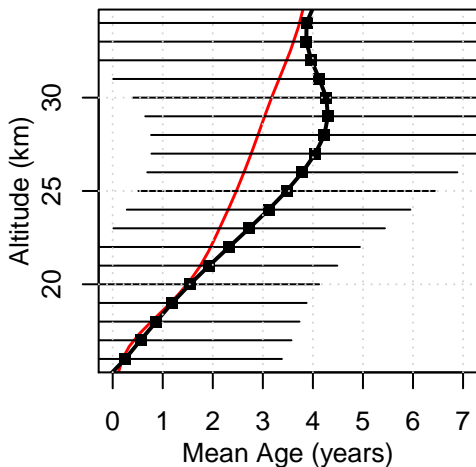
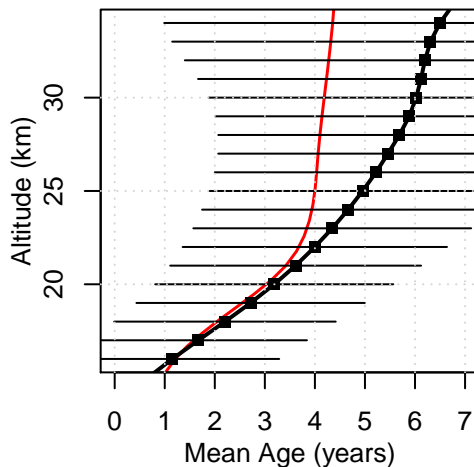


# UKCA xkawa Mean Age of Air

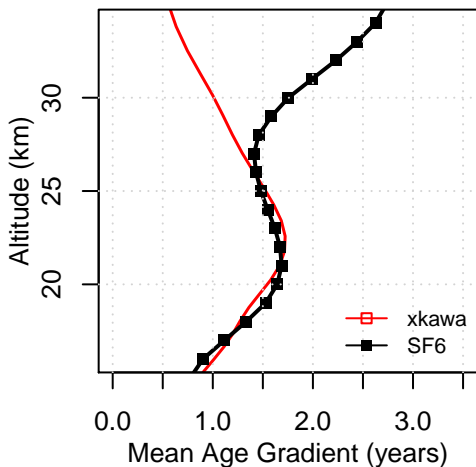
## Tropical Mean Age Profile



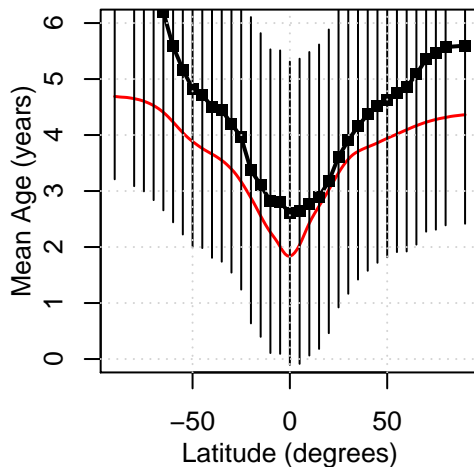
## Midlatitude Mean Age Profile



## Trop-Midlat Mean Age Gradient Prof



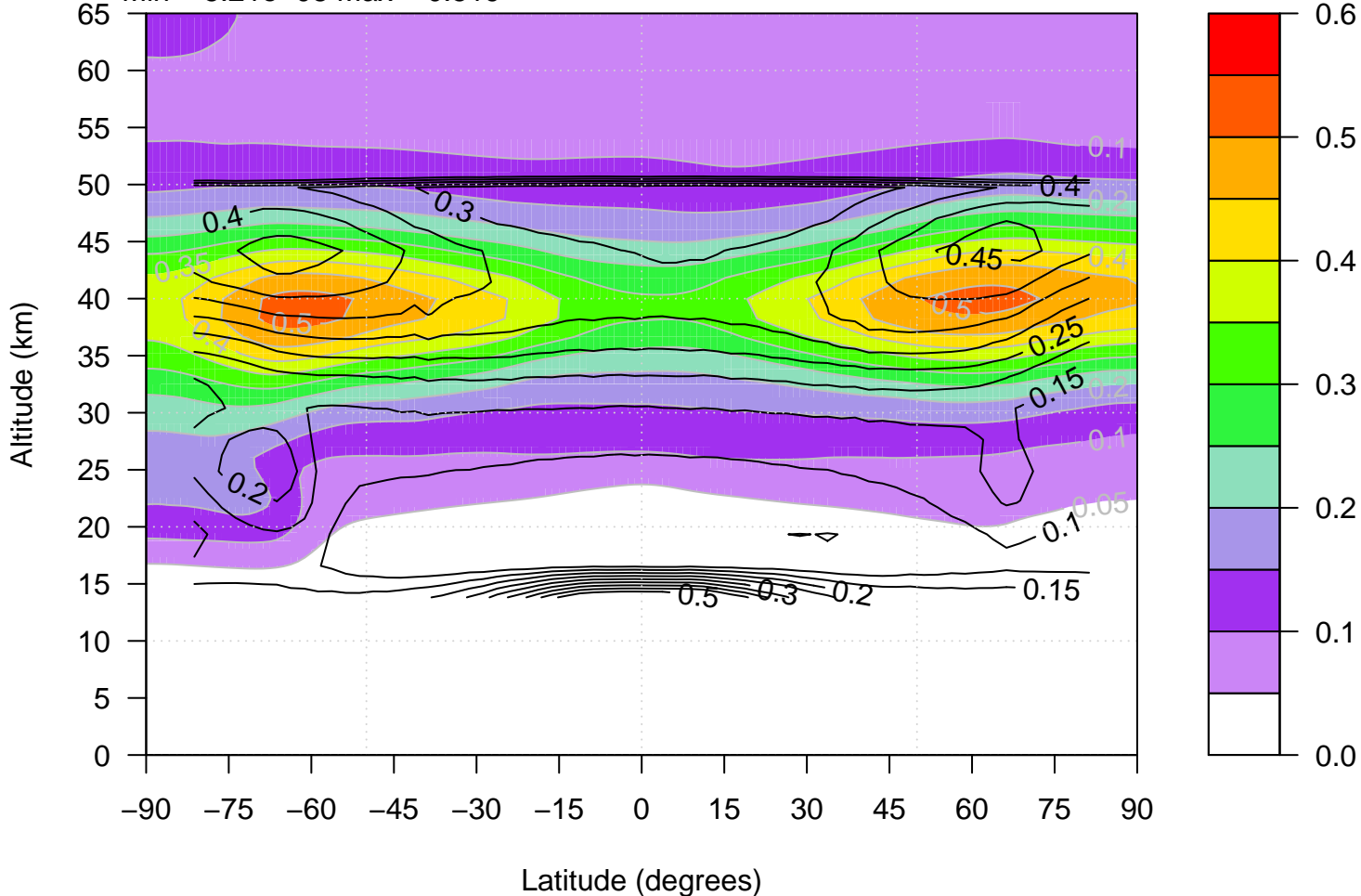
## Mean Age, 23km (~50hPa)

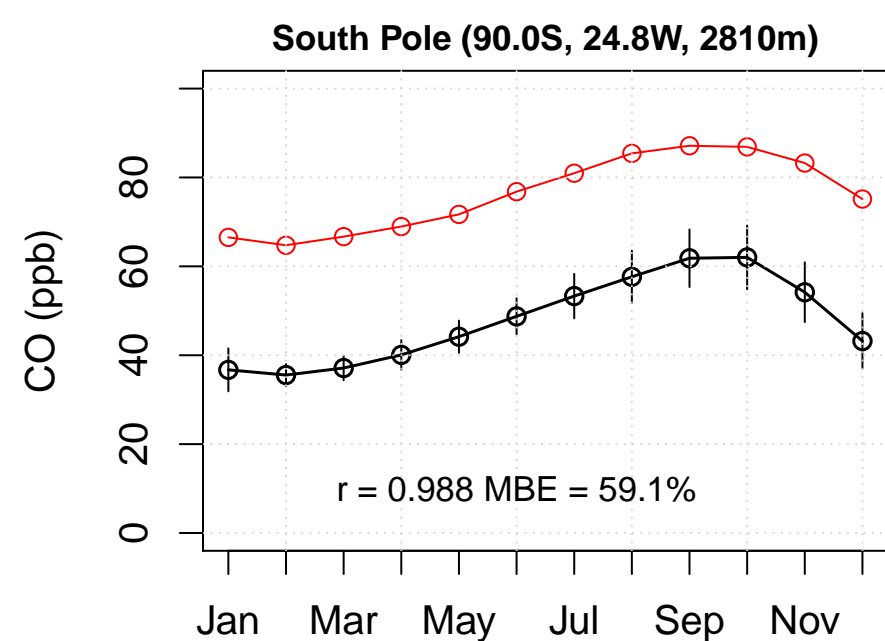
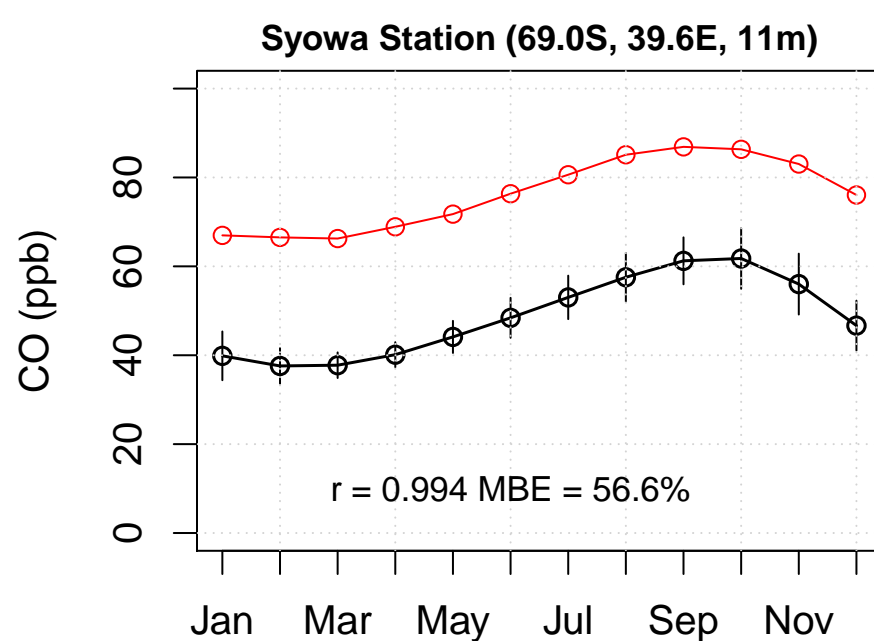
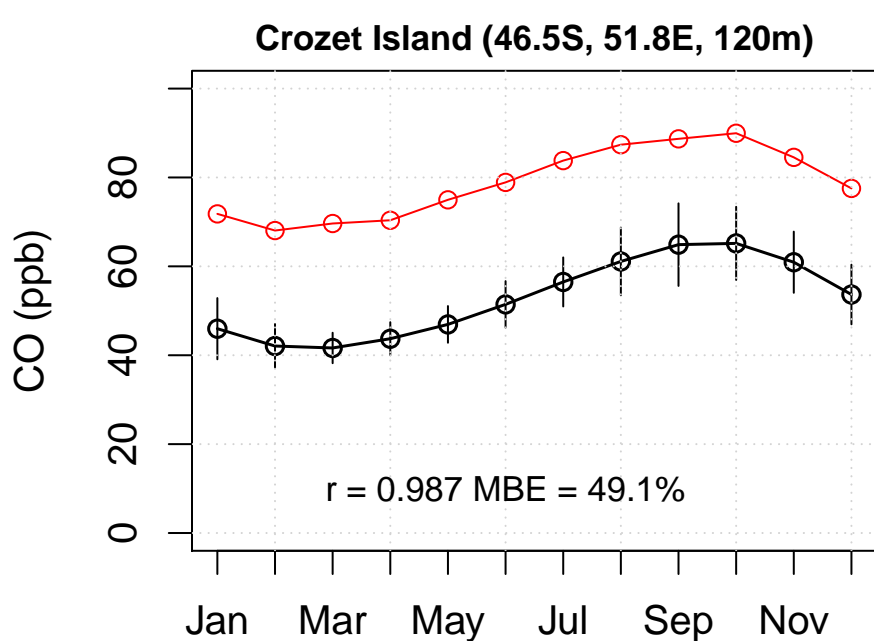
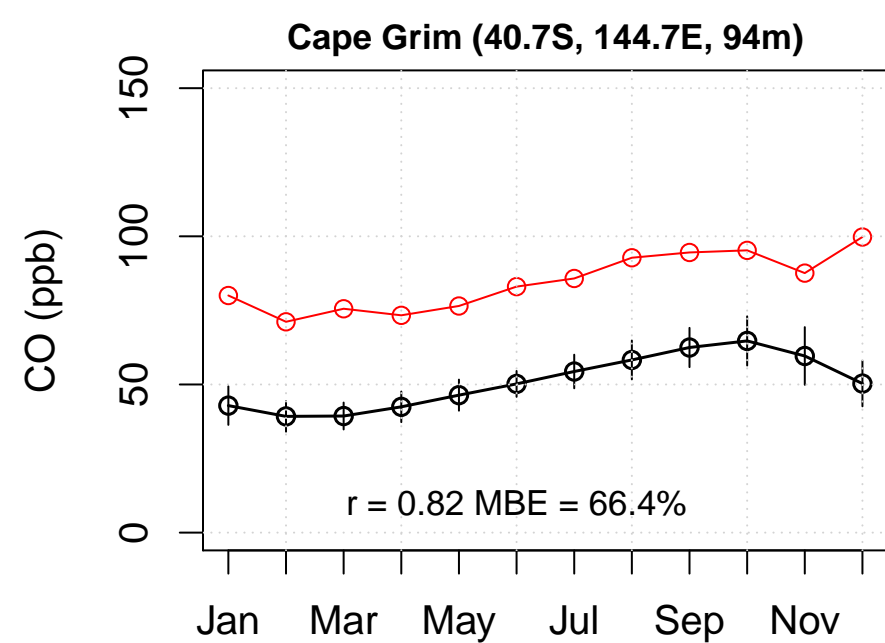
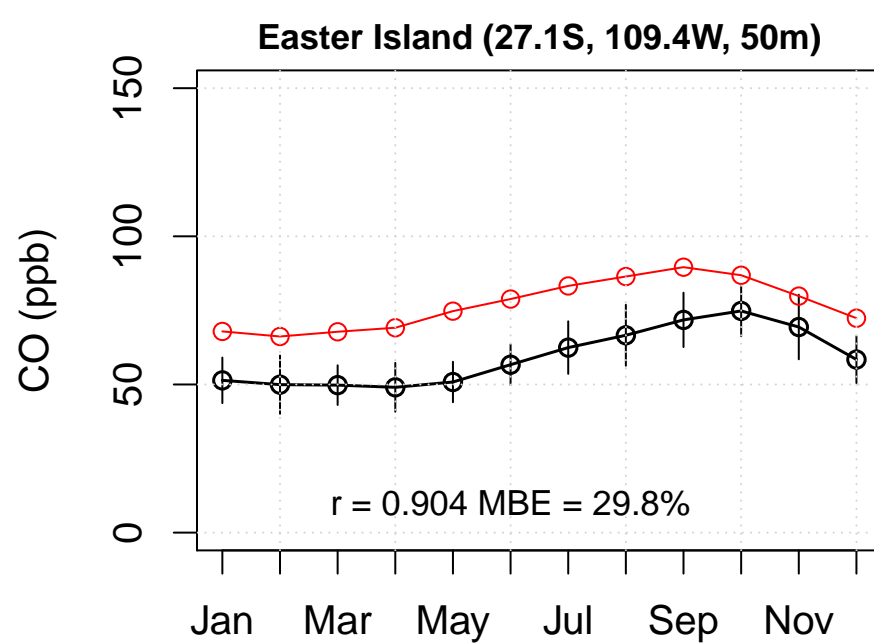
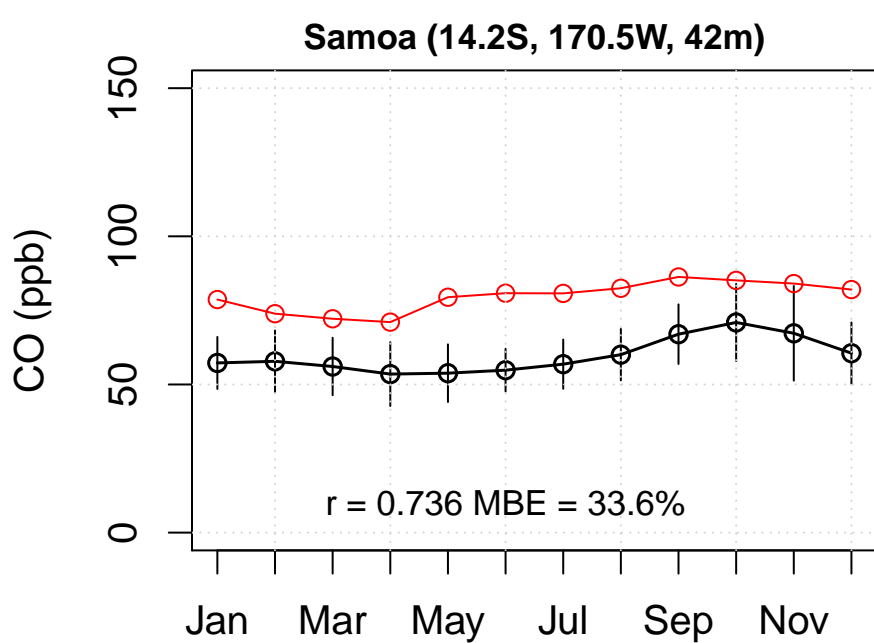
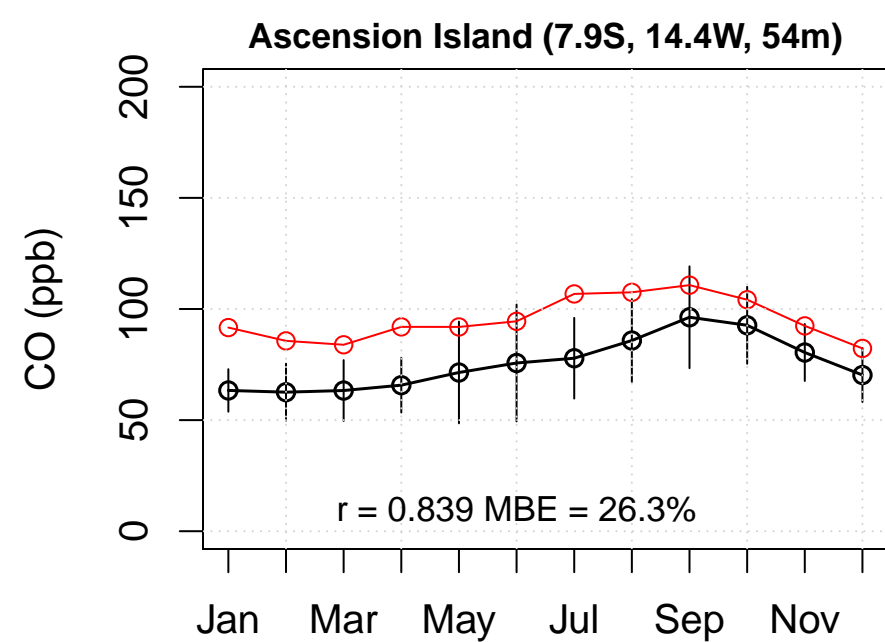
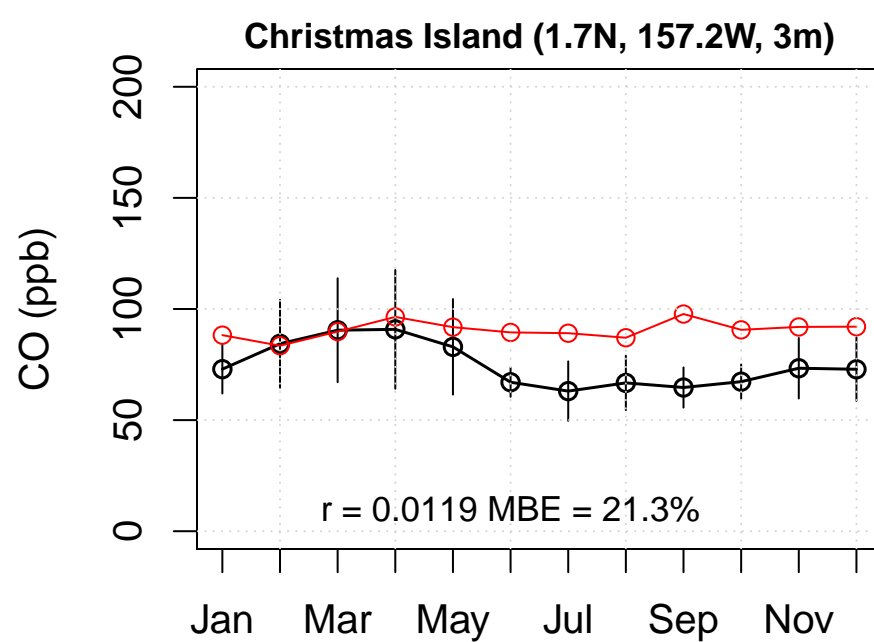
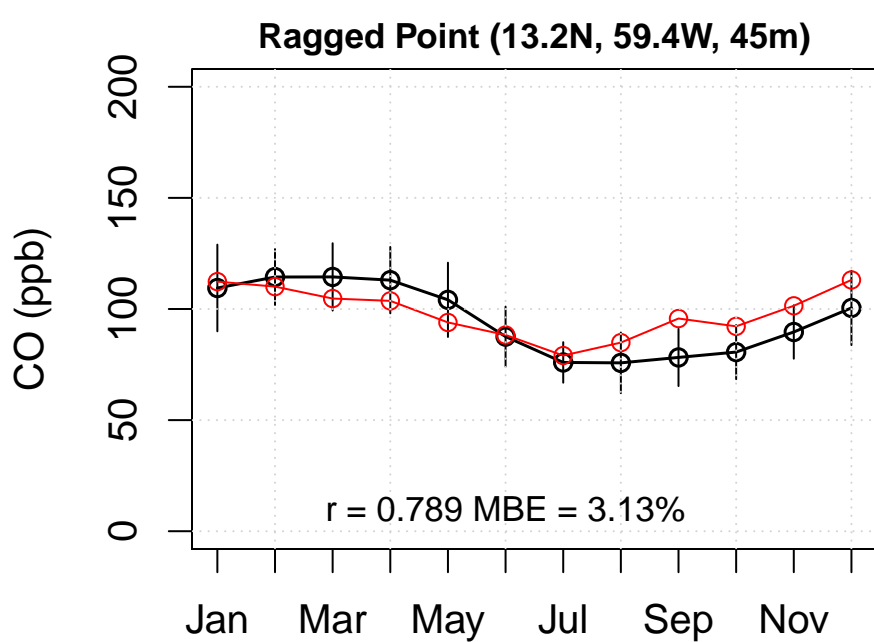
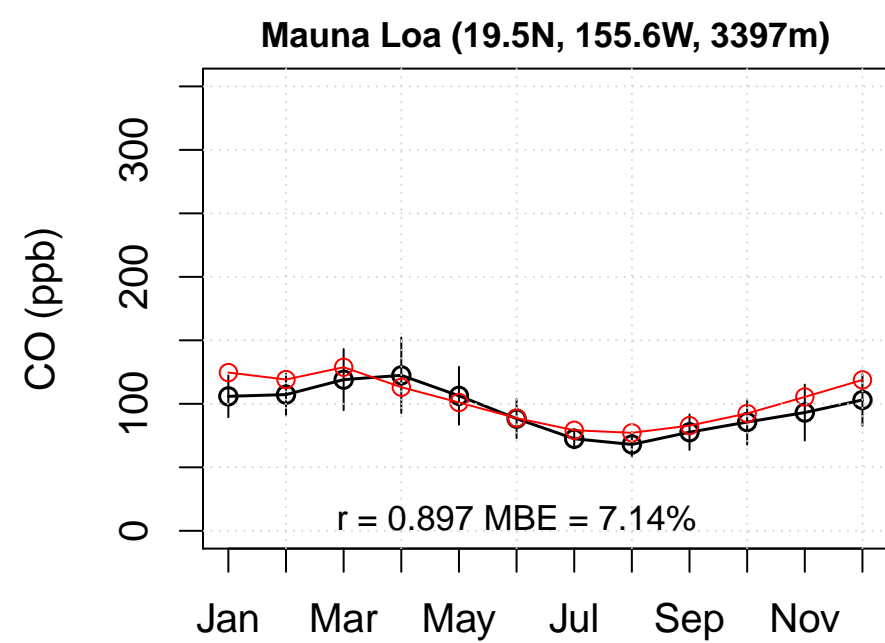
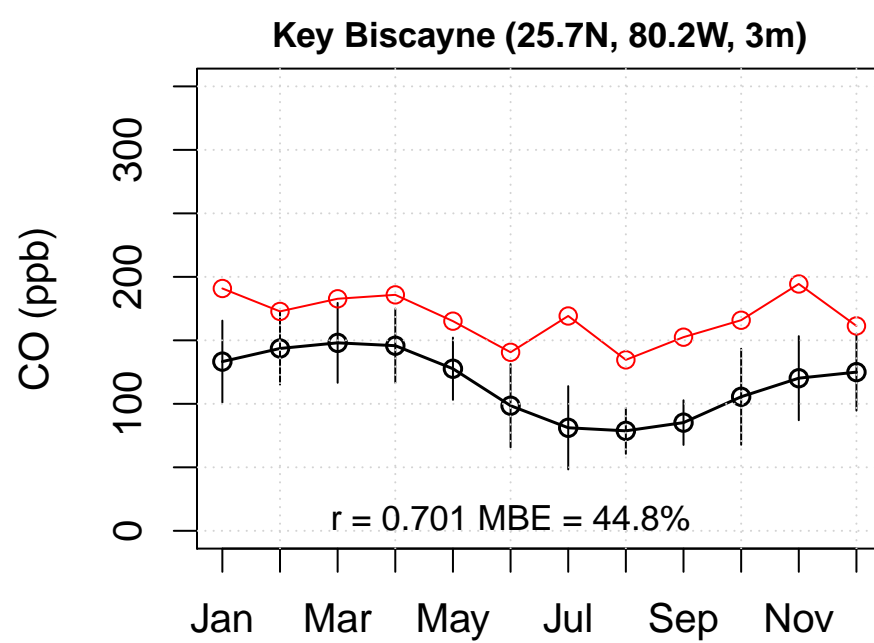
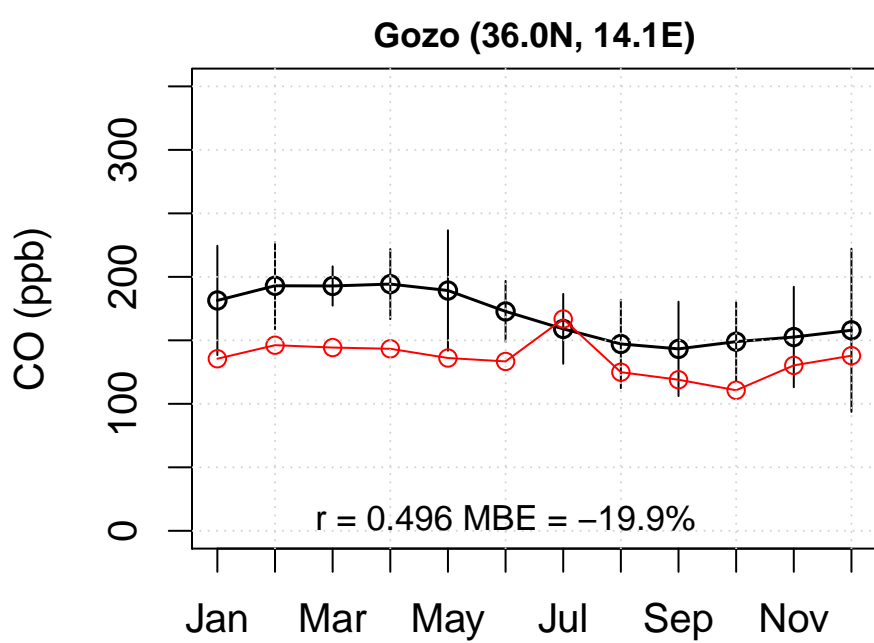
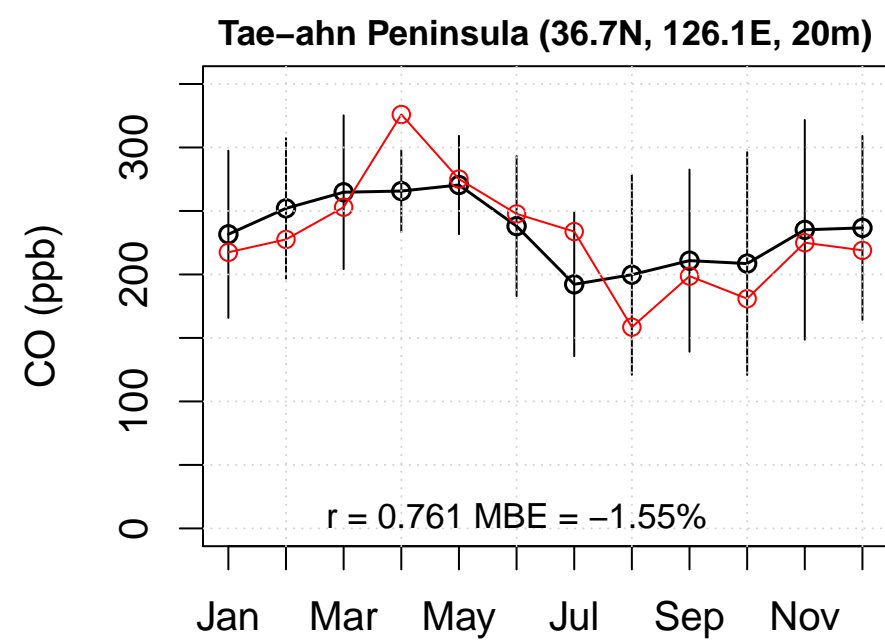
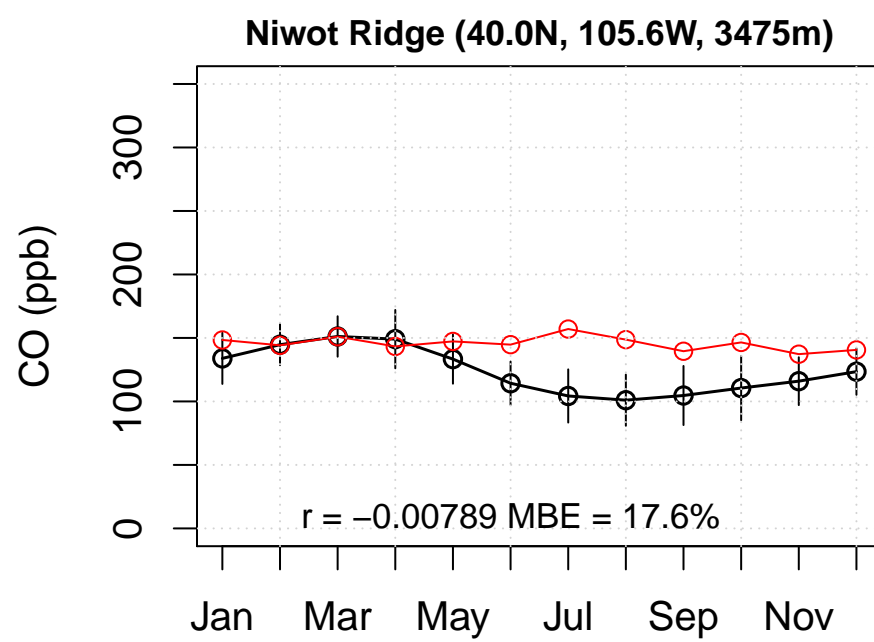
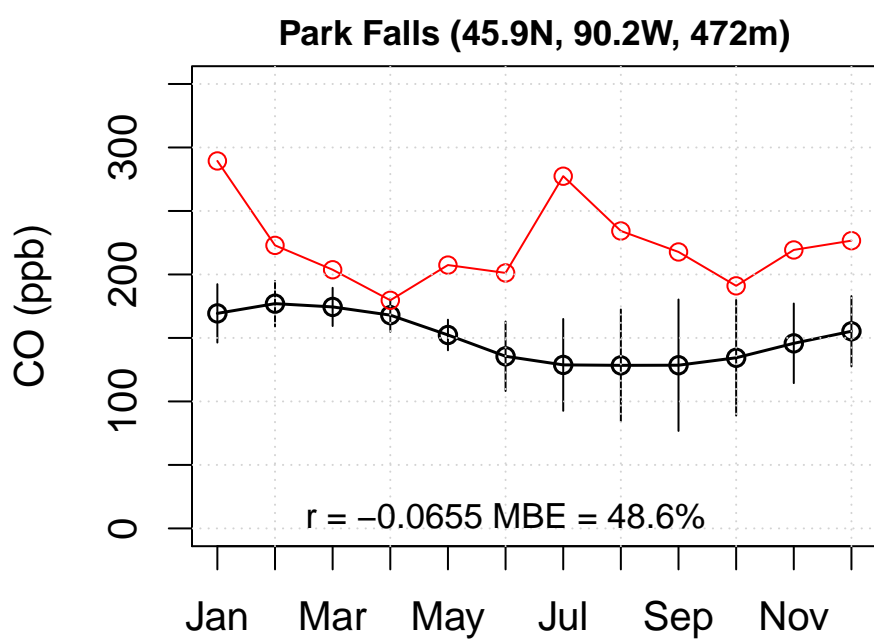
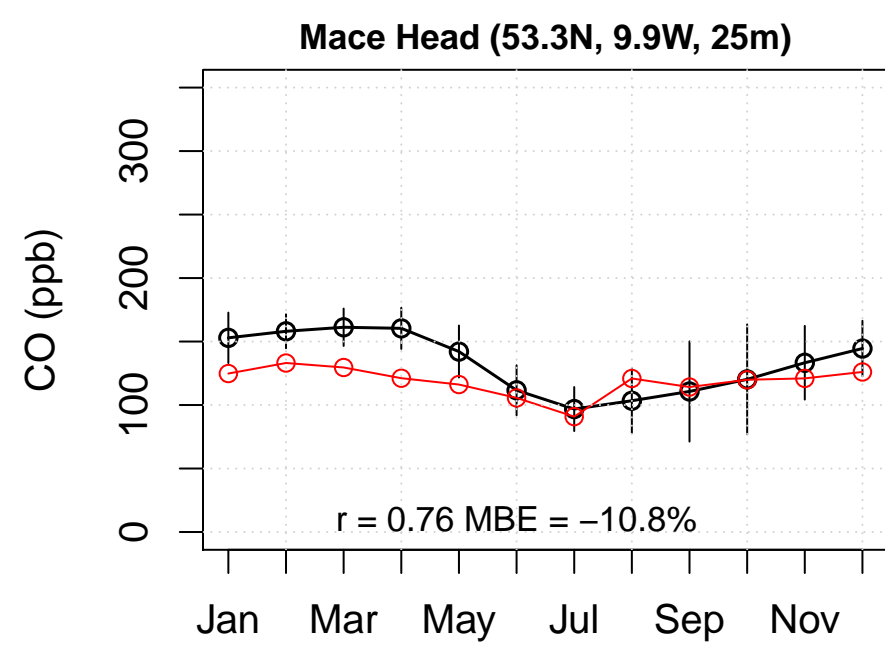
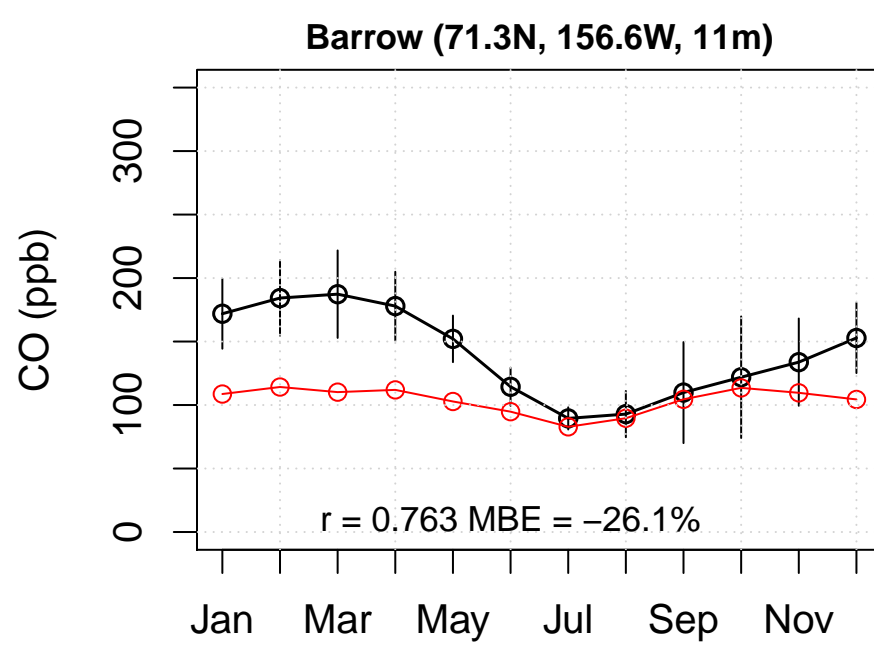
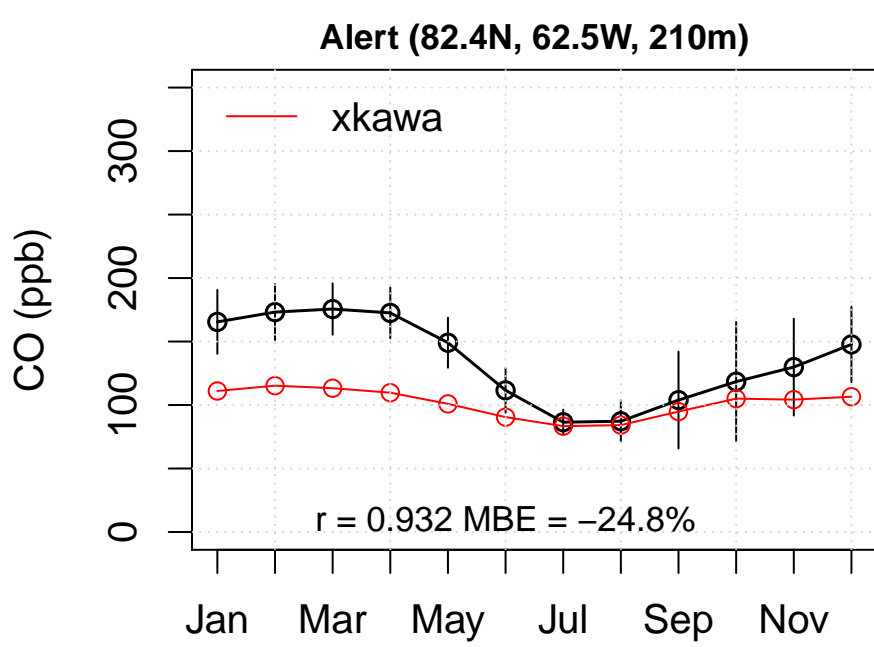


