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Section 2. Sources of Atmospherics and Atmospheric Electricity

The present study in this section aims at a comprehensive understanding of electrical aspects of the atmosphere from the ground surface up to the lower ionosphere, the range sometimes called the "electrosphere". Although the electrical state of the atmosphere is naturally conditioned by ionization process, it is closely correlated with the content of submicron aerosols and minor constituents of the atmosphere, such as ozone, NO_X, SO_2 etc., which are coming to have a progressive importance on the environment and human survival.

The practical activities in 1974 are described in the following.

(1) In February 1974, the density and size spectrum of aerosols, concentration of condensation nuclei and electrical conductivity in the level of 1500 meters were investigated by the use of an airplane, which covered the area up to about 300 kilometers from Nagoya district toward Hachijo Island. Along with the continuous observation of atmospheric electrical parameters and meteorological elements carried out at Sakushima Observatory, these observations give us some of fundamental knowledges on the physical behavior of aerosols during transport by air stream.

(2) In the same month, Ishikawa attended the Third CIAP (Climatic Impact Assessment Program) Conference held at Boston, U.S.A., for discussing the natural state of the stratosphere and the probable effect of SST and AST fleet flight if it would be actuated in the near future.

(3) In May 1974, Kanada and Morita visited Wyoming State University, Laramie, U.S.A. and carried out the observation of stratospheric electricity. Ionization rate, number densities of condensation nuclei and aerosols, and electrical conductivities were successufully measured up to 30 km altitude by the use of plastic balloons.
These observations give us the knowledge of recombination and attachment coefficients of small ion in the troposphere and stratosphere.

This experiment was for the research on "Pollutant distribution in the stratosphere" under the Japan-US Cooperative Science Program by the aid of Japan Society for the Promotion of Science.

(4) In September 1974, Ishikawa, Morita and Takagi attended the 5th International Conference on Atmospheric Electricity held at Garmisch-Partenkirchen, West Germany.
Before and after the conference, they visited some of research institutes in Switzerland, Sweden, West Germany and France.

(5) From August to November 1974, Morita and Takagi stayed at Astronomical Institute, University of Tuebingen, Weissenau, West Germany under the International Cooperative Research Program by the aid of Japan Society for the Promotion of Science. This was the last year in three years schedule for the research of "Atmospheric Electricity in the Free Atmosphere over Mid-Europe".
Although the research activity was restricted by the abnormally bad weather conditions in Europe this year, they compared the balloon flight techniques between Japanese and German electric field sondes and got good agreement between the two measured values. They also measured the ionization rate, number densities of aerosols and electrical conductivities by the use of rubber balloons. The results will be published at an early date.

December 6, 1974

——— Akira Iwata ———

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