

GOME / SCIA Workshop

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First Results from SCIAMACHY UV/vis Nadir Measurements

**Andreas Richter, K. Bramstedt, S. Noel, B. Sierk,
and John P. Burrows**

Institute of Environmental Physics and
Institute of Remote Sensing
University of Bremen

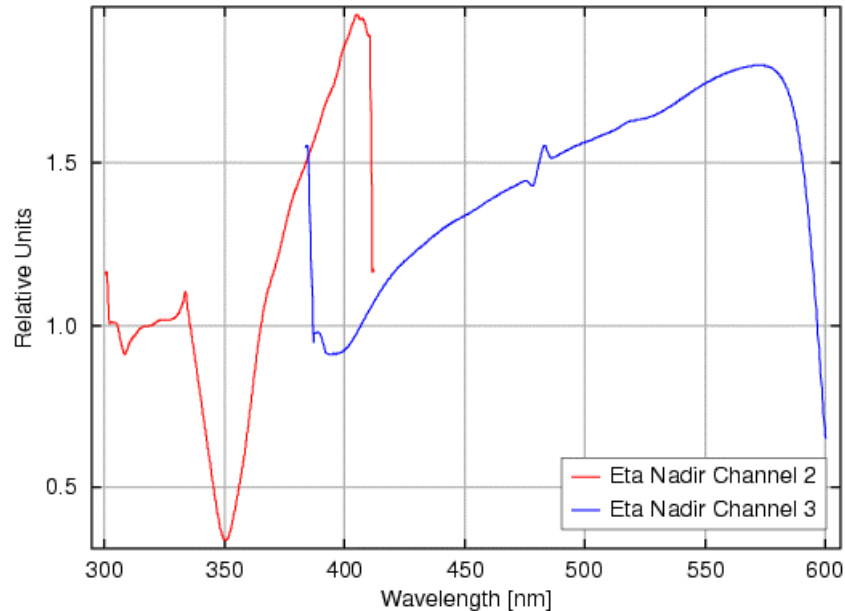
Main UV/vis Relevant Differences SCIA / GOME

Hardware:

- alternating limb and nadir measurements
 - ∅ possibility of limb-nadir matching for tropospheric products
 - ∅ reduced coverage
- channel clustering
 - ∅ higher data rate in parts of the channels
 - ∅ improved spatial resolution
 - ∅ less problems with clouds
- changes in dichroics
 - ∅ polarisation characteristic different and at different wavelengths
- larger FWHM of slit function
 - ∅ less undersampling
 - ∅ new cross-sections needed
- more options for solar irradiance measurements

Example 1: Polarisation dependence

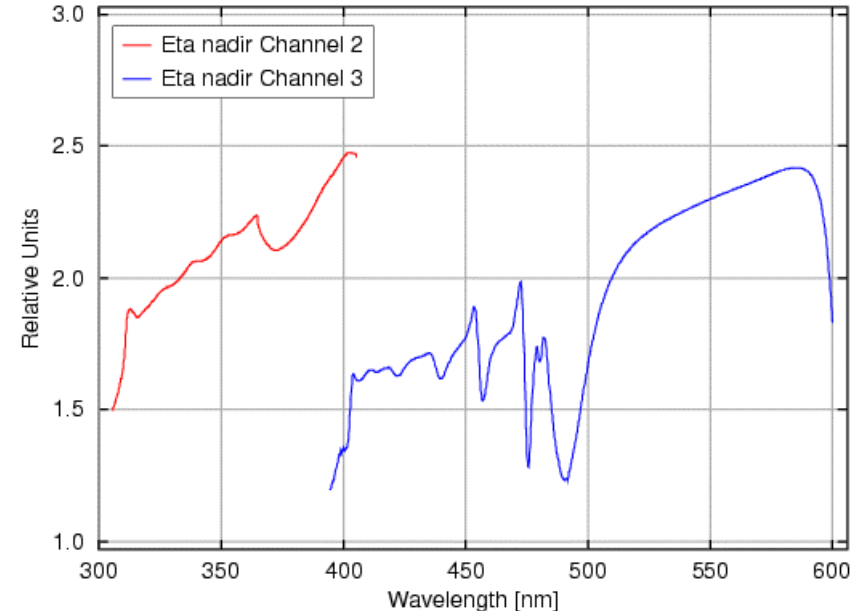
SCIAMACHY Keydata Eta Nadir channels 2 & 3



SCIAMACHY:

- Ø more problems in channel 2
- Ø relevant for O₃, BrO, OCIO, HCHO
- Ø more calibration functions needed!

