

16th SA/PAC Symposium
5 June 2003, St. Gallen, Switzerland

AMAXDOAS measurements and first results for the EUPLEX campaign

**Ping Wang, Marco Bruns, Andreas Richter, John P. Burrows (1)
Klaus-Peter Heue, Irene Pundt, Thomas Wagner, Ulrich Platt (2)**

(1) Institute of Environmental Physics, University of Bremen

(2) Institute of Environmental Physics, University of Heidelberg

Overview

- Scientific objective
- Instrument and measurement (previous presentation)
- Data analysis
- Results
- Comparison with GOME and SCIAMACHY
- Summary



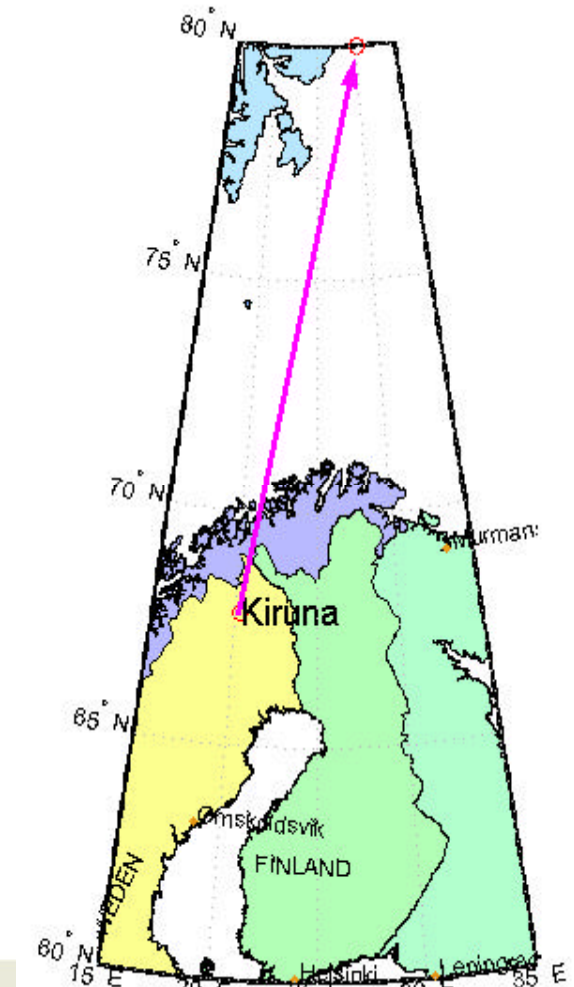
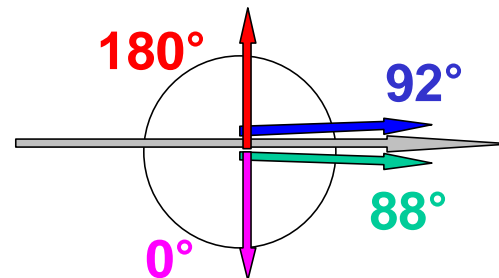
Scientific object

- Halon chemistry -- ozone loss – qualitative and quantitative
- Models underestimate the ozone loss rate, need more measurement data
- Match with other measurements
- OCIO is an indicator of ClO at $SZA < 92^\circ$
- Part of objective of EUPLEX campaign

