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Section 2. Sources of Atmospherics and Atmospheric Electricity

Electrical properties of the atmosphere from the earth surface to about 100 km in altitude are studied as a main theme in this section. The close interrelation between the atmospheric electricity and air pollution have directed our attention to the environmental problems in recent years.

The observation at Sakushima Observatory, which was set about in 1971, are continued on almost all electrical and meteorological parameters. Some data collected for these ten years demonstrate a characteristic seasonal variation in this region. Local disturbances are quite low in the season of strong north-westerly monsoon bursts from November to March, and the electrostatic field displays a typical diurnal variation in the same phase as that on the ocean. In summer a diurnal alteration of land and sea breeze considerably affects the regional electric conditions.

Dispersing pollution from land source area widely over to the ocean is an interesting target of aircraft observation to understand the self-scavenging effect in the natural atmosphere. Measurement of aerosols in the size range from 0.003 to 10 μm with particle counters of Pollak-type, electrostatic type and light-scatter type aboard Cessna 402 was again carried out on November 18, 1980 in succession of measurements in the last years. Based on these measurements made mainly on the Pacific coast area until now, the density of large particles is 10 to 200 cm^{-3} at 0.5 km and exponentially decays down to one-tenth of this value at 3 km altitude. The density of Aitken particles ranges from 700 to 70,000 cm^{-3} at 0.5 km level, but the variation with places becomes small as the altitude increases. Good correlation is usually obtained between both the densities of Aitken and large particles, except in less polluted areas where a background of about 200 cm^{-3} seems to appear in Aitken particles. Two papers, which dealt with these recent observations of aerosols and electrical parameters by using aircrafts and balloons, respectively, were presented at the Sixth International Conference on Atmospheric Electri-

city held in July, 1980 at Manchester, England.

A plan for globally monitoring stratospheric aerosols and ozone by measuring a limb absorption of sunlight is taking shape as one of the experiments by EXOS-C satellite, which is scheduled to be launched in February, 1984. To attain the high altitude-resolution less than 1 km, the payload is composed of lenses of 100 mm focal length, interference filters for the selection of wavelengths, CCD area image sensors and a processing unit. The proto-model will be completed until the end of March this year. The observation with the similar composition to the EXOS-C plan will be made by S-310 sounding rocket in this August partly to check the effectiveness of this system.

The MAP (Middle Atmosphere Program) starts from 1982 to develop an adequate description and understanding of the atmosphere in the altitude range which includes the stratosphere and the mesosphere. We are concerned with the in situ measurements of minor atmospheric constituents such as aerosols, ions, ozone and nitrogen oxide. Several technical problems for balloon observation of these elements are being investigated.

Y. Kondo came back from the Institute for Atmospheric Environmental Research at Garmisch-Partenkirchen, West Germany in July, and Y. Morita also came back from the University of Wyoming at Laramie, Wyoming, U. S. A. in August, 1980. During their stays at the respective institutes, they were favored by the chance to observe the stratospheric aerosol effects resulting from Mt. St. Helens which erupted in May, 1980. They proved in several balloon ascents that the electric conductivity was reduced by the volcanic dusts distributing in rather thin layers. The facts were confirmed by the cooperative observations with a lidar at Garmisch-Partenkirchen, and with dust sonde flights at Laramie.

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- Masumi TAKAGI -

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