

## Parameters of Main Stage of Discharge between Artificial Charged Aerosol Cloud and Ground in Presence of Model Hydrometeor Arrays

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**Abstract :** Investigation of the discharges from the artificial charged water aerosol clouds in presence of the arrays of the model hydrometeors could help to receive the new data about the peculiarities of the return stroke formation between the thundercloud and the ground when the large volumes of the hail particles participate in the lightning discharge initiation and propagation stimulation. Artificial charged water aerosol clouds of the negative or positive polarity with the potential up to one million volts have been used. Hail has been simulated by the group of the conductive model hydrometeors of the different form. Parameters of the impulse current of the main stage of the discharge between the artificial positively and negatively charged water aerosol clouds and the ground in presence of the model hydrometeors array and of its corresponding electromagnetic radiation have been determined. It was established that the parameters of the array of the model hydrometeors influence on the parameters of the main stage of the discharge between the artificial thundercloud cell and the ground. The maximal values of the main stage current impulse parameters and the electromagnetic radiation registered by the plate antennas have been found for the array of the model hydrometeors of the cylinder revolution form for the negatively charged aerosol cloud and for the array of the hydrometeors of the plate rhombus form for the positively charged aerosol cloud, correspondingly. It was found that parameters of the main stage of the discharge between the artificial charged water aerosol cloud and the ground in presence of the model hydrometeor array of the different considered forms depend on the polarity of the artificial charged aerosol cloud. In average, for all forms of the investigated model hydrometeors arrays, the values of the amplitude and the current rise of the main stage impulse current and the amplitude of the corresponding electromagnetic radiation for the artificial charged aerosol cloud of the positive polarity were in 1.1-1.9 times higher than for the charged aerosol cloud of the negative polarity. Thus, the received results could indicate to the possible more important role of the big volumes of the large hail arrays in the thundercloud on the parameters of the return stroke for the positive lightning.

**Keywords :** main stage of discharge, hydrometeor form, lightning parameters, negative and positive artificial charged aerosol cloud

**Conference Title :** ICLP 2017 : International Conference on Lightning Protection

**Conference Location :** Paris, France

**Conference Dates :** March 29-30, 2017