SCIAMACHY ozone column retrieval and the 2005 ozone hole

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Pepijn Veefkind, Johan de Haan and Ellen Brinksma

Topics:

- SCIAMACHY ozone column retrieval at KNMI: the TOSOMI algorithm
- Ozone hole 2005

SCIAMACHY retrieval, validation, assimilation

Eskes et al., Atmos. Chem. Phys. Discuss, 5, 4429-4475, 2005

TOSOMI DOAS algorithm

Based on the OMI-DOAS operational algorithm (P. Veefkind)

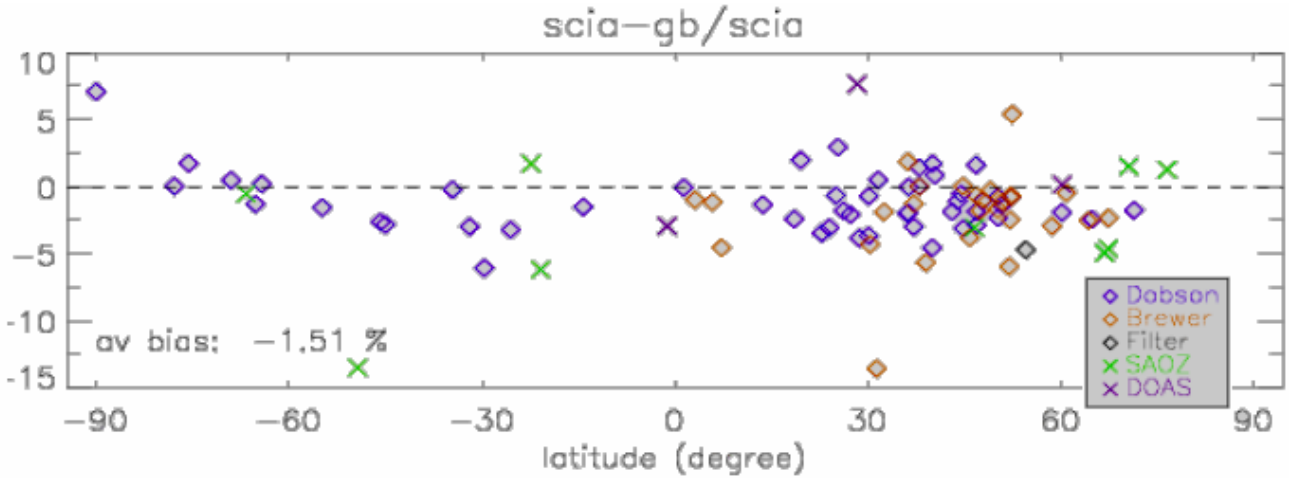
- Implementation for GOME
  TOGOMI - P. Valks
- Implementation for SCIAMACHY + FRESCO
  TOSOMI - H. Eskes and R. van der A

Innovations compared to e.g. GOME Fast Delivery, vs 3

- New treatment of Raman scattering (J. de Haan)
- Empirical air-mass factor approach
- TOMS v8 ozone profile data base
- Radiative transfer improvements
- ECMWF temperature profiles

Tosomi vs Brewer, Dobson …

World-wide validation for 2 years of SCIA-Tosomi ozone columns (Ellen Brinksma)



Main conclusions:

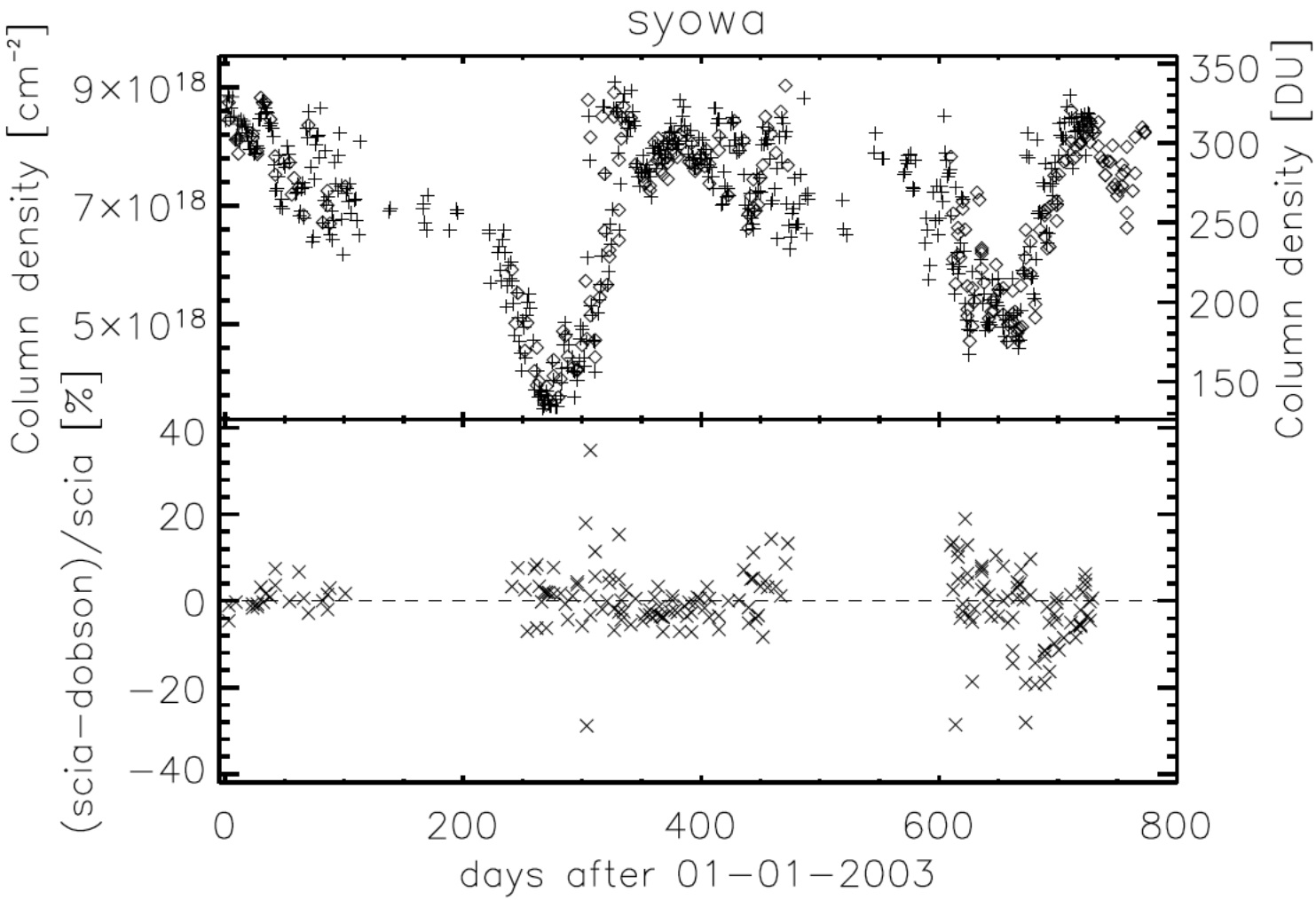
- Tosomi 1.5% lower than ground based
- RMS about 5%
- No clear geographical location or seasonal dependence !
- Stable product

