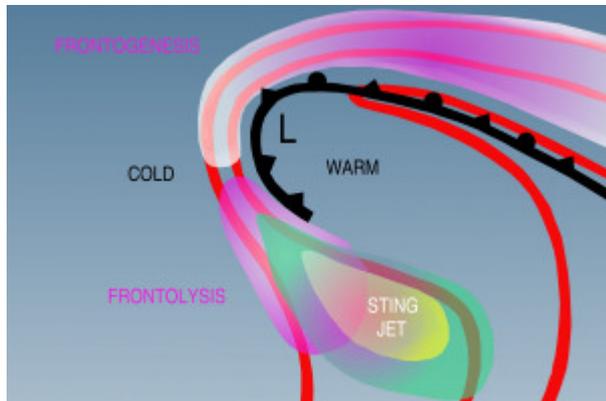


## New Research - The Great Storm



[Prof David M. Schultz University of Manchester - Read Biography](#) <sup>[1]</sup>

The Great Storm of October 1987 brought down 15 million trees and killed 18 people, causing losses at the time of £1.4 billion in the UK. The track and intensity of the storm was poorly forecast, but new research performed at the University of Manchester and in the United States at the National Weather Service's Ocean Prediction Center shows for the first time the mechanism that may cause the strong winds in these low-pressure systems. Recognizing this mechanism may help forecasters identify the conditions that produce these windstorms and provide more advance warning in the future.

The Great Storm was classified as an extratropical cyclone, a large region of winds and rain blowing anticlockwise in the Northern Hemisphere. Although the winds exceeded hurricane force (74 mph) in the Great Storm, the storm was not a hurricane---it was an extratropical cyclone. Extratropical cyclones are distinct from tropical cyclones, which are generally smaller and more intense, and, as their name implies, originate over relatively warm water in the tropics. Extratropical cyclones are associated with fronts. For example, cold fronts are where cold air advances and replaces warmer air.

The strongest winds in the Great Storm were associated with a specific type of cold front called a bent-back front. The bent-back front occurs south of the low center, and ironically where the front is weakening most rapidly the winds are strongest. At the tip of the bent-back front is where the strongest winds are, and this feature is called a *sting jet*, a feature first recognized by Norwegian meteorologists in the first half of the 20th Century due to its similarity to a scorpion's sting at the end of its tail. Later, the name sting jet was coined by Prof Keith Browning at the University of Reading in 2004. Not all low pressure systems produce windstorms, and not all windstorms have sting jets. Our research is aiming to understand the strong winds in such low-pressure systems and why some cyclones have sting jets and some don't.

Our first results indicate that three conditions appear to be necessary for the sting jet to occur. First, the bent-back front must be present and weakening. Second, descent must be occurring within this region of the weakening. Third, this weakening must be occurring in a region where the strong winds from aloft are able to mix down into the layer of air near the surface (called

the planetary boundary layer). This mixing is usually enhanced in regions where cold air is moving over relatively warmer water.

The video embedded below shows why the strong winds occur within and downstream of where the front is weakening.

Future research will be looking to test these ideas with a larger number of cyclones, both with windstorms caused by sting jets, but also those storms that do not produce sting jets. We will also be looking at developing tools that forecasters can use to better predict the occurrence of these storms. Simplified models of cyclones will be studied to isolate the physical processes that control the production of high winds. Groups from across the UK, Europe, and the United States will collaborate on this research, ensuring that our results will reach a wide audience.

**The article "Using frontogenesis to identify sting jets in extratropical cyclones" by David M. Schultz and Joseph M. Sienkiewicz was published online in *Weather and Forecasting*: <http://dx.doi.org/10.1175/WAF-D-12-00126.1> [2]**

**Link to the press release and YouTube video:**

**<http://www.manchester.ac.uk/aboutus/news/display/?id=9957> [3]**

---

**Source URL:** <http://test-accsys.rmets.org/weather-and-climate/weather/new-research-great-storm>

#### **Links**

[1] <http://test-accsys.rmets.org/weather-and-climate/weather/new-research-great-storm/prof-david-schultz-biog>

[2] <http://dx.doi.org/10.1175/WAF-D-12-00126.1>

[3] <http://www.manchester.ac.uk/aboutus/news/display/?id=9957>