# MLS – UKCA xkawa ClO comparison

ppm

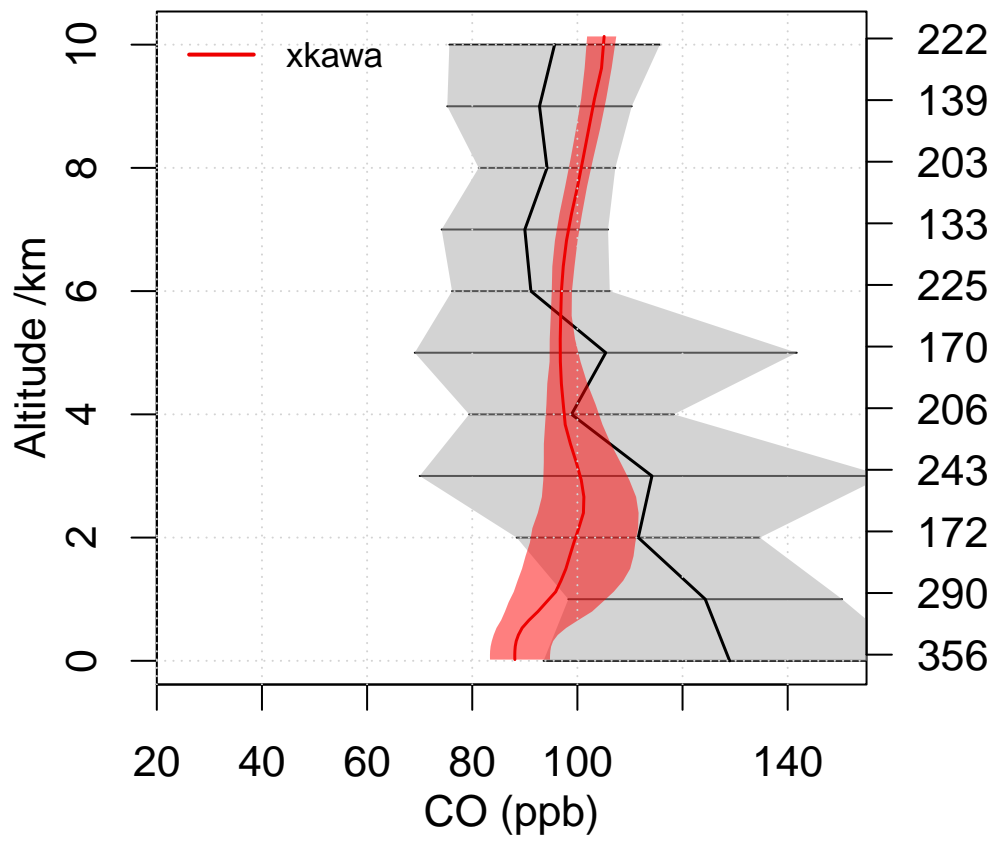
Min = 5.21e-08 Max = 0.519



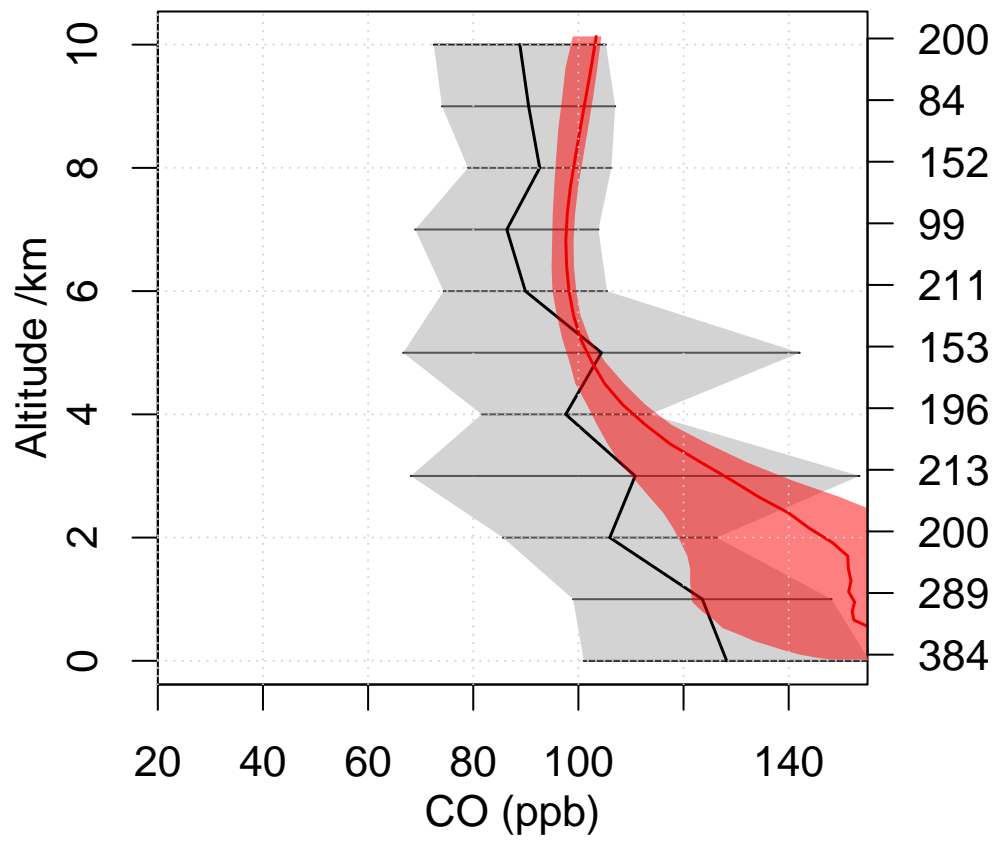


**Emmons CO comparison**

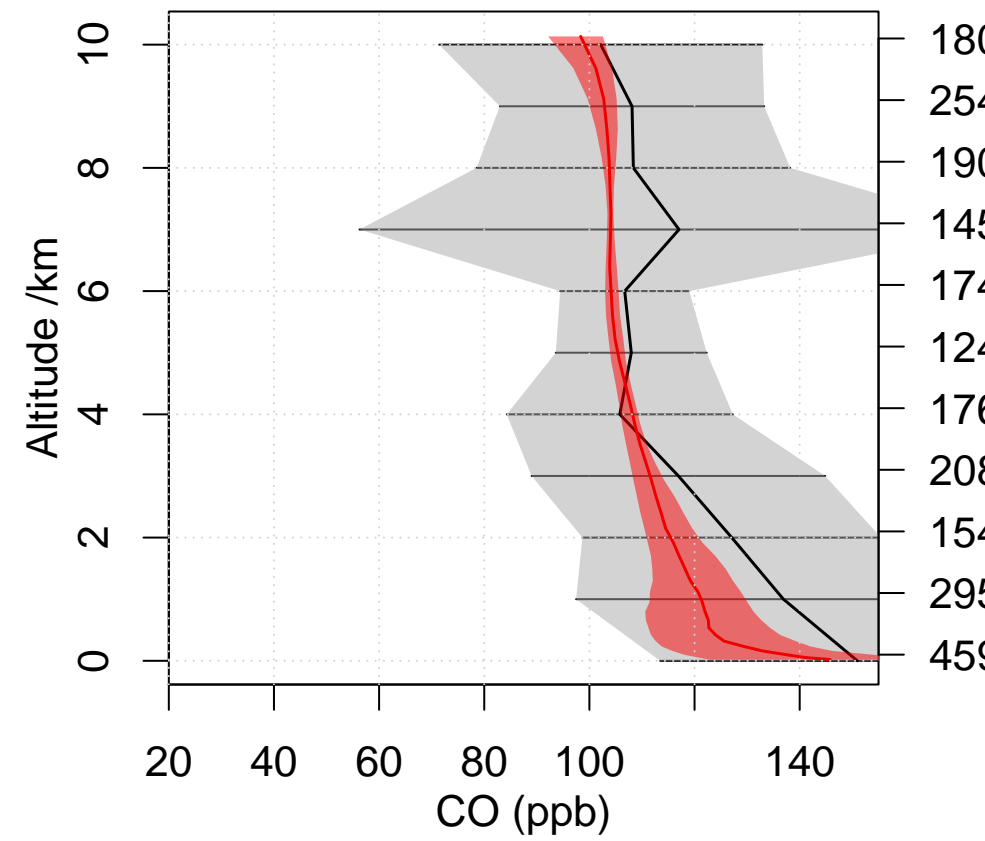
**INTEX-NA East Coast 2004 07**  
Lat 32.5 – 40 Lon 296.5 – 307



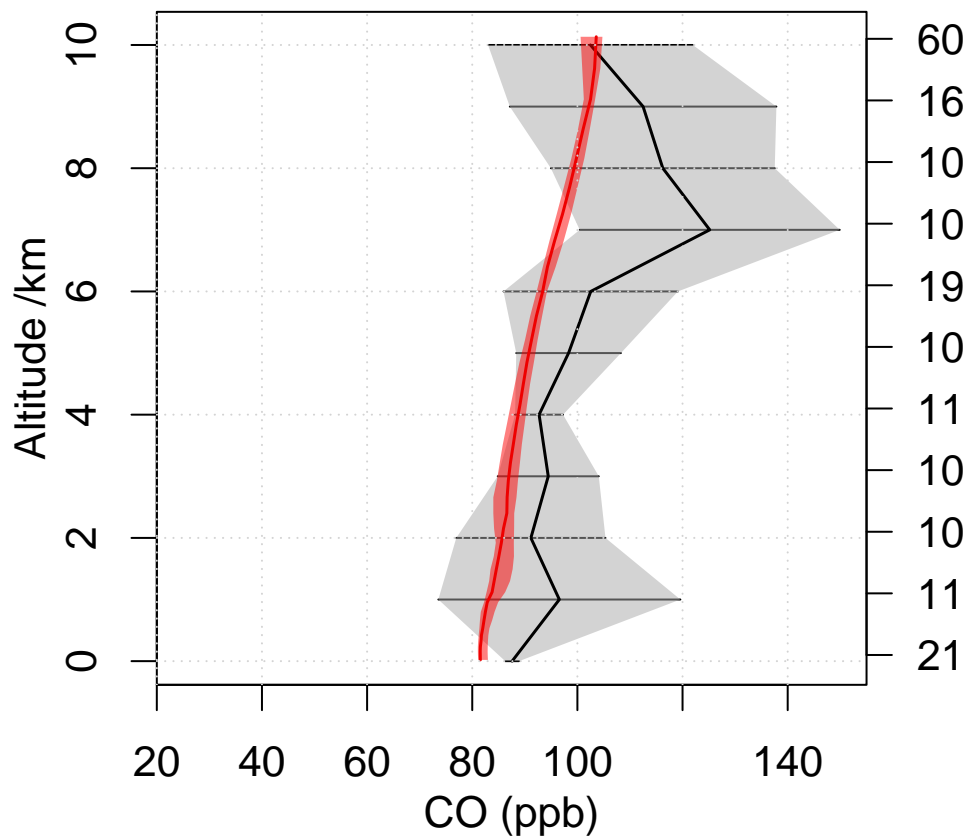
**INTEX-NA Central 2004 07**  
Lat 30 – 40 Lon 259.5 – 285



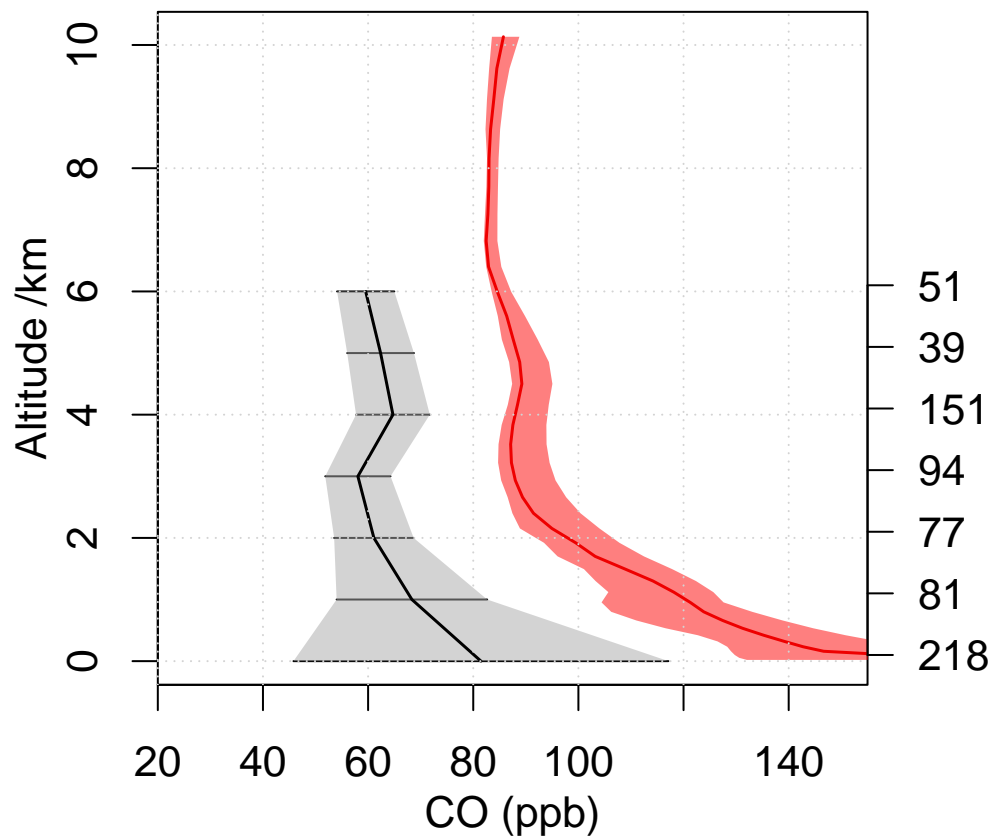
**INTEX-NA North East 2004 07**  
Lat 42.5 – 52.5 Lon 285 – 310



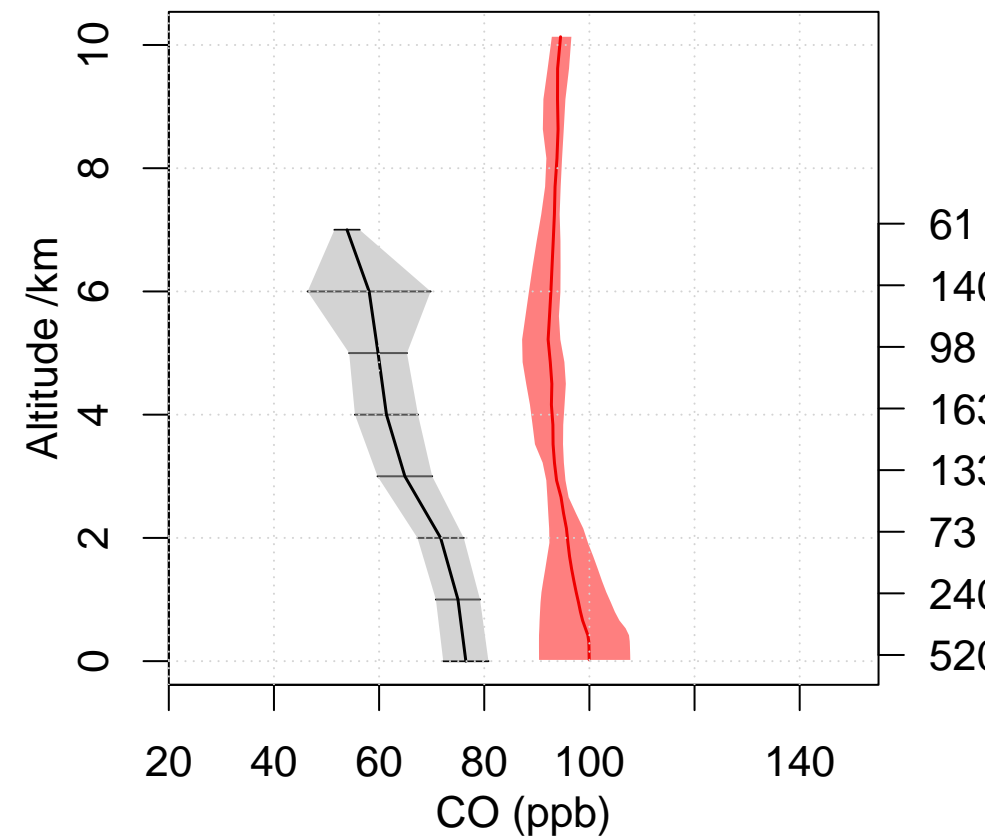
**INTEX-NA West Coast 2004 07**  
Lat 32.5 – 45 Lon 217 – 240



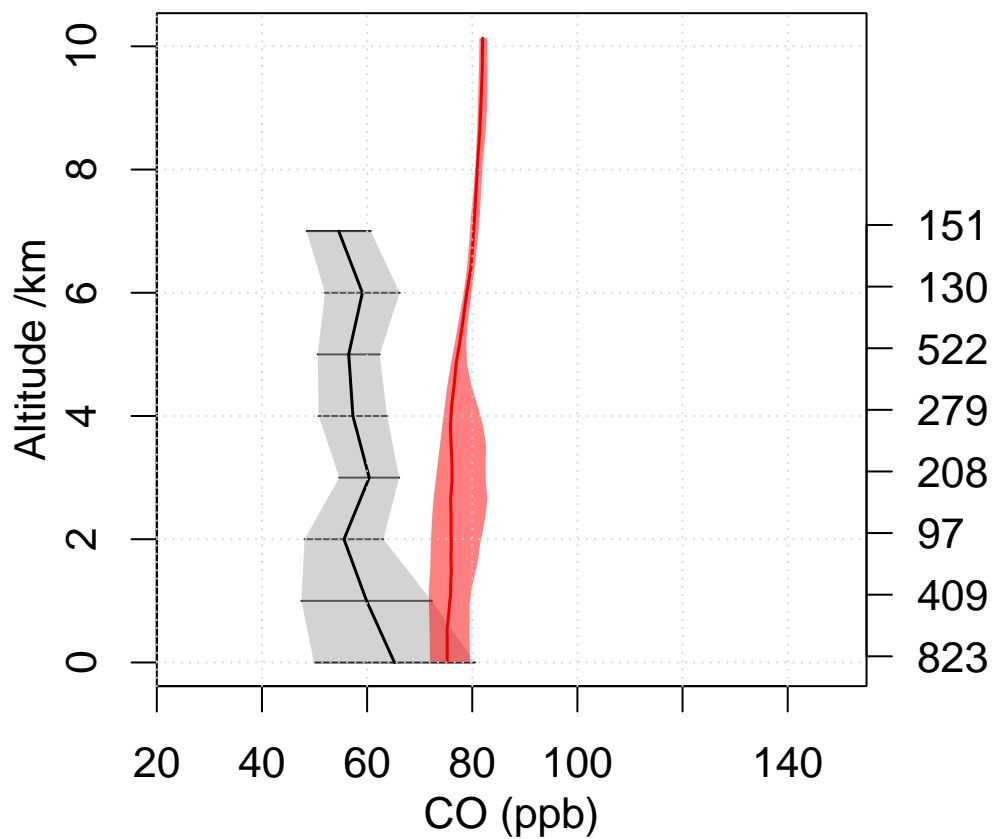
**OP3 2008 07**  
Lat 2.5 – 7.5 Lon 112.5 – 120



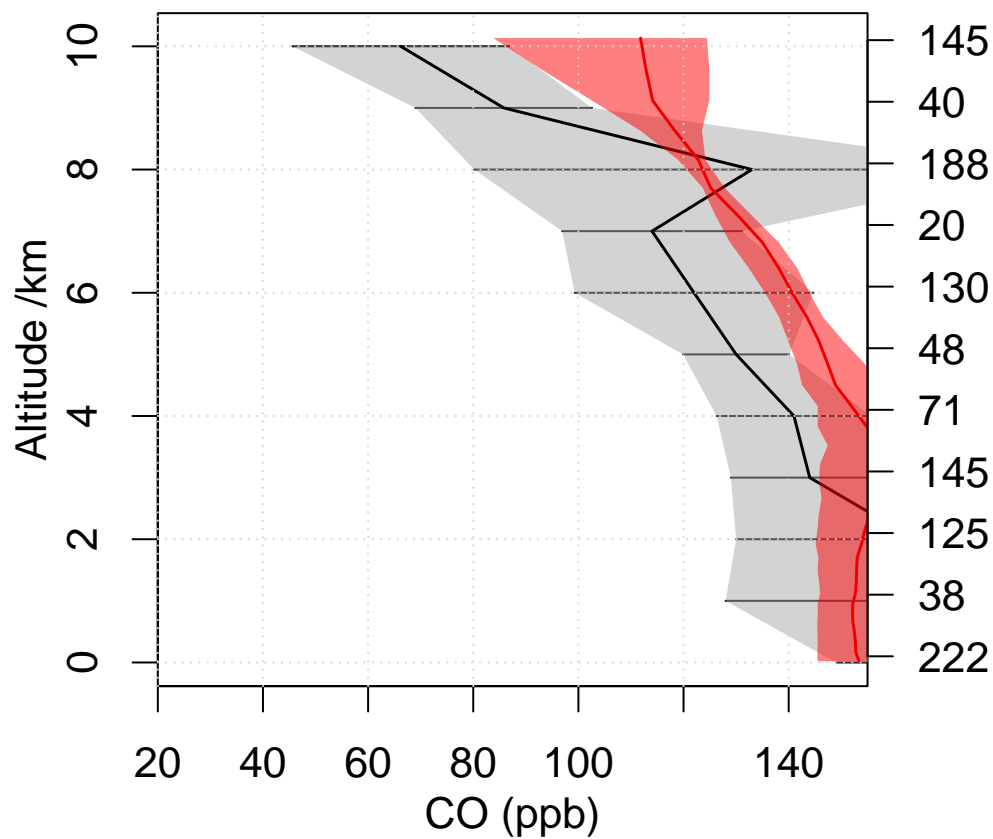
**PEM-Tropics-B Christmas-Island 1999 0**  
Lat 0 – 10 Lon 200 – 220



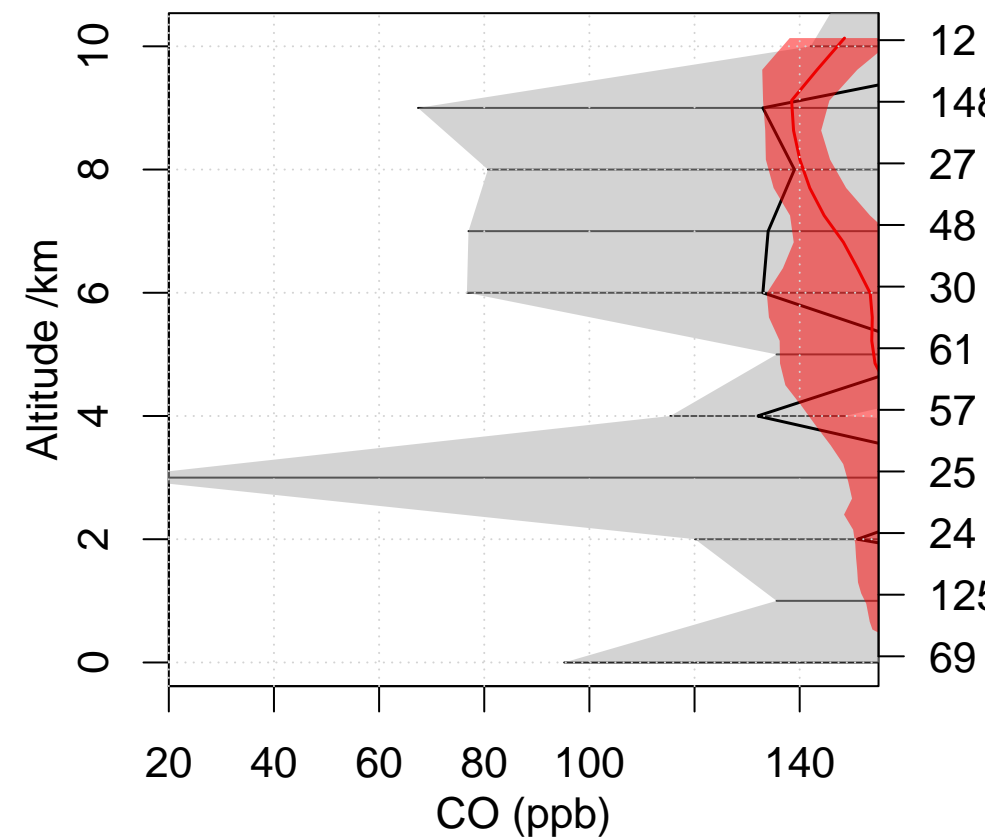
**PEM-Tropics-B Tahiti 1999 03**  
Lat -20 – 0 Lon 200 – 230



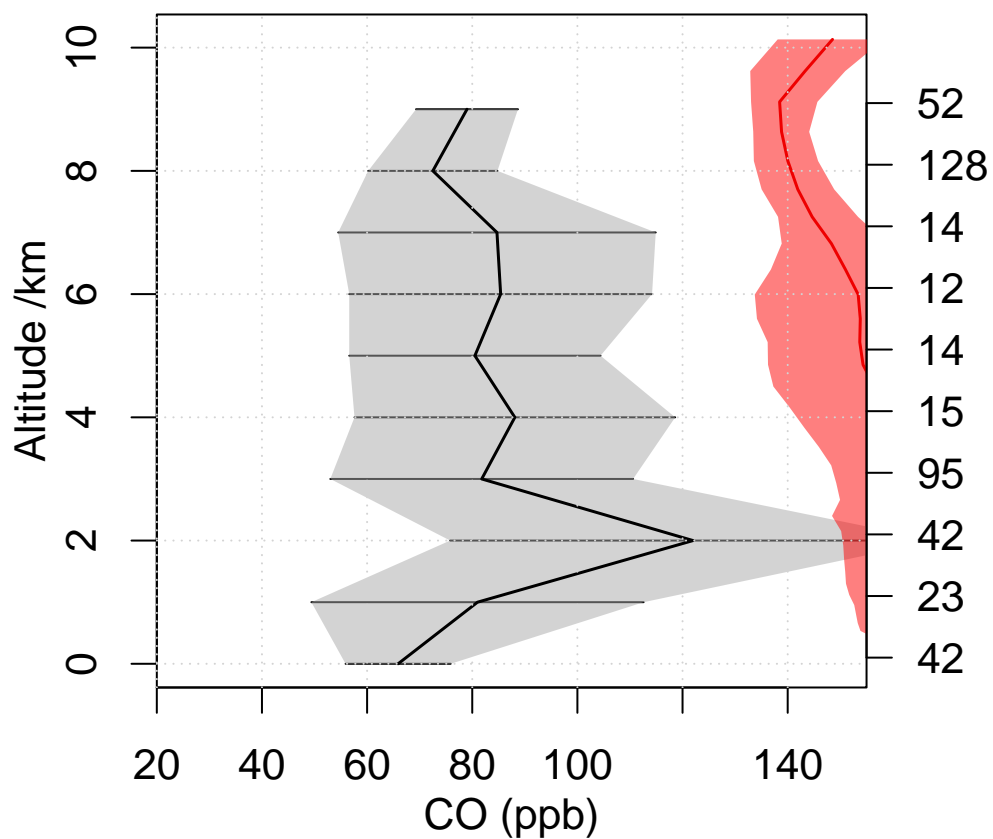
**PEM-West-B Japan 1994 02**  
Lat 25 – 40 Lon 135 – 150



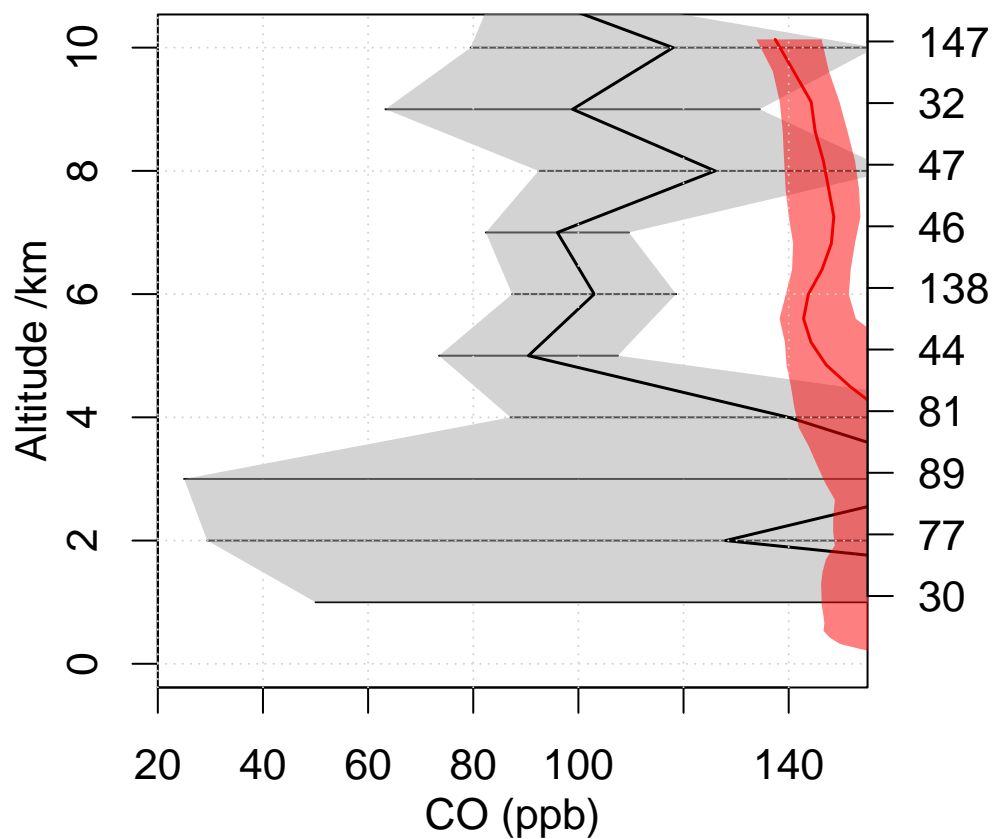
**TRACE-A E-Brazil 1992 09**  
Lat -15 – -5 Lon 310 – 320



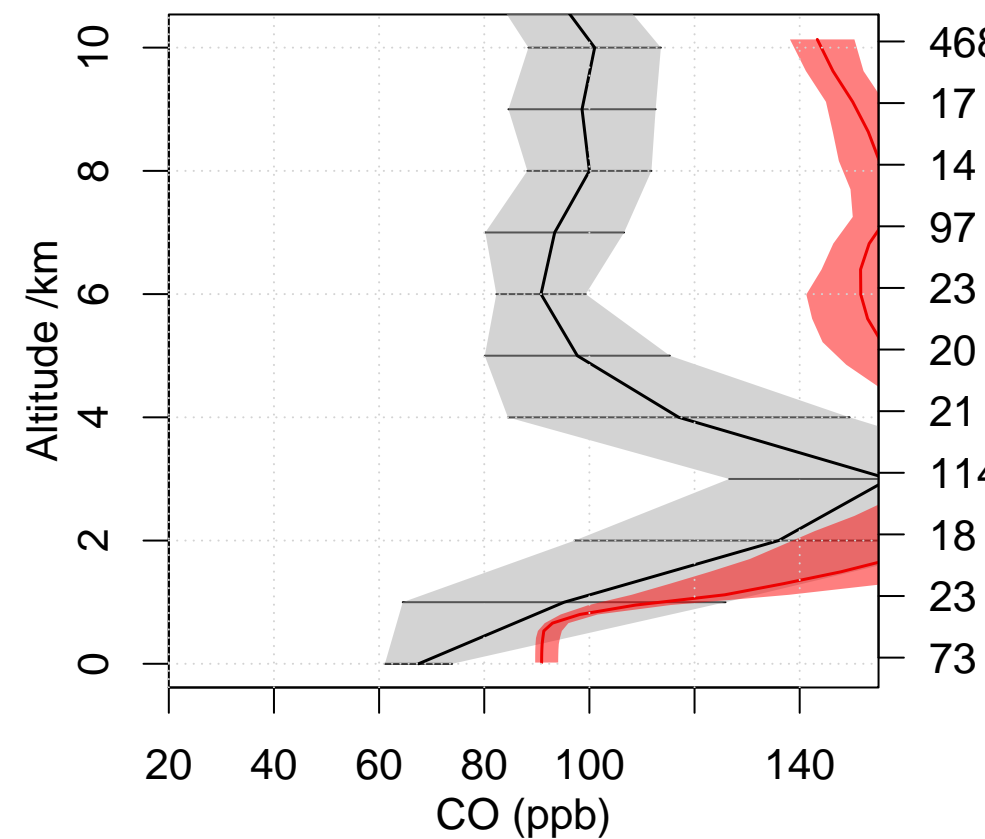
**TRACE-A E-Brazil Coast 1992 09**  
Lat -35 – -25 Lon 310 – 320



**TRACE-A S-Africa 1992 09**  
Lat -25 – -5 Lon 15 – 35

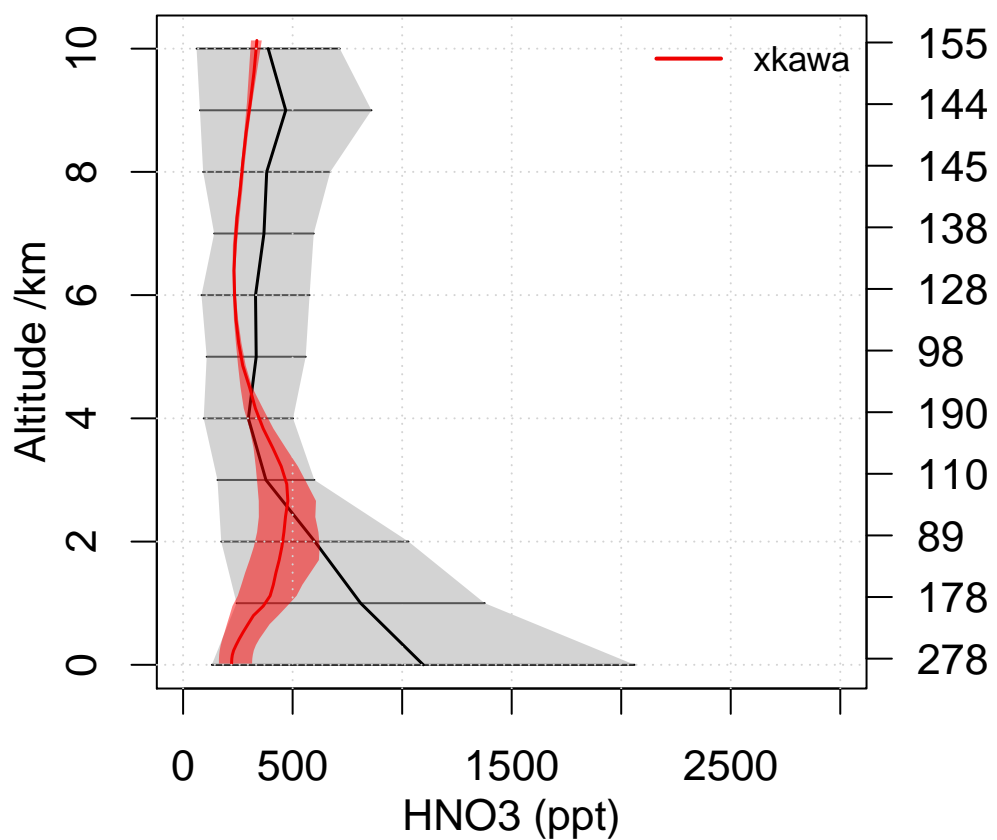


**TRACE-A W-Africa Coast 1992 09**  
Lat -25 – -5 Lon 0 – 10

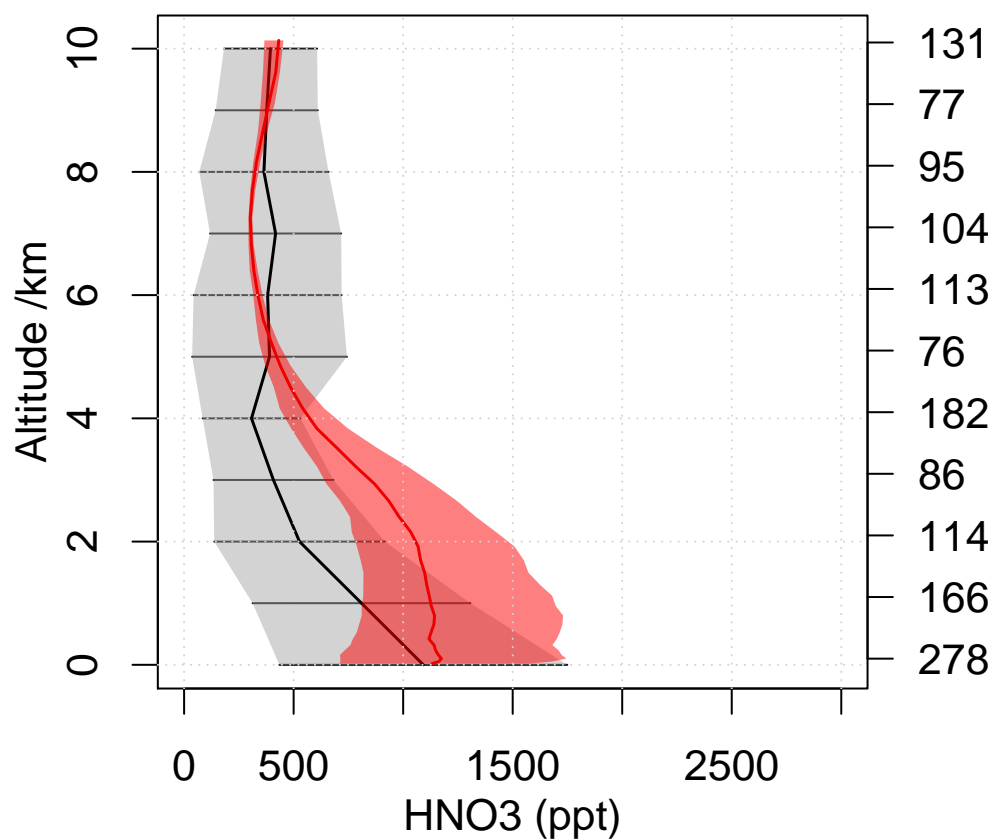


**Emmons HNO3 comparison**

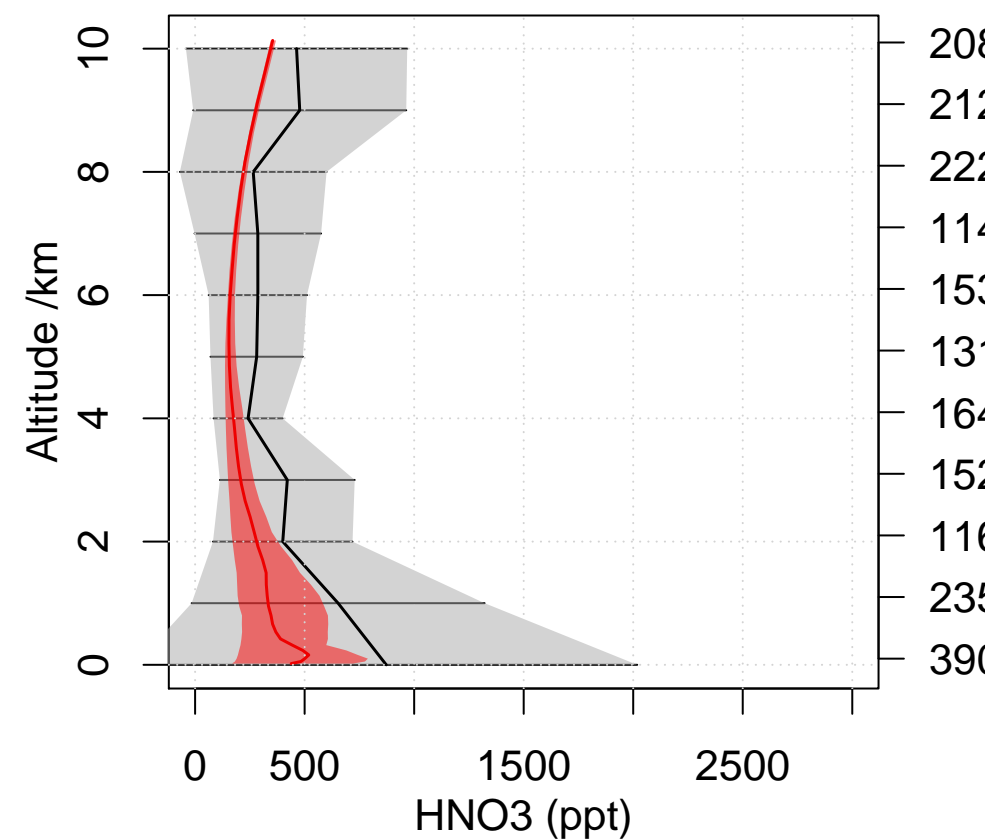
**INTEX-NA East Coast 2004 07**  
Lat 32.5 – 40 Lon 296.5 – 307



