



## **Calculation of TEC map assisted ionospheric corrections for single frequency GNSS applications**

**J.-P. Luntama, K. Kauristie**

Finnish Meteorological Institute, Helsinki, Finland (juha-pekka.luntama@fmi.fi / Fax: +358 9 1929 4603)

The GNSS (Global Navigation Satellite System) applications use the measurements of the range between the transmitters and the receiver to solve the location of the receiver. The range measurements are based on the phase of the code modulated on the satellite carrier signal and on the phase of the carrier signal itself. Both the code and the carrier phase suffer distortions when the signal passes through the ionosphere and the plasmasphere surrounding the Earth. Without correction the ionospheric error in the navigation solution can be up to 30 m, and the error is proportional to the total electron content (TEC) integrated along the signal propagation path. In the case of two-frequency receivers the ionospheric distortion can be eliminated almost totally and the necessary correction can be used to estimate the spatial distribution of TEC.

Finnish Meteorological Institute (FMI) has started a study to investigate the feasibility of using global or regional TEC maps to assist single frequency GNSS applications. The objective of the study is to use a TEC maps to calculate ionospheric corrections for mobile GNSS receivers. The study focuses especially on the estimation of the ionospheric correction at the northern auroral latitudes.

This presentation shows the results from the first phase of the study. At this point we have used TEC maps calculated from the IGS and EUREF GPS networks. The results indicate progress in the estimation of the ionospheric correction. However, it seems that TEC maps with better spatial and temporal resolution would be needed at auroral latitudes, especially when the structure of the ionosphere is disturbed. The presentation will also outline our plan to calculate high resolution regional TEC maps with ground based GPS observations.