

# Numerical Study on Impact of Electrical Structure on Dynamic Development in Thunderstorm

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In this paper, a new three-dimensional dynamics and electrification coupled model has been developed for investigating the characteristics of microphysics, dynamics and electrification inside thunderstorms and for numerical study on the impact of electric structure on dynamic development in cloud. The model include not only the coupling of electrification with dynamical and microphysical processes, but also the lightning discharge process and screening layer effect at the cloud top as well. Beside diffusion and capture processes of small ions to six classes of hydrometeors, the inductive and non-inductive charging mechanisms are more specifically considered in this model. The results indicate that the direct impact of electric field force on dynamic field is very small. The vorticity produced by electric force is  $10^{-4}/s$  and the vorticity produced by dynamic is  $10^{-6}/s$ . But the electric force can influence the fall velocity of solid and liquid rainfall particle, microphysical processes between three phase hydrometeors. These processes increase water vapor amount about 41% and potential heat about 19.4%. Therefore the dynamic field structure occurs to change and corresponding vorticity produced by electric action is  $10^{-4}/s$ , the same as dynamic vorticity.