Weighting function DOAS

Outlook and Future Work

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GOME Total Ozone Column Retrieval Development,
Final Presentation, 3 Dec 2003, Frascati

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Topics

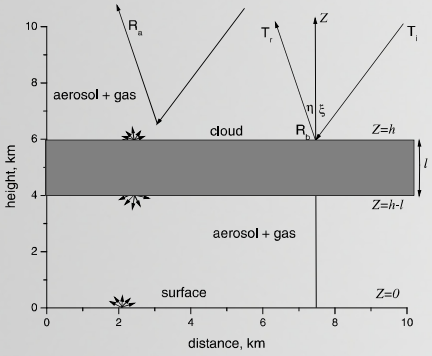
- Application of WF-DOAS to SCIAMACHY
  - ➔Improved spatial resolution (60X30 km^2)
  - ➔Limb/nadir matching for tropospheric ozone
- Improved cloud retrieval SACURA (Kokhanovsky et al. 2003)
- New ozone climatology

Overview

- Application of WF-DOAS to SCIAMACHY
  - ➔Improved spatial resolution (60X30 km²)
  - ➔Limb/nadir matching for tropospheric ozone
- **Improved cloud retrieval SACURA (Kokhanovsky et al. 2003) to be included**
- New ozone climatology

Improved cloud-top-height (cth) determination

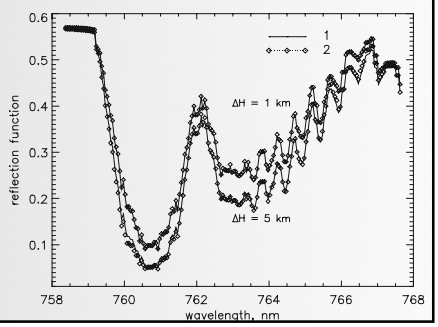
$$R = R_a + T_i R_b T_r$$



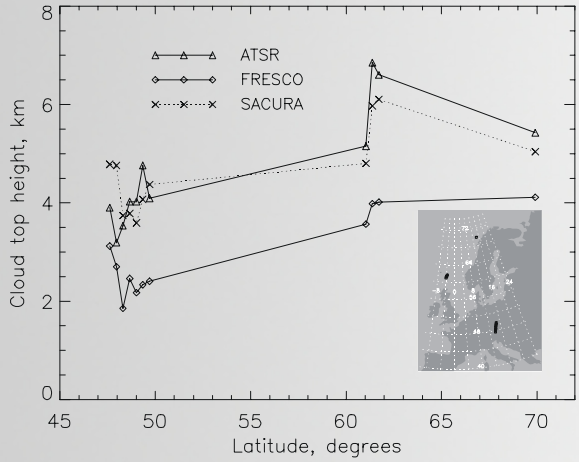
$$h = 5.5km,\ \tau = 20,\ \vartheta_0 = 60^\circ$$

New cloud algorithm SACURA (Kokhanovsky et al. 2003)

- Retrieval of **cloud-top-height**, **cloud-optical-depth**, and **geometrical thickness** from oxygen A-band
- Accounts for scattering/ reflection above, inside and below clouds using simple parametrisation



Improved cloud-top-height (cth) determination (2)



- CTH from SACURA agrees well with ATSR
- About 2 km difference between FRESCO and Sacura
- Enhanced GVC contribution to be expected (ca. 3 DU / km)

23.07.1995, GOME orbits: 50723095, 50723114

Overview

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  - ➔Improved spatial resolution (60X30 km²)
  - ➔Limb/nadir matching for tropospheric ozone
- Improved cloud retrieval SACURA (Kokhanovsky et al. 2003) to be included
- **New ozone climatology**

Improved ozone and temperature climatology

LUT

ref. spectra
Ring spectra
weighting f.

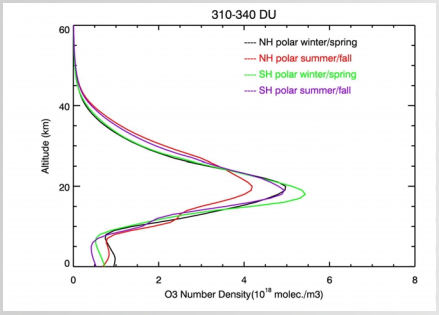
- profile shape [26]
- total ozone [26]
- SZA [34]
- LOS [7]
- RAZ [3]
- surface albedo [6]
- altitude [7]

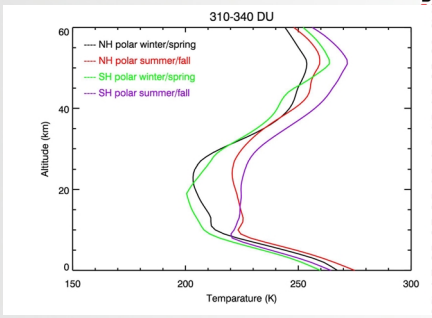
TOMS V7 standard profiles

HIGH_LAT MID_LAT LOW_LAT

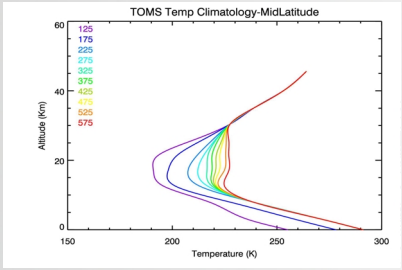
temperature field [26]

