



The Influence of Weather on the Atmospheric Electric Field Variations

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The hardware-software complex was developed for measuring the atmospheric electric field under different meteorological conditions. It includes the weather station MAWS 3010 (Vaisala) for automatic registration of the meteorological parameters: air temperature, relative humidity, air speed and direction, atmospheric pressure and amount of precipitation.

According to the measurement results the electric field values does not exceed +500 V/m and always has a positive sign under fair weather conditions regardless to the observation period. Fulfilled researches have stated that natural course of the electric field (fair weather electric field) changes dramatically during precipitation. In this case the precipitation causes the distortion of the natural electric field course synchronous with the precipitation intensity as well as asynchronous sudden changes of the electric field.

Precipitation leads to a significant deviation of the electric field dynamics from the natural course. Electric field values may undergo the sudden changes up to 10000 V/m during precipitation while the clouds producing precipitation cause irregular abrupt changes of the electric field.

Correlation relationship between the characteristics of the electric field distortion such as the duration T of a distorted state of the electric field, the amplitude A of the distortion fields and precipitation parameters, duration of precipitation t , maximum values of precipitation a , were calculated. High correlation coefficients (0.7 – 0.8) indicate a strong relationship of the electric field with observed meteorological phenomena. According to the research results, the impact of weather events in the changing of the electric field natural dynamics may reach +5000 V/m for the positive polarity and up to -3000 V/m for the negative polarity. The changes are 2000% and 1200% accordingly.