jump can be classified into two types, slip(retard) and advance.

These results indicated (1) that slips occurred in sunrise transition, (2) that occurrence frequency decreased with increasing solar activity, (3) that occurrence frequency increased in Southern Japan.

Cycle jump would be explained by the VLF mode theory, especially E-W propagation.

Researches of the slow tails of ELF atmospheric were financially supported by a scientific research grant of the Ministry of Education in this year. The observations of the ELF and VLF atmospheric were carried out on September 16 - 26 and November 6 - 18 in 1981 at Nakashibetsu-cho, Hokkaido, because the site was favourable to detect small signals of atmospheric free from the interference noise of the power lines. In November, the simultaneous observation of the ELF component over the frequencies from 10 Hz to 3 kHz and the VLF component over the frequencies from 100 Hz to 20 kHz was tried to study the origin of slow tail. Secondly, the frequency spectra of the LF atmospheric over the frequencies from 100 Hz to 100 kHz were also detected. The statistical analyses of the data observed are going on by the computer to calculate the phase velocity and the attenuation rate of the electromagnetic wave in the earth-ionosphere waveguide and to obtain the frequency spectra of the amplitude and phase for sources of atmospheric.

A computer simulation on the interaction of a solar wind with the earth's magnetosphere was started by using a two-dimensional MHD model. In a steady state of simulation, many structures like the bow shock, the magnetopause, the magnetotail and the plasma sheet in the magnetosphere were reproduced. The influence of the interplanetary magnetic field on the interaction was also investigated to simulate the magnetic

storms.

Another subjects of the computer simulation are the equilibrium and stability analyses of the high-beta tokamak and the bumpy torus, which have been carried out in collaboration with the Institute of Plasma Physics of Nagoya University.

In order to investigate the relation between solar X-ray bursts and disturbances in the D-region, we have continued with the phase measurements for waves of 22.3 kHz(NWC), 18.6 kHz(NLK), 11.3 and 10.2 kHz of four OMEGA stations at Aldra, Haiku, Reunion and N.Dakota. Sudden phase anomalies observed at Toyokawa were reported every month at Solar-Terrestrial Environmental Research Meetings and also reported to the World Data Center A at Boulder, U.S.A..

In 1981, we prepared for the observation of the Jovian decameter radio waves. The observation will be started from April in 1982.

The Japanese-Norwegian international balloon campaign sponsored by the National Institute of Polar Research will be carried out at arctic region of Norway on March in 1982. We have jointed a group for the natural wave phenomena to investigate the relationship between auroral arcs and precipitating particles. Two fleight are now planned.

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