



## **Warming Arctic, weakening polar vortex and winter cooling**

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Spatiotemporal patterns of air temperature trends (1958-2012) are evaluated using reanalysis datasets and radiosonde data. Our analysis demonstrates large discrepancies between the reanalysis datasets, possibly due to differences in the data assimilation procedures as well as sparseness and inhomogeneity of high-latitude observations. A change of sign in the winter temperature trend from negative to positive in the mid- to late 1980s is documented in the upper troposphere/ lower stratosphere with a maximum over the Canadian Arctic. This change from cooling to warming tendency is associated with weakening of the stratospheric polar vortex and shift of its center toward the Siberian coast and possibly can be explained by the changes in the dynamics of the Arctic Oscillation. This pattern is likely linked to the observed multi-decadal variability in the Arctic with implications for recently observed winter cooling in Siberia and continental United States. Possible dynamical mechanisms linking the weakening of the polar vortex and weather in mid-latitudes are demonstrated in a number of model frameworks.