Tosomi vs Brewer, Dobson …

Dobson

Syowa

Antarctica

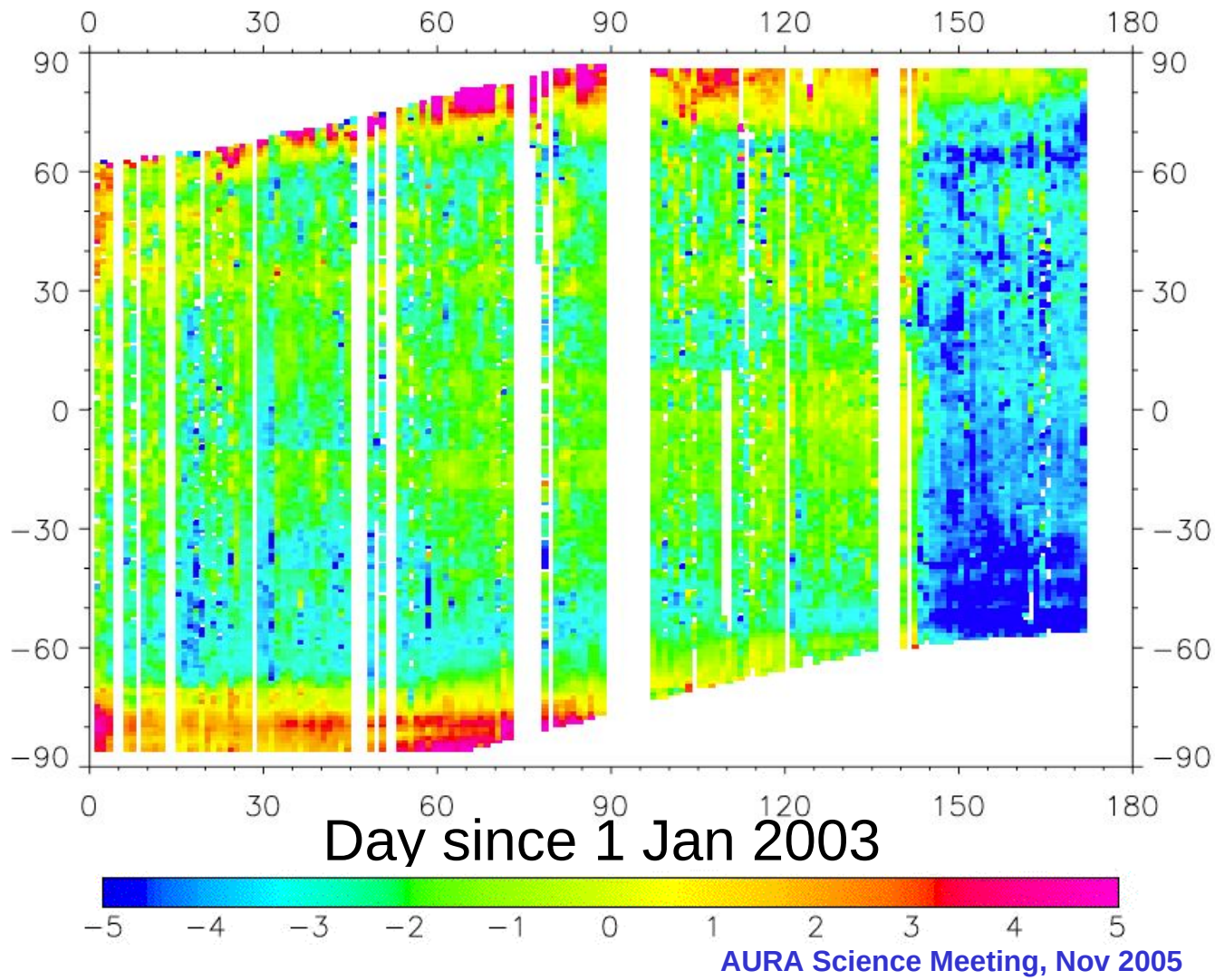


Tosomi vs GOME GDP-4

Good agreement GDP-4 and Tosomi

High SZA shows differences algo's

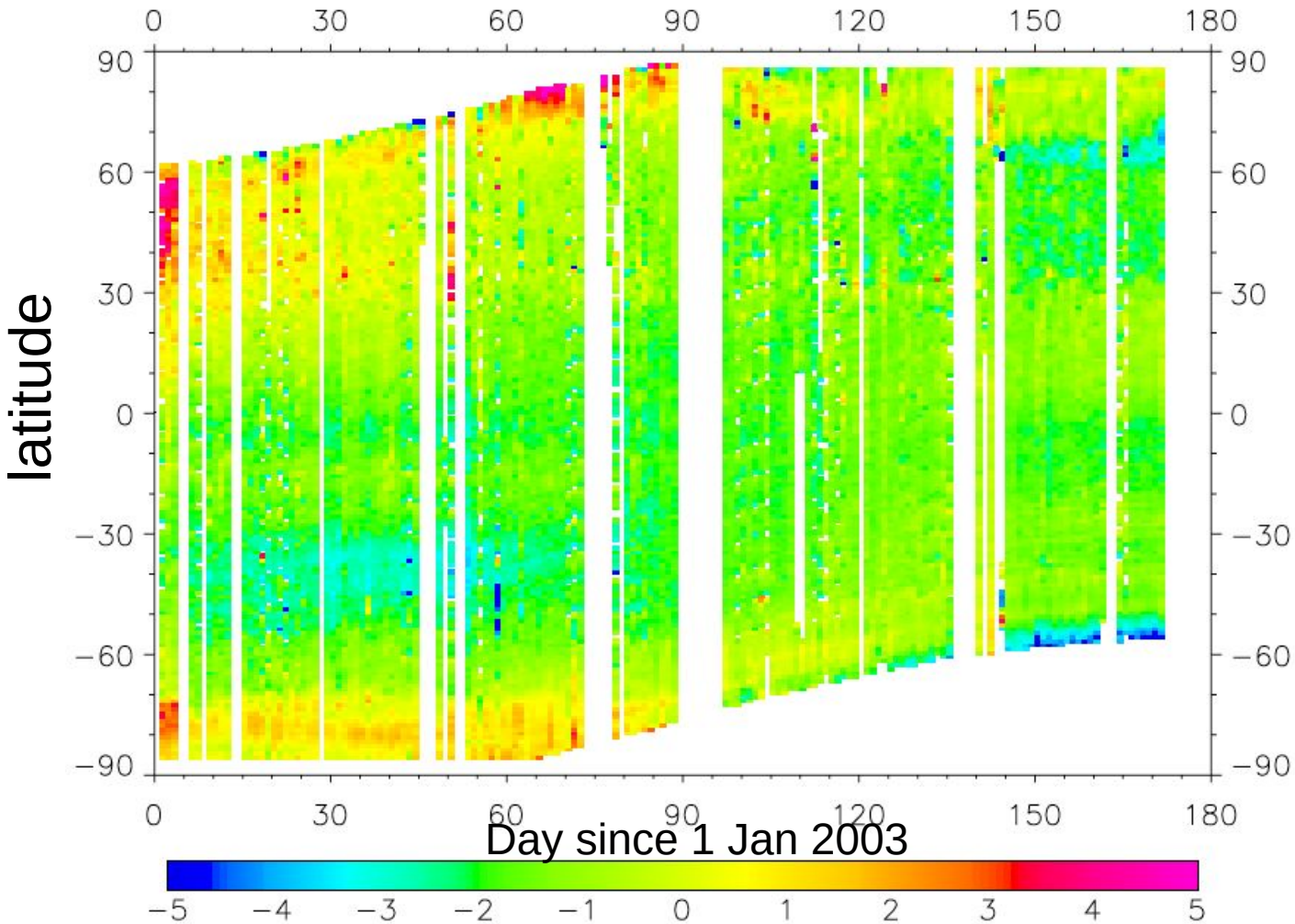
After day 140: Offset due to GOME GDP-4



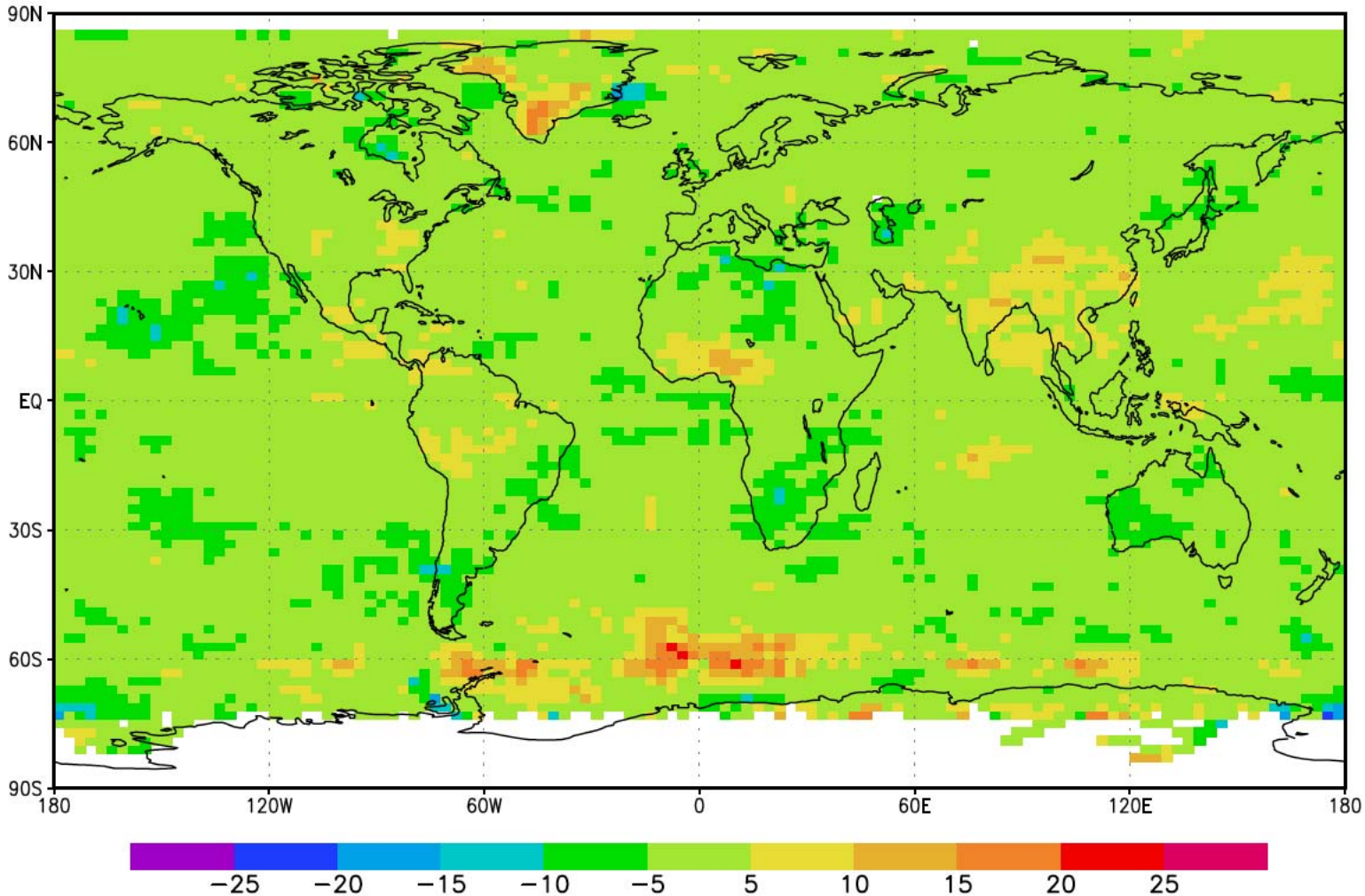