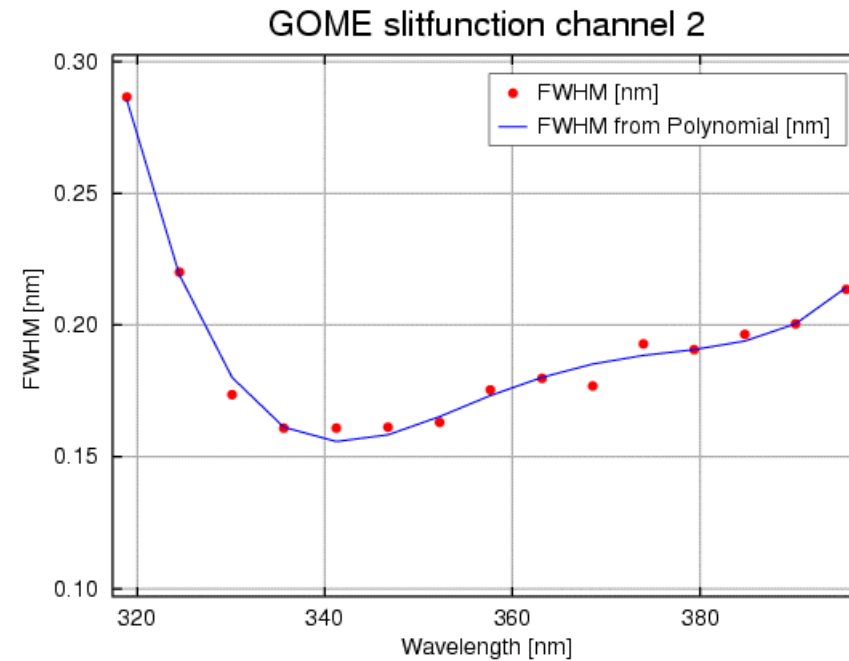
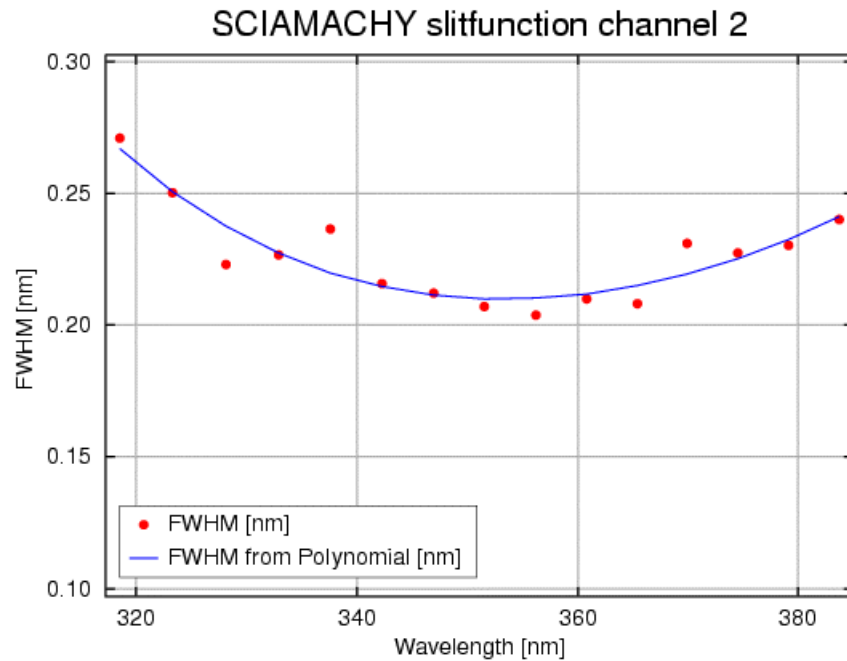
GOME Keydata Eta channels 2 & 3.PS



GOME:

- Ø more problems in channel 3
- Ø relevant for O₃ Chappuis

Example 2: Slit Function in Channel 2



SCIAMACHY:

