3rd GSVT Meeting

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Status of IUP Bremen scientific SCIAMACHY uv/vis nadir products

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Overview

SCIAMACHY nadir UV/vis products investigated:

- NO_2 total column

- BrO total column

- OClO slant columns

- SO_2 tropospheric column

- NO_2 tropospheric column

SCIAMACHY nadir UV/vis products not yet investigated:

- O_3 total column

- HCHO tropospheric column
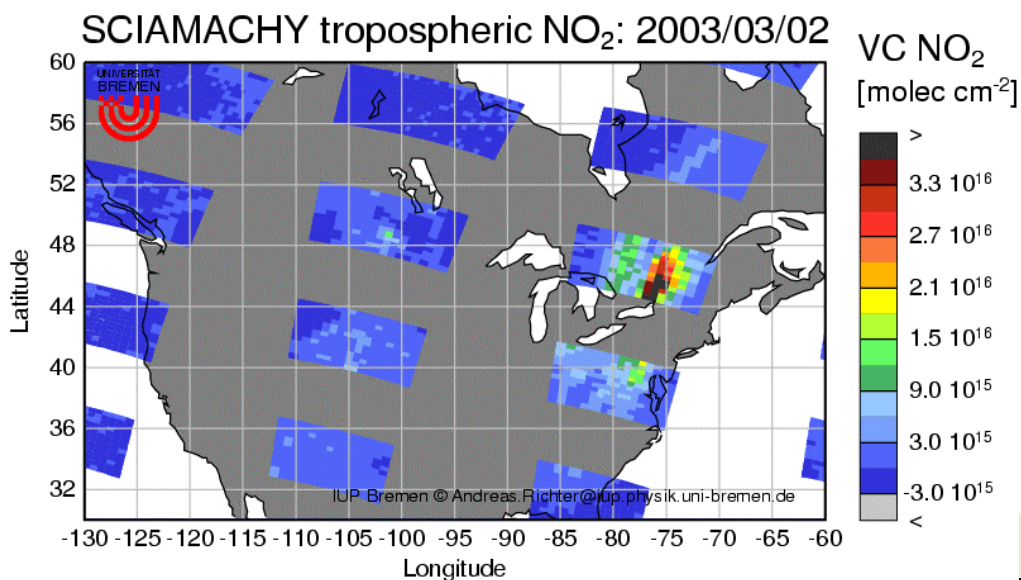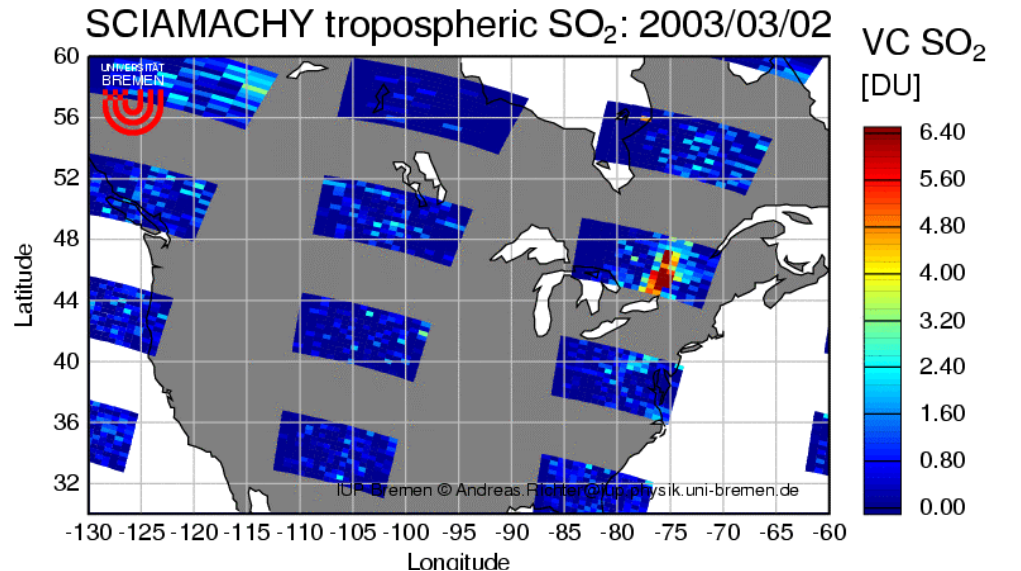
- H_2O tropospheric column

