

Characteristics of mesosphere echoes over Antarctica obtained using PANSY and MF radars

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We investigated characteristics of mesosphere echoes over Syowa Station (69S) in the Antarctic detected by Mesosphere, Stratosphere and Troposphere/Incoherent Scatter (MST/IS) radar (PANSY 47MHz) and MF radar (2.4 MHz). Low altitude MF radar echoes below about 70 km showed a similar seasonal, day-to-day and local time variations with those of the PANSY radar. Polar mesosphere winter echoes (PMWEs) by the PANSY radar and the low altitude MF echoes mostly coexisted appearing during day time and also a few hours after sunset, while summer echoes in the lower height region were absent in both radar observations suggesting a close relationship in the generation mechanisms of 47 MHz and 2.4MHz echoes. Angles of arrival of MF echoes showed a more isotropic nature in winter. Since gravity wave activity is much higher in winter than in summer over Syowa [Yasui et al., 2015], higher turbulence energy in winter caused by gravity wave breaking may be responsible for the generation of the winter echoes and their isotropic behavior. The horizontal wind velocities of the two systems were further compared and agreed very well with a high correlation coefficient around 0.8 or more throughout the height region of 60-90 km.