

Section 2. Source of Atmospherics and Atmospheric Electricity.

As a part of Atmospheric Electricity Ten-Year Program, the measurement of atmospheric electrical elements on the Pacific Ocean was planned and carried out on the research vessel, Hakuho-Maru, of the Ocean Research Institute, University of Tokyo. One of the two cruises, extending over 110 days from November 1968 to March 1969, took an almost longitudinal route along 170°W from 30°N through 70°S , which enabled us to investigate the latitude effect of atmospheric electricity. The measurement of electric field has been discussed in this issue (Takagi and Kanada, 1970), and the data of air-earth current, electric conductivity and small ion mobility spectrum are still being reduced. The other cruise of rather a short period in July 1969 aimed at investigating the electric interrelation between the sea and the atmosphere very close to the sea surface. The further measurements on the sea are being planned in 1970 in the North Pacific Ocean.

To approach to the general solution of the atmospheric electrical problems, it is very important to study the electric properties of the upper atmosphere with an in-situ measurement by the use of space vehicles. This fall, two balloon measurements were carried out at Haranomachi Balloon Center of University of Tokyo. One is for measuring the atmospheric ion concentration and the electric conductivity, from which the relation of the fluctuation in the ion concentration with the temperature fluctuation is being discussed. The other is for receiving atmospherics in ELF range, which would seem to present a possibility of the shielding effect of space charge due to contamination in the atmosphere lower than the exchange layer.

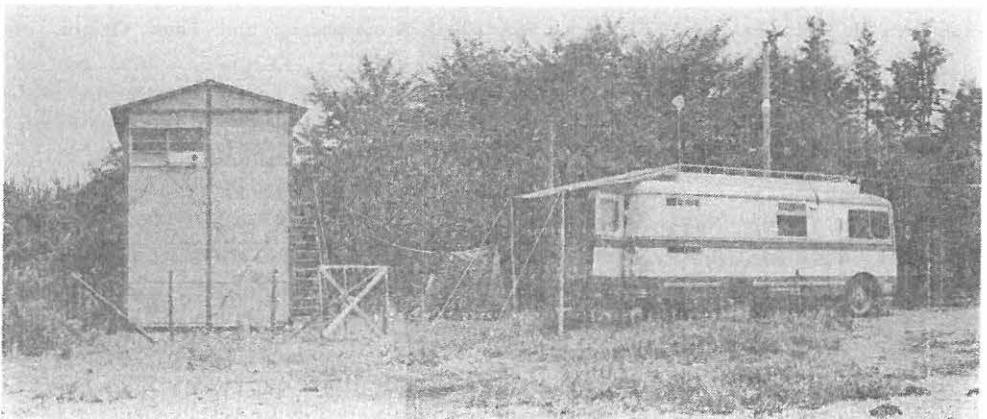


Fig. 1. Imaichi Observatory and mobile station operating for atmospheric source signal research.

The mechanism of thunderstorm activity development is also an important problem to be investigated in this section. Under the cooperative work with the members in Section 5, a thunderstorm observation was carried out in the summer of 1969 at Imaichi Observatory nearby Nikko National Park, where a prefabricated two-storied house built last year gave full play to support the observation together with an equipped mobile station. The measurements were made on the electric field changes due to lightning discharges in the frequency ranging from 0.1 Hz through 500 MHz by using several kinds of antennas, amplifiers and recorders. At the same time, a linked receiving of ELF atmospherics was done at Sakushima and Kagoshima Observatories, 300 and 1000 km distant from Imaichi, respectively. By comparing ELF atmospheric waveforms received at different ranges with the electric field changes at the origin, the problem of ELF genesis is going to be solved (Iwata, Ishikawa and Takagi 1970).

December 1, 1969

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