

SCIAMACHY Validation with the BREDOM Network

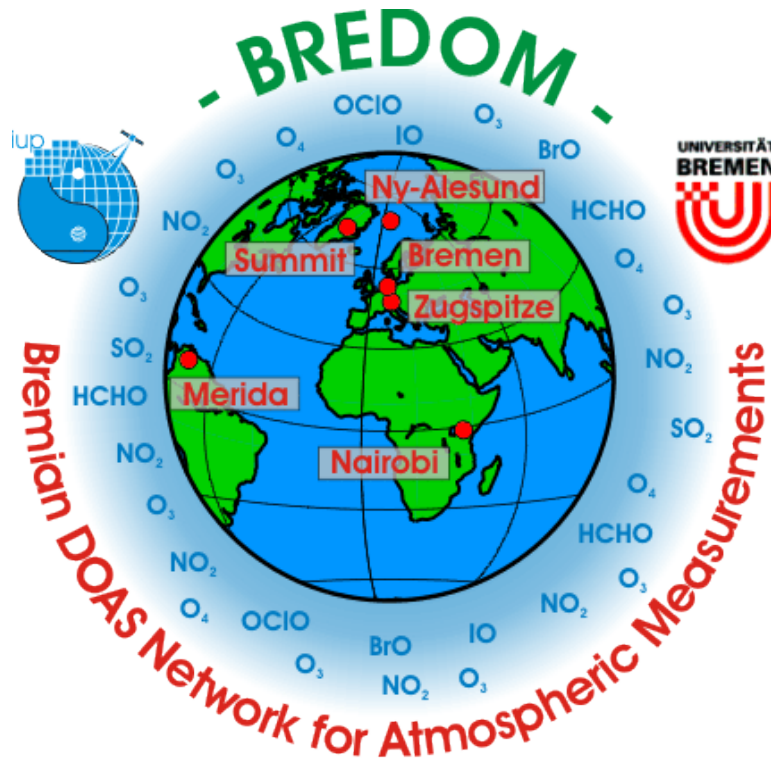


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Overview

- Bremian DOAS Network for Atmospheric Measurements
- Selected results (O_3 , NO_2)
 - Arctic (Ny Ålesund, Summit),
 - Mid latitudes (Zugspitze),
 - Tropics (Merida, Nairobi)
- Summary

Bremian DOAS Network for Atmospheric Measurements (BREDOM)



In operation:

- Ny Ålesund (79°N, 12°E)
- Summit (72°N, 38°W)
- Bremen (53°N, 9°E)
- Merida (8°N, 71°W)
- Nairobi (1°S, 37°E)

Temporary in operation:

- Zugspitze (47°N, 10°E)

BREDOM (II)

Advantages:

- Similar setup and data analysis for all measurement sites
- High-sensitivity DOAS-instruments for stand-alone operation
- Zenith-sky and horizon (off-axis) viewing mode
- Two tropical stations

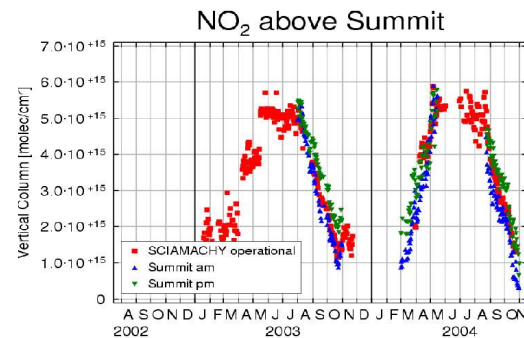
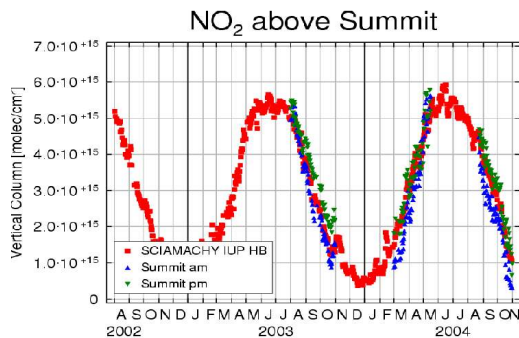
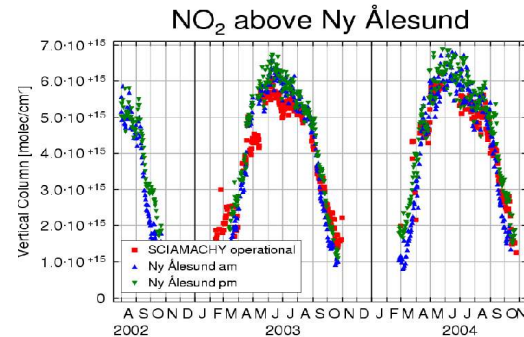
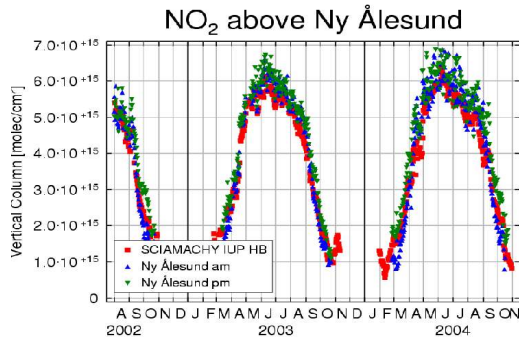
Target Quantities:

- O_3 and NO_2 as well as minor absorbers (e.g. BrO, OCIO, IO, HCHO)

Aims:

- Validation of satellites (e.g. SCIAMACHY onboard ENVISAT)
- Long- term measurements

NO₂ (Arctic)



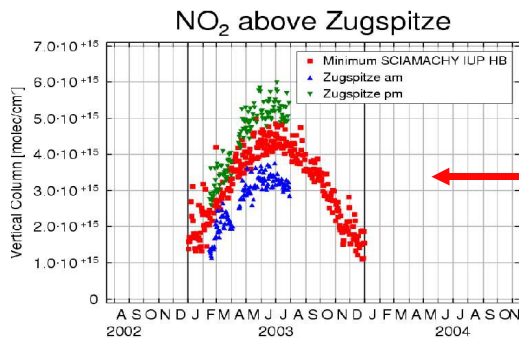
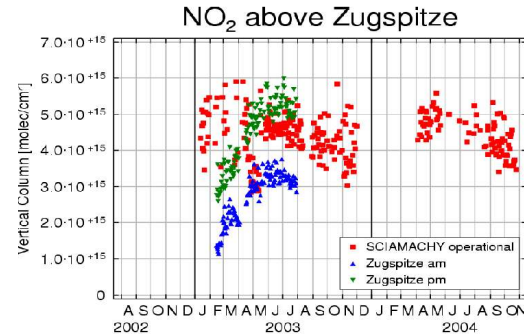
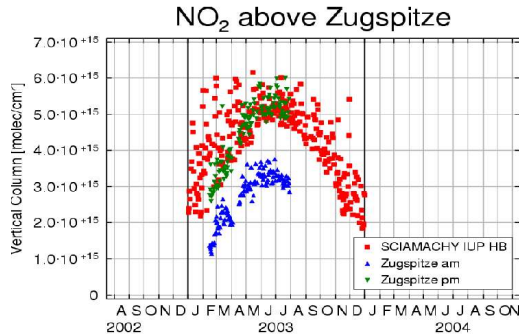
scientific

operational

- Seasonal trend is good represented
- Good agreement of absolute values between SCIAMACHY and ground based data

- SCIAMACHY
- ▲ DOAS am
- ▼ DOAS pm

NO₂ (mid latitudes)



Smallest SCIAMACHY NO₂ column within 500 km radius of station!