Overview

Data and algorithm:

- based on lv0 raw data (up to 10 orbits per day available)

- standard DOAS analysis

- calibration corrections using keydata

- NO2 tropospheric column: reference sector and nadir-limb matching

Status:

- NO2 total: good shape, first validation, offset?

- NO2 tropospheric: good shape, available in NRT on the web

- OClO, BrO, SO2: problems, but nice results for cases with large absorptions
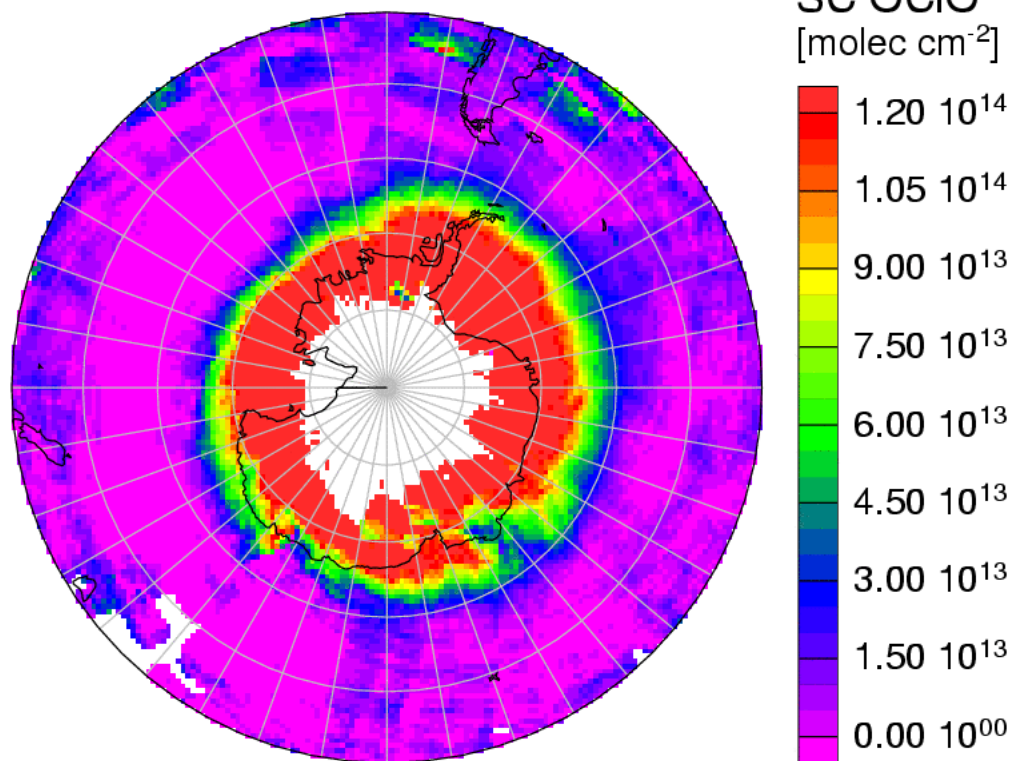
Examples: Pollution in North America

SCIAMACHY tropospheric SO_2: 2003/03/02

VC SO_2 [DU]

6.40
5.60
4.80
4.00
3.20
2.40
1.60
0.80
0.00

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SCIAMACHY tropospheric NO_2: 2003/03/02

VC NO_2 [molec cm^{-2}]

>
$3.3 \cdot 10^{16}$
$2.7 \cdot 10^{16}$
$2.1 \cdot 10^{16}$
$1.5 \cdot 10^{16}$
$9.0 \cdot 10^{15}$
$3.0 \cdot 10^{15}$
$-3.0 \cdot 10^{15}$
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- Very large NO2 and SO2 columns on March 2nd, 2003

- Export of US pollution to Canada?

