

Chemistry-dynamics interaction in polar stratospheric ozone: weak and strong vortex events

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A 29 year dataset of assimilated ozone from SBUV satellite observations is used to characterize the evolution of polar ozone anomalies during winter, in particular in the vicinity of strong anomalies in the stratospheric circulation. Extreme phases of the Northern Annular Mode (NAM), so-called weak and strong vortex events, lead to large and characteristically shaped ozone anomalies. We analyze in detail the processes that shape the ozone anomalies. Interactions between dynamics and chemistry are observed both in the lower stratosphere (through heterogeneous activation of chlorine) as well as in the upper stratosphere (through temperature-induced shifts in gas phase reaction equilibria). As an example how vortex events affect the evolution of previously created large anomalies in polar ozone, we analyze the evolution of ozone anomalies in the wake of four large solar proton events.