



MIPAS O<sub>3</sub>  
ACVT - GBMCD

Thomas Blumenstock

IMK, Forschungszentrum Karlsruhe



Comparisons with MIPAS data prov. by:

Ian Boyd, NIWA

C. De Clercq, J.-C. Lambert, BIRA

S. Mikuteit, IMK-FZK

H. Schets, RMI

S. Wood, NIWA



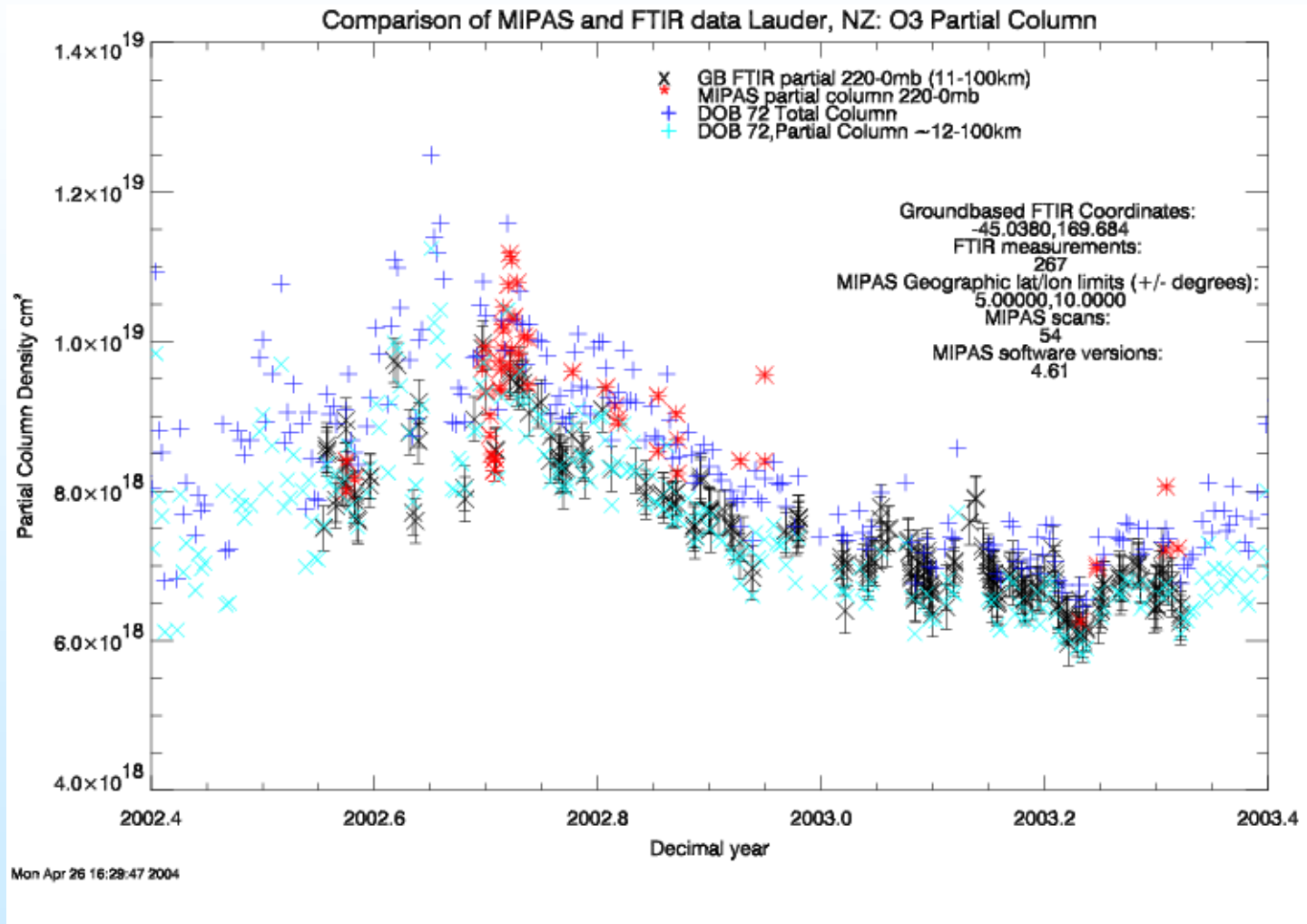
## Instruments used [AOID]

	Latitude	Sondes	LIDAR	MWR	FTIR
Kiruna	68 N				191
Uccle	51 N	300			
Hohenpeiss.	48 N		158		
Payerne	46 N	158		158	
Mauna Loa	20 N	179	179	179	
Lauder	45 S	179	9003	179	126
Arrival H.	78 S				126

# FTIR Lauder

Partial  
 columns  
 above 220hPa

S. Wood et al.  
 AOID 126  
 (M. De  
 Maziere)

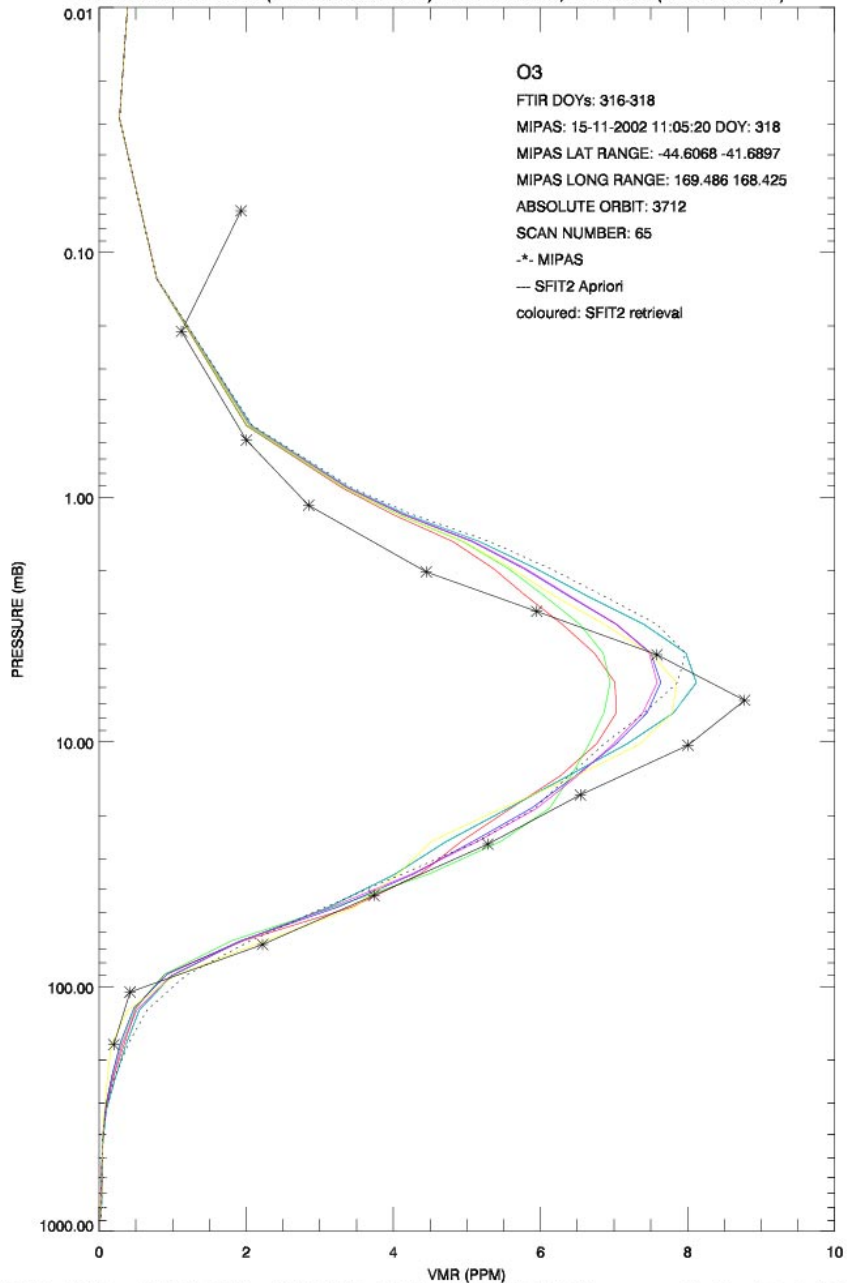


# FTIR Lauder

S. Wood et al.

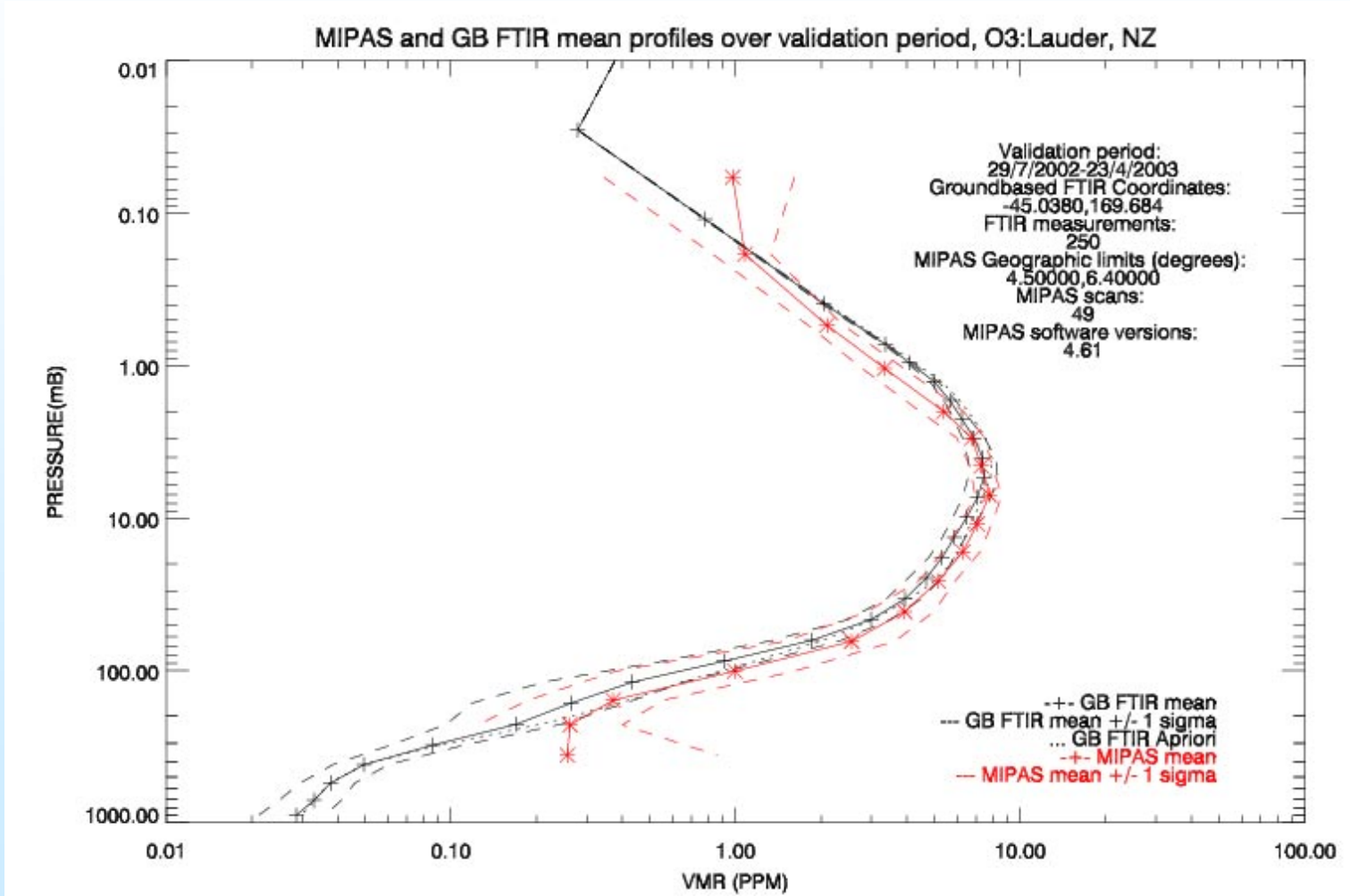
AOID 126  
(M. De Maziere)