Ølarger FWHM than GOME in ch 2

Øless variation in FWHM in ch2

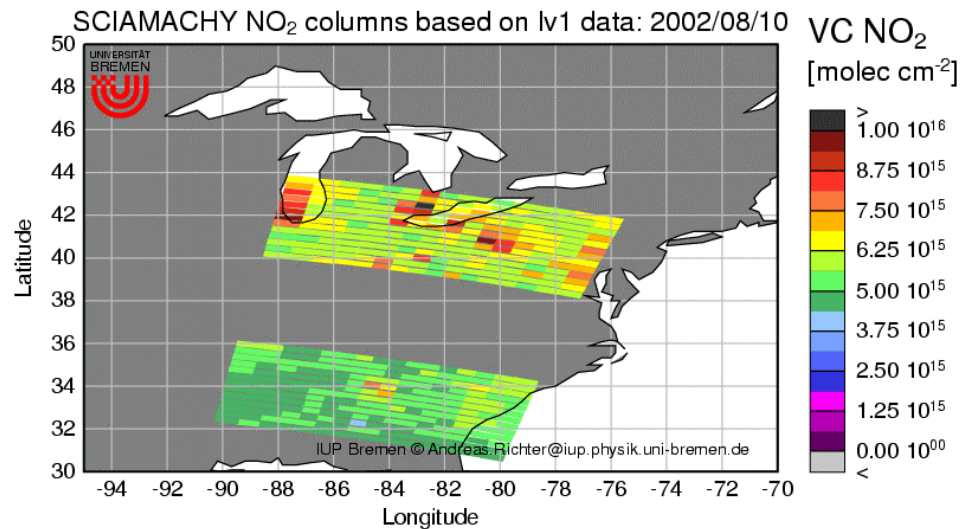
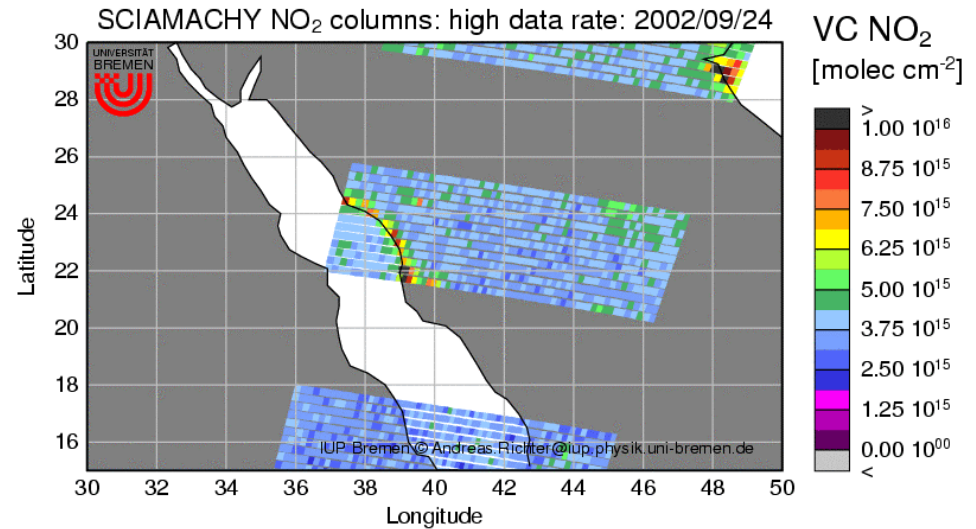
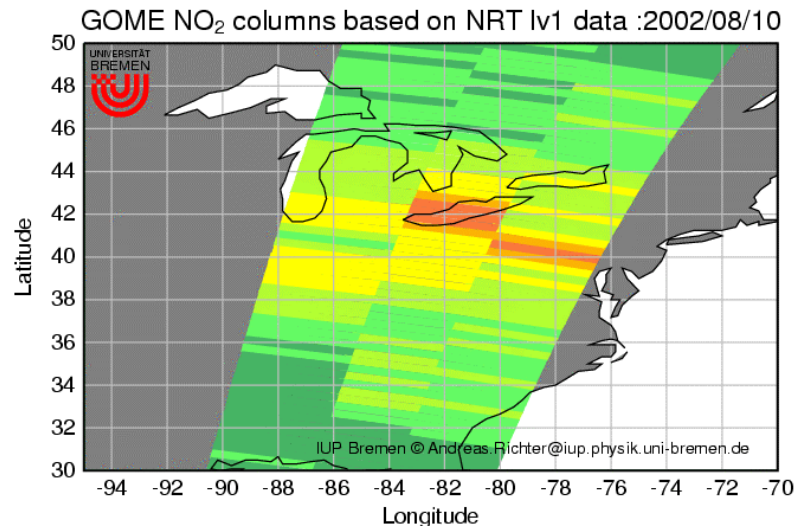
Øother cross-sections needed!

