

DETECTING INTERPLANETARY DUST PARTICLES WITH RADARS TO STUDY THE DYNAMICS AT THE EDGE OF THE SPACE

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The Earth's mesosphere is the region of the atmosphere between ~60-120 km altitude, where the transition from hydrodynamic flow to molecular diffusion occurs. It is highly dynamic region where turbulence by wave braking is produced and energy is deposited from sources from both, below and above this altitude range. Because aircraft and nearly all balloons reach altitudes below ~50 km and orbital spacecrafts are well above ~400 km, the mesosphere has only been accessed through the use of sounding rockets or remote sensing techniques, and as a result, it is the most poorly understood part of the atmosphere. In addition, millions of Interplanetary Dust Particles (IDPs) enter the atmosphere. Within the mesosphere most of these IDPs melt or vaporize as a result of collisions with the air particles producing meteors that can be detected with radars. This provides a mean to study the dynamics of this region. In this lecture the basic principles of the utilization of meteor radars to study the dynamics of the mesosphere will be presented. A system overview of these systems will be provided as well as discuss the advantages/disadvantages of these systems, provide details of the data processing methodology and give a brief overview of the current status of the field as well as the vision for the next decade.