Estimation of global scale airglow structure by observation from International Space Station

*Yusuke Kitamur[1], Akinori Saito[1], Takeshi Sakanoi[2], Yuichi Otsuka[3], Atsushi Yamazaki[4], Yuta Hozumi[1]

1. Department of Geophysics, Graduate School of Science, Kyoto University, 2. Planetary Plasma and Atmospheric Research Center, Graduate School of Science, Tohoku University, 3. Institute for Space-Earth Environmental Research, Nagoya University, 4. Institute of Space and Astronautical Science / Japan Aerospace Exploration Agency

We analyzed the dependence of large scale structure of night time airglow at 630 nm on the local time, latitude and longitude using ISS-IMAP/VISI observation data from the International Space Station and analyzed the IRI model TEC, IRI and MSIS airglow model .
ISS-IMAP/VISI is an airglow observer installed in the International Space Station for about 3 years from September 2012 to August 2015. It observes observes 630 nm airglow. At 630 nm, the airglow is emitting at around 250 km altitude, and the emission due to the equatorial anomaly has a dominant influence. We examined the dependence of 630nm airglow on local time, latitude and longitude, and compared it with the previous study. In the equator, it seemed that the latitude of the north and south became maximum at around 15 degrees due to equator anormaly. The equatorial anomaly weakened from the night to the morning and disappears, but it was observed that the observation was brightening around midnight and things like midnight temperature maximum were confirmed. Also, the asymmetry between the north and south hemisphere of the seasonal variation was confirmed. Similar asymmetry was observed in the 40 degrees north and south where the influence of equatorial anomaly was small.
In addition, we compared and verified the results of these results, total electron number data by IRI model which is an ionosphere model, and emission intensity of 630 nm airglow calculated from IRI model and MSIS model which is the atmosphere model.

