

Comparative analyzing influence of trigger factors with electromagnetic nature on tornado formation

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Basing on electrohydrodynamics equation system, the work shows important role of dipole or tripole thundercloud electric structure in forming jet downbursts or tornado funnels correspondingly with regard to strong atmospheric electric field (AEF) perturbations under the thunderclouds. Actually, in these cases AEF perturbation play the role of trigger mechanisms for the beginning of realizing hydrodynamic instability like Rayleigh – Taylor one.

During the recharging process of a dipole cloud to a tripole one giant dielectric permittivity effect (GDPE) of cloud droplets suspense with thin double electric layer on their surfaces is often crucial at the initial stage of tornado funnel formation. Electromagnetic factors of trigger character also include strong paramagnetic properties of oxygen and diamagnetism of nitrogen providing collection of oxygen molecules to a tornado-cyclone rotation axis and extruding nitrogen from the central zone. With account of hydrated cluster ions presence in the atmosphere and small difference in atomic masses of oxygen and nitrogen molecules, similar separating main components of atmospheric air also provides Rayleigh – Taylor instability realization namely in the central zone of a rotating thundercloud, i.e. starting tornado funnel formation.

Comparative analyzing influence of different trigger factors with electromagnetic nature on tornado funnel or downburst generation proves that main of these factors are value and topological shape of AEF perturbations and GDPE during a thundercloud recharge from dipole to tripole one, while other mechanisms usually play a secondary role.