

## **DISTURBANCES IN THE D-REGION INDUCED BY LARGE SOLAR FLARES**

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Observed amplitude and phase on Very Low Frequency (VLF) radio signals can be used to study variability, morphology and other phenomena occurring in the D-region of the ionosphere. Great variations in amplitude and phase occur near sunrise and sunset, while more steady levels of amplitude are observed during daytime and nighttime conditions. Among many natural phenomena effects of solar flares can be observed by perturbations of amplitude and phase on VLF radio signals (Šulić *et al.* 2014, 2016). On the basis of measured intensity of solar X-ray by GOES satellites data, the X17.2 ( $I_X = 1.72 \cdot 10^{-3} \text{ Wm}^{-2}$  X-ray flux in the band 01-0.8 nm) class solar flare is ranking on the third place on the list of the most powerful solar flares recorded since 1976. Beside this solar flare for studying the influence of large solar X-ray flare on the enhancement of the D-region electron density the X5.4 ( $I_X = 5.4 \cdot 10^{-4} \text{ Wm}^{-2}$ ) class solar flare is selected. Both of these flares were recorded in October 2003. Simultaneous amplitude and phase on GQD/22.10 kHz radio signal measurements made over short ( $\sim 2000$  km) mainly land path are used to determine the enhancements of electron density in the D-region induced by large solar X-ray flares.

### **References**

Šulić, D. M., Srećković, V. A.: 2014, *Serb. Astr. Jour.* **188**, 45.

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