

PRE の強度に寄与する日没前電離圏電流の構造解析

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Investigating Pre-sunset equatorial electrojet contributing to PRE

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In the ionospheric E region, there are both the eastward current (EEJ) and the westward current (CEJ). The currents about 2 hours before sunset (Evening EEJ/CEJ) control the intensity of the Pre-Reversal Enhancement (PRE), and it has been suggested that when the evening CEJ is incomplete or reverts to the EEJ component (CEJ + Evening EEJ), it affects the occurrence of plasma bubbles [Uemoto et al., 2010, Akiyama et al., 2019].

In this study, to clarify the daily, regional, and seasonal dependence of evening EEJ/CEJ, we analyzed the EE-index, which consists of the magnetic field variation due to globally varying magnetospheric currents (EDst) and the localized ionospheric magnetic field variations (EUEL) [Uozumi et al., 2008]. Additionally, semidiurnal lunar tidal variations were calculated from EUEL [Fujimoto et al., 2019]. Observation stations in the Asian and South American regions are used for comparison with previous studies

The composite waveforms of semidiurnal lunar tides and Sq currents were analyzed for each lunar time. As a result, characteristic waveforms combining CEJ and evening EEJ were observed when tidal effects are strong (e.g., during SSW). This result suggests that the superposition of semidiurnal lunar tides and Sq currents may promote the formation of eastward currents before sunset, i.e., PRE. This longitudinal dependence was observed in South America, particularly in the Peru sector.

In this presentation, we will discuss whether the evening EEJ/CEJ results from independent current systems or from the superposition of Sq currents and lunar tides, through comparative analysis of Asian and South American regions.