GLOBAL AND LOCAL OZONE MEASUREMENTS FROM THE THERMAL INFRARED IASI SOUNDER FOR THE MONITORING OF ATMOSPHERIC COMPOSITION

C. Scannell[1], A. Boynard[1], D. Hurtmans[2], P-F. Coheur[2], Cathy Clerbaux[1,2]

[1] UPMC Univ. Paris 6, CNRS/INSU, , LATMOS-IPSL, France.
[2] Spectroscopie de l'Atmosphère, Service de Chimie Quantique et Photophysique, Université Libre de Bruxelles, Brussels, Belgium

Second IASI Conference, January 2010

Table of Contents

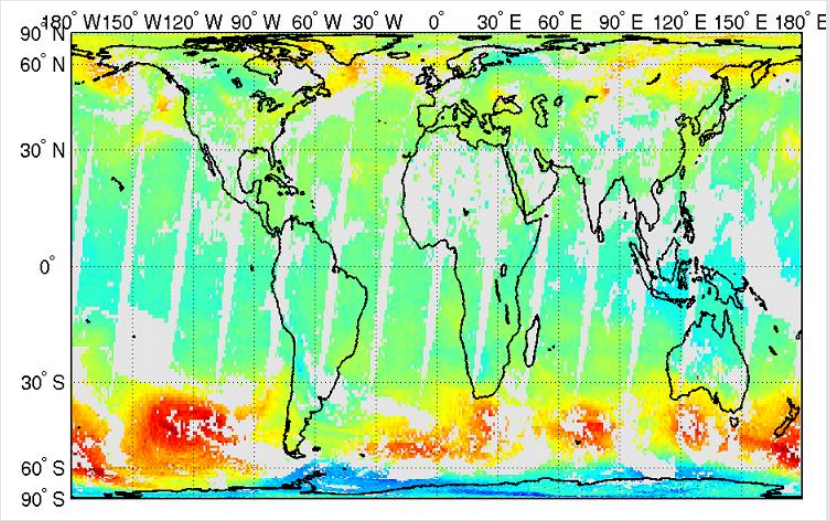
- FORLI/Neural Network ozone distributions
    - Comparsion with GOME 2
- Global FORLI Ozone
    - profiles – specific cases
      – stratospheric intrusion
- Ozone Hole
    - progression of ozone hole for June – December 2009
    - Profiles inside and outside of the ozone hole
    - Ozone hole at different partial columns
- Tropospheric Ozone
    - comparison with TC maps
    - profiles for specific cases
- IASI/GOME 2 combined product – first steps

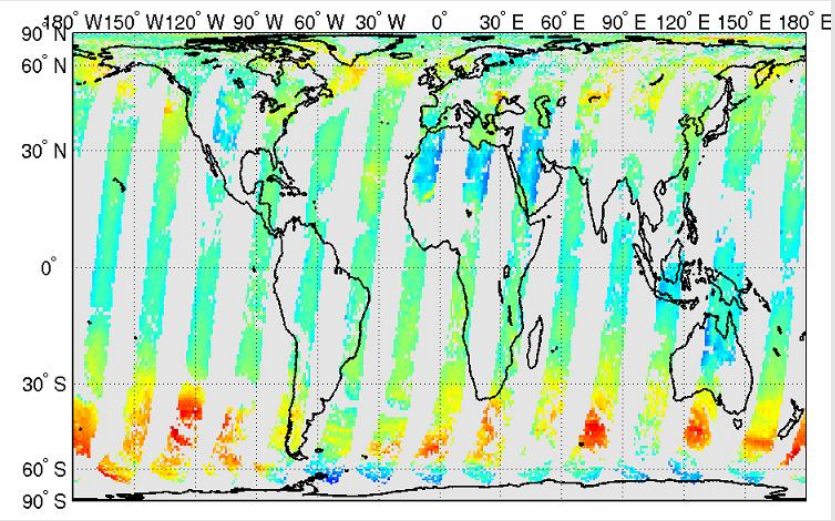
FORLI Ozone Distributions

- FORLI - Fast Optimal Retrievals on layers for IASI
- Increased computing power – analysis of more data – less data gaps
- Provides profiles directly
- Provides DOFs directly
- Provides averaging kernals directly