COMPARISON OF MIPAS(ODP PRODUCT 4.61) AND FTIR DATA,LAUDER NZ(45.04S 169.68E)



# FTIR Lauder

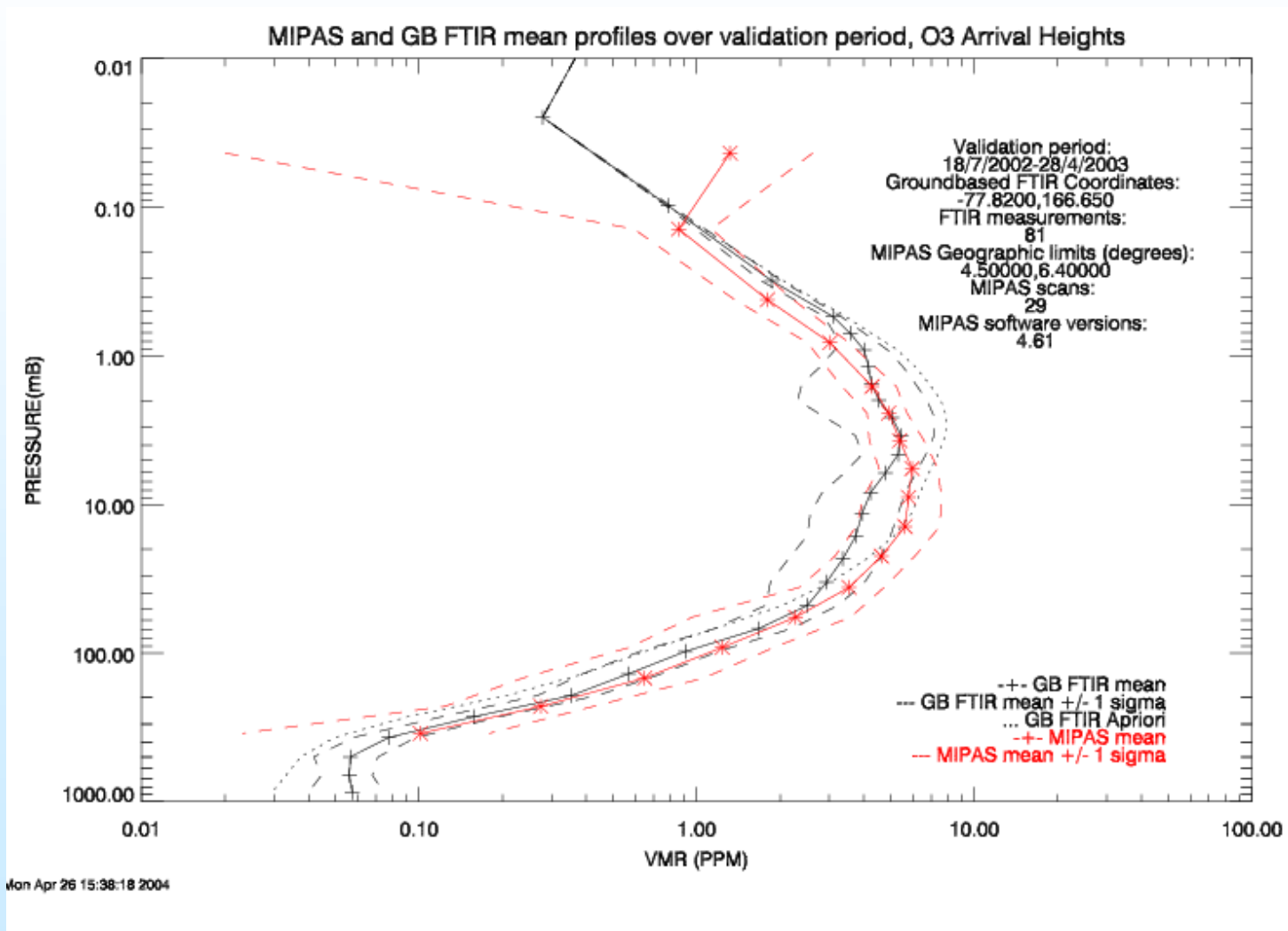
S. Wood et al.  
 AOID 126  
 (M. De  
 Maziere)



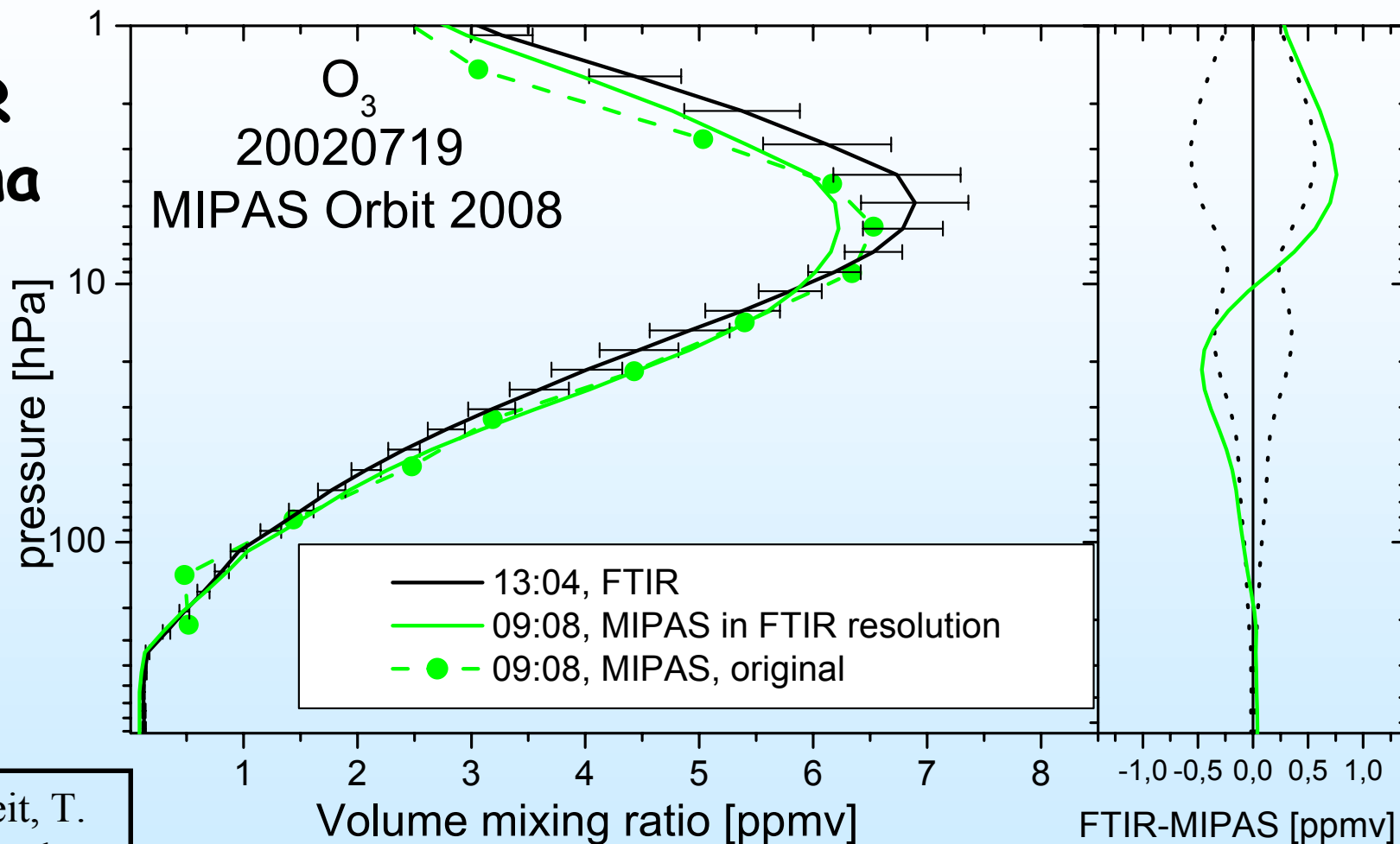
# FTIR Arrival Heights Antarct.