AMAXDOAS: OCIO data analysis

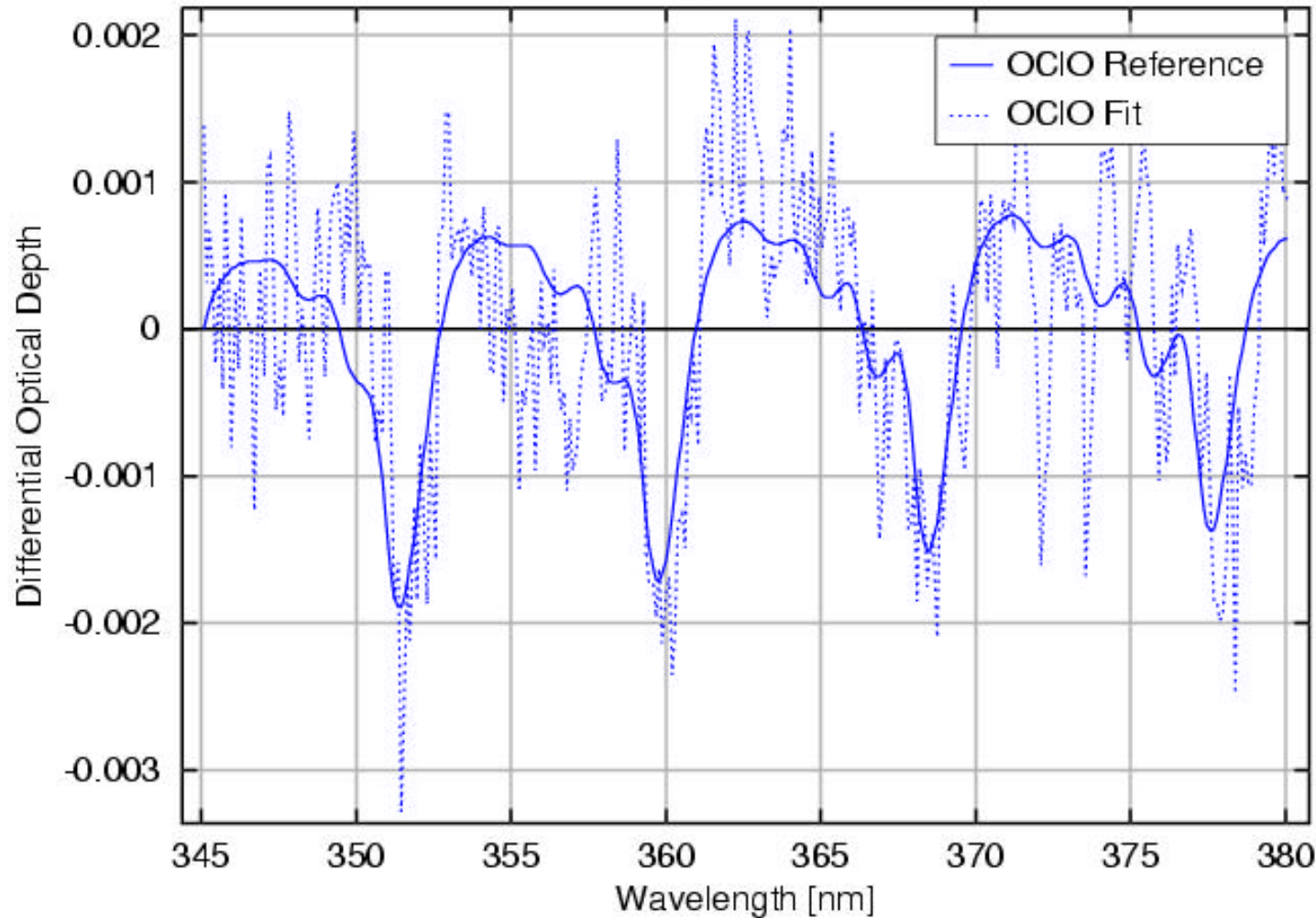
Differential Optical Absorption Spectroscopy (DOAS) method

- **Data** January 26th, 2003
Kiruna(67.82°N, 20.34°E) to the north east,
return at (80°N, 30°E)
- **Viewing directions**
180°, 92°, 88°, 0°.
Nadir 0°, flight direction 90°
- **Flight altitude 11km**



