

# Storm researcher calls for new air safety guidelines

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Aircraft turbulence guidelines should be completely rewritten after new research by Centre of Excellence chief investigator Dr. Todd Lane revealed thunderstorms could produce unexpected turbulence more than 100km away from storm cells.

The research by Centre of Excellence for Climate System Science and The University of Melbourne researcher Dr Todd Lane has highlighted the impact of atmospheric gravity waves caused by [thunderstorms](#) and how air safety guidelines have not taken them into account.

“It is likely that many reports of encounters with turbulence are caused by thunderstorm generated gravity waves, making them far more

important for turbulence than had previously been recognised,” Dr. Lane said.

“Previously it was thought turbulence outside of clouds was mostly caused by jet streams and changes in wind speed at differing altitudes, known as wind shear, but this research reveals thunderstorms play a more critical role,” he said.

Dr. Lane said it is now recognised that thunderstorms have far reaching effects, modifying airflow, strengthening the jet stream and enhancing wind shear at a significant distance from the storm cell itself.

Flights along domestic Australian routes and international routes across the tropics towards Asia and between Australia and the US regularly detour around storm cells. However, this research indicates they may still be close enough to encounter [gravity waves](#) and clear-air turbulence.

This unexpected turbulence mid-flight can lead to passenger injuries with around 97% of injuries caused by turbulence during flight occurring because people are not wearing seatbelts. On average, around 15 people are injured every year due to turbulence.

Beyond the immediate safety concerns, it has been estimated that turbulence costs the aviation industry more than \$100M a year globally due to associated rerouting and service checks.

Despite this, little research is being done worldwide on near-cloud turbulence according to Dr. Lane, even though improvements in high-resolution atmospheric modeling could generate important advances.

“Ten years ago, we didn’t have the computing power and atmospheric models to answer some of the important questions around turbulence,” Dr. Lane said.

“Now we can answer some crucial questions but there are only a few groups working on this problem. We need more researchers to become engaged to improve the guidelines and passenger safety.”

Currently, many of the world’s guidelines for flying around thunderstorms – including Australia’s - are similar to those produced by the US Federal Aviation Administration (FAA). However, these guidelines do not include information about atmospheric wave processes.

“We are working hard to develop new guidelines to recommend to the FAA that include a proper representation of the physics.”

“We now know a lot more about how thunderstorms cause turbulence than we did when the guidelines were originally introduced,” Dr. Lane said.

“It is time to alter air [turbulence guidelines](#) in light of this knowledge and employ new technologies to forecast where it is likely to occur to improve air safety for all air travellers.”.

Provided by Australian Research Council

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