



The ECOMA 2007 rocket campaign: Observations and numerical modelling of aerosol particle density enhancements and plasma depletions in a PMSE layer

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The ECOMA rocket campaigns use an unprecedented set of particle, plasma and optical instruments to study the properties of aerosol particles and their interaction with the ambient plasma environment in the polar mesopause region. In particular, the smoke/aerosol particle instrument is designed to distinguish between neutral and charged particles. We present results from the summer campaign in 2007, in which the payload was launched into a region with Polar Mesosphere Summer Echoes (PMSE). A strong electron bite-out layer was detected at approximately 87 km, coincident with enhanced density of negatively charged aerosol particles. We also find evidence for positive ion depletion in the same region. A numerical model for the charging of aerosol particles and interaction with the ambient plasma is used to analyze the data. Preliminary results indicate that very high aerosol particle densities are required in order to explain the observed plasma density depletion, implying a considerable abundance of net-neutral particles.