



Near real-time monitoring of TEC fluctuations in northern hemisphere using GNSS permanent networks

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Studies on the space weather, with special regard to periods of geomagnetic and ionospheric storms, have been executed using many different measuring techniques by several research groups. The increasing number of permanently tracking GNSS stations near the North Geomagnetic Pole allow to use satellite observations to detect the ionospheric disturbances at high latitudes with higher spatial resolution. In the proposed algorithm developed at GRL/UWM, the data from the Arctic stations belonging to IGS/EPN/POLENET networks were used to study TEC fluctuations. Medium and large scale ionospheric structures cause the increase of the horizontal TEC gradients, which in turn, are the source of the difficulties in the carrier phase ambiguity resolution in GPS positioning.

Since the beginning of 2011, a near real-time service showing the conditions in the ionosphere on the web site have been operational at GRL/UWM. The rate of TEC index (ROTI) expressed in TECU/min is used as a measure of TEC fluctuations. The service provides 2-hour maps of the TEC variability. In addition, for each day the daily map of the ionospheric fluctuations as a function geomagnetic local time is also created. This presentation shows the architecture and algorithms behind this new service, its performance and future developments.