Existing Instruments and Data Quality

E. Kyrölä and P. Bernath

Existing European Instruments

Excellent current situation:

- GOME on ERS-2
- GOMOS, MIPAS and SCIAMACHY on ENVISAT
- OMI on Aura

Third party

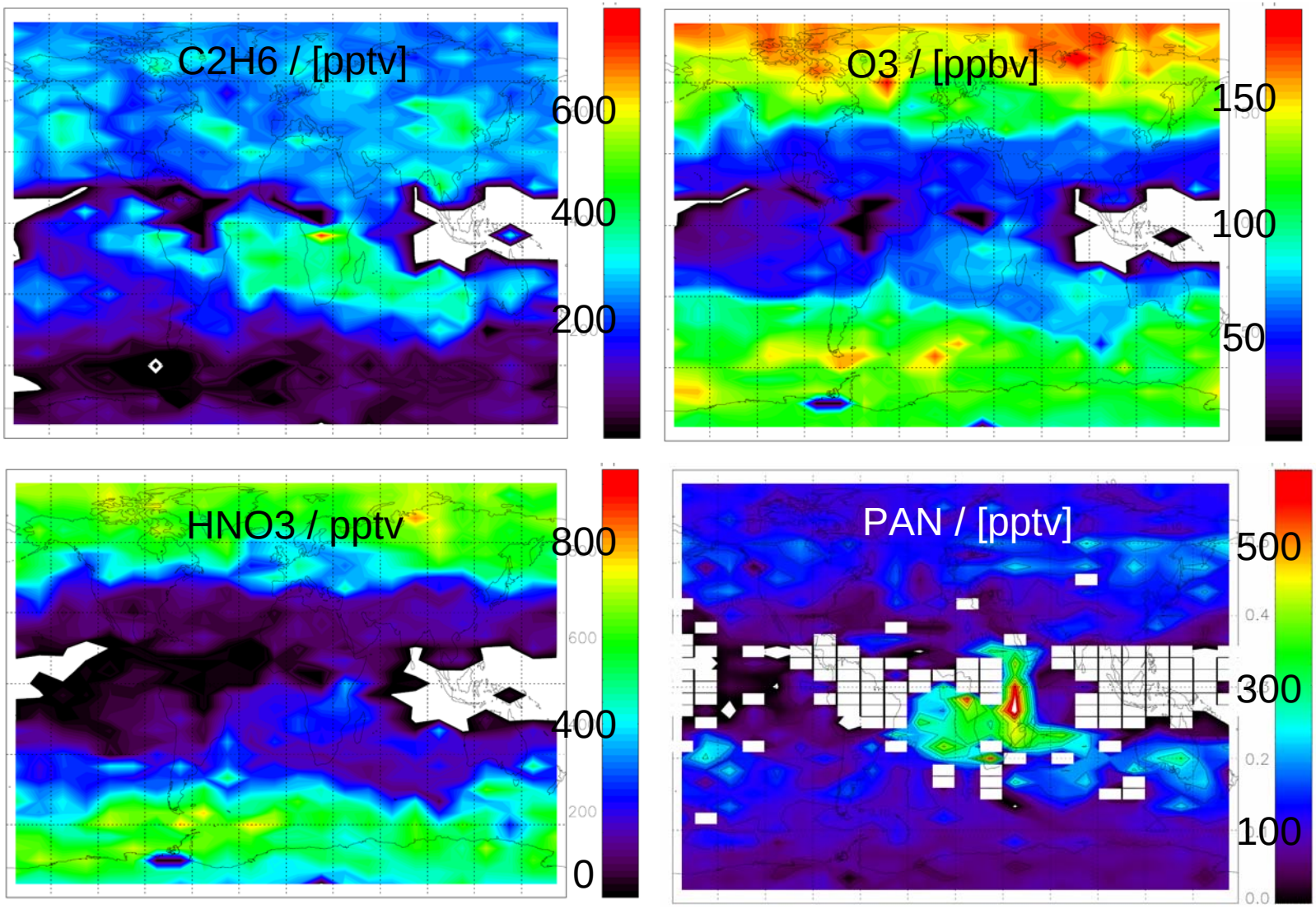
- ACE-FTS and MAESTRO on SCISAT-1
- SMR and OSIRIS on Odin (in future, we hope)
- OCO (in future)

1. Future limb data gap

- Limb instruments for atmospheric composition have a data continuity problem
- Successors to GOMOS, MIPAS, ACE, SCIAMACHY, etc., are not yet secure
- Limb instruments have been very successful and could be used for operational “chemical weather forecasting” (e.g., MIPAS)

