

Flying into the eye of the storm

December 12 2011, by Tom Marshall



Scientists sprang into action to probe the violent storm that battered Scotland yesterday.

They used a dedicated [research aircraft](#) to measure the atmosphere around the [storm](#) and even to drop specially-designed instrument packages into its heart.

The data they collected will help improve [weather forecasts](#) by giving scientists an unprecedented insight into what goes in storms' turbulent depths. This storm saw exceptionally powerful winds; the measurement station on the summit of Cairn Gorm registered gusts of up to 165mph (266km/h).

The aircraft measured variables including wind speed, temperature,

humidity, [cloud particles](#) in the eye of the storm. The scientists also dropped instruments into it to measure its 'profile' - how these atmospheric properties vary as you move vertically through it. All this data was transmitted to the aircraft's base in Exeter to be used in forecasting how the storm would develop.

'Our study of today's storm will be a major opportunity to improve forecasts of violent wind events,' says Professor Geraint Vaughan of the University of Manchester, an [atmospheric scientist](#) who stayed on the ground monitoring the information being collected by the researchers on the aeroplane. 'It's a unique experiment, and we were very excited to get this opportunity to do it - these storms are fairly rare but as it turned out we were ideally placed to gather data on this one.'

He explains that the researchers and air crew were able to respond so quickly because they were already on alert in Exeter; this month is one of the designated research periods for the DIAMET project, which seeks to improve our ability to predict extremely [stormy weather](#).

There are several possible explanations of how the kind of incredibly powerful winds encountered yesterday are generated within major storm systems. One is that they're examples of a phenomenon known as a 'sting jet', named because the cloud band observed by satellites looks like a scorpion's tail, with the highest winds at the tip. Data on these kinds of storms is scarce, so the information gathered on this flight will be invaluable.

'Many of us have studied this type of storm extensively but we've never had enough data to really understand its dynamics,' Vaughan says. 'We hope that this flight will give us a new knowledge of the processes by which these extremely high wind speeds arise.'

Meteorologists can these days predict major storm systems much more

accurately than they once could, but within these storms are smaller areas of particularly vicious weather that are much trickier to forecast, particularly more than a day or so ahead. It's vital we learn to do this though, as much of a storm's damage is concentrated in these pockets of severe weather. If we could tell where they'd happen, people living there could be better prepared for the onslaught.

Vaughan says it's too early to say which hypothesis the data gathered support - it's still not certain if this storm's most extreme winds were caused by a sting jet or by more normal storm processes, but he hopes the results will be published in a journal article before too long.

The BAe-146 atmospheric research aircraft is operated by the Facility for Airborne Atmospheric Measurements (FAAM), which is a collaboration between the Met Office and the Natural Environment Research Council (NERC).

The flight was part of DIAMET, a NERC-funded consortium between the universities of East Anglia, Leeds, Manchester and Reading and NERC research centres the National Centre for Atmospheric Science (NCAS) and the National Centre for Earth Observation (NCEO), with the Met Office also heavily involved as partners. It aims to find ways to improve our ability to forecast this kind of rare, high-impact weather.

The aircraft took off on Thursday morning from Exeter, flew north to Stornoway in the Outer Hebrides, spent time sampling the storm's south-western reaches, to the west of Scotland, before landing in Teesside to refuel and then measuring the storm over eastern Scotland.

This story is republished courtesy of [Planet Earth online](#), a free, companion website to the award-winning magazine Planet Earth published and funded by the Natural Environment Research Council (NERC).

Source: PlanetEarth Online

Citation: Flying into the eye of the storm (2011, December 12) retrieved 9 April 2024 from <https://phys.org/news/2011-12-eye-storm.html>

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