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Stratosphere-troposphere coupling: The polar-night jet oscillation

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The Arctic Polar Vortex can exhibit highly predictable flows with timescales of several months. Recent work suggests that as a result of coupling between the polar night jet and the extratropical troposphere, it may be possible to leverage this stratospheric predictability to improve seasonal surface forecasts. However, the origin and nature of the long stratospheric timescales remain unclear. While the long timescales are related to radiative timescales in the lower stratosphere, the enhanced predictability also depends on extended episodes of suppressed planetary wave activity entering the vortex. These episodes correspond to `Polar night jet oscillation' events which occur following roughly two thirds of stratospheric sudden warmings. We analyze a variety of reanalysis and model datasets to characterize and describe the dynamical processes responsible for these long timescale events.