First results from EUPLEX campaign

File 030126_F.CA1, 09:27:28, SZA = 91.34°

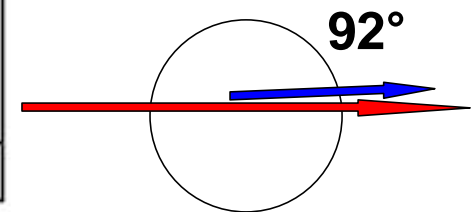


**A Nice
OCIO fit**

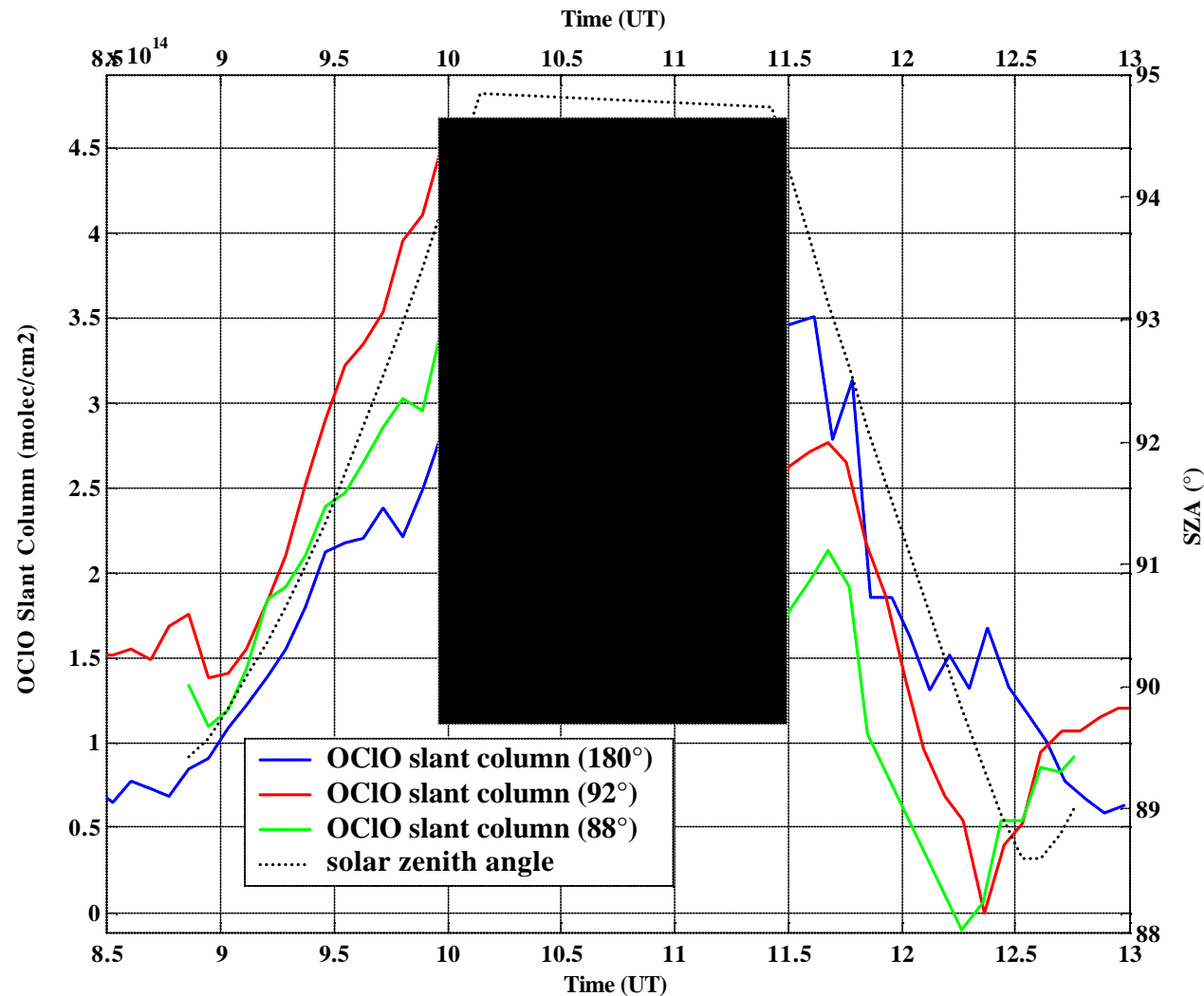
background
spectra

SZA = 89.6°