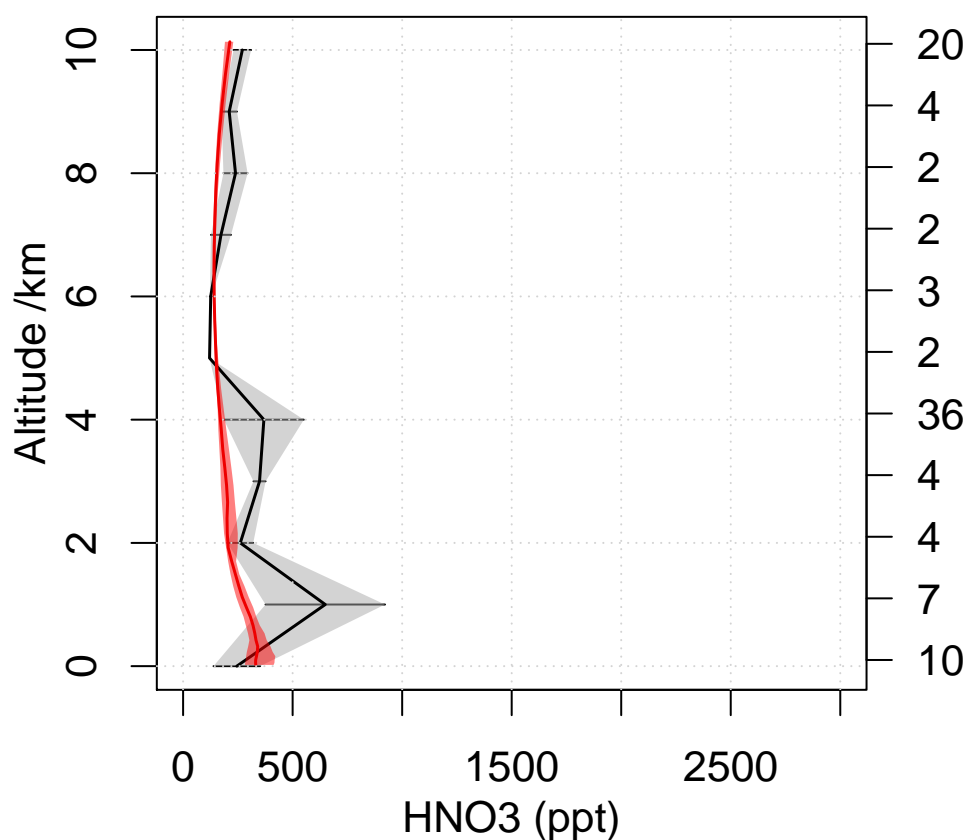
**INTEX-NA Central 2004 07**  
Lat 30 – 40 Lon 259.5 – 285



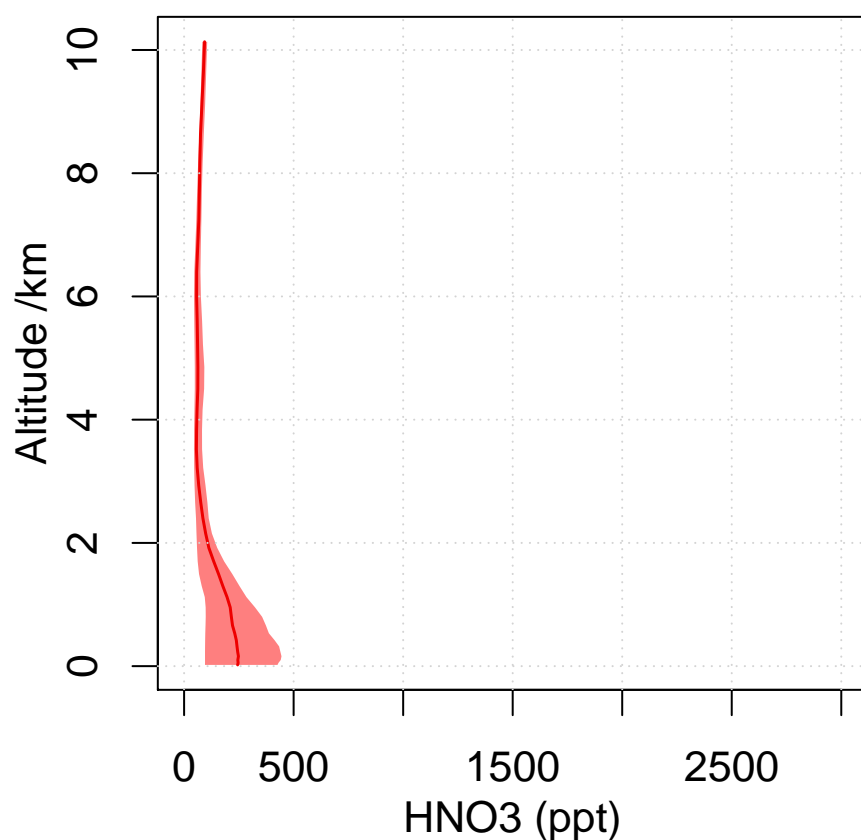
**INTEX-NA North East 2004 07**  
Lat 42.5 – 52.5 Lon 285 – 310



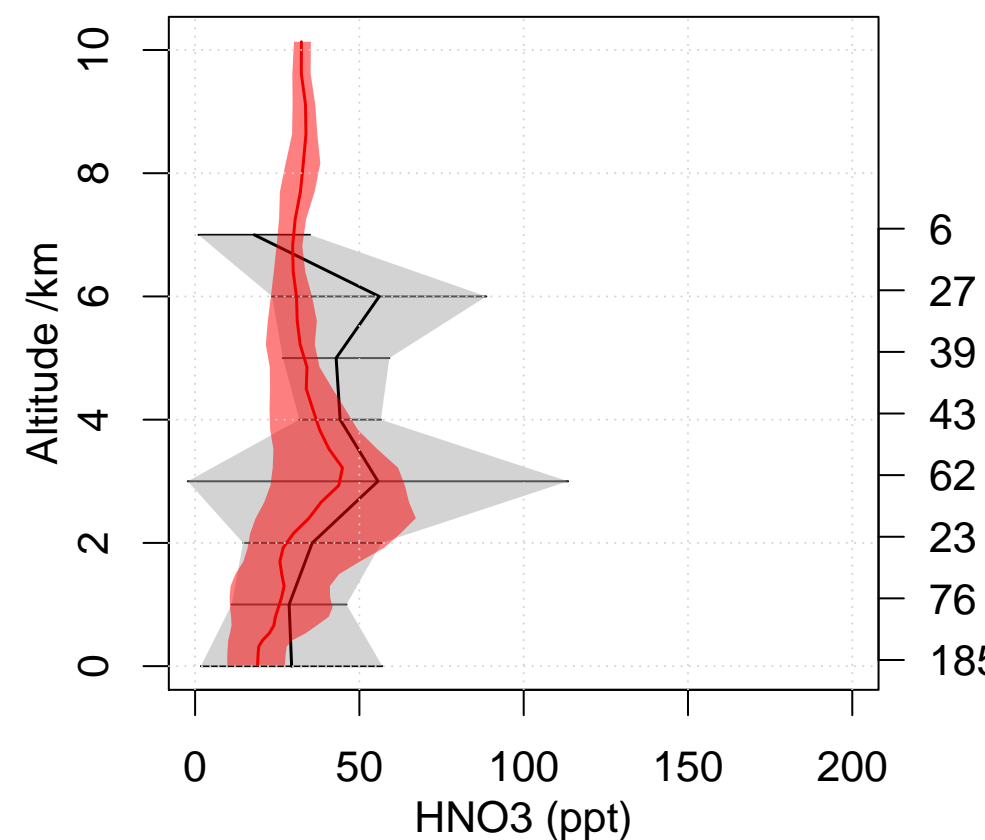
**INTEX-NA West Coast 2004 07**  
Lat 32.5 – 45 Lon 217 – 240



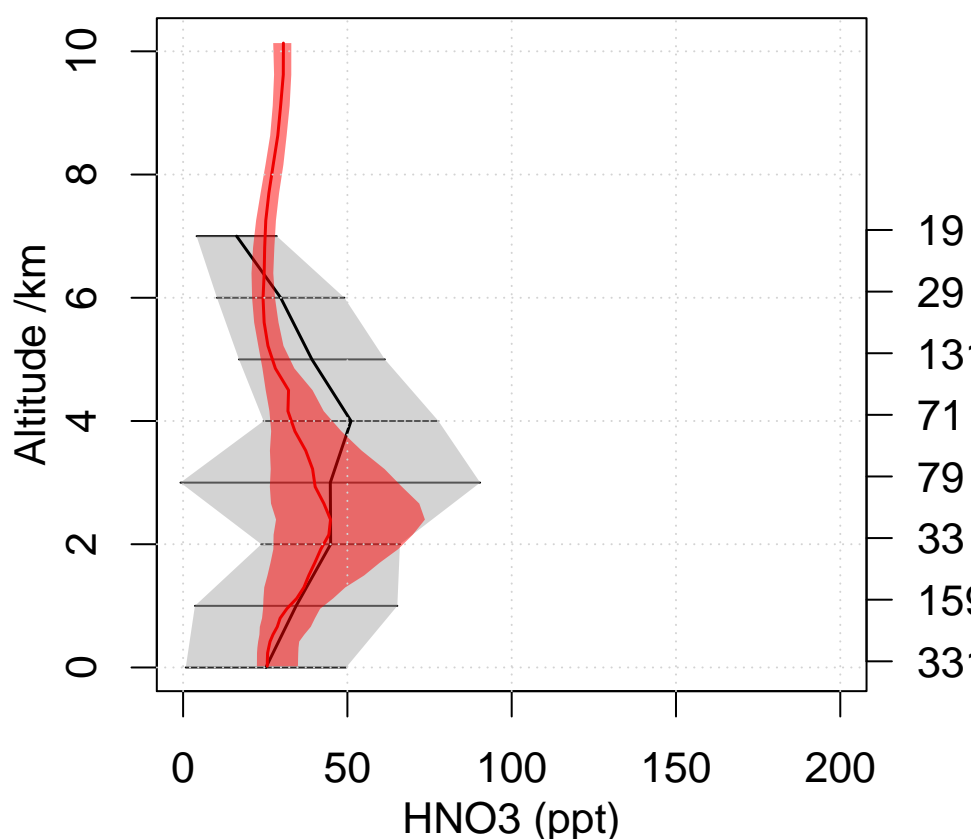
**OP3 2008 07**  
Lat 2.5 – 7.5 Lon 112.5 – 120



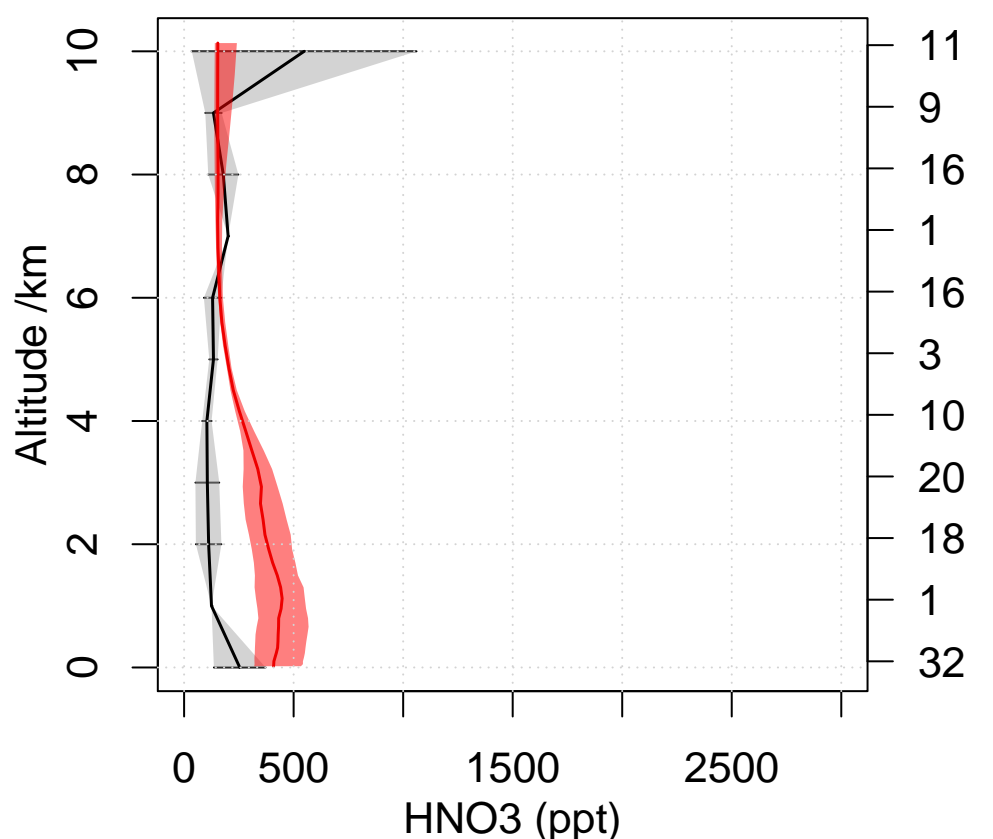
**PEM-Tropics-B Christmas-Island 1999 07**  
Lat 0 – 10 Lon 200 – 220



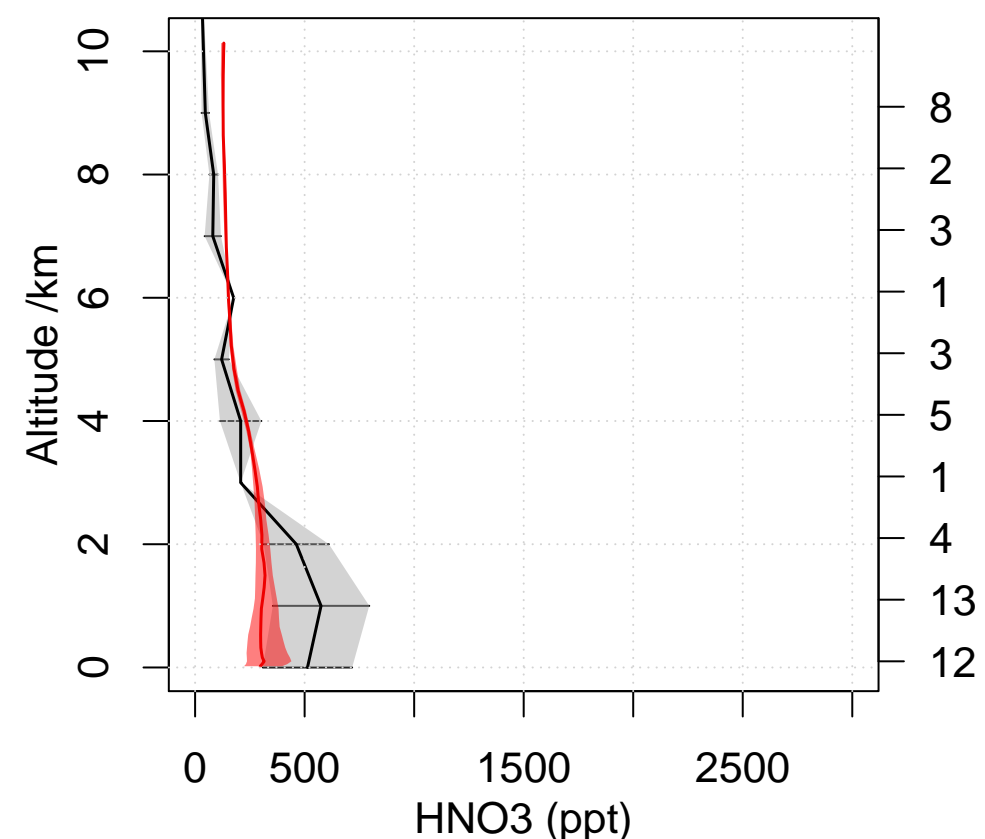
**PEM-Tropics-B Tahiti 1999 03**  
Lat -20 – 0 Lon 200 – 230



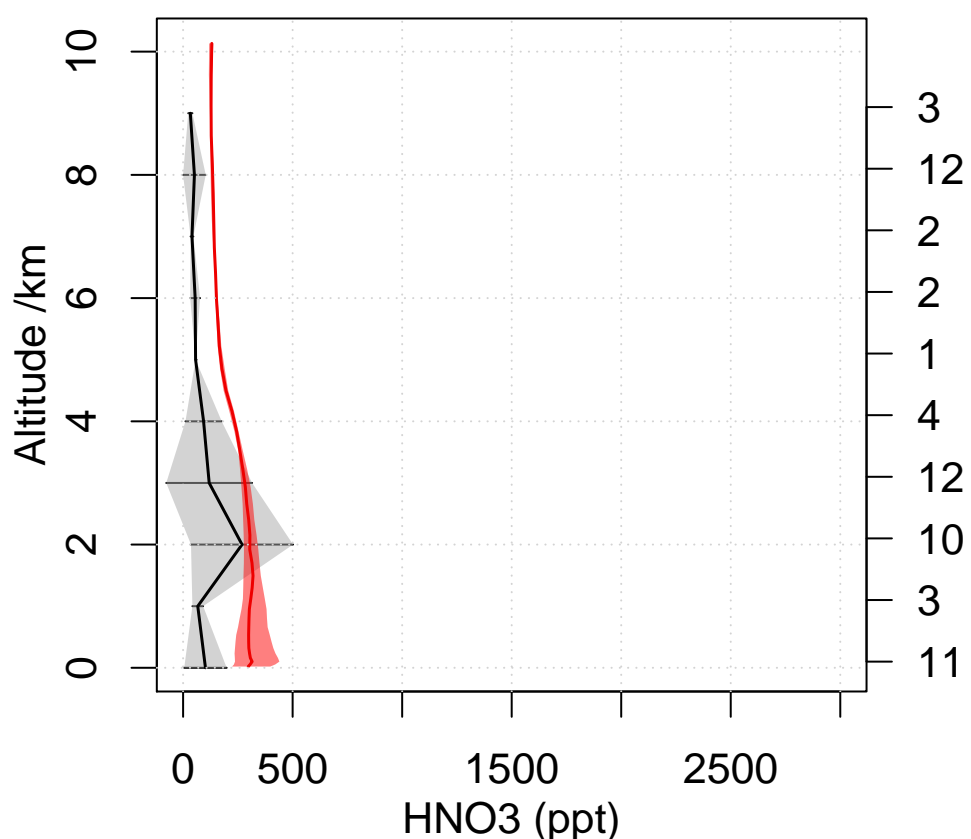
**PEM-West-B Japan 1994 02**  
Lat 25 – 40 Lon 135 – 150



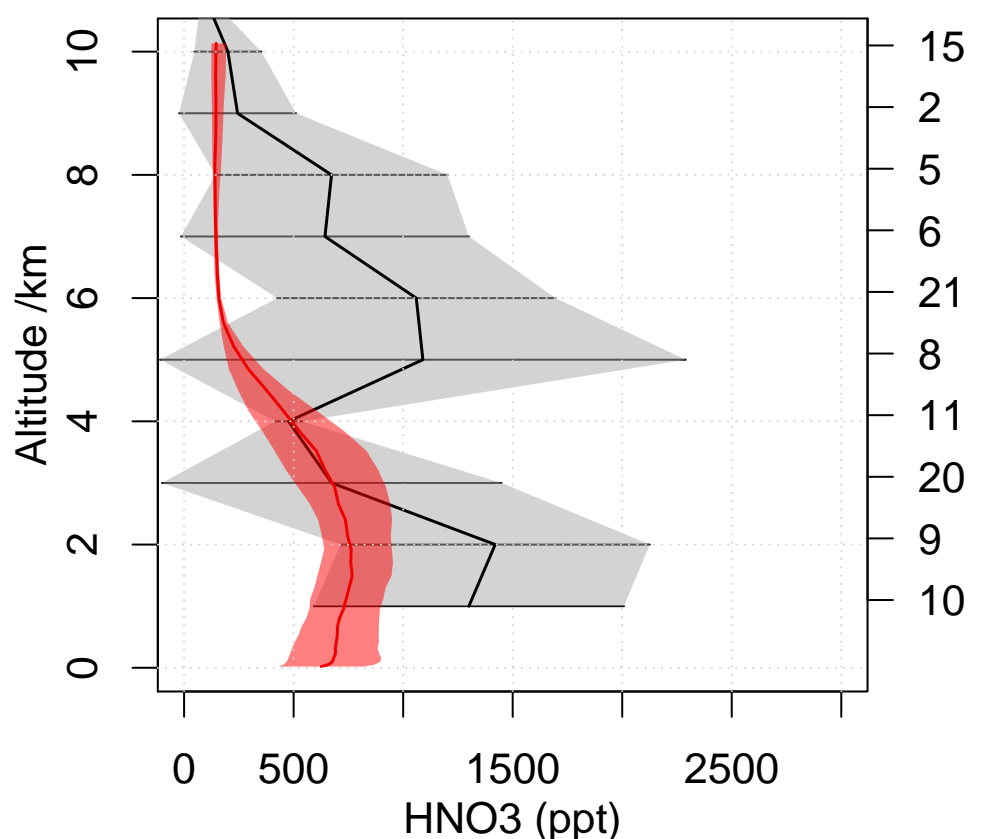
**TRACE-A E-Brazil 1992 09**  
Lat -15 – -5 Lon 310 – 320



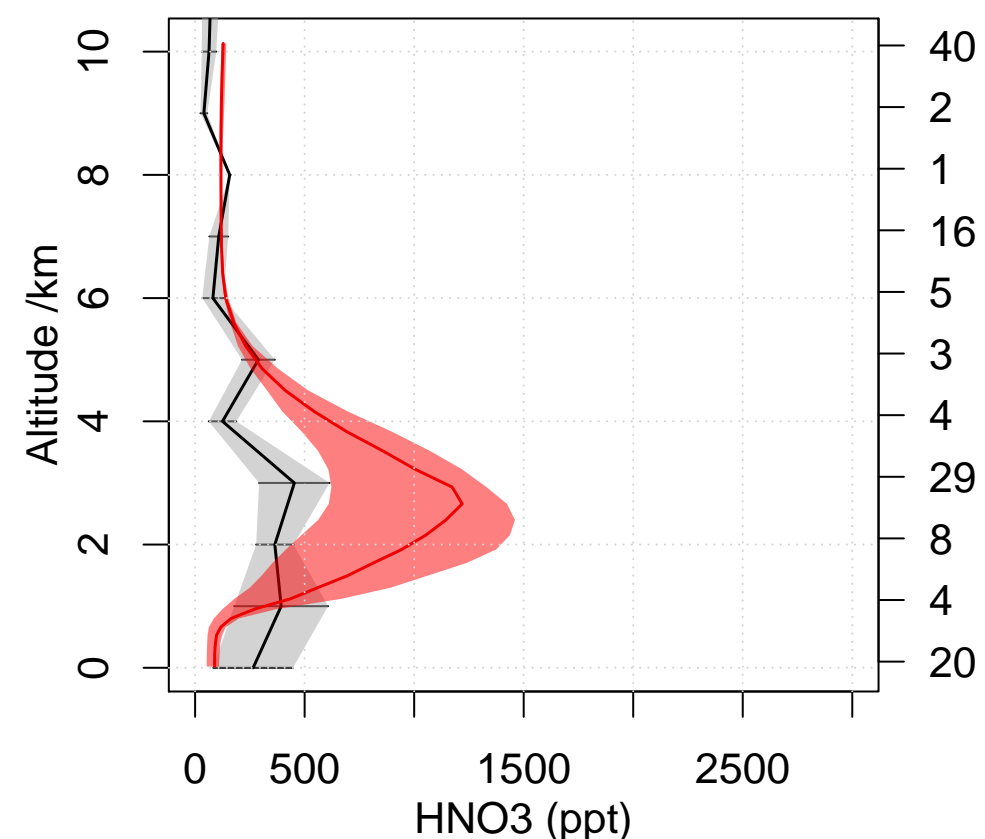
**TRACE-A E-Brazil Coast 1992 09**  
Lat -35 – -25 Lon 310 – 320



**TRACE-A S-Africa 1992 09**  
Lat -25 – -5 Lon 15 – 35

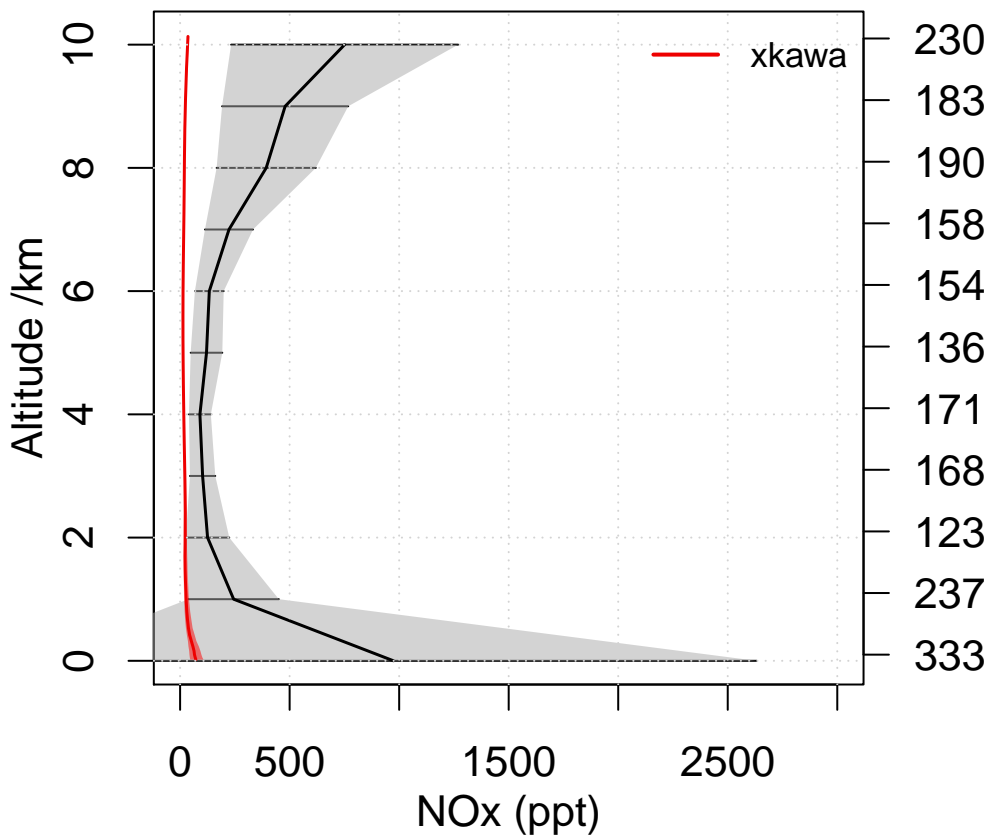


**TRACE-A W-Africa Coast 1992 09**  
Lat -25 – -5 Lon 0 – 10

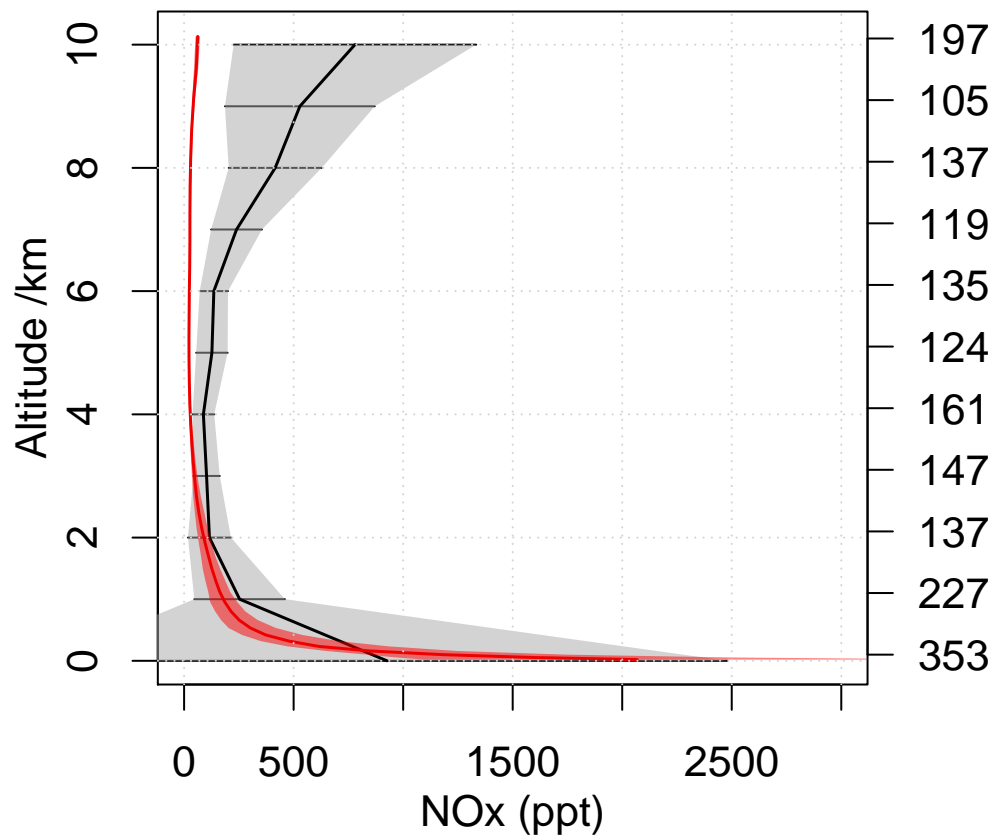


**Emmons NOx comparison**

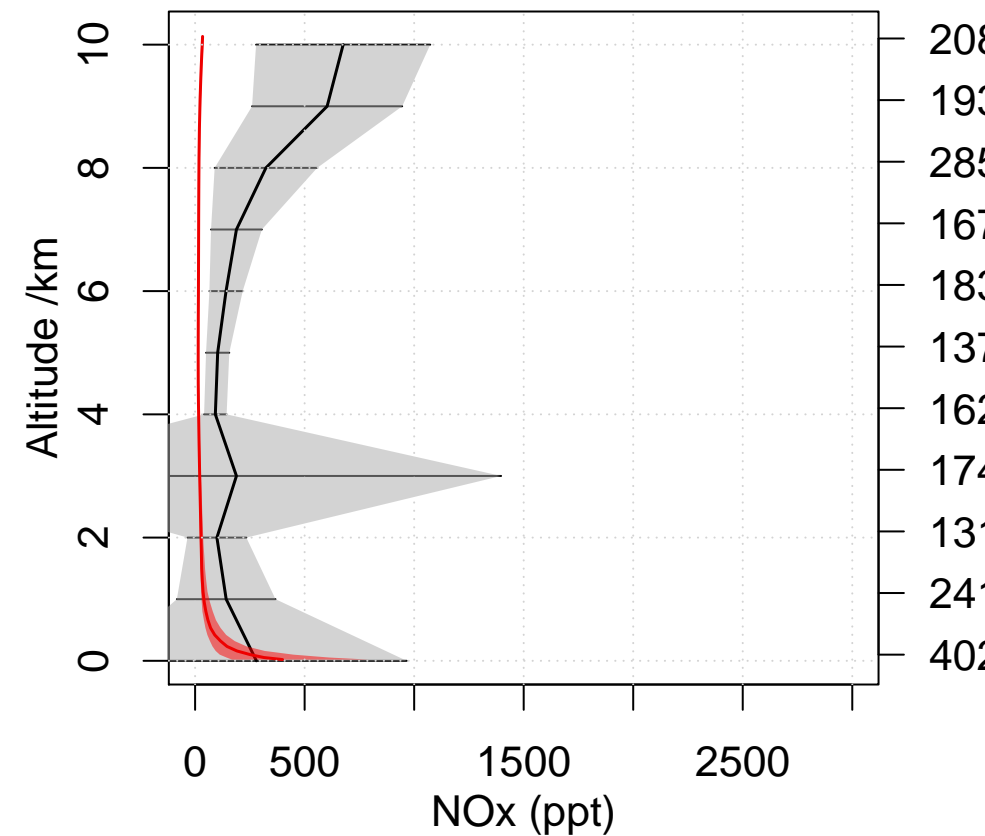
**INTEX-NA East Coast 2004 07**  
Lat 32.5 – 40 Lon 296.5 – 307



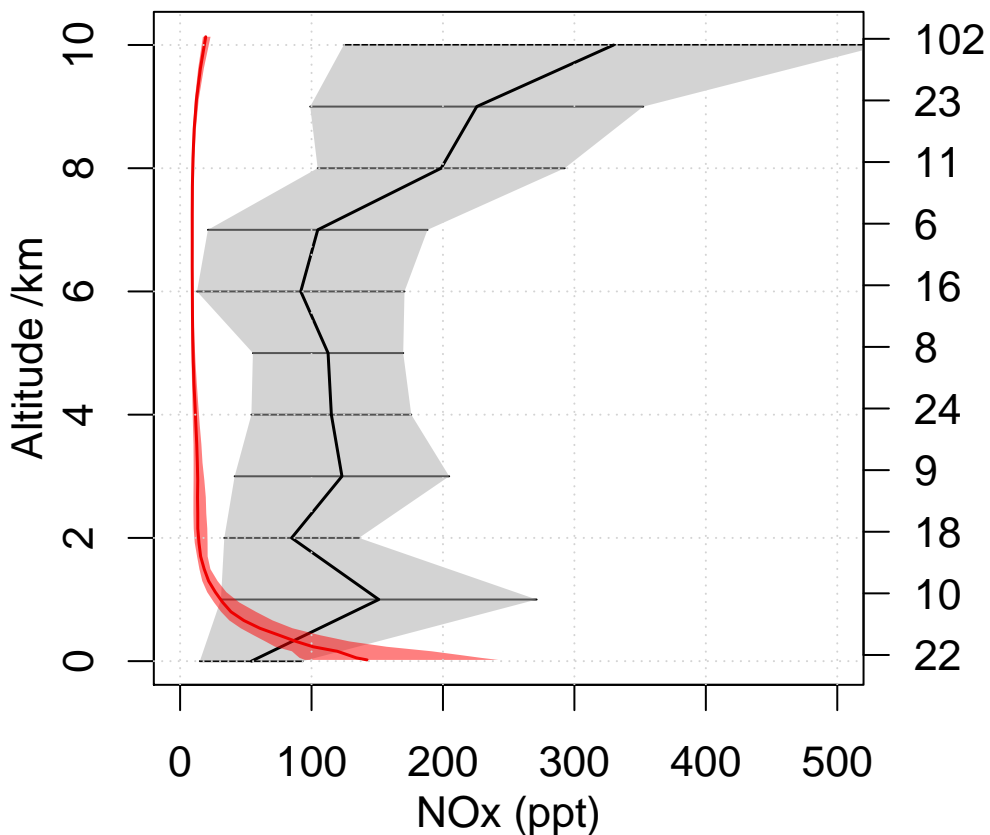
**INTEX-NA Central 2004 07**  
Lat 30 – 40 Lon 259.5 – 285



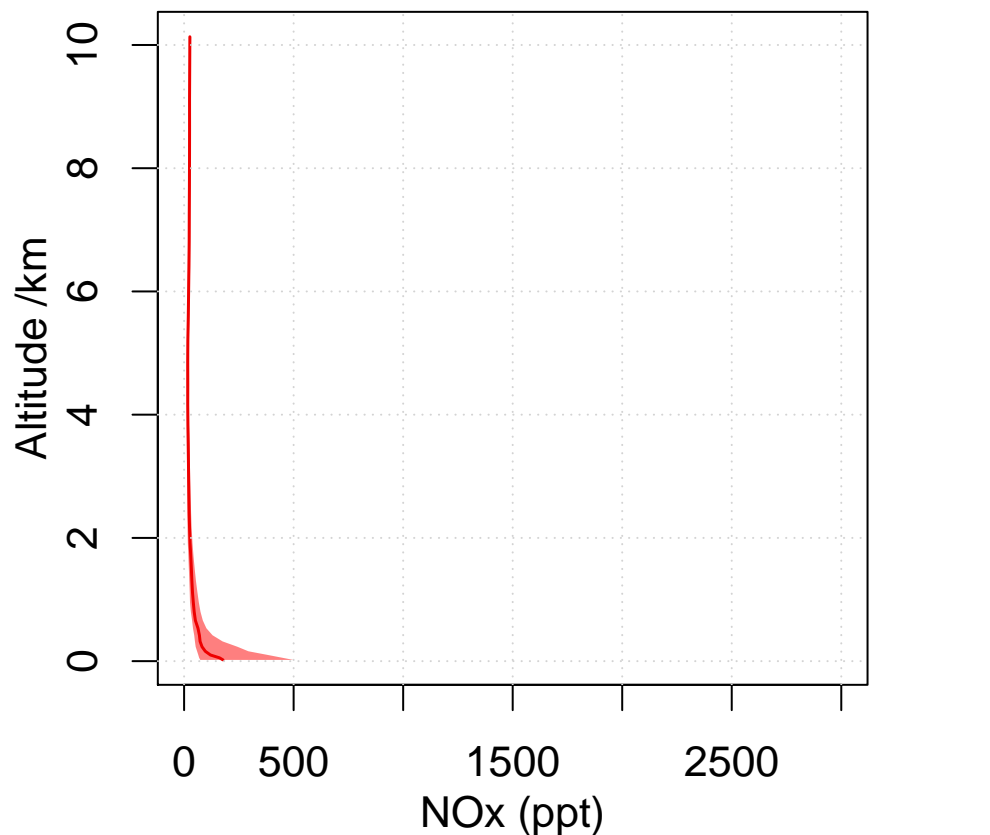
**INTEX-NA North East 2004 07**  
Lat 42.5 – 52.5 Lon 285 – 310



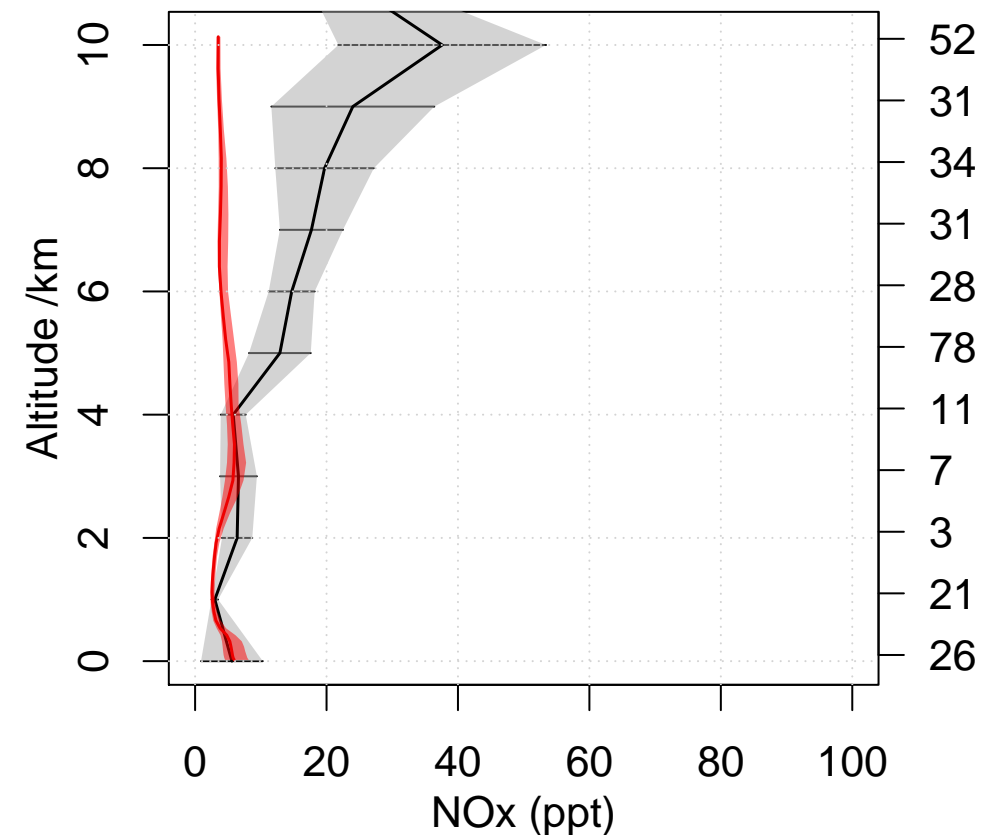
**INTEX-NA West Coast 2004 07**  
Lat 32.5 – 45 Lon 217 – 240



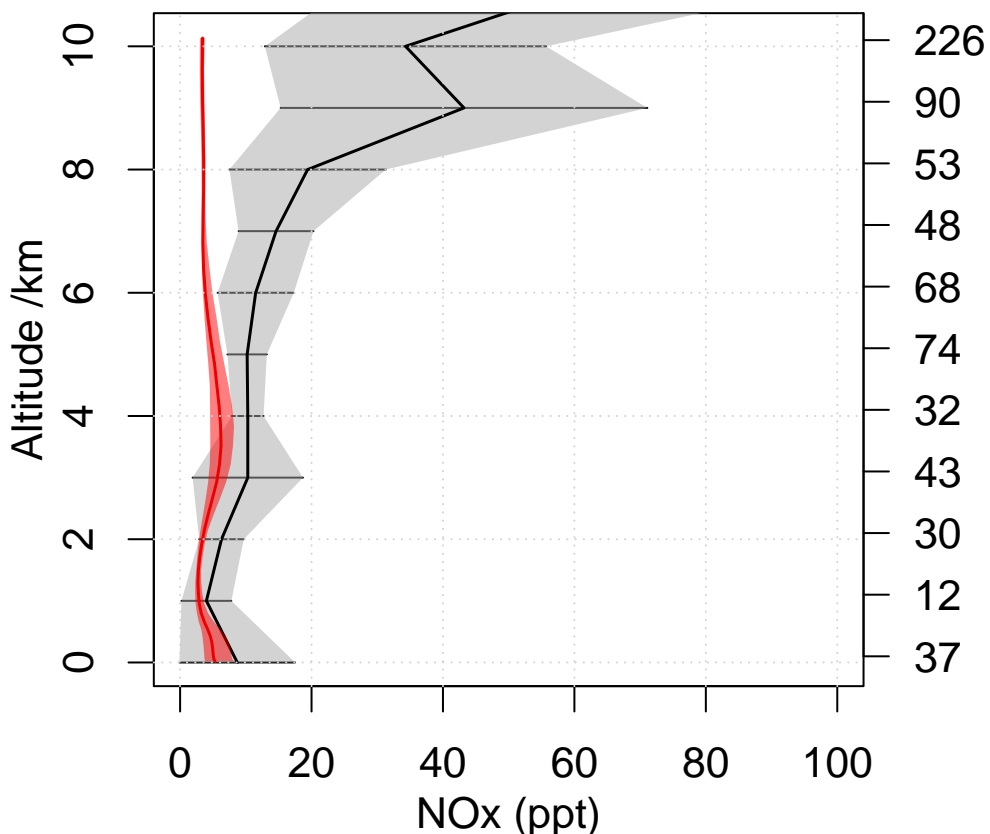
**OP3 2008 07**  
Lat 2.5 – 7.5 Lon 112.5 – 120



