

## The momentum balance of the neutral atmosphere in the lower thermosphere estimated by a GCM.

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The polar lower thermosphere neutral winds show significant variations due to the energy inputs from the solar UV/EUV flux and from the magnetosphere. The EISCAT radar observation revealed that the neutral wind at an altitude of 118 km exceeds 500m/s during strong energy input. They estimated the momentum balance of the neutral wind and concluded that the major driving force was the horizontal pressure gradient force induced by the Joule heating. However the direct observation of the neutral density and pressure were not performed. The absence of these parameters may cause a serious error in the momentum balance of the neutral wind. In this study, we examined mechanism for the generation of high speed neutral wind in the lower thermosphere using a whole atmosphere general circulation model. We performed a series of GCM experiments under various conditions (Cross polar potential: 30, 90 120 and 150kV). We obtained the enhancement of the neutral wind with the magnitude of 500 m/s under the disturbed condition. This enhancement of the neutral wind obtained in this study is comparable to the observed. Analysis of the momentum balance of the neutral wind indicates that the fluctuations of the wind under the quiet and disturbed condition are mainly caused by the pressure gradient force which is generated by the Joule heating. In particular, the enhancement of the wind under the disturbed condition coincides with the increase of the pressure gradient force. We also found that the molecular diffusion was not negligibly small and attenuated the high speed neutral wind under the disturbed condition

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