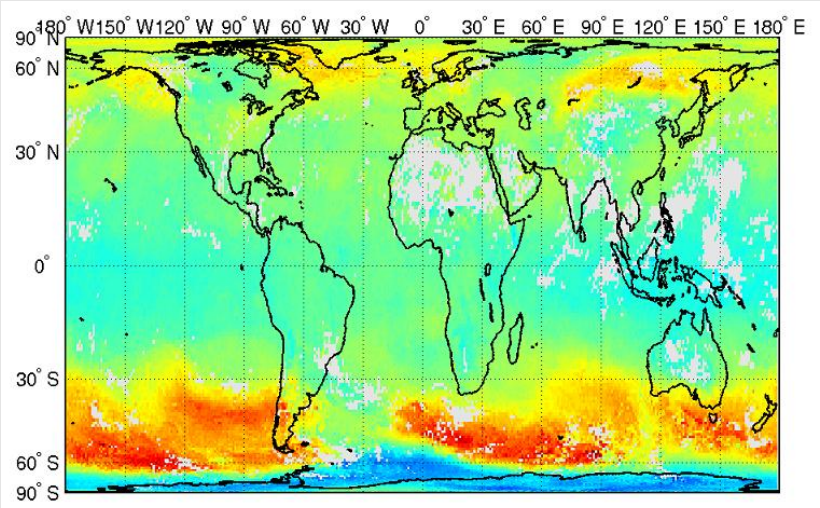
FORLI TOTAL COLUMN NN TOTAL COLUMN

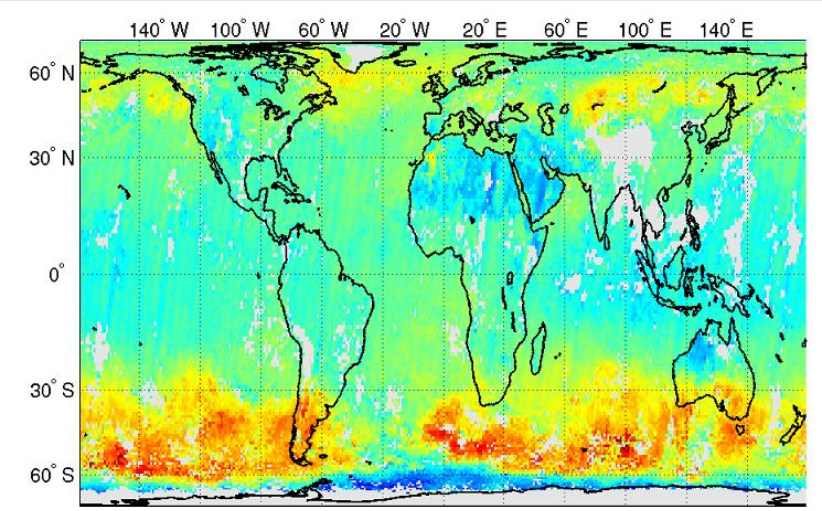
1 Day

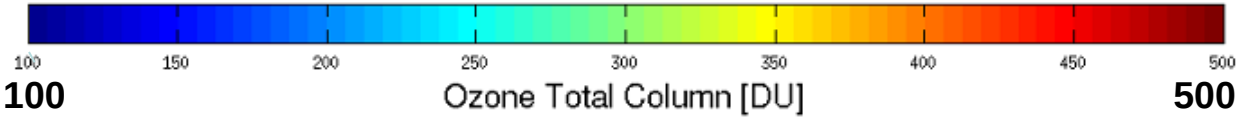




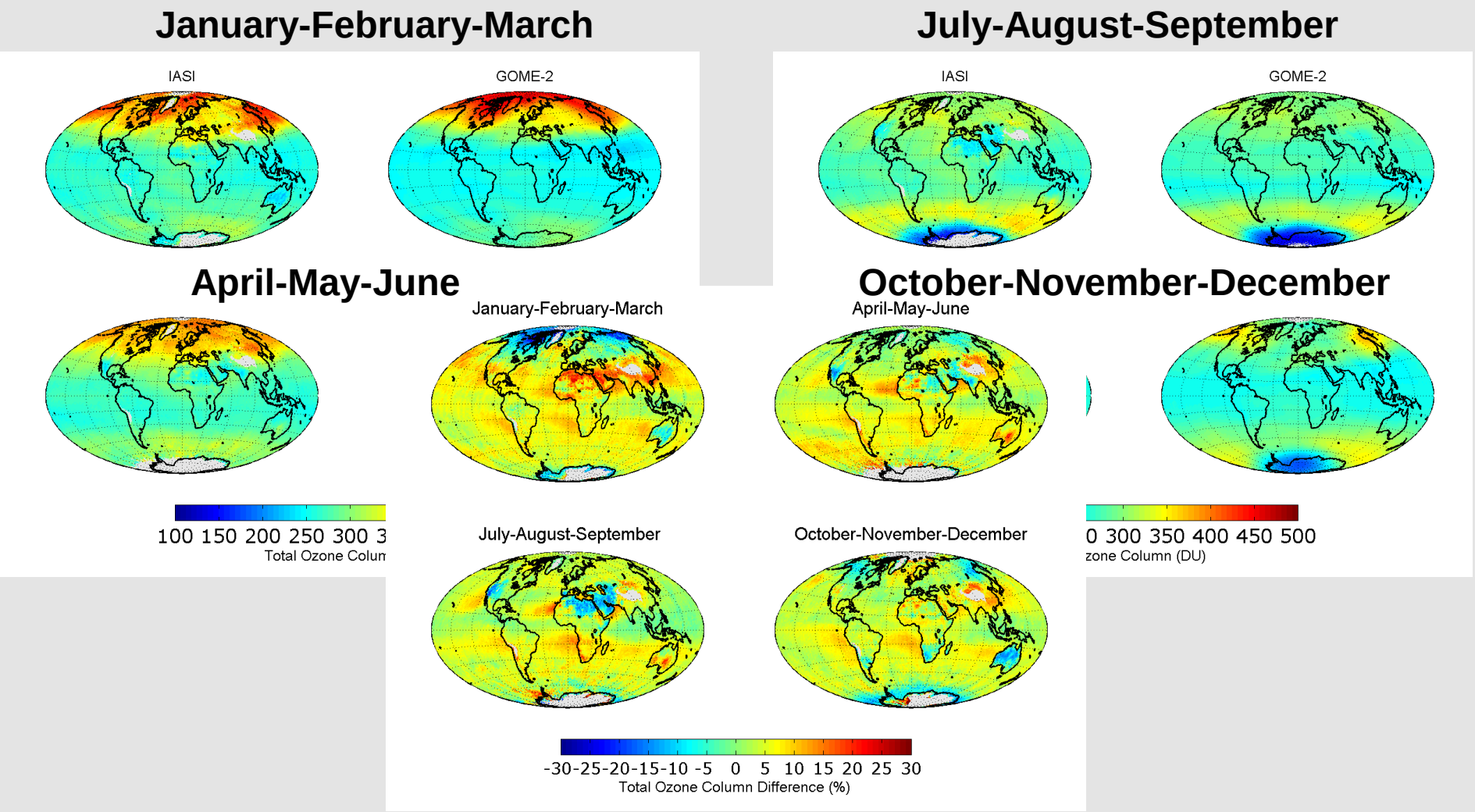
3 Day Average







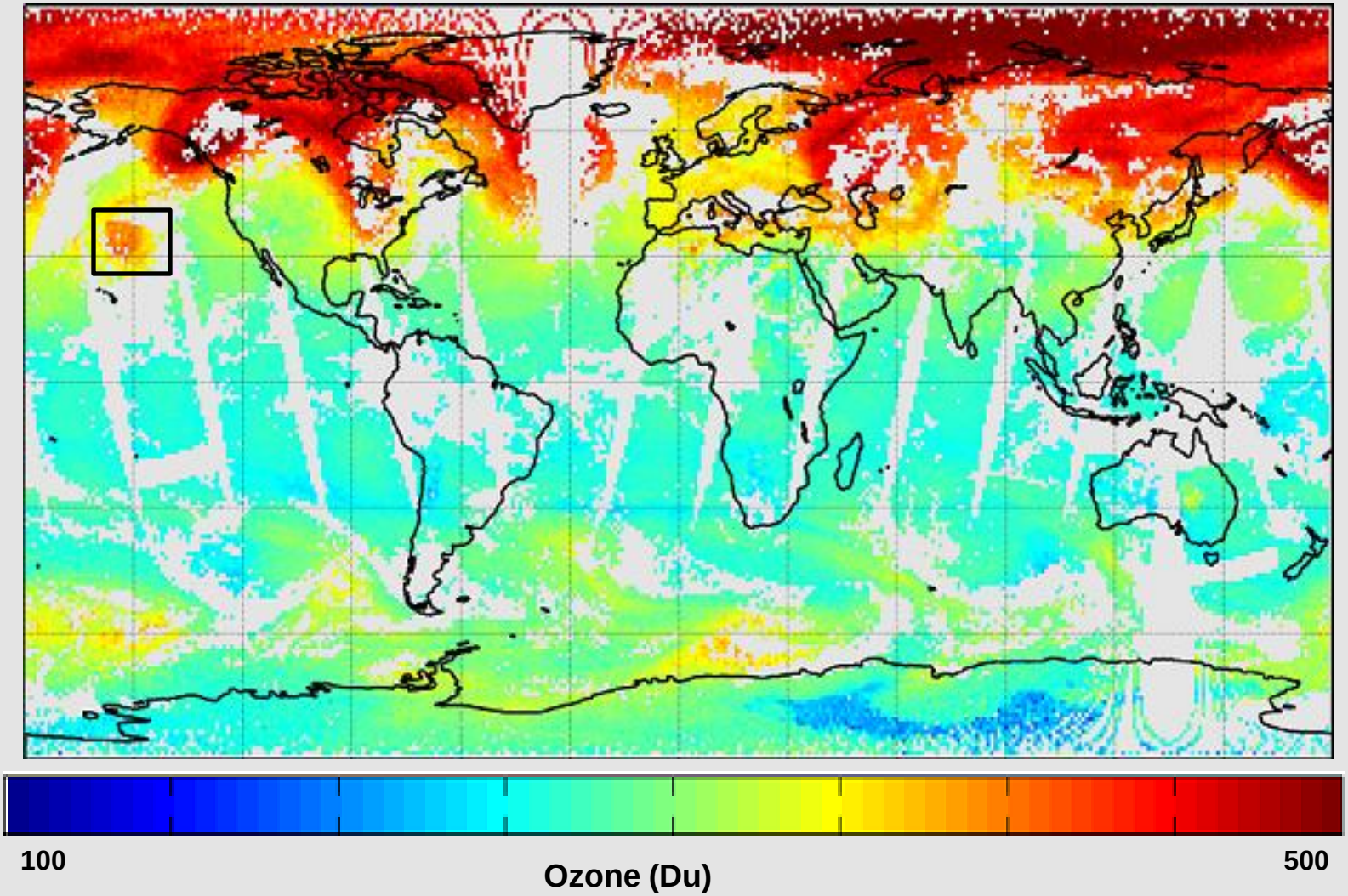
LATMOS ULB



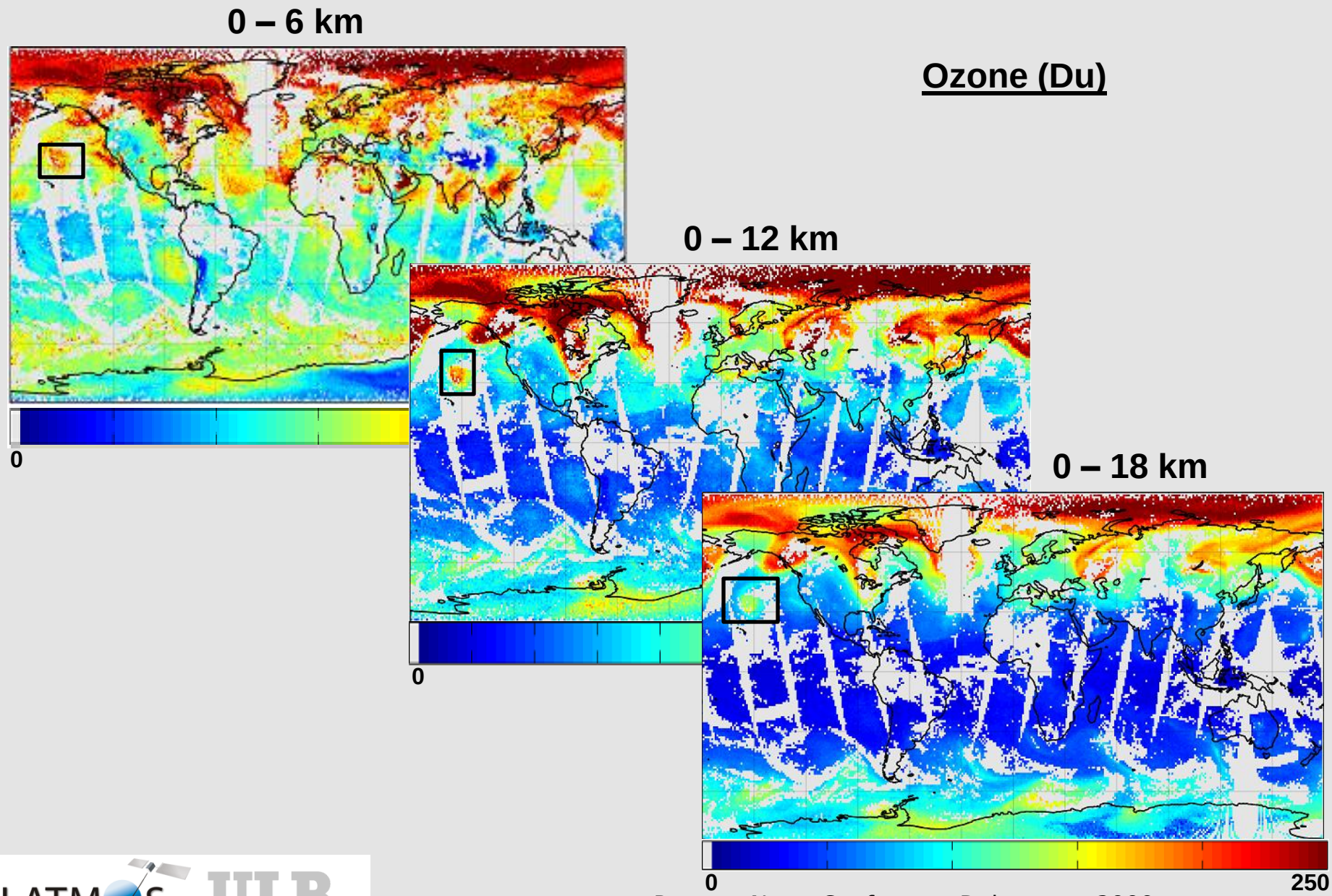
A.Boynard et al., Atmos. Chem. Phys.,9,6255-6271,2009.
Measurements of total and tropospheric ozone from IASI: comparison with correlative satellite, ground-based and ozonesonde observations

