



Ionospheric GPS TEC anomaly prior to Alaska earthquake on 24 June 2014

Andrzej Krankowski (1), Irk Shagimuratov (2), Nadejda Tepenitzina (2), Galina Yakimova (2), and Luisa Koltunen (2)

(1) University of Warmia and Mazury in Olsztyn, Space Radio-Diagnostics Research Centre (SRRC/UWM), Olsztyn, Poland (kand@uwm.edu.pl), (2) WD IZMIRAN, Kaliningrad, Russian Federation

In this presentation the analysis of the ionospheric total electron content (TEC) behavior prior to the strong Alaska earthquake of 24 June 2014 is presented. The earthquake magnitude was 7.9, the shock took place in 00:53:09 UT. The geographical coordinates of epicenter were 51.8N, 178.7E; the depth of seismic focus was 109 km.

To detect pre-seismic anomaly in the ionosphere GPS TEC measurements provided by IGS stations located in the considered region and global TEC maps provided by IGS community were used. The differential TEC (dTEC) maps were created to study the TEC variability during the discussed period. Differential TEC maps presents the deviation of TEC relative to non-perturbed: $dTEC = (TEC - TEC^*)$. We used mean values from the previous 30 days to obtain the non-perturbed TEC. During 18 June 2014, prior 6 days to the earthquake the anomalous behavior of dTEC (with TEC enhancement) was detected. During this day the geomagnetic activity was weakly varied: the sum of Kp was only 15 and Dst did not exceed -32 nT. The enhancement of TEC anomaly reached 25-30% relatively to the mean TEC. The observed TEC anomaly had well pronounced local character with size of 35-30 degrees in longitude and 15-20 degrees in latitude. The similar TEC enhancement between 8 and 10 UT on 18 June 2014 had been also registered on the satellite pass of PRN 28 over AC10 station (the nearest station to the earthquake's epicenter). The TEC enhancement reached the value of 3-4 TECU against to previous days. The analysis have shown that according to the series of characteristics (its locality, affinity with the epicenter, dome-shaped zone of manifestation, characteristic time of existence) the detected ionospheric anomaly may be associated to the precursors of seismic activity.