

Latitudinal Dependence of the Sq Current System Response to an X-class Solar Flare.

Nogueira, P. A. B. [1]; Abdu, M. A. [2]; Souza, J. R. [2]; Denardini, C. M. [2]
[1] Instituto Federal de Educação, Ciência e Tecnologia de São Paulo, IFSP, Jacareí,
São Paulo, Brazil;
[2] Aeronomy Division, DAE, National Institute for Space Research (INPE),
São José dos Campos, 12227-010, São Paulo, Brazil..

We have analyzed the ionospheric response in South America associated to two strong solar flares (X class) that occurred on 13-May-2013 and 11-March-2015. The present work discusses the disturbances in the ionosphere E-region in the form of the Sq-current and Equatorial electrojet (EEJ) intensifications as detected by magnetometer data. In particular we show for the first time up to 7 minutes time delay between Sq current peak stations (occurring nearby x-ray peak) and at EEJ current peak stations in response to the solar flare. We aim to show that the observed delay in the electric current is occurring due to the ionospheric electric field, which may be owing the altitudinal difference between Sq location (outside equator) at about 120 km and the EEJ location (at the magnetic equator) at about 106 km causing the response time delay at those locations. Our conclusion has been supported by the Sheffield University Plasmasphere-Ionosphere Model (SUPIM) by simulating the E-region conductivity enhancement and the related variations arising from the flare enhanced solar EUV flux and soft X-rays.