

Plasmaspheric contribution to GPS-TEC over Japan

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We present the variations of PEC over Japan by using the TEC measured by the GPS network in Japan and the TEC and IEC calculated using the Sheffield University plasmasphere ionosphere model. The variations are presented for different seasons under low and high solar activity conditions.

It is well known that the accuracy of GPS satellite navigation using single frequency receiver can be affected by the variations of the total ionization between the satellite at 20200 km altitude and the receiver. The total ionization, called the total electron content (TEC), is composed mainly of ionospheric electron content (IEC) and partly of plasmaspheric electron content (PEC). Models of IEC have been incorporated into the single frequency GPS system to compensate for the gross variations IEC. However, little is known about the variations of PEC, particularly over Japan. In this paper we present the variations of PEC over Japan by using the TEC measured by the GPS network in Japan and the TEC and IEC calculated using the Sheffield University plasmasphere ionosphere model. The relations are presented for different seasons under low and high solar activity conditions.