

ICESTAR: SIMULTANEOUS ANTARCTIC OBSERVATIONS OF POLAR MESOSPHERIC CLOUDS AND POLAR MESOSPHERE SUMMER ECHOES

A.R. Klekociuk, R.J. Morris, J.L. Innis

Australian Antarctic Division, Kingston, Tasmania, Australia

Polar Mesospheric Clouds (PMCs) and Polar Mesospheric Summer Echoes (PMSE) were simultaneously observed during the 2005-2006 austral summer above Davis, Antarctica (latitude 68.6°S). This is the first time such observations have been obtained from the southern hemisphere.

The PMC were measured by a Rayleigh lidar operating at a wavelength of 532nm. A statistical signal processing technique yielded 15 detections of discrete PMC during the observing campaign, spanning a total period of 10 hours or 6% of the total observing time. The PMC were detected between altitudes of 81km and 89km, and had a mean centroid altitude of 83.3 ± 0.2 km.

During all of these events, PMSE were observed using a Mesosphere-Stratosphere-Troposphere radar. All of the PMC overlapped with the lower edges of PMSE to within a few hundred meters or less. This behaviour has previously been seen in the northern hemisphere. The overlap occurred where the degree of water saturation was greater than 100% determined from measurements by the Microwave Limb Sounder on the Aura satellite. It is suggested that the PMC represent a sub-group of the particles responsible for PMSE which have sedimented and grown to a sufficient size and quantity to be detected, before evaporating in the warming temperatures below the layer. Information on these particles is provided from an analysis of the radar echo strength and optical backscatter efficiency.