Tosomi vs GOME Togomi

Variations
small
RMS 0.7%
Bias -1.3%

TOSOMI,
TOGOMI
and
GDP-4
in good
agreement



Tosomi vs assimilation

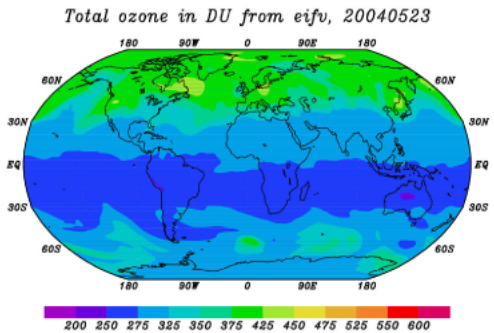


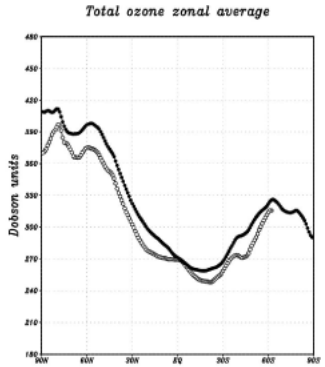
ECMWF: Assimilation of SCIAMACHY-TOSOMI

No SCIA

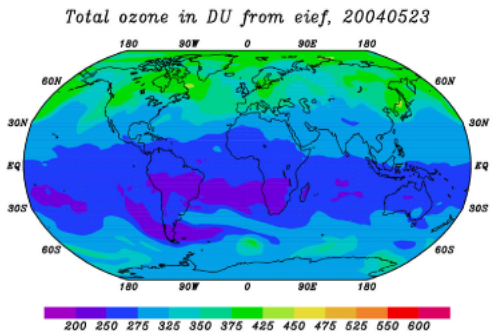
With SCIA