STRATOSPHERIC INTRUSION

20090422

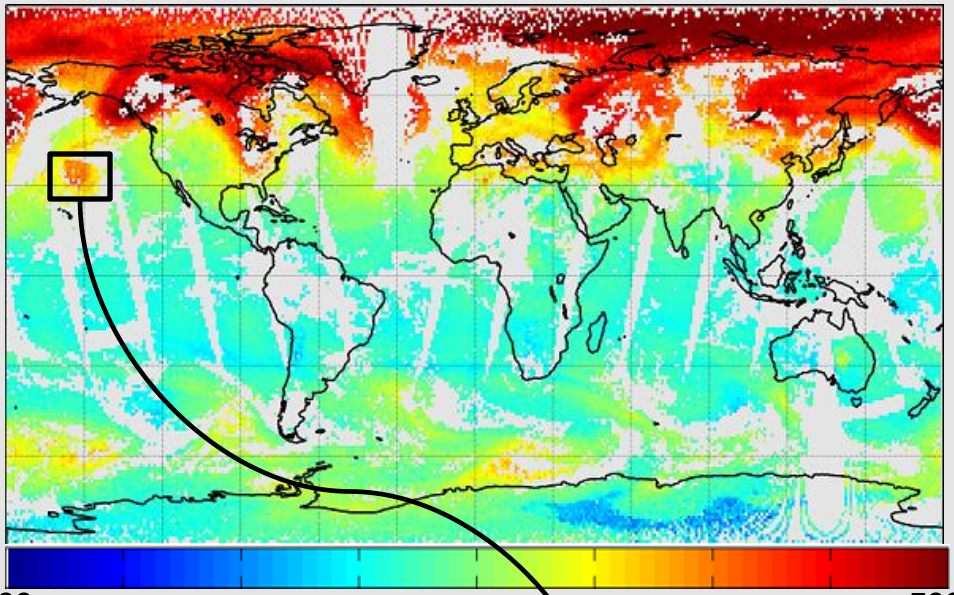


Ozone (Du)

