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Altitude distribution of neutral wind responses to external forces in the polar upper atmosphere

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Neutral winds in the polar upper atmosphere are mainly determined, in addtion to solar and auroral heatings, by external forces such as plasma convection driven by magnetospheric electric field and atmospheric waves propagated from the lower atmosphere. In particular, the effects of plasma convection via ion drag also rely on the ion density produced not only by solar production but also by energetic particle precipitation. On the other hand, the atmospheric waves such as gravity wave, planetary wave, and tide, propagating from the lower atmosphere, should deposit energy and momentum into the upper atmosphere and affect the neutral winds in the polar region. Then, which external forces dominate the neutral winds in the polar upper atmosphere? What is the boundary region in which the transition occurs from one to the other forces? In order to address these questions, in this study, the effects of the external forces on the neutral winds are investigated using the observations for the neutral winds by Fabry-Perot Interferometer (FPI) at Jang Bogo Station (JBS), Antarctica. The initial result indicates that the effects of plasma convection dominates the neutral winds even at 97 km altitude but the winds at 87 km altitude seem to be dominated by the lower atmospheric wave effects, regardless of season.