S. Wood et al.

AOID 126  
(M. De Maziere)

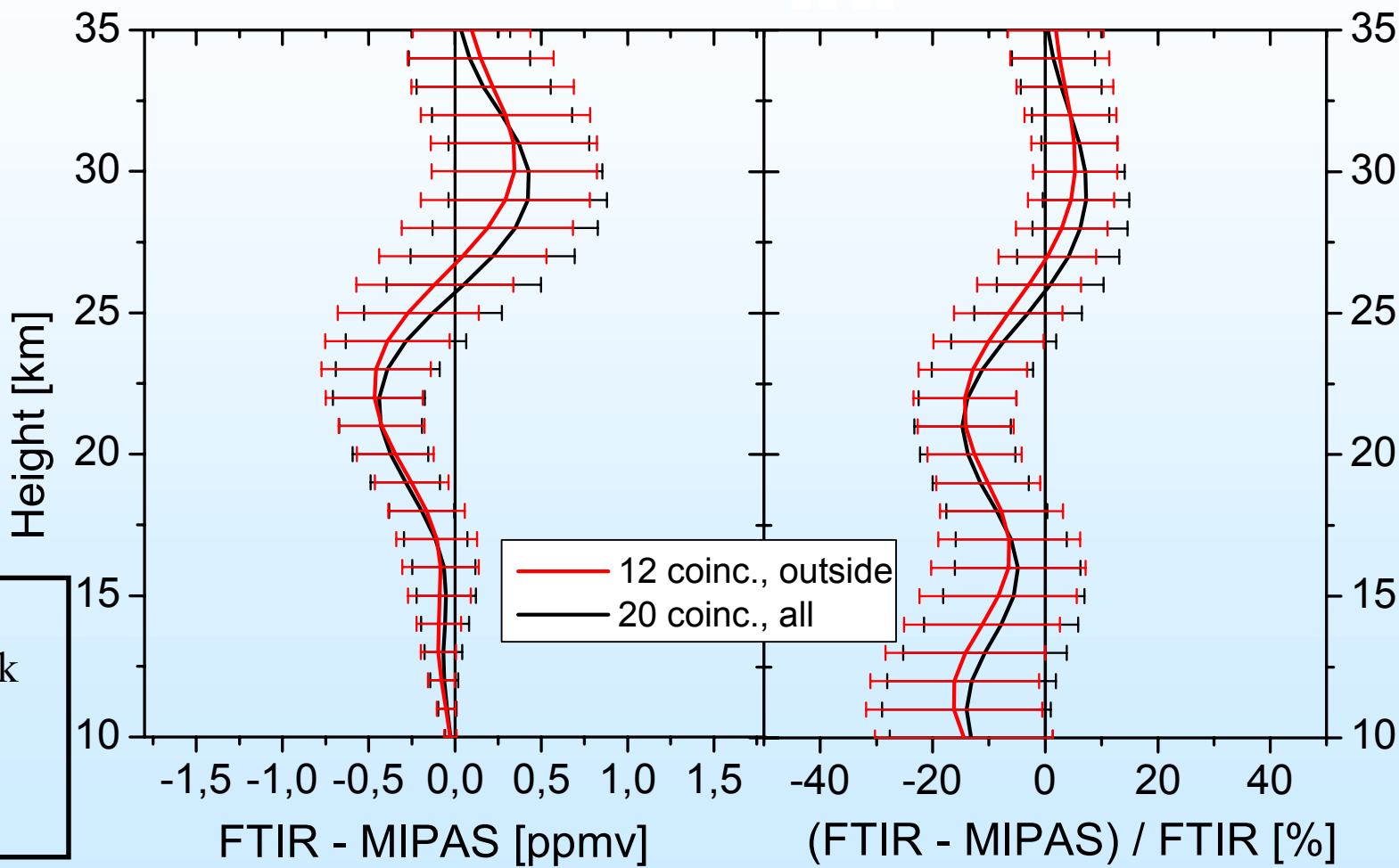


FTIR  
Kiruna



S. Mikuteit, T. Blumenstock et al., AO 191

# FTIR Kiruna



S. Mikuteit  
T. Blumenstock  
F. Hase  
U. Raffalski  
et al., AO 191

## Comparisons with ground-based FTIR

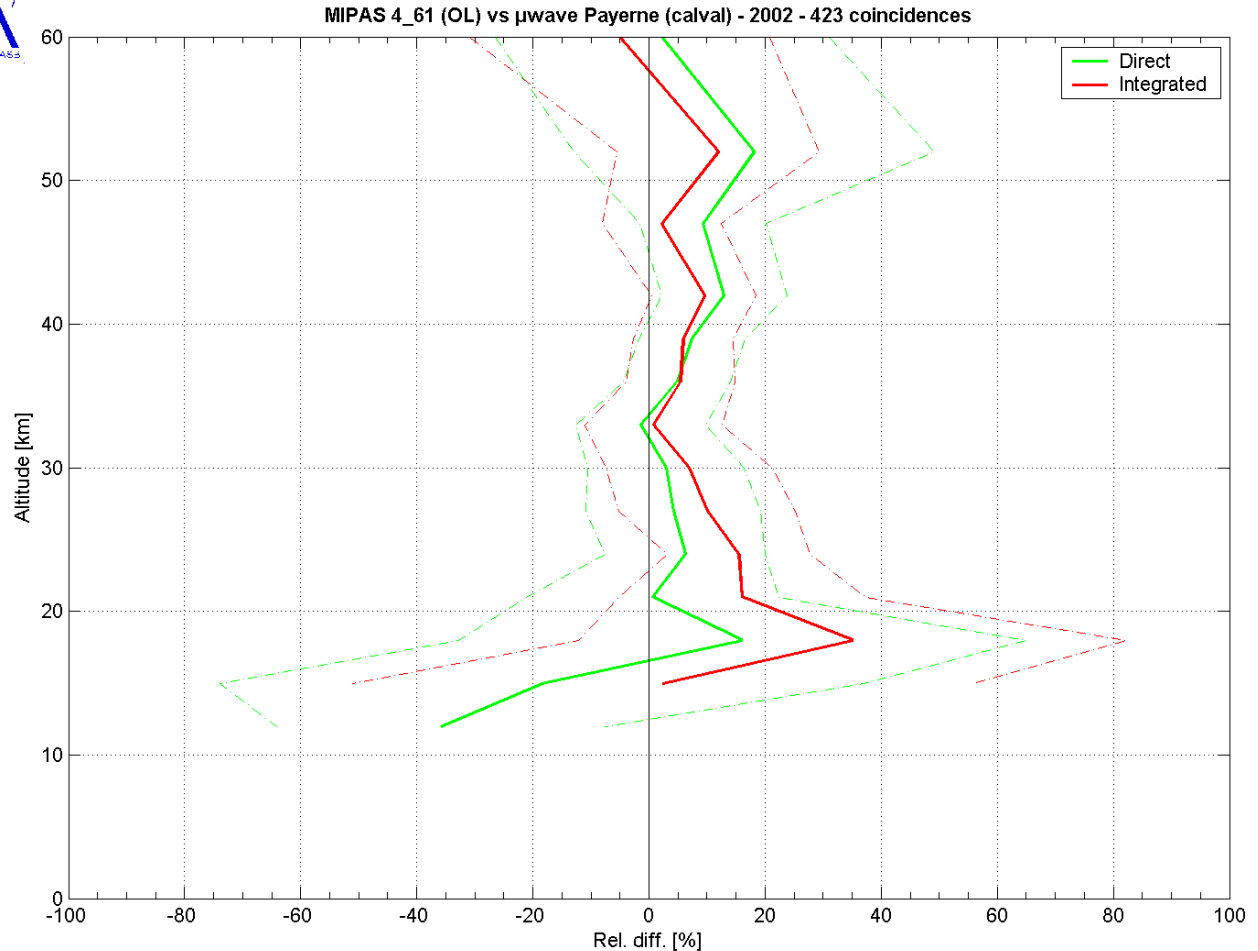
### Differences:

- Lauder: mean profiles differ < 10%
- Arrival Heights: up to 20% 25-30 km
- Kiruna: 15 - 30 km: within +/- 12%  
max. @ 22 km
- Typ. error (prec.) of FTIR O<sub>3</sub> profiles: 10%  
columns: 3%
- Conclusion: agreement within combined error
- partial columns still to be investigated

# MWR

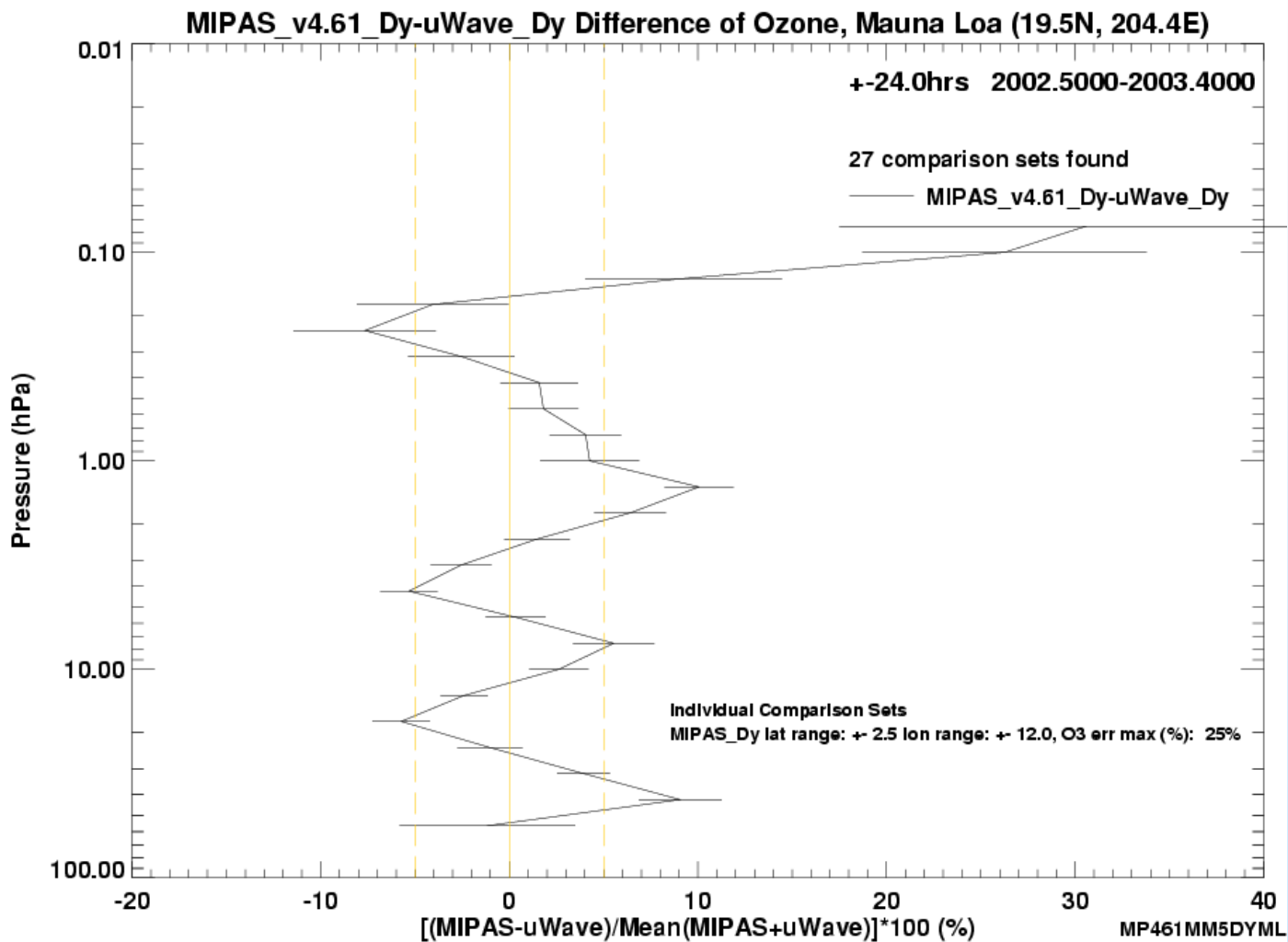
Microwave Radiometer  
 Payerne, CH  
 Y. Calisesi

