CORRELATION BETWEEN TEMPERATURE AND SPACE CHARGE DENSITY FLUCTUATION

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To investigate whether there is a correlation between temperature and space charge density fluctuations in the atmosphere, simultaneous measurements were done on both parameters. The space charge density fluctuations were recorded using the well known Obolensky filter method and the temperature by using diodes attached to a simple bridge device. To distinguish the correlation between small and large scale eddies, instruments were adjusted to take measurements under three different time constants: 3, 10 and 30 seconds. In order to get an idea about the strength of turbulence, wind speed and temperature gradient measurements were obtained throughout the period of experiment. Recordings were carried out at two levels: 20 & 80 cm from the ground.

Correlations at the 80 cm level were found to be bigger than those found at the 20 cm level. Also, the correlation coefficient of 3s. time constant, which corresponds to smaller eddies were pronounced.

The results confirm the existence of the electrode effect. Under very unstable conditions, warmer air at lower levels with high space charge densities move upwards, whereas colder air at higher levels having lower space charge densities move downwards to yield a good correlation between temperature and space charge fluctuations.

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