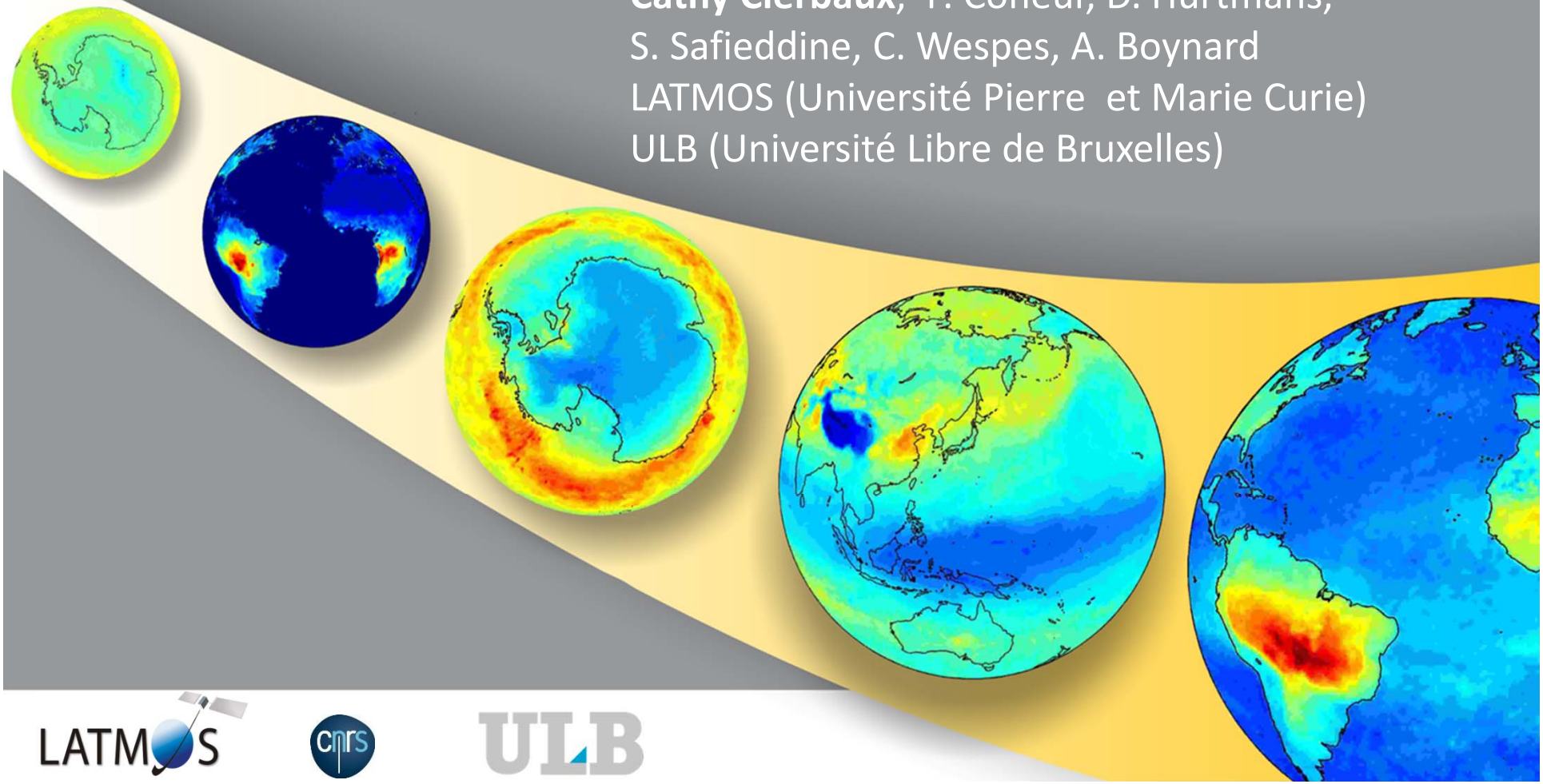
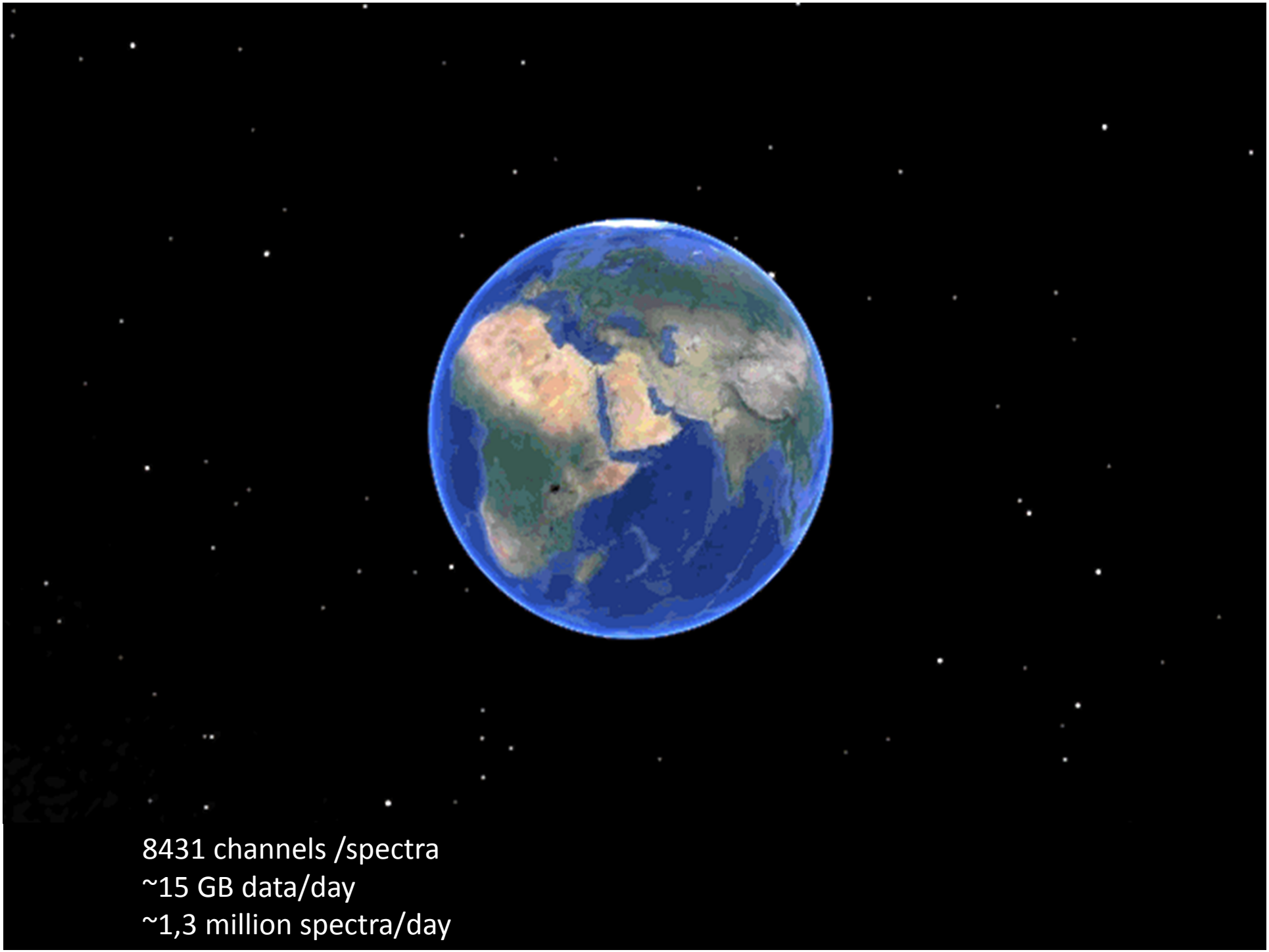
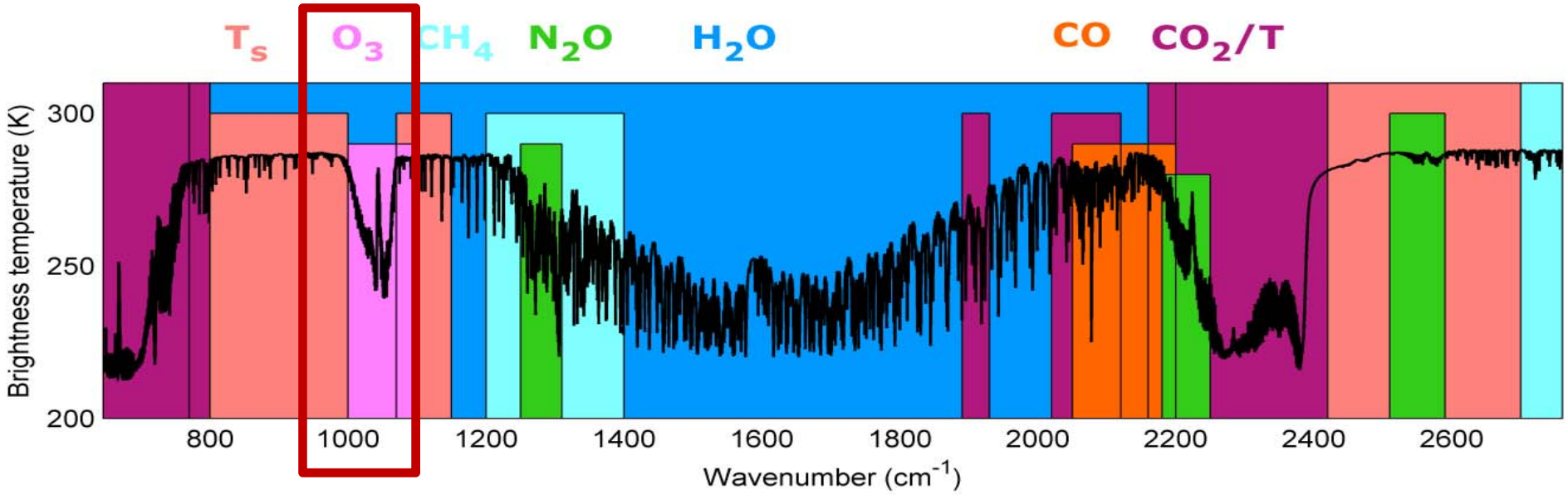
Ozone from IASI

