Disturbances in the Northern Hemisphere wintertime stratospheric polar vortex and their connection with cold temperature anomalies in the mid-latitude troposphere are studied using MERRA Reanalysis data for the winter seasons of 1980-2014. By taking geometric moments of potential vorticity in the upper stratosphere, 55 disturbances of the polar vortex are identified during the 35 winter seasons either as splits or displacements. The position of the polar vortex during each disturbance event is averaged to generate an area-averaging filter. A potential vorticity inversion method is used to show negative height tendencies in the stratosphere, induced by negative temperature tendencies in the troposphere and lower stratosphere, under the disturbed polar vortex preceding most disturbance events. This suggests that tropospheric cooling may help determine the orientation of the stratospheric polar vortex during at least some disturbance events.