



## **Simulations of lightning flashes featuring fractal patterns with the cloud resolving model MésoNH.**

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An improvement of the stochastic lightning flash scheme (Molinié et al., 2002, C. R. Phys. Acad. Sciences, Barthe et al., 2005, Atmos. Res.) specifically designed to  $\gamma$ -mesoscale thundercloud simulations will be presented. In this scheme, a particular attention is addressed to lightning branch simulations. On the basis of both dielectric breakdown and lightning flash studies, it is assumed that the electrical potential, the local electrical charge density, the distance from the initiation point and the number of close developing branches are key factors to parameterize lightning flash branch propagations at the  $\gamma$ -mesoscale. Branch numbers are limited using fractal object characteristics.

The scheme has been implemented in the french meteorological community model MésoNH. First, the scheme capabilities have been illustrated through 2D static simulations. The self similarity of resulting lightning flashes will be discussed. A second part concerns comprehensive 3D-thundercloud lifecycle simulations. Lightning flash patterns and other electrical activity diagnostics will be discussed.

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