

Airplane contrails worse than CO₂ emissions for global warming: study

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Photo: Ann the Doc

(PhysOrg.com) -- In a recent study published in *Nature Climate Change*, Dr. Ulrike Burkhardt and Dr. Bernd Karcher from the Institute for Atmospheric Physics at the German Aerospace Centre show that the contrails created by airplanes are contributing more to global warming than all the CO₂ that has been caused by the entire 108 years of airplane flight.

Airplane contrails are the white clouds that we see in the sky spreading behind jets. These cirrus clouds are created when the hot, moist air released from the plane freezes in the colder and drier air. These clouds then trap the long-wave radiation from Earth and create a warming of the [atmosphere](#).

In their study, Burkhardt and Karcher utilized [satellite imagery](#) of these spreading contrails to create a [computer model](#) which estimates how the contrails affect the Earth's temperature.

They have discovered that aviation contrails play a huge role in the impact on the climate and an even greater impact than that created by the CO₂ emissions produced. While the CO₂ emissions from airplanes account for around three percent of the annual CO₂ emissions from all fossil fuels and change the radiation by 28 milliwatts per square meter, the aviation contrails are responsible for a change of around 31 milliwatts per square meter.

The only difference is that CO₂ has a longer life than that of the contrails, and can still continue to cause warming even hundreds of years down the road.

The researchers believe that while continuing to reduce CO₂ emissions in aviation, more work needs to be done to reduce contrails as well. This reduction of contrails could present an immediate effect on [global warming](#). Solutions for this could include such things as creating flight plans at lower altitudes and the development of new airplane engines which would either reduce the water vapor released or immediately condense the water into ice that would drop to the ground below.

More information: Global radiative forcing from contrail cirrus, *Nature Climate Change* 1, 54–58 (2011) [doi:10.1038/nclimate1068](https://doi.org/10.1038/nclimate1068)

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