- Possibly some amplification by bright surface (snow? clouds?)
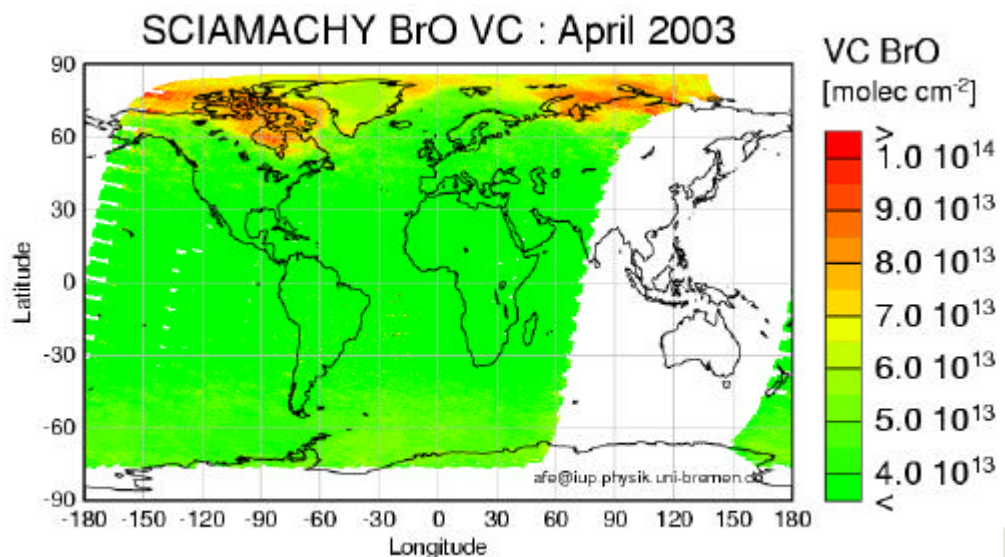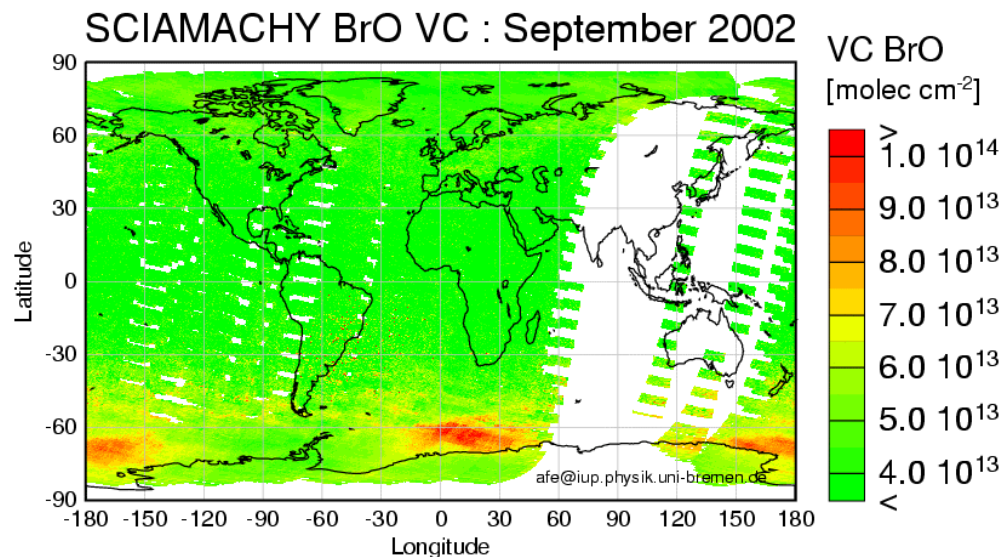
- Significant noise in SO2 data