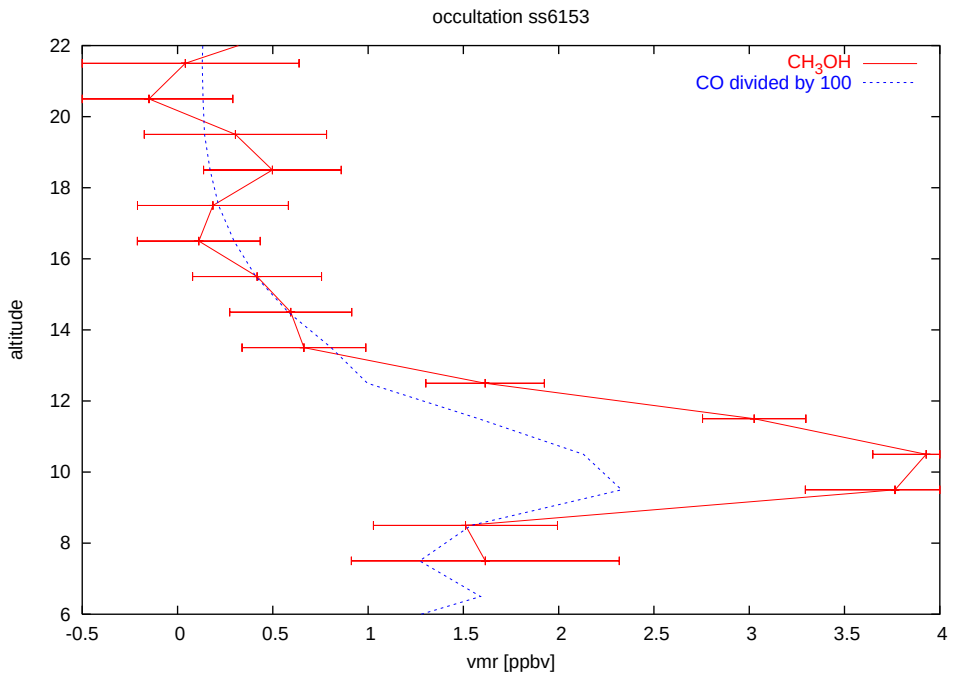
Biomass burning observed by MIPAS

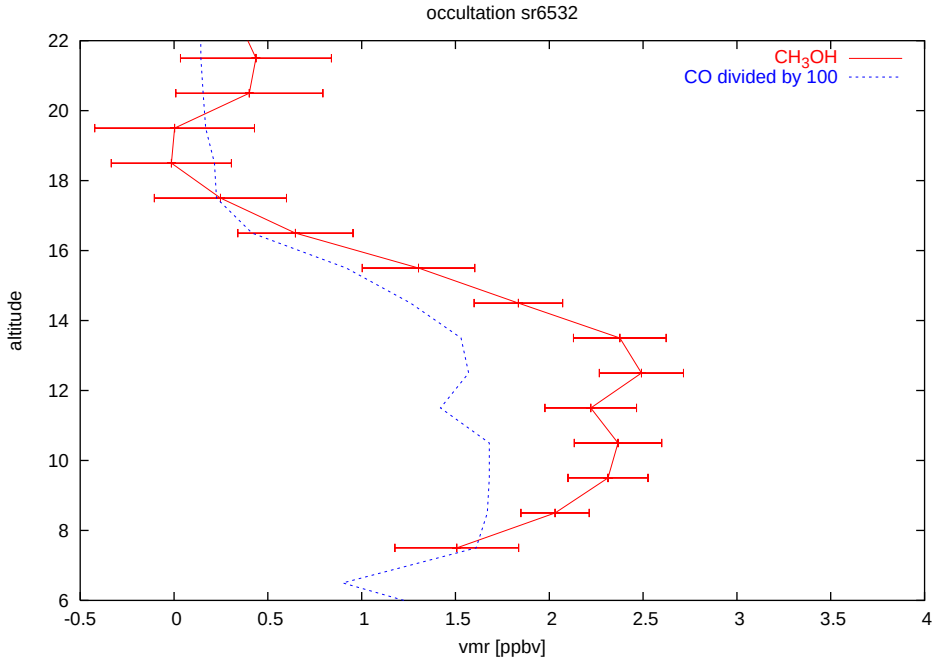
MIPAS observations of C_2H_6, O_3, HNO_3, and PAN at 275 hPa,
21 Oct – 14 Nov 2003 (Stiller et al.)