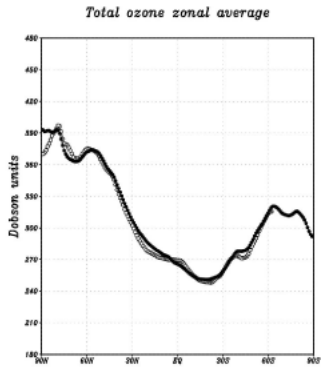
TOMS

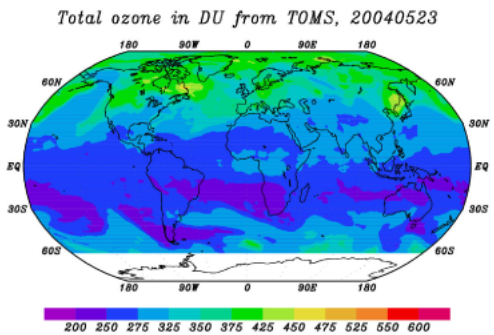


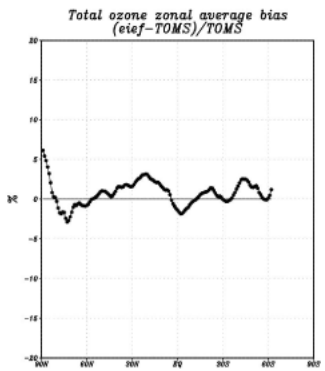


23 May 2004









Antje Dethof

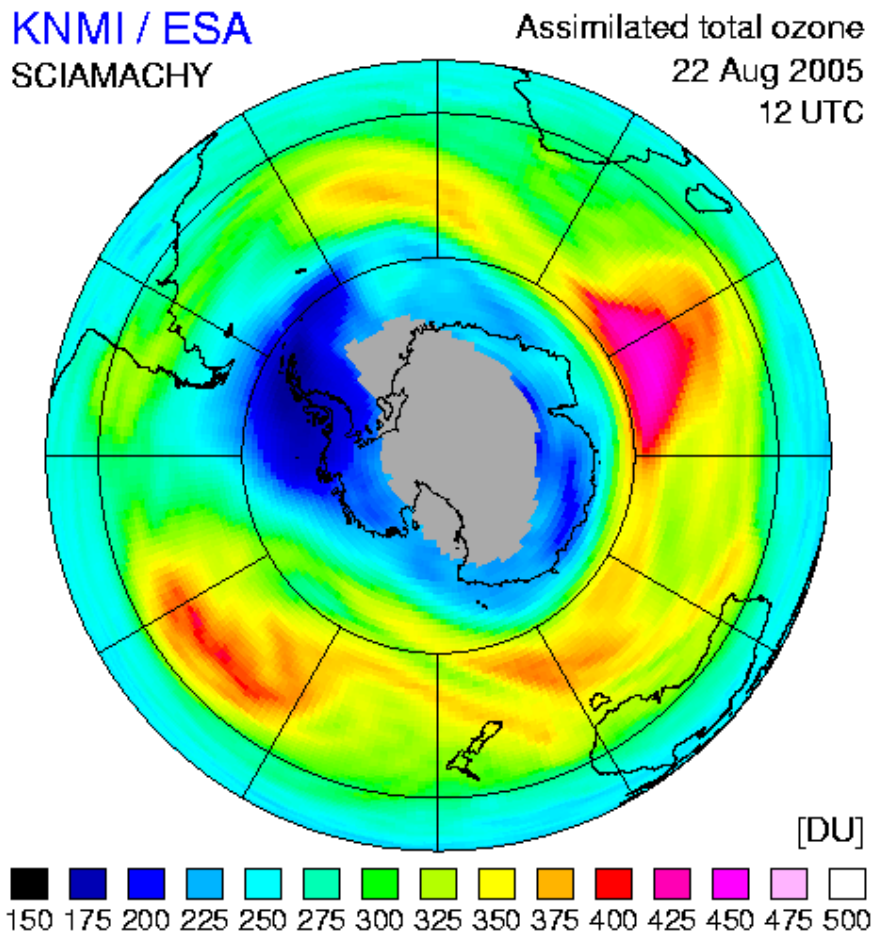
Ozone hole 2005

Operational ozone data assimilation since 2000, available on:
www.temis.nl
www.gse-promote.org

