Reply

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12 May 1975

As Dr. Aufdermaur noted, the space charge observed for the fair-weather field was much higher than that calculated from the electric field profile. The reason for this is the non-uniform airflow profile in the radiosonde cage. The air close to the wall of the cage is not completely removed during flight and as a result the space charge is higher than it would otherwise be. The curve which I showed in Fig. 21 is not the representative value of space charge in fair weather but is the calibration curve of my instrument to study the space charge profile in disturbed weather. The deviation of the field which is observed in disturbed weather from the fair-weather profile is only meaningful after the value obtained has been adjusted with respect to the value measured at the ground. Although the magnitude of the space charge observed in underestimated in this case, our radiosonde does indicate the existence in a cloud of a negative space charge layer. The space charge in a precipitating cloud varied greatly in magnitude and was of opposite sign to the fair-weather field. The error in my instrument is 0.1 V so I cannot be confident of the existence of a negative space charge above 7 km, even though anomalies were observed in most instances at levels higher than that. Although the conclusion which I made in the paper does not change, I am presently developing a different space charge radiosonde which I hope will give more quantitative results.