Methanol Retrieval Results

- Enhanced profiles in biomass burning plumes
- CH_3OH peak slightly higher than CO peak





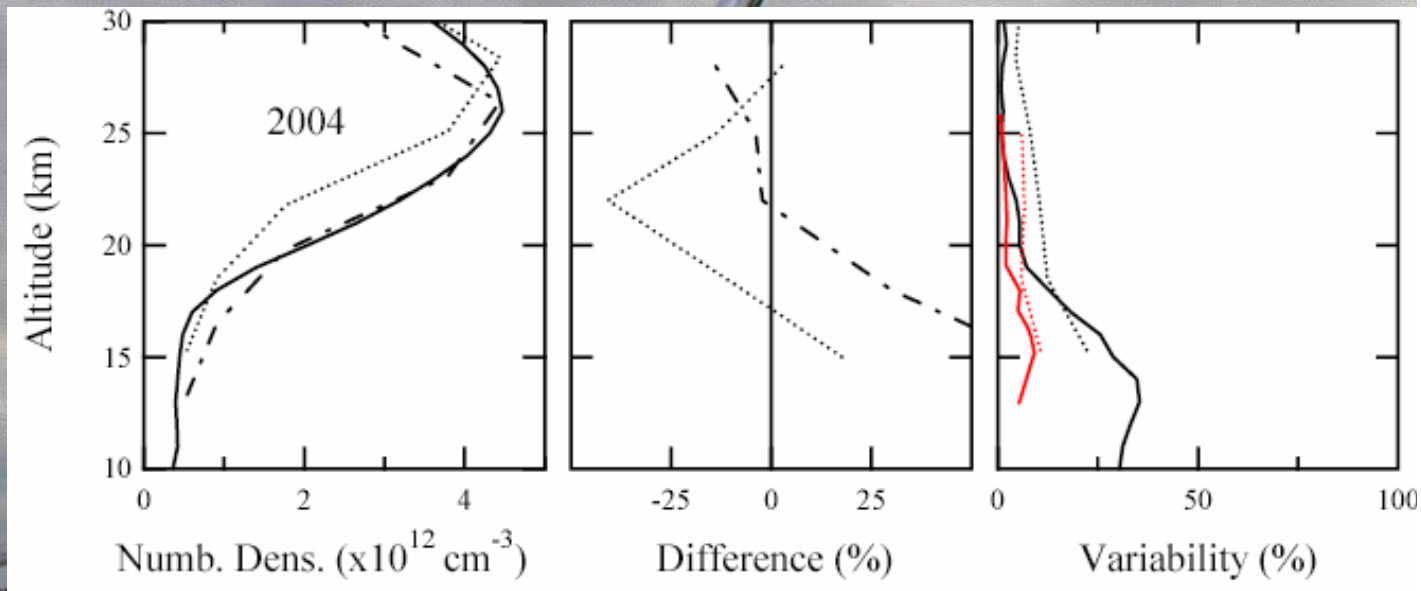
2. More cal/val before and after launch

- Many instruments have problems with (for example) pointing knowledge; additional testing and modelling with scientists (not just engineers in companies) before launch would be desirable
- After launch more ESA support for ground-based, balloon-borne and other satellite validation activities

