

Modelling the Neutral Atmosphere Propagation Delay in the Canadian Arctic

ABSTRACT

The increasing importance of high latitude regions for high precision positioning and meteorological studies on one hand and the crucial role of GPS in both applications on the other encourage regionally focussed research for high precision GPS positioning and GPS meteorology in the Arctic. The Challenging GPS constellation and unique atmospheric conditions are encouraging factors to propose regional GPS meteorology related research work in the Arctic.

In this thesis I will develop a regionally tuned strategy for GPS tropospheric delay retrieval in the Canadian Arctic. Spatial and temporal tropospheric delay error covariance models, which are expected to benefit both numerical weather prediction (NWP) tropospheric delay assimilation procedure and GPS zenith total delay (ZTD) retrieval itself, will be empirically determined. An additional objective would be to derive a regional tropospheric propagation zenith delay model for the Canadian Arctic using statistical modelling of long term meteorological data and newly available radio occultation measurements. A field observation campaign provides a unique opportunity to validate both empirical and NWP models in the Canadian Arctic.