Climate change may force planes to lighten loads or stay grounded – study

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The effects of climate change may extend further than melting glaciers and rising sea levels, according to a new study which says that hot temperatures may cause up to 30 percent of airplanes to be grounded in coming decades.

The study, published in the journal Climatic Change on Thursday, says that 10 to 30 percent of fully loaded airplanes may at some point be forced to adapt during the hottest part of the day.

Those adaptations include removing fuel, cargo, or passengers, or waiting for cooler hours to fly.

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The potential take-off problems would be due to the fact that as air warms, it spreads out and its density declines.

“In thinner air, wings generate less lift as a plane races along the runway. Thus, depending on the aircraft model, runway length, and other factors, at some point a packed plane may be unable to take off safely if the temperature gets too high,” Columbia University, whose

researchers took part in the study, wrote in a press release.

“Weight must be dumped, or else the flight delayed or canceled,” it continues.

The study’s authors estimate that fuel capacities and payload weights would have to be reduced as much as four percent for some aircraft.

To put those numbers in perspective, an average 160-seat aircraft would need roughly 12 or 13 less passengers to reach a four-percent weight reduction.

However, if carbon emissions were to somehow be sharply reduced in the near future, those reductions could amount to as little as 0.5 percent.

Planes with lower temperature tolerances would struggle more, according to the study. Airports which have shorter runways, or which are located in hotter parts of the world or in higher elevations will also suffer more than others.

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Airports which would be in danger in those cases include New York’s LaGuardia, which has short runways. Dubai International Airport in the United Arab Emirates would suffer due to its very high temperatures.

“Airports probably less affected because they are in temperate regions and have long runways include New York’s JFK, London Heathrow and Paris’s Charles de Gaulle,” the Columbia press

release states.

In theory, the potential problems could be somewhat mitigated with new engine or body designs for aircraft, or expanded runways, according to study co-author Radley Horton, a climatologist at Columbia University's Lamont-Doherty Earth Observatory.

However, such solutions are unlikely to be implemented, as planes are already highly engineered for efficiency, and there simply isn't room to expand runways in major cities such as New York.

"The sooner climate can be incorporated into mid- and long-range plans, the more effective adaptation efforts can be," said co-author Ethan Coffel, a Columbia University PhD student.