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Examples: OClO in the SH

SCIAMACHY August 2002

SC OClO
[molec cm^{-2}]

1.20 10^{14}
1.05 10^{14}
9.00 10^{13}
7.50 10^{13}
6.00 10^{13}
4.50 10^{13}
3.00 10^{13}
1.50 10^{13}
0.00 10^{00}

- chlorine activation in the SH vortex clearly observed

- noise at high and at low SZA

- good overall agreement with GOME data

- limb gaps and missing orbits make average less than representative (although this is the best of all months!)

Examples: BrO in the NH

SCIAMACHY BrO VC : September 2002

VC BrO
[molec cm⁻²]

SCIAMACHY BrO VC : April 2003
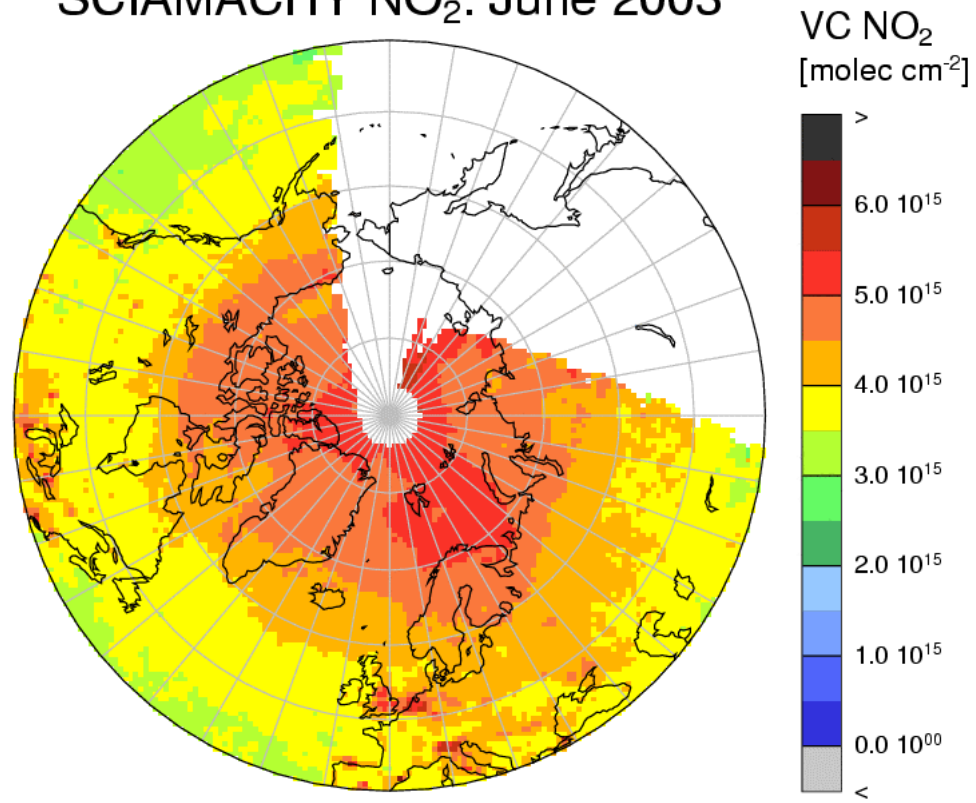
VC BrO
[molec cm⁻²]