AOID 158,  
 C. De Clercq,  
 J.-C. Lambert



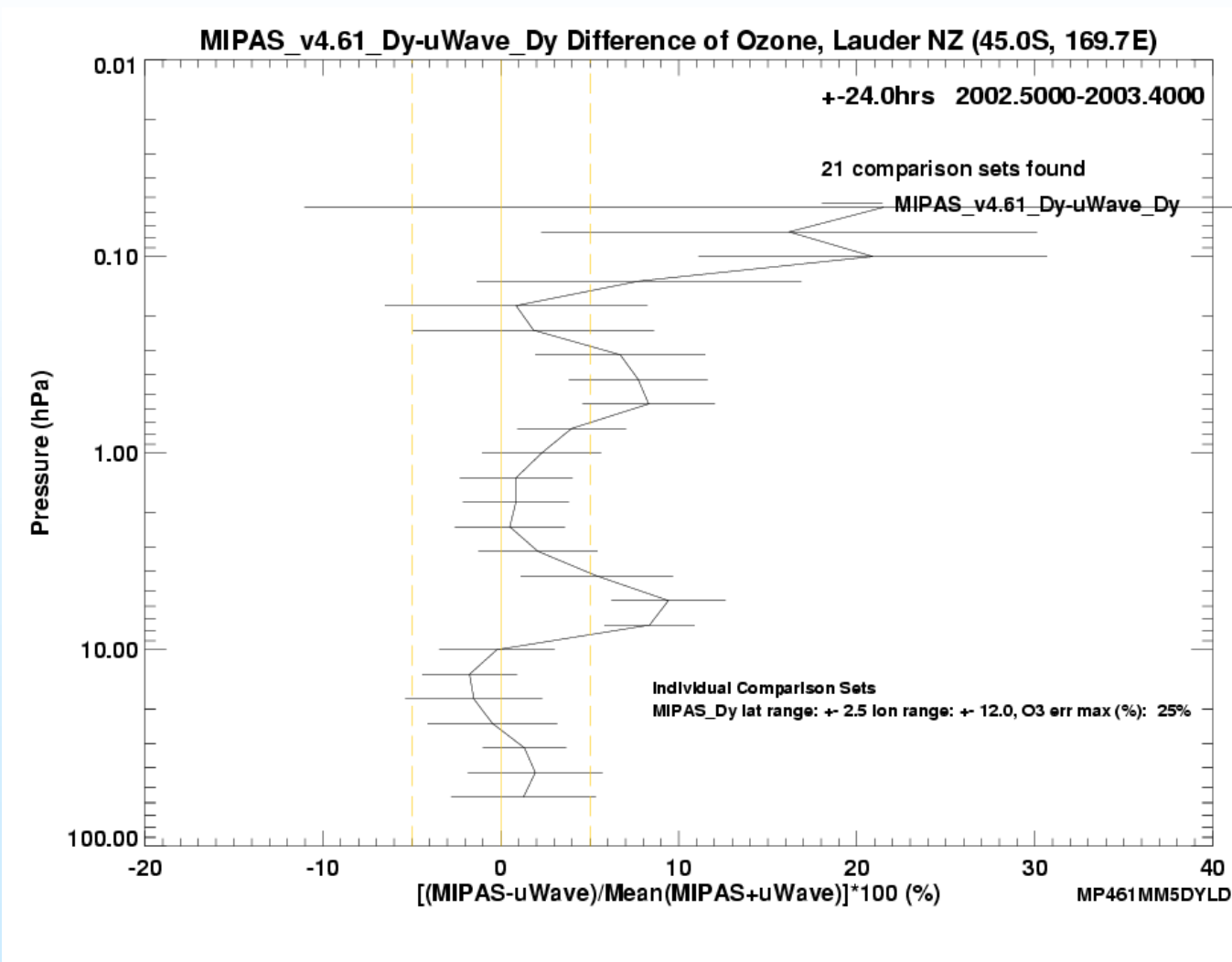
# MWR

MWR  
Mauna Loa  
  
AOID 179,  
I. Boyd



MWR

MWR  
Lauder  
AOID 179,  
I. Boyd



## Comparisons with microwave radiometers (MWR)

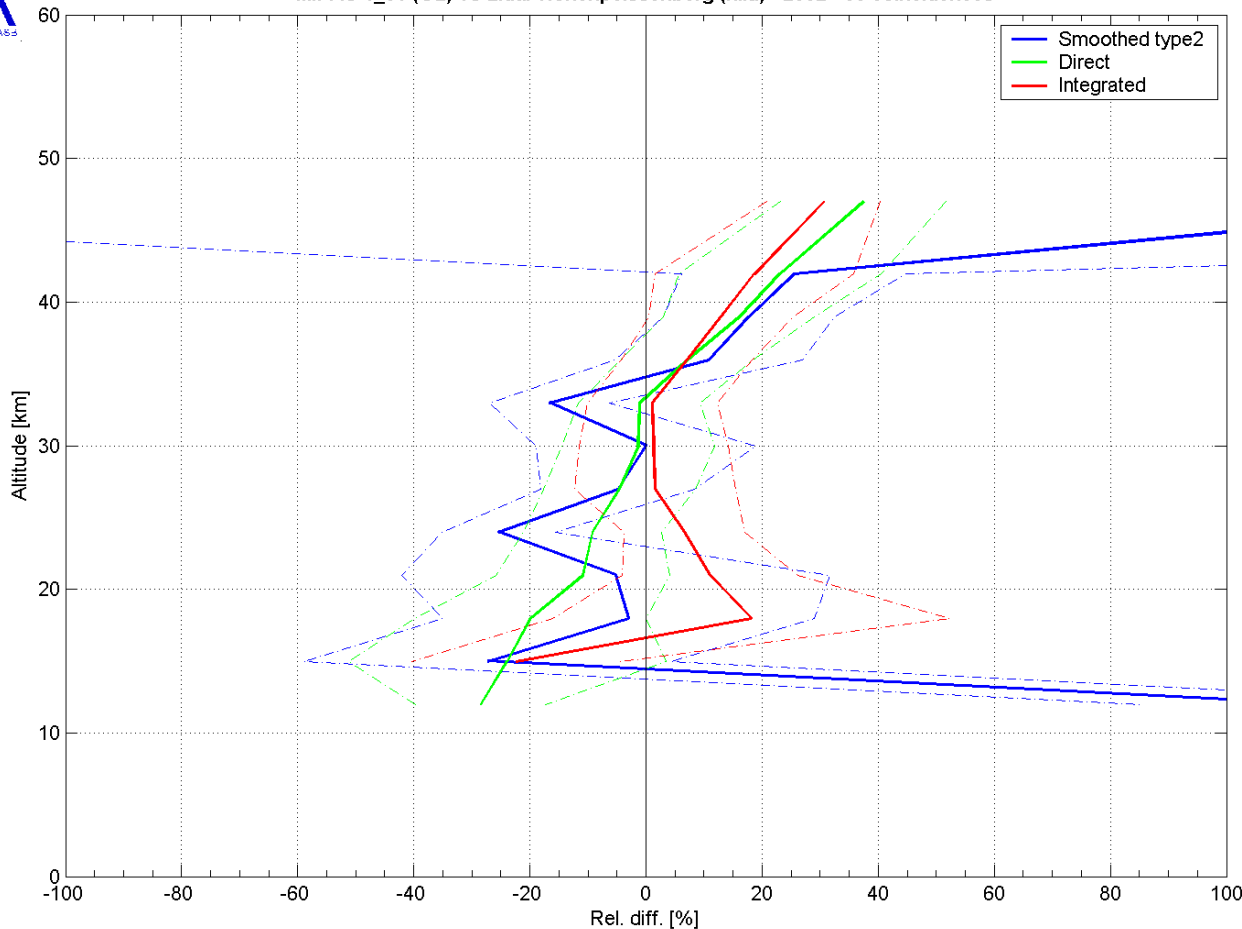
### Differences:

- Lauder: up to ~ 30 km: +/- 5%
- ~ 30 - 50 km: +/- 10%, above increasing
- Mauna Loa: ~ 20 km: +/- 10%; 20 - 40 km: +/- 5%
- ~ 50 km: +/- 10%, above increasing
- Payerne: > ~ 20 km: +/- 10%, below increasing
- Typ. error of MWR O<sub>3</sub> profiles: 20- 40 km: 10 %
- Conclusion: agreement within combined error up to ~50 km

