

Tropospheric aerosol formation by atmospheric ions

Kenkichi Nagato[1]

[1] Kochi National College of Technology

Nucleation phenomena in the lower atmosphere have received considerable attention because of the potential influence on earth's climate. A number of observations of new particle formation have been reported in the last decade and the results indicate that more than one nucleation process is operational in the atmosphere. Along with homogeneous binary nucleation and homogeneous ternary nucleation, nucleation around atmospheric ions has been considered to be one of the possible mechanisms. The reason for this is that molecular cluster ions are much more stable and can grow significantly faster than corresponding neutral clusters.

The production of primary ions by ionizing radiation is the first step in ion-induced nucleation in the atmosphere, which is immediately followed by the conversion of primary ions to stable cluster ions through ion-molecule reactions with a variety of neutral species. Cluster ions that reach the critical size undergo subsequent growth into nano-particles. In this paper, review of recent advances in assessing the role of atmospheric ions in tropospheric aerosol formation will be presented.