

Daytime ionospheric longitudinal gradients seen in the observations from a regional BeiDou GEO receiver network

*Fuqing Huang^{1,2}, Jiuhou Lei^{1,2}

1. School of Earth and Space Sciences, University of Science and Technology of China, 2. Mengcheng National Geophysical Observatory, University of Science and Technology of China

Many studies have devoted to the longitudinal variations of the ionosphere globally. However, the ionospheric longitudinal variations in a small region are rarely reported. In this paper, we use the TEC data from a BeiDou geostationary orbit (GEO) receiver network to investigate ionospheric longitudinal variations within the zonal scale of 1000 km in China. The BeiDou GEO TECs provide a good dataset to study longitudinal variations, compared with non-GEO TEC, without contaminating the spatial variations and elevation change due to satellite motion. Pronounced daytime longitudinal gradients within the distance of 1000 km are present in BeiDou GEO TEC observations. It was found that the TEC is larger in the west than in the east. In some cases, the TEC gradient magnitudes are larger than 20 TECU. For most events, the obvious daytime longitudinal gradients occurred under the weak and moderate geomagnetic activity conditions. In addition, daytime longitudinal gradients are mostly accompanied by TEC enhancement. We suggest that the observed daytime longitudinal gradients are probably associated with the electric field disturbances.

Keywords: ionospheric longitudinal gradients, BeiDou GEO TEC, small region, small region