

Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)

Advances in Remote Sensing of the Middle and Upper Atmospheres and Ionosphere from the Ground and from Space, including Sounding Rockets, Novel Radar, and Multi-Instrument Studies (C0.2)

ON THE INFLUENCE OF AEROSOLS IN MEASUREMENT OF ELECTRIC FIELD FROM EARTH SURFACE USING A FIELD-MILL

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Aerosol particles influence the electrical conductivity of air. The value is reduced through the removal of small ions responsible for the conductivity. The metropolitan city, Kolkata (latitude 22.56° N, longitude 88.5° E) is densely populated surrounded by various types of Industries. Air is highly invaded by pollutant particles here for which the city falls under small-scale fair-weather condition where electric field and air-earth current get perturbed by ionization and different aerosols produced locally. Fine particles having diameter $< 0.1 \mu\text{m}$ (Aitken nuclei) are distributed in air which decreases the electrical conductivity and increases the columnar resistance. Aerosol particles steadily change the status at different times of the day through coagulation, sedimentation, charge-transfer initiated by precipitation. The diurnal variation of potential gradient is caused mainly due to urbanization, emission from industry and traffic. The rate of production of haze (atmospheric suspension) and their vertical transportation control the daily variation of atmospheric potential. The nuclei of pollutant particles combine with ions and decrease the concentration of small ions thereby reducing the conductivity. The pollutants, influenced by CO_2 and other green house gas emission from fossil fuels are also responsible for the variation of electric field. Variation in consumption of Oil and Gasoline due to traffic in the city contributes a high Aitken count and there are changes in atmospheric dispersion following reduction of conductivity of the medium. Outcome of some important measurement of potential gradient and air-earth current will be presented. Different parameters like air-conductivity,

relative abundance of smoke, visibility would offer new signatures of aerosol-influence on electric potential gradient. Some of those will be reported here.