- bromine explosion in polar spring observed in both hemispheres

- good qualitative agreement with GOME data

- problems with standard fitting window, UV window has to be used

- data still noisy and not in quantitative agreement with GOME measurements
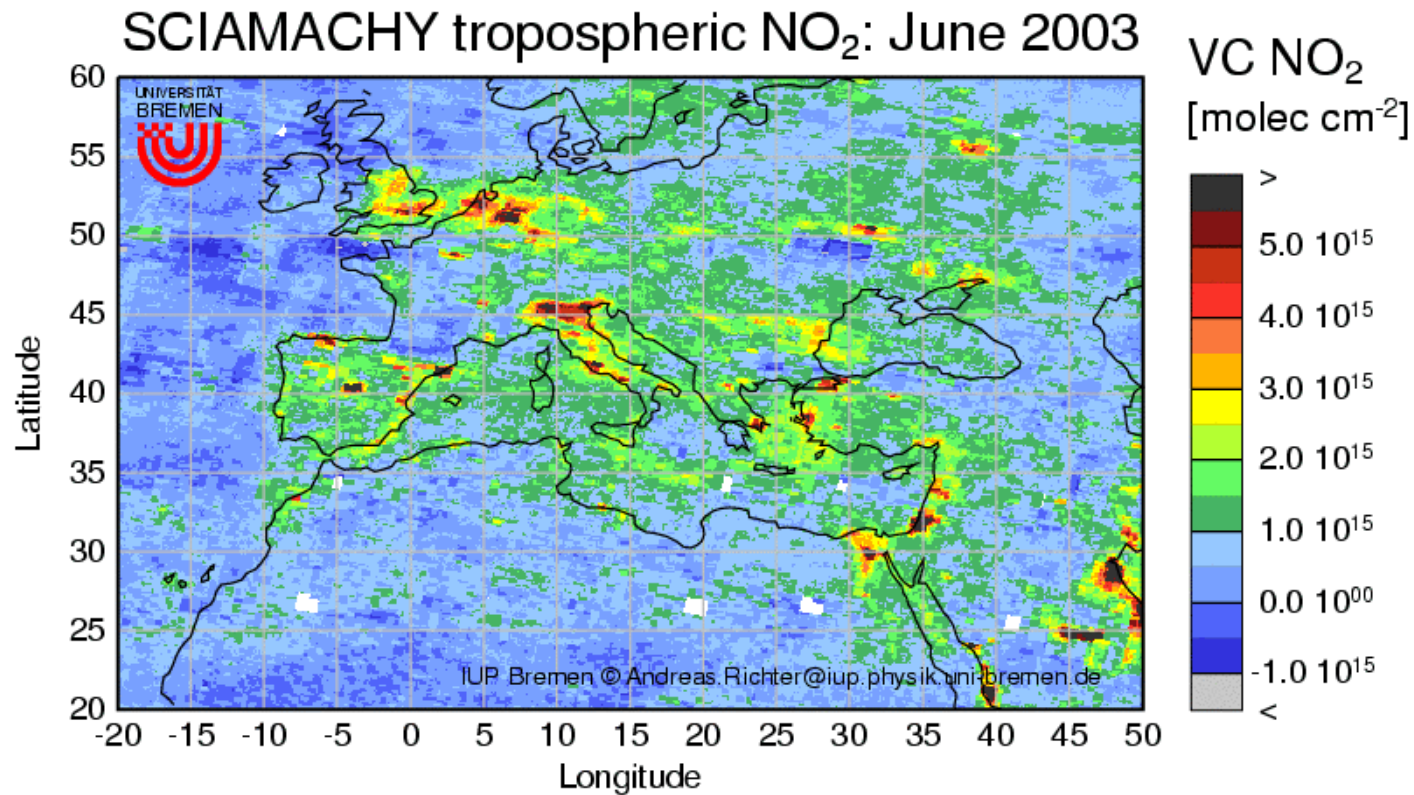
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Examples: Total NO2