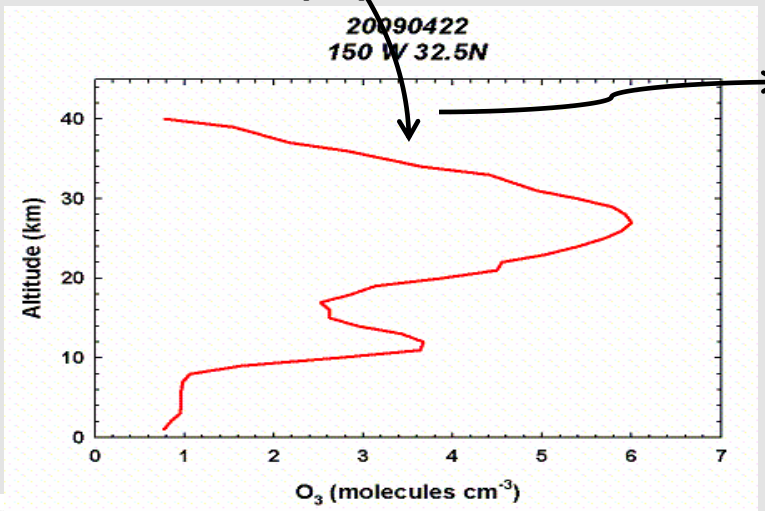


STRATOSPHERIC INTRUSION

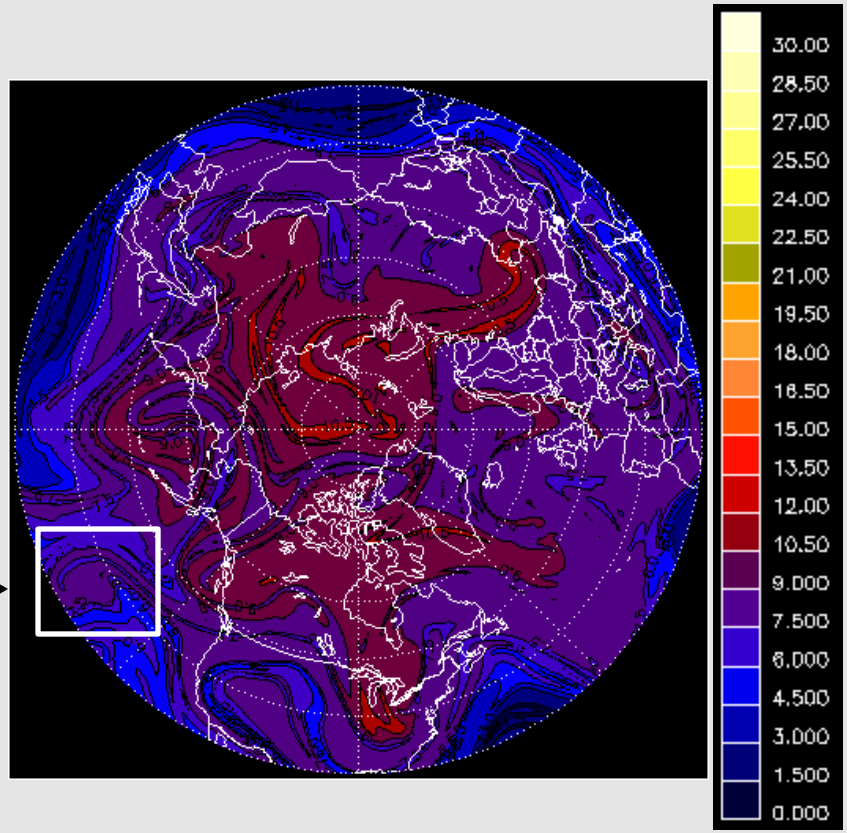
20090422



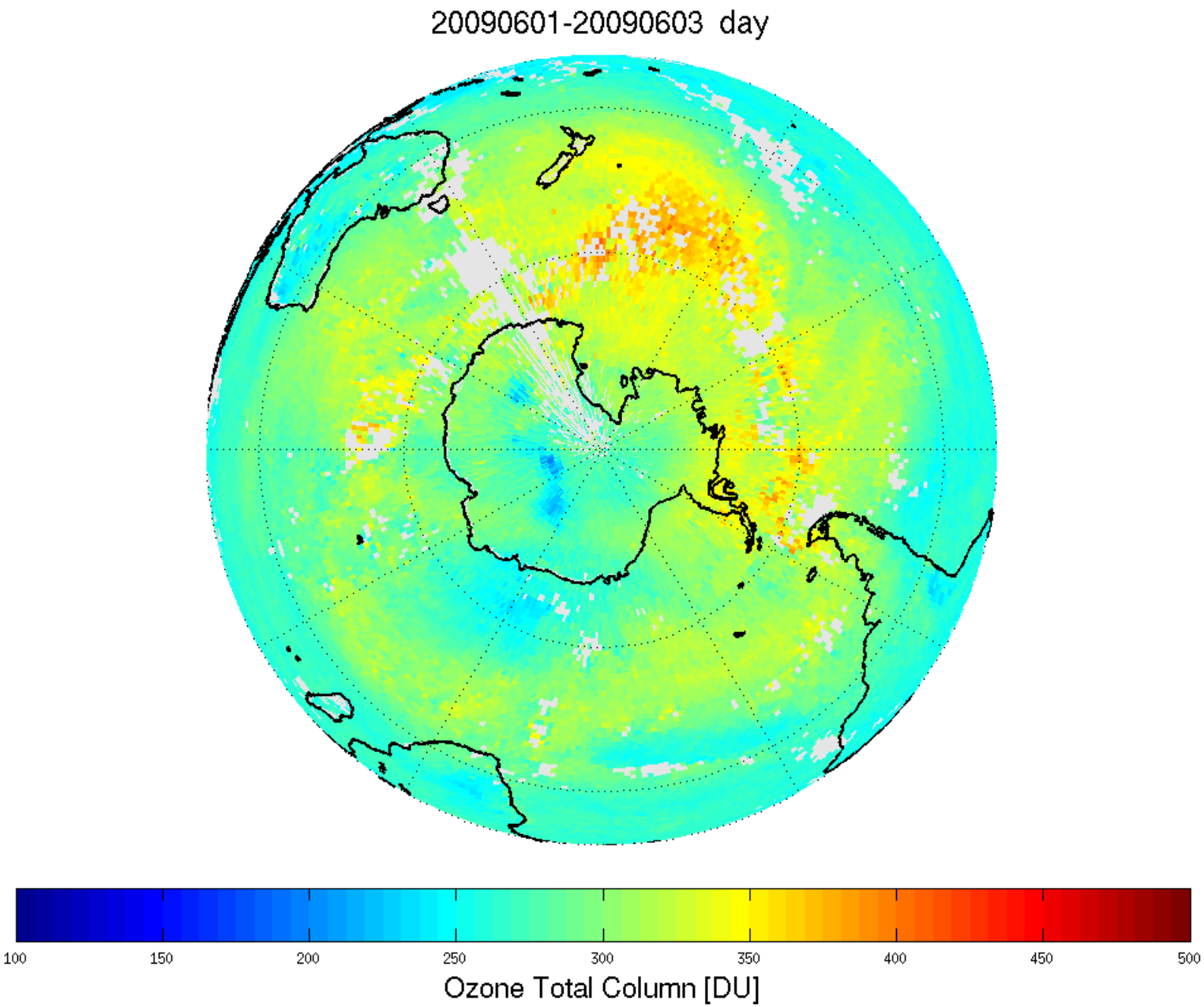
Ozone (Du)

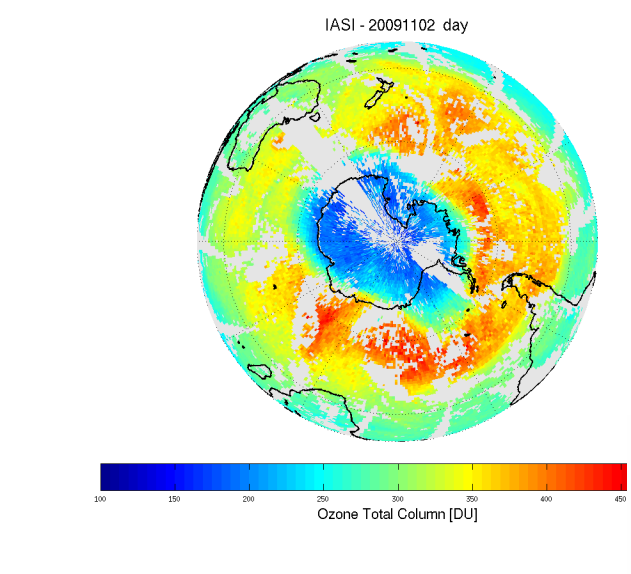


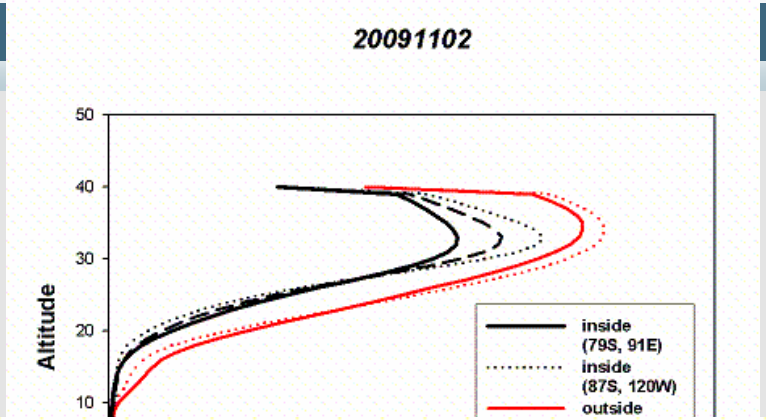
MIMOSA Potential Vorticity @ 380K

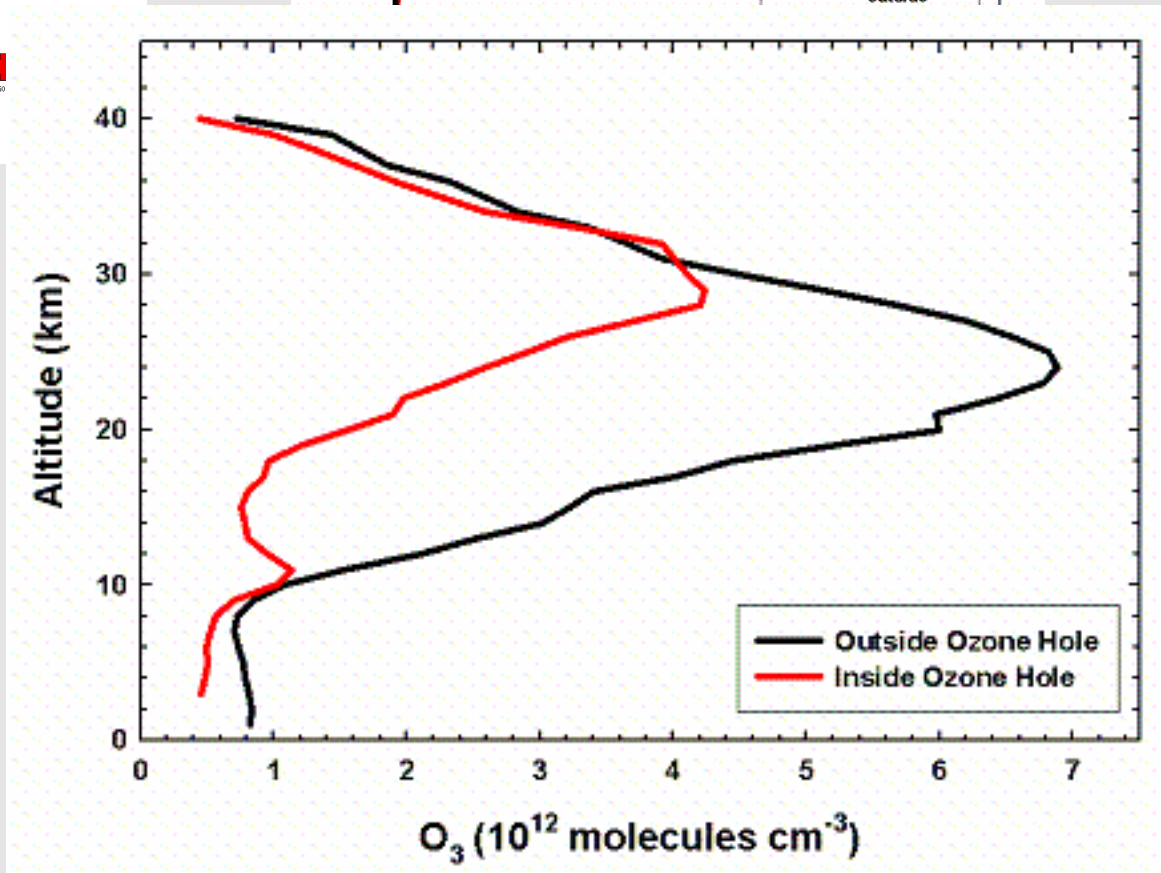


Study of Ozone Hole


20090601-20090603 day
100
150
200
250
300
350
400
450
500
Ozone Total Column [DU]

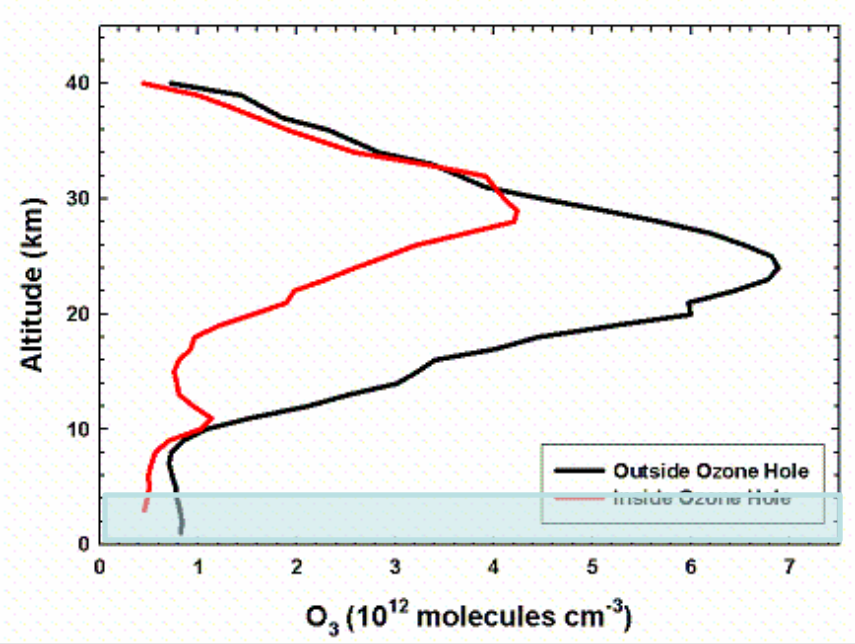

IASI - 20091102 day
100
150
200
250
300
350
400
450
Ozone Total Column [DU]


