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## Opposite Impacts of Interannual and Decadal Pacific Variability in the Extratropics

**Melissa Seabrook**<sup>1</sup>, Doug Smith<sup>1</sup>, Nick Dunstone<sup>1</sup>, Rosie Eade<sup>1</sup>, Leon Hermanson<sup>1</sup>, Adam Scaife<sup>1,2</sup>, and Steven Hardiman<sup>1</sup>

<sup>1</sup>Met Office

<sup>2</sup>College of Engineering, Mathematics and Physical Sciences, Exeter University, UK.

It is well established that the positive phase of El Niño Southern Oscillation (ENSO) tends to weaken the Northern Hemisphere stratospheric polar vortex (SPV), promoting a negative North Atlantic Oscillation (NAO). Pacific Decadal Variability (PDV) is characterised by a pattern of sea surface temperatures similar to ENSO, but its impacts are more uncertain: some studies suggest similar impacts of ENSO and PDV on the SPV and NAO, while others find the opposite. We use climate model experiments and reanalysis to find further evidence supporting opposite interannual and decadal impacts of Pacific variability on the extratropics. We propose that the decadal strengthening of the SPV in response to positive PDV is caused by a build-up of stratospheric water vapour leading to enhanced cooling at the poles, an increased meridional temperature gradient and a strengthened extratropical jet. Our results are important for understanding decadal variability, seasonal to decadal forecasts and climate projections.