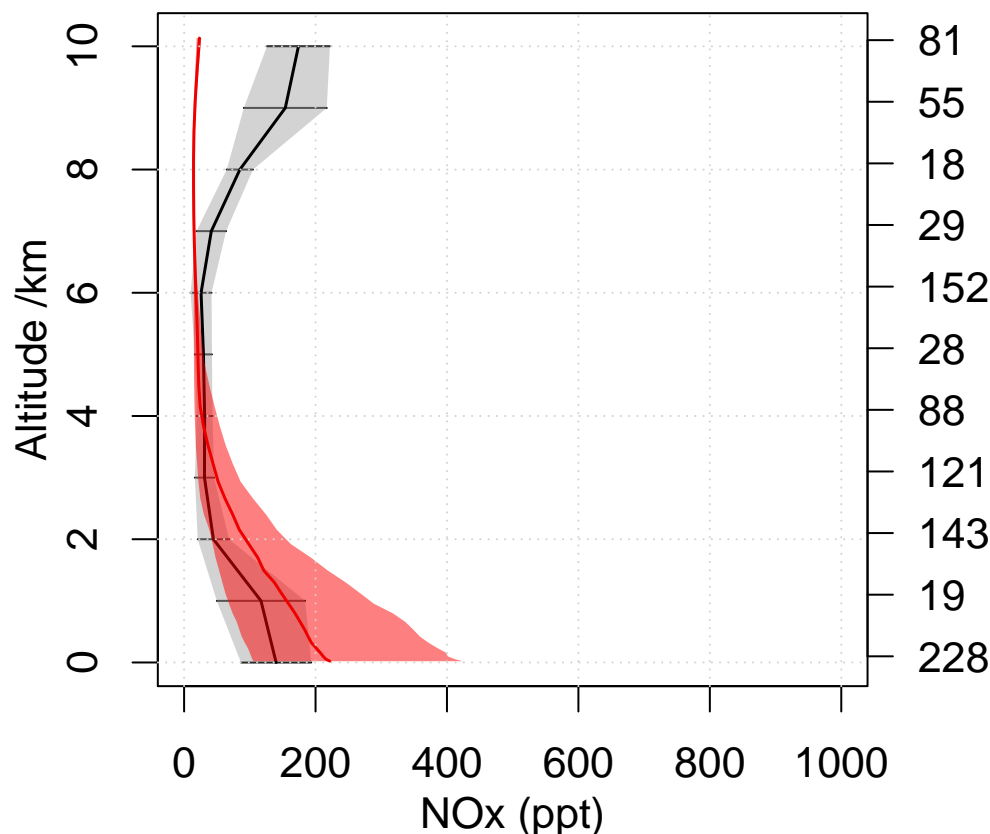
**PEM-Tropics-B Christmas-Island 1999 07**  
Lat 0 – 10 Lon 200 – 220



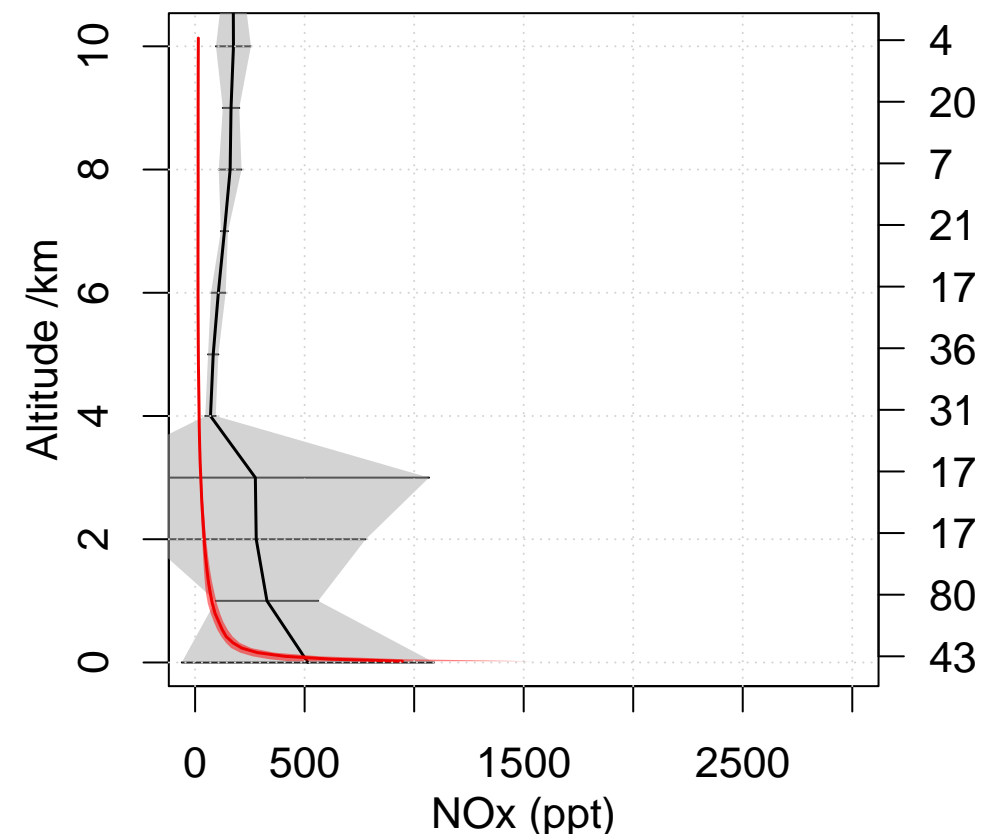
**PEM-Tropics-B Tahiti 1999 03**  
Lat -20 – 0 Lon 200 – 230



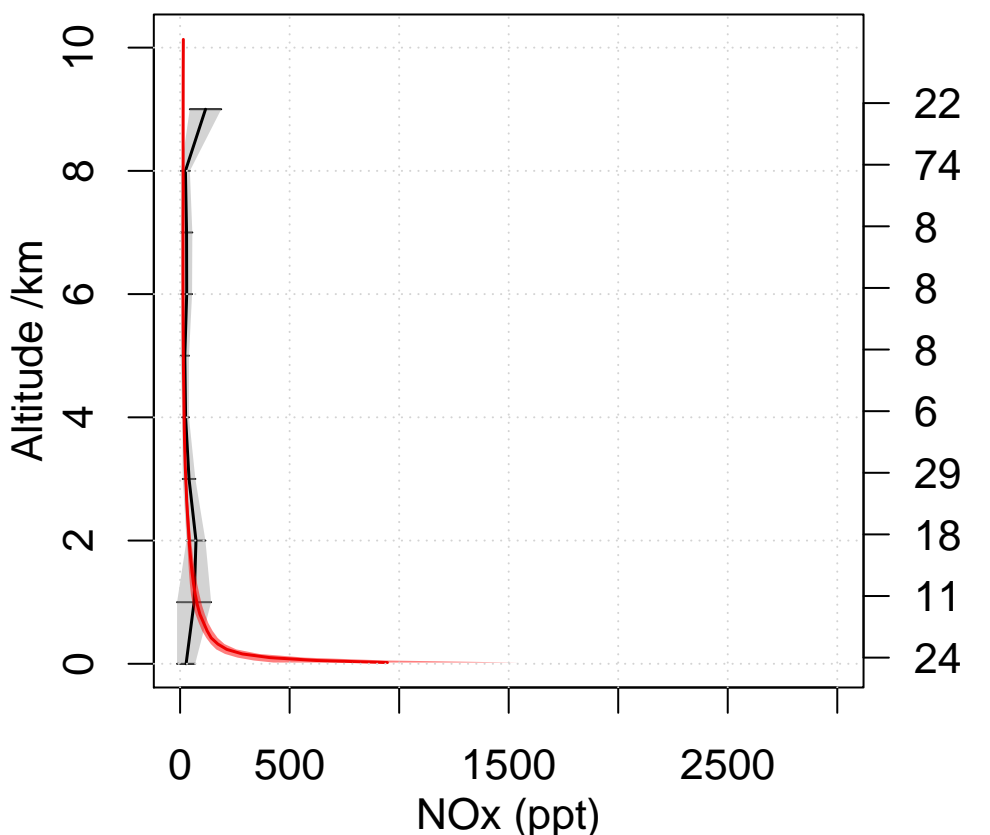
**PEM-West-B Japan 1994 02**  
Lat 25 – 40 Lon 135 – 150



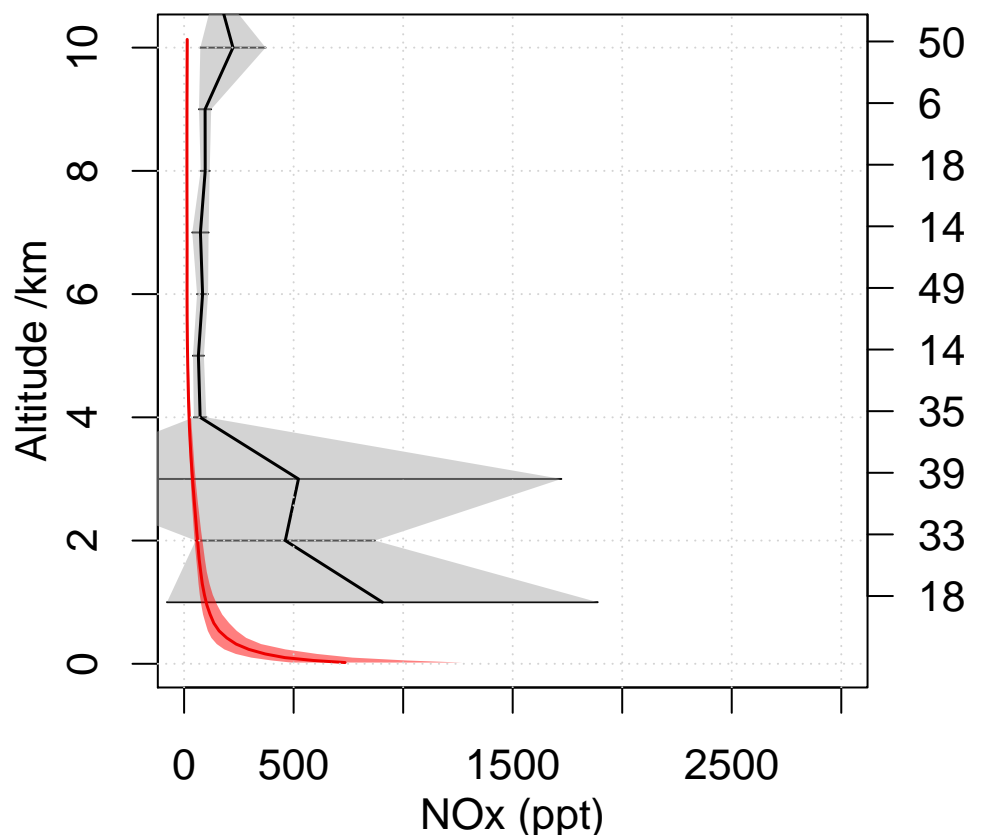
**TRACE-A E-Brazil 1992 09**  
Lat -15 – -5 Lon 310 – 320



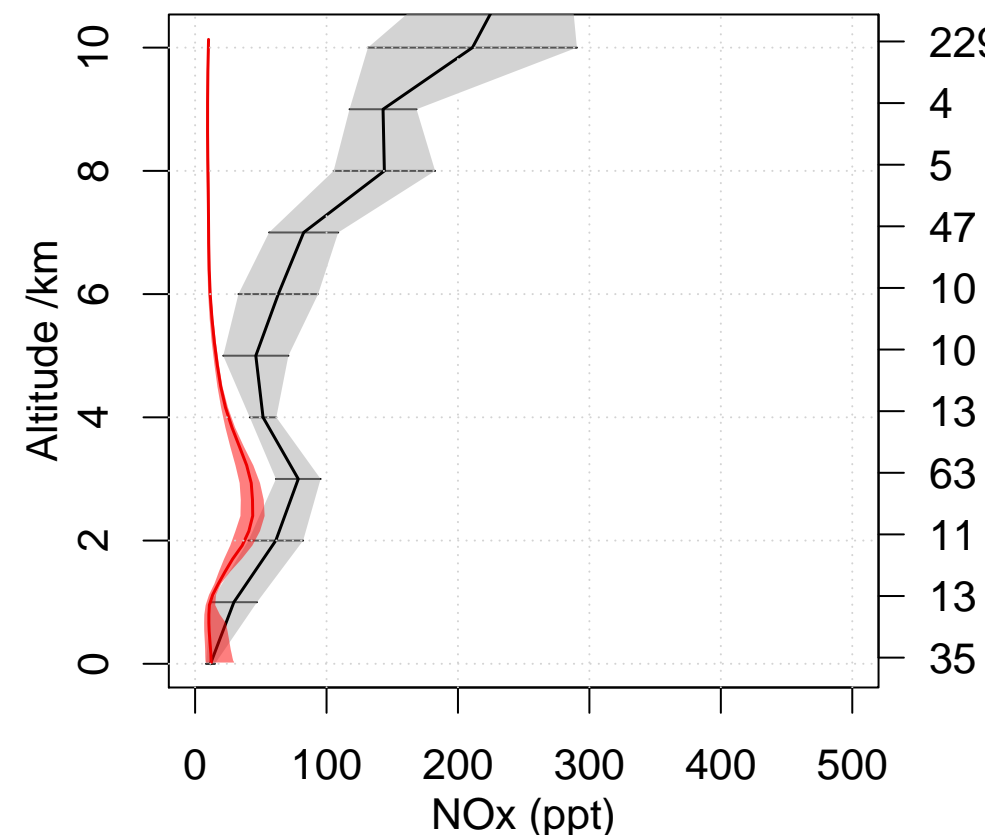
**TRACE-A E-Brazil Coast 1992 09**  
Lat -35 – -25 Lon 310 – 320



**TRACE-A S-Africa 1992 09**  
Lat -25 – -5 Lon 15 – 35

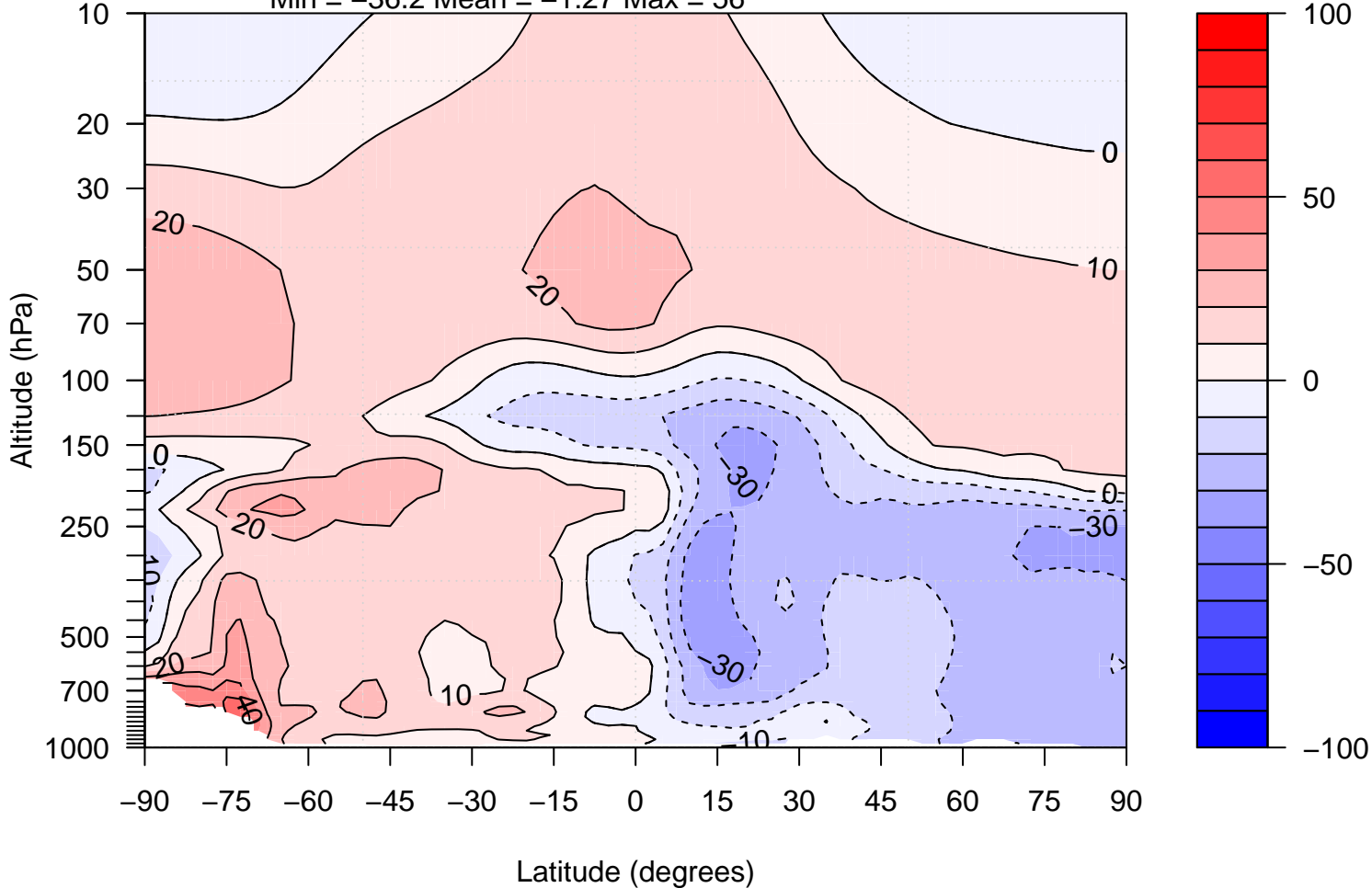


**TRACE-A W-Africa Coast 1992 09**  
Lat -25 – -5 Lon 0 – 10



# xkawa - ERA Q bias

Min = -36.2 Mean = -1.27 Max = 56



[OH] Air mass weighted

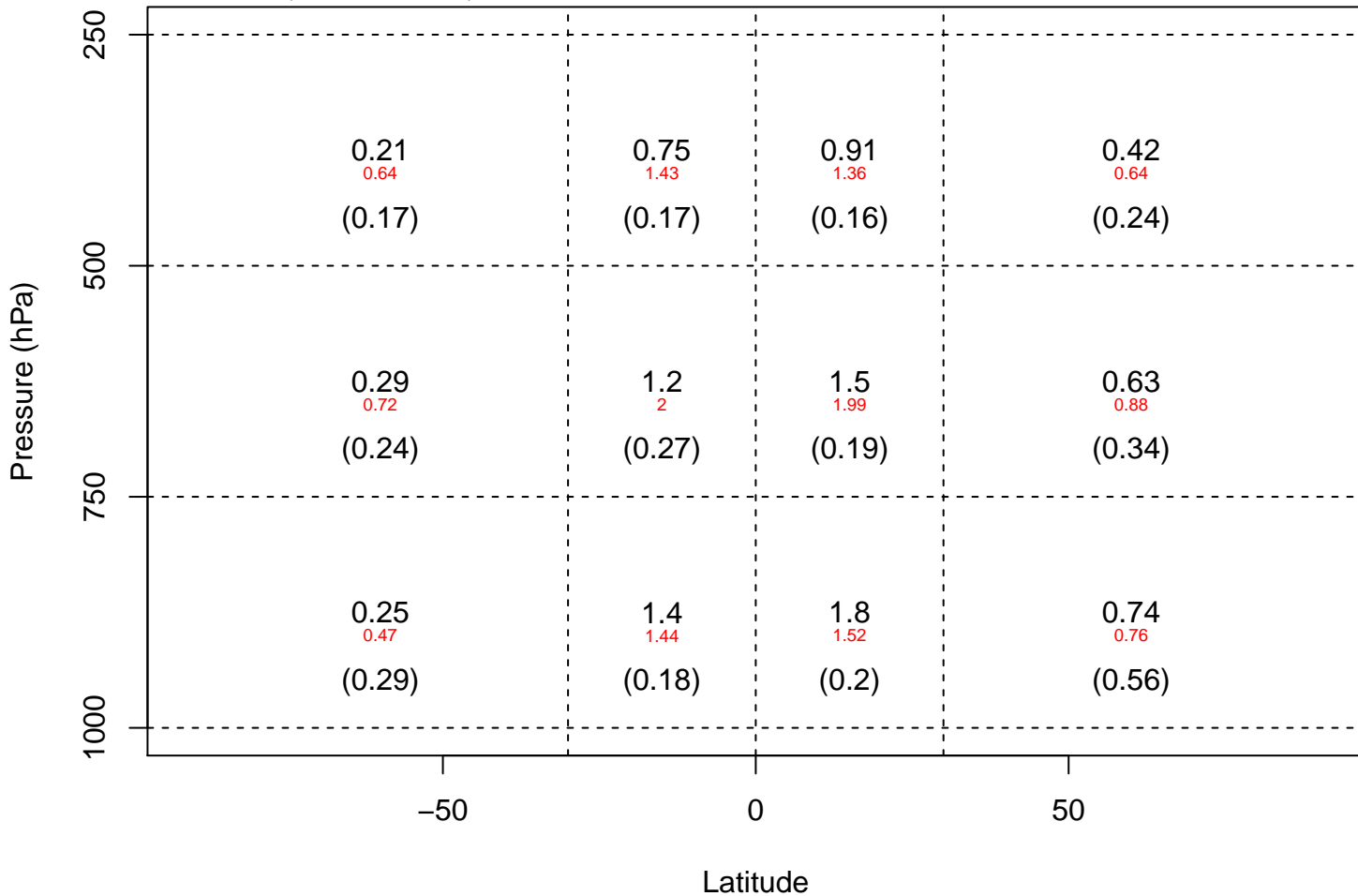
# UKCA xkawa

Red: Spivakovsky values

( $10^6$  molecules  $\text{cm}^{-3}$ )

