

# Clear-air Turbulence over the North Pacific under 2-K Global Warming –Ensemble Projections using a 60-km Atmospheric General Circulation Model

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Future changes in the frequency of clear air turbulence (CAT) events and its seasonality over the North Pacific are estimated based on the Database for Policy Decision-Making for Future Climate Change (d4PDF), which includes over 3000 years of ensemble projections for a 2-degree warming climate relative to the pre-industrial level. The climatological CAT frequency broadly decreases in the mid-latitude central to western North Pacific along with the anticyclonic side of its present-day envelope. Meanwhile, large relative increases are found outside the envelope, implying an increasing risk for aviation incidents. Uncertainty of future CAT changes due to sea surface temperature change patterns from six selected CMIP5 (Climate Model Intercomparison Project Phase-5) climate models is addressed for the first time. It maximizes in boreal winter and spring over the central North Pacific associated with uncertainty in future changes of jet stream and activity of upper-level synoptic-scale disturbance.

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