Effects of the refraction of gravity waves on polar mesospheric warming after sudden stratospheric warming

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Two Fourier Transform Spectrometers at Esrange (67°53′N) and Dasan arctic station (78°55′N) have been operated for mesospheric temperature measurements. During sudden stratospheric warming (SSW) event, WACCM simulation severely underestimates mesospheric temperature near the Dasan while it is in a good agreement with FTS measurement at Esrange. WACCM assumes that gravity waves only propagate in a vertical direction and this may lead to significant discrepancy in polar mesospheric wind and temperature structure. In this study, we try to investigate the effects of gravity wave propagation on mesospheric warming during SSW by using ray-tracing model and to provide better understanding on polar mesospheric response to SSW.