

# Improving Klobuchar Type Ionospheric Delay Model using 2D GPS TEC over China

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## Abstract

In Global Positioning System (GPS), the 8 parameter Klobuchar type ionospheric delay model is broadcast to predict the global vertical TEC distribution at a given time period for real-time correcting the ionospheric effect on single frequency GPS measurements. The Klobuchar type ionospheric delay model, which originally comes from Bent Model, is a simple but utility model. It adopts trigonometric cosine function to describe the characteristics of ionospheric diurnal variation. The reliability for TEC prediction by means of large scale variation can be guaranteed. Due to the Klobuchar model is completed in early 1980s, confined to the technology of that era, the parameters and the model type were not so accurate. It needs to be updated and validated for common global and/or regional users.

Using the original Klobuchar model, over 60% of the ionosphere delay effects can be corrected generally at present. In order to improve the result, a new type of the model needs to be developed, which is more suitable for TEC correlation of regional and global area. For this target, after taking the short comes of current models into considerations, we increased the number of the original model parameters from 8 to 14. Then, use the ionospheric TEC data by Chinese GPS network, we evaluated and checked the parameters settings basing on Least Square fitting method. It's showed that the accuracy of the new Klobuchar Model is improved greatly.

Key Words: GPS/TEC, Ionosphere, Klobuchar Model, the ionosphere delays correcting models ;