Title: Temporal trends and seasonal and multi-year variability of ozone, water vapor and temperature throughout the stratosphere

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Background

In this study, we propose to combine measurements of water vapor and ozone from recent satellite missions, most notably from the Aura and UARS measurements, but also including those from SAGE-II. NOAA GMD (formerly CMDL) balloon measurements from 40N will be used for quality checking. Polar regions will also include measurements from the ACE and POAM satellite instruments, and high latitude ozonesonde measurements available at the World Ozone and Ultraviolet Radiation Data Center (WOUDC) will help extend coverage to the pole. The end goal is to analyze long-term trends and variability in water vapor and ozone and relate those to observed trends and variability in stratospheric temperatures and related zonal mean transport. We will compute temporal trends, along with seasonal cycles and cycles with periods less than 4 years (including the QBO and ENSO). After establishing corrections necessary to combine the data sets, we will continue with long-term trend analyses, and will analyze changes in the mean meridional circulation of the stratosphere and use the constituent time series in a modeling study examining the impact of observed changes on the stratospheric mean meridional circulation. For examining specific issues related to transport in the tropics, we will analyze specific ozone sonde records for indications of possible longitudinal variability in transport as well as temporal variability.