DE-2 Observations of Ionosphere-Thermosphere Coupling

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An ionosphere-thermosphere coupling is very important for dynamics and thermal dynamics of atmosphere and plasma. We analyzed DE-2 satellite data to understand the physical mechanism of momentum and energy transfers between atmosphere and plasma. We found that the zonal wind of neutral atmosphere is strongly controlled by geomagnetic field in all magnetic local time (MLT). In addition, the zonal wind velocity increased with the increase of altitude. The zonal wind distribution is similar to that obtained from the accelerometer on board CHAMP satellite at 400 km altitude (Liu et al., submitted in 2009). The zonal wind distribution is also similar to those of zonal plasma drift velocity and plasma density. The zonal wind on geomagnetic equator flows eastward between 16 and 05 MLT, when plasma drift direction is eastward. On the other hand, the plasma drift velocity distribution shows trough on geomagnetic equator and crests in +/- 10 geomagnetic latitudes between 16 and 20 MLT. During this period, the distribution of plasma density is similar to that of zonal plasma drift velocity. However, the peak of plasma density occurs in the higher latitude than that of zonal plasma drift velocity. Vertical plasma drift velocity becomes a maximum on geomagnetic equator in 16 and 20 MLT. It is known that the large upward plasma drift results in Fountain Effect. But, we could not find any relation between zonal and upward plasma drifts. In this presentation, we will discuss the ionosphere-thermosphere coupling process from the distributions of plasma drift velocity, plasma density, neutral wind and
neutral density.