

# Contrail

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**Contrails** are **condensation trails** (sometimes **vapour trails**): artificial clouds made by the exhaust of jet aircraft or wingtip vortices which precipitate a stream of tiny ice crystals in moist, frigid upper air. They are the cloud-like trails of water vapour that can be seen in the wake of airplanes, either from their exhaust or sometimes from their wing tips.

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Contrails

## Contrail creation

Contrails are created in one of two ways:

1. Firstly, the airplane's exhaust increases the amount of moisture in the air, which can push the water content of the air past saturation point (see saturation or dew point). This causes condensation to occur, and the contrail to form.
2. The wings of an airplane causes a drop in air pressure in the vicinity of the wing (this is partly what allows a plane to fly). This drop in air pressure brings with it a drop in temperature, which can cause water to condense out of the air and form a contrail.

Exhaust contrails tend to be more stable and long-lasting than wing-tip contrails, which are often disrupted by the aircraft's wake.

## NASA experiment; Sept 11 2001

In 1998, NASA scientists found that by circling a jet off the Pacific coast of the United States they were able to create contrails that eventually coalesced into a cirrus cloud covering 1,400 mile<sup>2</sup> (3,600 km<sup>2</sup>). Satellite photographs have confirmed that on one occasion jet contrails produced by commercial aircraft over New Mexico formed a cloud covering 13,000 mile<sup>2</sup> (34,000 km<sup>2</sup>).

It had been hypothesized that in regions such as the United States with heavy air traffic, contrails affected the weather, reducing solar heating during the day and radiation of heat during the night by increasing the albedo. The suspension of air travel for 3 days in the United States after September 11, 2001 provided an opportunity to test this hypothesis. Measurements did in fact show that without contrails the local diurnal temperature range (difference of day and night temperatures) was about 1 degree Celsius higher than immediately before.



Contrail over Bristol, England

## Conspiracy theory

A conspiracy theory postulates that contrails are chemical experiments conducted by the government:

Some tell tales of mysterious white tanker planes, a counterpart to the black helicopters of paranoid legend, crisscrossing the country spraying "chemtrail" that make people sick. Often the chemtrails form an X, which is "read by satellites to track dispersal patterns," we learn. In many cases the contrails are accompanied by a cobweblike cloud of "angel hair" filaments descending from the sky. Other times clear or brown Jell-O-like goop spatters the landscape. Some think the goop and the filaments result from improperly adjusted spray nozzles on the mysterious aircraft. [1]  
(<http://www.straightdope.com/columns/000616.html>)

## External links

- Abstract of article in *Nature* announcing research results of contrail temperature change study ([http://www.nature.com/cgi-taf/DynaPage.taf?file=/nature/journal/v418/n6898/abs/418601a\\_fs.html&filetype=](http://www.nature.com/cgi-taf/DynaPage.taf?file=/nature/journal/v418/n6898/abs/418601a_fs.html&filetype=))
- Vapour trails' effects confirmed, *Nature* August 8, 2002 (<http://www.nature.com/nsu/020805/020805-7.html>)
- Clouds Caused By Aircraft Exhaust May Warm The U.S. Climate (<http://www.sciencedaily.com/releases/2004/04/040428061056.htm>)
- Picture: Plane producing contrails (<http://wetterchronik.de/mm/20040412klarerrhimmel.htm>)

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