**Motivation and Introduction**

SCIAMACHY (Scanning Imaging Absorption Spectrometer for Atmospheric Cartography) aboard ENVISAT and SABER (Sound of the Atmosphere using Broadband Emission Radiometry) aboard the TIMED satellite, have been launched in 2002 and 2001, respectively. They provide high altitude ozone profiles from the stratosphere into the mesosphere. Due to their high global sampling their data are well suited for studying short-term and semiannual variations in ozone related to the 27-day solar rotation period and diurnal variations.

Daily solar observations from GOME and SCIAMACHY allow the calculation of a long-time series of the MgII index (@279.6 nm) as a proxy for solar UV irradiance variability. (Steinhilber et al., 2005). Effects on short-time variations are up to half the order of magnitude of the 11-year cycle. The MgII index has been shown to track the solar UV irradiance changes throughout the UV region. A change of 1% in the MgII index corresponds to a 0.6% change in solar irradiance at 205 nm (also often used as solar proxy). The MgII index has been combined with SCIAMACHY ozone observations. The diurnal solar response on ozone can be investigated with SABER data since the TIMED satellite is in a non-sun synchronous orbit. It covers any given latitude at different local times within a period of about 60 days. Diurnal and short term solar variations and their impact on ozone are also studied with the Bremen 2D Chemistry-Transport-Model (B2dCTM) and compared with satellite observations.

**Ozone Anomalies and QBO**

Ozone profiles between 20 and 65 km have been retrieved using SCIAMACHY limb spectra and the knowledge about absorption features of ozone in the Hartley and Chappuis bands. The profiles were used to calculate daily area weighted zonal mean profiles. Fig. 1 shows the ozone anomaly in the tropics and their temporal evolution from August 2002 to December 2007. In addition, version 1.06 ozone profiles between 25 and 105 km from the SABER instrument onboard NASA’s TIMED spacecraft were used. In contrast to SCIAMACHY, SABER-measures ozone at night as well (absorption feature of ozone at 9.6 um, 25-105 km). Daytime O3(σ) airglow emissions (at 1.27 μm) may make the retrieval of ozone profiles possible at altitudes above 70 km (Mlynczak et al., 2007). Yaw maneuvers of the TIMED satellite constrain the analysis of continuous time series to latitudes between 52°S and 52°N. Area weighted zonal mean profiles could be calculated in 5° time as. For SCIAMACHY the ozone anomaly for SABER can be seen in Fig. 2c.

Ozone anomalies (% deviation from the mean) are based on area weighted zonal mean profiles from SCIAMACHY and SABER. A semi-annual fit was subtracted to get a better look at the QBO signal. High ozone values correspond to QBO west phases. The anomalies form the basis for further investigations on diurnal variations and response to solar signal (see ‘Ozone Response to Solar Variability’).

**Outlook**

In addition to further adjustments to the model (solar and daily variability), future investigations will concentrate on the decomposition of the time series by a multivariate least square fit in order to better separate 27-day solar cycle variability, instrumental features (60 days). Diurnal and short term solar variations and their impact on ozone are also studied with the Bremen 2D Chemistry-Transport-Model (B2dCTM) and compared with satellite observations.

**Selected References**


Huang, F. T., Mayr, H., Russell, J. M., Mlynczak, M. G., Reber, C. A., 2008b. Recent Huang et al. (2008a,b) also investigated diurnal ozone variations from SABER. In general the match between Huang et al. and our study is good. Here we focused on in ozone profiles retrieved at 1.27 μm and also compared our results to the output of the B2dCTM. Except for 76 km and 80 km in the comparison to the data looks promising (cf. Fig. 4). Sensitivity studies are underway to better understand the observed differences between 20 models and observations.

**Ozone Response to Solar Variability**

The results of the impact of solar variability on tropical ozone are illustrated in Fig. 7. They show good agreement to previous studies from Hood (1998) and Hood and Zhou (1998). Fig. 6 shows an example of the decomposition of a time series at 40 km.

**Diurnal Variations**

Recently Huang et al. (2008a,b) also investigated diurnal ozone variations from SABER. In general the match between Huang et al. and our study is good. Here we focused on in ozone profiles retrieved at 1.27 μm and also compared our results to the output of the B2dCTM. Except for 76 km and 80 km in the comparison to the data looks promising (cf. Fig. 4). Sensitivity studies are underway to better understand the observed differences between 20 models and observations.

See also: www.lup.uni-bremen.de/UVSat