



Influence of the TEC fluctuations in the polar region on precise GPS positioning.

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The ionospheric delay is an atmospheric effect influencing on Global Navigation Satellite System signals. On the one hand it is a factor limiting the accuracy of the GNSS positioning, and on the other it makes satellite observations a very good source of the information on the ionospheric conditions. The degradation of the relative positioning accuracy and reliability can be connected with high gradients of the total electron content or with the TEC fluctuations. The latter of these effects mainly occurs in the equatorial and polar regions. The ionosphere near the geomagnetic poles is characterized by relatively small TEC values in comparison to the other regions. However, the connection between the magnetosphere and ionosphere systems in the polar regions allows particle precipitation and leads to very strong ionospheric dynamics. In this work, performance of the GNSS precise relative positioning under disturbed ionospheric conditions in the northern polar region is studied. The test results are based on processing 24-hour data sets from the selected permanent GPS stations located in Greenland. The studies cover several days of high and low solar activity, and also periods of a geomagnetic storm characterized by intensive TEC fluctuations. The data processing was carried out in static and kinematic modes. The GINPOS software developed at the University of Warmia and Mazury in Olsztyn was used for positioning tests. The study confirms and presents the influence of the ionospheric and geomagnetic activity in the polar region on the results in coordinate and ambiguity domains.