# LIDAR



MIPAS 4\_61 (OL) vs Lidar Hohenpeissenberg (nilu) - 2002 - 60 coincidences



IASB, Brussels, Apr-2004

LIDAR  
Hohenpeissen-  
berg  
H. Claude,  
W. Steinbrecht

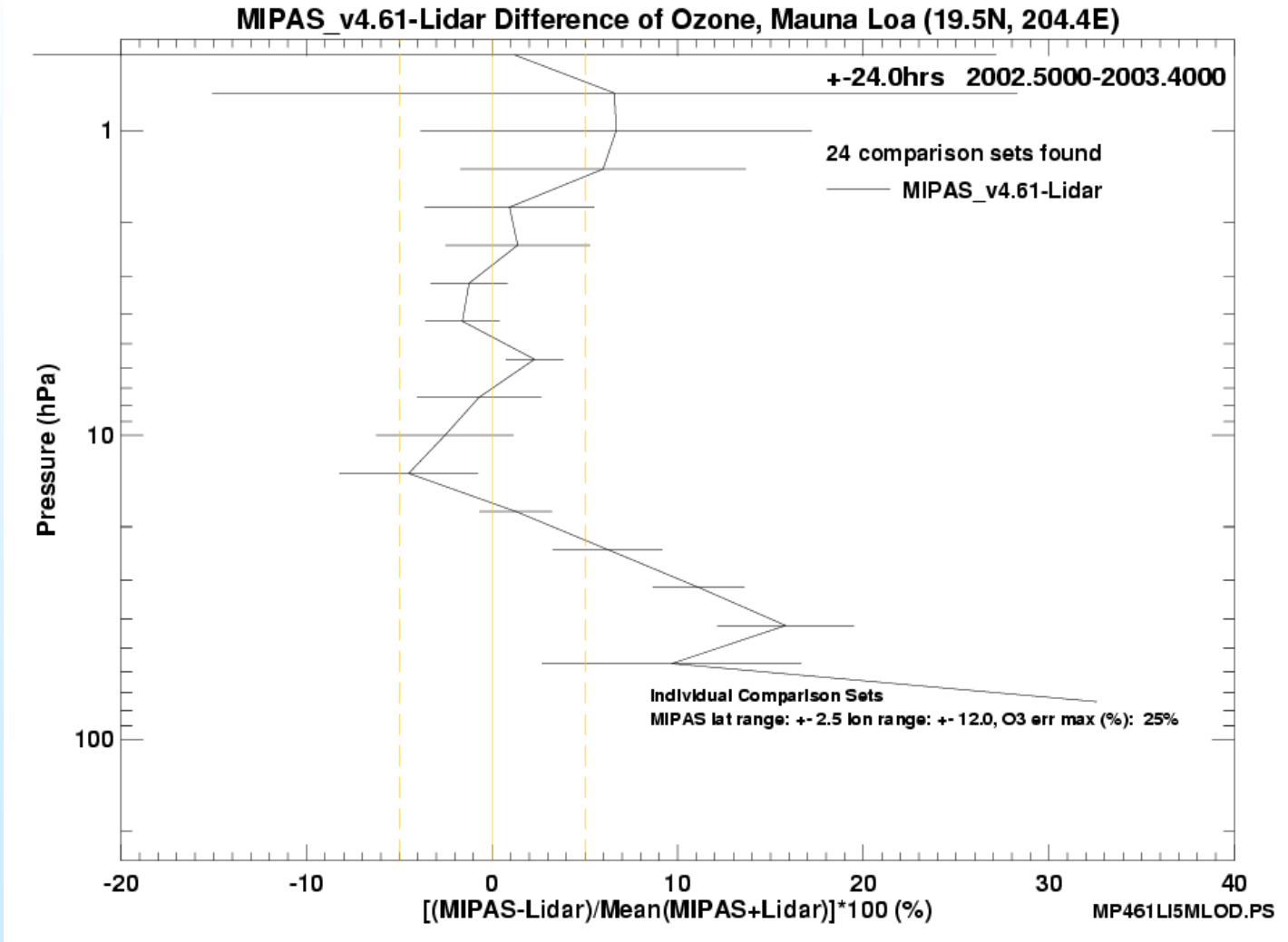
AOID 158,  
C. De Clercq,  
J.-C. Lambert

# LIDAR



Mauna Loa  
S. McDermid,  
JPL

AOID179  
I. Boyd



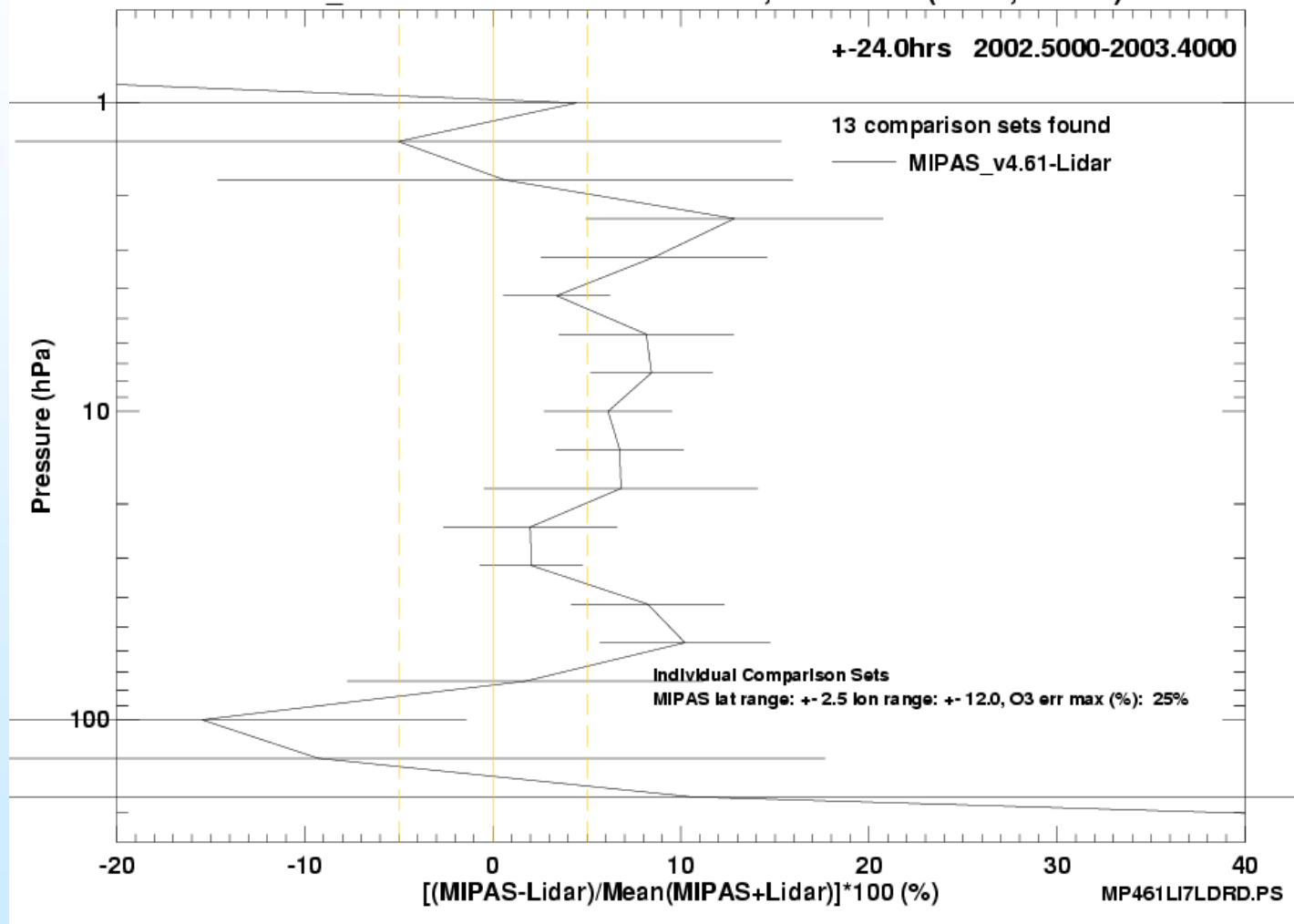
# LIDAR



Lauder, NZ  
D. Swart,  
RIVM

AOID 9003,  
I. Boyd

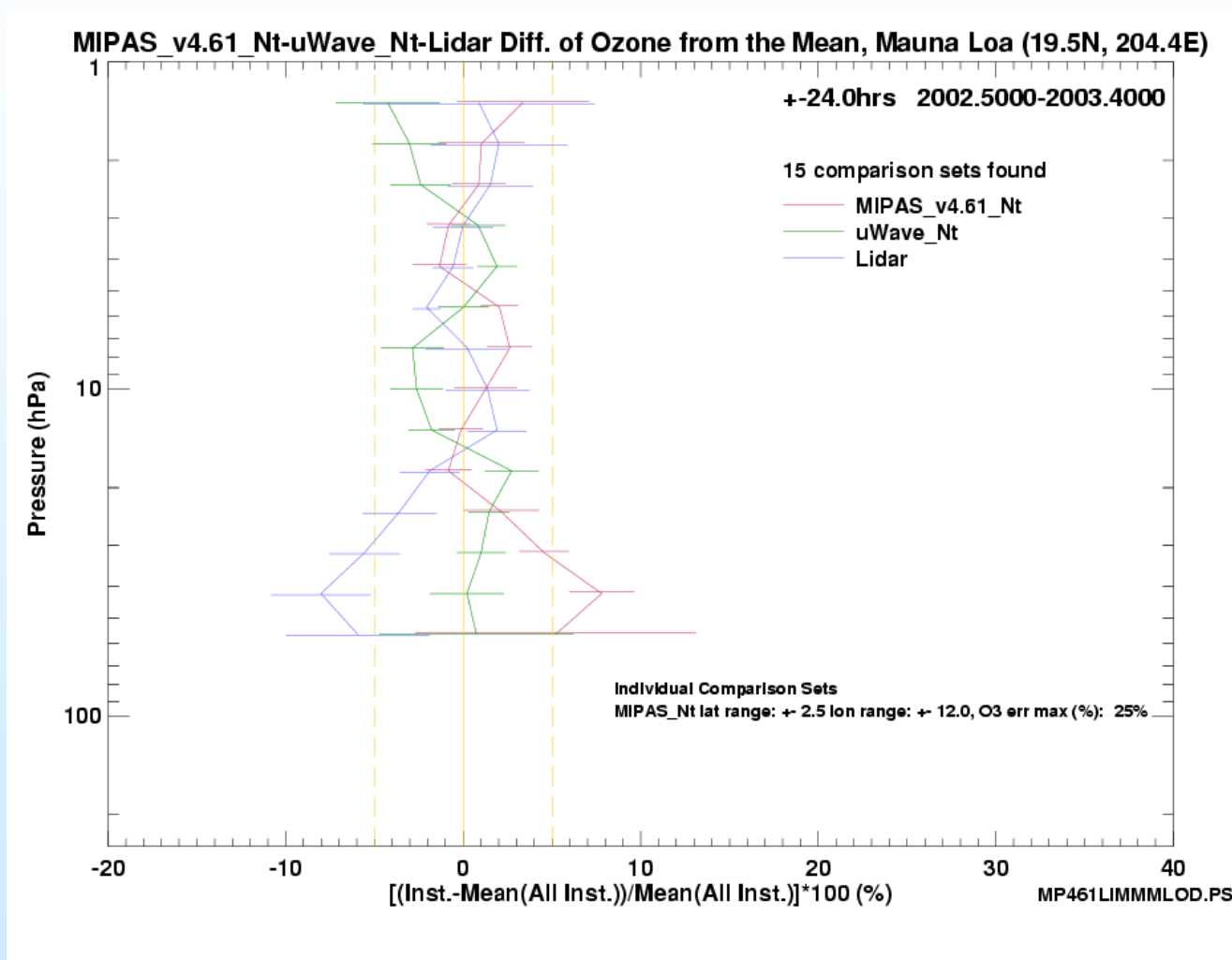
MIPAS\_v4.61-Lidar Difference of Ozone, Lauder NZ (45.0S, 169.7E)