Viewing
angle 92°

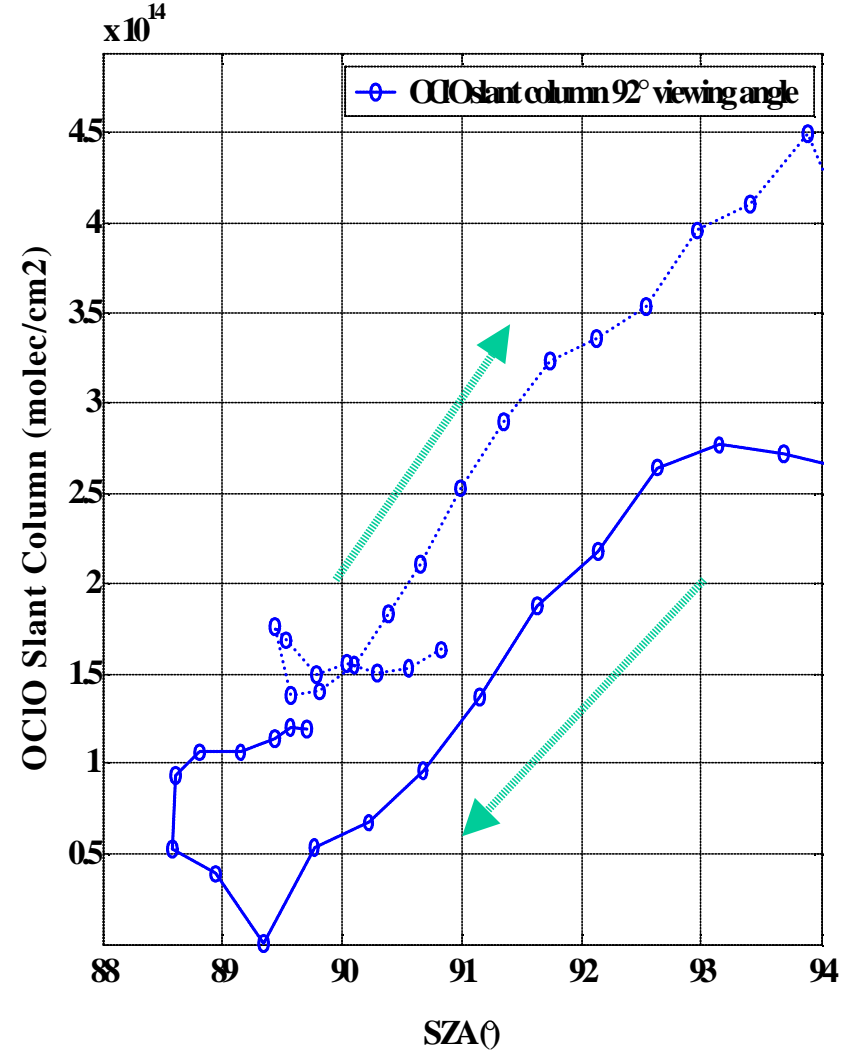
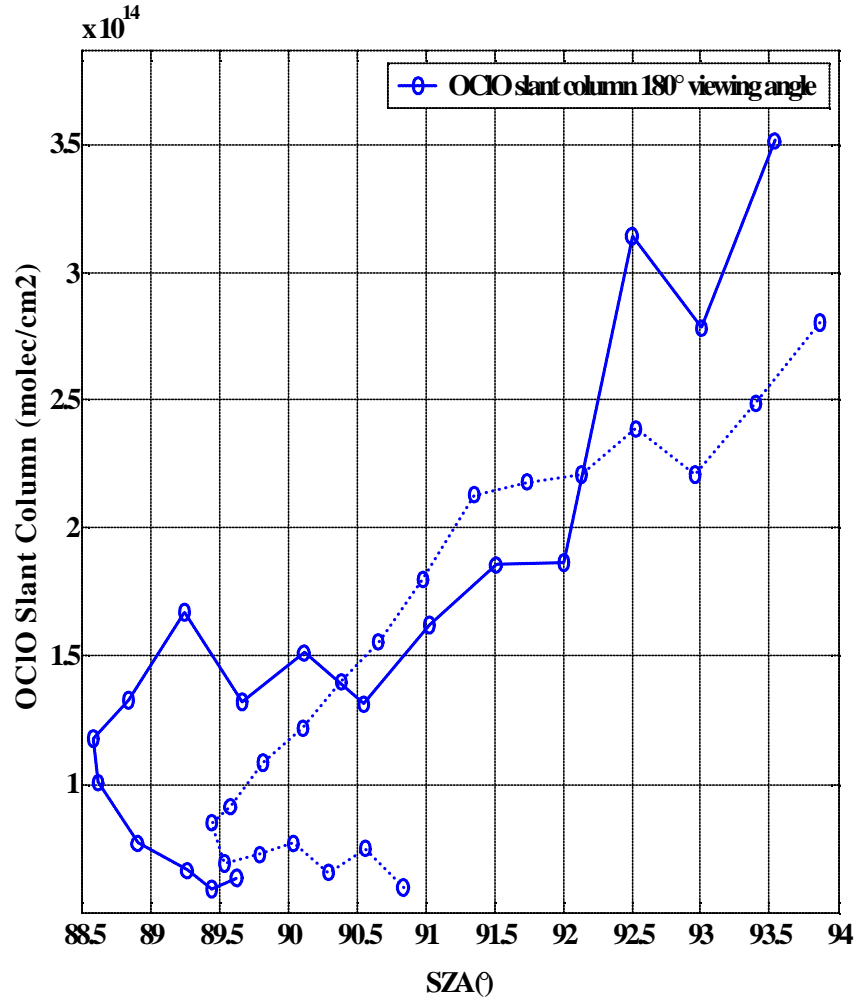