20091102
Altitude
50
40
30
20
10
inside
(79S, 91E)
inside
(87S, 120W)
outside

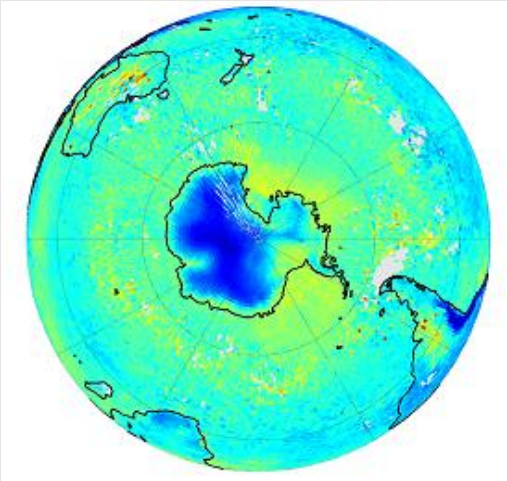

Altitude (km)
40
30
20
10
0
0
1
2
3
4
5
6
7
Outside Ozone Hole
Inside Ozone Hole
O_3 (10^{12} molecules cm^{-3})

LATMOS ULB

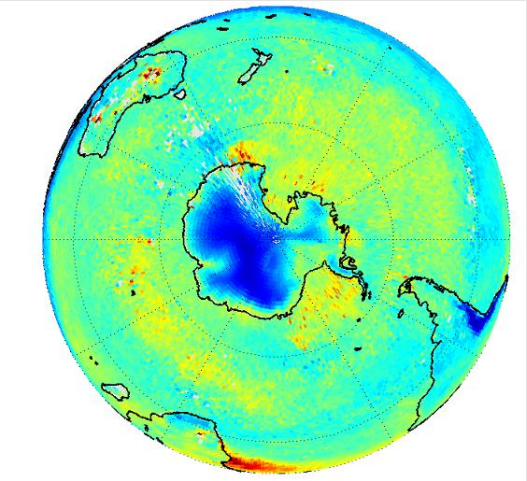
0 – 5 km



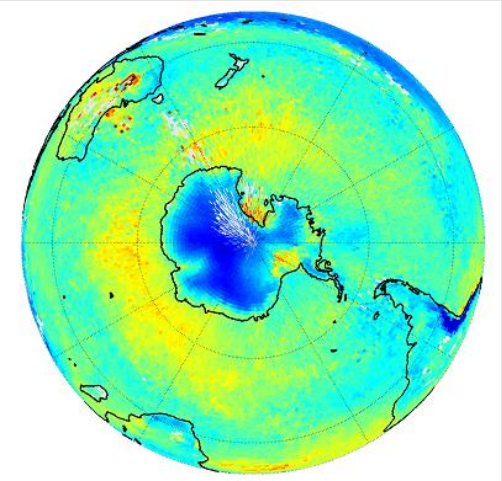
June (1 Wk)

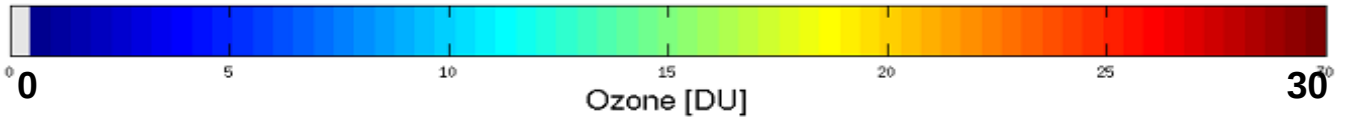


Sept (1 Wk)

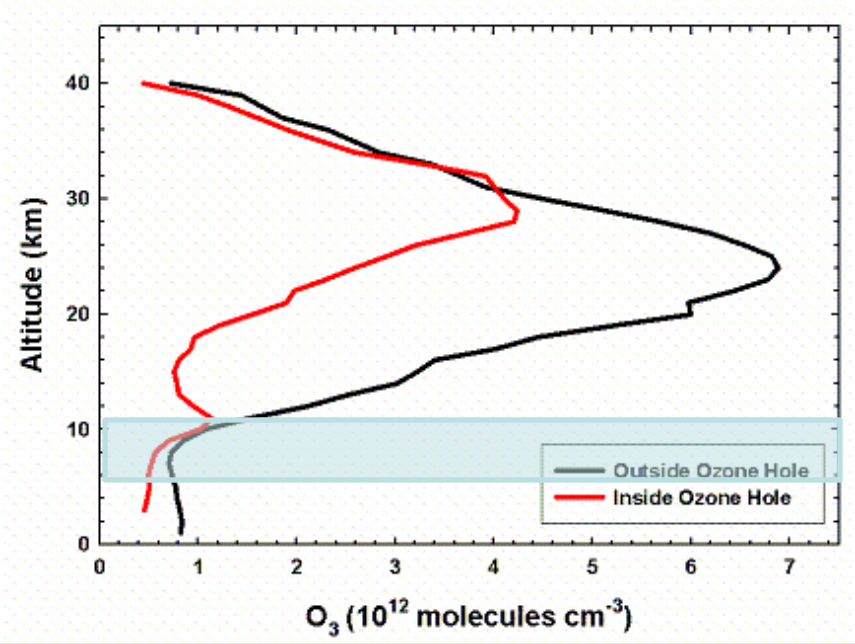


Nov (1 Wk)

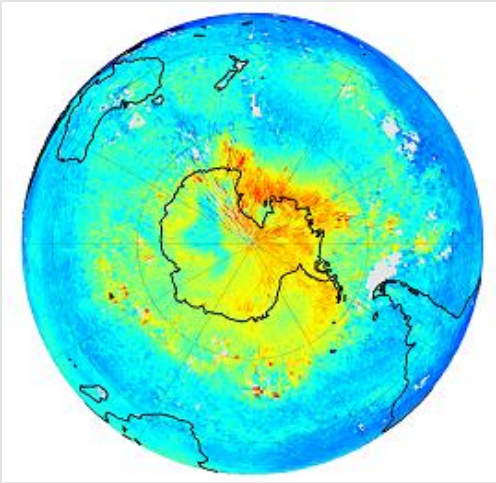




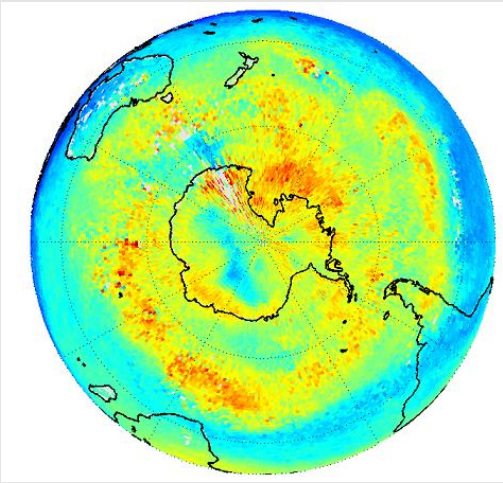
05 – 10 km



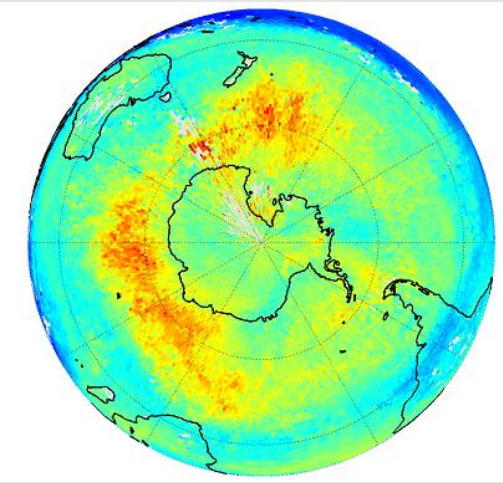
June (1 Wk)

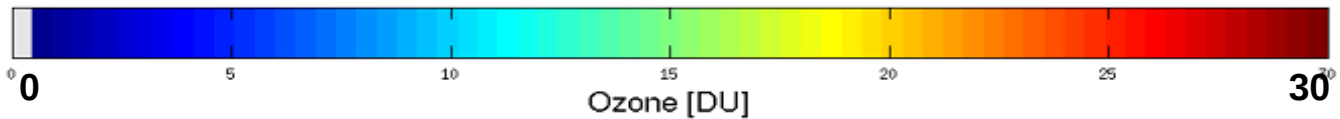


Sept (1 Wk)