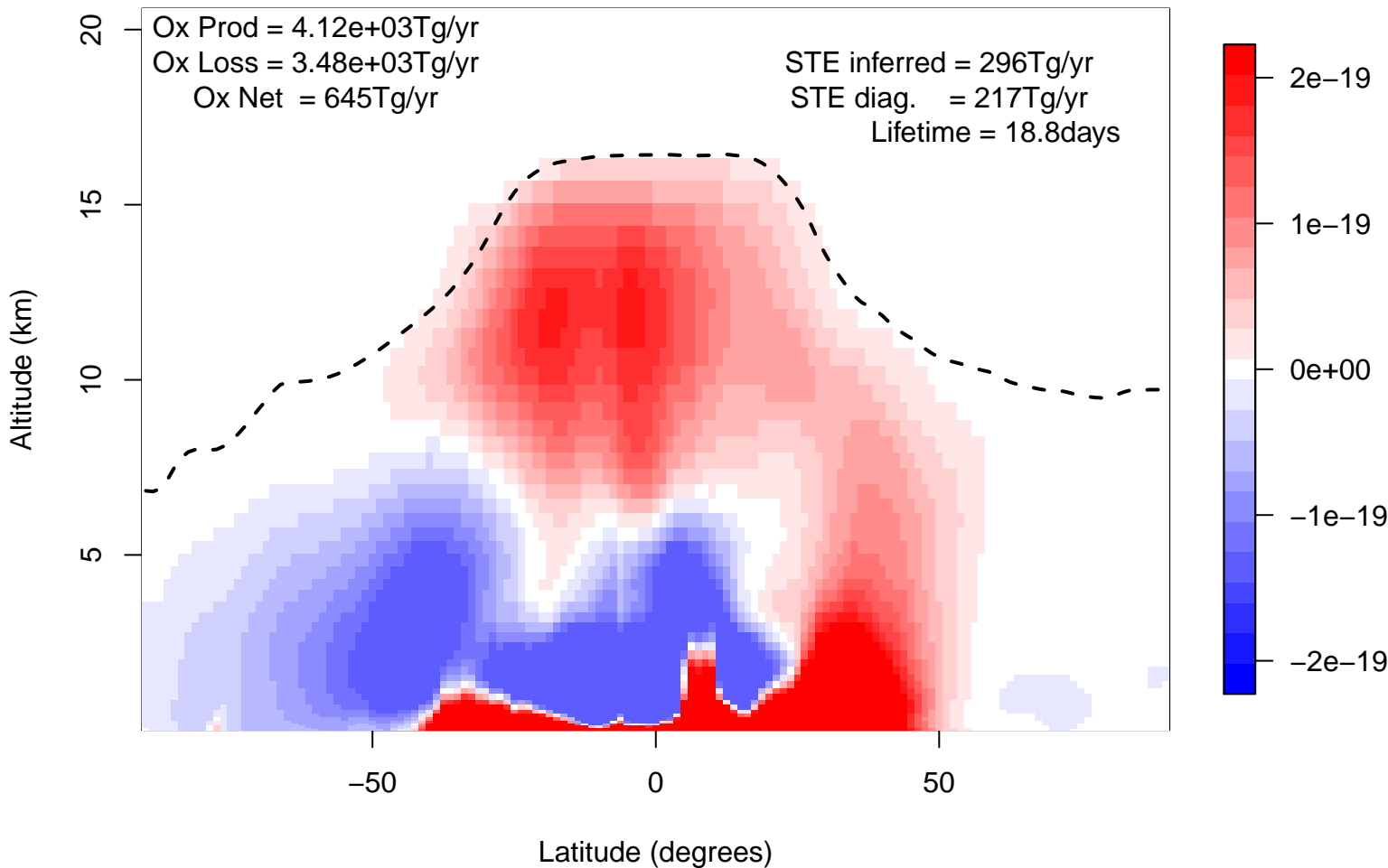
Mean OH =  $7.85 \times 10^5$

Values in ( ): Std dev

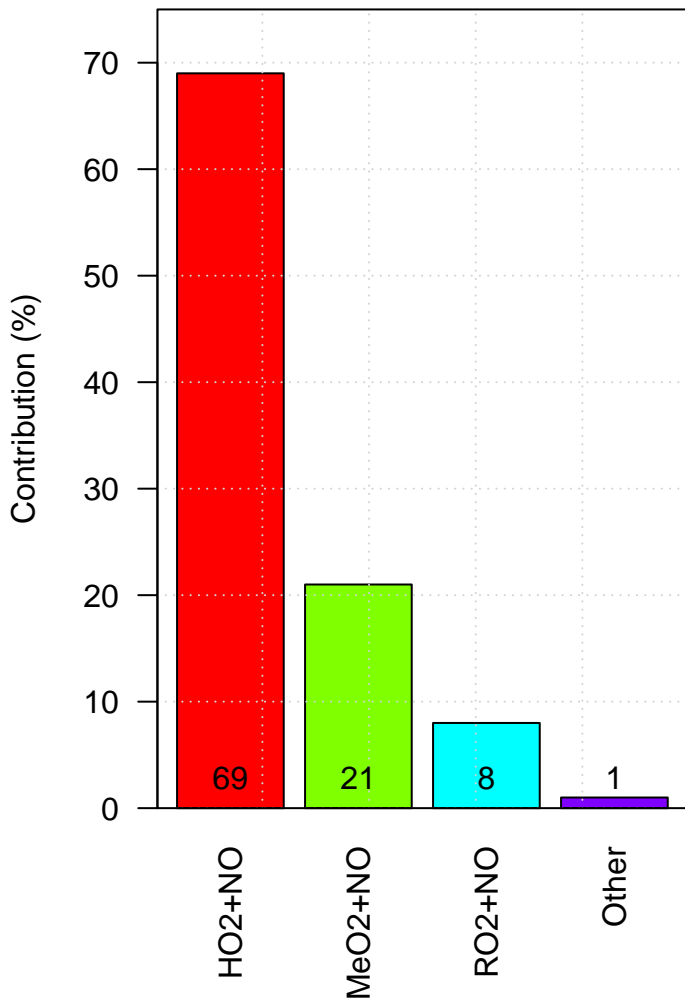




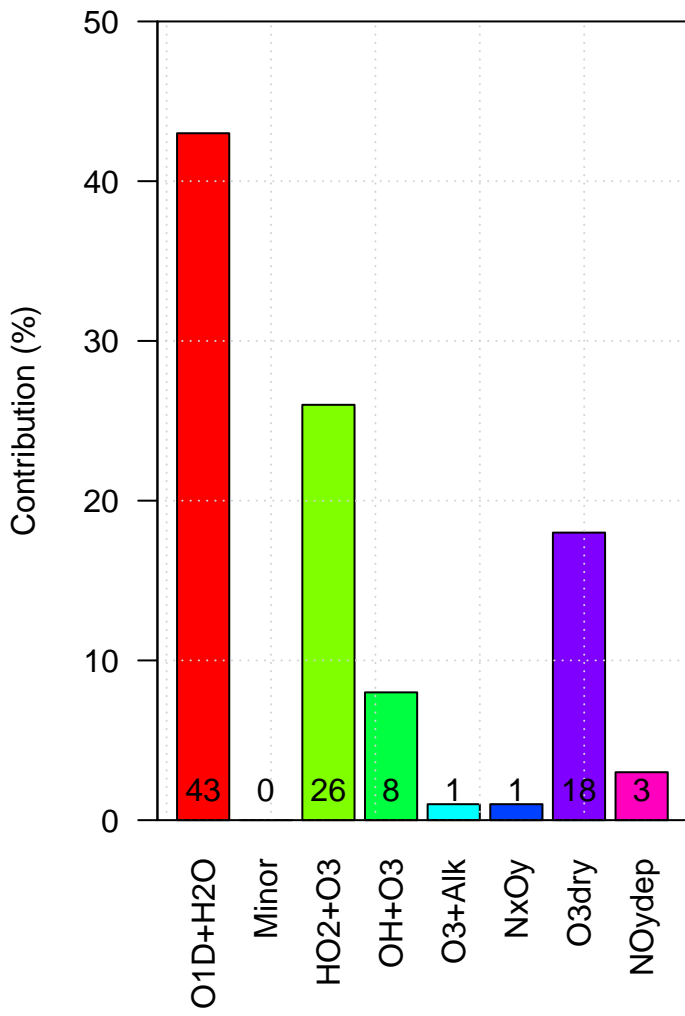
# UKCA xkawa Ox Net Chemical Production



### xkawa Production of Tropospheric Ox

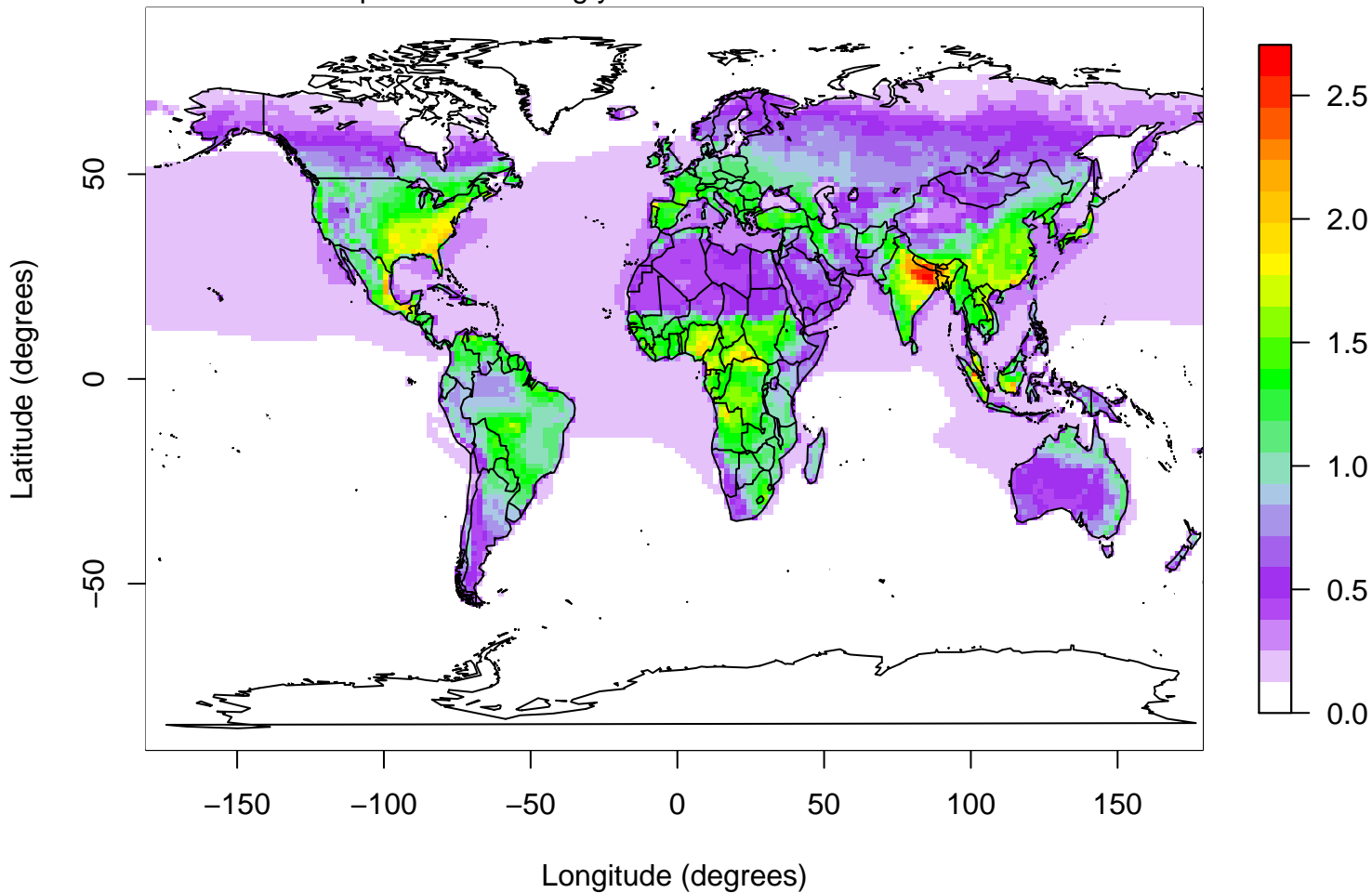


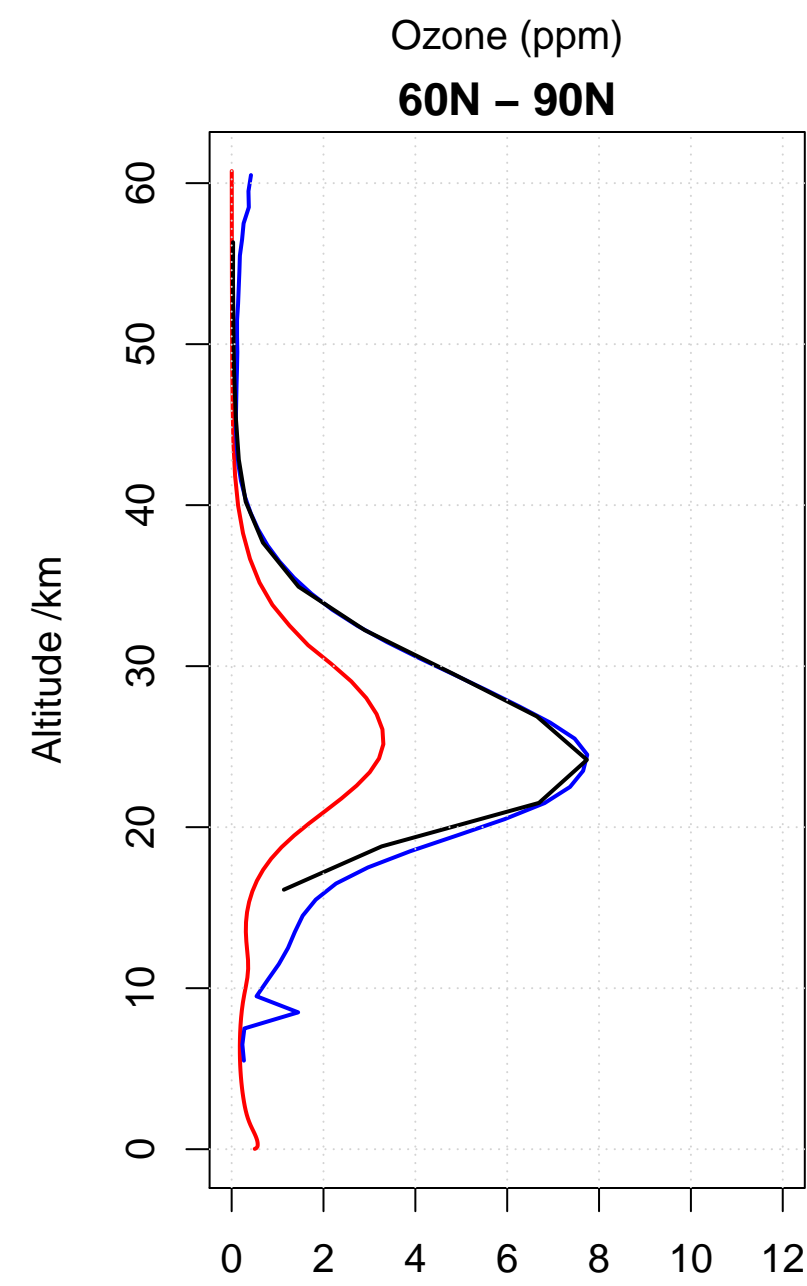
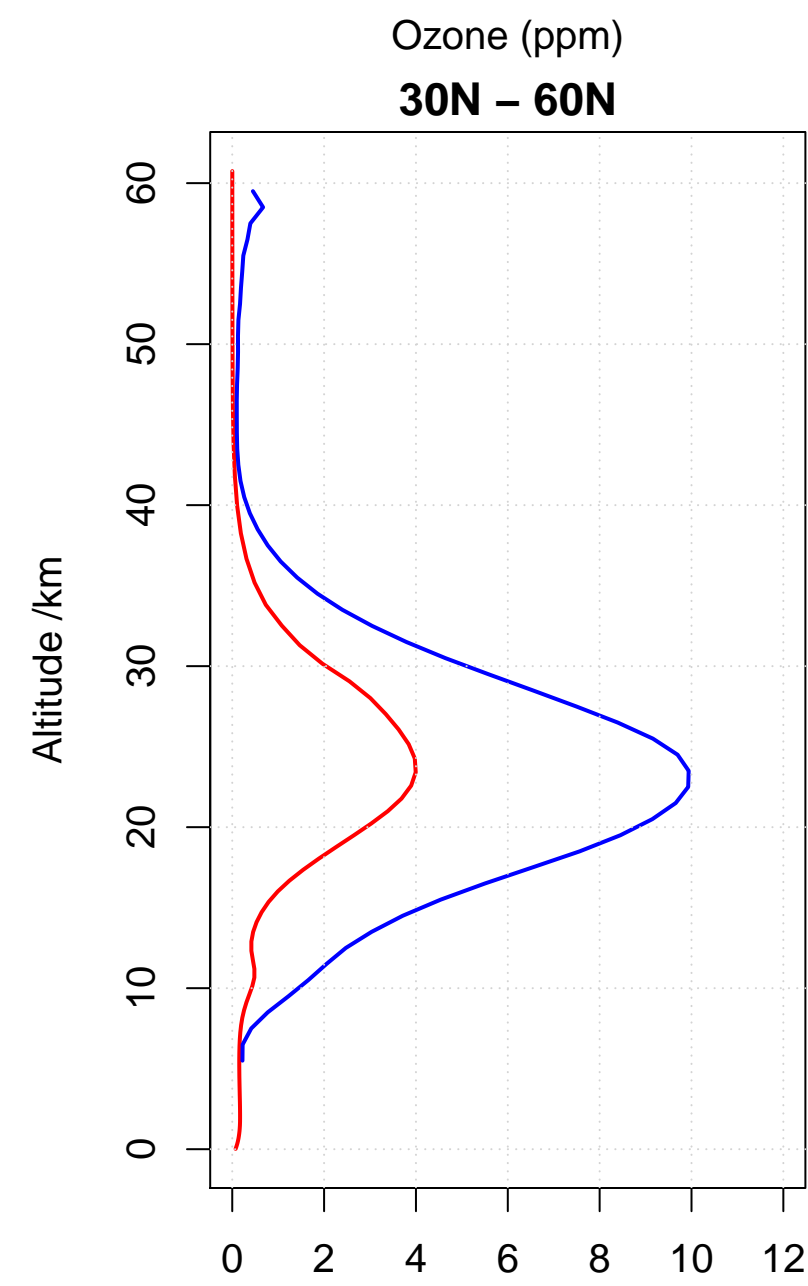
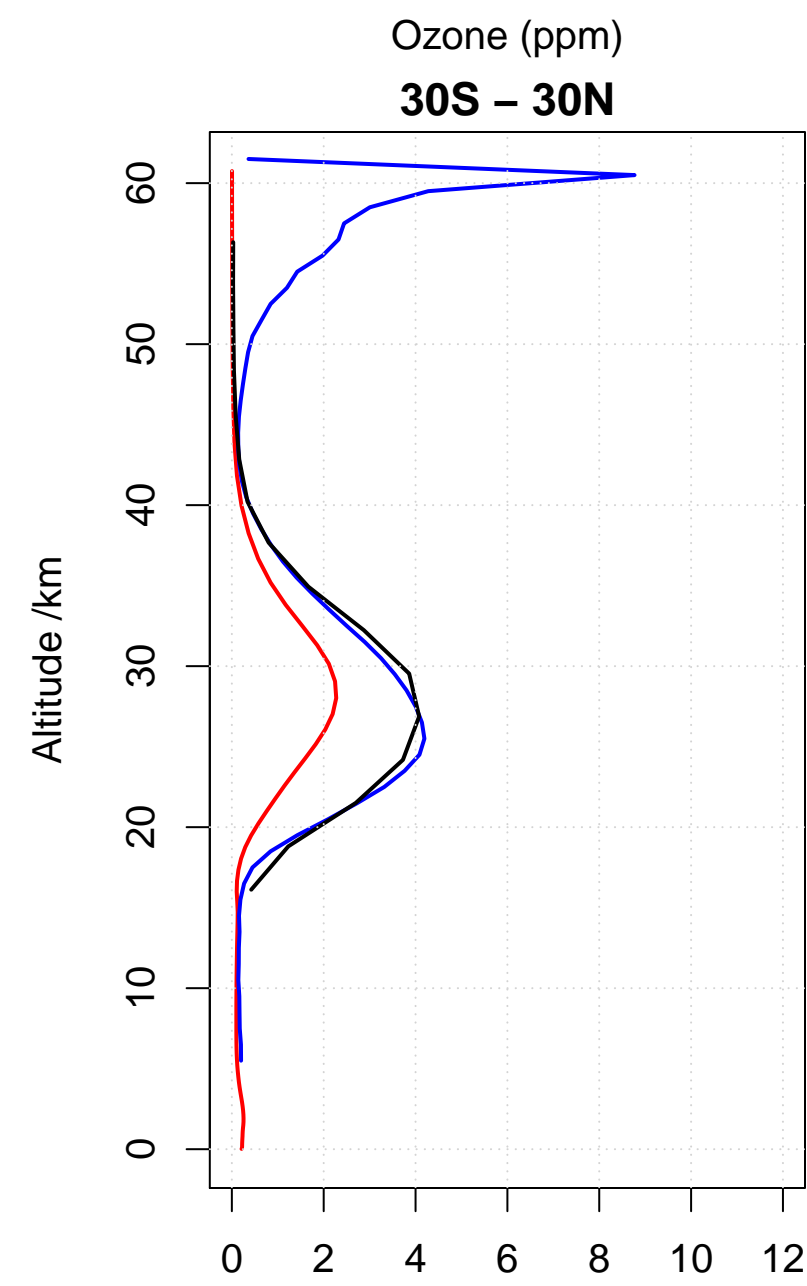
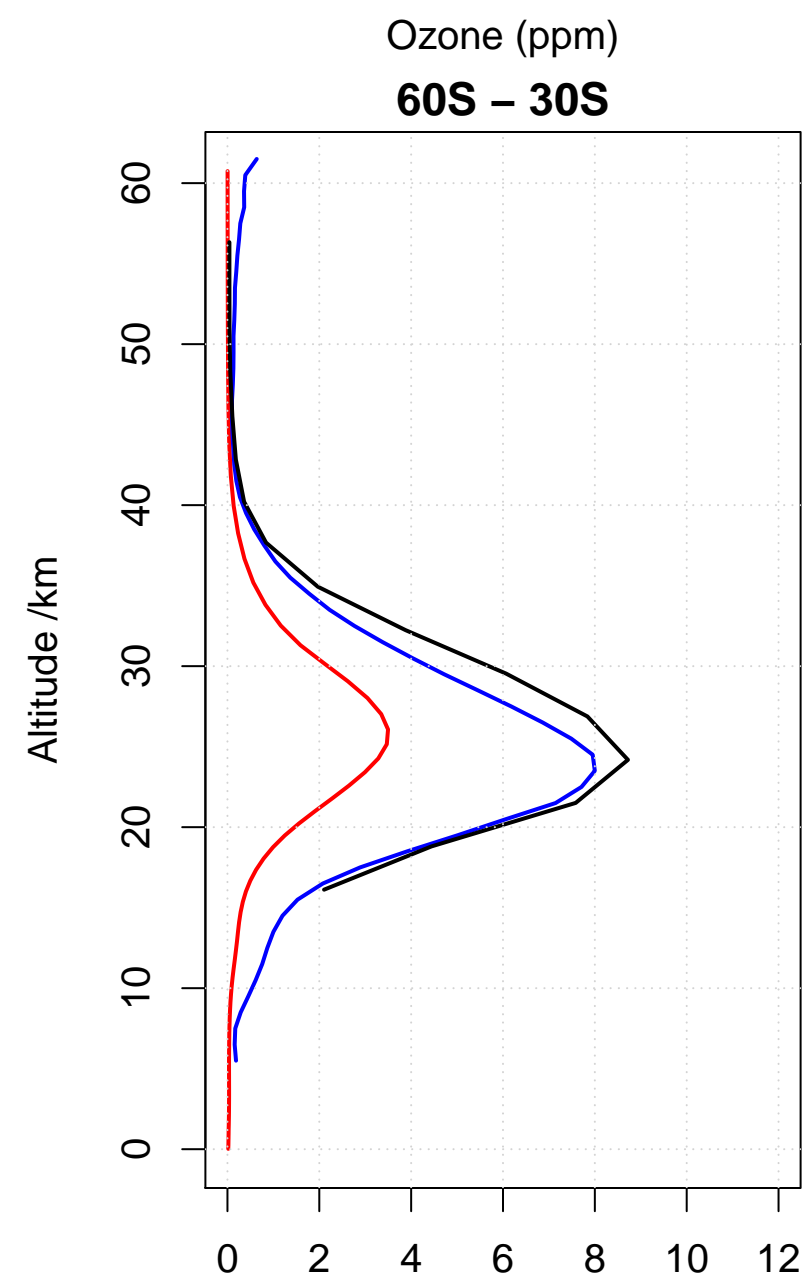
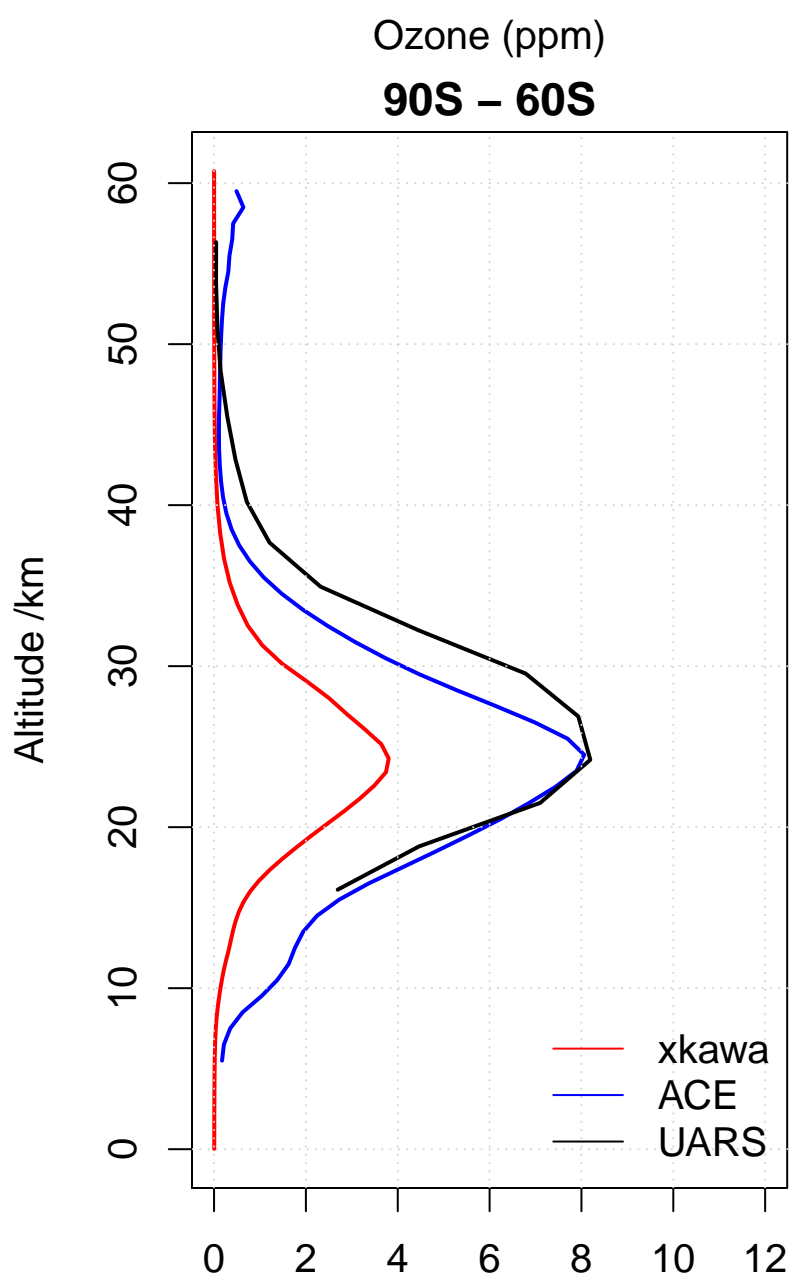
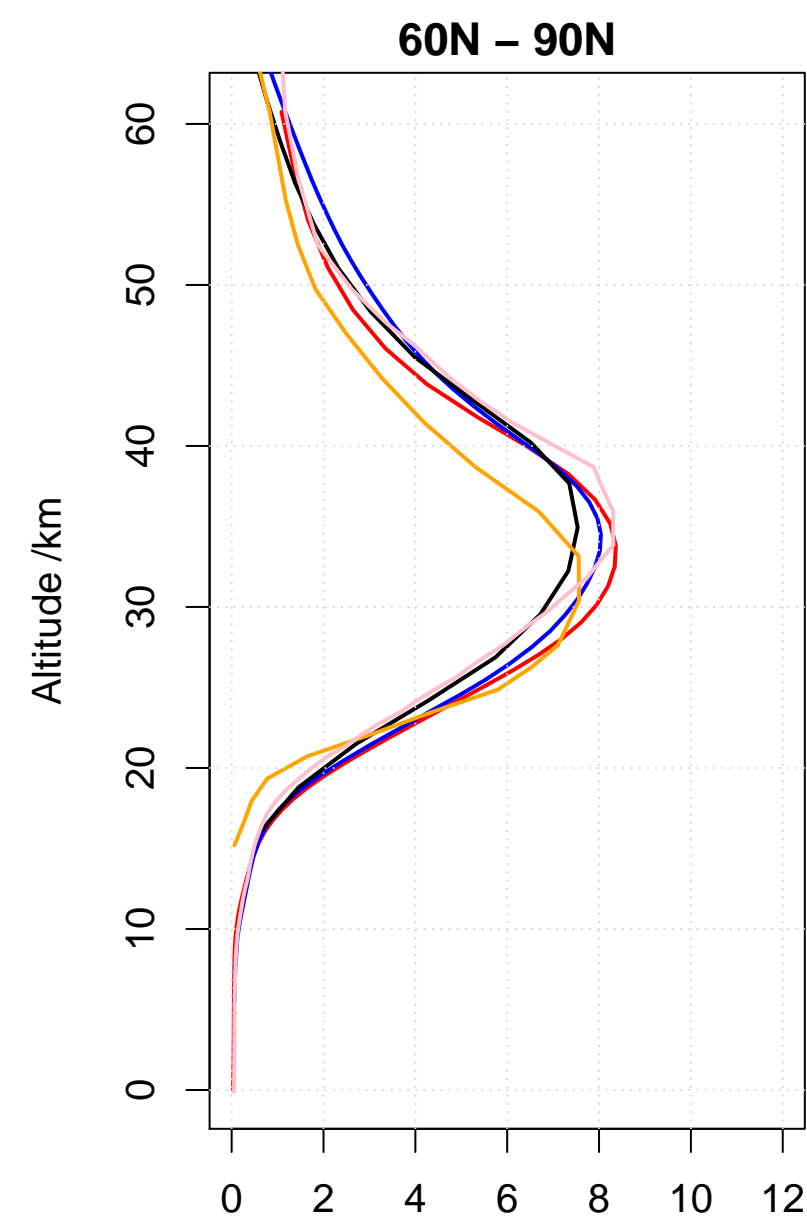
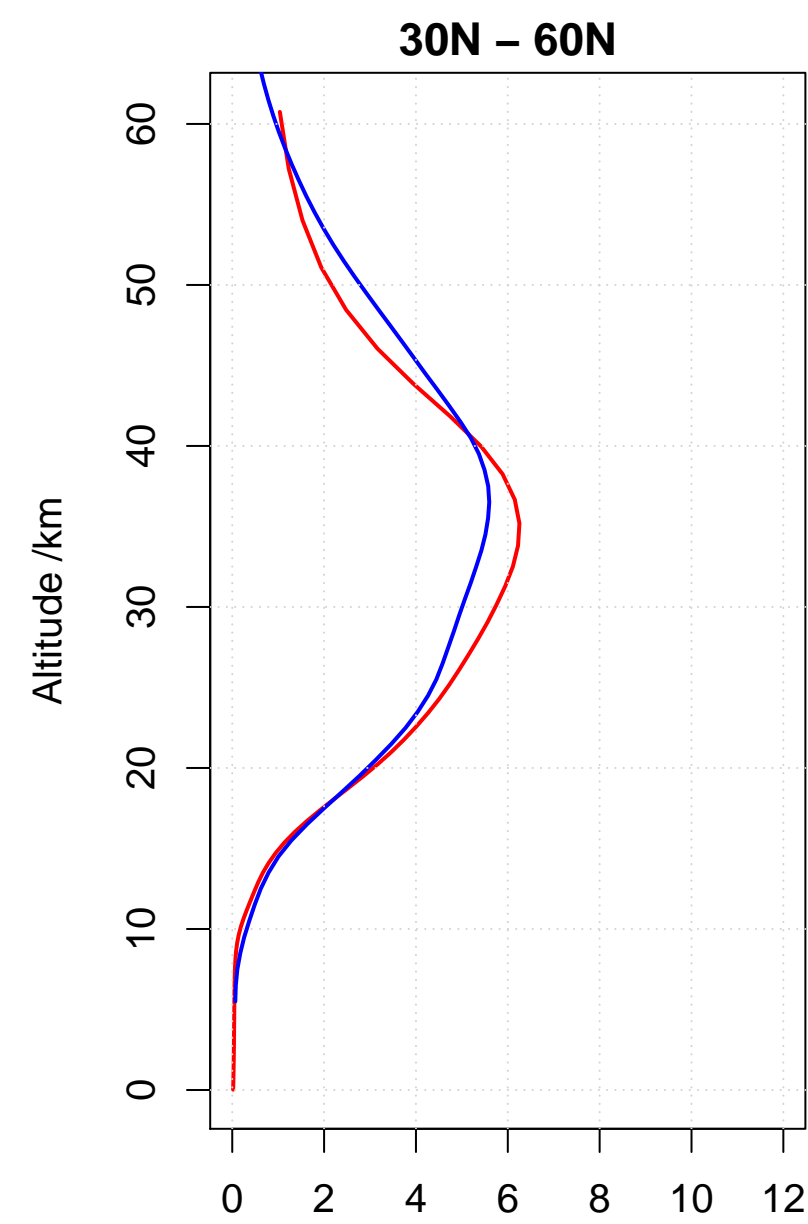
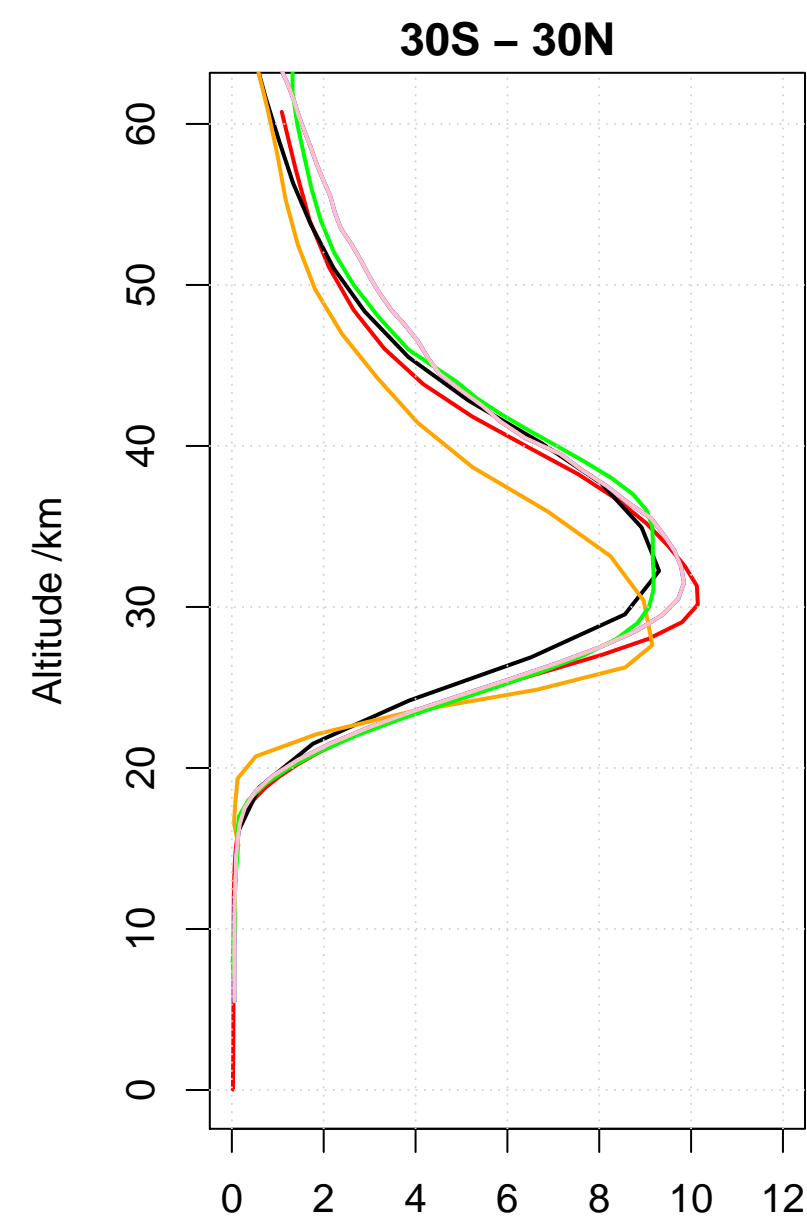
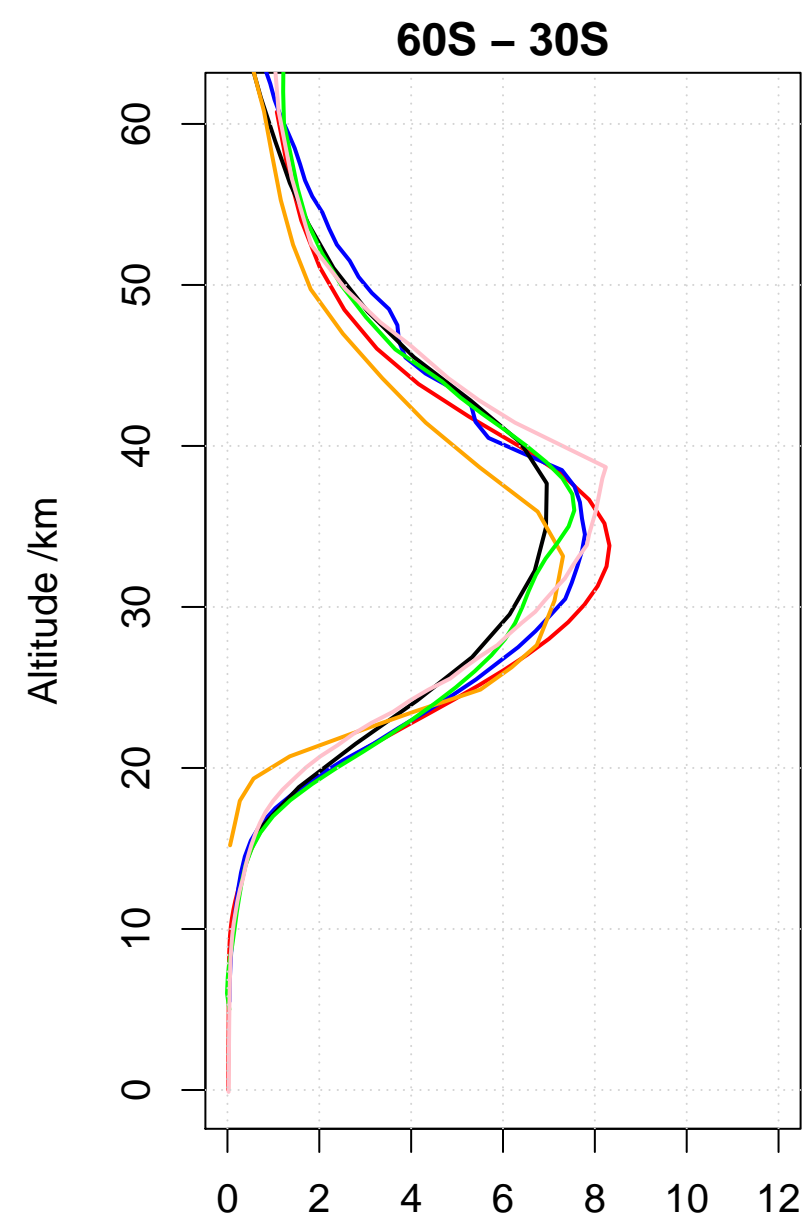
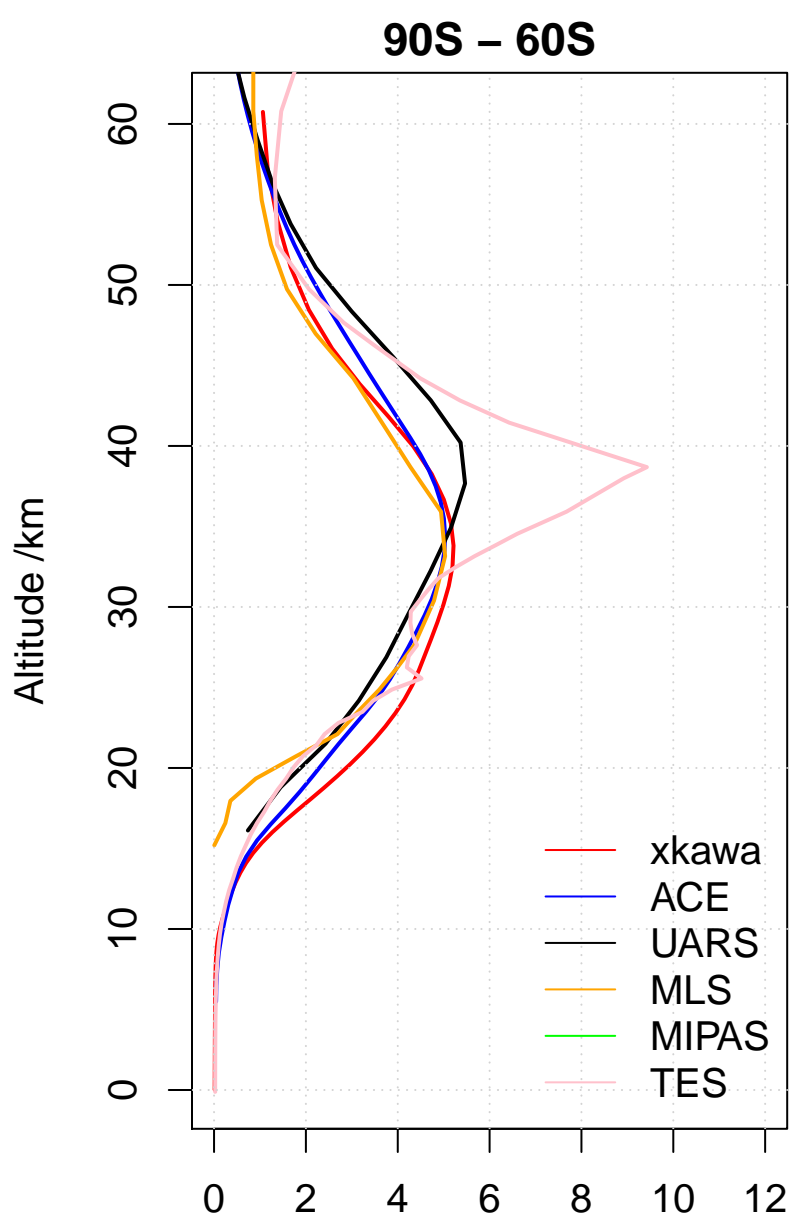
### xkawa Loss of Tropospheric Ox

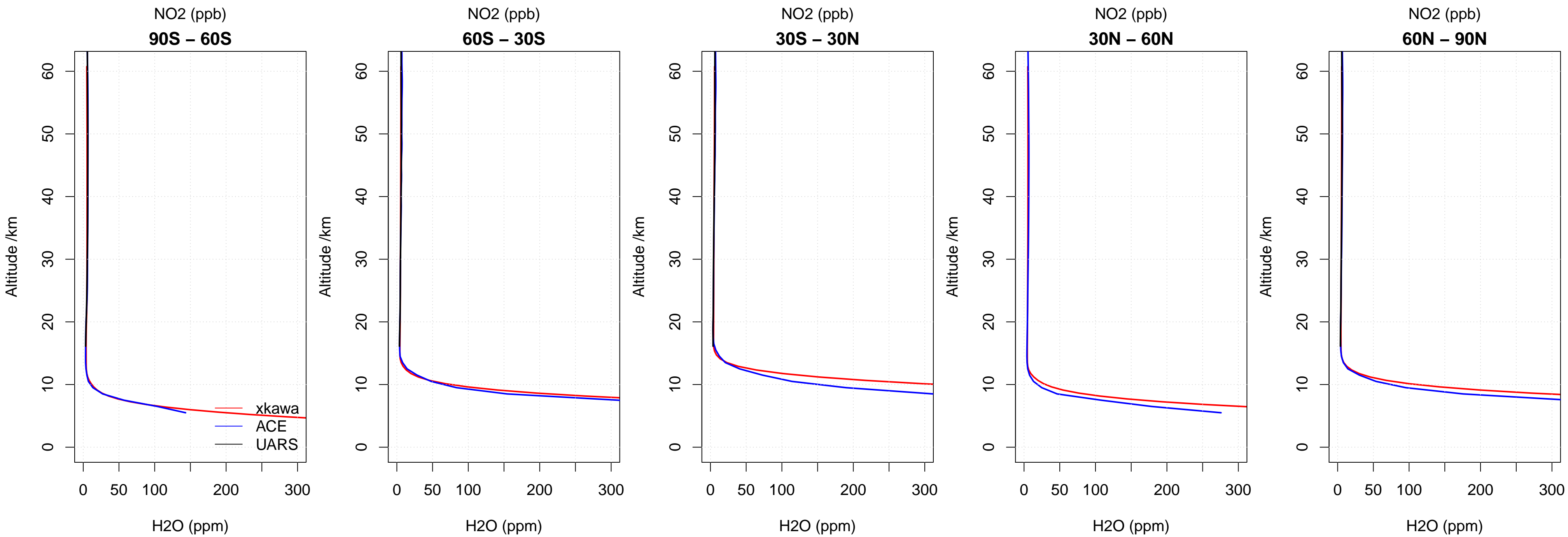
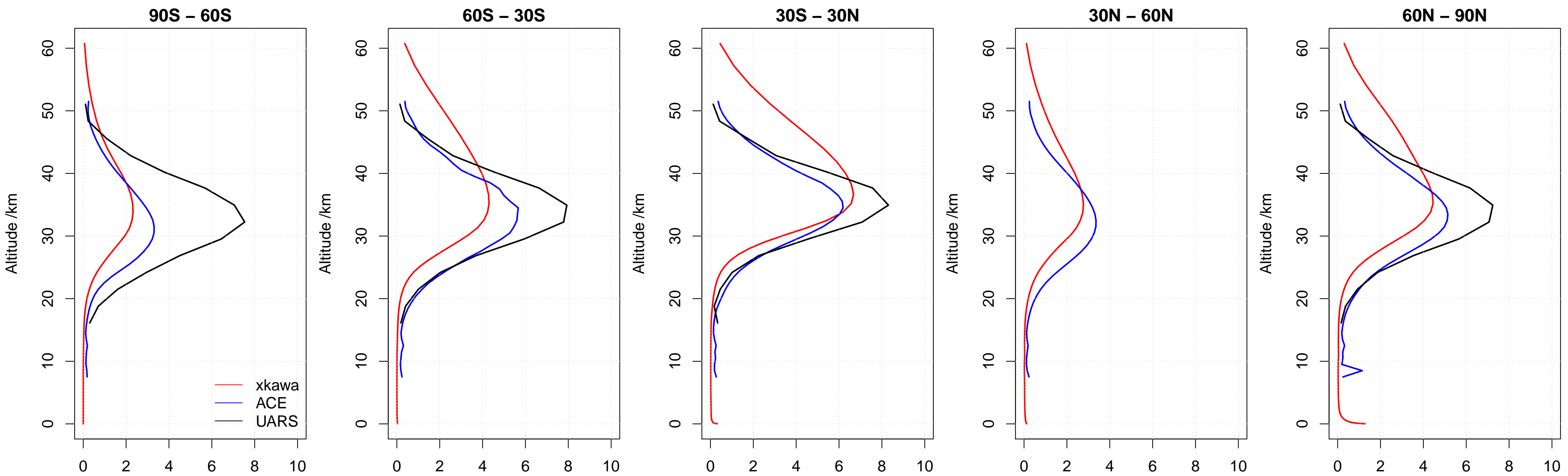