OCIO slant column 030126

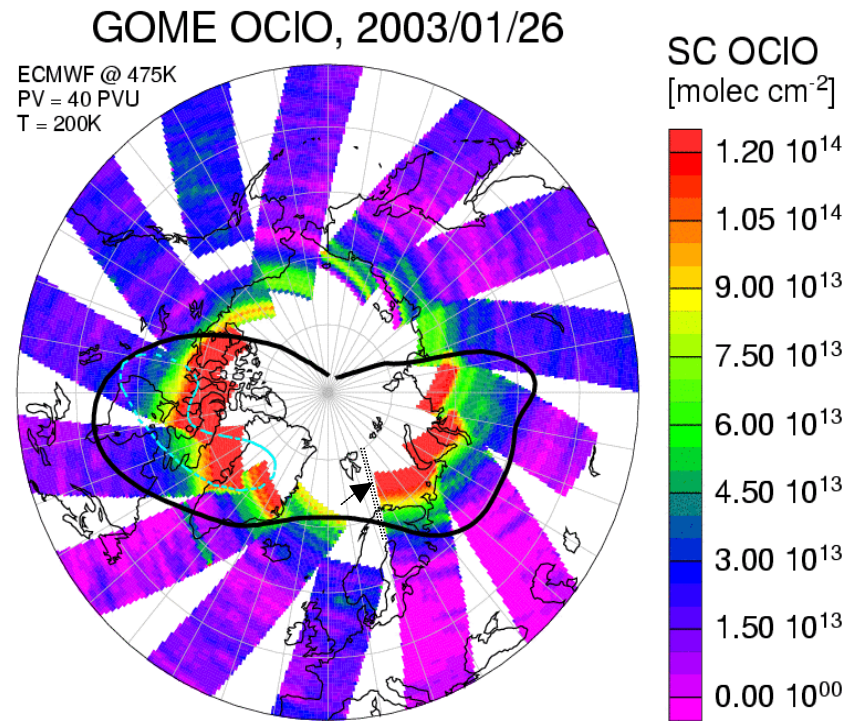
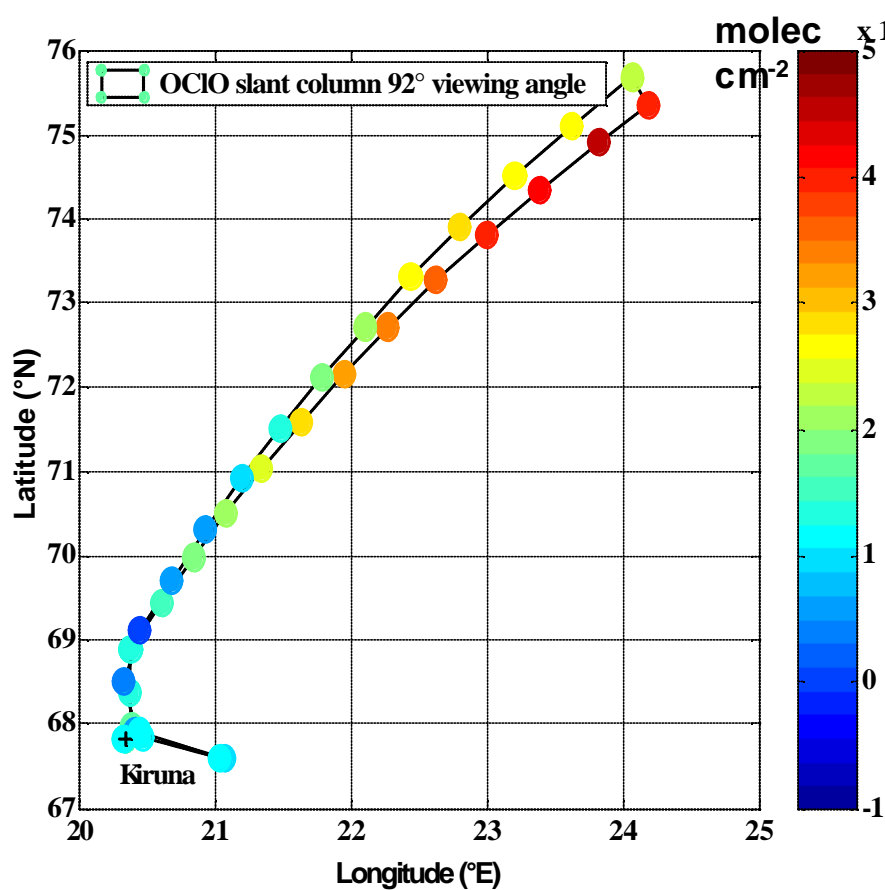


