Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

PEM025-P31 Room: Convention Hall Time: May 26 17:15-18:45

DE-2 satellite observations of neutral atmosphere and plasma in the low latitude upper atmosphere

Tsutomu Kondo[1*], Shigeto Watanabe[1], Yoshihiro Kakinami[2]

[1]Division of Cosmoscience, Hokkaido Univ., [2]National Central University

Interaction process between neutral atmosphere and plasma in the upper atmosphere is very important to understand the dynamics of atmosphere and plasma. Recent studies revealed that the zonal neutral wind flows strongly on magnetic dip equator instead of geographic equator. Plasma density forms equatorial ionization anomaly (EIA) where the zonal wind flows strongly on magnetic dip equator. Other studies showed that the zonal plasma drift velocity forms large vertical shear and velocity anomaly which is a distribution of minimum velocity on magnetic dip equator and maximum velocities in +- 10 latitudes. We have analyzed data of zonal neutral wind, zonal plasma drift and plasma density measured by DE-2 satellite to understand the interaction process between atmosphere and plasma in the upper atmosphere. We found that the zonal plasma drift velocity distributes along geomagnetic field lines during only 18MLT-21MLT. The zonal plasma drift velocity below F-region peak forms a velocity anomaly and upon F-region peak the zonal plasma drift velocity does not show altitude dependence. We also found that the zonal neutral wind at altitudes of 200km-600km flows strongly on magnetic dip latitude. Around and below F-region peak, the zonal neutral wind velocity distribution corresponds to EIA distribution. This feature is most prominence in 18MLT-21MLT when EIA is developed. During 18MLT-21 MLT, F-region dynamo affects ionospheric plasma density structure. Since the zonal plasma drift forms velocity anomaly when F-region dynamo is driving and the zonal neutral wind corresponds to EIA, we suggest that the zonal plasma drift and the zonal neutral wind are strongly controlled by F-region dynamo. In this presentation, we will discuss the interaction process between atmosphere and plasma in the low latitude ionosphere/thermosphere.