

PEM006-18

Room:101

Time:May 25 17:15-17:30

Equatorial Electrodynamics in the Asian Sector During the 2009 Stratospheric Sudden Warming

Huixin Liu^{1*}, M. Yamamoto¹, T. Tsugaawa², Tulrasi Ram¹, Y. Otsuka³

¹RISH, Kyoto University, ²NICT, ³Nagoya University

Using observations of the TEC, NmF2 and EEJ from the ground network in south-east asia, the Equatorial Ionization Anomaly (EIA) and related electrodynamics in this longitude sector are examined during the period of stratospheric sudden warming in January 2009. Plasma density and neutral density from the CHAMP satellite are also employed to investigate the neutral background and possible longitudinal variability. The analysis reveals the following features. 1. The EIA indicated by both the TEC and NmF2 was seen to experience a semi-diurnal perturbation, with strong enhancement around 09 LT and significant weakening in the afternoon around 15 LT. This perturbation was consistent with that seen in the EEJ with strong counter electrojet developed in the afternoon during the same period. 2. Strong hemispheric asymmetry occur in the afternoon sector, with the plasma depletion in the northern EIA crest being 3 times of that in the southern crest. 3. Significant longitudinal difference was observed in the plasma density variation around 15 LT, with stronger depletion in the American sector than in the Asian sector. 4. Neutral density around 350 km was found to decrease by about 30% in the equatorial region, indicating overall cooling effects in the equatorial region associated with the warming in the polar region. It also demonstrates that the plasma density response in the EIA region may likely evolve chemical changes in the neutral background, in addition to electrodynamical processes.

Keywords: equatorial electrodynamics, equatorial electrojet, stratospheric warming, neutral-plasma interaction