August 2005: very early start of ozone hole

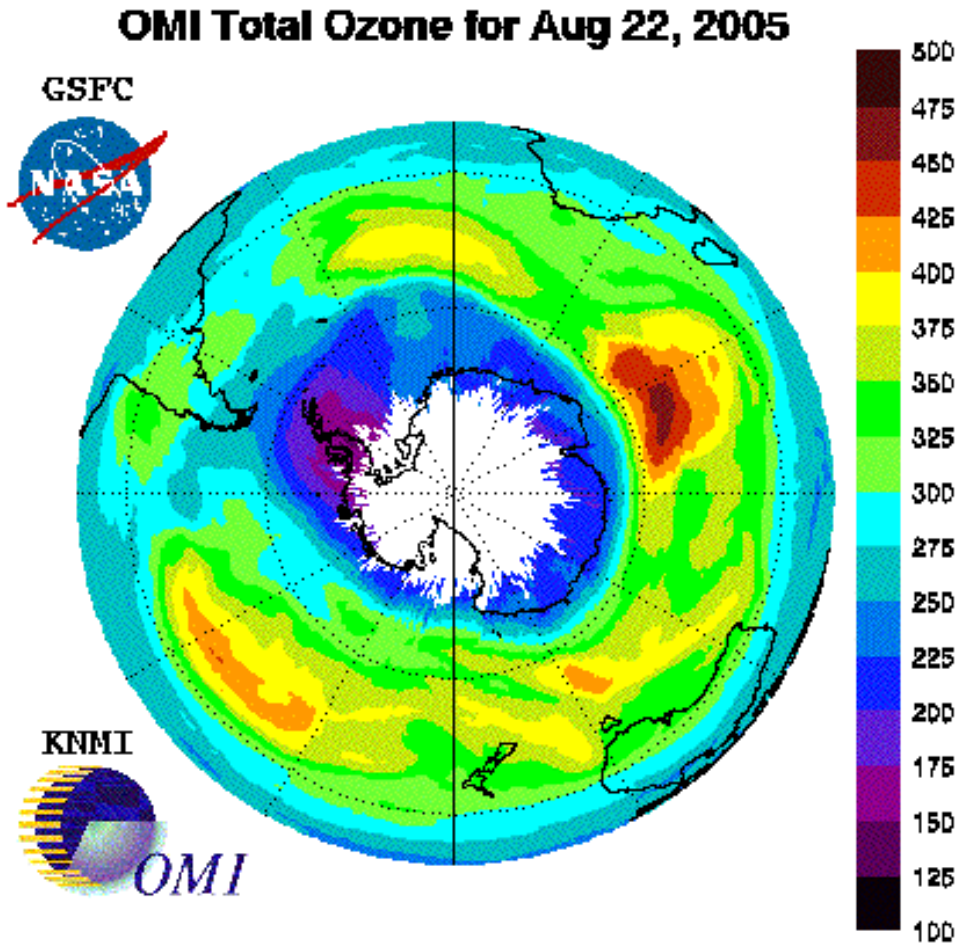
SCIAMACHY
assimilation

(grey:
large analysis error)