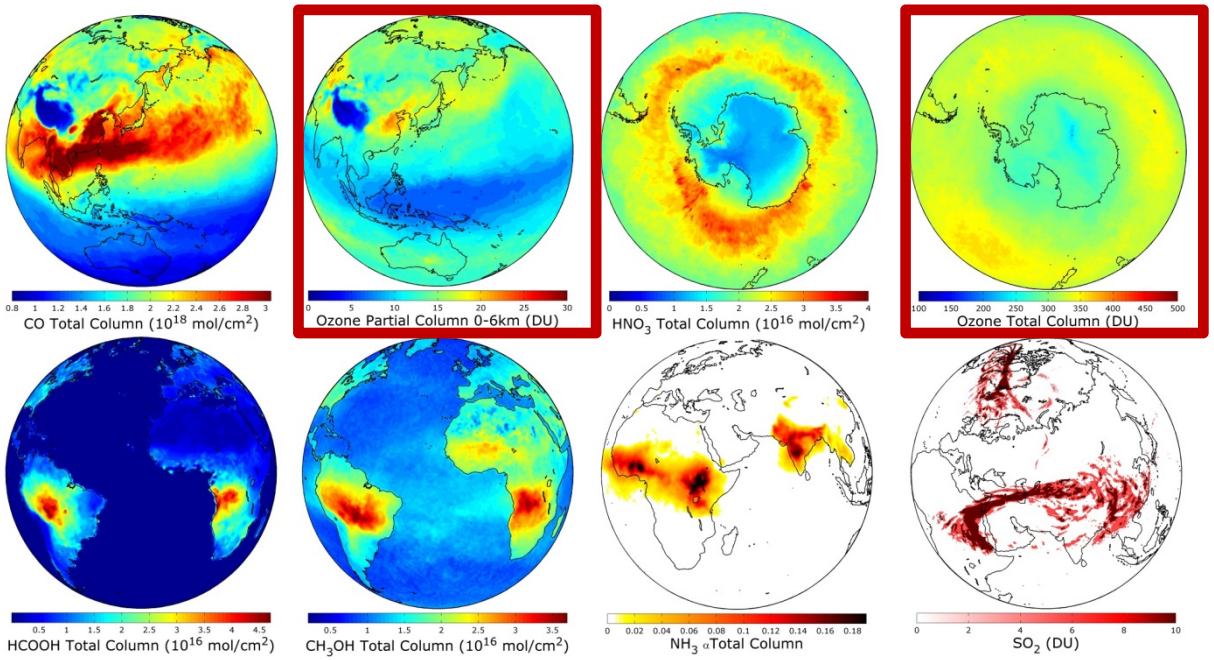
Cathy Clerbaux, P. Coheur, D. Hurtmans,
S. Safieddine, C. Wespes, A. Boynard
LATMOS (Université Pierre et Marie Curie)
ULB (Université Libre de Bruxelles)