- OCIO slant columns increase with solar zenith angle
- On return flight OCIO slant columns smaller than during first part of flight
- OCIO SC **zenith** >
<
OCIO SC off-axis

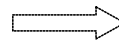
OCIO slant column 180°, 92° viewing angle



OCIO Slant columns AMAXDOAS -- GOME

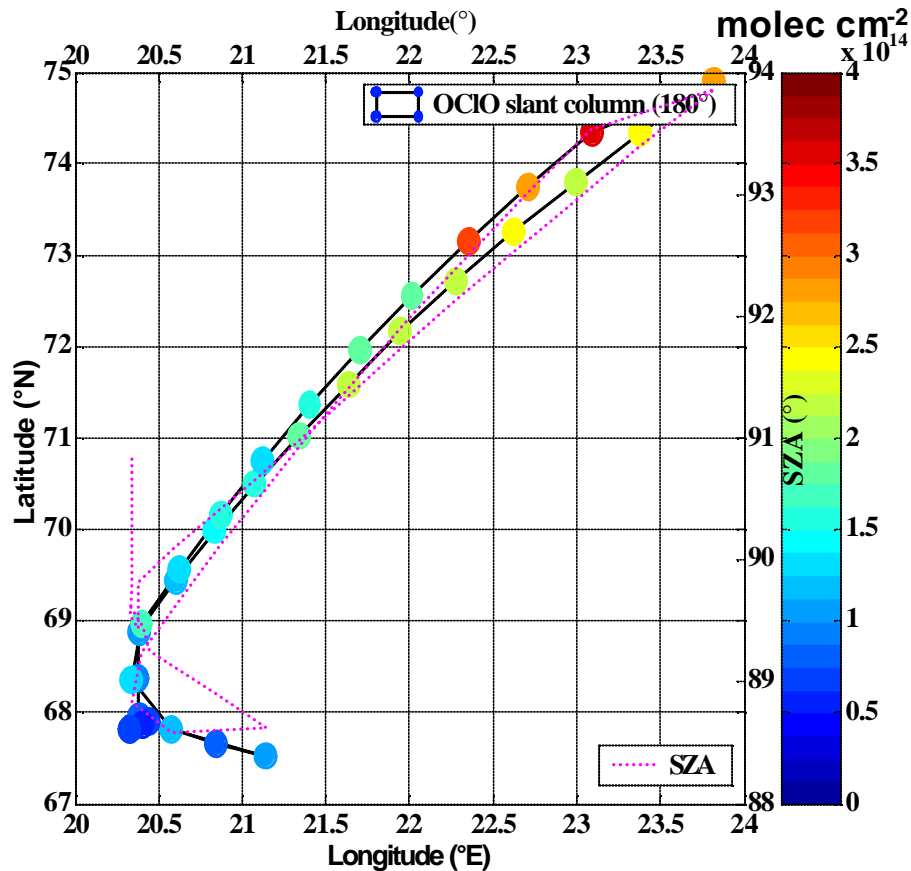


Return flight OCIO slant columns smaller than during first part of the flight?



Different solar zenith angle
 Different solar azimuth
 OCIO photolysis
 Go to / leave vortex

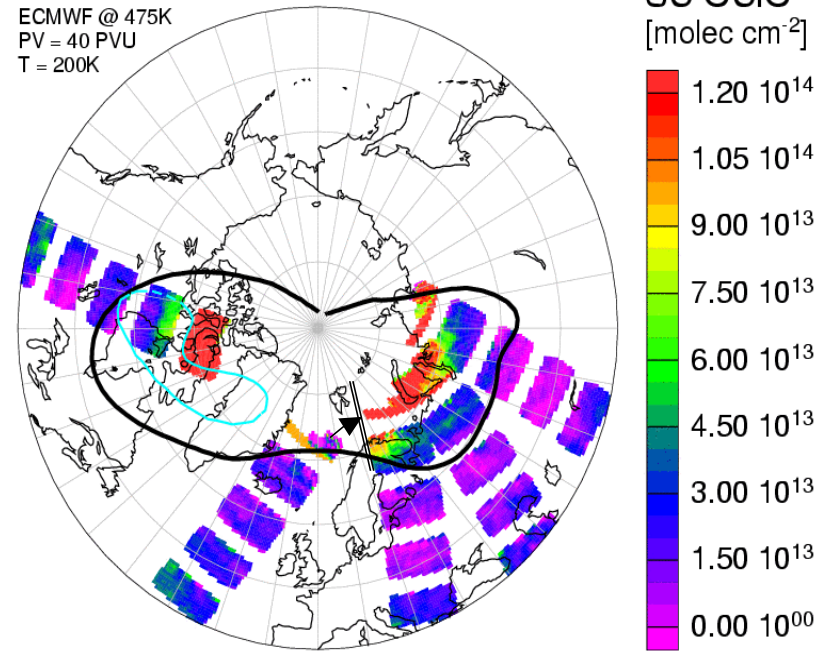
OCIO slant column AMAXDOAS -- SCIAMACHY



SZA: 90°, 70°N, 21.8°E,
 OCIO SC: 1.2~1.4 ? 10¹⁴ molec cm⁻²

SCIAMACHY OCIO, 2003/01/26

ECMWF @ 475K
 PV = 40 PVU
 T = 200K



SZA: 90°, 71.5°N,
 OCIO SC: 1.2 ? 10¹⁴ molec cm⁻²

Summary

- During the EUPLEX campaign, the AMAXDOAS detected OCIO , higher OCIO columns were found inside the vortex, and a strong increase with SZA was observed.
- Off-axis telescopes saw much higher OCIO when flying into the vortex and lower values on the way back whereas the zenith pointing telescope showed only a small difference between the two parts of the flight.
- Compare with GOME and SCIAMACHY OCIO slant columns close to the time and location of the Falcon underpass, the results are similar.
- The remaining differences are related to differences in solar zenith angle and the large horizontal gradients which make OCIO validation close to the vortex edge particularly difficult.
- Further analysis and evaluation of results from more flights will have to be performed to provide a more quantitative validation of the satellite measurements.