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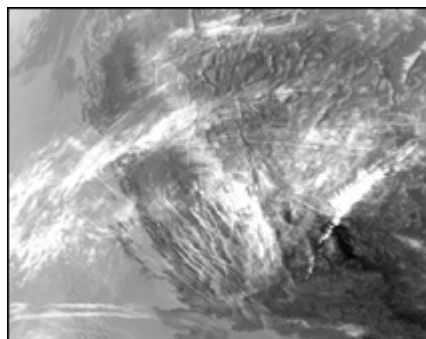
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9/11 study: Air traffic affects climate

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By Richard Stenger
 CNN



(CNN) -- The thin wisps of condensation that trail jet airliners have a significant influence on the climate, according to scientists who studied U.S. skies during a rare interruption in national air traffic after the September 11 terrorist attacks.

Contrails, such as in this satellite image over California, have an impact on temperatures, scientists say. The trail of condensation forms in an aircraft's wake.

During the three-day commercial flight hiatus, when the artificial clouds known as contrails all but disappeared, the variations in high and low temperatures increased by 1.1 degrees Celsius (2 degrees Fahrenheit) each day, said meteorological researchers.

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While the temperature range is significant, whether the jet clouds have a net effect on global warming remains unknown.

"I think what we've shown are that contrails are capable of affecting temperatures," said lead scientist David Travis of the University of Wisconsin, Whitewater. "Which direction, in terms of net heating or cooling, is still up in the air."

In many ways, contrails behave in the same manner as cirrus clouds, thin high-altitude floaters that block out solar energy from above and trap in heat below.

As a result, they help reduce the daily range in daytime highs and nighttime lows. Contrails, by providing additional insulation, further reduce the variability.

With air traffic growing and contrails becoming more prevalent, the natural variation will further decline and could disrupt regional ecosystems, some scientists speculate.

Certain trees, crops and insect species depend on specific daily temperature variations for their

Contrails Explainer:

- Long white wisps of artificial clouds high in the atmosphere, contrails are the condensation trails left behind by jet airplanes.
- Similar to human exhalation making a fog in chilly weather, contrails form when warm humid engine exhaust meets extremely cool air in the atmosphere.
- Air temperatures where contrails form are generally lower than minus 40 degrees Fahrenheit (minus 40 degrees Celsius).
- Like natural cirrus clouds, contrails insulate the planet,

survival.

In some ways, contrails differ from their natural brethren. Cirrus clouds let less heat out than in overall, producing a net increase in the Earth's temperatures, according to climate scientists. With contrail clouds, they said they are not so sure.

blocking out incoming solar energy from above and keeping in heat down below.

- Scientists estimate that contrails cover some 0.1 percent of the Earth's overall surface, with regional concentrations as high as 20 percent.

"Contrails are denser and block sunlight much more than natural cirrus clouds," said Travis, who conducted the study with Andrew Carleton of Penn State University in University Park, Pennsylvania. They reported the findings this week in the journal Nature.

"And contrails are much more prevalent when the sun is out," he said. "When this is factored in, there is a possibility that they offset global warming, and this is what we are trying to determine now."

The researchers plan more studies to tackle that question, but they said they expect to rely on circumstantial evidence only.

"We can only hope that the September 11 tragedy never happens again," Travis said.

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