# Using aviation meteorology to improve aircraft safety

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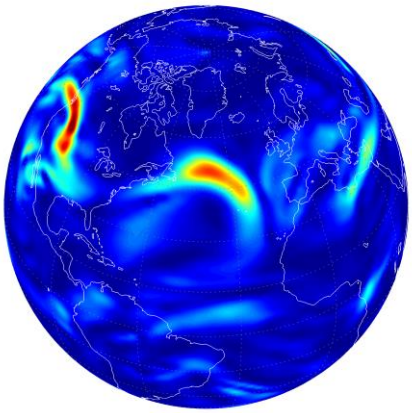
Aircraft fly through an atmosphere that contains lightning, turbulence, and other aviation hazards. Aviation meteorology is the science of understanding, predicting, and minimizing the risks from these hazards, to improve flight safety. There is evidence that both lightning and turbulence will become more common because of climate change, increasing the need to improve our understanding of these hazards.

Many helicopters working in the North Sea oil and gas sector have been struck by lightning, but the detailed relationship between atmospheric conditions and lightning strikes is currently poorly established. Additionally, thousands of planes encounter potentially hospitalizing severe turbulence globally each year, but existing operational turbulence prediction algorithms contain many missed events and false positives.

This project will improve our scientific understanding of aviation-affecting turbulence and lightning and their relationship to atmospheric conditions. The Civil Aviation Authority's (CAA's) database of several hundred-thousand accidents and incidents since the 1970s will be mined to isolate events involving turbulence or lightning. For each event, the atmospheric conditions at the time, date, and location will be examined and various proposed indicators of turbulence and lightning will be calculated and tested. A second strand to the project will be to use climate models to analyze the effects of future climate change on turbulence and lightning.

The project will result in an improved understanding of (i) the relationship of aviation-affecting turbulence and lightning to large-scale atmospheric conditions, and (ii) the response of aviation-affecting turbulence and lightning to climate change.



Patches of turbulence over the North Atlantic Ocean calculated from an atmospheric model.

**Training opportunities:**
The student will spend three months of their PhD working at the Civil Aviation Authority in London.

**Student profile:**
This project would be suitable for students with a degree in physics, mathematics or a closely related environmental or physical science.

**Funding particulars:**
This project has CASE co-sponsorship from the Civil Aviation Authority.

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