

R010-16

B会場：11/27 PM1 (13:15-15:15)

14:45~15:00

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Diurnal and Seasonal Variations of Quiet-Time Geomagnetically Induced Currents in Power Transmission Systems in Japan

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This study investigates the characteristics of long-term variations in geomagnetically induced currents (GICs) in Japan, with a focus on the Kanto region. In response to the recent growing awareness of GIC risks in geomagnetically low- to mid-latitude regions, observations at several points in Japan islands have been conducted (Watari et al. (2021), Nakamura et al. (2017)). However, these studies have primarily concentrated on periods of high geomagnetic activity, and GICs in Japan during magnetically quiet intervals have not been well understood. Although GIC amplitudes during quiet periods are relatively small, continuous currents may still have the potential to impacts on underground gas pipelines. Therefore, we focus on the characteristics and causes of GICs during magnetically quiet intervals in Japan. Additionally, we evaluated techniques to calculate GICs using the geomagnetic field observations. In this study, we selected five geomagnetically quiet days each month based on the Kp index . We analyzed the average diurnal variations of both GIC and geomagnetic variations for each season (spring/summer/fall/winter) using Superposed Epoch Analysis. Our findings indicate a strong correlation between the diurnal variation of GIC and the diurnal variation of the Sq current. Furthermore, we used the method developed by Ebihara et al. (2021) to estimate GIC from the geomagnetic data in the ground. The calculated GIC accurately reproduced the observed diurnal patterns, except for specific time periods in UT (LT), demonstrating that the magnetic fields generated by the Sq current can account for the observed GIC variations. We conclude that the diurnal and seasonal variations in GIC in Japan are predominantly caused by geomagnetic variations associated with the Sq current.