# UKCA Ox deposition xkawa

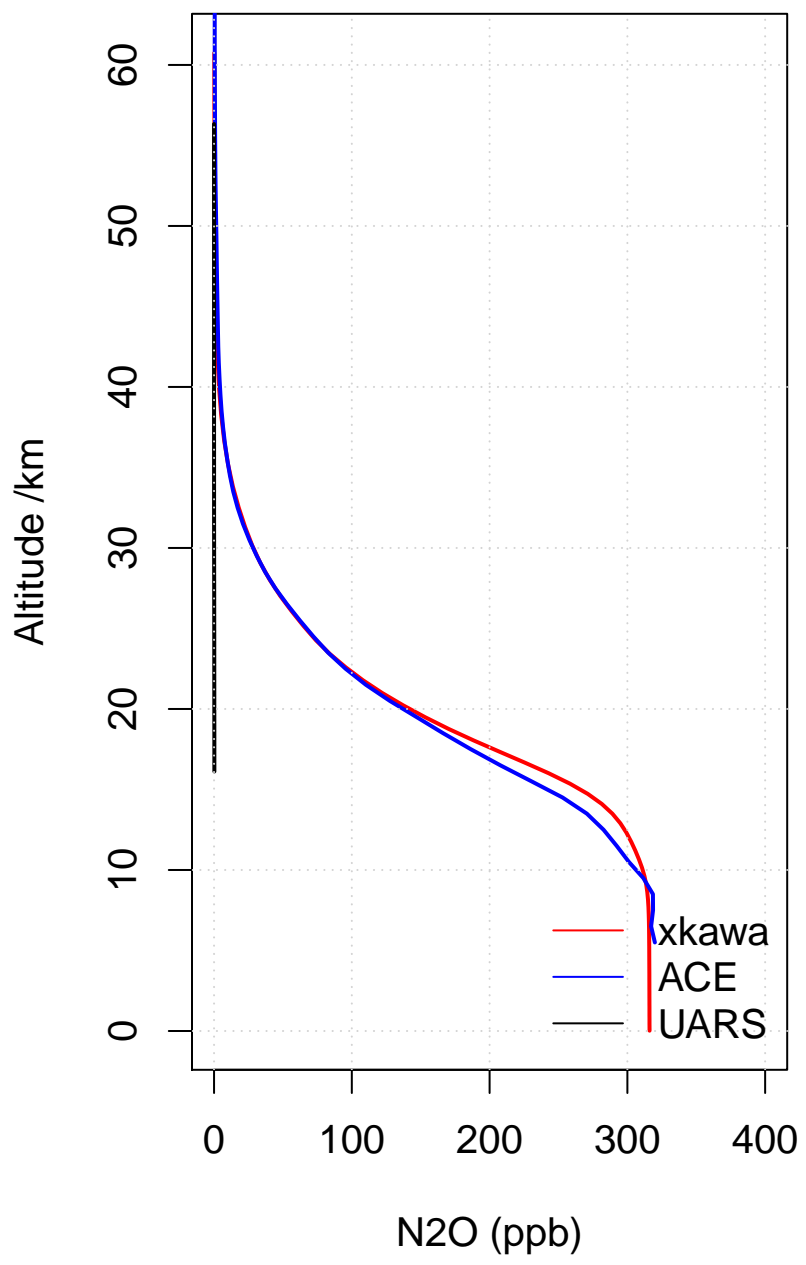
Total Ox Deposition = 940 Tg/yr



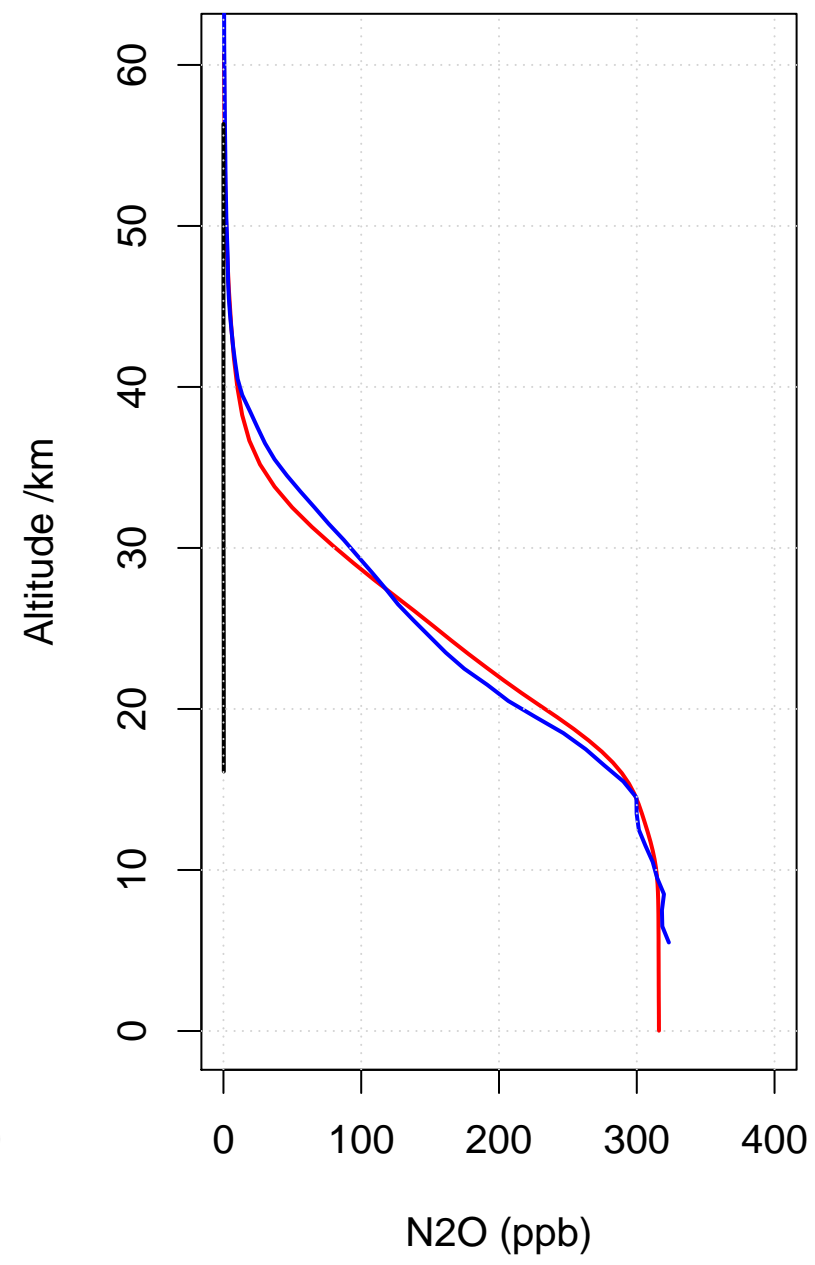




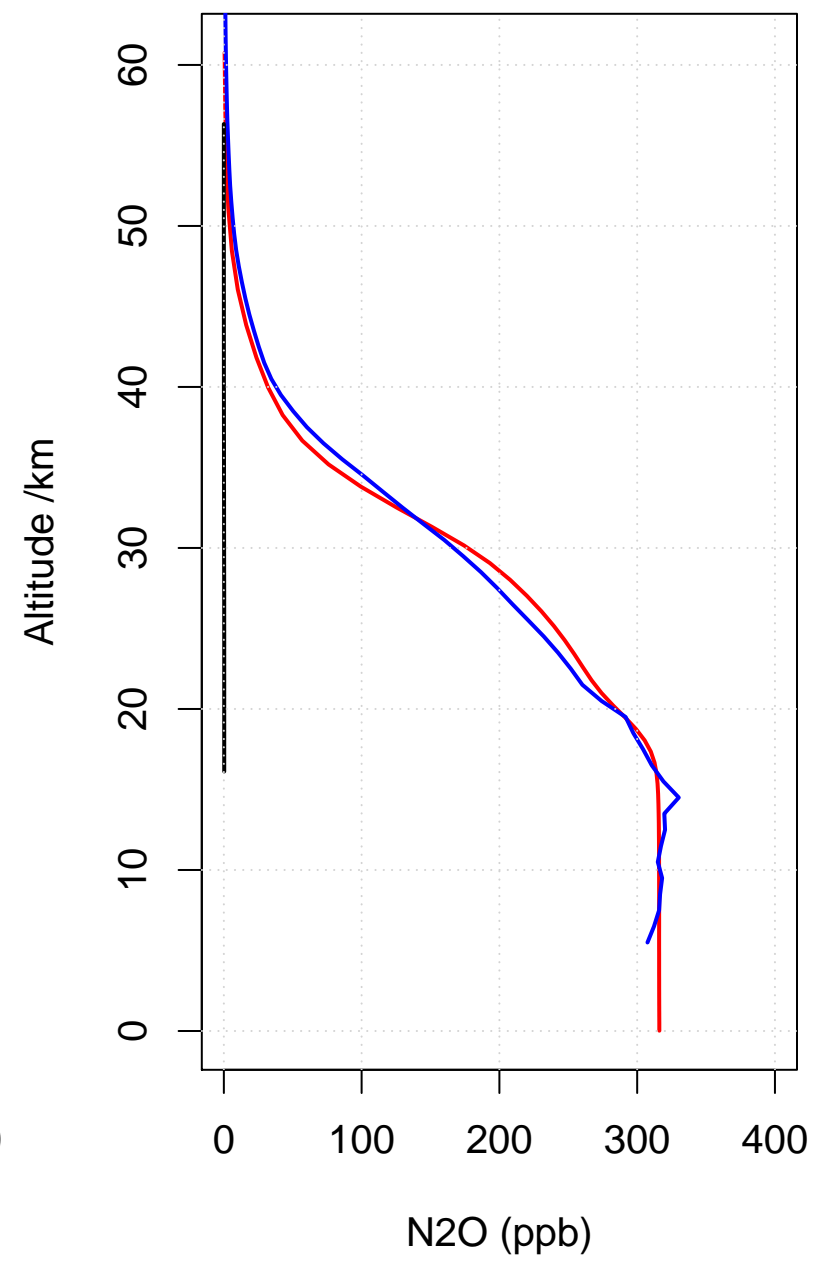
90S – 60S



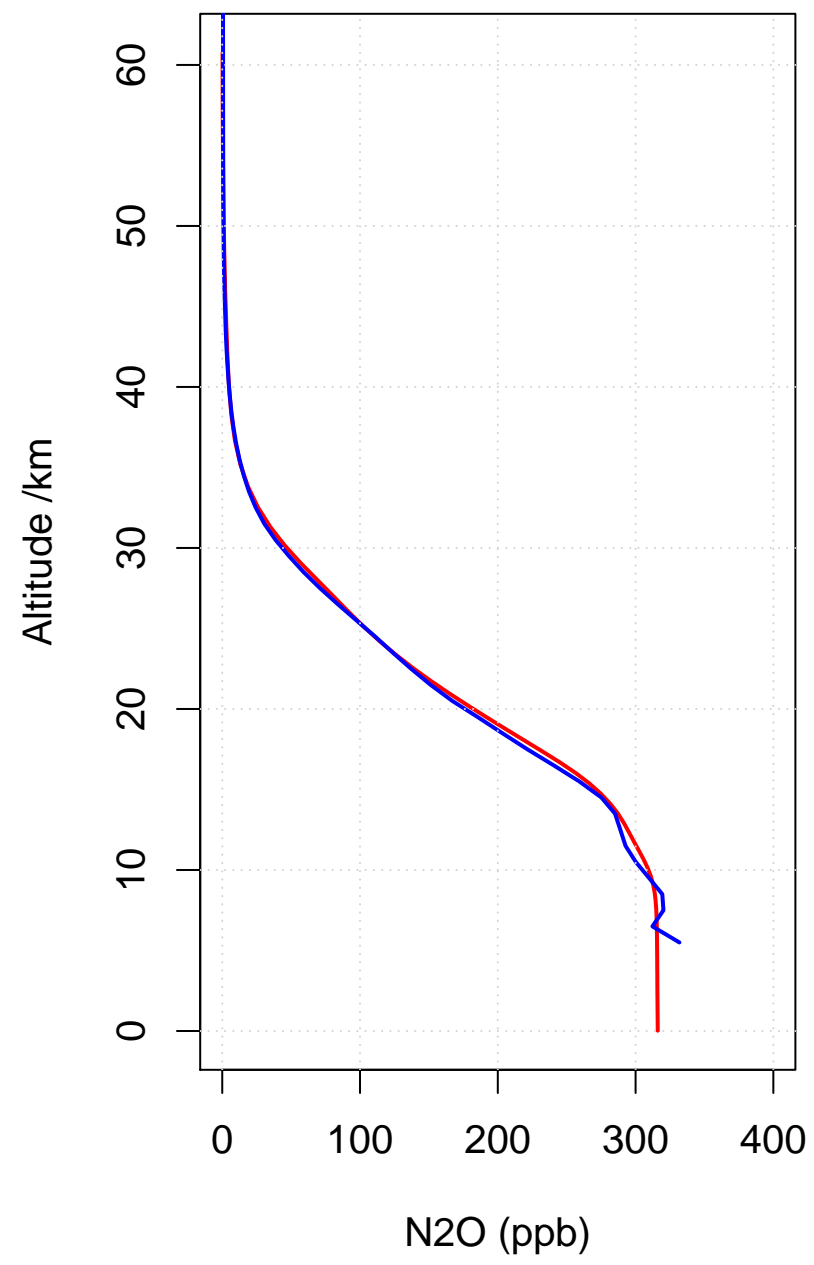
60S – 30S



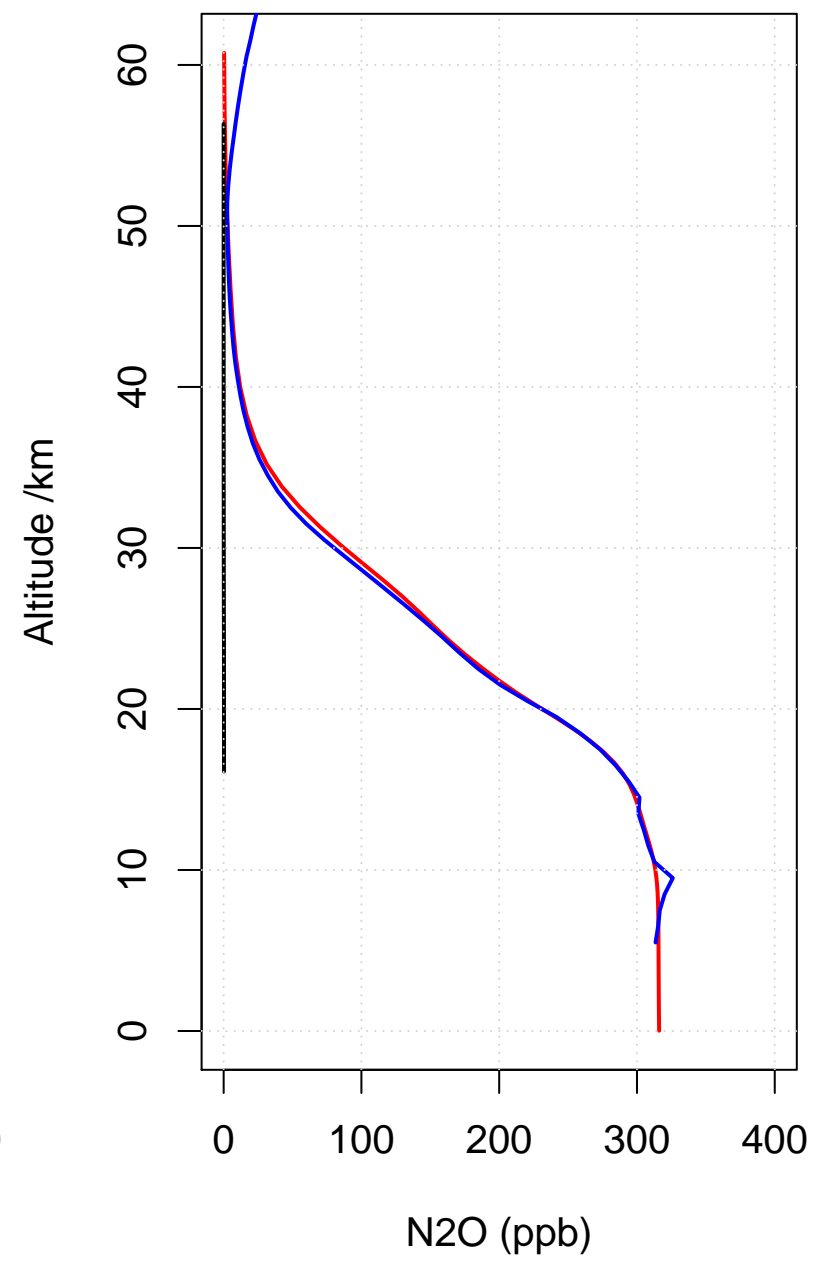
30S – 30N



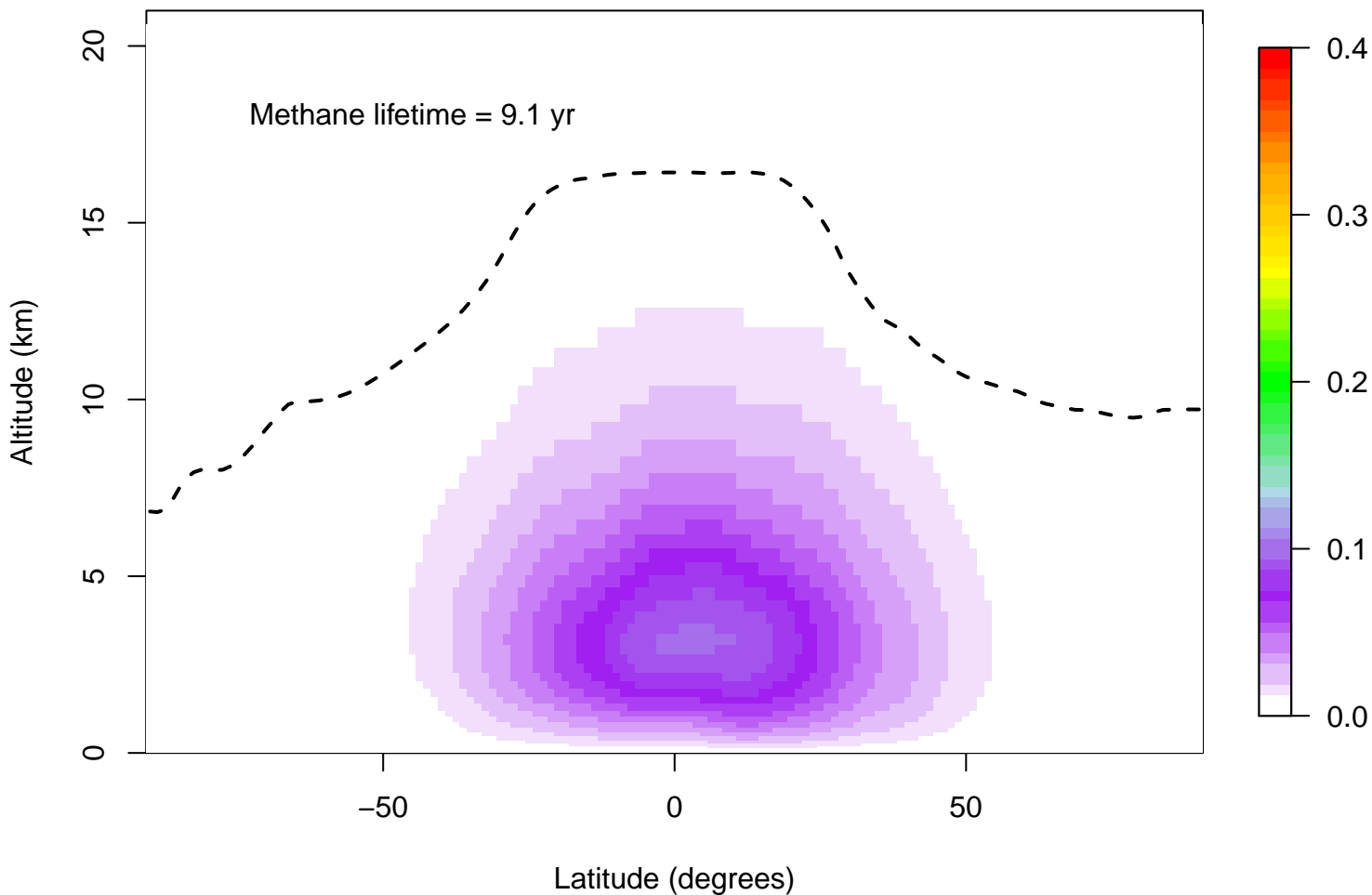
30N – 60N



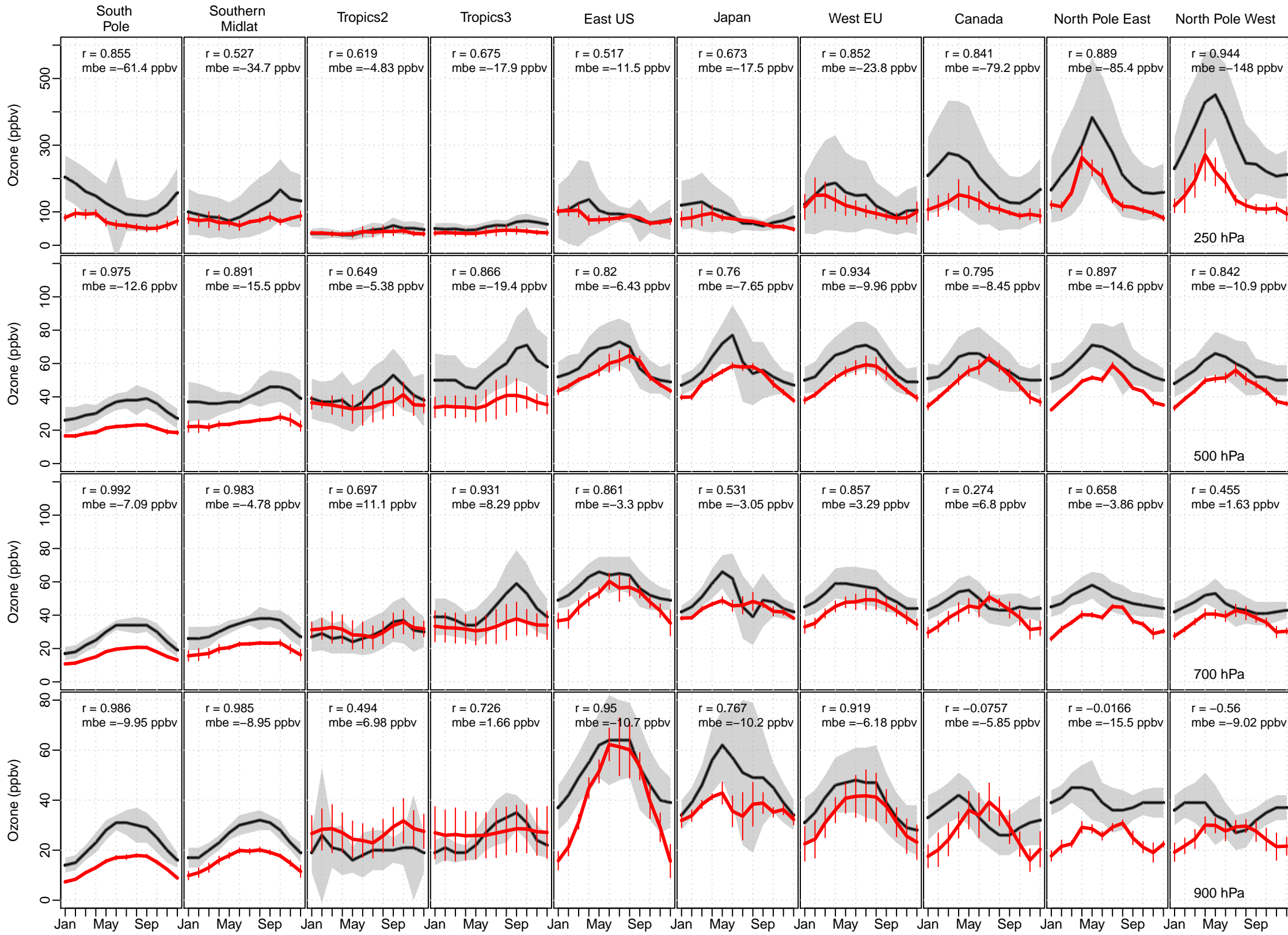
60N – 90N



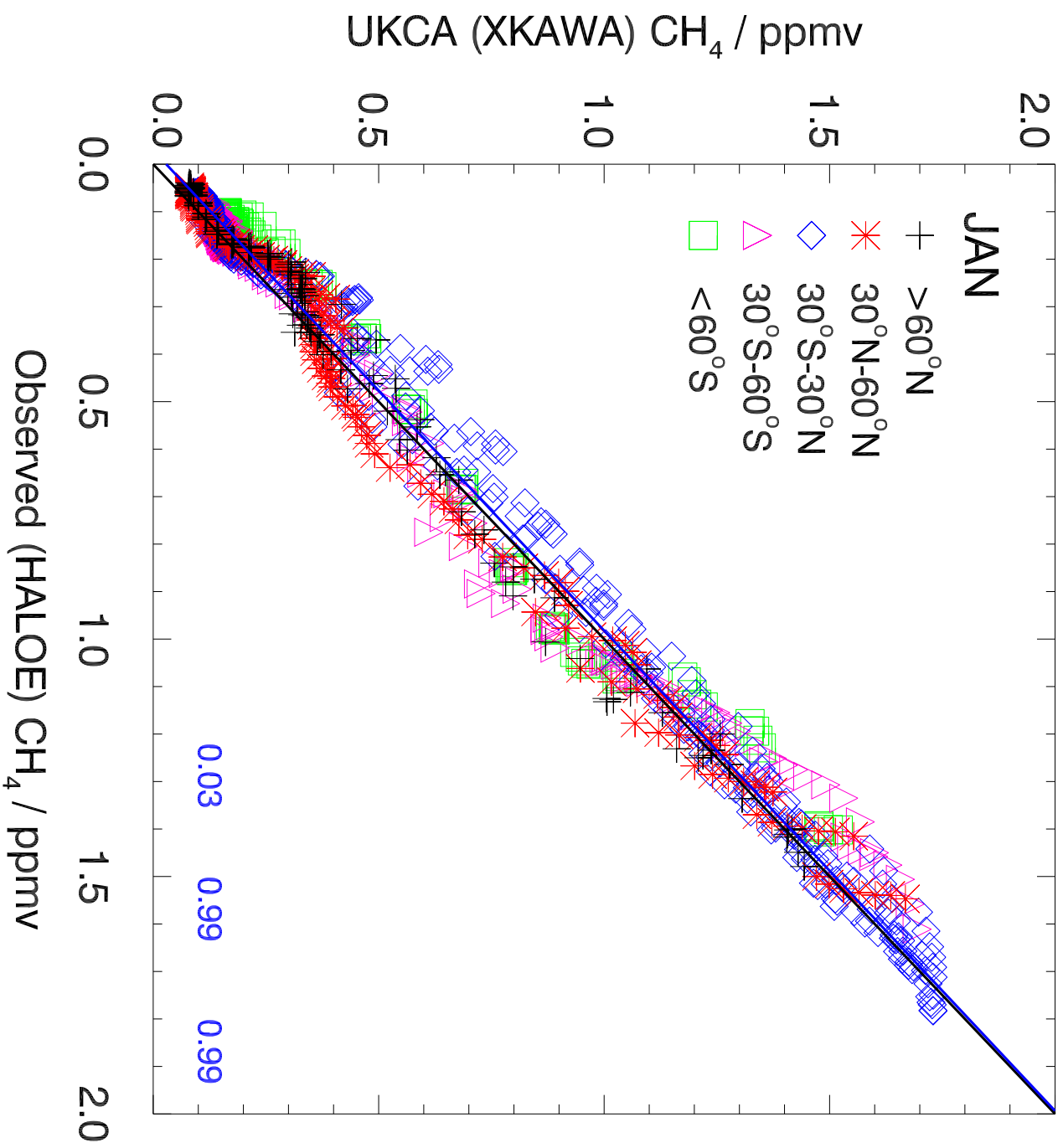
**UKCA xkawa**  
% CH<sub>4</sub> + OH flux (moles cm<sup>-3</sup> s<sup>-1</sup>)

