

Weighting function DOAS algorithm for backscatter UV satellite instruments (GOTOCORD)

Introduction

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**GOME Total Ozone Column Retrieval Development,
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▶ *Ring implementation*
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▶ *Validation*



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- ▶ *Algorithm Development*
- ▶ *Error analysis*



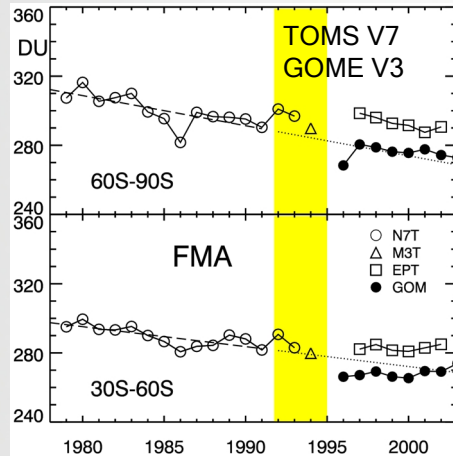
Hanna

Michael Buchwitz / First version of WF-DOAS
Rüdiger de Beek / Ring effect issues
Klaus Bramstedt/ WOUDC collocation list
Marco Vountas / Ring effect in SCIATRAN
Andreas Richter / Advice on DOAS issues
John Burrows / Advice on GOME issues

Current Status on GOME Total Ozone



- ▶ GDP V3 release in November 2002
- ▶ Reduction in the seasonal dependence of GOME-ground data differences by half
- ▶ uncertainty in continuation of longterm trend after mid nineties remains
- ▶ high accuracy needed for detection of ozone recovery (on decadal scale) using combined TOMS/ GOME/ SCIA/ OMI/ GOME2/ data record



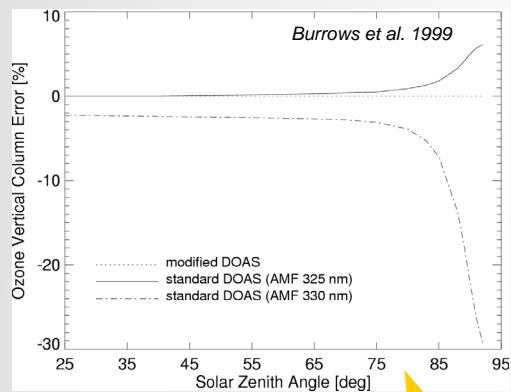
⇒ propose a new algorithm in response to ESA ITT:
weighting function DOAS (Buchwitz et al., 2000, Coldewey et al., 2003)

Standard DOAS



Operational approach for GOME total ozone

- ▶ „Standard“ DOAS Two Step Procedure (up to GDP V3)
 - Slant column spectral fitting (325-335 nm)
 - Single Airmass factor for conversion into vertical columns (325 nm)
- ▶ Valid approach for optically thin atmosphere (AMF does not vary with λ , not true for O₃ in UV)



⇒ possible alternatives for strong absorbers:

modified DOAS (KNMI)	$\sigma(\lambda) * AMF(\lambda) * V$
WF-DOAS (IUP)	$\frac{\partial \ln I(\lambda)}{\partial V} * \Delta V$
Direct fitting (BIRA)	$\frac{\partial I(\lambda)}{\partial V} * \Delta V$

Optimized choice for AMF wavelength:
325.5 nm (Roozendael et al. 2003)

Overview of Final Presentation



Part 1: Weighting Function DOAS

- ▶ Introduction/Motivation
- ▶ Foreword: John Burrows
- ▶ WF-DOAS Algorithm
- ▶ Auxilliary Retrieval
 - Effective albedo
 - Clouds
 - Effective scene height
- ▶ Ring effect (ozone filling-in)
- ▶ Sensitivity study
 - A-priori ozone climatology
 - Tropical clouds
 - Mountains
 - Aerosol
- ▶ Error Budget
- ▶ Performance

Overview of Final Presentation (2)



Part 2: Validation Report

- ▶ Introduction
- ▶ Brewer and Dobson intercomparison
- ▶ Long-term validation 1995-2003
- ▶ Pole-to-Pole validation (WOUDC)
- ▶ Conclusion

Part 3: Outlook and Future Work

- ▶ Application to SCIAMACHY
- ▶ Improved cloud retrieval
- ▶ Improved ozone & T climatology
- ▶ Conclusion