No hemispheric and seasonal differences





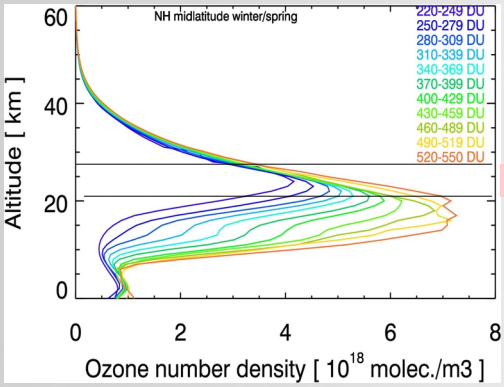
seasonal and hemispheric differences in O3 profiles



seasonal and hemispheric differences in temp. profiles

A-priori - a major error contributor

Preparation of new column classified climatology

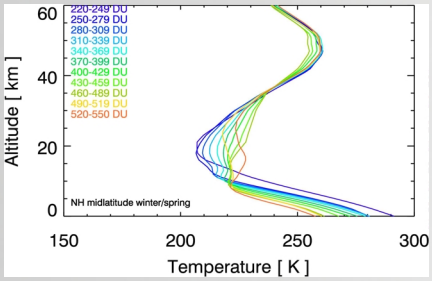


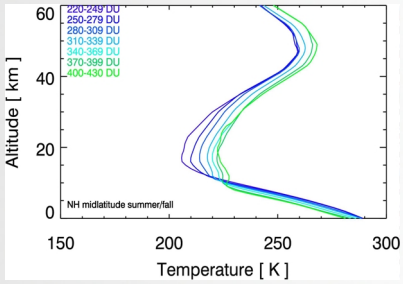
SAGE II [1989-2000]
POAM III [1998-2002]

Transition region

Sonde [1990-2000]

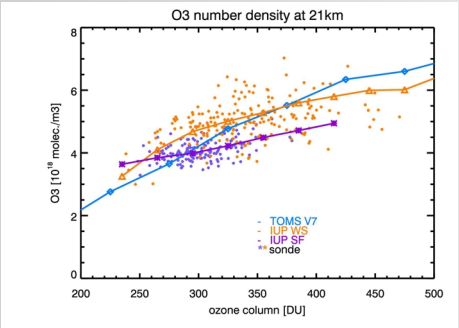
Temperature data:
NMC (SAGE II)
UKMO (POAM III)
radiosonde

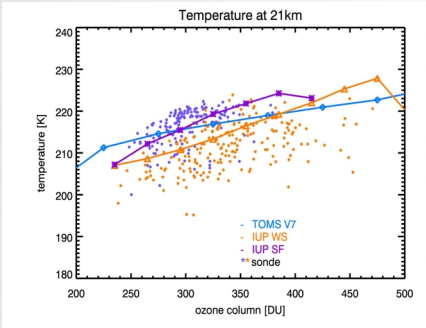




A case study: Hohenpeissenberg

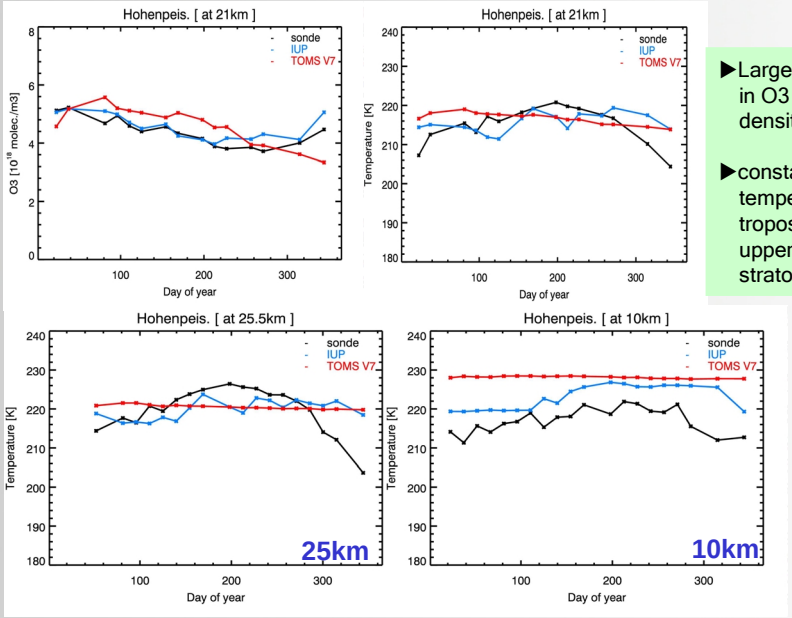
ozone and temperature at 21km





➡ Matching climatological profile to total ozone from ground station (1996-1999)

Seasonal cycle in O3 and temperature



- ▶Large difference in O3 number density
- ▶constant TOMS temperature in troposphere and upper stratosphere

Conclusion

- ▶Implementation of WF-DOAS to SCIAMACHY is in preparation
- ▶SACURA as alternative to FRESCO will be investigated
  - ➔Extention of SACURA to partial cloudiness is completed
  - ➔First test with WF-DOAS in preparation
- ▶New LUT tables based upon IUP climatology are underway

⇨ WF-DOAS V2