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Climate change will delay transatlantic flights

Planes flying between Europe and North America will be spending more time in the air due to the effects of climate change, a [new study](#) has shown.

By accelerating the jet stream – a high-altitude wind blowing from west to east across the Atlantic – climate change will speed up eastbound flights but slow down westbound flights, the study found. The findings could have implications for airlines, passengers, and airports.

The study, led by Dr Paul Williams, an atmospheric scientist at the University of Reading, calculates that transatlantic aircraft will spend an extra 2,000 hours in the air every year, adding millions of dollars to airline fuel costs and increasing the risk of delays.

“The aviation industry is facing pressure to reduce its environmental impacts, but this study shows a new way in which aviation is itself susceptible to the effects of climate change,” Dr Williams said.

“The bad news for passengers is that westbound flights will be battling against stronger headwinds. The good news is that eastbound flights will be boosted by stronger tailwinds, but not enough to compensate for the longer westbound journeys. The net result is that roundtrip journeys will significantly lengthen.

“This effect will increase the fuel costs to airlines, potentially raising ticket prices, and it will worsen the environmental impacts of aviation.”

Record-breaking flights

The study, [published today](#) (10 February 2016) in the IOP journal *Environmental Research Letters*, looked at the effects of doubling the amount of CO₂ in the atmosphere, which will occur within the next few decades unless emissions are cut quickly.

The average jet-stream winds along the flight route between London’s Heathrow airport and New York’s John F. Kennedy International airport are predicted to become 15% faster in winter, increasing from 77 to 89 km/hr (48 to 55 mph), with similar increases in the other seasons.

As a result, London-bound flights will become twice as likely to take under 5h 20m, implying that record-breaking crossing times will occur with increasing frequency in future. On the other hand, New York-bound flights will become twice as likely to take over 7h 00m, suggesting that delayed arrivals will become increasingly common.

Due to the extra time spent in the air, transatlantic flights will burn an extra \$22 million worth of fuel annually, and will emit an extra 70 million kg of CO₂ – equivalent to the annual emissions of 7,100 British homes. And this might only be the tip of the iceberg.

“The jet stream encircles the globe, and there is one in the southern hemisphere too. It is possible that flights elsewhere in the world will also suffer from a similar jet stream effect,” Dr Williams said.

The latest findings are further evidence of how climate change will affect aviation in the future. A previous University of Reading [study](#), also led by Dr Williams, found that [clear-air turbulence will become stronger](#) and more frequent as a result of global warming.

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For more information or to organise interviews, contact Pete Castle at the University of Reading press office on +44 (0)118 378 5757 or p.castle@reading.ac.uk. Dr Paul Williams is available for interview. The University of Reading has ISDN radio studio facilities available.

Heathrow third runway: The effect of UK airport expansion on climate change has been closely scrutinised by the Airports Commission. However, while the Commission recognised the potential impacts of changes to the jet stream in a [2013 Discussion Paper](#), the issue was disregarded in both its [Interim Report](#) and [Final Report](#) on airport expansion.

Flight numbers: The transatlantic route between Europe and North America is one of the world’s busiest aviation corridors, with around 600 flights per day. The transatlantic route contributes just a fraction of the estimated 100,000 flights per day globally. Historically, global air traffic (measured in passenger-kilometres) has experienced an average long-term growth rate of 5% per year.

Transatlantic records: The current (non-Concorde) record for a transatlantic crossing from New York to London stands at 5h 16m. It was set on 8 January 2015 by a British Airways 777, which rode a particularly strong jet stream from the USA to Britain. The new study predicts that we will see far more record-breaking crossings like this in future.

Funding: This work was [funded by the Royal Society](#).

Environmental Research Letters: [Environmental Research Letters](#) covers all of environmental science, providing a coherent and integrated approach including research articles, perspectives and editorials.

Full reference: Williams (2016) *Environ. Res. Lett.* **11** 024008 doi: 10.1088/1748-9326/11/2/024008 will be freely available to the public from 10 February at <http://iopscience.iop.org/article/10.1088/1748-9326/11/2/024008>.