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Meteor dust in the ionosphere makes dust plasma SCOTT ROBERTSON, University of Colorado - Boulder, HEINER ASMUS, Leibniz-Institute of Atmospheric Physics at the University of Rostock, Kühlungsborn, 18225, Germany — Flights of rocket-borne probes into the ionosphere have returned data from 60-100 km altitude on the occurrence of meteoric dust (Robertson et al., J. Atmos. Sol.-Terr. Phys, 2013 in press). The number density of these particles is of order 20,000/cc which exceeds the typical electron density at 60-70 km but is smaller than the electron density typical at 90-100 km. Model equations and rocket data show that the ionosphere makes a transition from the dust particles being almost entirely negatively charged at high altitude to the dust particles being almost equally positive and negative at lower altitudes. The low-altitude result is a consequence of the electron and ion from an ionization event each attaching to dust particles before other processes can occur. Equilibrium is established in which attachment of an electron or ion to a neutral dust particle is equally as probable as it neutralizing a dust particle of the opposite sign. The low altitude region has many more positive and negative dust particles than electrons or ions, hence a dust plasma rather than a dusty plasma.

Scott Robertson
University of Colorado - Boulder

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