

A Study of the interhemispheric conjugacy of large-scale TIDs using the GPS networks in Japan and Australia

Takuya Tsugawa[1]; Akinori Saito[1]; Yuichi Otsuka[2]

[1] Dept. of Geophysics, Kyoto Univ.; [2] STEL, Nagoya Univ.

The interhemispheric conjugacy of large-scale traveling ionospheric disturbances (LSTIDs) is discussed using total electron content (TEC) data derived from GPS networks in Japan and Australia.

LSTIDs have the horizontal scale of more than 1,000 km and the period of 30-120 minutes. They are widely believed as the ionospheric manifestations of the passage of atmospheric gravity waves (AGWs) that are generated at high latitudes by the energy input from the magnetosphere. Although this energy is considered to be injected into both hemispheres coincidentally, there have been few studies focusing on the geomagnetic conjugacy of LSTIDs by observations using GPS networks in both hemispheres.

Tsugawa et al. [2004] statistically studied on the occurrence and damping rate of 156 LSTIDs using GEONET data, and revealed that almost all of them propagated southward and they had not only positive damping rates but also negative damping rates. If their damping rate is small or negative, it is considered that they are able to travel across the equator from the other hemisphere. There was, however, only one LSTID propagating northward over Japan. This indicates the difference of their occurrences between hemispheres and/or the existence of intense damping mechanism in the equatorial region. We discuss about the interhemispheric conjugacy of occurrence and propagation characteristics of LSTIDs with the simultaneous observations of TEC using GPS networks in Japan and Australia.