8431 channels /spectra
~15 GB data/day
~1,3 million spectra/day

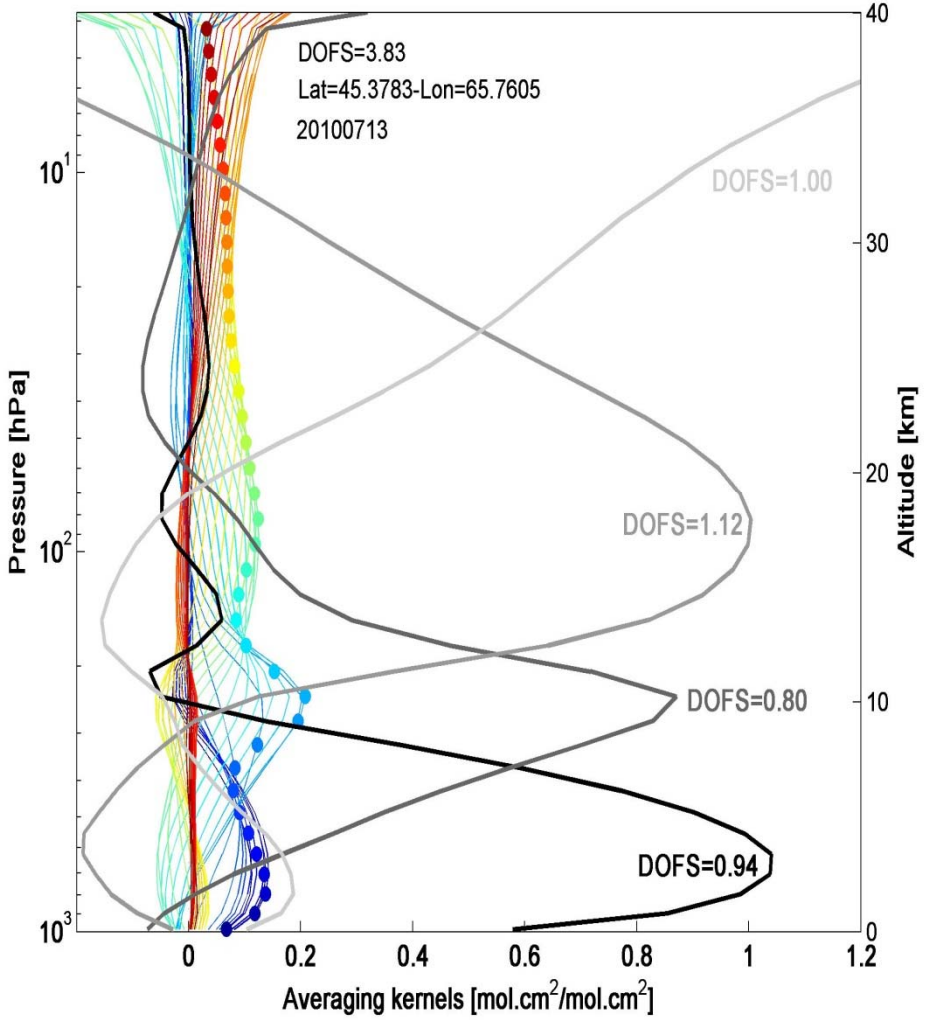


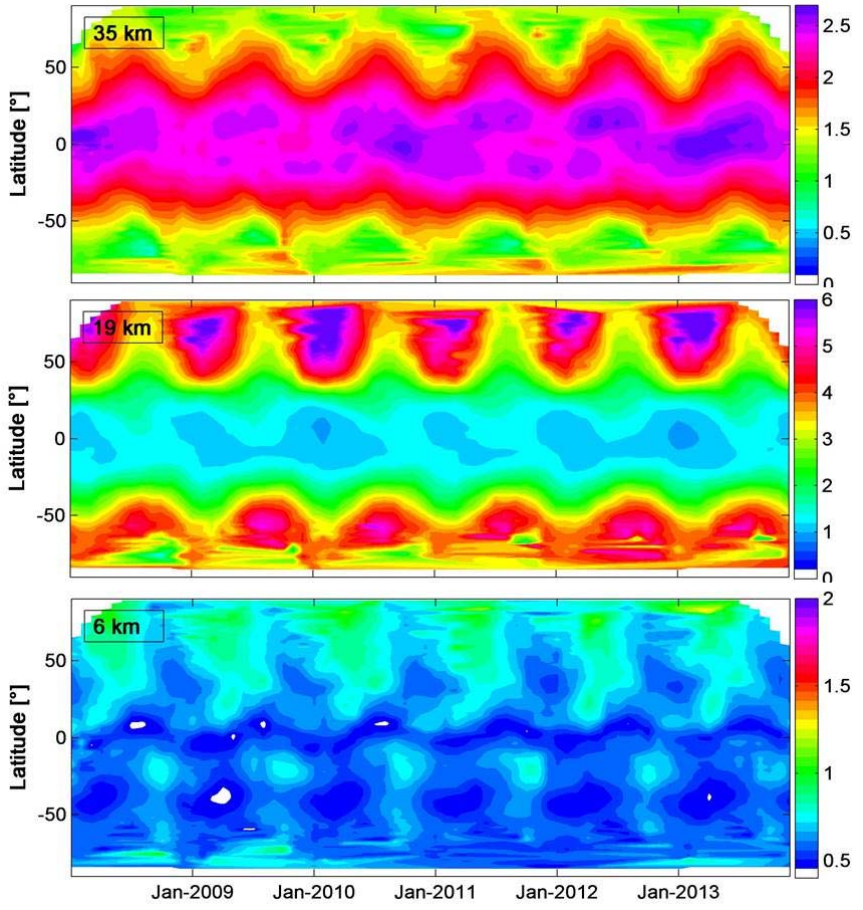
↓ Ozone



Ozone « profiles »
in NRT
with a 12 km footprint
day/night
global coverage

Ozone (vertical)

