



The extraordinarily strong and cold polar vortex in the early northern winter 2015/2016

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The Arctic polar vortex in the early winter 2015/2016 was the strongest and coldest of the last 68 years. Using global reanalysis data, satellite observations, and mesospheric radar wind measurements over northern Scandinavia we investigate the characteristics of the early stage polar vortex and relate them to previous winters. We found a correlation between the planetary wave (PW) activity and the strength and temperature of the northern polar vortex in the stratosphere and mesosphere. In November/December 2015, a reduced PW generation in the troposphere and a stronger PW filtering in the troposphere and stratosphere, caused by stronger zonal winds in midlatitudes, resulted in a stronger polar vortex. This effect was strengthened by the equatorward shift of PWs due to the strong zonal wind in polar latitudes resulting in a southward shift of the Eliassen-Palm flux divergence and hence inducing a decreased deceleration of the polar vortex by PWs.