



Scenario
DOCTORAL TRAINING PARTNERSHIP

NERC
SCIENCE OF THE ENVIRONMENT

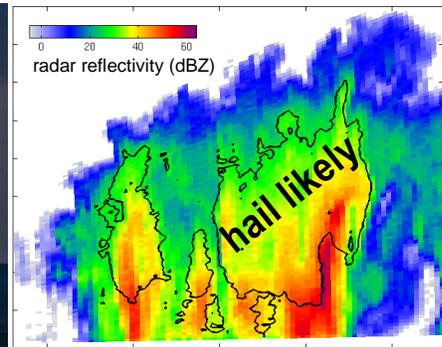
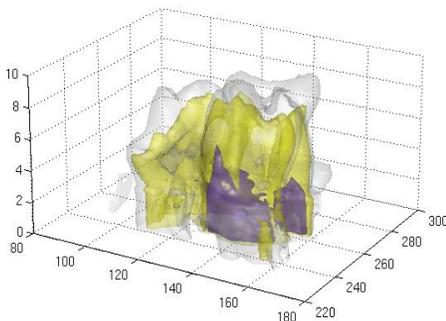
Cloud electrification and lightning in the evolution of convective storms

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Hail and lightning are severe-weather phenomena that can occur throughout the year in the UK. For several years now, the UK Met Office have run their 1.5-km operational forecast model (UKV) with prognostic graupel alongside cloud ice and liquid and rain. The additional information of ice hydrometeor characteristics in clouds and storms allows for improved predictability of lightning. A lightning parameterization has been developed for the UKV and shows promising results, but the stochastic nature of lightning makes forecast verification challenging. In this project, the student will develop new quantitative methods for lightning and hail forecast verification, using a range of observations including detection networks for lightning and electrostatic field changes and detailed radar measurements of turbulence and hail in convective storms. The student will investigate storm dynamics and microphysics before and after electrification and the representation of these processes in high-resolution simulations with the Met Office model.



Left to right: 3D representation of a storm simulated with the Met Office model; "Lightning strikes" by John Fowler (flickr.com/people/snowpeak), cropped and used under CC BY 2.0; a range-height scan with the Chilbolton radar of a hail storm over Reading.

Training opportunities:

This project will involve simulations with the Met Office model and the option of operating the Chilbolton Advanced Meteorological Radar (CAMRa) to track thunderstorms.

Student profile:

The student should have a background in the mathematical or physical sciences. The student will be required to work across the meteorological disciplines of numerical weather prediction, atmospheric physics, and radar meteorology; good understanding of at least one of these is desirable.

<http://www.reading.ac.uk/nercdtp>