

Mid-latitude summer nighttime anomaly in OI 135.6nm airglow emission monitored by TIP and other instruments

Hsu, M. L.^{1,2}, C. H. Lin³, J. Y. Liu⁴, and L. J. Paxton⁵

¹Department of Physics, National Cheng Kung University, Tainan, Taiwan

²Earth Dynamic System Research Center, National Cheng Kung University, Tainan, Taiwan

³Plasma and Space Science Center, National Cheng Kung University, Tainan, Taiwan

⁴Institute of Space Science, National Central University, Chung-Li, Taiwan

⁵The Johns Hopkins University Applied Physics Laboratory, Laurel, Maryland, USA

The paper presents the OI 135.6-nm airglow emission observations of the middle-latitude electron density enhancement during summer nighttime observed by the Tiny Ionospheric Photometer (TIP) onboard the FORMOSAT-3/COSMIC (F3/C) mission and the Global Ultraviolet Imager (GUVI) onboard the Thermosphere Ionosphere Mesosphere Energetics and Dynamics (TIMED) spacecraft. The density enhanced anomaly in the southern hemisphere known as the Weddell Sea Anomaly (WSA) has been observed by various observations and the WSA-like feature occurring in the northern hemisphere is also found during local summer, which suggests both anomalies are generally the mid-latitude summer nighttime anomalies (MSNA). This study utilizes the two-dimensional global airglow map and vertical electron density profiles derived from the disk and limb scans of the GUVI 135.6-nm observations to further explore the three-dimensional structure of the MSNA with day-to-day variations. The results are also compared with the F3/C radio occultation observations.