



Gravity Wave Observations in the polar summertime mesosphere from Cloud Imaging and Particle Size (CIPS) Experiment on the AIM Spacecraft

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The Cloud Imaging and Particle Size (CIPS) experiment is one of three instruments on board the Aeronomy of Ice in the Mesosphere (AIM) spacecraft that was launched into a 600 km sun-synchronous orbit on April 25, 2007. CIPS images have shown clear and distinct wave patterns and structure in Polar Mesospheric Clouds (PMCs), around the summertime mesopause region, which are qualitatively similar to ground based photographs of Noctilucent Clouds (NLCs). These structures, observed in PMCs, are interpreted as manifestations of upward propagating gravity waves (GWs). CIPS has observed structures in PMCs ranging from as small as 8 km to hundreds of km in horizontal scales. CIPS offers the opportunity of studying a part of the GW spectrum (shorter horizontal scale, high frequency GWs) rarely studied from space borne instruments. One of the objectives of the AIM mission is to investigate gravity wave effects on PMC formation and evolution. In this presentation we provide new results pertaining to the longitudinal variability of observed PMC wave structures from CIPS in both hemispheres. The horizontal scales and maps of the observed GWs during the northern and southern hemisphere 2007 and 2008 cloud seasons are presented. By comparing the longitudinal variability of the normalized wave occurrence frequency with the CIPS observed PMC occurrence frequency and albedo we can infer new details about the effect of GWs on PMCs. We also compare the longitudinal variability in GW occurrence with SABER observed temperature profiles at PMC altitudes for evidence of GW induced heating or cooling effects. The GW occurrence frequency is compared with topography and the propagation directions of the waves are also considered to infer information about their possible sources.