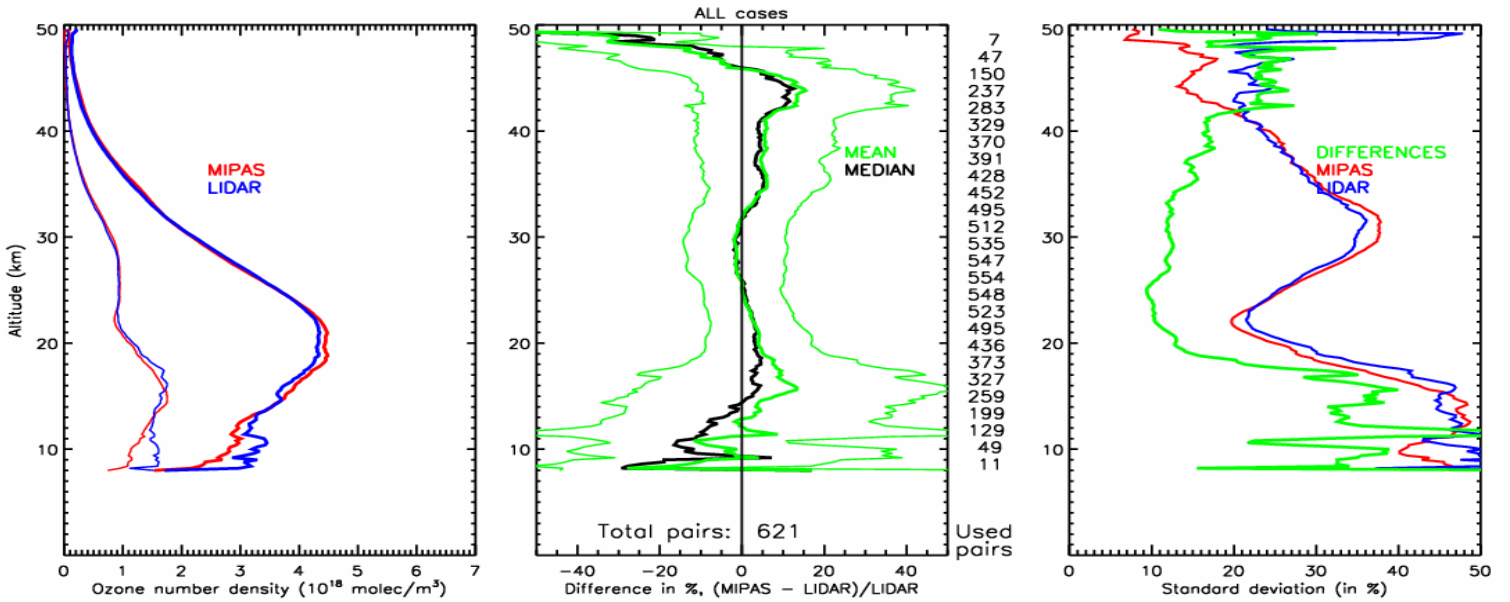
Evaluation of ozonesondes, HALOE, SAGE II, SAGE III, ODIN-OSIRIS and SMR, and ENVISAT-GOMOS, -SCIAMACHY and MIPAS Ozone profiles in the tropics from SAOZ long duration balloon measurements

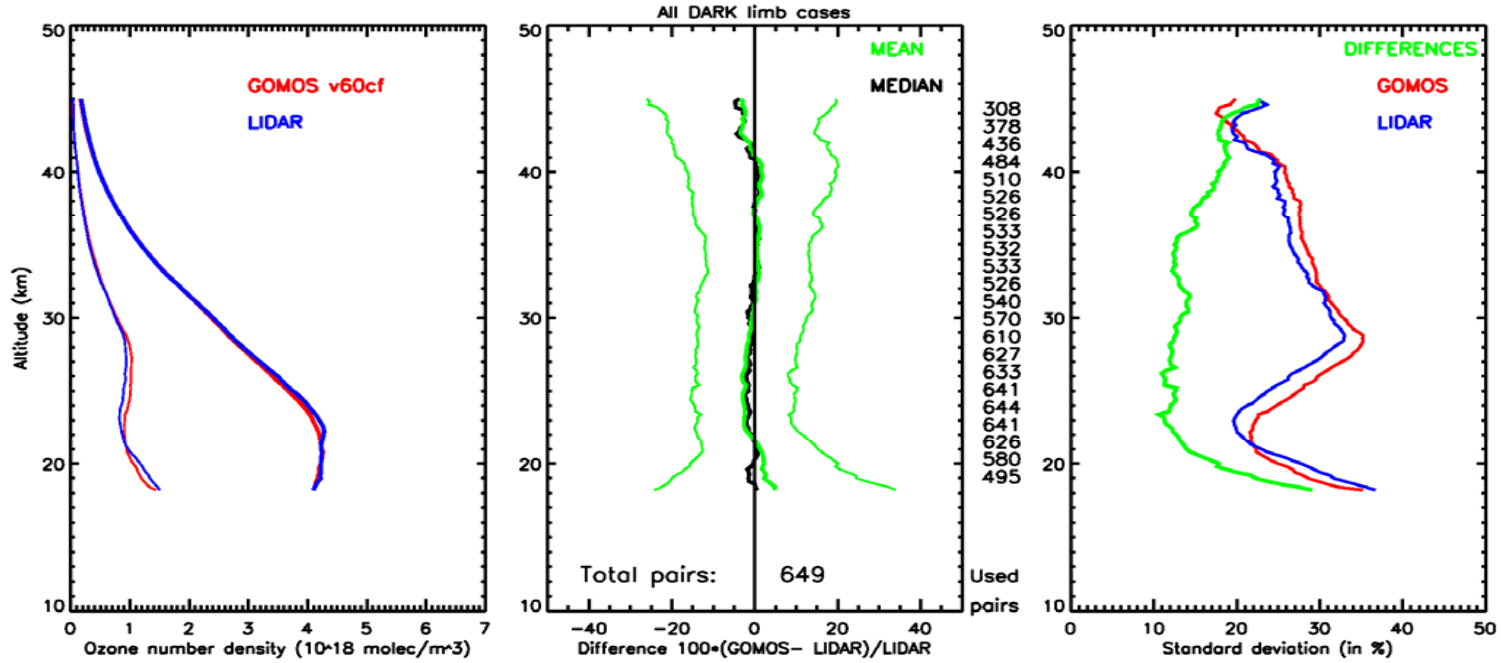
J. P. POMMEREAU, F. BORCHI, M. PINHARANDA
CNRS Service d'Aéronomie, BP3, Verrières le Buisson, France