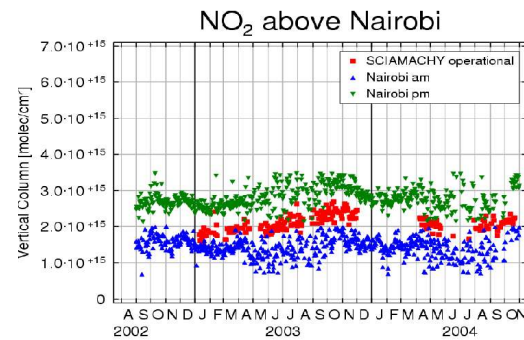
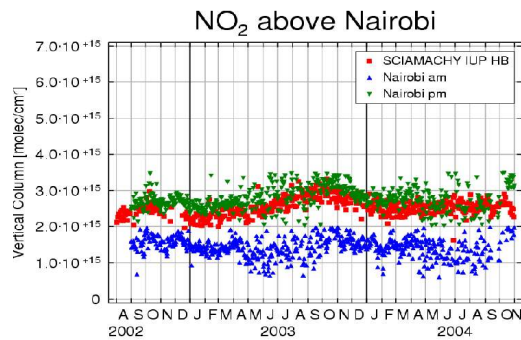
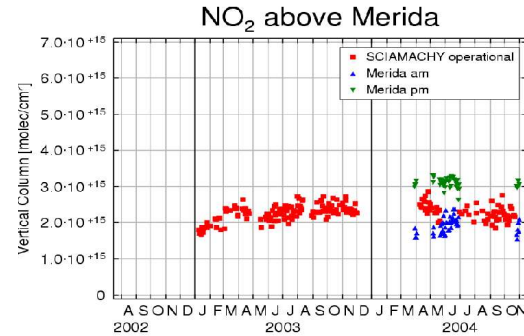
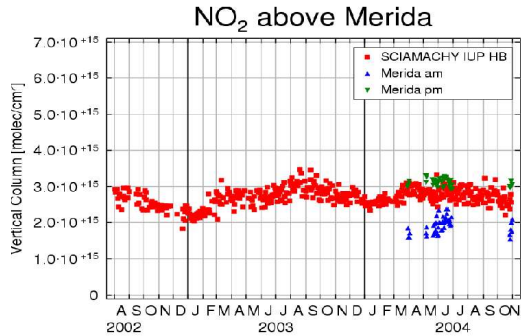
scientific

operational

- Offset to SCIAMACHY slant column is added
- SCIAMACHY NO₂ column within 500 km radius of station!
- Good agreement with scientific product if minimum VC is used

- SCIAMACHY
- ▲ DOAS am
- ▼ DOAS pm

NO₂ (Tropics)



scientific

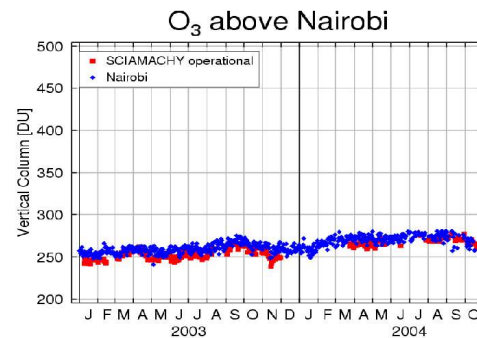
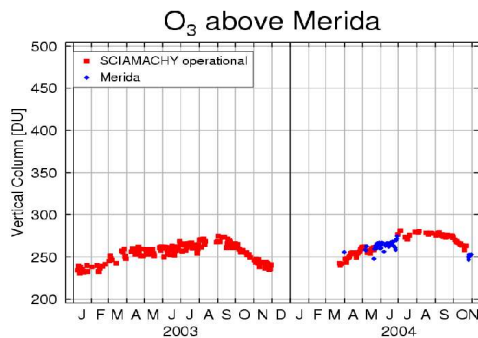
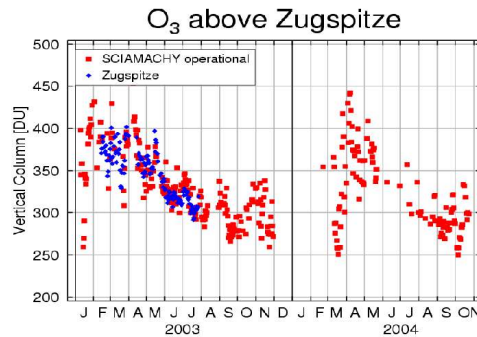
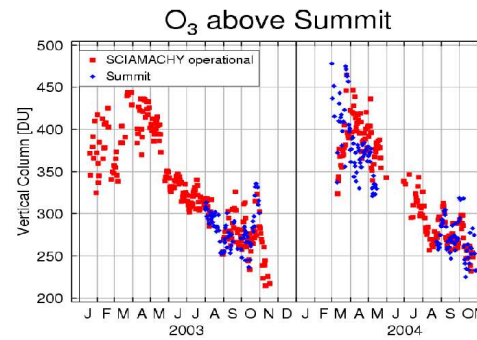
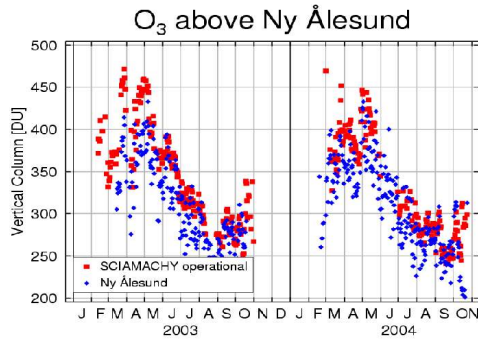
operational

