

PANSY レーダーおよび MF レーダーにより南極昭和基地上空で観測された 冬期中間圏エコーの性質

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Characteristics of winter time mesosphere echoes over Syowa in the Antarctic obtained using PANSY and MF radars

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Characteristics of winter time mesosphere echoes have been investigated over Syowa (69.0S, 39.6E) station in the Antarctic using PANSY (47 MHz) [Sato et al., 2014] and MF (2.4 MHz) radars. 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 for 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 2.4 MHz echoes. In other words winter time low altitude MF echoes can be used as a proxy of PMWEs in VHF. High correlation between local K-index and the occurrence of winter echoes was found suggesting that electron density enhancement due to ionized particle precipitation was one of the triggers of echo generation. Angles of arrival of MF echoes were estimated using the interferometry capability of Syowa radar and showed a more isotropic nature in winter [Tsutsumi et al., 2017]. Because gravity wave activity is much higher in winter than in summer over Syowa [Dowdy et al., 2007; Yasui et al., 2015], higher turbulence energy in winter caused by gravity wave breaking can be partly responsible for the generation of the winter echoes and their isotropic behavior. A preliminary comparison between gravity wave activity and MF echo power indicated a positive correlation.

References

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