SCIAMACHY
Limb, near UV



GOMOS and MIPAS Ozone

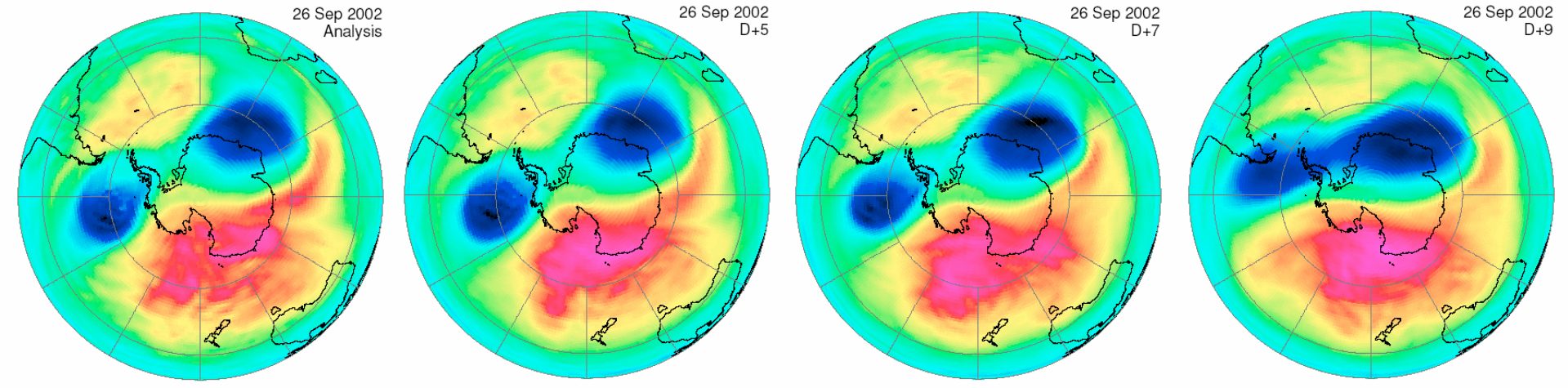




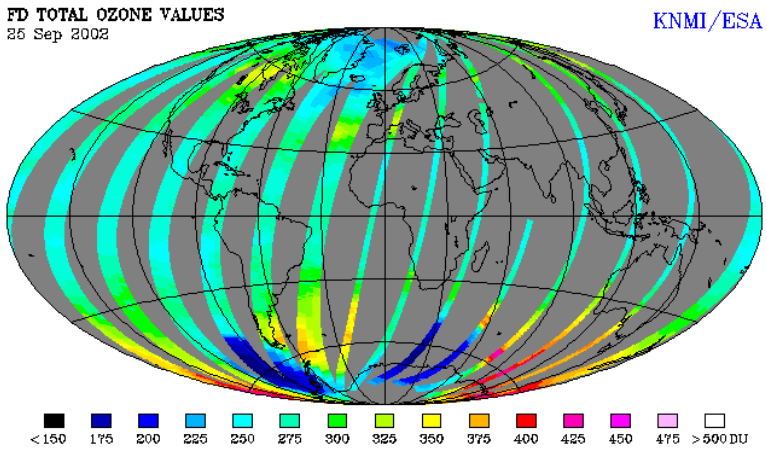
3. Integration of models

- Atmospheric modelling needs to be better supported and integrated into mission design and used more for data assimilation, e.g., chemical weather forecasting

