

# Better forecasts of extreme windstorms - understanding 'sting jets'

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## Summary

In the early hours of 16 October 1987, a now infamous storm caused a swathe of damage across south-east England and northern France, resulting in 22 fatalities. Observations of the October 1987 storm were re-examined in detail to examine what had occurred and, in particular, explain the pattern of the very strong wind gusts which were responsible for much of the storm's impact.

## Background

The storm of 16 October 1987 was probably the most severe wind storm to affect southern England since the Great Storm of 1703, causing widespread structural damage to buildings and resulting in the loss of some 15 million trees. Rail and road transport were disrupted, and power supplies were not fully restored for more than two weeks. A special report by Risk Management Solutions, a company which evaluates weather risks, estimated that the cost to the insurance industry in the UK was £1.4 bn, making the storm one of the most expensive UK weather events on record.

## How is University of Reading research contributing?

Researchers from the University of Reading re-analysed data from the 1987 event, with a particular focus on the features of the storm which had made it so damaging, especially the extreme wind gusts which occurred. This work formally identified the phenomenon of a 'sting jet' for the first time, and recognized the evolution of the cloud pattern in satellite imagery associated with these sting jets as a useful tool for short-period weather forecasting. The most damaging winds occur when a jet descends to the surface from the tip of the cloud structure known as the 'cloud head', though it resembles the sting of a scorpion's tail. This jet is short-lived at the surface and in a different region from where strong winds are generally expected to occur. In collaboration with the Met Office, the researchers developed ways to identify sting jets in weather forecasting models and, later, methods to forecast these extremely damaging events up to several days in advance.

## What impact has our research had?

This research led to the understanding that sting jets are a feature of many, but not all, rapidly developing storms. The ability to predict these sting jets is important because of the potential loss of life and property damage that can occur as a consequence of the extremely high wind speeds. Prediction enables early warnings to be made and alerts to be given in the locations most likely to be affected, with resultant reduction in risk to people and infrastructure. Predicting the intensity of the sting jet is crucial, and joint work with the Met Office has established both what is needed to identify and forecast the severity of such events.



***"The work at Reading was very helpful to the Met Office in making reliable forecasts and warnings of hazardous weather ... it led to us gaining the capability to identify damaging sting jets, predict their evolution and issue timely warnings. The collaboration between Reading and the Met Office was very effective."***

**Professor Brian Golding**  
Head of Numerical Weather  
Prediction, Met Office



### Find out more...

- Department of Meteorology, University of Reading, UK
- [www.met.reading.ac.uk](http://www.met.reading.ac.uk)