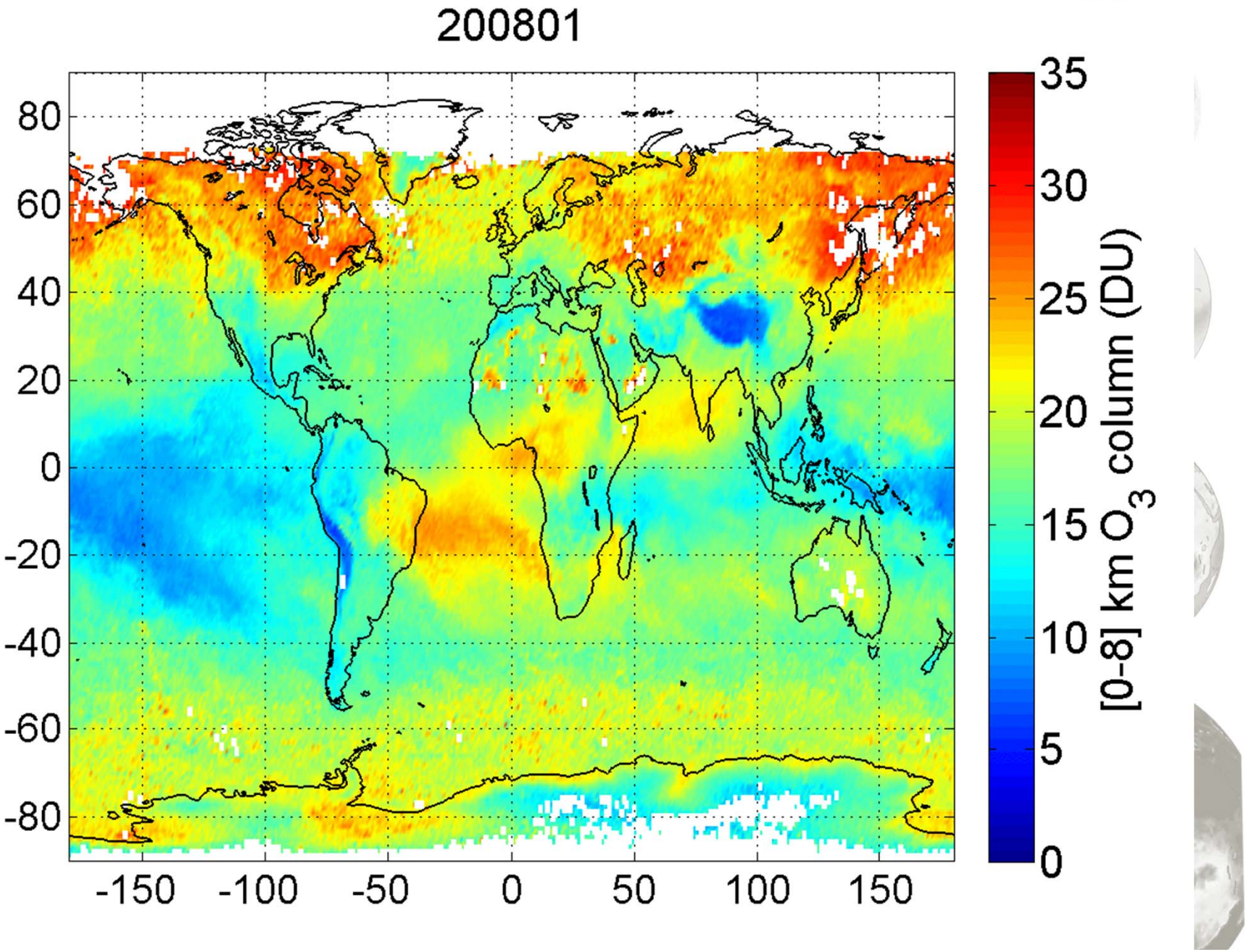




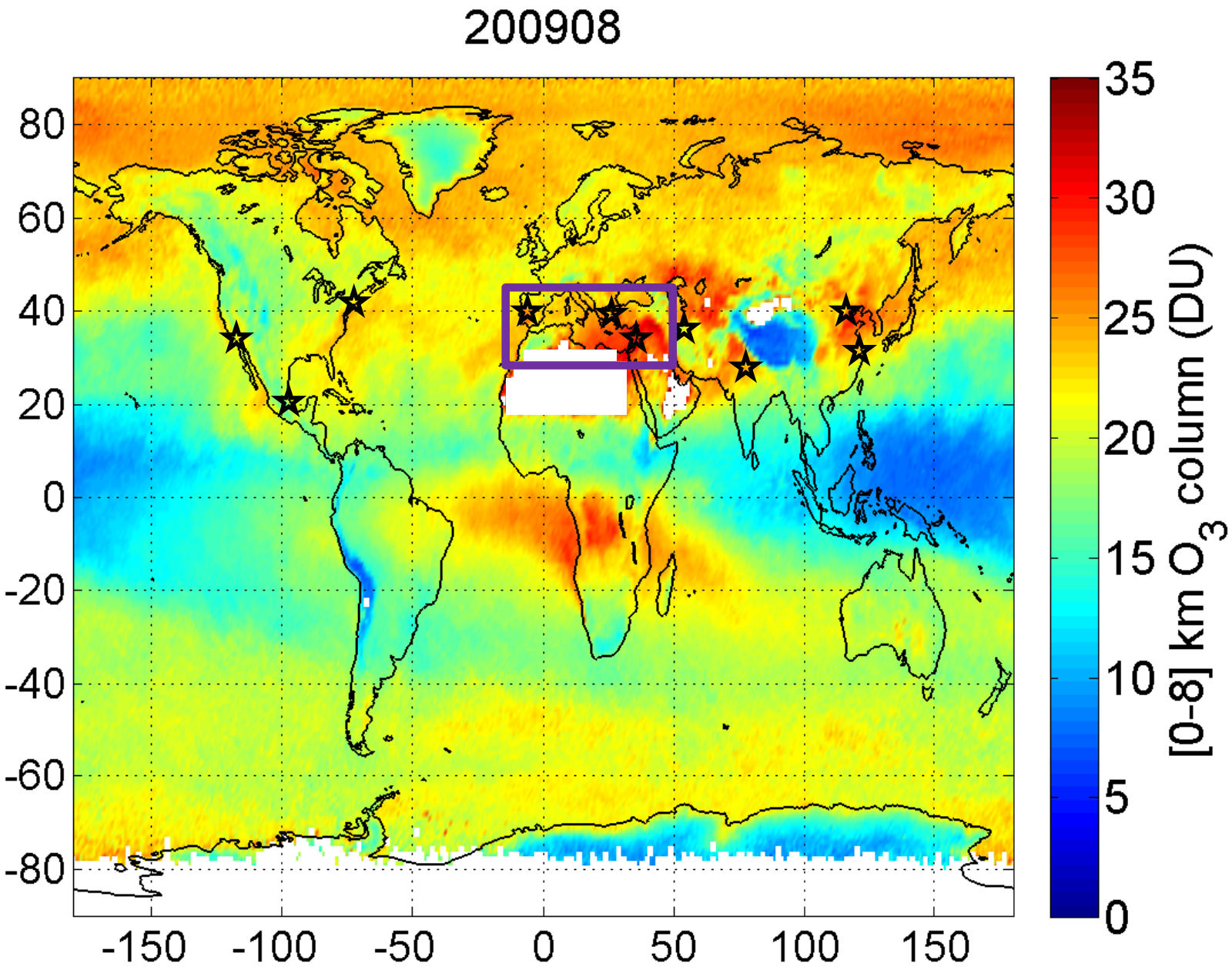
4 merged layers:
0-300 hPa; 300-150 hPa; 150-25 hPa; 25-3 hPa

Wespes et al., 2015

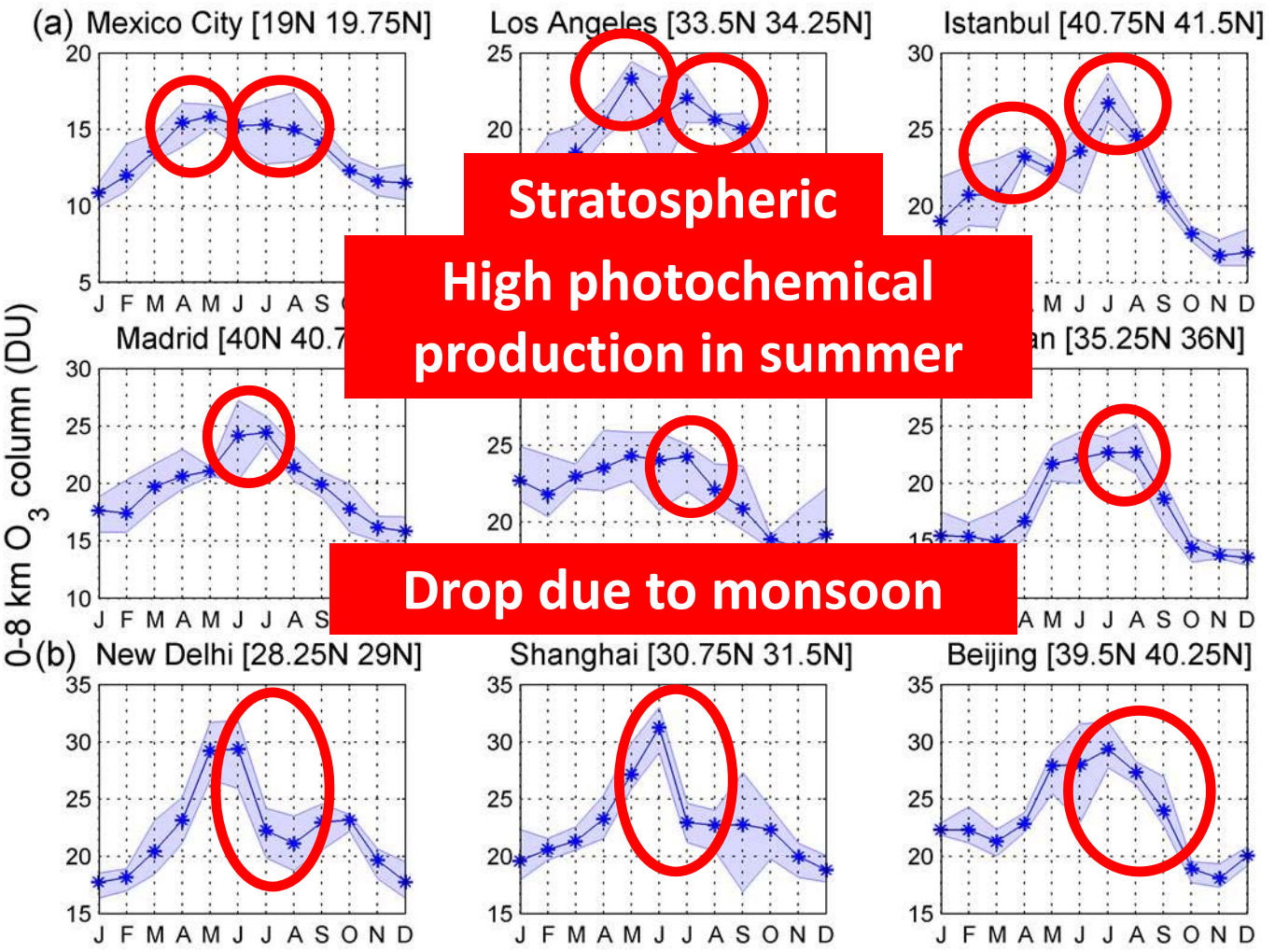
Ozone tropo (global) : 2008 to 2013 monthly



