

## **TEC fluctuations at auroral ionosphere derived from GPS measurements**

I.I. Shagimuratov, I.I. Ephishov (WD IZMIRAN, Kaliningrad, Russia)

J. Cisak, A. Krankowski (Institute of Geodesy, Poland)

The changes of total electron content (TEC) caused ionospheric irregularities are clearly exhibited via phase fluctuations of GPS signals. The standard sampling interval GPS observations of 30-s enable to register irregularity structures of the order of a few kilometres. In analyses we used GPS observations collected from more than 20 stations of north hemisphere. The data sets discussed refer to September 1999 active events.

During magnetically quiet days the phase fluctuations are observed at auroral latitudes with maximum occurrence near a magnetic midnight (MM). In polar latitudes of Thule at Geomagnetic Latitude (GGL)~85N, in contrast with it a minimum occurrence of fluctuations took place near MM. At high-latitude near of Ny Alesung (GGL~76N) fluctuations are observed almost 24 hours, in doing so near MM there were low level fluctuations. The development of the phase fluctuations on quiet day are probably controlled by auroral oval. The occurrence pattern are affected by the movement of the site relative to oval.

During magnetic storm occurrence of phase fluctuations is substantially modified. Their intensity is increased and at auroral stations it is observed as night as day time. The behaviour of fluctuations are dominated by the storm time. The intense phase fluctuations took place at the same UT at American and European sectors. The evident correlation took place between development of fluctuations and the level magnetic disturbance at Lovozero (GGL~64N). At Asian sector of Tixi (GGL~64N) the intensity of fluctuations are increased around MM and time interval of occurrence of fluctuations is expanded. At high-latitude of Thule the intensity fluctuations also are increased during storm but it did not shown great changes against quiet period. The storm-time equatorward development of the phase fluctuations reaches a subauroral latitudes of Onsala (GGL~54N).