Current Status of Data Analysis

Data:

- A few level 0 data orbits have been analysed
- All available lv1 data orbits have been analysed
- Analysis has been performed for
 - NO₂ very good results
 - SO₂ good results
 - BrO results are OK
 - O₃ UV good results
 - O₃ vis problems!
 - HCHO results are OK
 - OCIO problems!
- Comparisons have been made with GOME data

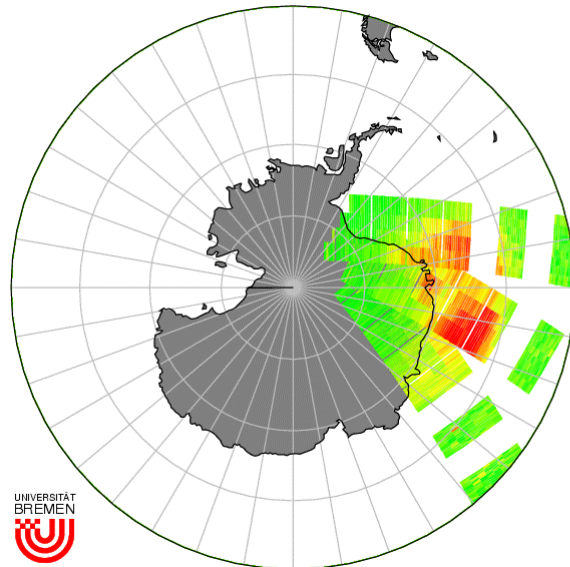
Results: SCIAMACHY NO₂



- **SCIAMACHY and GOME measurements agree well**
- **SCIAMACHY has much better spatial resolution**
- **Even higher spatial resolution is possible and seems to be appropriate**

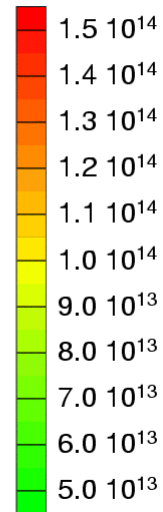
Results: SCIAMACHY BrO

SCIAMACHY 2002/09/17

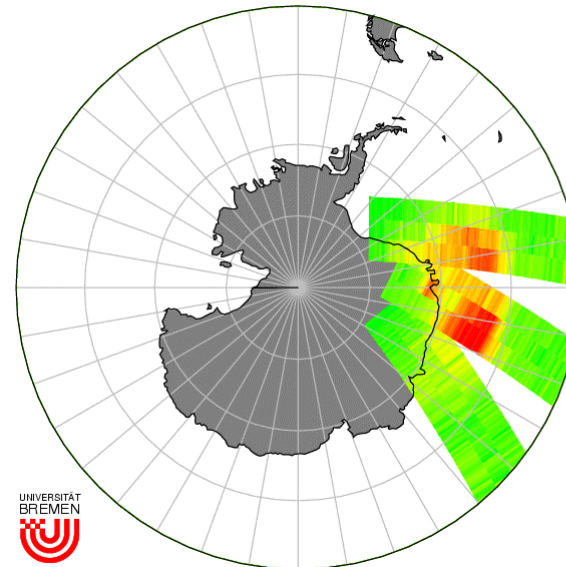


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VC BrO
[molec cm⁻²]

