

TEC Determination over Single GPS Receiver Station Using PPP Technique

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ABSTRACT

Bernese GPS Software (BGS) version 5.0 is now capable of processing un-differenced GPS observations. The most important reason for this enhancement of BGS software are that processing un-differenced data gives access to the satellite and receiver clocks and it allows for a so-called precise point positioning (PPP). PPP is a widely used technique within positioning communities, but it is less well known among ionospheric mapping groups. In this paper, we show that the extraction of TEC information for single GPS receiver station can also be done under PPP. GPS data was taken from KUKP's station (01°19' N, 103° 27' E), Johor, Malaysia. Through BGS's Bernese Processing Engine (BPE)'s PPP mode, GPSEST program is used to model and estimate the ionosphere. In GPSEST program, geometry-free linear combination, L4 from the zero-difference code observations was used because it principally contains ionospheric information. The quality of the ionosphere representation was tested by comparison to nearest IGS station, NTUS (1° 20' N, 103° 40' E) and IGS Global Ionosphere Maps (GIM), which were used as reference. Results show that RMSE value between TEC from KUKP and GIM is 0.026% while for NTUS is 0.023%. This proved that PPP technique can be used to determine TEC over single station. It is shown that the extraction of TEC information for single station can also be done under PPP.

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