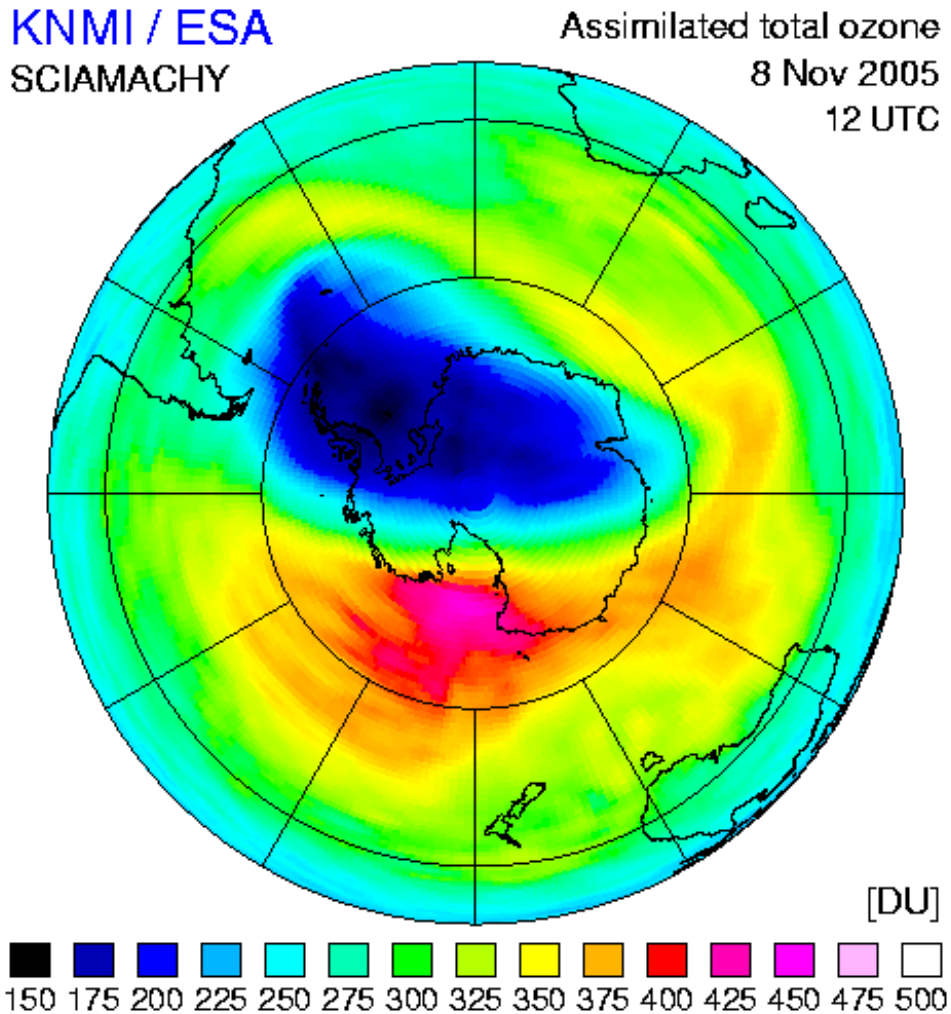


August 2005: very early start of ozone hole

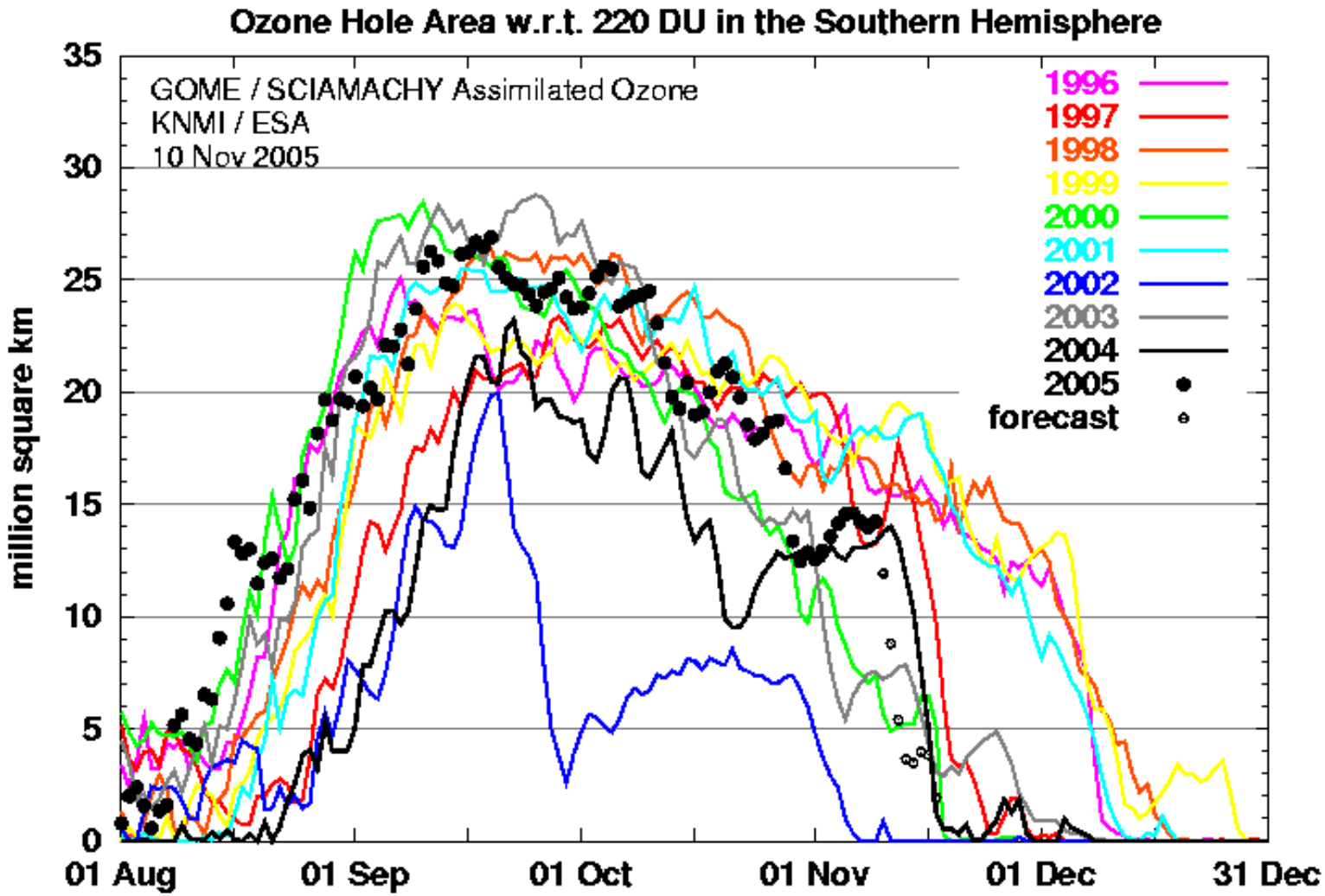
As seen by OMI ...