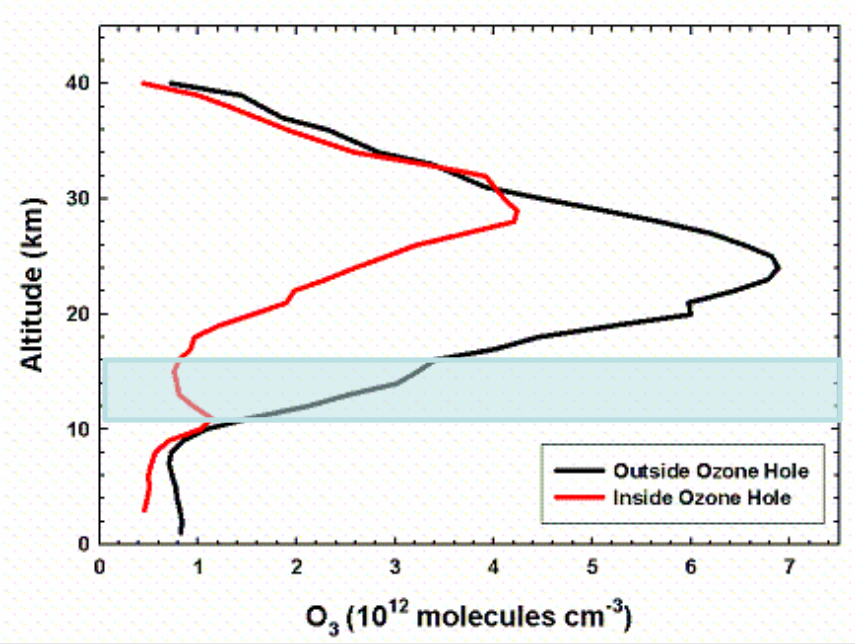


Nov (1 Wk)

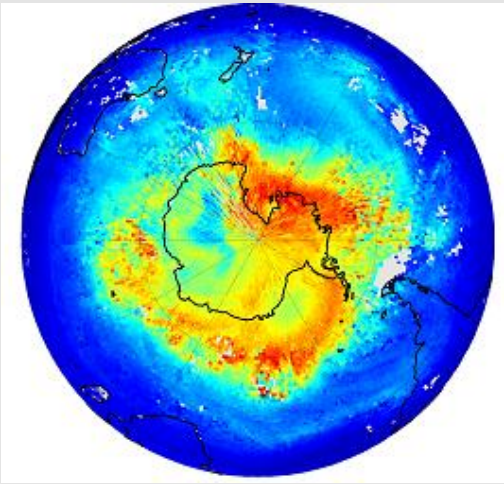




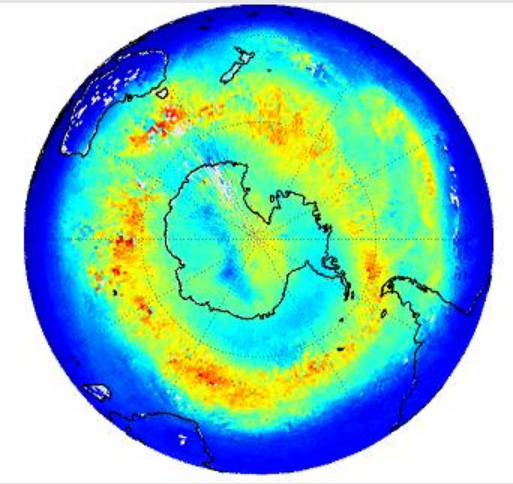
10 – 15 km



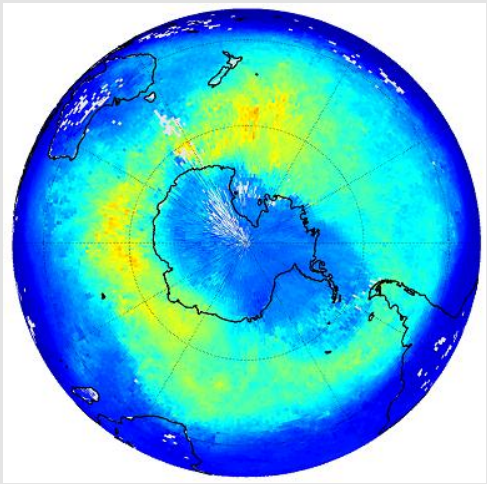
June (1 Wk)



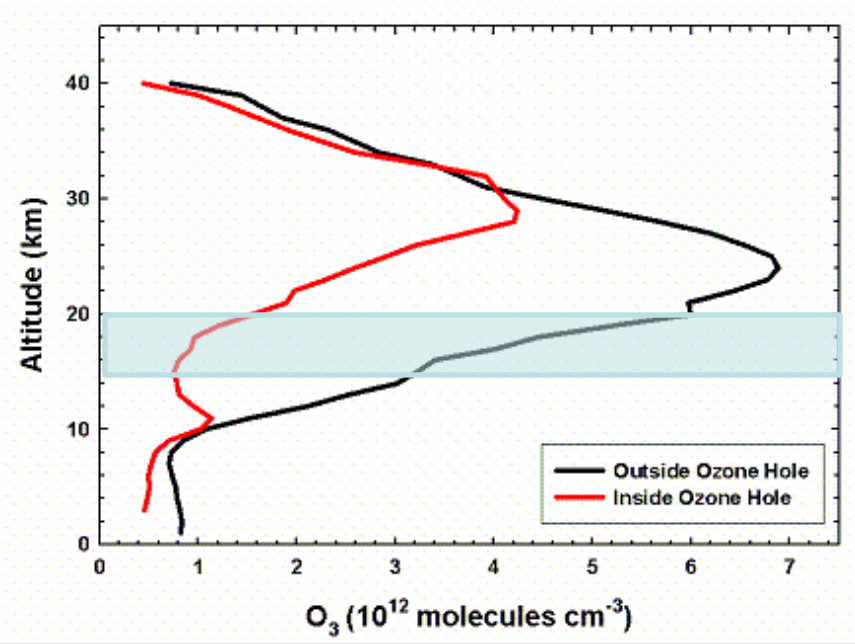
Sept (1 Wk)



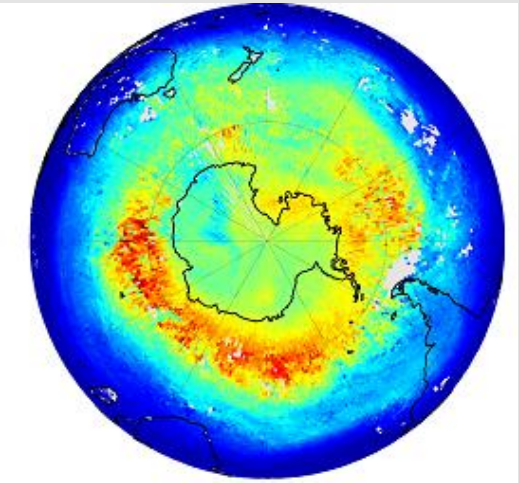
Nov (1 Wk)



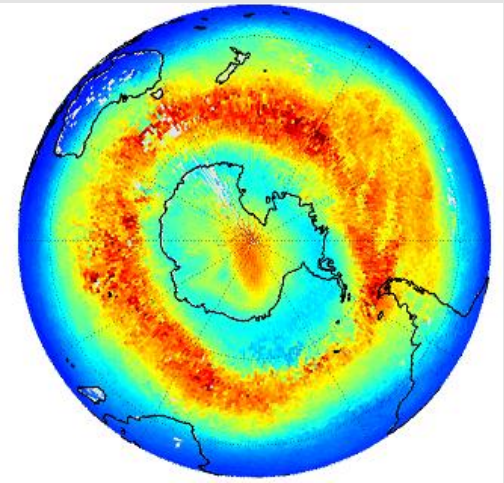
15 – 20 km



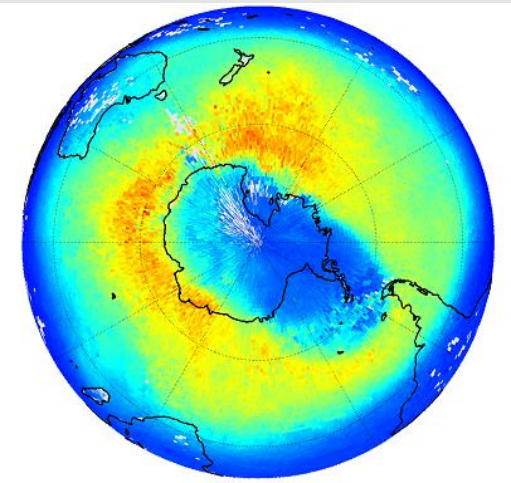
June (1 Wk)

