

南極昭和基地 MF レーダーで 15 年間観測された中間圏重力波の季節変動と年々変動

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Seasonal and interannual variation of mesospheric GWs based on MF radar observations over 15 years at Syowa Station

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Seasonal and interannual variations of gravity waves (GWs) in the high latitude mesosphere in the Southern Hemisphere (SH) were analyzed by using horizontal wind observation data in the altitude range of 50-100 km from the MF radar at Syowa Station (69.0S, 39.6E) in the Antarctic. The GW climatology is maximized for the horizontal wind variances in winter for a wide altitude range of 64-90 km. The GW interannual variability is large for the horizontal wind variances below 80 km in the spring and autumn. These features are consistent with previous studies. In addition, we detected a weak but significant enhancement with large interannual variability for the GW activity in summer: The GW climatology exhibits a weak maximum in summer for the zonal wind variance in 70-78 km. The GW interannual variability shows that the meridional wind variance is large in summer. Thus we examined three possible mechanisms to control the GW interannual variability in summer, namely, the interhemispheric coupling associated with the stratospheric sudden warmings (SSWs) in the Northern Hemisphere (NH), the modulation of GW vertical filtering in association with the polar vortex breakdown in the SH, and the generation of GWs from tropical convection. The GW variance does not have remarkable features in association with the NH SSWs. Although the GW variance increases in the beginning of summer, the timing is not well correlated with that of the polar vortex breakdown in the SH. In contrast, there is a good correspondence between the years with strong tropical convection and those with large GW variance at Syowa Station.