MWR  
+  
LIDAR

Mauna Loa  
S. McDermid,  
JPL

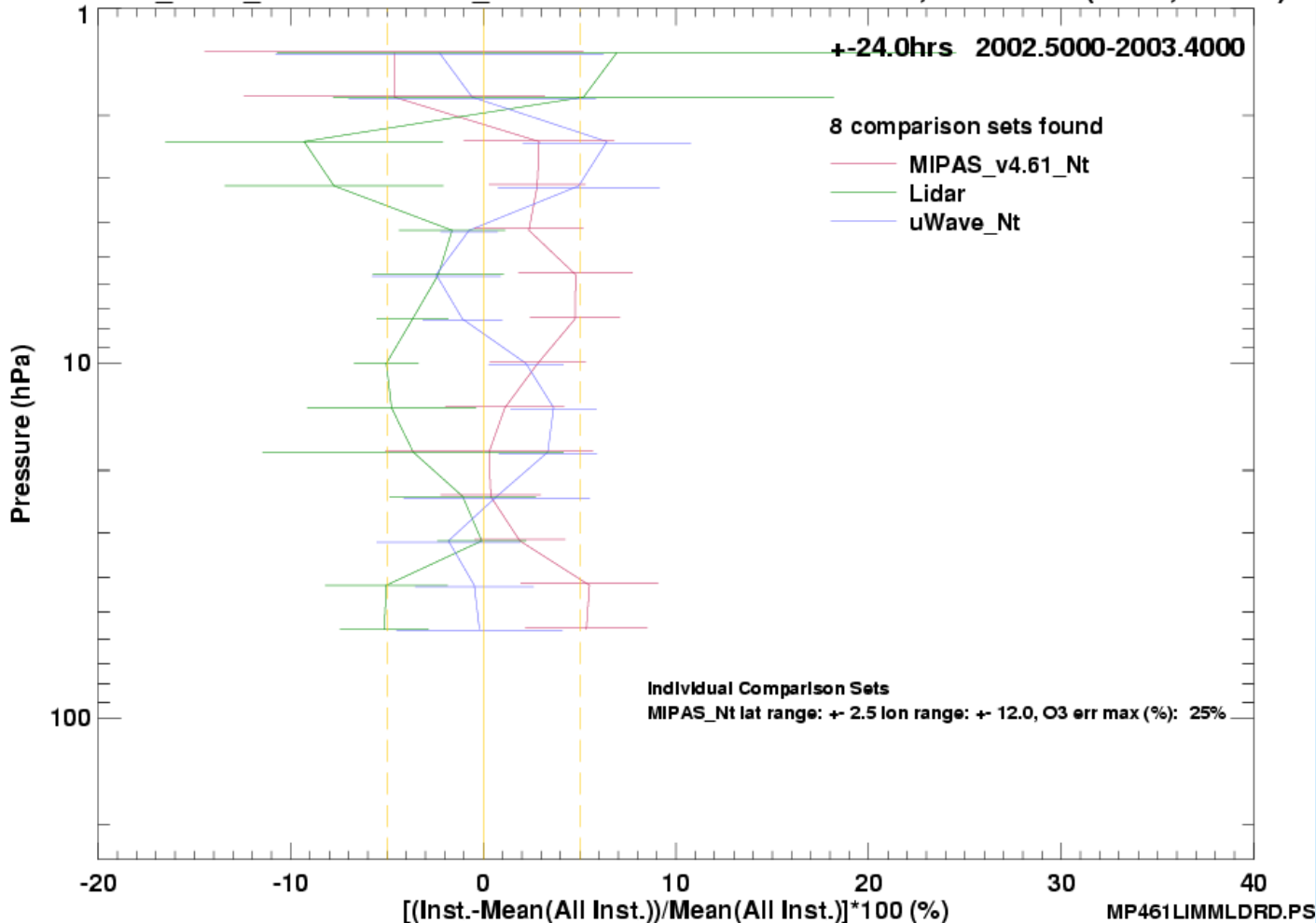
AOID179  
I. Boyd



MWR  
+  
LIDAR

Lauder, NZ  
D. Swart,  
RIVM  
  
AOID 9003,  
I. Boyd

MIPAS\_v4.61\_Nt-Lidar-uWave\_Nt Diff. of Ozone from the Mean, Lauder NZ (45.0S, 169.7E)



## Comparisons with LIDAR

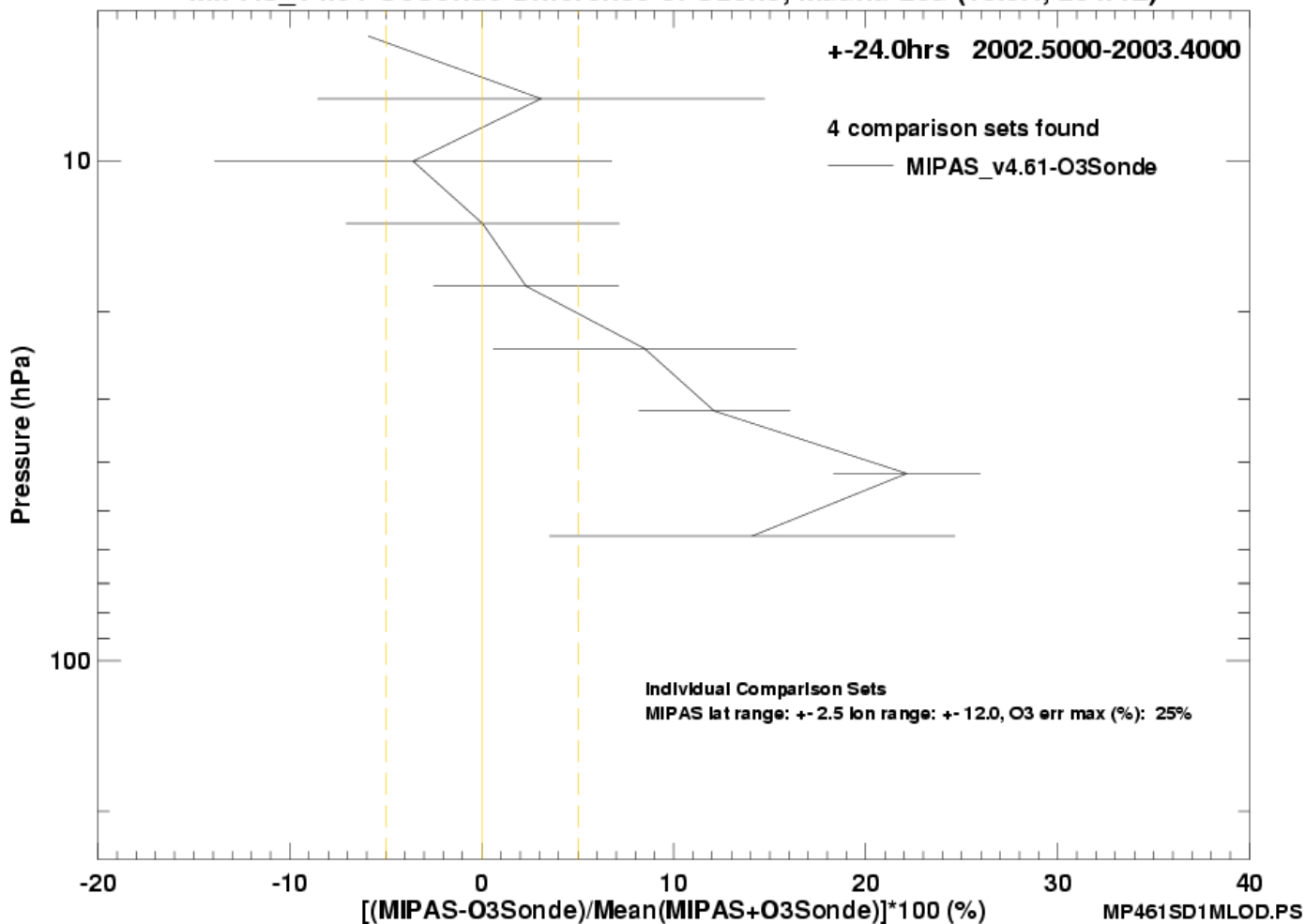
### Differences:

- Lauder: 20 - 40 km: +/- 10%
- MIPAS VMR < LIDAR VMR : ~ 5%
- Mauna Loa: 30 - 50 km: +/- 5%
- < 25 km: +/- 15%
- Hohenpeissenberg: 20 - 40 km: +/- 10%
- Typ. error of LIDAR O<sub>3</sub> profiles: 20 - 40 km: 5%;  
below and above: 10%, increas. at top & bottom
- Conclusion: 20 - 40 km: agreement within combined error