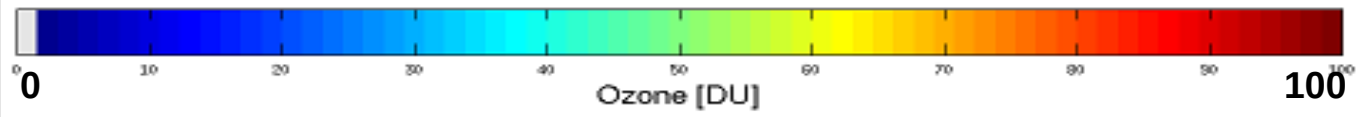


Sept (1 Wk)

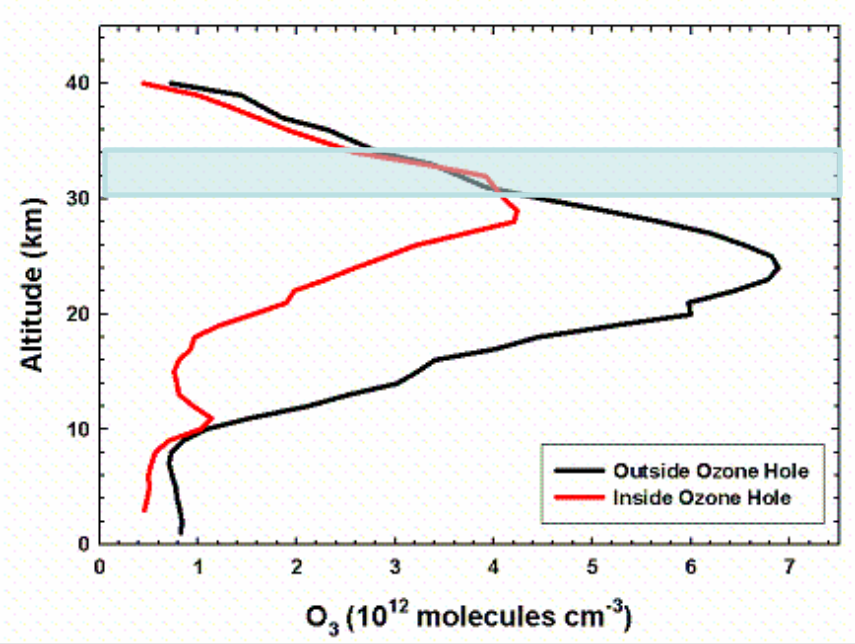


Nov (1 Wk)

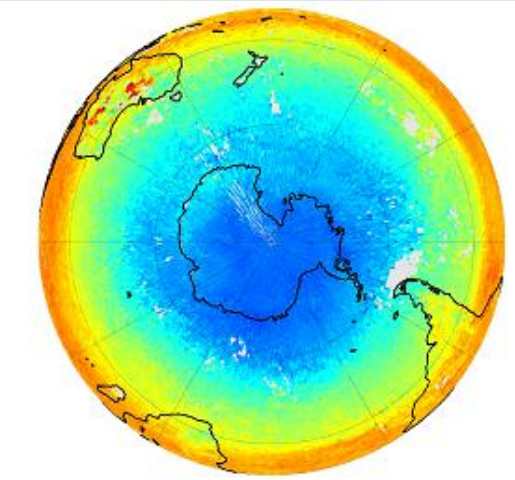




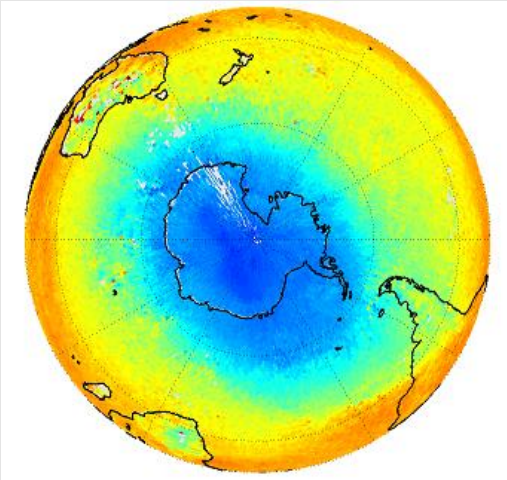
30 – 35 km



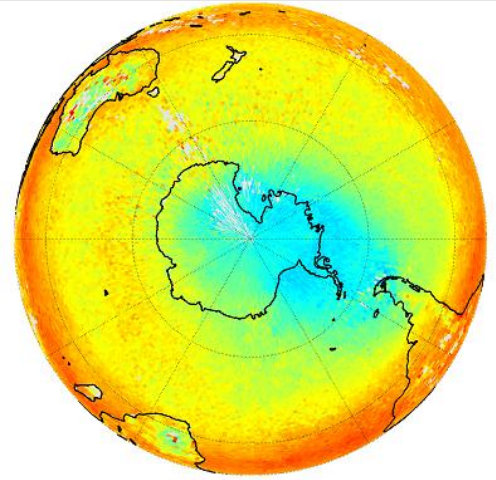
June (1 Wk)

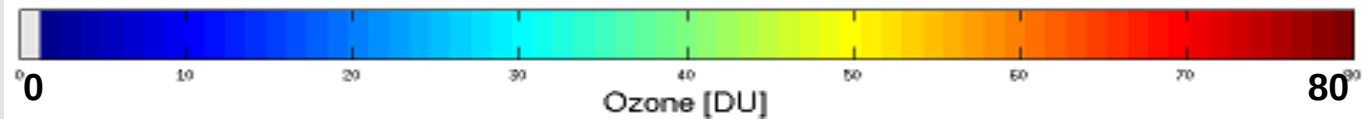


Sept (1 Wk)

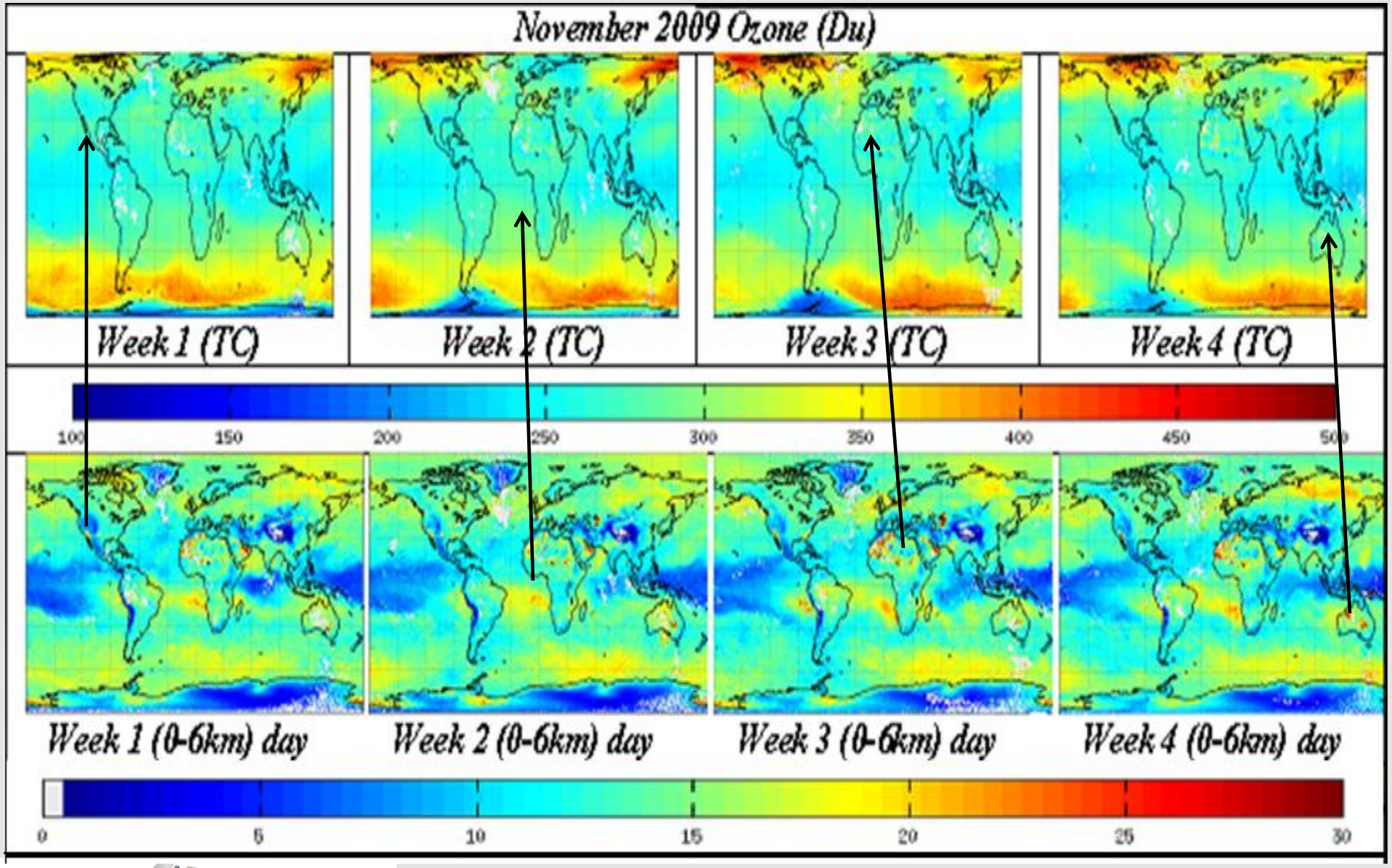


Nov (1 Wk)

