# Detecting severe weather with radars for observations-based nowcasting

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The Met Office have recently upgraded their weather radars to have Doppler and dual-polarization capabilities, which has produced a wealth of new measurements for data assimilation, model evaluation, and forecasting purposes. One particular forecaster need is to identify potentially hazardous weather based on observations, and both the Doppler and dual polarization measurements can assist with that. Recent findings from my current PhD student (Courtier et al., 2019; https://doi.org/10.1002/asl.873) show for instance how the Met Office 3D radar composite could help identify storms that may produce lightning imminently (see Figure).
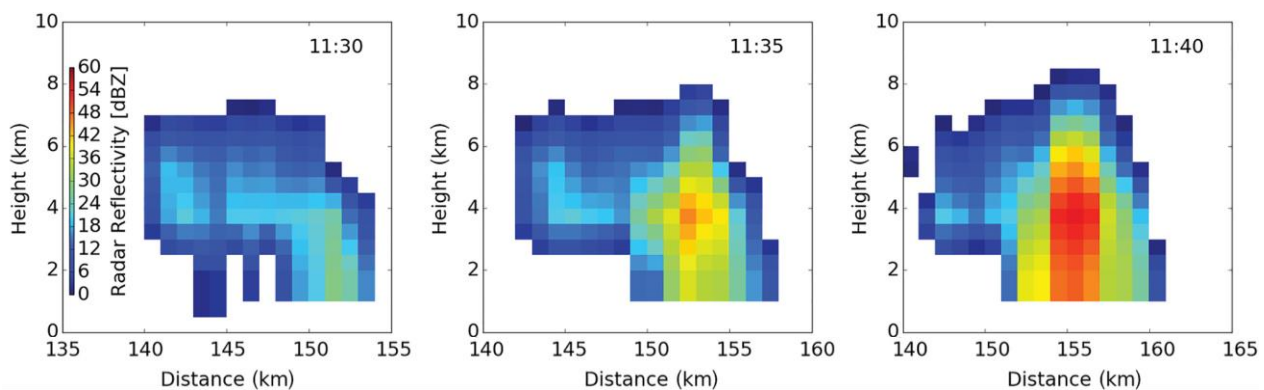
Figure: Three vertical cross-sections through a developing convective storm captured in the Met Office 3D radar composite. A rapid increase of high radar reflectivity values can be indicative of lightning onset (Courtier et al., 2019).

In this project, you will design algorithms to automatically identify and track features in radar dual-pol and Doppler measurements that are indicative of hazardous weather. Working with forecasters, you will investigate the environmental conditions before and during the onset of convection, analysing under what conditions the radar signatures are more or less indicative of severe weather. For specific cases of interest, you will use your radar-based techniques to evaluate storm behaviour in the Met Office operational forecasting model, the UKV.

Training opportunities:
You will frequently interact with Met Office scientists and you will have the opportunity to run versions of the UKV model, testing different physical parameterization schemes. You will have the opportunity to spend a period of time at the Met Office to work on your project and experience an operational forecasting environment.

Student profile:
This project is suitable for students with a degree in an environmental or physical science. A strong affinity for developing skills in programming and handling of large and complex data sets is beneficial, although no prior experience is required.

Funding particulars:
This project comes with Met Office CASE funding.

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