



# The impact of weather on international aviation

A data-driven look at how weather influences safety, schedules, and costs.

## Weather conditions impacting flight phases

Taxi & takeoff:	Cruising:	Landing:
<ul style="list-style-type: none"> <li>CROSSWINDS</li> <li>THUNDERSTORMS</li> <li>ACTIVE VOLCANOES</li> <li>DUST</li> <li>SAND STORMS</li> <li>HEAT</li> </ul> <p>Adverse weather often contributes to delays during the takeoff phase, affecting both safety and timing.</p>	<ul style="list-style-type: none"> <li>TURBULENCE</li> <li>JET STREAM SHIFTS</li> <li>ICING</li> <li>VOLCANIC ASH PLUME</li> </ul> <p>Turbulence remains a significant factor in in-flight disruptions and operational challenges.</p>	<ul style="list-style-type: none"> <li>LOW VISIBILITY</li> <li>FOG</li> <li>DUST</li> <li>VOLCANIC ASH</li> <li>WIND SHEAR</li> </ul> <p>Weather conditions like volcanic ash, and wind shear impact landing schedules at major airports.</p>

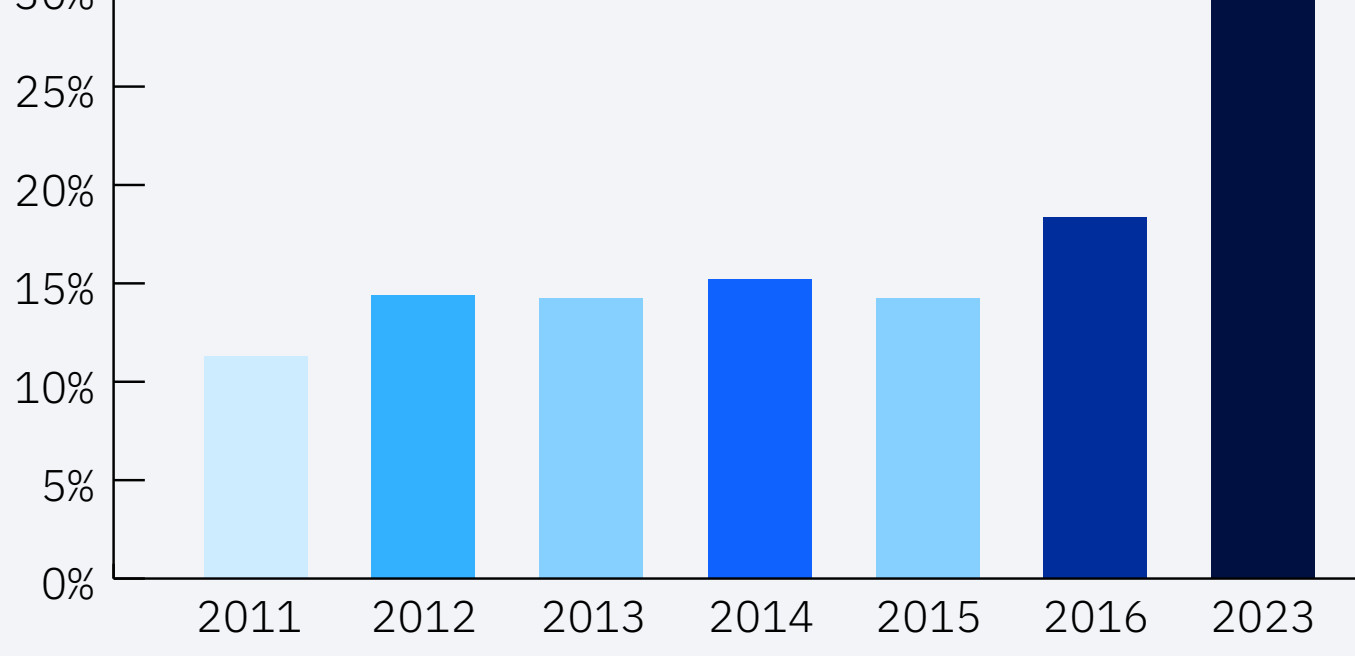


## Weather-related flight delays are rising

<p><b>18%</b> more in 2023 compared to 2022:</p> <p>the number of reports of large hail and heavy rain captured in the European Severe Weather Database.<sup>1</sup></p>	<p><b>41%</b> more than in 2023:</p> <p>The weather-related Air Traffic Flow Management (ATFM) delay per flight averaged 2.2 minutes.<sup>1</sup></p>	<p><b>65%</b> on-time arrivals:</p> <p>performance of the European aviation network during the core summer months, reflect the increased impact of adverse weather paired with a rise in traffic.<sup>1</sup></p>
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## Weather-Related Flight Delays Have Nearly Tripled Since 2011

Weather-related Air Traffic Flow Management (ATFM) delays have nearly tripled since 2011, reflecting the growing challenges posed by extreme weather conditions.<sup>2</sup>



This rise represents an operational and financial burden, with airlines incurring significant costs as weather-related disruptions caused over 90,000 hours of delays in 2023.<sup>2</sup>

Advanced weather monitoring and predictive tools can reduce delays and save airlines **millions annually**.

Weather-related delays in Eurocontrol airspace cost airlines **between €378 million and €1.03 billion annually**, depending on severity and traffic levels.<sup>3\*</sup>

\*This estimate is derived from IATA and EUROCONTROL data based on weather-related delay minutes in 2023 and the standardized cost per minute of delay for airlines. Foundational figures, such as delay minutes, were sourced from IATA, while cost-per-minute values were taken from EUROCONTROL's Standard Inputs for Economic Analyses. The final range reflects variations in airline operating costs and the financial impact of disruptions across different flight phases.

## Safety and operational efficiency

### Real-time weather monitoring benefits

Real-time weather data helps airlines fly smarter and greener.<sup>4</sup>

<p><b>5%</b></p> <p>less fuel consumed on long-haul routes by avoiding turbulence and altitude adjustments</p>	<p><b>258 kg</b></p> <p>of fuel saved per long-haul flight by reducing taxi time by 5 minutes</p>	<p><b>176 kg</b></p> <p>of fuel saved per mid-haul flight by improving arrival management and reducing holding patterns</p>
<p><b>852 kg</b></p> <p>of fuel saved for wide-body aircraft by cutting holding patterns by 10 minutes</p>	<p><b>5,000 kg</b></p> <p>of fuel saved annually per aircraft by optimizing flight paths and avoiding turbulence</p>	

## Take flight with confidence, no matter the forecast.

Advanced weather insights are revolutionizing how the aviation industry operates, enabling airlines to make more informed decisions and optimize performance in any condition. With the right weather intelligence, every forecast becomes an opportunity to enhance efficiency and reliability.

Ready to elevate your operations? Discover how accurate, real-time weather data can transform your airline's decision-making process and drive operational excellence. [Contact us](#) today to explore weather intelligence solutions designed for your specific operational needs. Here's to clearer skies and smoother operations ahead.

Sources:  
<sup>1</sup> EUROCONTROL, Summer 2024 Overview of Network Performance. Available at: [EUROCONTROL](#)  
<sup>2</sup> International Air Transport Association (IATA), Weather-Related Operational Disruptions Are Rising, 2024. Available at: [IATA](#)  
<sup>3</sup> European Environment Agency (EEA), Extreme weather: floods, Droughts, and Heatwaves, 2024. Available at: [EEA](#)  
<sup>4</sup> EUROCONTROL, Rate of Fuel Burn, 2024. Available at: [EUROCONTROL](#)