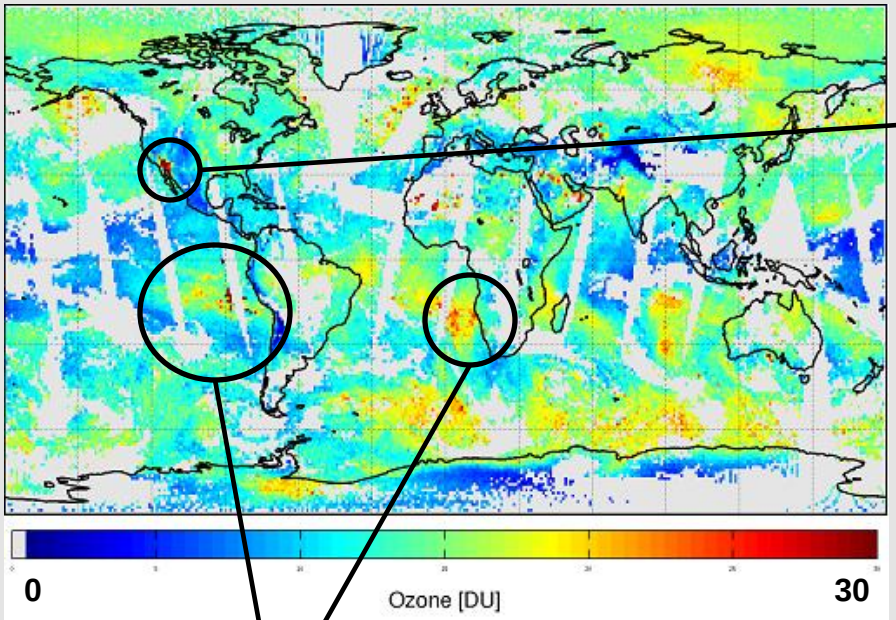




Tropospheric Ozone from IASI using FORLI

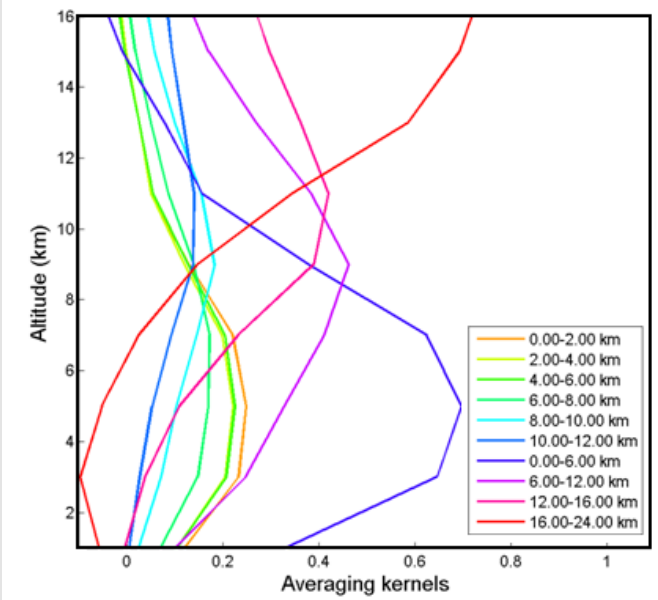

November 2009 Ozone (Du)
Week 1 (TC)
Week 2 (TC)
Week 3 (TC)
Week 4 (TC)
100
150
200
250
300
350
400
450
500
Week 1 (0-6km) day
Week 2 (0-6km) day
Week 3 (0-6km) day
Week 4 (0-6km) day
0
5
10
15
20
25
30

0 – 5 km



High thermal contrast is observed

DOFS

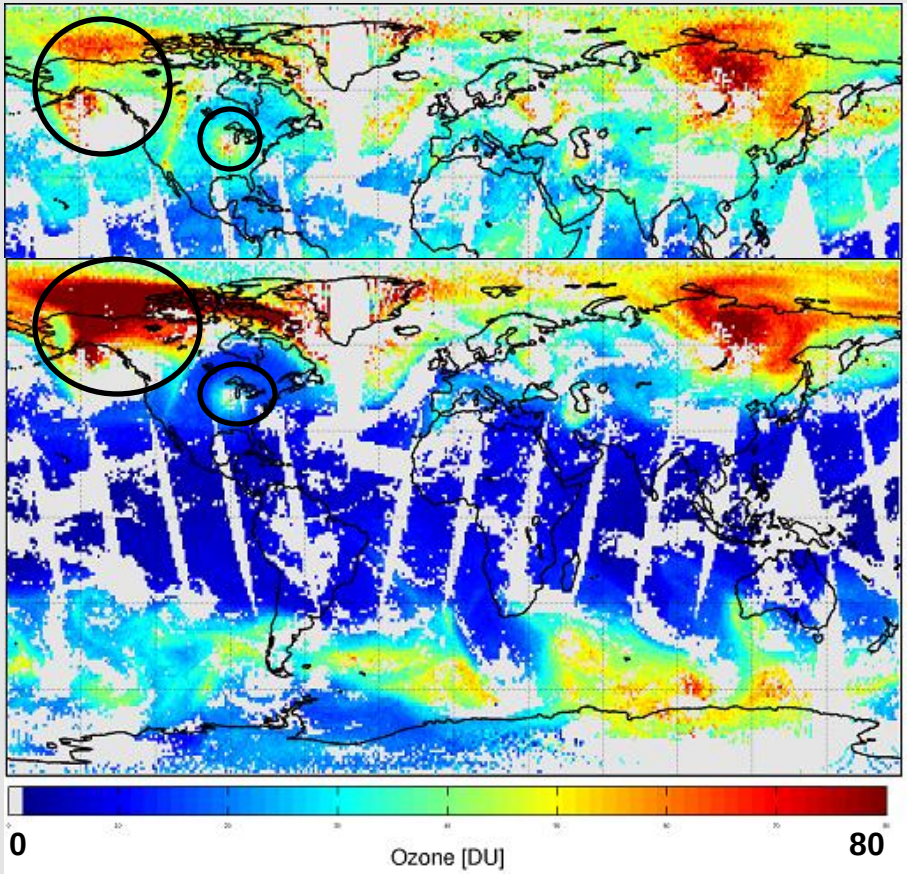


Low Lying Clouds ?

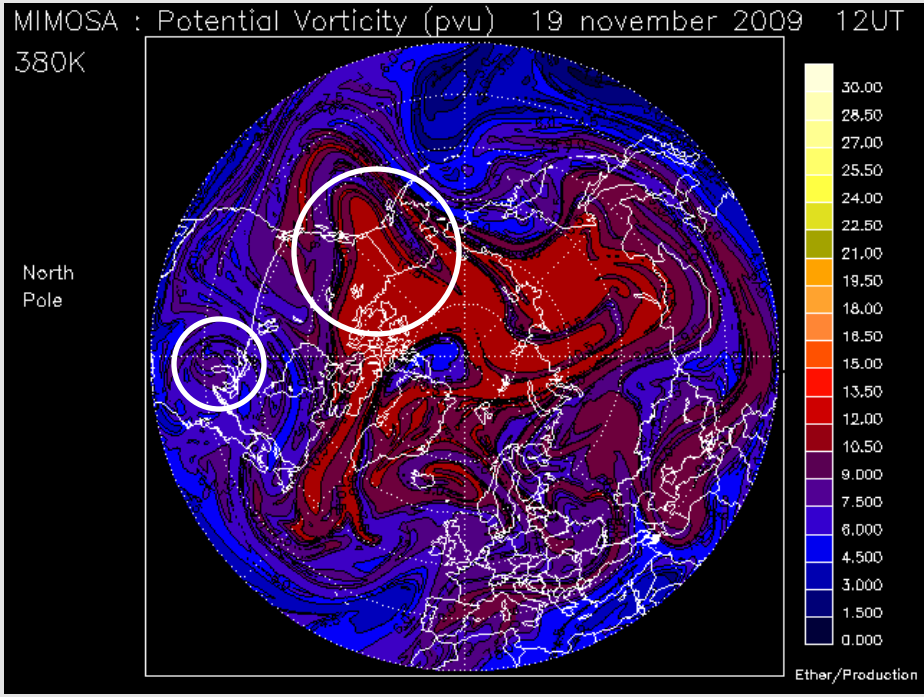
High sensitivity towards the ground

DOFS = 2.82

5 – 10 km



10 – 15 km



IASI/GOME 2 Combined Product

- **O3MSAF Network – LATMOS, ULB, KNMI**
- **IASI/GOME 2 Intercomparison**
- **Validation with ozone sonde**

THANK YOU FOR YOUR ATTENTION

LATMOS ULB