

PEM005-P03

会場:コンベンションホール

時間:5月26日 10:30-13:00

磁気嵐電場によるグローバル電離圏電流について Global ionospheric currents driven by storm-time electric fields

辻 裕司^{1*}, 新堀 淳樹², 菊池 崇¹, 西村 幸敏¹, 長妻 努³

Yuji Tsuji^{1*}, Atsuki Shinbori², Takashi Kikuchi¹, Yukitoshi Nishimura¹, Tsutomu Nagatsuma³

¹ 名古屋大学 太陽地球環境研究所, ² 京都大学 生存圏研究所, ³ 情報通信研究機構

¹STEL, Nagoya University, ²RISH, Kyoto University, ³NICT

During the strong southward interplanetary magnetic field (IMF), the convection electric field originating from the region-1 field-aligned currents (R1 FACs) causes a two-cell ionospheric current at high latitudes [Nishida, 1968]. The convection electric field penetrates to the magnetic equator, and drives the eastward equatorial electrojet (EEJ) [Kikuchi et al., 1996]. This condition is called an undershielding. Subsequently, when the southward IMF weakens, the reversed ionospheric current, equatorial counter electrojet (CEJ), is driven by the developed shielding electric field originating from the region-2 field-aligned currents (R2 FACs). Its condition is called an overshielding because the shielding electric field relatively overcomes the reduced convection field in lower latitudes of the R2 FACs [e.g., Kelley et al., 1979]. However, the temporal and spatial development of global ionospheric current has not been yet established in middle latitudes during storms. So, we have investigated global ionospheric current deduced by magnetic field variations in high-low latitudes in the 21 storm events. During the periods of EEJ, the influence of the Hall current expanded into the middle latitudes (around 40 degrees in corrected geomagnetic latitude) driven by the intensified convection electric field. While, during the periods of CEJ, the reversed Hall currents appeared in the middle latitudes due to the overshielding electric field. Based on the above results, we reconstructed a picture of the 3-D current system depending on undershielding/overshielding condition corresponding to the storm main/early recovery phase, including the middle latitudes. Moreover, it is found the observed life time of CEJ was longer than that of the overshielding current at the middle latitudes. This fact implies that the CEJ at the equator is driven by the ionospheric disturbance dynamo. We will talk about global ionospheric currents driven by the convection, shielding, and disturbance dynamo electric fields.