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Total electron content observation by using GPS, QZSS and BeiDou

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There are several methods for observation of total electron content (TEC). TEC can be obtained from the measurement of global navigation satellite system (GNSS) such as GPS. Recently, RNSS (regional navigation satellite system) has been developed in China and Japan. We are trying to use RNSS for TEC observation.

RNSS makes TEC observation stable since a satellite is tracked continuously for long time. It is of benefit to study of plasmasphere because the altitude is higher than GNSS. There is also drawback. Since the direction of vector from grand receiver to satellite is not so variable, it is hard to observe the horizontal electron density distribution of ionosphere. This problem can be solved by combining with measurements of RNSS and GNSS. That is called multi-GNSS.

TEC can be caluculated from the difference of delay between dual-frequency. The inter-frequency bias which remain in TEC measurement are required to estimated and removed. We will present model of ionospheric electron density distributionfor the bias estimation procedure. We have constructed the observation system for GPS, Japanese QZSS, and Chinese BeiDou in Yokohama National University. Various observational results will be shown and discussed.

Keywords: TEC, QZSS, BeiDou, GPS, ionosphere, plasmasphere