

Analysis of characteristics of ionospheric parameters, Sq index and neutral winds over Taiwan

*Yu-Jung Chuo¹

1. Department of Information Technology, Ling Tung University

In this paper, we examine the variation of thermospheric neutral winds and solar quiet (Sq) current of the geomagnetic fields for the equatorial ionospheric anomaly area (EIA) during the solar activity period in 1999. The thermospheric neutral winds are derived from the ionospheric F_2 -layer peak height, hmF_2 , by using the servo model method. The variability of the amplitude of Sq fields is derived from the ground geomagnetic fields in the components H and Z, respectively. The results of the current system show a same diurnal variation, which that peaks / valleys in the local noon time for Sq(H) / Sq(Z) in the low latitudes, respectively. The results also indicate a weak seasonal variation that peaks appear at the local summer of the Sq currents in H and Z components, respectively. The Sq current system is associated with the change of the equatorial electrojet (EEJ). Further, the variability is probably attributed to local thermospheric winds. The study also shows that the zonal and meridional components of the neutral winds at the EIA over Taiwan area. Furthermore, the study examines the variations of Sq(H), Sq(Z), neutral winds, and ionospheric parameters foE_s , NmF_2 , and hmF_2 during the disturbed geophysical conditions such as geomagnetic storm and earthquake. The result shows the variations of ionospheric Sq(H), Sq(Z) and thermospheric neutral winds are different between the seismo-ionospheric and solar-terrestrial disturbed periods, even they lead the same decreasing electron density reaction in the ionosphere at the EIA over Taiwan area.

Keywords: Sq current, ionosphere, neutral winds