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Variability in polar processing and ozone loss based on seven years of Aura Microwave Limb Sounder measurements

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In the last decade, the Arctic lower stratosphere has seen some of the most dynamically disturbed winters, with major stratospheric sudden warmings that curtailed polar processing early in the season and limited chemical ozone loss, as well as several winters marked by exceptionally cold conditions and the most severe chemical ozone destruction in the observational record. Although more consistent from year to year, the Antarctic lower stratosphere also experiences some variability in meteorological and chemical conditions, with unusually strong and prolonged chlorine activation in the lower reaches of the vortex leading to a record ozone hole in 2006. Launched in July 2004, NASA's Aura satellite is providing a suite of measurements enabling quantification of stratospheric polar processing and ozone loss in both hemispheres. Here we use observations from the Aura Microwave Limb Sounder (MLS), along with related data sets, in a comprehensive analysis of interannual and interhemispheric variability in polar processing. Several methods are used to quantify both Arctic and Antarctic chemical ozone loss in each of the winters observed by Aura MLS.