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Section 5. Atmospheric Radio Noise and Thunderstorms

I. The study of the electric field intensity at the atmospheric source was undertaken as an extension of the study of the atmospheric radio noise in order to; (1) measure the electric field intensity by using the procedure of statistical measurement and analysis which have been used and developed in the research field of atmospheric radio noise; (2) describe the structure of the electric field at the atmospheric soucre in terms of the four statistical parameters; (3) explore any close relation which may exist between the electric field at the atmospheric source and atmospheric radio noise by comparing the former to the latter with respect to the same statistical parameters. Observations of the electric field intensity change at the atmospheric source at 3 KHz were made at Imaichi in the summers of 1969 and 1970, and fruitful data were obtained. Analysis of the data of 1969 has revealed a few interesting results.

II. At Imaichi Station the following observations were made to study the nature of thunderstorms.

Thunder: Thunders were recorded on a tape recorder by using four microphones. Three of four were used to find out the spatial distribution of lightnings in the thunderclouds and shapes of the lightning channels. One microphone with wide band response was used to obtain the spectra of thunders along the lightning channels. We will infer the energy distribution along the channels from the above results.

VHF radiation: VHF radiation from the lightning was observed with three VHF receivers each with a directional antenna. We will obtain from the data some spatial information about streamers in the lightning channels.

Meteorological observations: We have observed rainy regions in thunderstorms with 3 cm rader. In addition to rader observation, some meteorological elements, wind direction, temperature etc., were measured at Imaichi and three other points around Imaichi. Those results are valuable to understand the general meteorogical aspects of thunderstorms and to help our study.

III. A 200 km range directional thunderstorm finder is now being developed. A nondirectional finder was constructed in the summer of 1969 and tested as a preliminary trial for a directional one.

VI. To observe the thunderstorm activity in the world, co-observation among our section, Heinrich-Hertz-Institut für Schwingungsforschung Berlin-Charlottenburg

at Berlin, West Germany, and Naval Research, U. S. A. is beginning from the winter of 1970. The "Atmospheric Analyser" constructed at the Heinrich-Hertz-Institut were set at Toyokawa, Berlin, and near Washington and data obtained from three points sets will be exchanged.

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—— Taketoshi NAKAI ——

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