Vortex breakup, 26 September 2002



analysis 5-day forecast 7-day forecast 9-day forecast

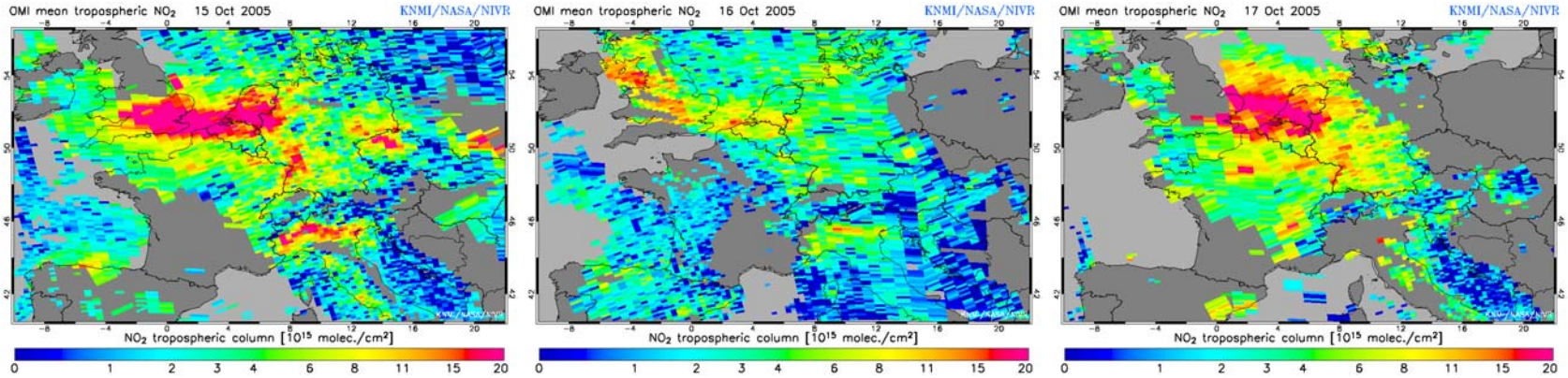


26 September 2002
based on GOME

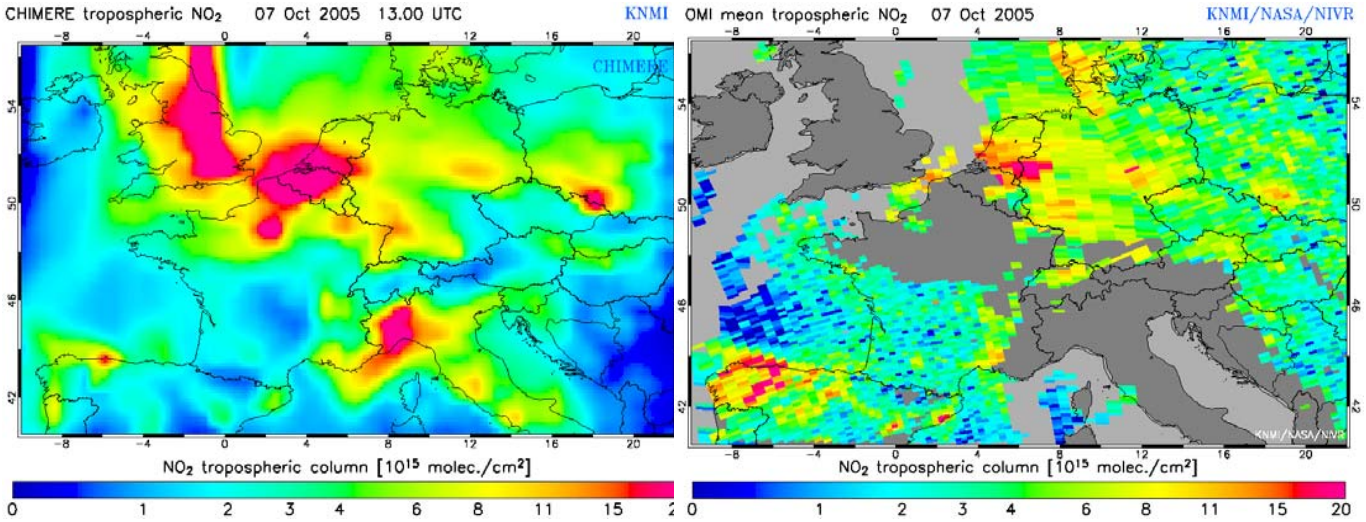
H. Eskes et al., J.Atmos.Sci. 62, 812, 2005