Ozone tropo (global) : 2008 to 2013 monthly



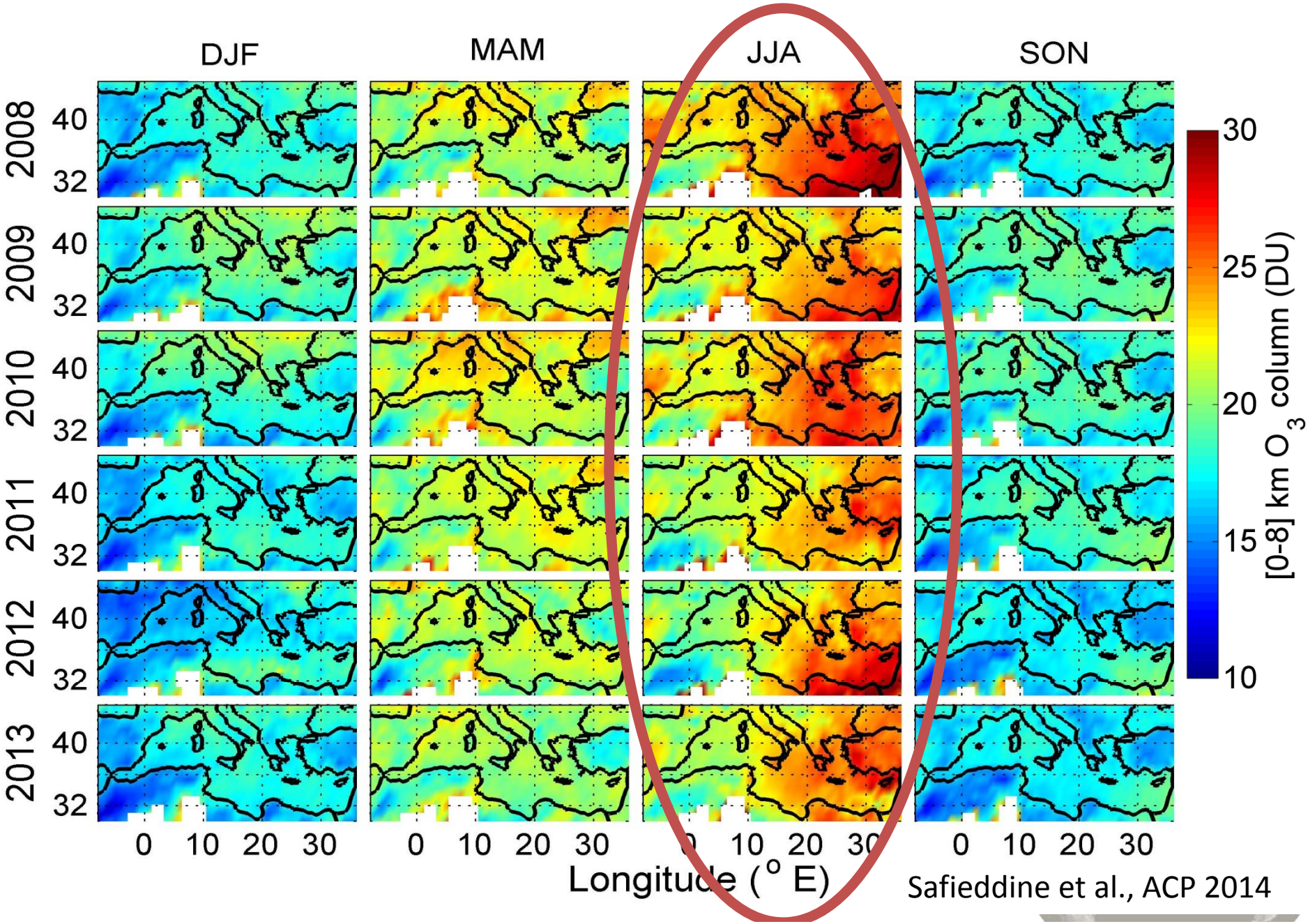
Ozone tropo over cities



Safieddine et al., JGR 2013


Ozone tropo over the mediterranean area

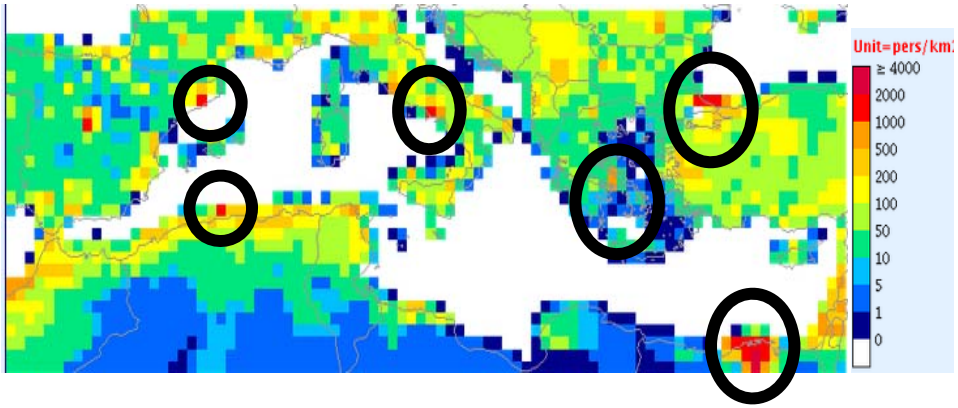
Ozone : seasonal variability over Mediterranean area

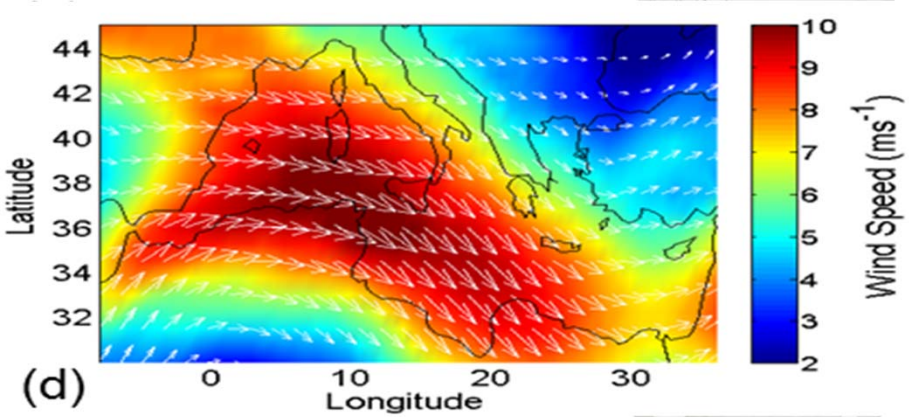


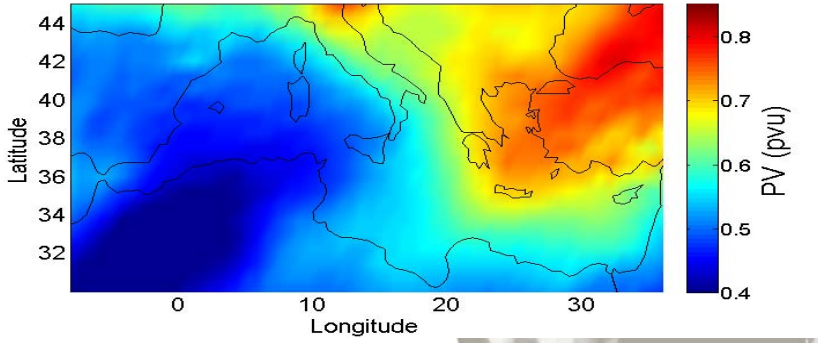
Safieddine et al., ACP 2014

Ozone : seasonal variability over Mediterranean area

High and alerting tropospheric O_3 values are recorded in summer, especially to the east of the basin because of:

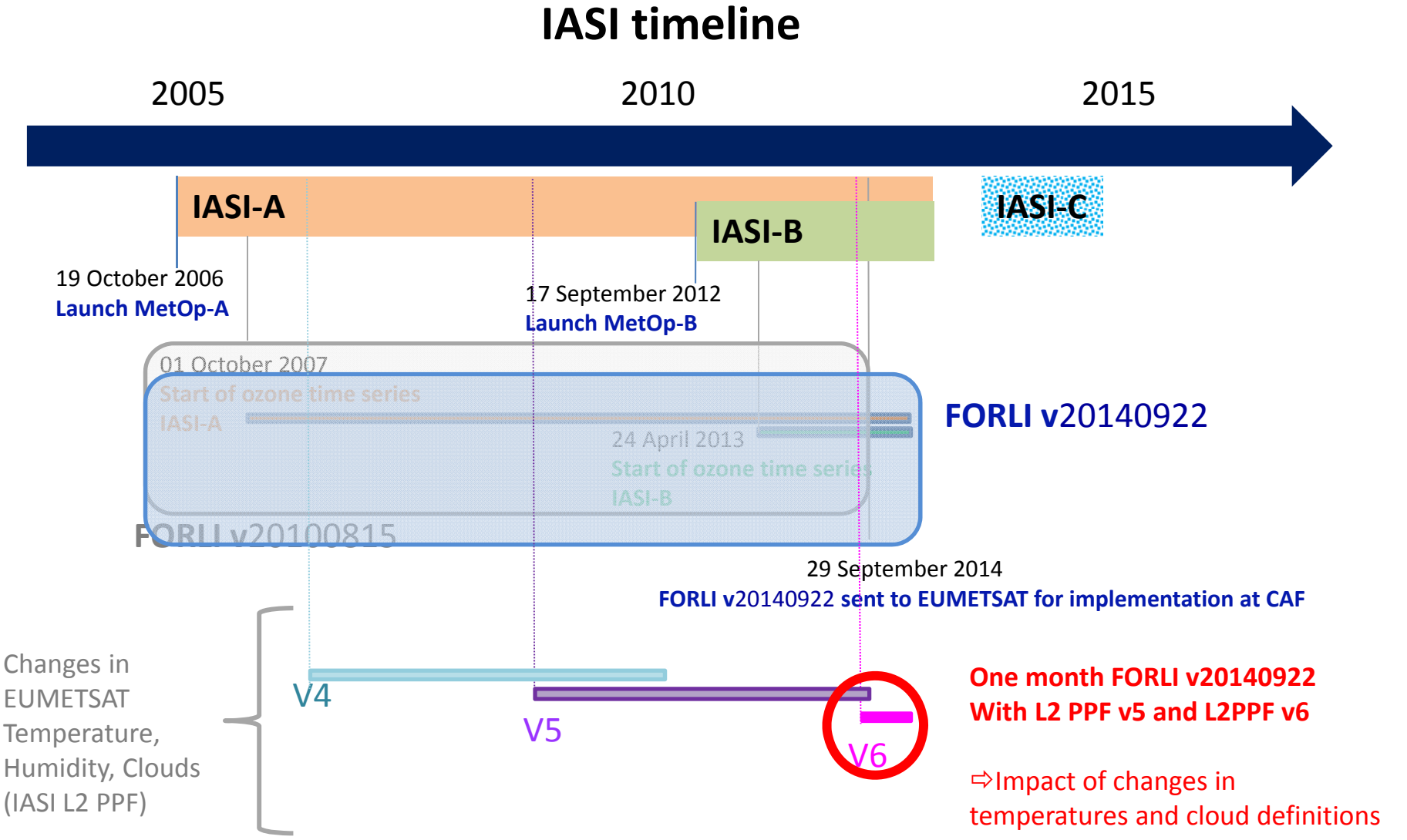






Safieddine et al., ACP 2014

Ozone retrieval



OPTIMAL ESTIMATION: Retrieval spectral range 960-1075 cm-1 in 40 layers (0-40 km). One set of a priori xa, Sa for the globe (Mc Peters- Labow)

Ozone validation: ballons, satellites, ground-based

Positive biais on total column (3-5%)

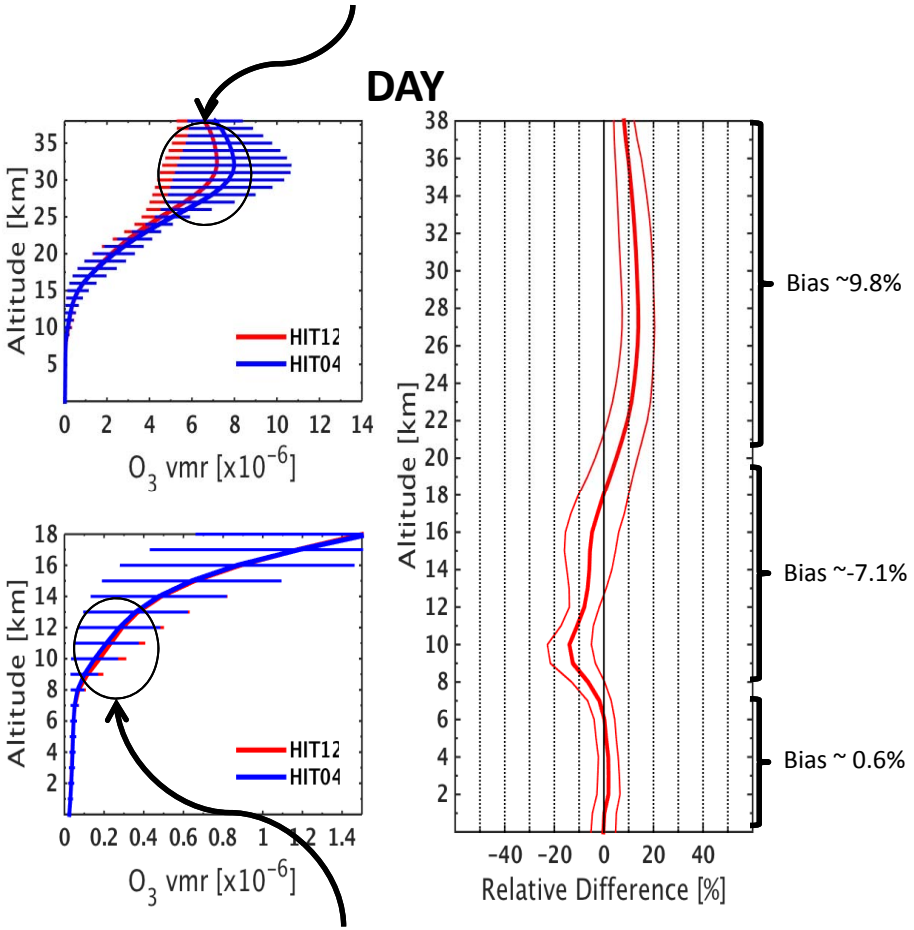
Positive biais in the UTLS (~15%)

