

## **MULTI-RADAR STUDIES OF PMSE: IMPLICATIONS FOR MESOSPHERIC LARGE SCALE VARIABILITY AND MICROPHYSICAL PROCESSES**

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Observations of radar volume reflectivities at frequencies of about 50 MHz are done on the northern and southern hemisphere at 69° latitude during the appearance of polar mesosphere summer echoes (PMSE). The PMSE have lower seasonal occurrence rate on the southern hemisphere with less volume reflectivity. Model results indicate that the 1-10 K higher mesopause temperatures of the southern hemisphere are the main reason.

Multi-frequency radar observations of radar volume reflectivities at 69°N under PMSE conditions at frequencies of 53.5, 224, and 930 MHz were made with the ALWIN radar at Andenes and the EISCAT VHF and UHF radars at Tromsø. The EISCAT radars provide electron densities, their gradient and turbulent energy dissipation rates. Using this data and standard theory of PMSE with large Schmidt numbers between 2500 and 5000 radar volume reflectivities are derived which are in quantitative agreement with the observations. It is shown that these Schmidt numbers correspond to ice particles with radii between 20-30 nm which should frequently occur in the summer mesopause region.

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