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## The statistical study of the local time dependence of Mid-latitude TEC enhancement using TEC data

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The difference of the local time dependence of Total Electron Content (TEC) enhancement at mid-latitude was clarified by TEC data. TEC enhancement in topside ionosphere was detected with TEC data. TEC data between GRACE and GPS satellite is the integration value of the electron density in plasmasphere and topside ionosphere. The local time dependence of TEC enhancement at mid-latitude was studied from 2003 to 2006 statistically. Three type of local time dependence was founded. First type is the pre-dawn type. This type was observed during pre-dawn region from 01LT to 04LT and most of them are tend to be observed during geomagnetic quiet term. All the rest types are daytime type and evening type. In these type, TEC enhancement at mid-latitude were tend to occur during geomagnetic disturbed term. The difference of altitudinal region which occurred TEC-enhancement at mid-latitude between daytime type and pre-dawn type was researched during May, 2003. The difference of altitudinal region was researched by comparing GRACE-TEC and ground based GPS data during May, 2003. The main enhanced region of daytime type was detected above topside ionosphere. All TEC-enhancement in daytime was derived from SED. The main enhanced region of pre-dawn type was detected around topside ionosphere. These results indicate that the origin of TEC-enhancement is different between daytime and pre-dawn type.

Keywords: TEC data, total electron content, plasmasphere, low earth orbit satellite, mid latitude, ionosphere