ROCKET MEASUREMENTS OF ICY DUST PARTICLES OBSERVED IN THE POLAR SUMMER MESOSPHERE

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The two Black Brant payloads flown during the DROPPS (Distribution and Role of Particles in the Polar Summer Mesosphere) rocket program were launched during early July, 1999 from Andøya Rocket Range (ARR), Norway. The purpose was to investigate the polar summer mesosphere, particularly polar mesospheric summer echoes (PMSE) and their possible relationship to noctilucent clouds (NLC). Both DROPPS payloads included front mounted side by side Particle Impact Detector (PID) charge and mass telescopes. Computer simulations have shown that the PID telescopes have the potential to detect atmospheric ice particles within the mesosphere having dimensions of a few nanometers. Ice particles of nanometer size are believed to be responsible for PMSEs through the process of scavenging. Evidence for this process is suggested by the presence of an electron biteout observed in the same region as the observation of nanometer size particles at an altitude of $\sim$82-87 km over Andøya during the first DROPPS launch sequence. Evidence for this dusty plasma was observed independently by several instruments aboard the DROPPS payload.

We have previously presented results from the longer PID charge telescope that indicated two possible particle distributions differing by mean particle size. Due to the different geometries of the PID telescopes (primarily, that the charge telescope is longer than the mass telescope) each PID telescope collects a different portion of the nanometer sized PMSE particle distribution. When compared to the previous PID charge telescope results, the PID mass telescope results allow the true PMSE particle size distribution to be estimated. This talk will introduce the new findings from the shorter PID mass telescope and the comparison to the previous PID charge telescope. By comparing PID observations with the computer simulations we can obtain information concerning the properties of the PMSE particles, including their rocky core size, ice mantle thickness and distribution. This paper discusses the results of this analysis.

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2. H - Waves in Plasma

3. (a) S-H1

4. C - Contributed Paper

5. No special instructions