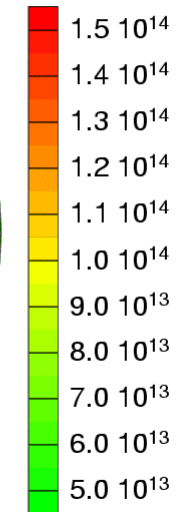


GOME 2002/09/17



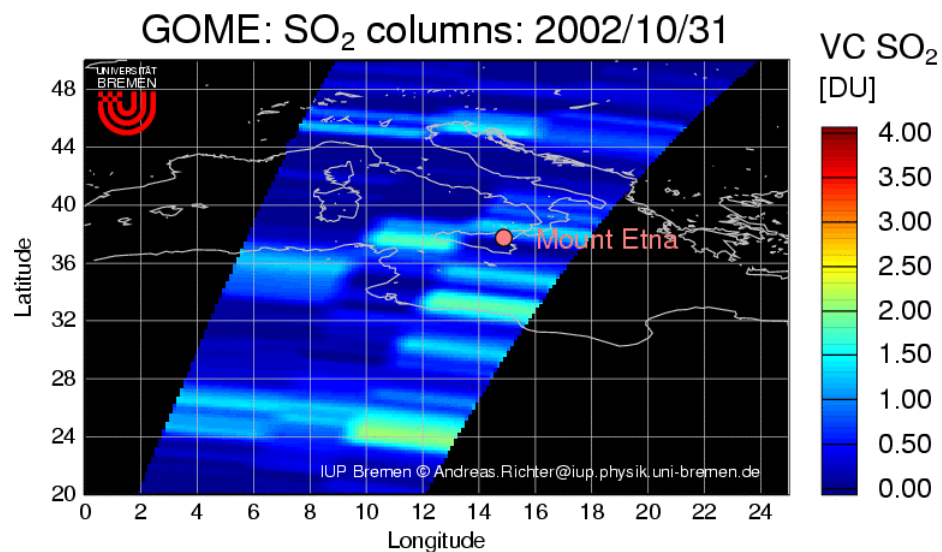
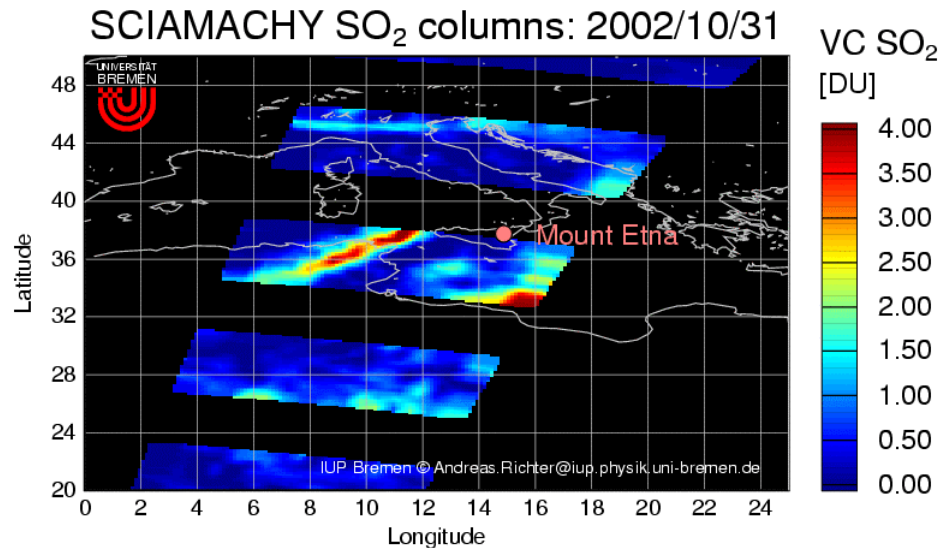
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VC BrO
[molec cm⁻²]



- Good general agreement in values
- slightly better resolution in SCIA data
- SCIA data seem to be noisier
- No clear improvement over GOME measurements

Results: SCIAMACHY SO₂



- good general agreement of values
- much better spatial resolution
- plumes from Mount Etna is much better resolved
- locally, SCIA measures much larger SO₂ values
- gaps from limb measurements limit applicability to process studies

Problems in Current Data Analysis

Problems:

- calibration of lv1 data not ok (polarisation)
- solar irradiances can't be used (huge residuals)
- polarisation features are prominent in channel 2
- polarisation features in channel 3 > 450 nm interfere strongly with retrieval
- Signal to noise in channel 2, 340 – 380 nm not as good as expected
 - ∅ higher spatial resolution can probably not be used for BrO, HCHO, and OCIO

Summary and Plans for the Future

Summary:

- DOAS analysis of SCIAMACHY UV/vis nadir results works nicely for NO₂, BrO, SO₂, O₃ and HCHO
- Results for NO₂ are very promising and show the potential of SCIAMACHY for tropospheric measurements
- Problems remain in the visible channels and for OCIO
- Better calibration of the spectra seems to be essential
- Improved solar irradiance measurements are urgently needed

Plans for the near future:

- automatic processing of all “GOME”-species
- validation where possible
- tropospheric products (NO₂, O₃)
- limb-nadir matching
- focus on halogen oxides (BrO, IO, OIO)
- Synergistic use of GOME and SCIAMACHY?