OMI Tropospheric NO_2 Near Real Time service

KNMI websites : www.knmi.nl/omi and www.knmi.nl/temis

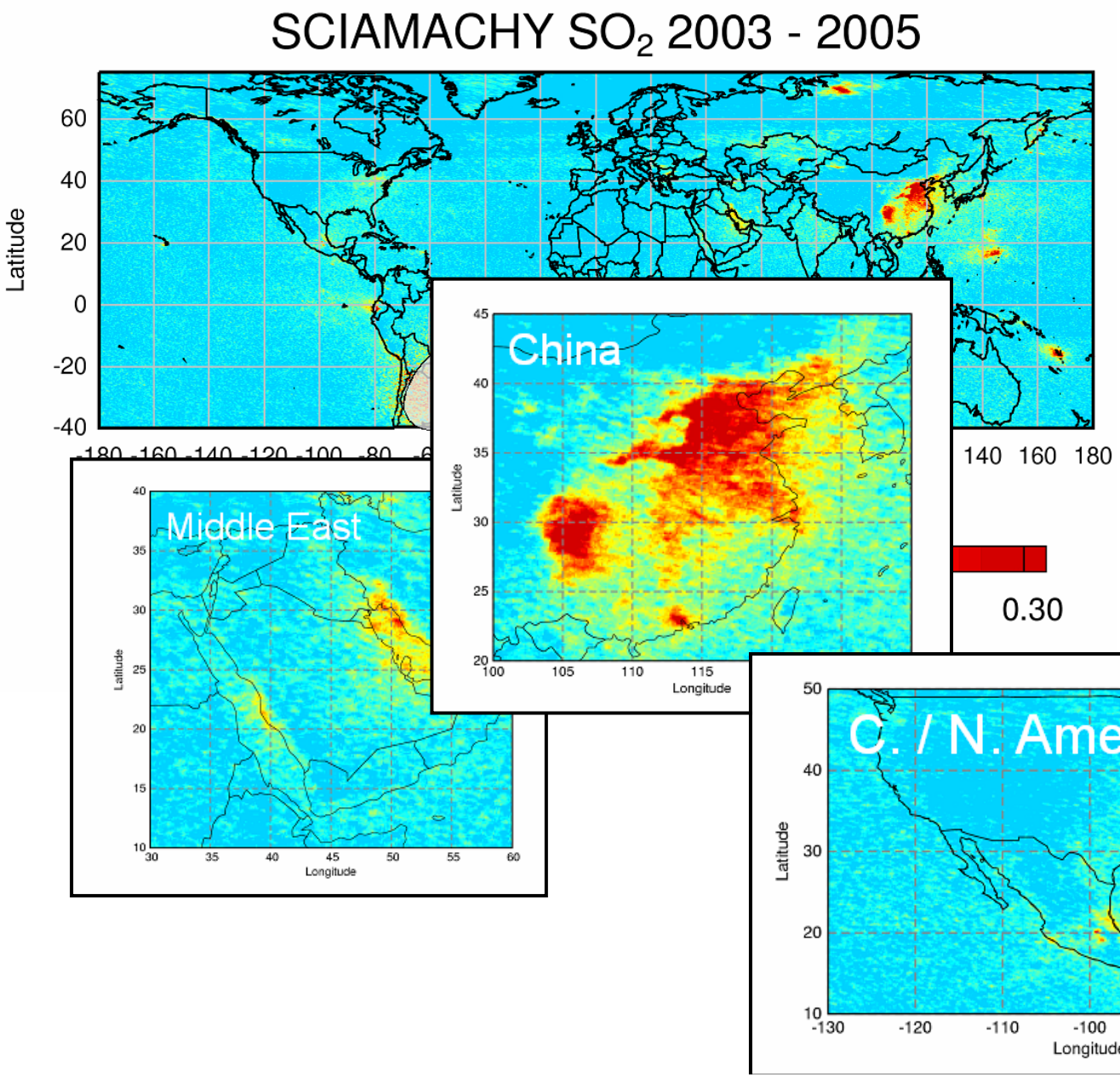


Saturday 15 October Sunday 16 October Monday 17 October



Boersma,
Eskes,
Avander,
Veefkind,
Blond…

Measurements of tropospheric SO_2

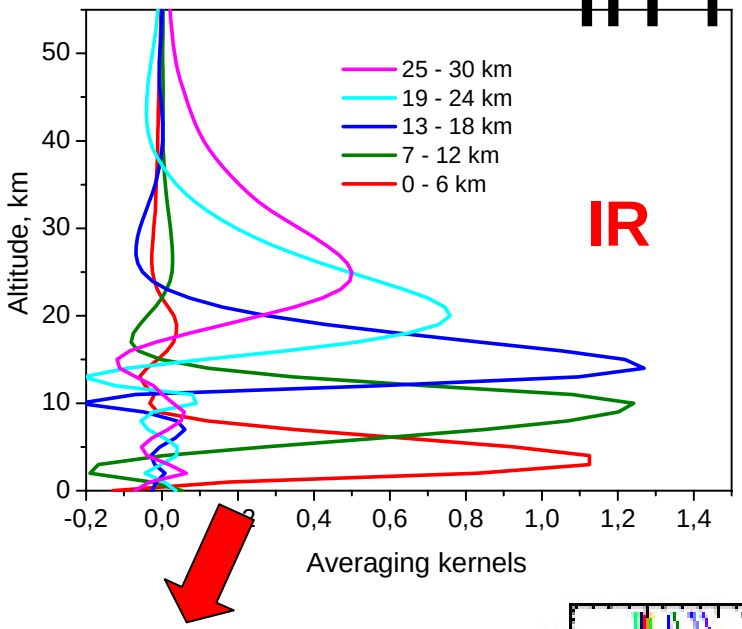


- global observations of SO_2
- volcanic sources
- anthropogenic sources:
  - •coal burning
  - •oil industry
  - •smelting
- much improved spatial resolution compared to GOME

4. Retrieval development

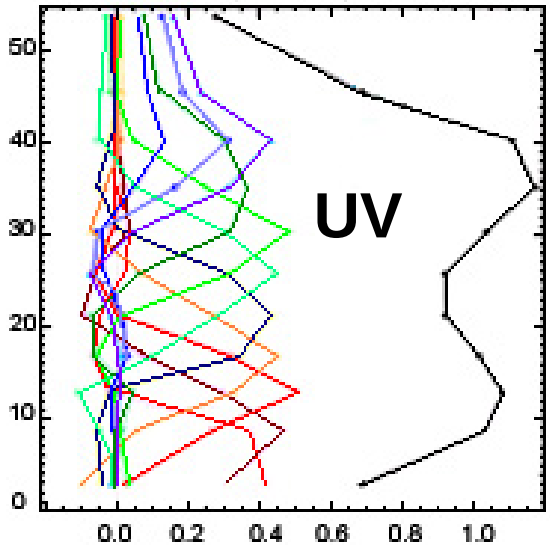
