

Latitudinal and Longitudinal Profile of EEJ current during different phases of Solar Cycle

*Nurul Shazana Abdul Hamid¹, Wan Nur Izzaty Ismail¹, Mardina Abdullah^{2,3}, Akimasa Yoshikawa⁴

1. School of Applied Physics, Faculty of Science and Technology, Universiti Kebangsaan Malaysia, 43600 UKM, Bangi, Selangor, Malaysia, 2. Space Science Centre (ANGKASA), Institute of Climate Change, Universiti Kebangsaan Malaysia, 43600 UKM, Bangi, Selangor, Malaysia, 3. Department of Electrical, Electronic and Systems Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia, 43600 UKM Bangi, Selangor, Malaysia, 4. International Center for Space Weather Science and Education (ICSWSE), Kyushu University 53, 6-10-1 Hakozaiki, Higashi-ku, Fukuoka 812-8581, Japan

Study of equatorial electrojet (EEJ) has always been one of the research interest in ionospheric field. EEJ current is an eastward current that flows within the range of $\pm 3^\circ$ at dip equator. In this study, we attempt to find the latitudinal and longitudinal profile of this ionospheric current. This research is carried on using data from magnetometer network from Magnetic Data Acquisition System (MAGDAS)/ Circum-pacific Magnetometer Network (CPMN), Indian Institute of Geomagnetism (IIG) and International Real-Time Magnetic Observatory Network (INTERMAGNET). The analysis is carried out using geomagnetic northward H component which is later used to calculate the magnetic component of EEJ. In order to correct the latitudinal effect caused by the location of observatories, we applied the normalization technique of observation data. The EEJ latitudinal profile is obtained and it shows that the current started to reverse westward at 5° latitude and not more than 10° latitude in both hemispheres. On the other hand, the longitudinal profile obtained shows that EEJ is higher in American sector and lowest between African and Indian sector in solar minimum (2008) and inclination phase (2011) of solar cycle. However, in solar maximum (2014), the EEJ current is found to be comparable between American and Southeast Asian sector. Moreover, our result agreed with previous study, showing that the Sq current does not vary with longitude, especially in solar minimum.

Keywords: Equatorial electrojet, Latitudinal profile, Longitudinal profile, Solar cycle