Geophysical Research Abstracts, Vol. 8, 00611, 2006
SRef-ID: 1607-7962/gra/EGU06-A-00611

Research of the earthquake effects in the GPS positioning and ionosphere total electron content variations

A. Krankowski (1), I.E. Zakharenkova (2), I.I. Shagimuratov (3), A.F. Lagovsky (2)

(1) Institute of Geodesy, University of Warmia and Mazury, Olsztyn, Poland, (2) Immanuel Kant State University of Russia, Kaliningrad, Russia; (3) West department of Institute of a Terrestrial Magnetism, Ionosphere and Radiowaves Propagation, Kaliningrad, Russia; (pcizmiran@gazinter.net);

Using the data of the GPS observations an analysis of the TEC variations during the Baltic Sea earthquake on September 21, 2004 (unique for the considered region) has been carried out. The earthquake magnitude was about 5.0. In the TEC variations one day prior to the main shock the seismo-ionospheric anomaly has been detected in the form of a specific increase of the TEC level over the place of the future earthquake. The anomaly had a positive sign with TEC enhancement of about 4 TECU (it is 20-25 percentage relative to a normal non-perturbed state of the ionosphere. The spatial size of anomaly was about 1000 km.

The analysis of the anomaly showed that according to the series of characteristics (its locality, dimensions of the disturbed area, and characteristic time of existence) it may be associated with seismic activity precursors. The results of this study demonstrate that under favorable geophysical conditions seismo-ionospheric precursors may be revealed even for a not very strong earthquake. The ionospheric anomaly caused errors in GPS positioning. The effect was clearly visible on the GPS vectors' elaboration for the stations nearest to the earthquake epicenter. The impact reached several millimeters.