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Ionospheric Storm Effects above Kharkov during the August 5–6, 2011

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The super strong magnetic storm began at 19:03 UT on August 5, 2011. The geomagnetic activity index K_p during the main storm phase was 8–, D_{st} = –113 nT. The solar wind radial velocity during the main phase varied within 570 – 620 km s^{-1}. The temperature of solar wind particles increased up to $6.4 \cdot 10^5$ K and their concentration $N_{sw} \approx 1.9 \cdot 10^7$ m^{-3}. The value of the interplanetary magnetic field (IMF) B_z component was –(15 – 18) nT, the value of the magnetic induction modulus of the IMF equaled 25 – 27 nT. The aurora activity index was *AE* ≈ 1740 nT. The value of Akasofu function was $\varepsilon \approx 37$ GJ s^{-1}.

For the observations of ionospheric storm effects, the Kharkov incoherent scatter radar was used, which is unique source of information about parameters and processes in ionospheric plasma in mid-latitude Europe.

The effects of the magnetic storm on August 5 – 6, 2011 were observed in variations of ionosphere parameters confidently. The storm above Kharkov was accompanied by a negative ionosphere disturbance. The electron density in the F2-layer maximum of ionosphere decreased approximately by a factor up to 2 in comparison with the reference day up to 10^{11} m^{-3}. Next twenty-four hours on 6 August N_m was approximately more on 30 % than in the reference day of 4th August 2011. The F2-layer maximum height in the main phase of the ionospheric storm increased to 513 km. In quiet conditions of 4th August F2-layer was on a height $z_m \approx 315$ km.

The electron density on heights 200, 250, 300, 350 and 400 km in the moment of the main phase of the ionospheric storm decreased approximately by 85, 91, 82, 61 and 27% accordingly.

The electron temperature in the main phase of the ionospheric storm increased approximately by a factor up to 4 and 2.5 at the heights 200 – 250 km, and in the range of heights 300 – 700 km T_e increased approximately by a factor up to 1.5 – 1.8 in comparison with the reference day. The ion temperature in considered period also increased approximately on 700 – 1000 K in the range of heights 200 – 250 km. On heights 300 – 700 km T_i increased approximately by a factor up to 1.5.

The storm on August 5 – 6, 2011 had adduced to transform of dynamic and heat conditions in ionosphere.