DETAILED OBSERVATIONS OF DISCHARGESWITHIN THE ARTIFICIAL CHARGED AEROSOL CLOUD

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We have observed the intracloud discharge with plasma parameters close to the parameters recorded in the long spark discharges. Plasma structures occurred in the artificial highly charged aerosol clouds of the negative and positive polarities. These plasma structures were recorded with the use of a high-speed IR camera (of wavelength 3.8-4.9 μm) simultaneously with the visible radiation recorded by high-speed visible cameras and photomultiplier tubes (PMTs) with interference filters. The wavelength range of the IR camera gave to us a unique possibility for diagnostics of the structures within the cloud formed by drops with a typical radius of 0.5 μm. The plasma structures found in the positive and negative clouds differ substantially. Elongated discharge channels are often organized into different clusters of the complicated structure. The thermal-ionization instability is discussed as a common mechanism of the plasma channel formation in the observed discharges and the natural cloud and cloud-to-ground discharges.