- More work on retrievals needed, particularly joint retrievals using two or more instruments, for example combining limb and nadir
- More work on spectroscopic data, and this new data needs to be shared and made public

Tropospheric Ozone in Nadir (Flaud)

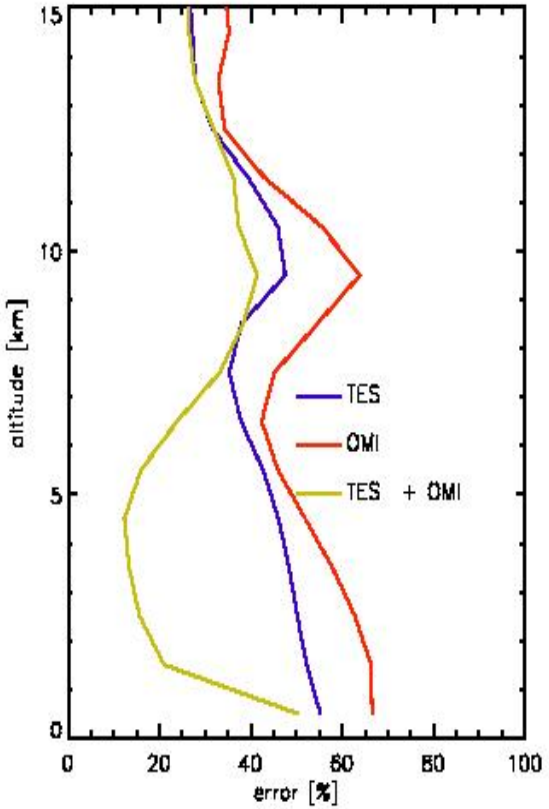


3/4 independent points

column



Reduced errors when IR + UV



5. Improved data access

- ESA needs to make data more easily available on the web (more efficient and more accessible)

Summary

1. Future limb data gap
2. More cal/val before and after launch
3. Integration of models
4. Retrieval development
5. Improved data access