**Detection and Mass-analysis of Charged Aerosol Particles in a PMSE/NLC Layer by a Rocket-borne Spectrometer**

S. Robertson*[1], M. Horanyi[1], S. Knappmiller[1], Z. Sternovsky [1], R. Holzworth[2], M. Shimogawa[2], J. Gumbel[3], M. Khaplanov[3], L. Megner[3], M. Friedrich[4], G. Baumgarten[5], R. Latteck[5] and M. Rapp[5]
(1) University of Colorado, Boulder, CO 80309 USA
(2) University of Washington, Seattle, WA 98195
(3) Stockholm University, 10691 Stockholm, Sweden
(4) Technical University of Graz, Graz, Austria
(5) Leibniz Institute for Atmospheric Physics, 18225 Kuehlungsborn, Germany

The "MASS" (Mesospheric Aerosol Sampling Spectrometer) rocket campaign was conducted from the Andoya Rocket Range the first week of August 2007. The payloads carried an electrostatic mass analyzer for the charged fraction of the aerosol particles, forward and aft deployable electric field booms, a photometer for cloud brightness, and Faraday rotation antennas for electron density. The mass analyzer was mounted on the tip of the payload and pointed in the ram direction. It has a forward inlet slit and side vents for air exit. Aerosol particles with different ranges of charge-to-mass ratio are collected within the instrument housing on two sets of four biased collector plates, with one set for positive particles and one set for negative particles. The first rocket was launched into PMSE and NLC on 3 August approximately 26 minutes after an AIM satellite overpass. The sun was 4 degrees below the horizon and NLC were seen in the previous hour at 83 km by the ALOMAR RMR lidar pointed along the rocket trajectory. NLC were detected at the same altitude by rocket-borne photometer measurements. A preliminary analysis of the data shows the density of negative particles with radius greater than 3 nm rising sharply at 83 km and continuing to 89 km, collocated with PMSE detected by the ALWIN radar. Particles with 1-2 nm radii with both signs of charge and particles with less than 1 nm radius charged positively were detected at 86-88 km. Initial charge-density estimates are several thousands per cubic centimeter for each of these size ranges. The E field booms detected significant potential variations in the PMSE/NLC region. The second launch was 6 August into PMSE without NLC. The 1-2 nm particles were seen from 85.4 to 87.4 km, again with both signs of charge. Larger and smaller sizes were nearly absent. This project is supported by NASA.