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Influence of Electrical Self-Polarization Aerosols in the Microphysical Evolution of Intracloud Lightning Flashes

N. Falcón and A. Quintero

Universidad de Carabobo. FACYT, Departamento de Física. Grupo de Física Teórica y Astrofísica. Apdo. Postal 129 Avda. Bolívar Norte. Valencia 2001, Carabobo, Venezuela.

We present a theoretical microphysical model of intracloud lightning flashes that incorporate the influence of the aerosols with electrical self-polarization (pyroelectrics) like methane. We estimate the water and methane dipole contribution to the internal electric field of a cloudy cell of 3.6 Km of side. We obtain that methane increases the electric field inside the thunderclouds, and facilitate the formation of the electrical charges so a discharge would be generated; and we obtain too that water contribution to the internal electric field, due to the electrical displacement vector generated by the atmospheric electric field of the Earth, is not enough to produce a typical discharge. We calculate the associated capacitance for the used cloudy cell and the internal electric field. The results obtained for the charge of a cloudy cell due to a methane concentration (using a concentration lower than the air composition) and water, seem to agree with recent observations in lightning.

Key words: lightning: flashes, atmospheric electricity, microphysical cloud model, aerosols: methane.