



Climate change impacts on turbulence

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Clear-air turbulence (CAT) is projected to intensify in response to future climate change, as the meridional temperature gradient across the jet streams strengthens at flight cruising altitudes, largely due to amplified warming at low latitudes associated with the tropical upper-tropospheric warming hotspot. However, our understanding of past CAT trends is currently limited. Here we analyse CAT trends globally during 1979–2020 in an analysis dataset using 21 diagnostics. We find clear evidence of large increases around the globe at aircraft cruising altitudes. For example, at an average point over the North Atlantic, the total annual duration of light-or-greater CAT increased by 17% from 466.5 hours in 1979 to 546.8 hours in 2020, with even larger relative changes for moderate-or-greater CAT (increasing by 37% from 70.0 hours to 96.1 hours) and severe-or-greater CAT (increasing by 55% from 17.7 hours to 27.4 hours). We conclude that CAT has increased over the past four decades, consistent with climate model projections.