

On the relationships between EEJ distribution and plasma bubble occurrences

*Takafumi Akiyama¹, Akimasa Yoshikawa², Hiroki Matsushita¹, Akiko Fujimoto³, Teiji Uozumi³

1. Field of Space and Earth Electromagnetism, Department of Earth and Planetary Sciences, Graduate School of Sciences, Kyushu University, 2. Department of Earth and Planetary Sciences, Kyushu University, 3. International Center for Space Weather and Education, Kyushu University

To understand the relationship between distributions of Equatorial Electro Jet (EEJ) along dayside dip-equator and generation characteristic of plasma bubble, we investigate how Local Time (LT) dependence of EEJ amplitude is relating to the plasma bubble occurrences. The LT dependence of the amplitude of EEJ is characterized by using integrated value of EUEL of EE-index (produced by ICSWSE, Kyushu University) at daytime (07:00~17:00LT), noon time (09:00~15:00LT) and evening time (17:00~19:00LT)). While plasma bubble occurrence is determined by S4 index of ionospheric scintillation produced by ISEE, Nagoya University. In this study, EUEL data at equatorial station: Langkawi, Malaysia (GG Lon. =99.78, Dip Lat. =-1.07), and S4 data at Kototabang, Indonesia (GG Lon. =100.32, Dip Lat. =-10.1) from 1 January 2011 to 8 November 2014 are used to investigate the relationship between EEJ and the scintillation. Our result shows that there are relationship between plasma bubble occurrence and integrated EUEL value in all the above period; larger integrated EUEL value, larger occurrence rate of plasma bubble. Moreover it turned out that plasma bubble tends to be suppressed when integrated EUEL value in the evening is negative. Our result for evening side is consistent with previous study of Uemoto et al., [2010], while the one for daytime does not. This might be due to different way of EEJ amplitude estimation was used. In our study, EUEL value at Langkawi not only reflects EEJ amplitude but also background Sq disturbances. While in the study of Uemoto et al., [2010], EEJ amplitude is estimated by purely equatorial enhancement and/or equatorial depression component. Our results strongly suggested that plasma bubble occurrence is not only controlled by the Equatorial enhancement but also Sq structure near dip equator.

Keywords: Equatorial ElectroJet, Plasma Bubble