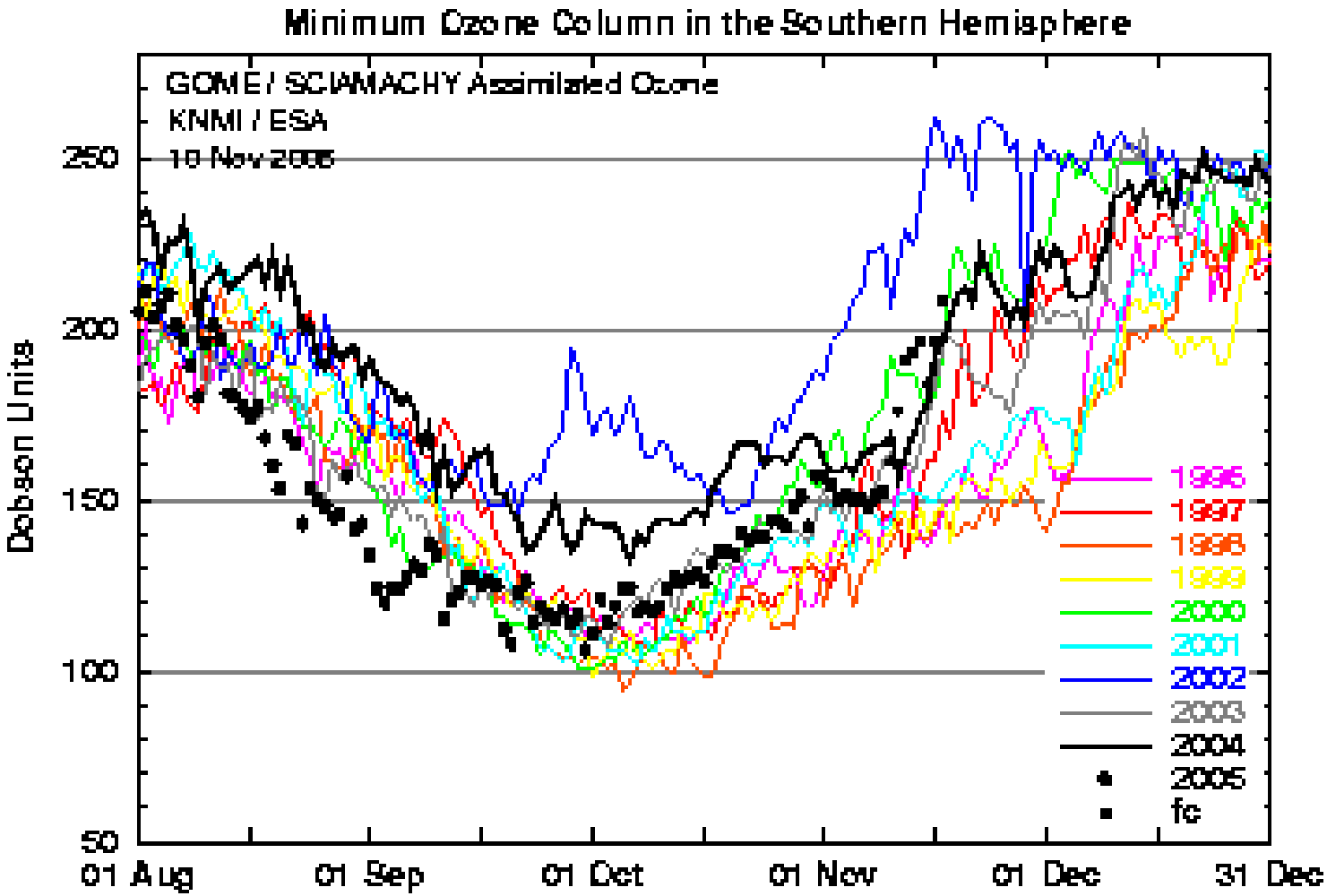
8 November 2005



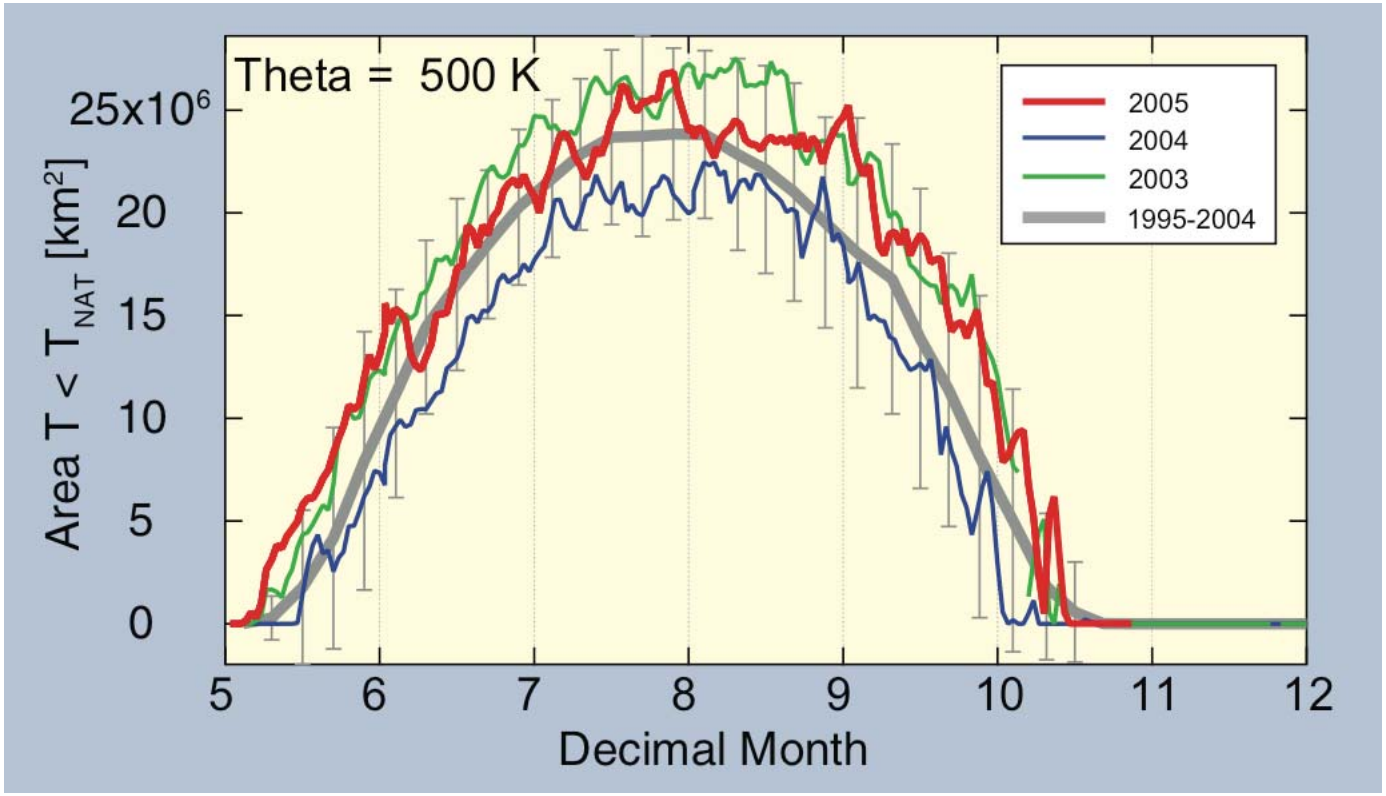
Ozone hole area, 10 Nov 2005



Ozone minimum



Temperature (ECMWF)



From WMO ozone bulletin #5

In summary …

Total ozone columns from SCIAMACHY form:

- stable and accurate product;
- useful extension of the GOME period …
- … and prequel for OMI;
- available on www.temis.nl