Title: Fast upper-level jet stream winds get faster under climate change

Abstract: Earth's upper-level jet streams influence the speed and direction of travel of weather systems and commercial aircraft, and are linked to severe weather occurrence. Climate change is projected to accelerate the average upper-level jet stream winds. However, little is known about how fast (>99th percentile) upper-level jet stream winds will change. Here we show that fast upper-level jet stream winds get faster under climate change using daily data from climate model projections across a hierarchy of physical complexity. Fast winds also increase ~2.5 times more than the average wind response. We show that the multiplicative increase underlying the fast-get-faster response follows from the nonlinear Clausius–Clapeyron relation (moist-get-moister response). The signal is projected to emerge in both hemispheres by 2050 when considering scenario uncertainty. The results can be used to explain projected changes in commercial flight times, record-breaking winds, clear-air turbulence and a potential increase in severe weather occurrence under climate change.