# Ozone Sondes

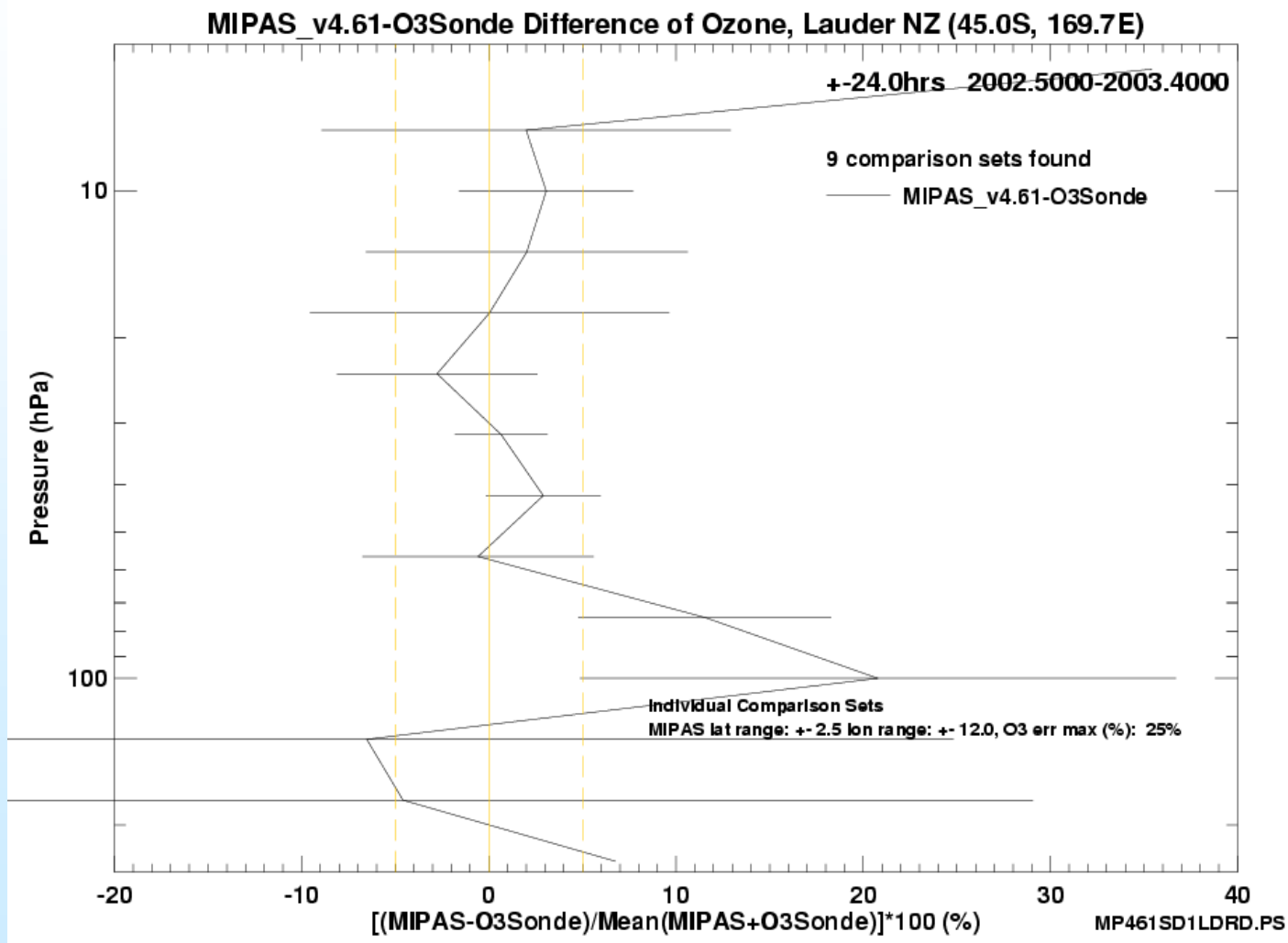
Ozone sondes  
Mauna Loa,  
S. Oltmans,  
NOAA  
AOID 179,  
I. Boyd et al.

MIPAS\_v4.61-O3Sonde Difference of Ozone, Mauna Loa (19.5N, 204.4E)



# Ozone Sondes

Ozone sondes  
Lauder,  
AOID 179,  
I. Boyd et al.

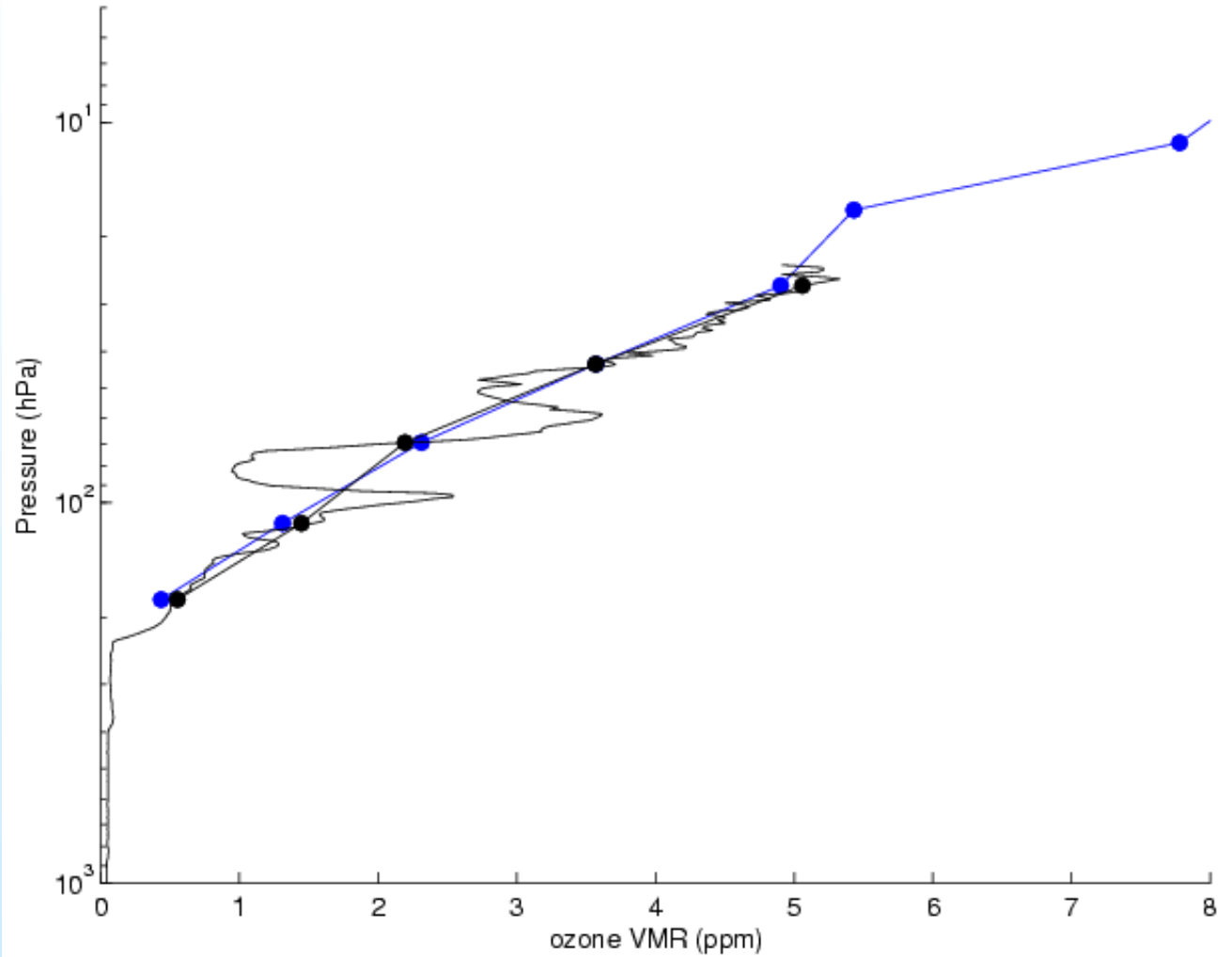




# Ozone Sondes

March 19, 2004  
 Sonde: 10:12  
 MIPAS: 11:15

O3 sondes  
 Uccle,  
 AOID 300,  
 H. Schets et al.