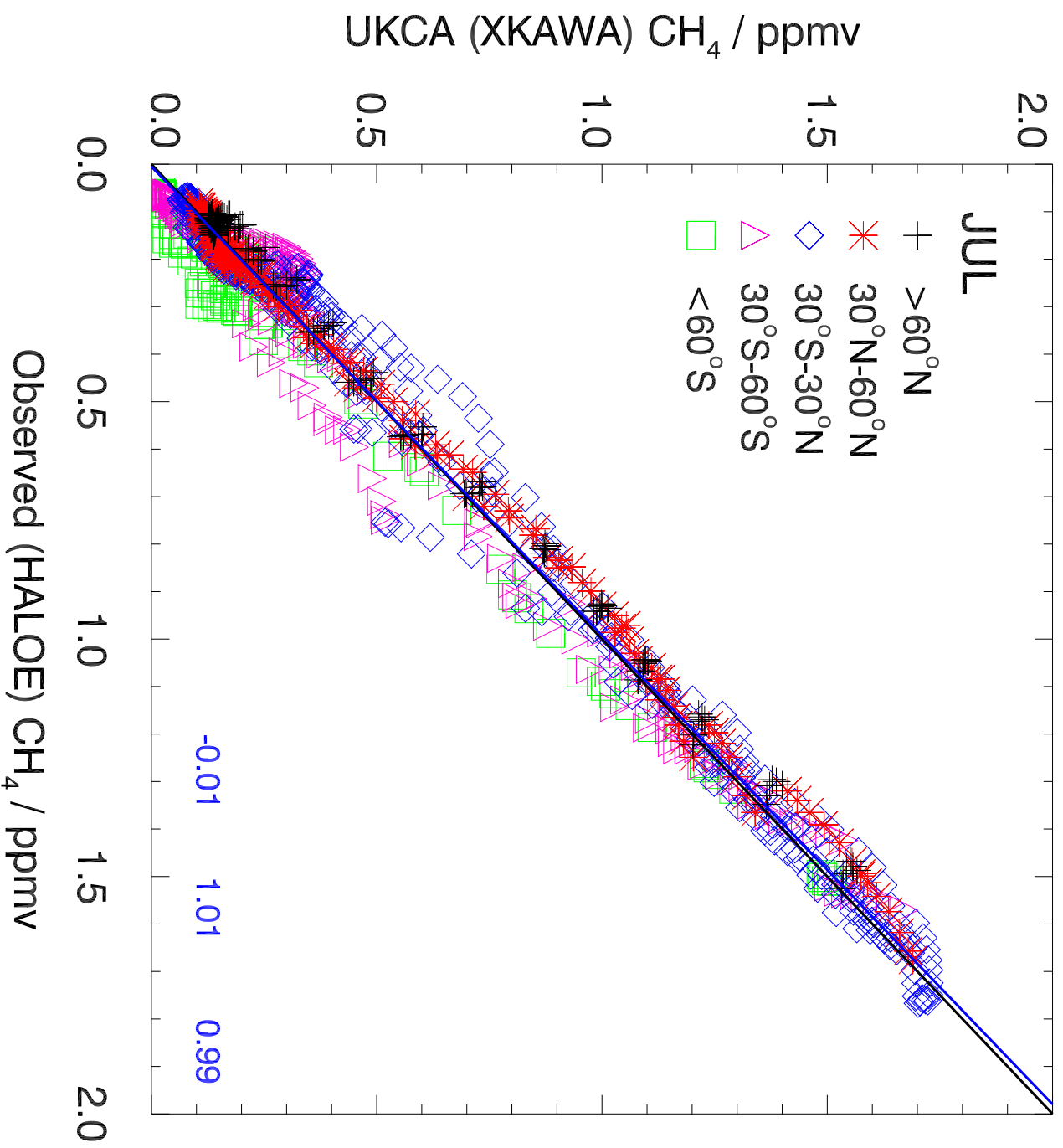


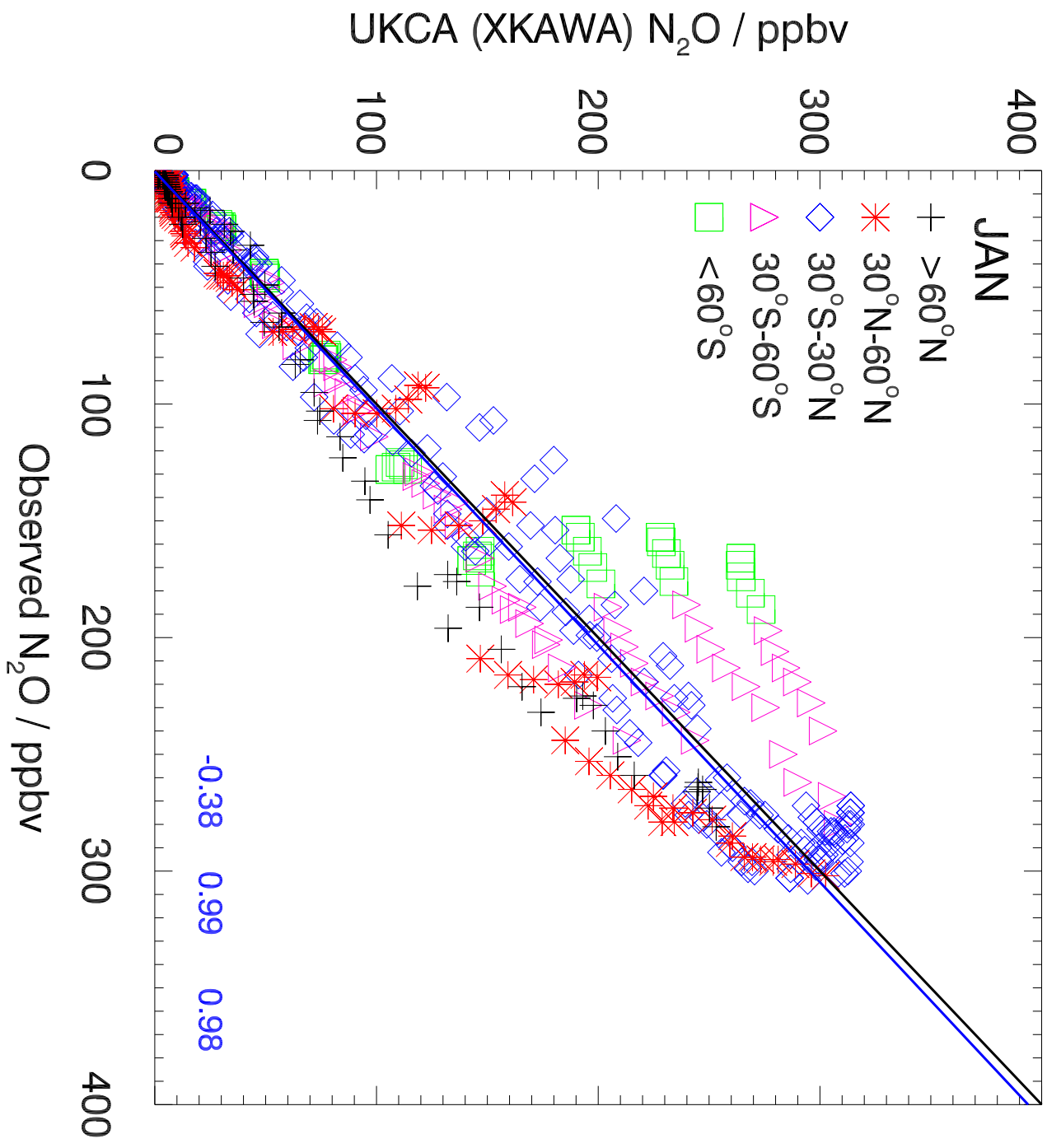
zkawa Tilmes ozone sonde comparison

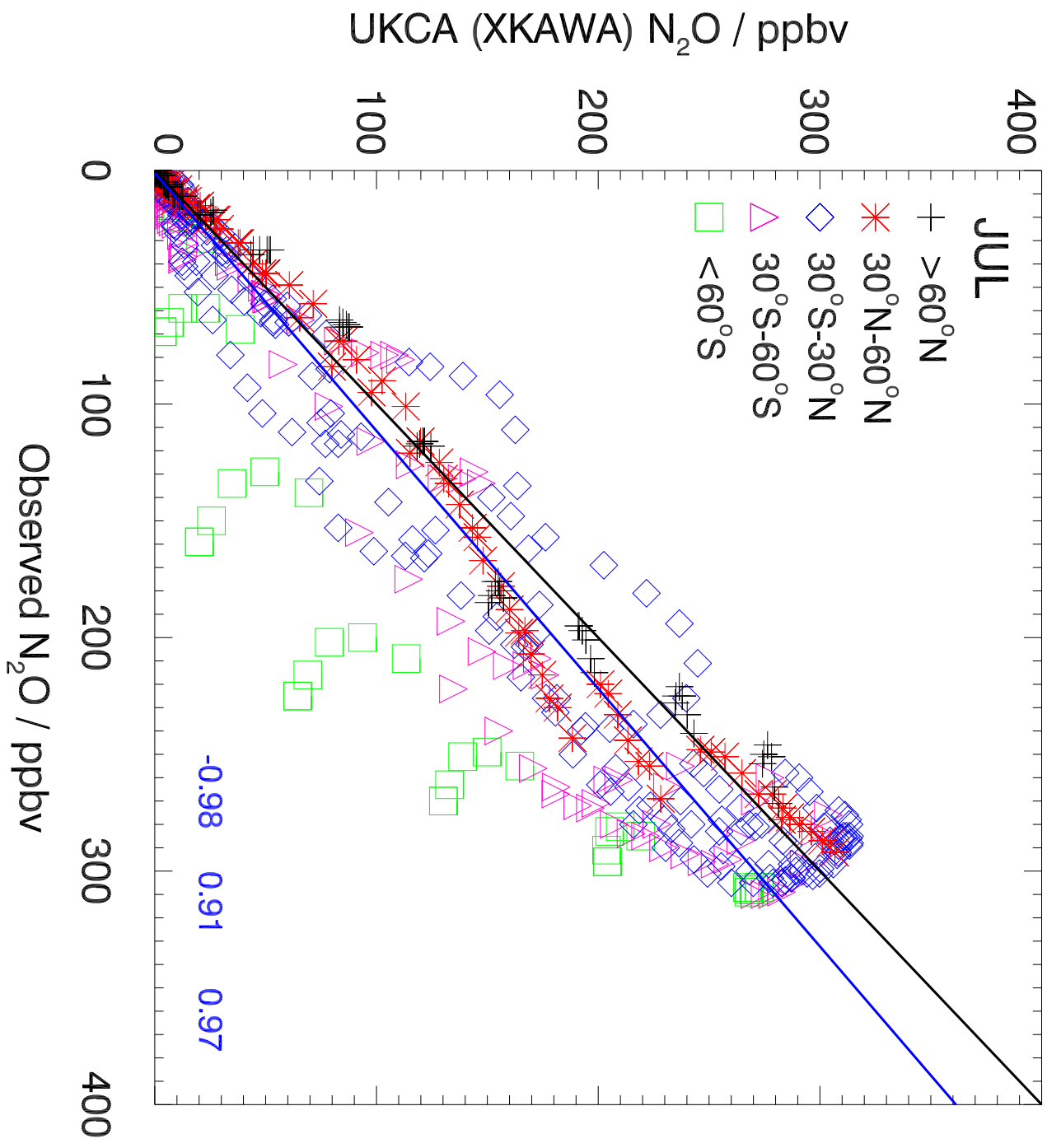


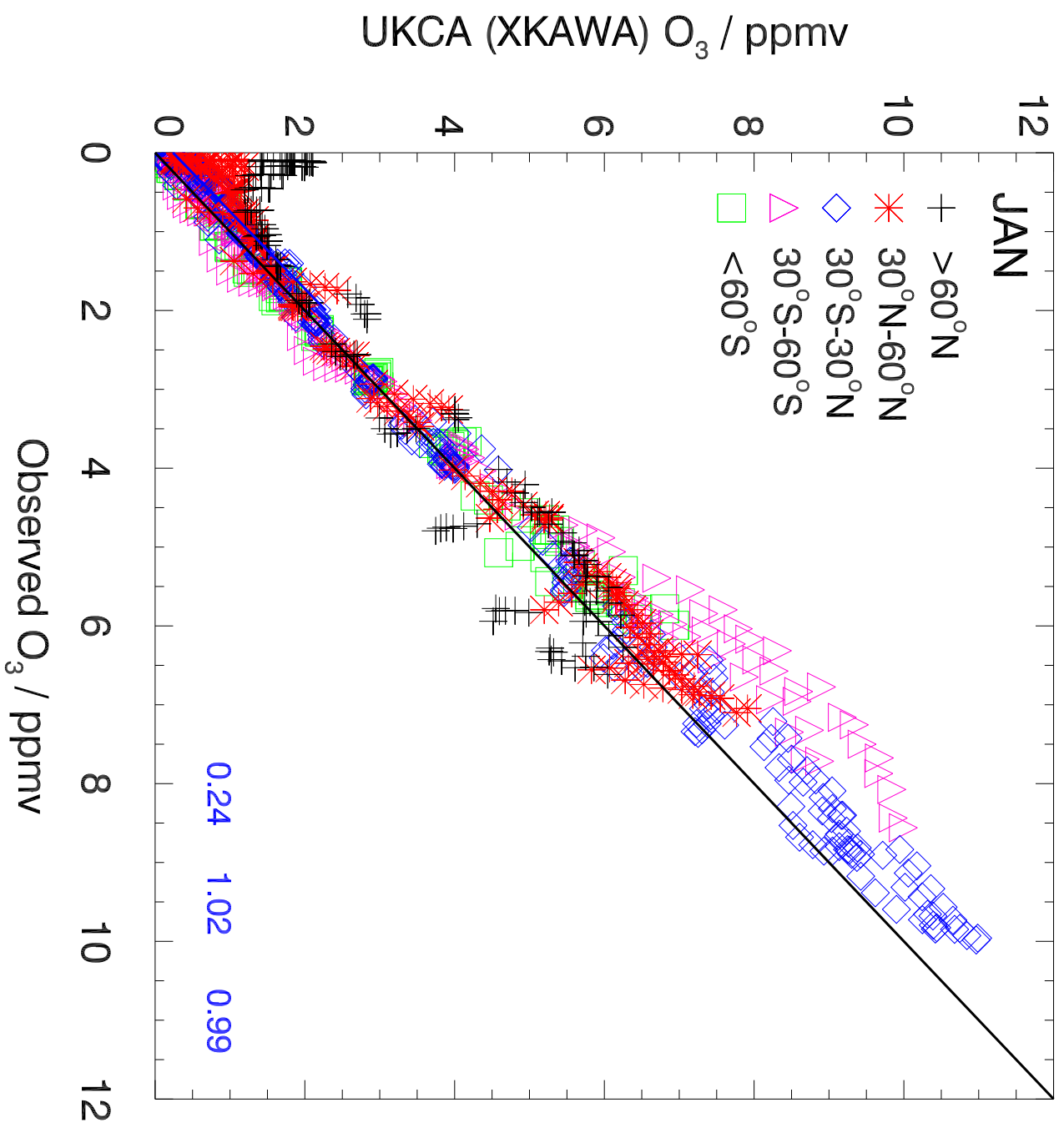


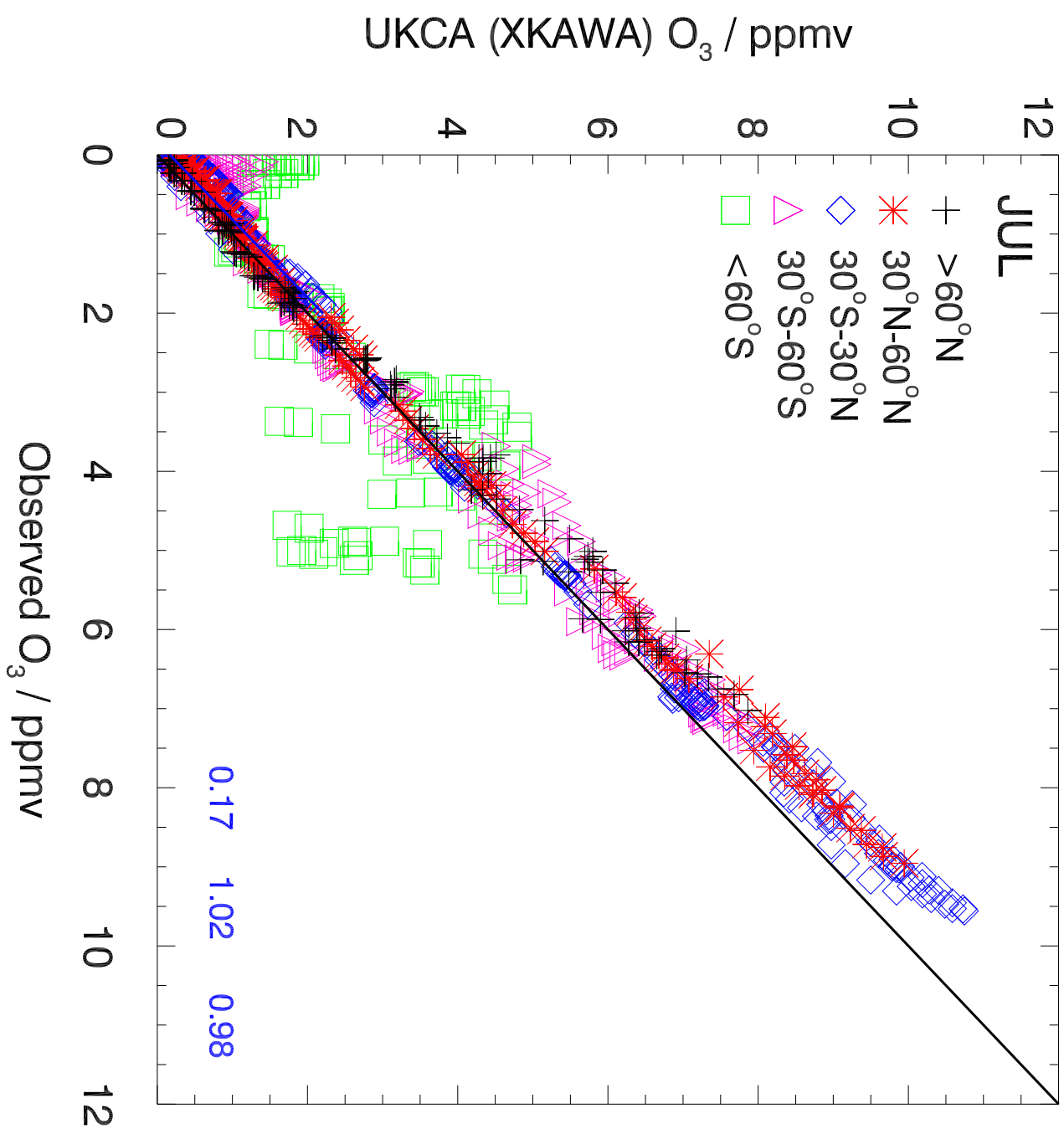


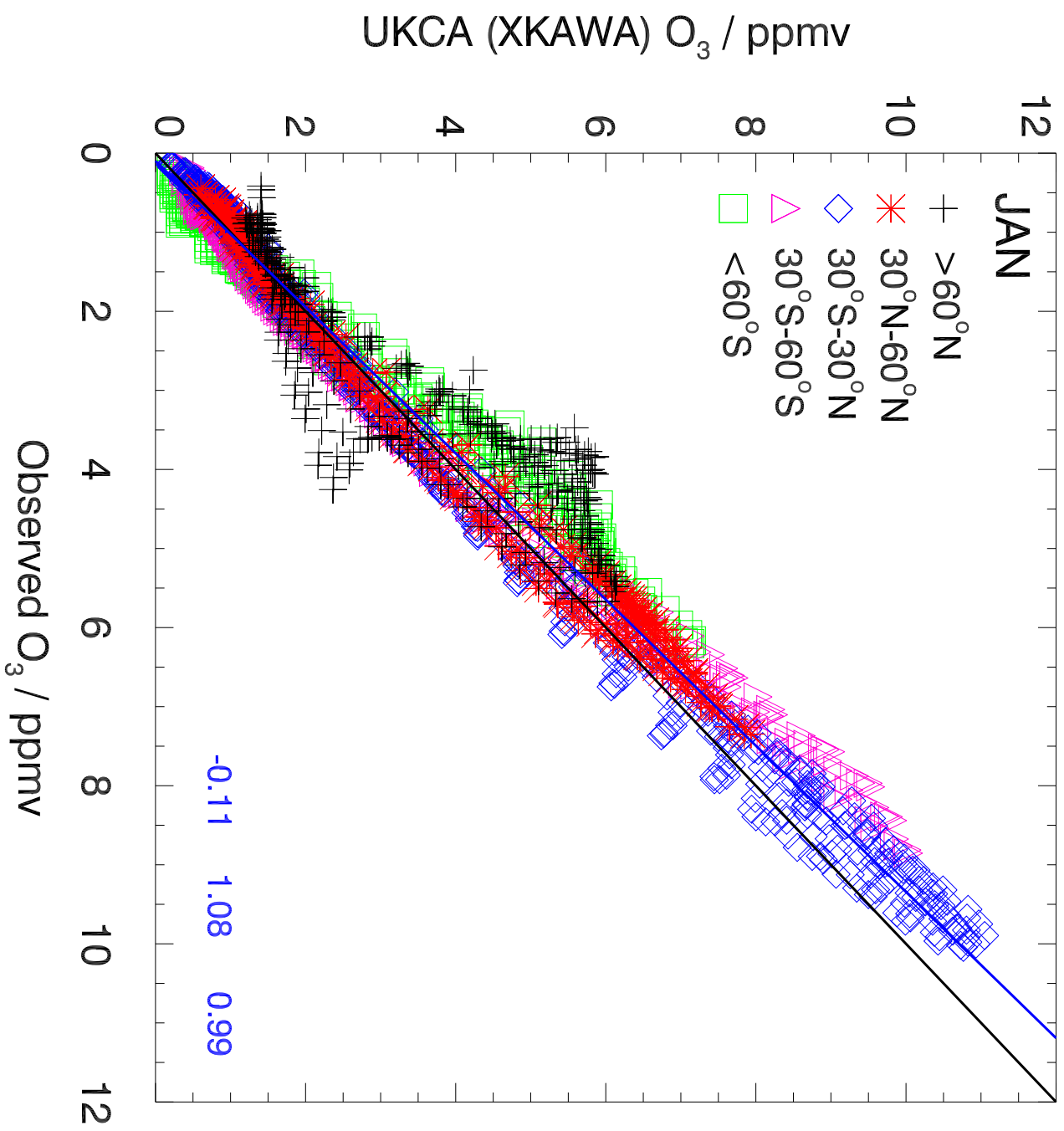


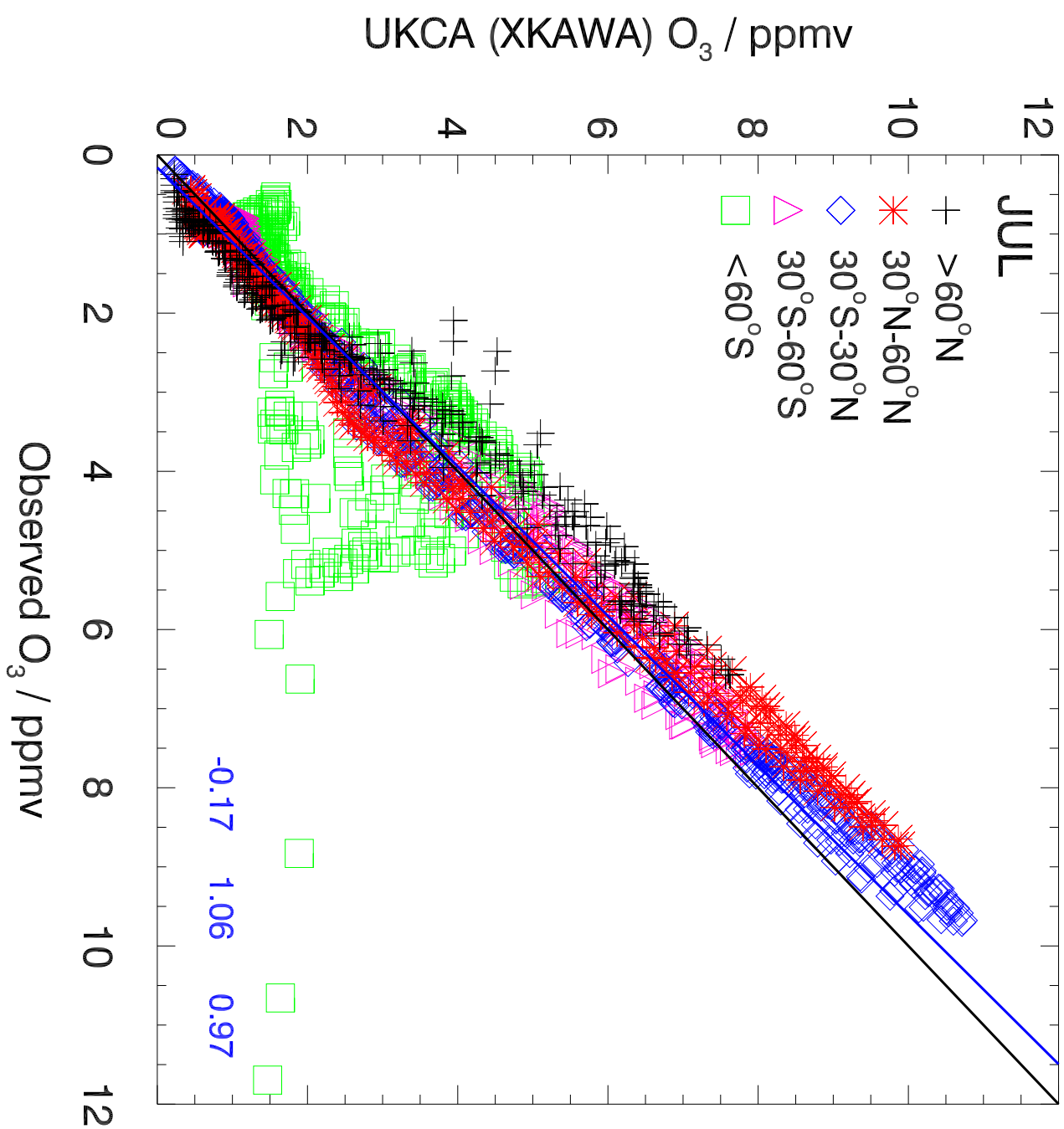








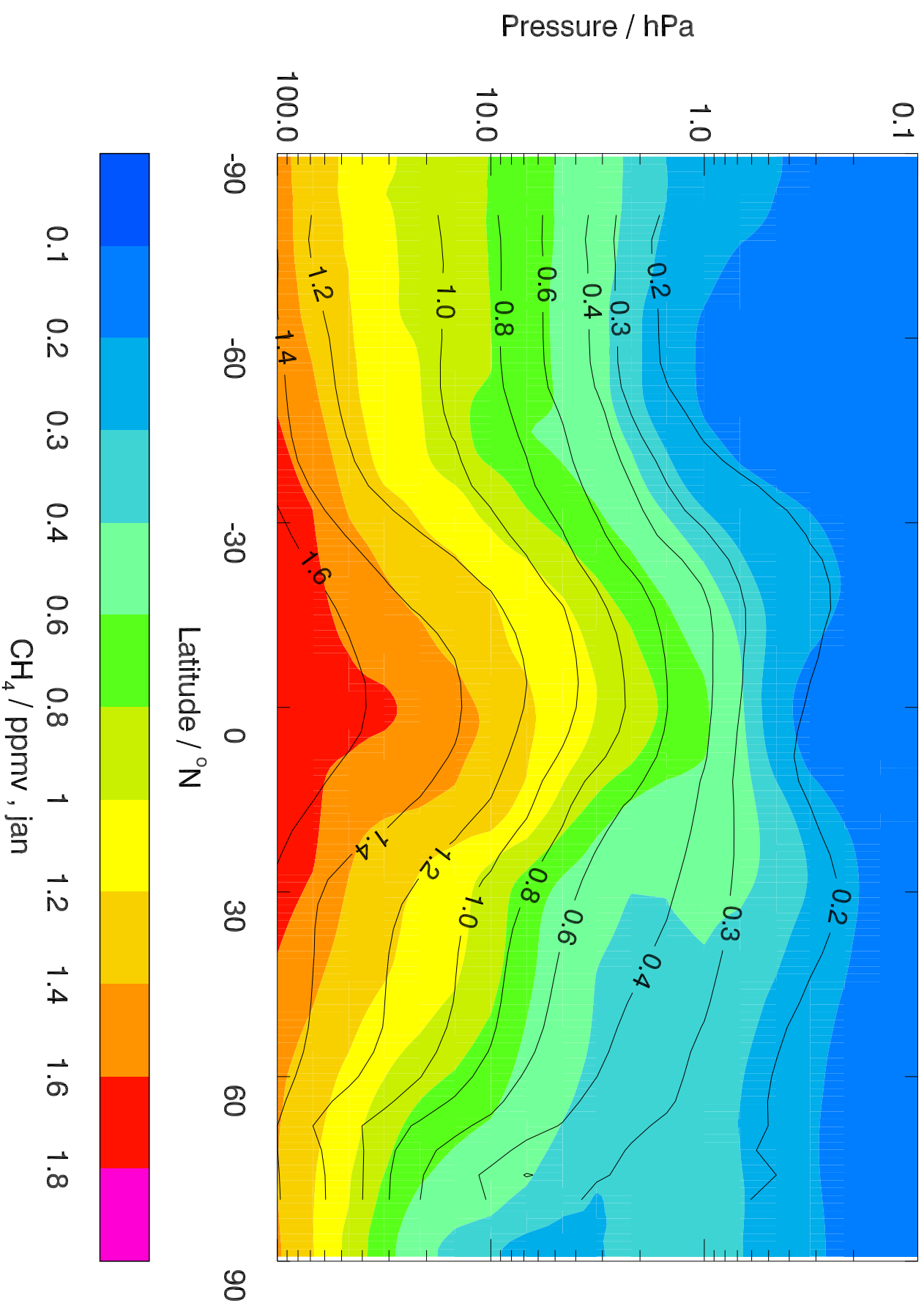




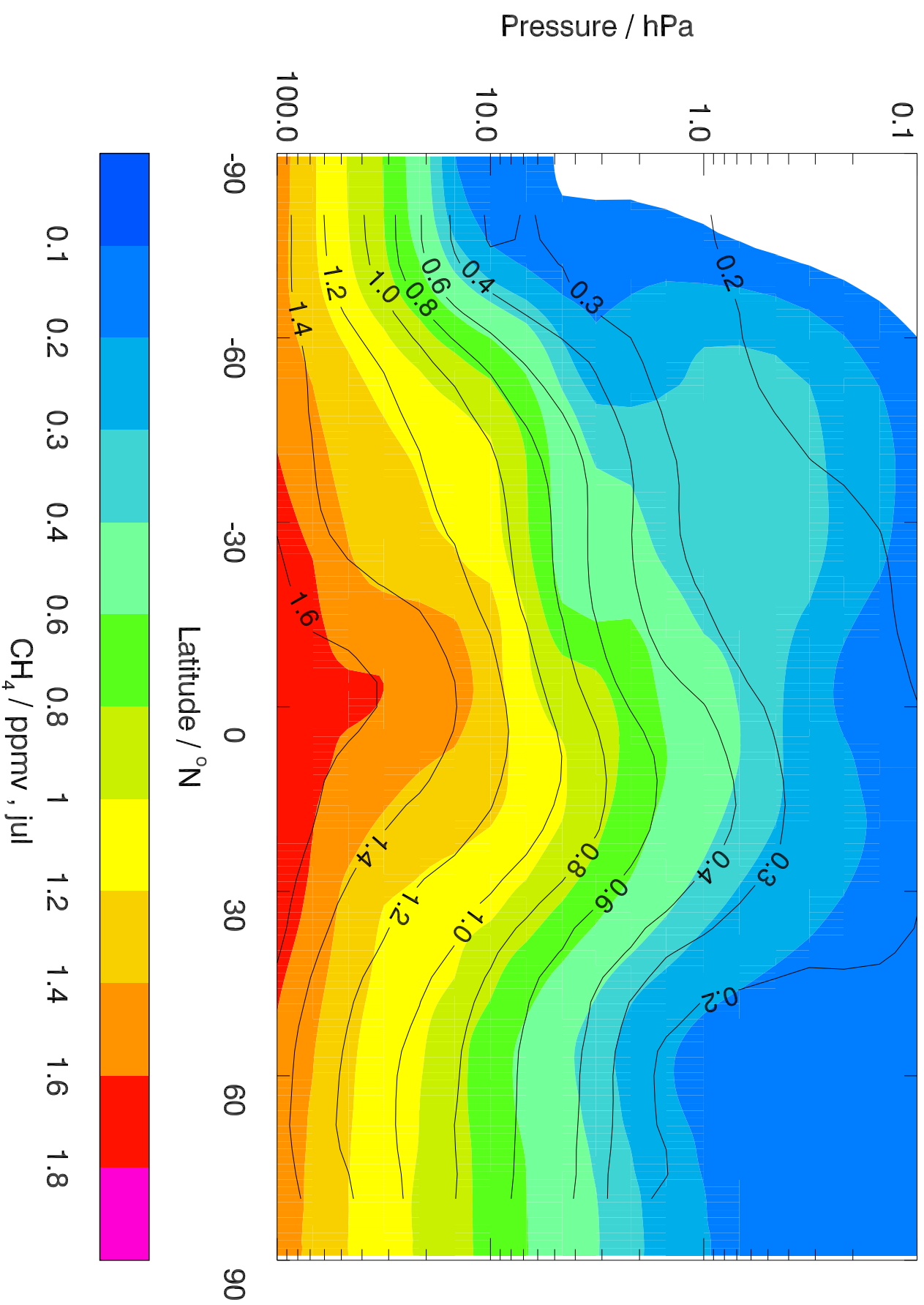




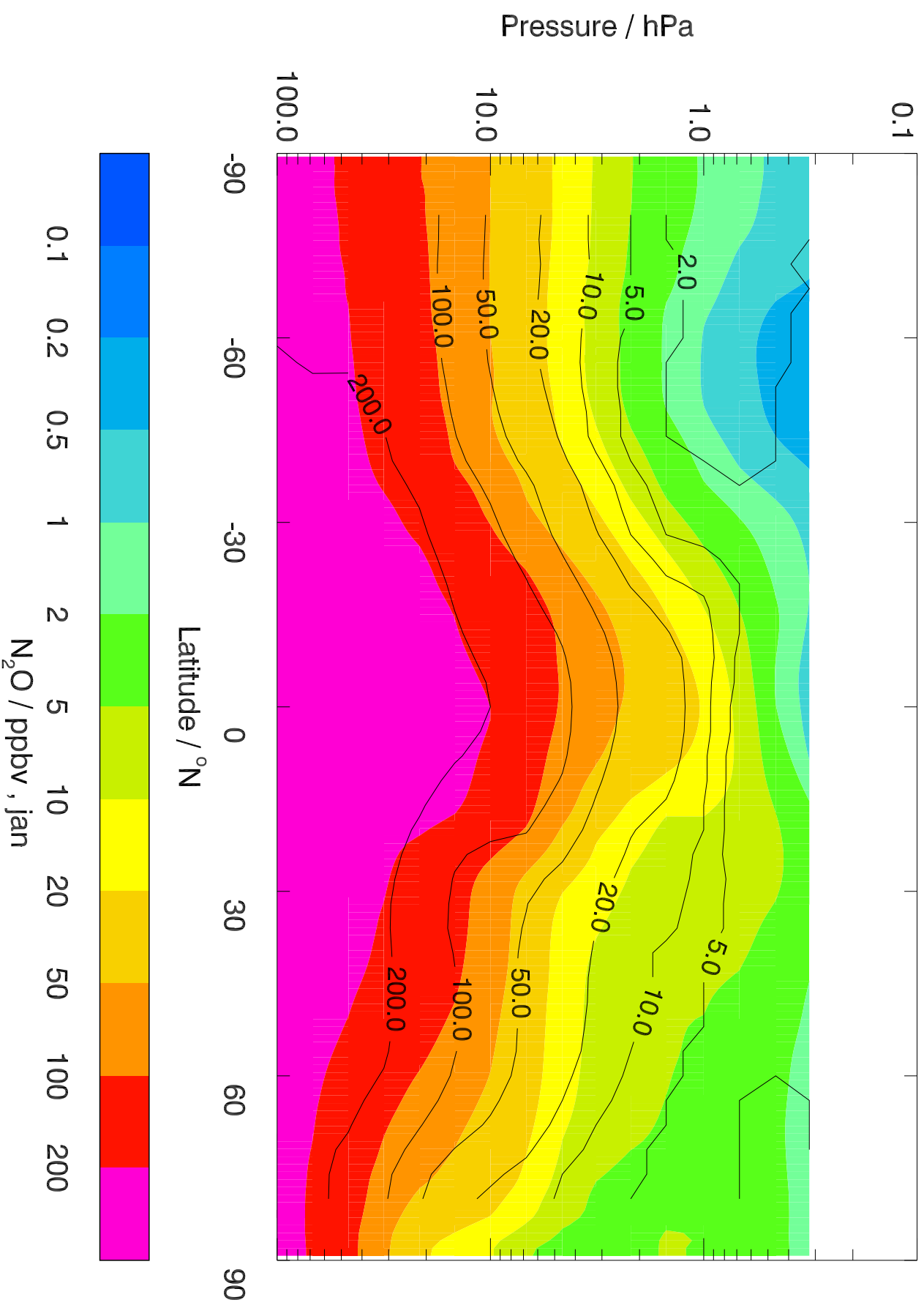
Colours: UKCA (XKAWA), Contours: HALOE



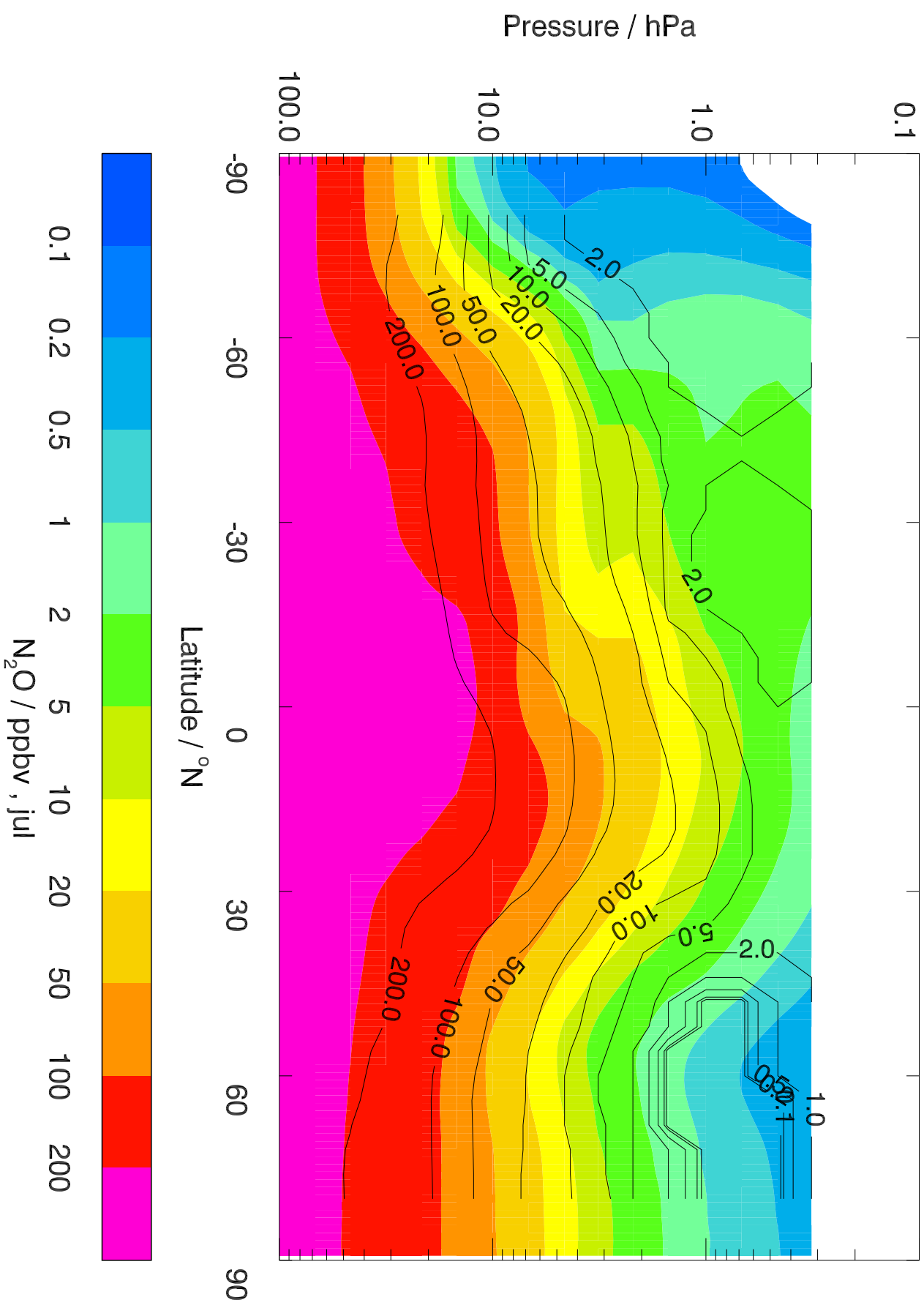
Colours: UKCA (XKAWA), Contours: HALOE



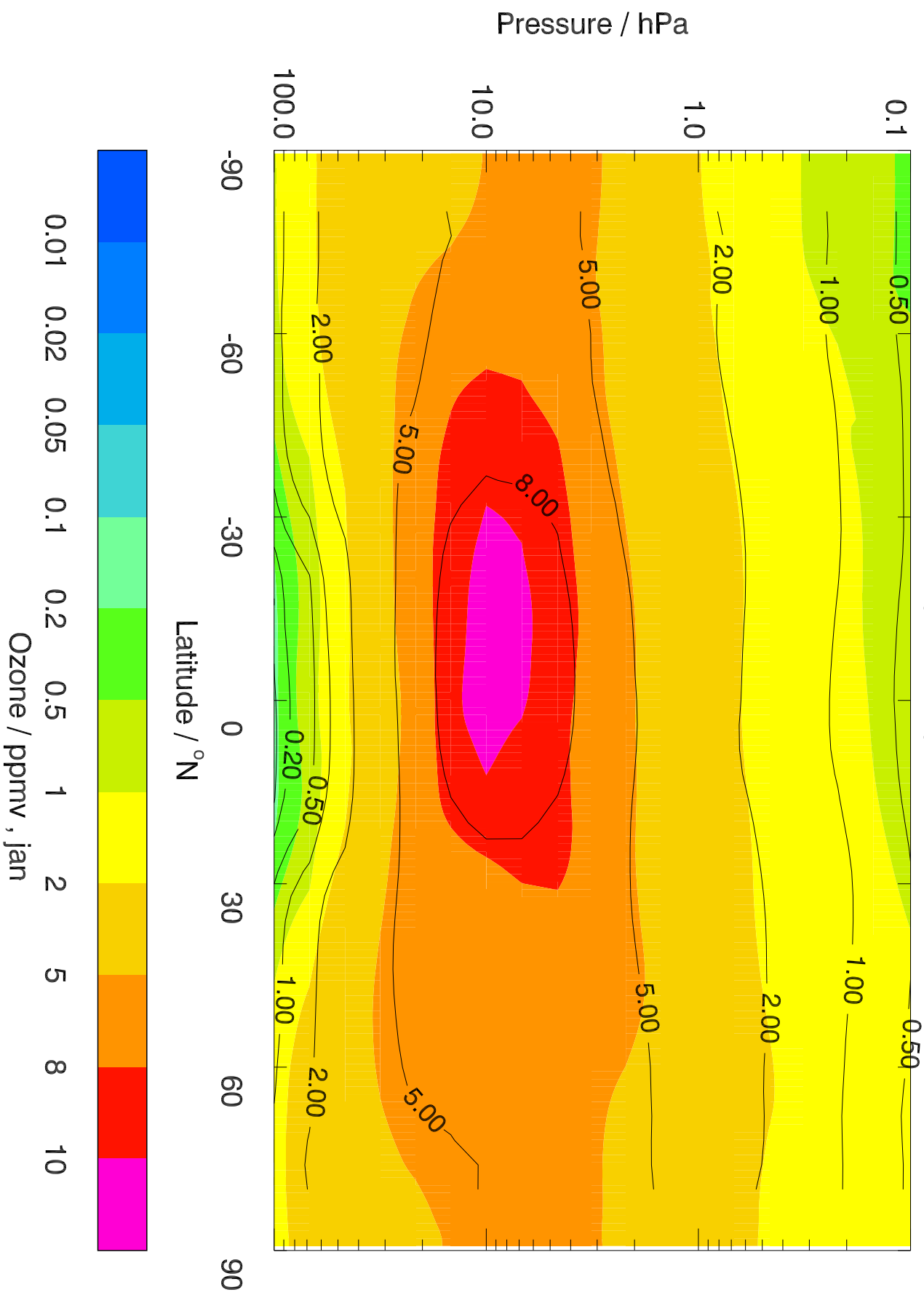
Colours: UKCA (XKAWA), Contours: HALOE



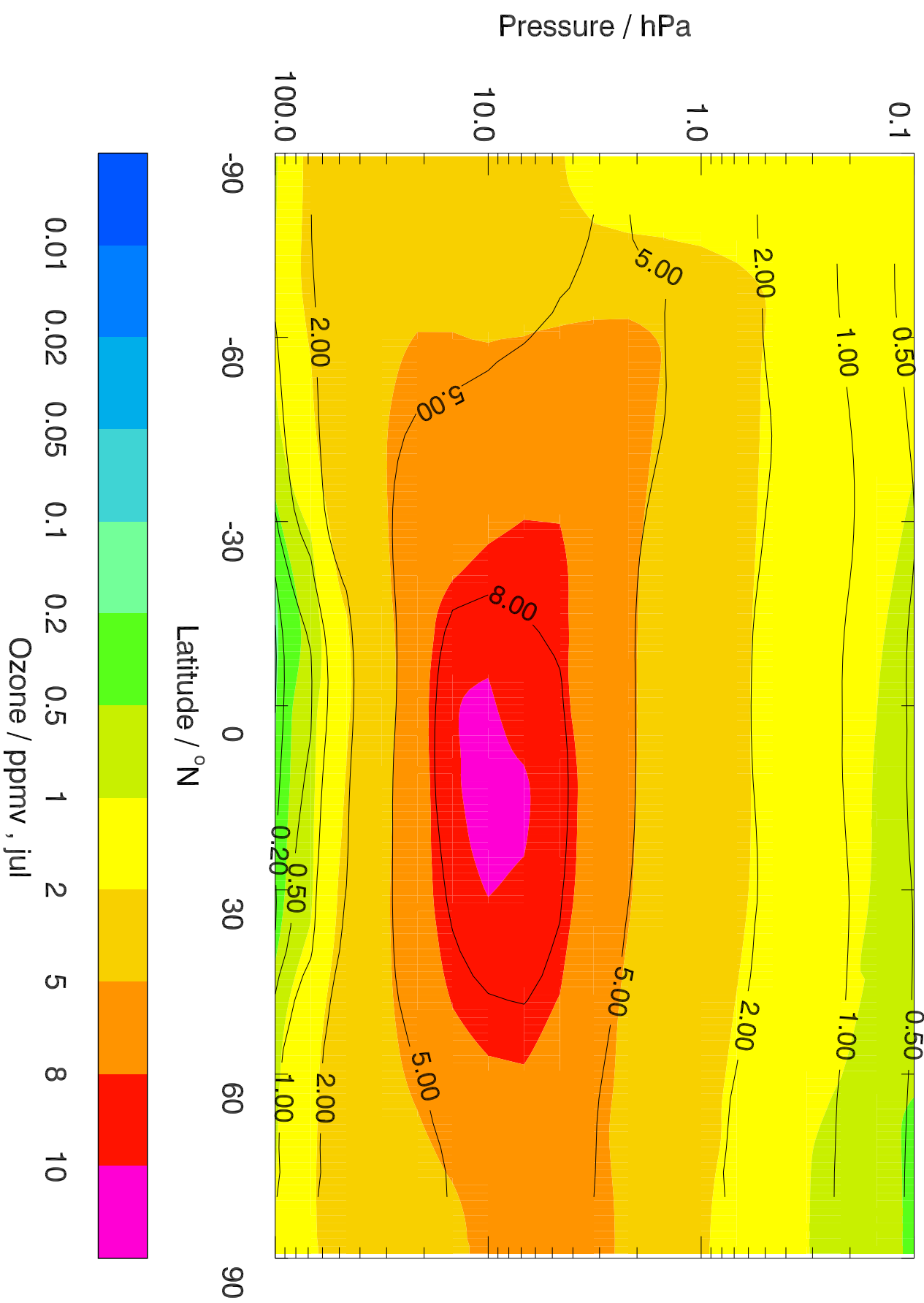
Colours: UKCA (XKAWA), Contours: HALOE



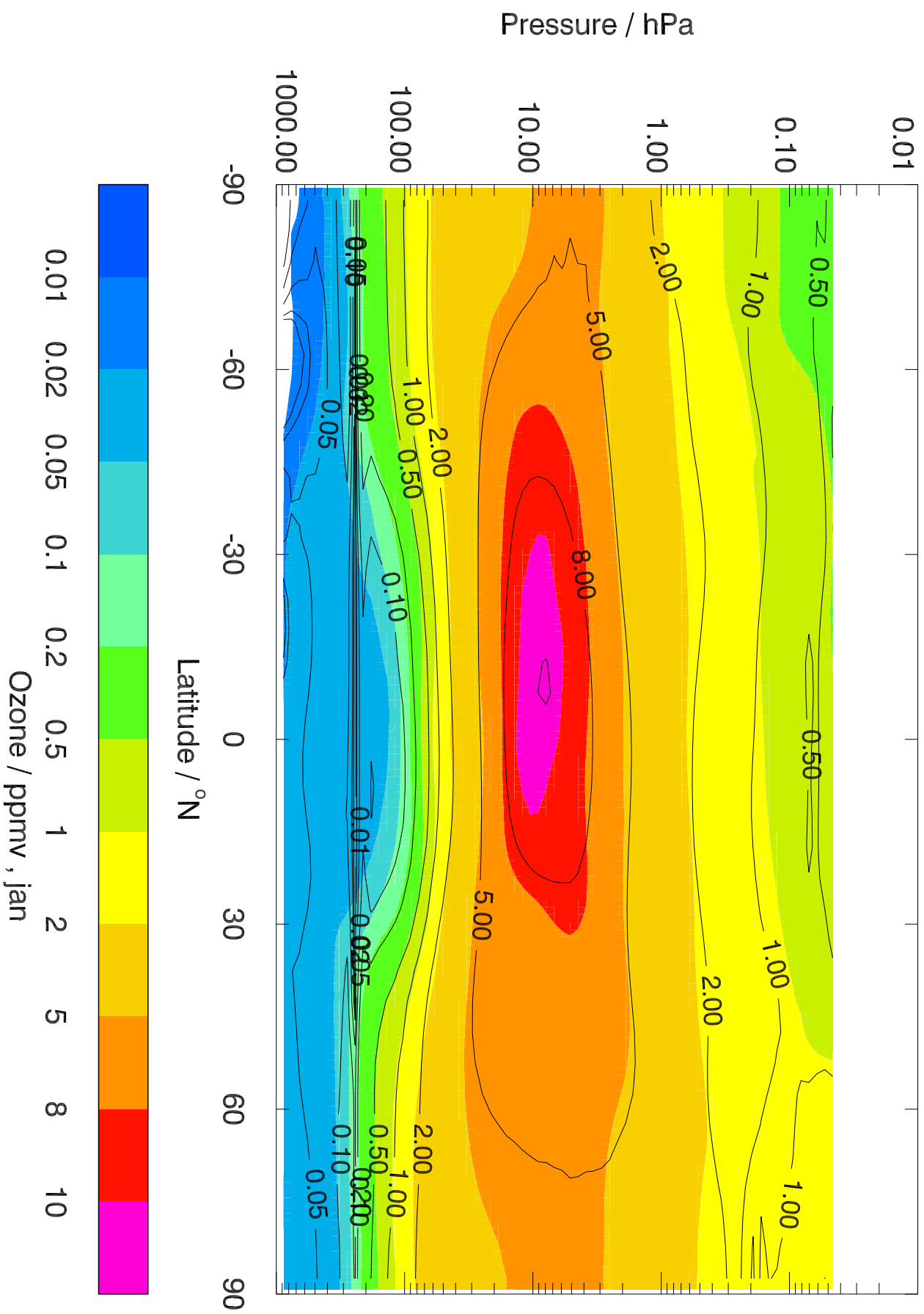
Colours: UKCA (XKAWA), Contours: HALOE



Colours: UKCA (XKAWA), Contours: HALOE

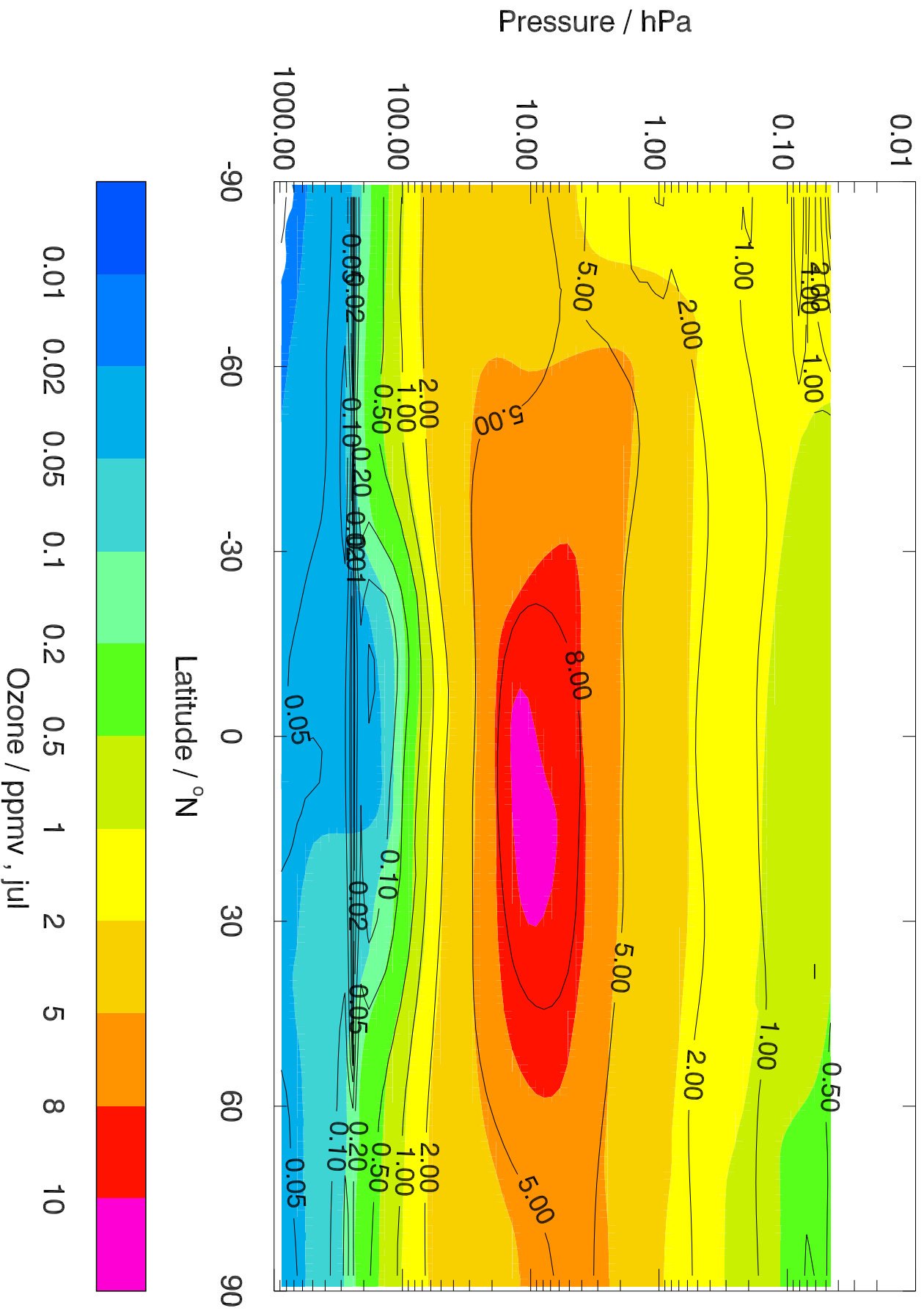


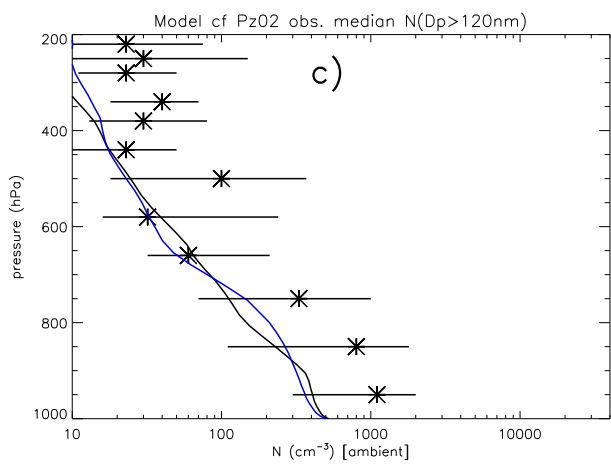
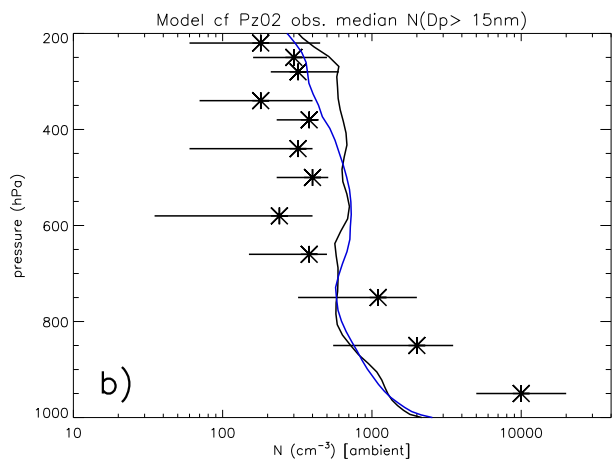
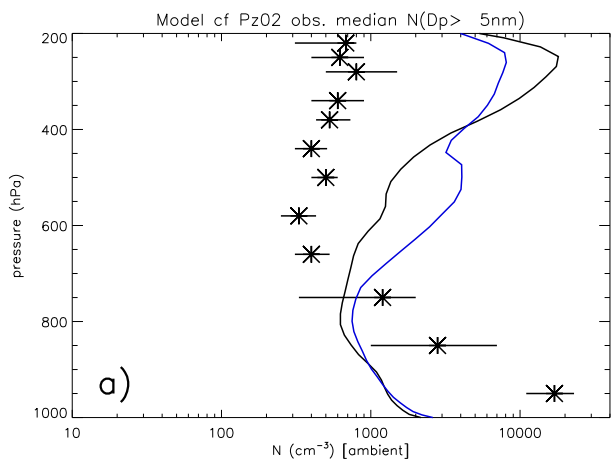
Colours: UKCA (XKAWA), Contours: NIWA-CCMVal



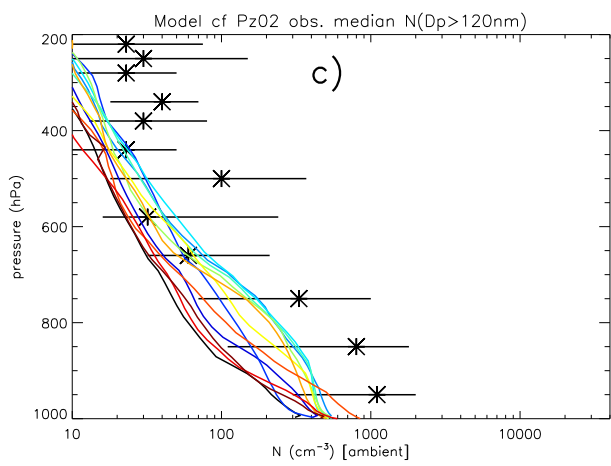
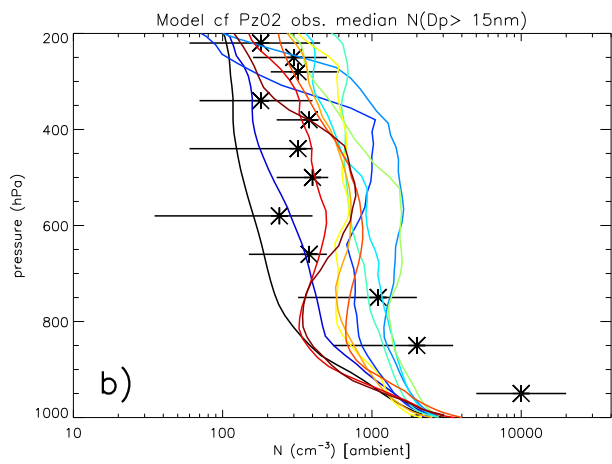
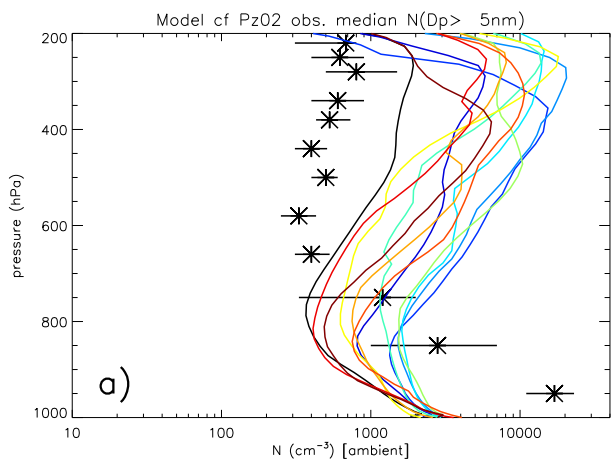