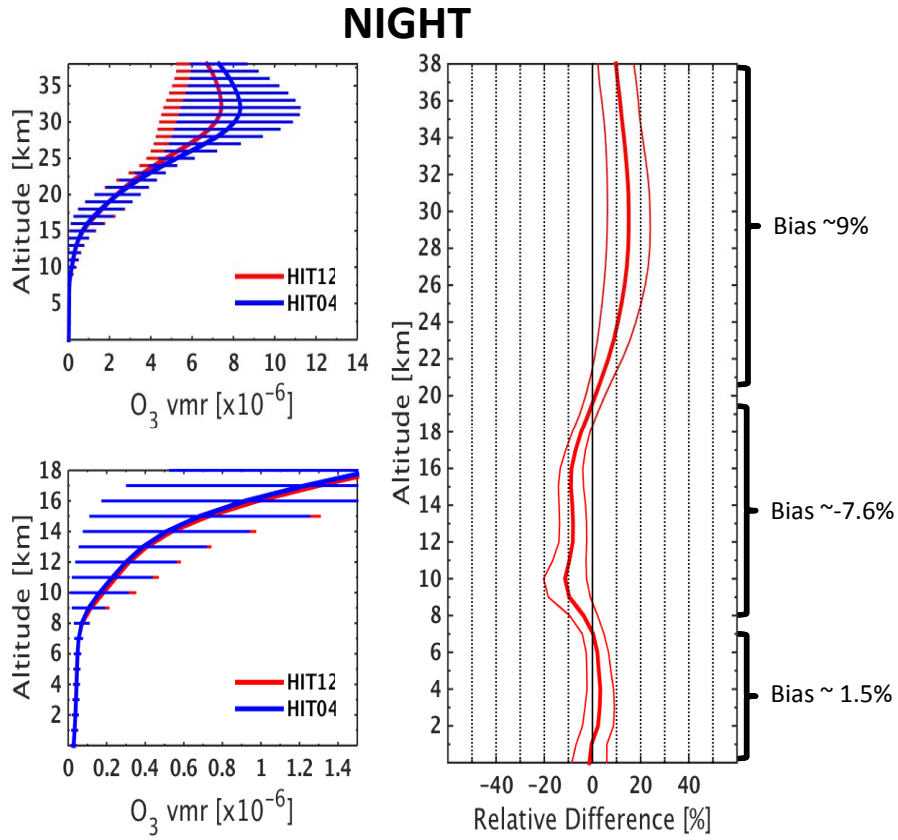
>> Tests with HITRAN 2012

Ozone vertical profiles - January (ALL LATITUDES)

FORLI-O3 with HIT12 (red) is clearly lower in the stratosphere >> the 3-4% O3 bias observed between IASI TC and observations may be due to spectroscopy

Relative Difference= 100x(HIT04-HIT12)/HIT12



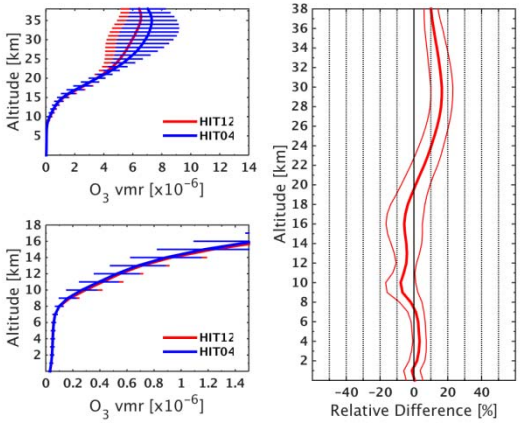


FORLI-O3 with HIT12 (red) is higher in the UTLS >> O3 bias observed between IASI and sonde is apparently not due to spectroscopy

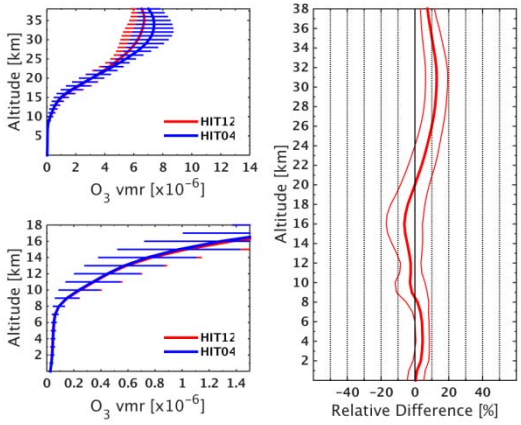
Credit: Anne Boynard (LATMOS)