- No significant seasonal trend
- Good agreement between SCIAMACHY and ground based data
- Offset to SCIAMACHY slant column is added

- SCIAMACHY
- ▲ DOAS am
- ▼ DOAS pm

O₃ (operational)

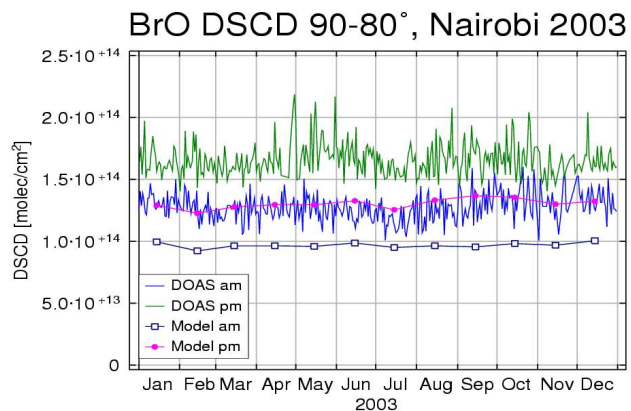
- Seasonal trend is good represented
- SCIAMACHY O₃ column within 500 km radius of station!
- Good agreement of absolute values



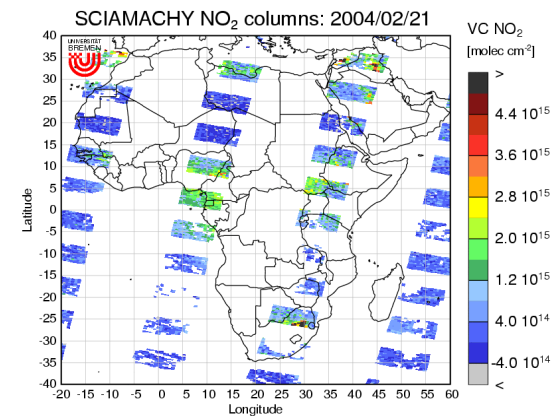
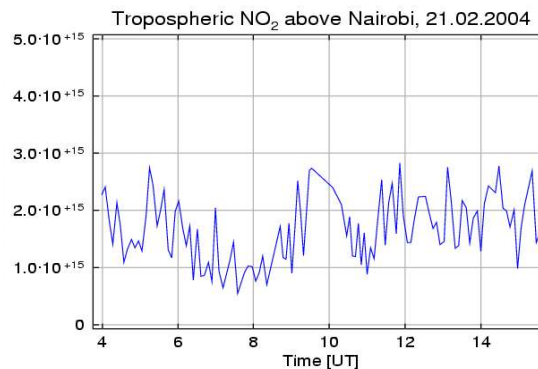
■ SCIAMACHY
▲ DOAS mean

Nairobi

Stratospheric BrO



Tropospheric NO₂



Summary

- 5 Ground-based UV/visible instruments from the BREDOM network have been operated to collect data for SCIAMACHY validation
- Validation of scientific NO₂ product shows excellent agreement at all stations (an offset of 2E15 molec/cm² is added)
- Validation of operational NO₂ and O₃ products shows scatter but nice agreement at all stations
- Seasonal and latitudinal variation is well represented
- MAX DOAS can be used to provide information about tropospheric NO₂

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