SCIAMACHY NO$_2$: June 2003

VC NO$_2$
[molec cm^{-2}]
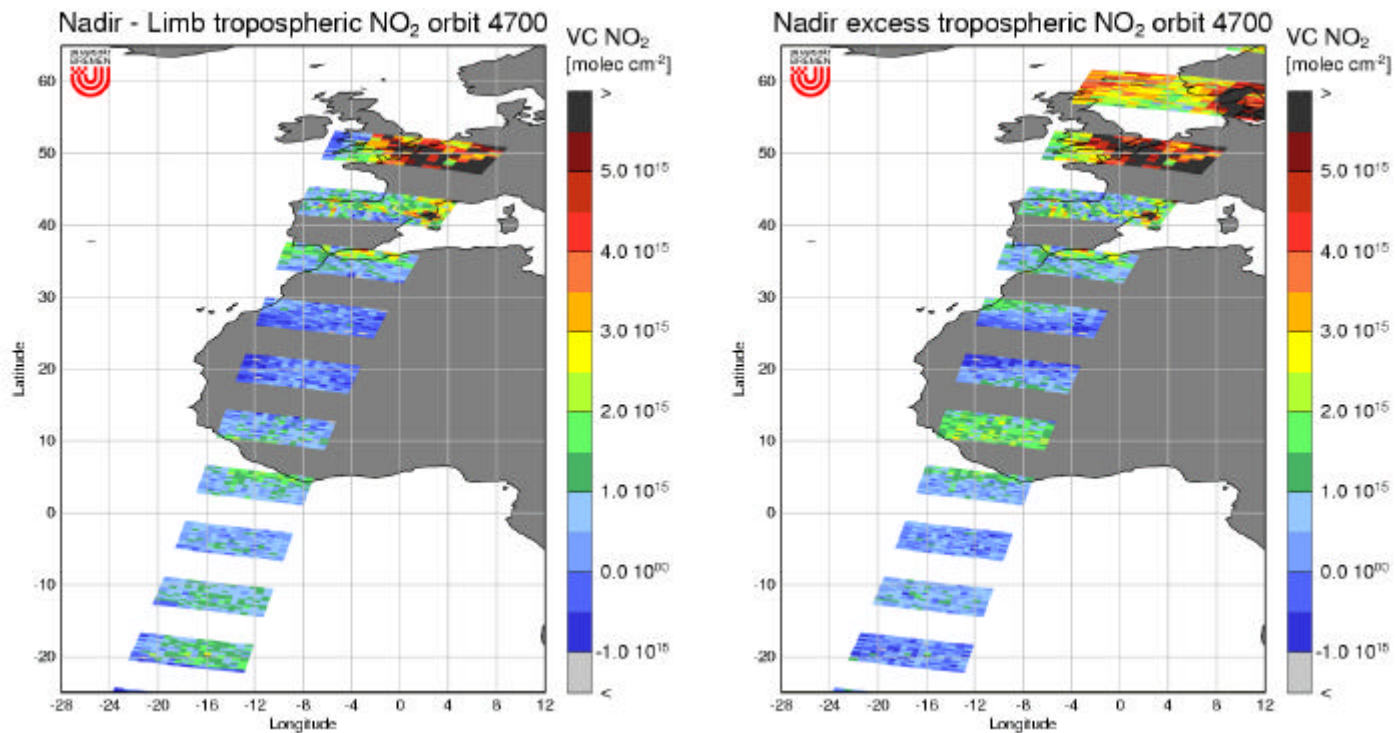
Examples: Tropospheric NO2

- nice spatial resolution for tropospheric NO2

- good agreement with GOME data when averaged appropriately

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Examples: NO2 limb nadir matching

- first results of limb nadir matching

- qualitative agreement with reference sector method, but also some differentces
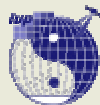
Summary

- SCIAMACHY nadir UV/vis scientific products based on lv0 data are created at the IUP Bremen on a regular basis

- NO2 products are quite mature

- SO2, OClO, and BrO still have serious problems

- HCHO, H2O and O3 still missing

- tropospheric NO2 from limb nadir matching seems to work well

All data are available on request, some plots can already be downloaded from the webpage www.doas-bremen.de

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Outlook

- automated generation of scientific products will be continued

- work on improved BrO, OClO, SO2, and HCHO products is under way

- work on limb nadir matching continues

- validation of scientific products has already been started and will be continued

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SCIAMACHY tropospheric NO₂: 2003/07/06

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