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Spectral characteristics of polar mesosphere winter echoes measured with the EISCAT VHF and ESRAD MST radars

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Polar mesosphere winter echoes (PMWE), between 55-80 km altitude, are seen by high latitude radars when excess ionization is produced by energetic particle precipitation. The mechanism of PMWE generation is still unclear though both turbulent and non-turbulent (highly damped ion-acoustic waves) hypotheses have been suggested. The EISCAT VHF radar (224 MHz) in Tromso, Norway and the ESRAD MST (52 MHz) radar at Esrange, Sweden detected strong backscatter from narrow layers at 65-75 km altitude during the solar proton event on 10-12 November 2004. Spectral characteristics of the echoes have been derived for both radars and compared to each other and to the models for an incoherent scatter (ion line) and coherent isotropic turbulent scatter. Widths and shapes of the spectra are discussed in a context of possible mechanism of PMWE generation.