

Recent progresses in the study of lightning initiation, progression and attachment process

*Daohong Wang¹

1. Gifu University

All types of lightning have the issues of initiation and leader propagation. All types of downward CG flashes involve lightning attachment processes. Recent observations have shown that lightning initiation involves a type of either fast positive breakdown or fast negative breakdown, and produces an initial E-field change (IEC) with initial breakdown (IB) pulses followed. With respect to lightning leaders, high speed optical observations have shown that the negative leaders and positive leaders behave apparently differently. Negative leaders always propagate in stepped mode, while most positive leaders propagate continuously with many recoil leaders accompanied. There are plenty of evidences reported showing that some positive leaders propagate in stepped mode. Depending how tall is the object on which a downward CG is hitting, the duration of the CG's attachment process could change significantly. In this talk, I will review our current understanding on (1) how a lightning is initiated; (2) how a stepped leader is stepped and (3) how a lightning is attached to various heights of tall structures including flat ground.

Keywords: Atmospheric electricity, lightning discharge, return stroke