



Observations of storm effect in TEC over Europe during geomagnetic event of July 23-27, 2004

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The response of the ionosphere to the summer geomagnetic storm was analyzed using TEC maps for the European region. The TEC maps were created using GPS data from over 100 European stations. This enabled to obtain very high spatial resolution. The discussed event consists of sequence of three severe geomagnetic disturbances. The storm started around midnight of July 22-23. The Dst index reached the minimum value of -100, -130 and -190 nT for July 23, 25 and 27, respectively. The maximum sum of Kp index reached 58 and 60 for July 25 and 27, respectively. The occurrence of the storm in TEC variations demonstrated negative effect which, as it is known, predominates in summer season. The maximal depression of TEC took place during the recovery phase of the storm. The unusual TEC behavior during this storm was the positive effects, which were observed in daytime on the background of the negative effect. The short-term enhancement of TEC was well recognized in diurnal TEC variations in the proper phase of the storm. This effect was observed over all discussed latitudes (from 40° to 70°N latitude), and it was more pronounced at lower latitudes. The duration of the positive effect was ~2-3 hours. This effect was associated with substorm activity. It is interesting that the occurrence of the main ionospheric trough was detected in TEC distribution in summer time. As known, the trough is well pronounced in winter conditions. The trough was recognized in the TEC maps in the evening and night-time ionosphere. The latitudinal profiles created from the TEC maps show the structure and dynamics of the trough in TEC measurements. During

maximal geomagnetic activity the trough migrated until 50°N. The results obtained for the summer storm will be also discussed together with these obtained for winter storm of November 7-12, 2004.