



On the impact of disturbed weather regions on the global electric circuit

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The influence of disturbed weather regions on electric processes in the atmosphere is of considerable interest in the global electric circuit (GEC) investigations. Recent studies [1-2] show that the contribution of clouds into the global electric circuit still requires careful research to refine existing models. Among the conductivity inhomogeneities typical for various elements of the GEC the perturbed regions associated with thunderstorm and non-thunderstorm clouds occupy an important place [3]. The conductivity of the Stratus and Cumulus clouds can be significantly reduced in comparison with the fair-weather conductivity of the ambient air. Such heterogeneities can significantly affect the structure and quantitative characteristics of the GEC.

We present the results of observations and experimental data processing of long-term (five years) continuous measurements of the electric field. The region fluxmeters network in the Nizhny Novgorod operates permanently since 2012 and provides electric field information for any weather condition. The data were compared with meteorological parameters from the local meteorological stations. We discovered the seasonal dependency of the averaged electric field and the daily average temperature correlation for whole observation period. Antiphase correlation between parameters in cold period and phase correlation in warm period of the year were noticed and statistically investigated. Also there was obtained good season independent anti-correlation between cloudiness and average electric field. Theoretical estimates of the cloudiness influence on the electric field in the surface layer are performed. Comparison with experimental results is provided. The dependence of the electric field attenuation on the conductivity of the cloud layer is hypothesized and investigated.

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