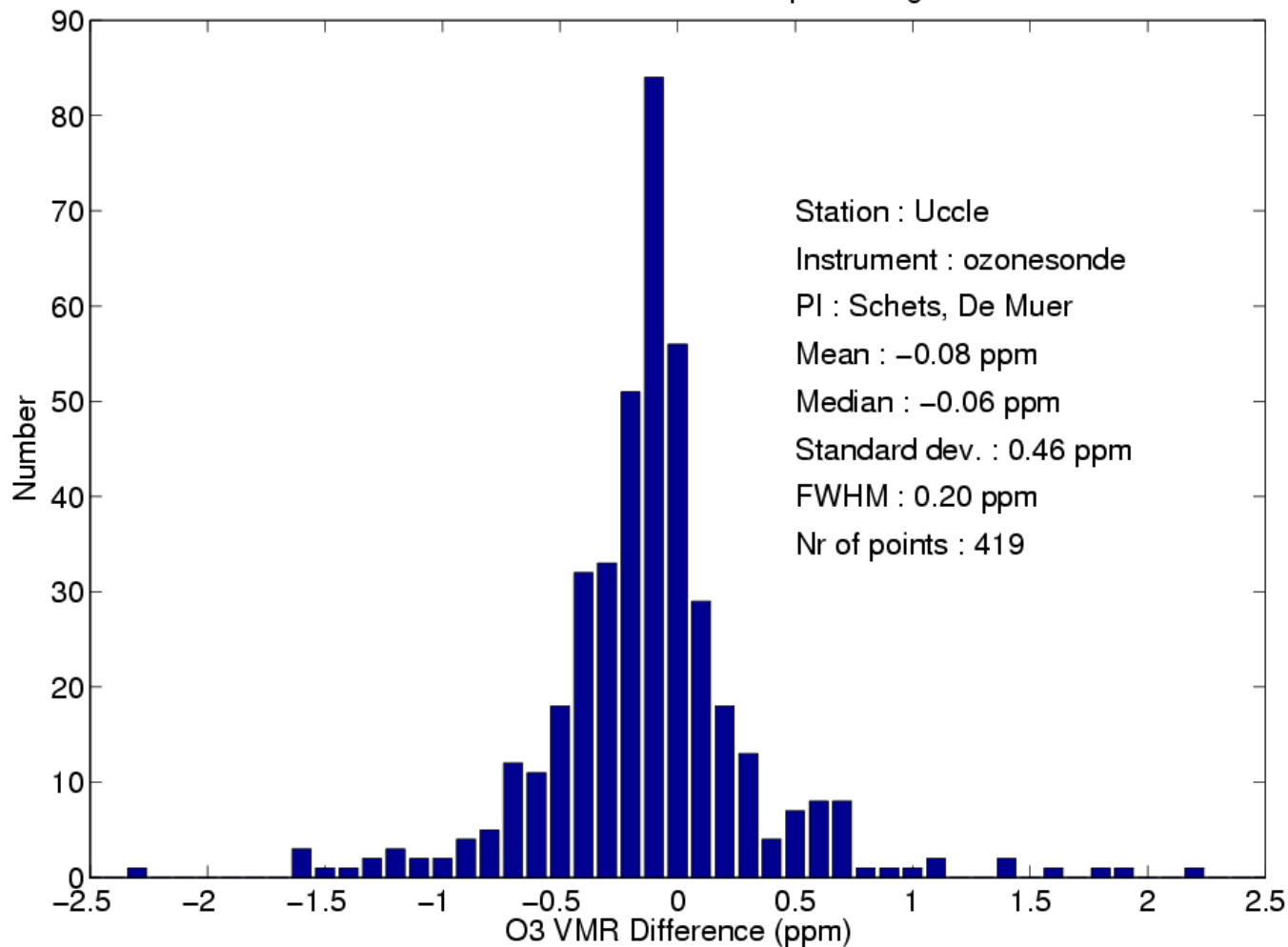


# Ozone Sondes

64 coinc.  
419 data points

O3 sondes  
Uccle,  
AOID 300,  
H. Schets et al.

MIPAS vs. ozonesonde on a pressuregrid



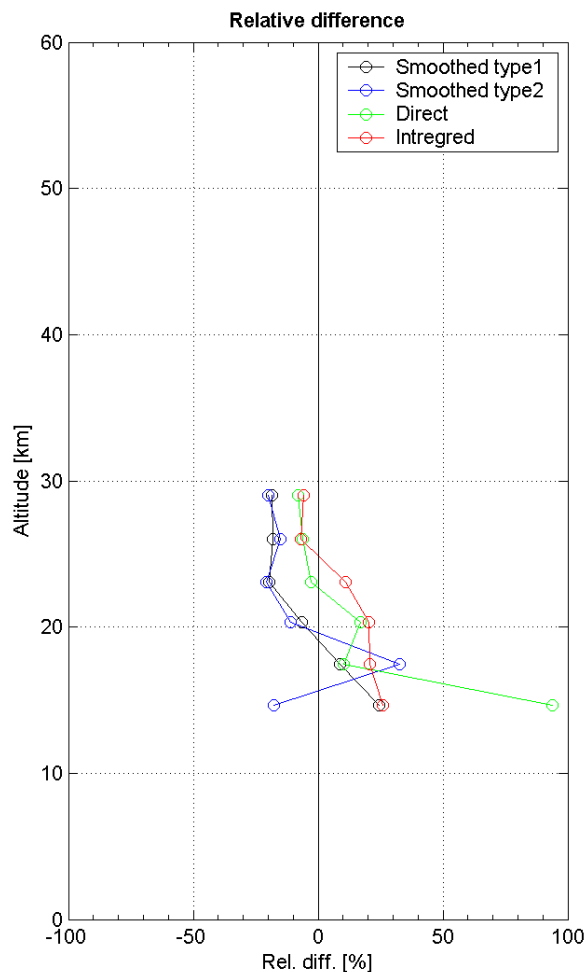
# Ozone Sondes



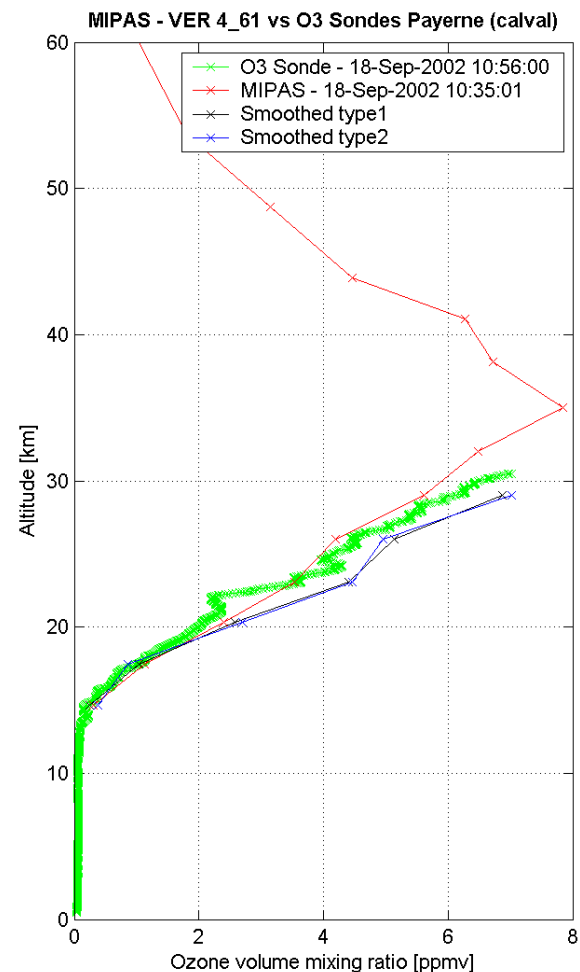
Sept. 18, 2002  
Sonde: 10:56  
MIPAS: 10:35

O3 sondes  
Payerne, CH  
R. Stübi

AOID 158,  
C. De Clercq,  
J.-C. Lambert



IASB, Brussels, Apr-2004



# Ozone Sondes

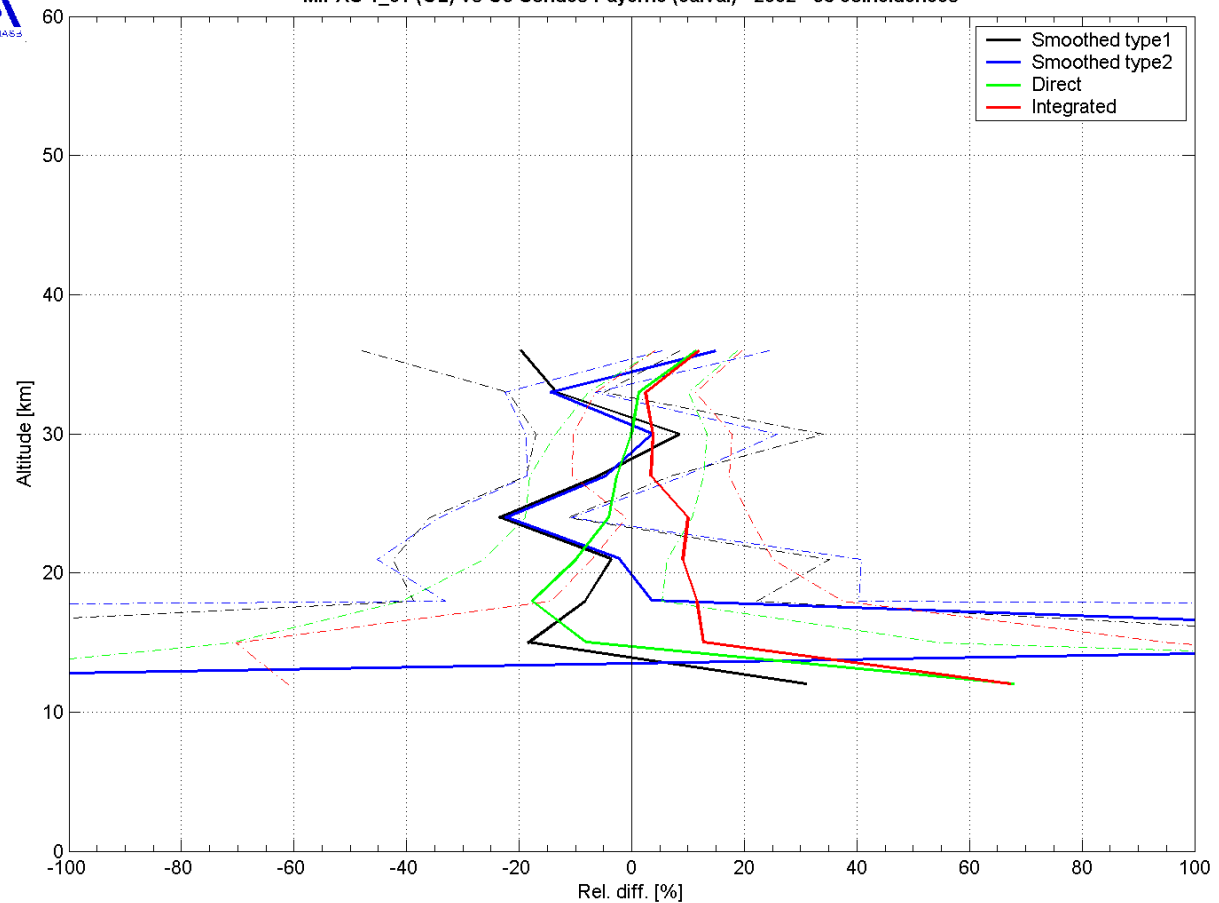


O3 sondes  
Payerne, CH  
R. Stübi

AOID 158,  
C. De Clercq,  
J.-C. Lambert



MIPAS 4\_61 (OL) vs O3 Sondes Payerne (calval) - 2002 - 98 coincidences



IASB, Brussels, Apr-2004

## Comparisons with O<sub>3</sub> sondes

### Differences:

- Lauder: > 18 km: +/- 5%, below increasing
- Mauna Loa: > 30 km: +/- 5%
- > 25 km: +/- 10%, below increasing
- Payerne: > 20 km: +/- 10%, below increasing
- Uccle: histogram: FWHM 0.2 ppmv
- Typ. error of O<sub>3</sub> sondes: 10 - 25 km: 3 - 5%;
- below and above: 10%
- Conclusion: > 20 km: agreement within combined error

## Conclusions

### Differences between MIPAS and type of instrument used

Height[km]	Sondes	LIDAR	MWR	FTIR
< 20	>20	> 20		15
20 - 30	10	10	5	12
30 - 40		10	10	
40 - 50 (>50)		> 20	10-20 (20)	

<20 km & > 50 km: MIPAS vmr too large

20-40 km: Differences are within combined error bars