Ozone vertical profiles - January (DAY)
Latitude bands

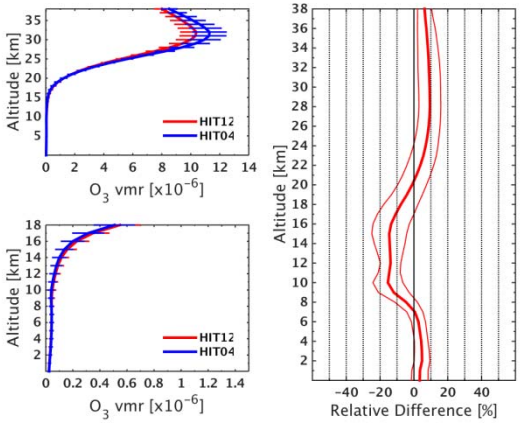
60°N-90°N



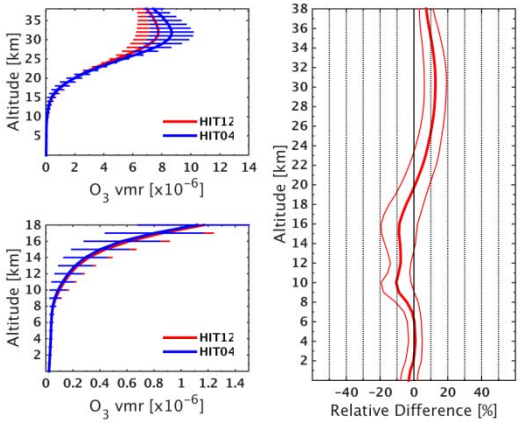
30°N-60°N



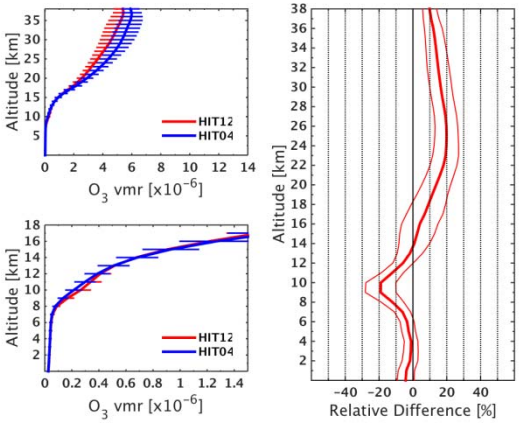
30°S-30°N



30°S-60°S



60°S-90°S

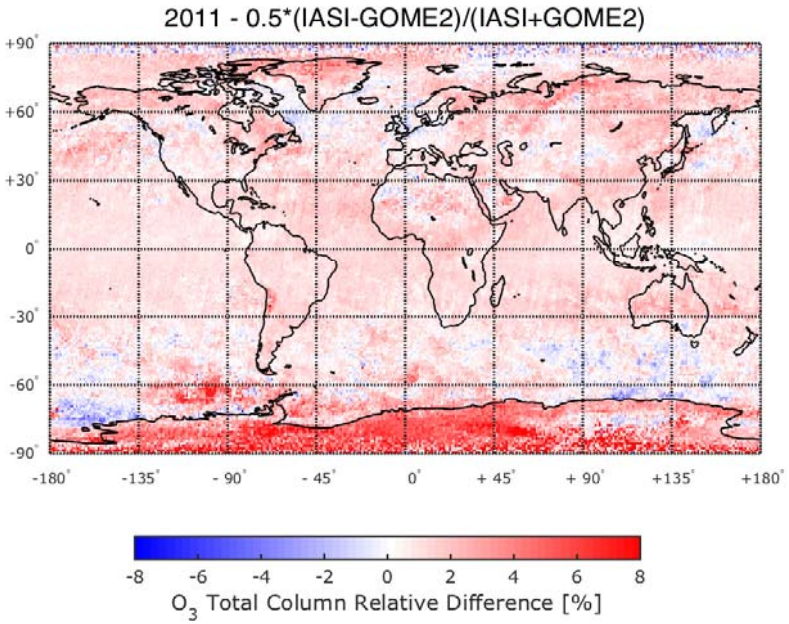


- No dependence on latitudes except for the South Pole

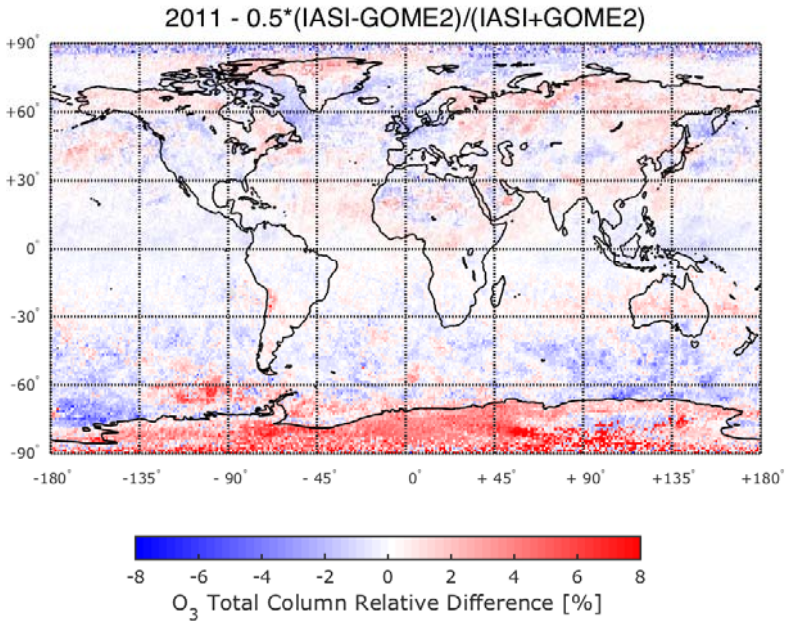
Credit: Anne Boynard (LATMOS)

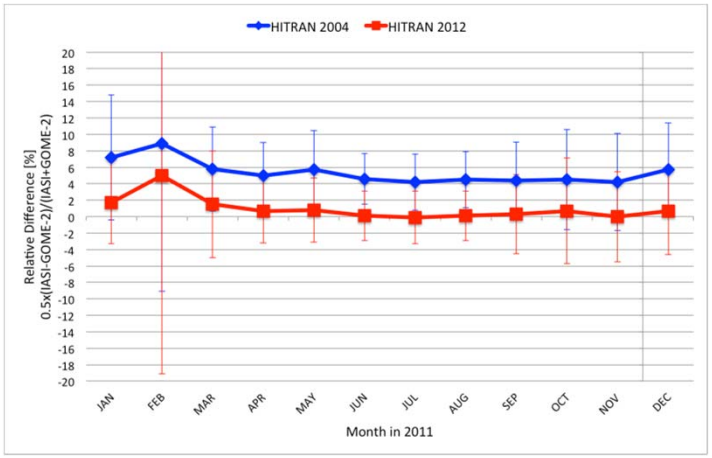
IASI vs GOME-2 ozone total column

FORLIO3(HIT04) vs GOME-2



FORLIO3(HIT12) vs GOME-2





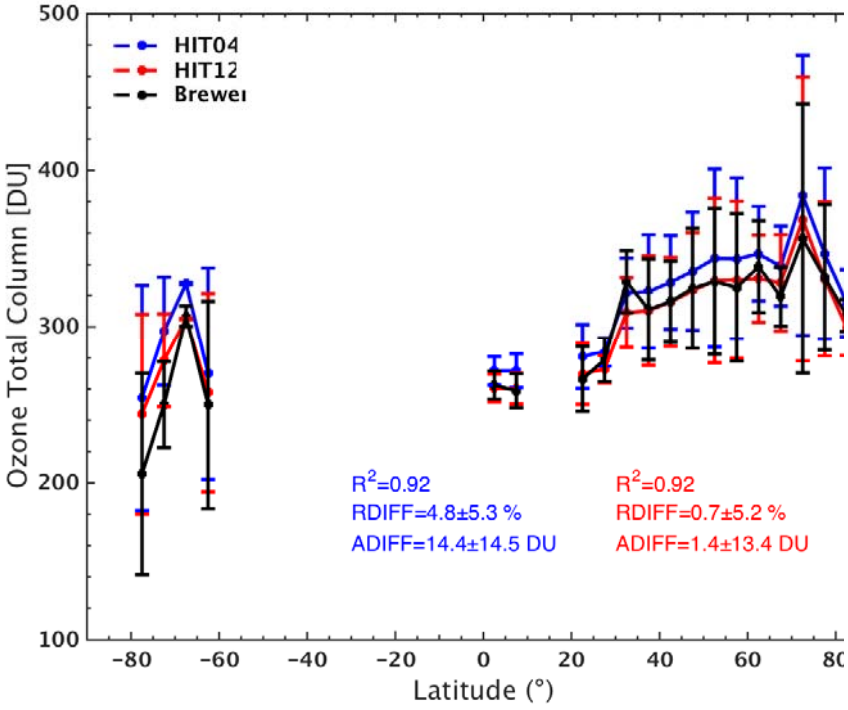
Biais 5.8%

Biais 1.4%

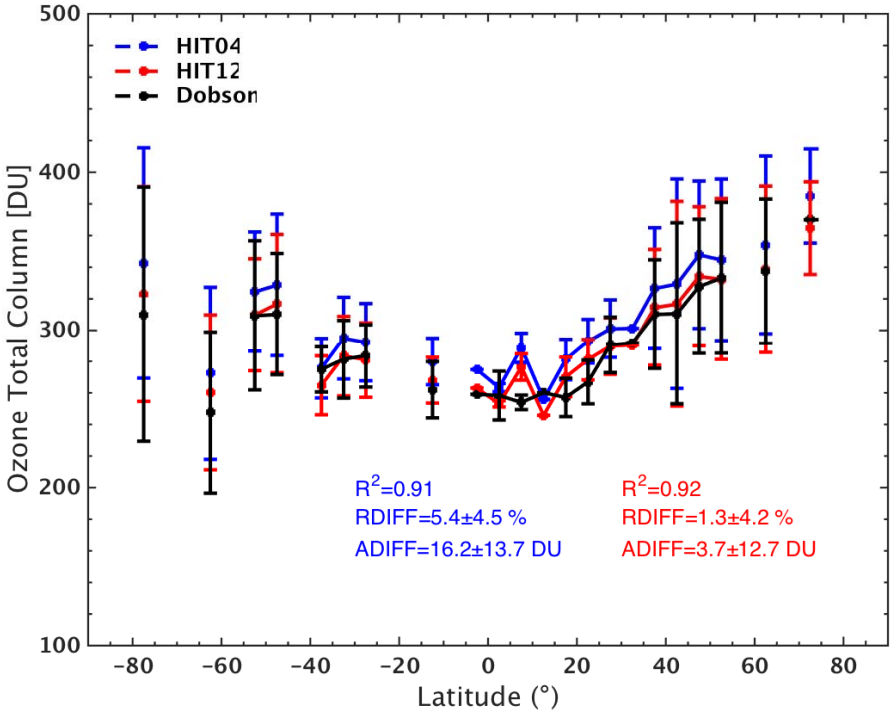
Credit: Anne Boynard (LATMOS)

IASI vs Dobson/Brewer ozone total column

Comparison with Brewer Sonde



Comparison with Dobon Sonde



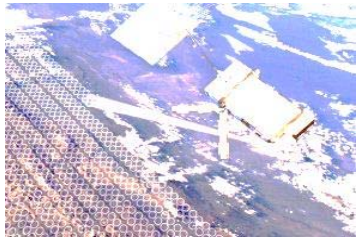
Credit: Anne Boynard (LATMOS)

Perspectives

2006 … 2012 …. 2018 …. 2021 … 2026 … 2035

IASI-A/METOP-A

IASI-B/METOP-B



IASI-C/METOP-C

IASI-NG on METOP SG

IASI-A + IASI-B (+ IASI-C)

Consistent set of +15 years of O_3 observation (ESA CCI-O_3)

IASI NG ~2021

Spectral resolution x2 (0.25 cm^{-1})

Reduction of noise by a factor of 2

better assessment of the lower troposphere