Colours: UKCA (XKAWA), Contours: NIWA-CCMVal

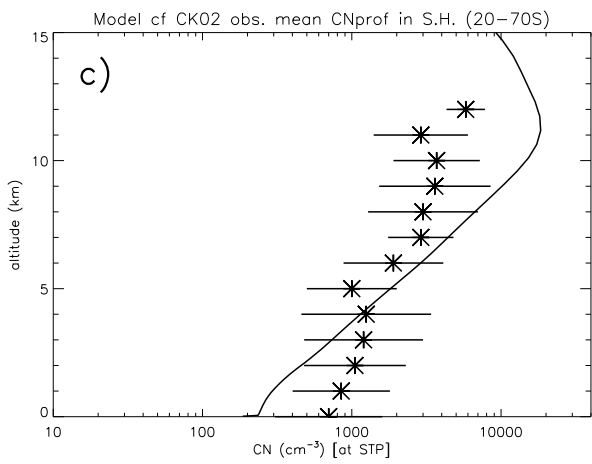
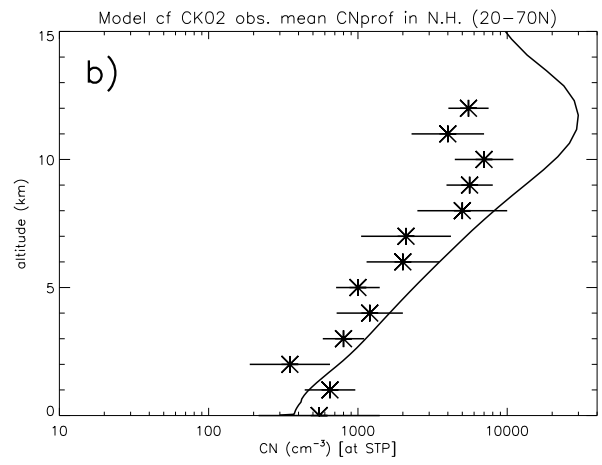
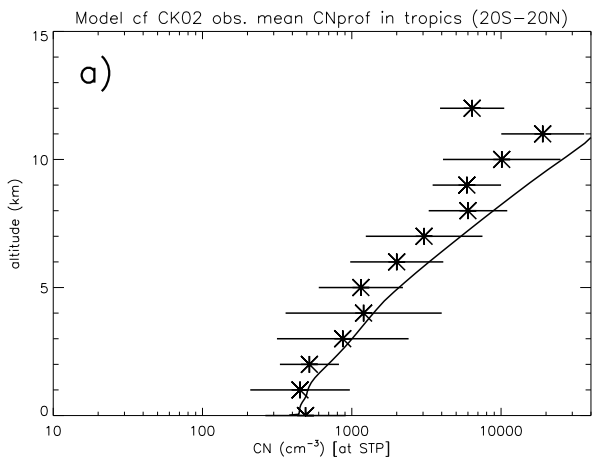




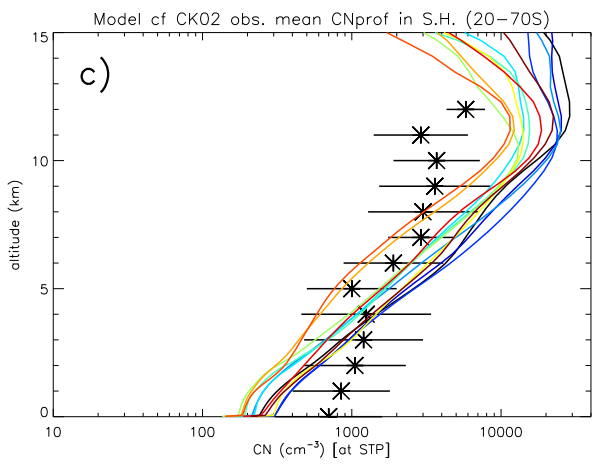
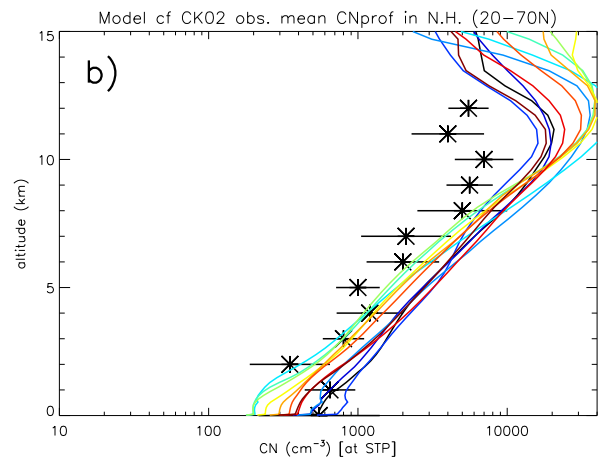
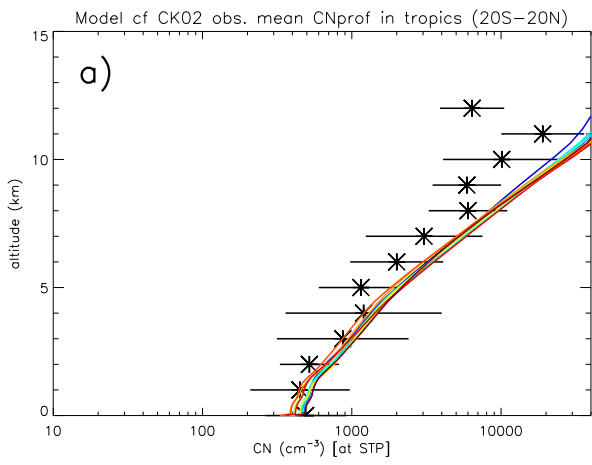
HadGEM3UKCA\_XKAWA\_2008



HadGEM3UKCA\_XKAWA\_2008

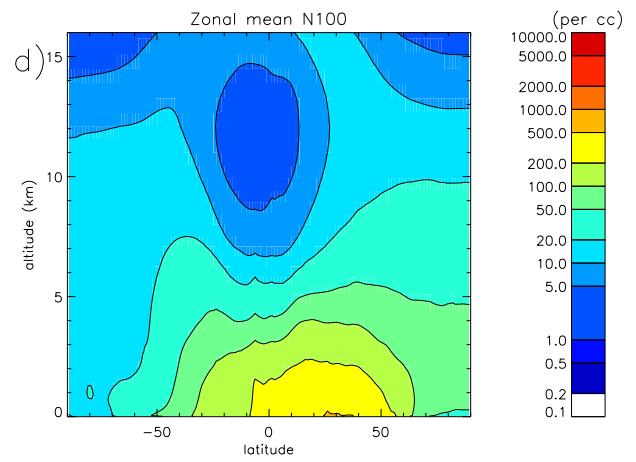
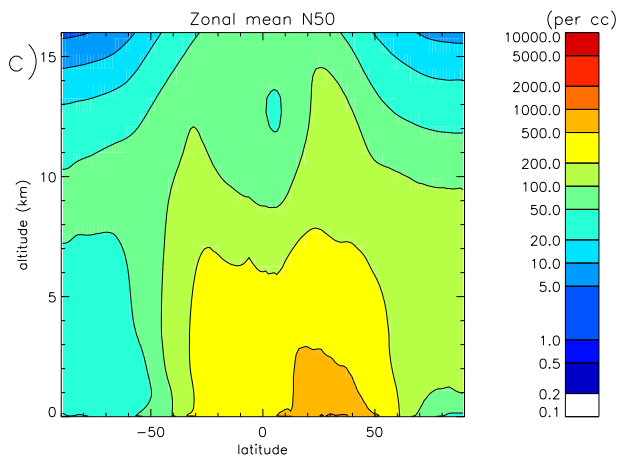
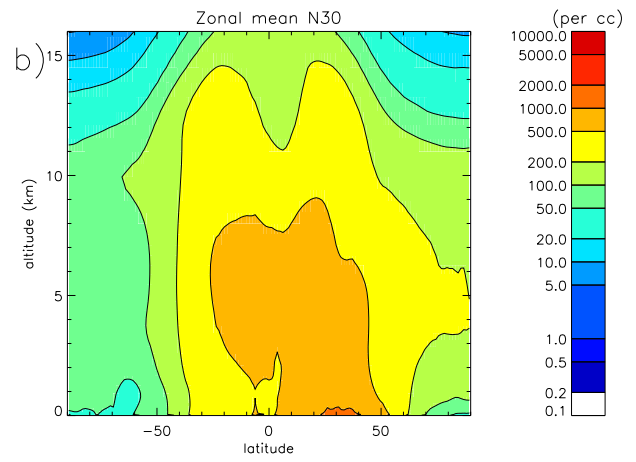
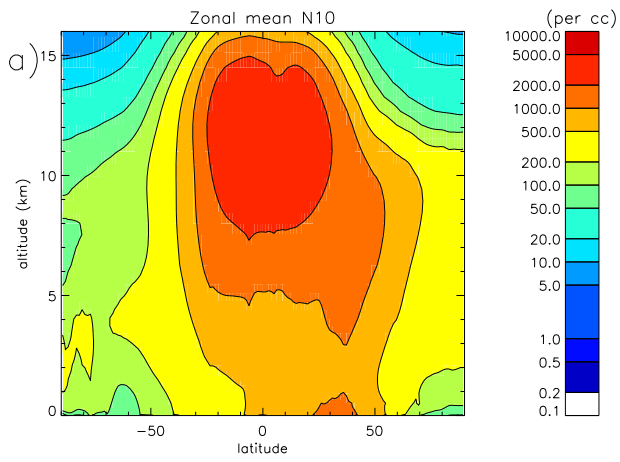


HadGEM3UKCA\_XKAWA\_2008

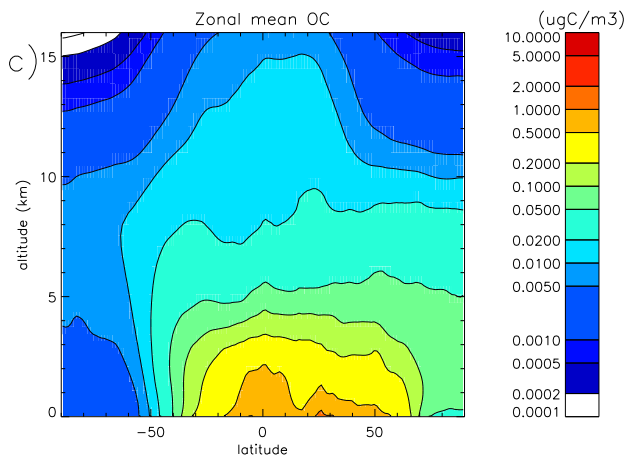
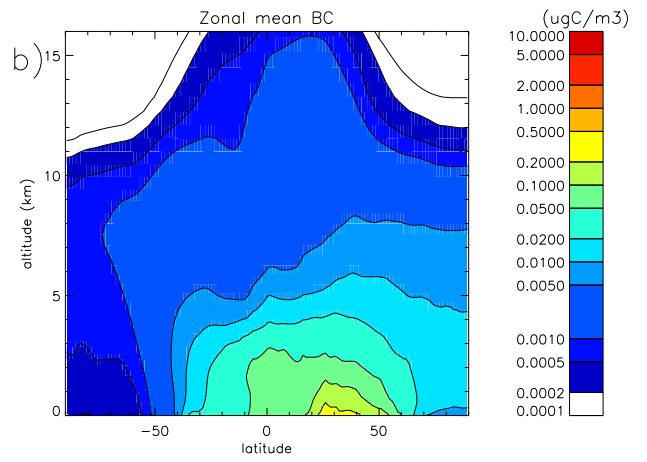
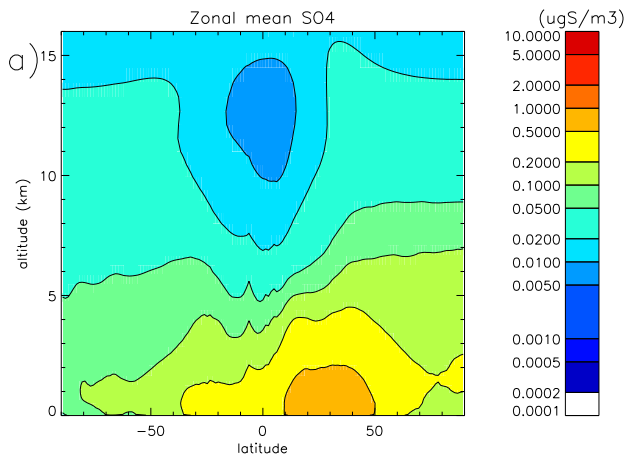


HadGEM3UKCA\_XKAWA\_2008

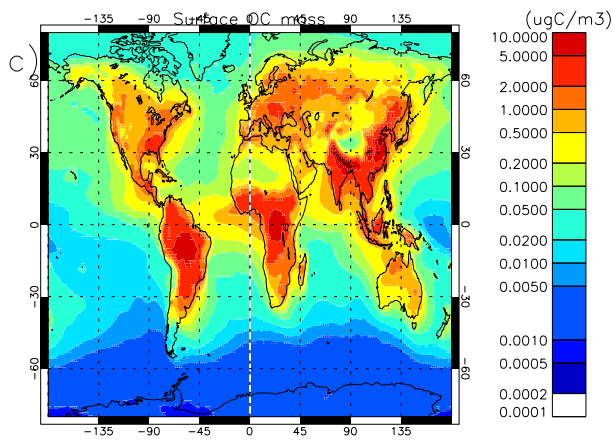
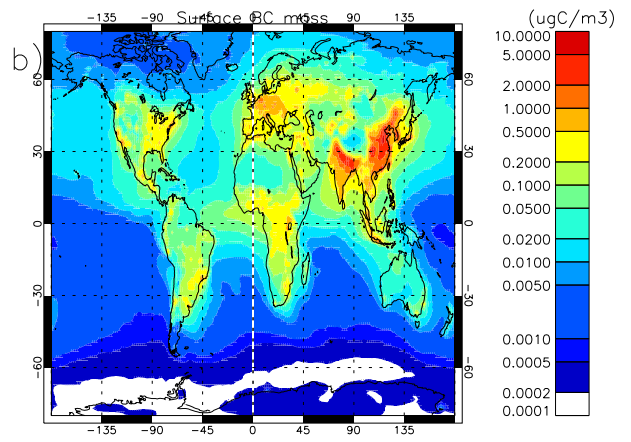
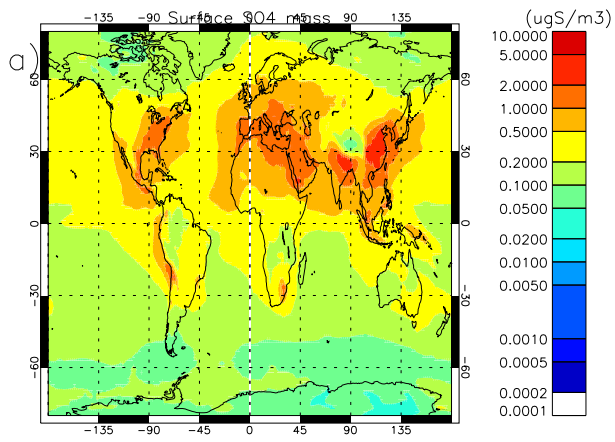
# HadGEM3UKCA\_XKAWA\_2008



# HadGEM3UKCA\_XKAWA\_2008

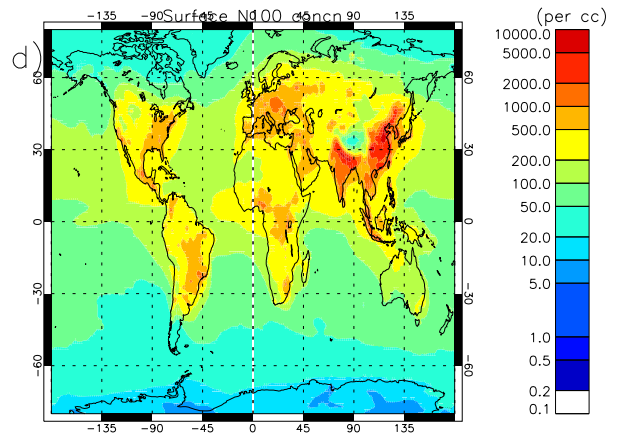
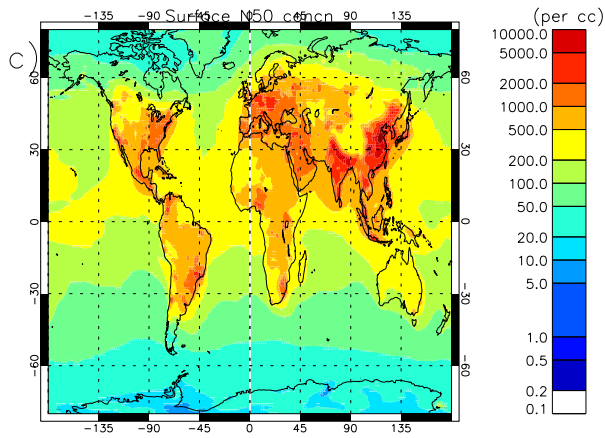
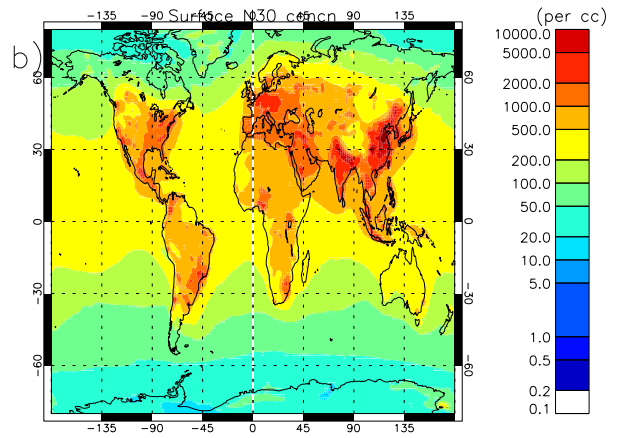
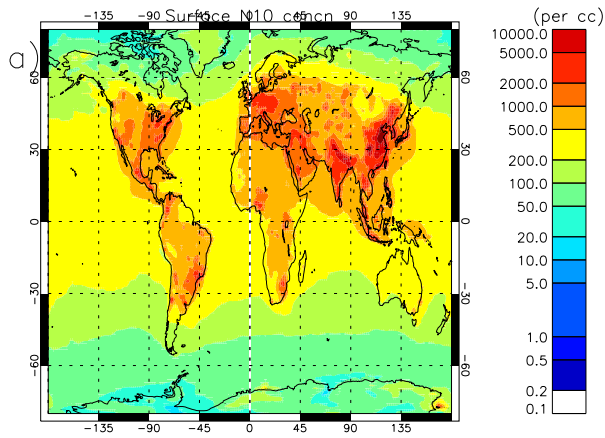


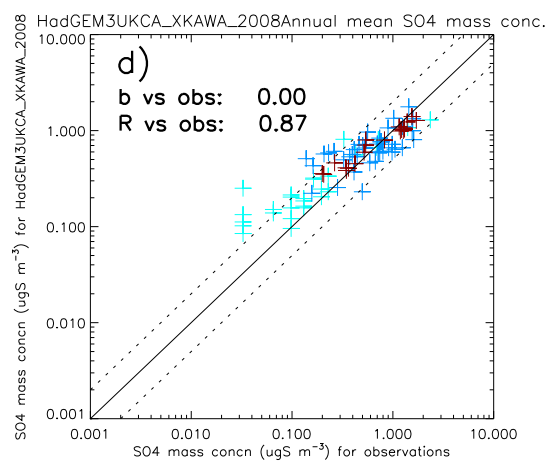
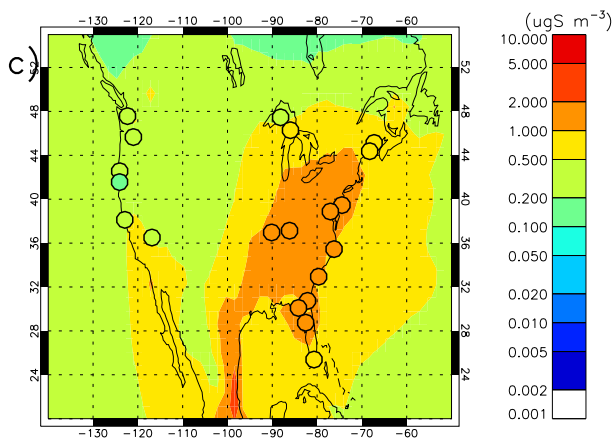
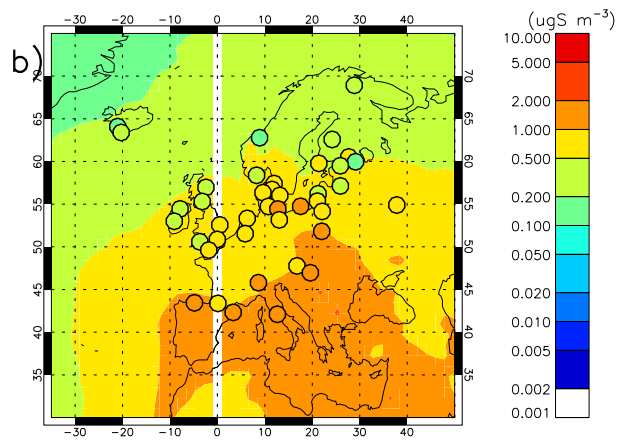
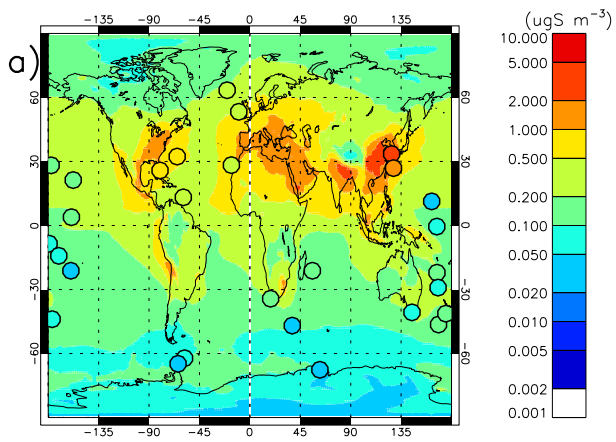
# HadGEM3UKCA\_XKAWA\_2008



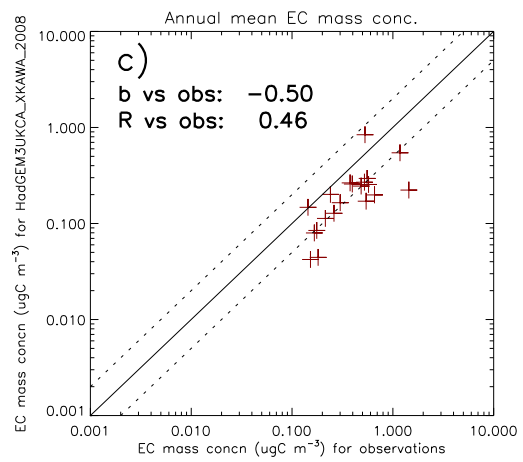
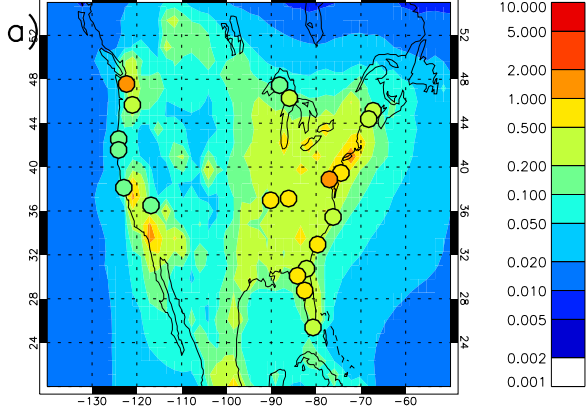


# HadGEM3UKCA\_XKAWA\_2008

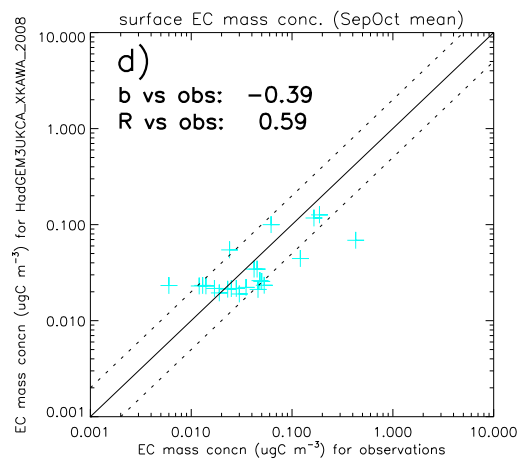
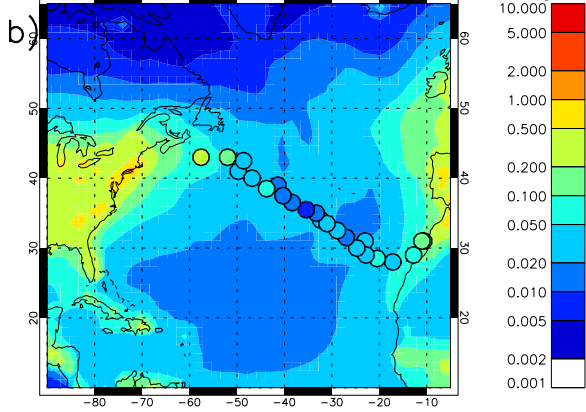


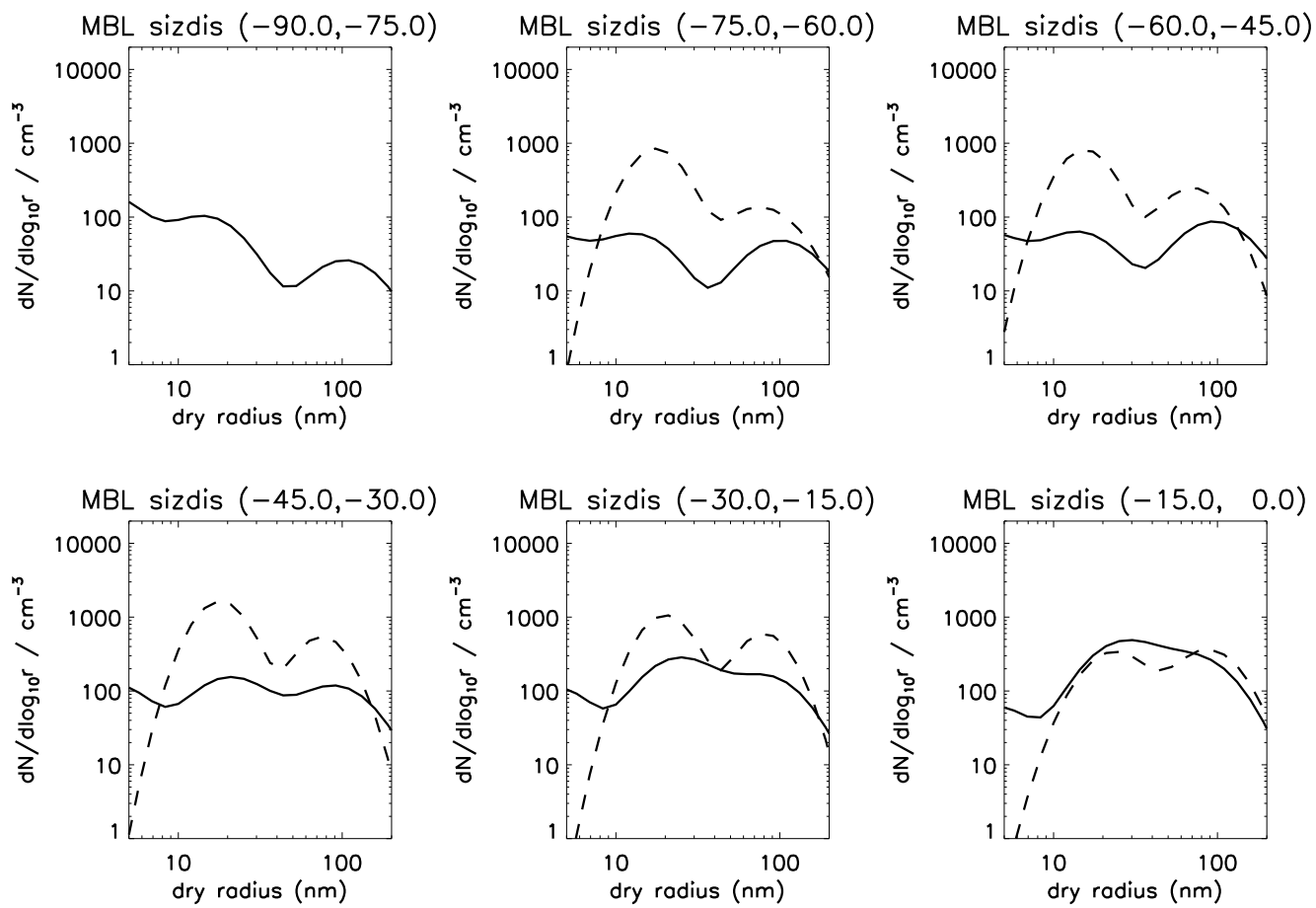


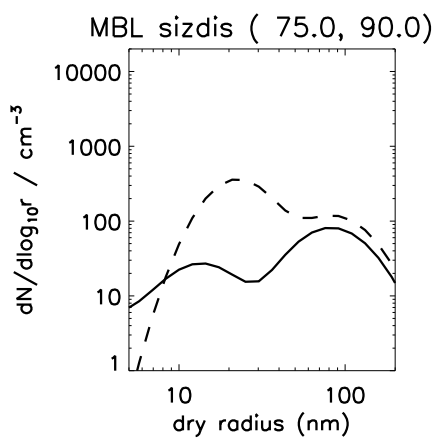
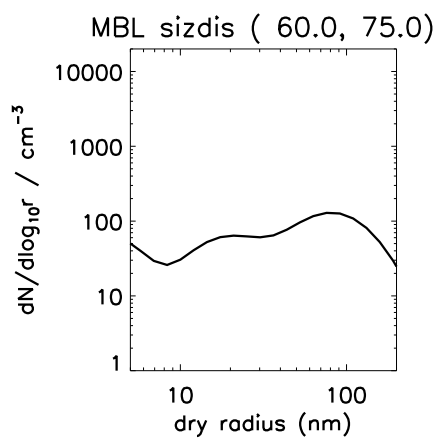
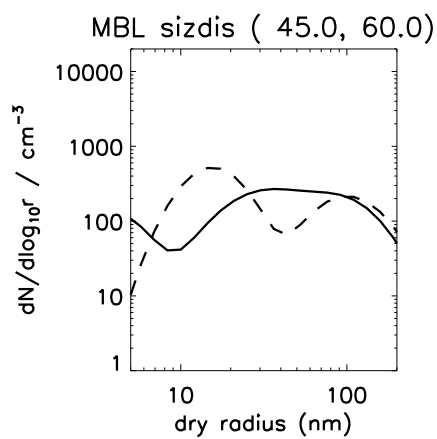
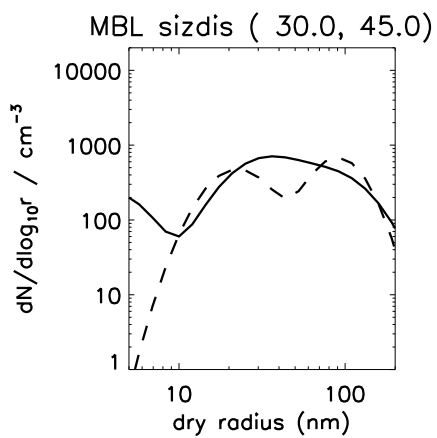
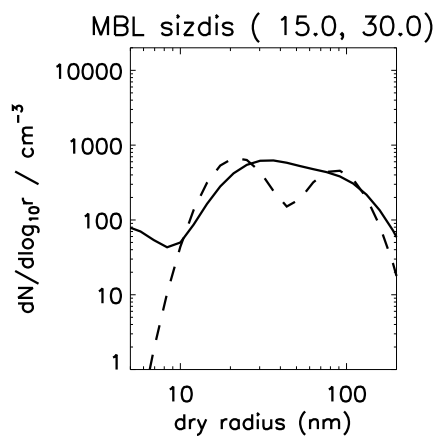
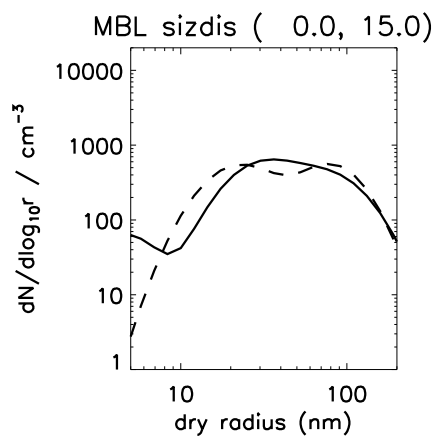
HadGEM3UKCA\_XKAWA\_2008 Annual mean EC mass conc. ( $\mu\text{gC m}^{-3}$ )

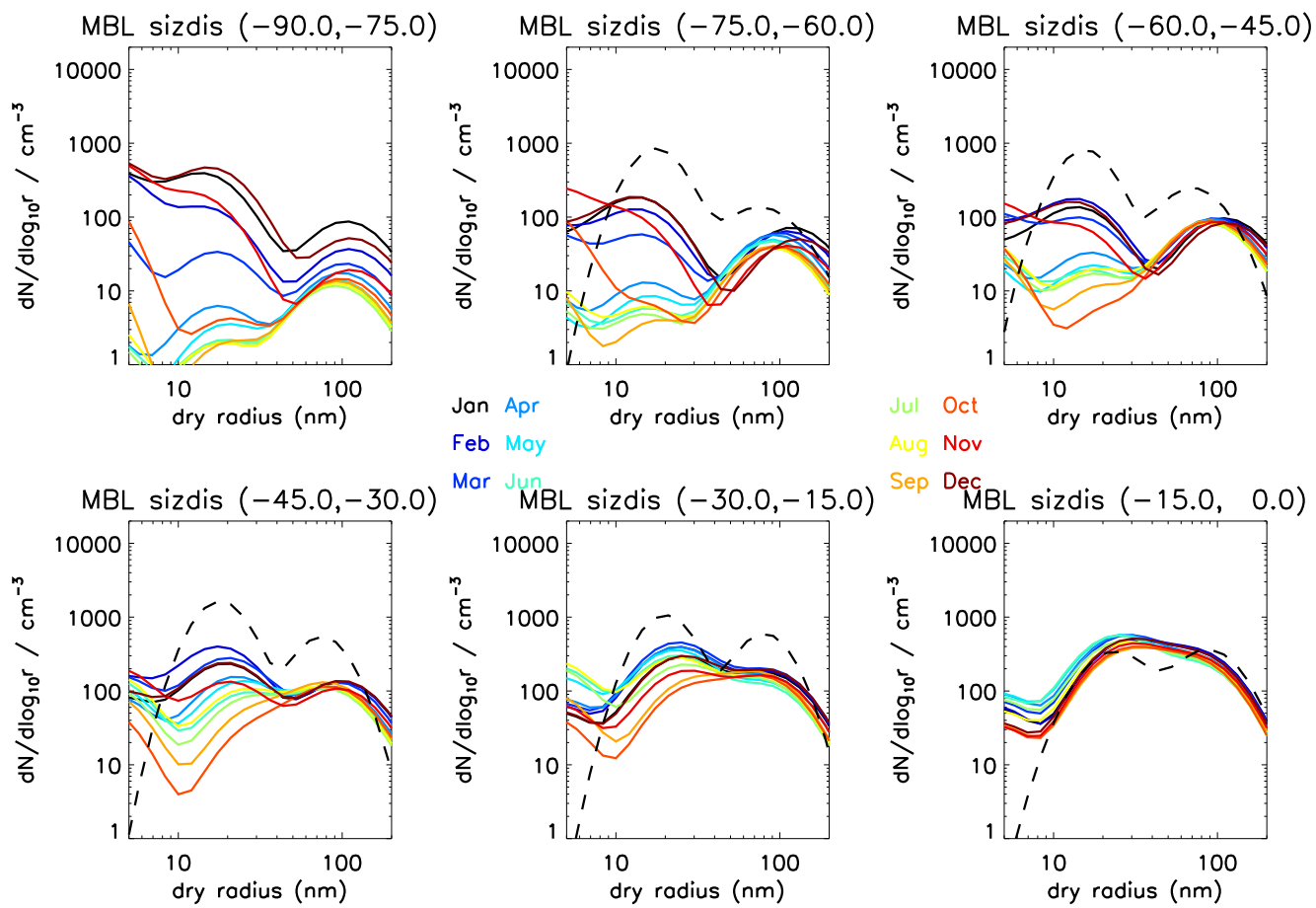


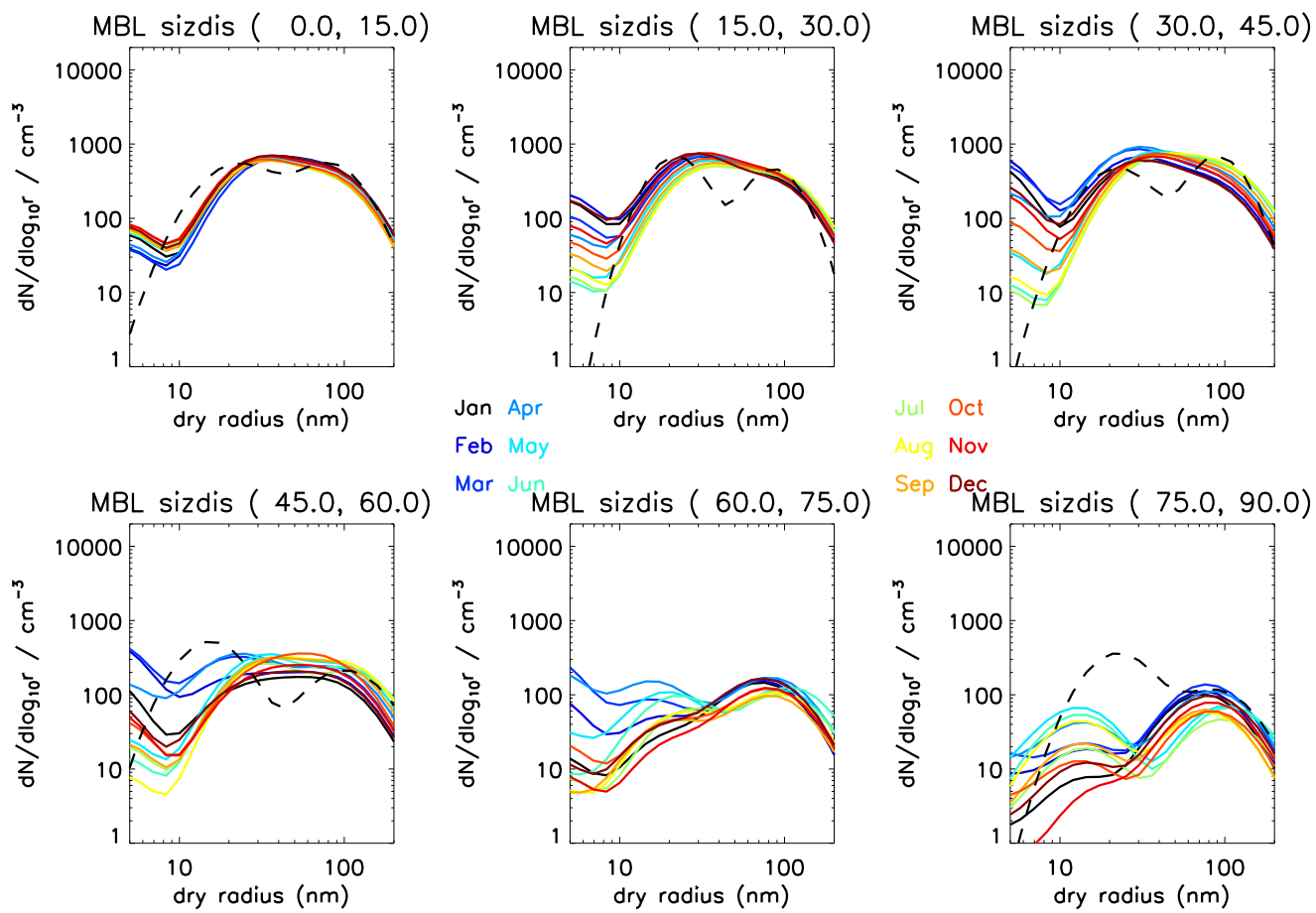
HadGEM3UKCA\_XKAWA\_2008 surface EC mass conc. (SepOct mean) ( $\mu\text{gC m}^{-3}$ )



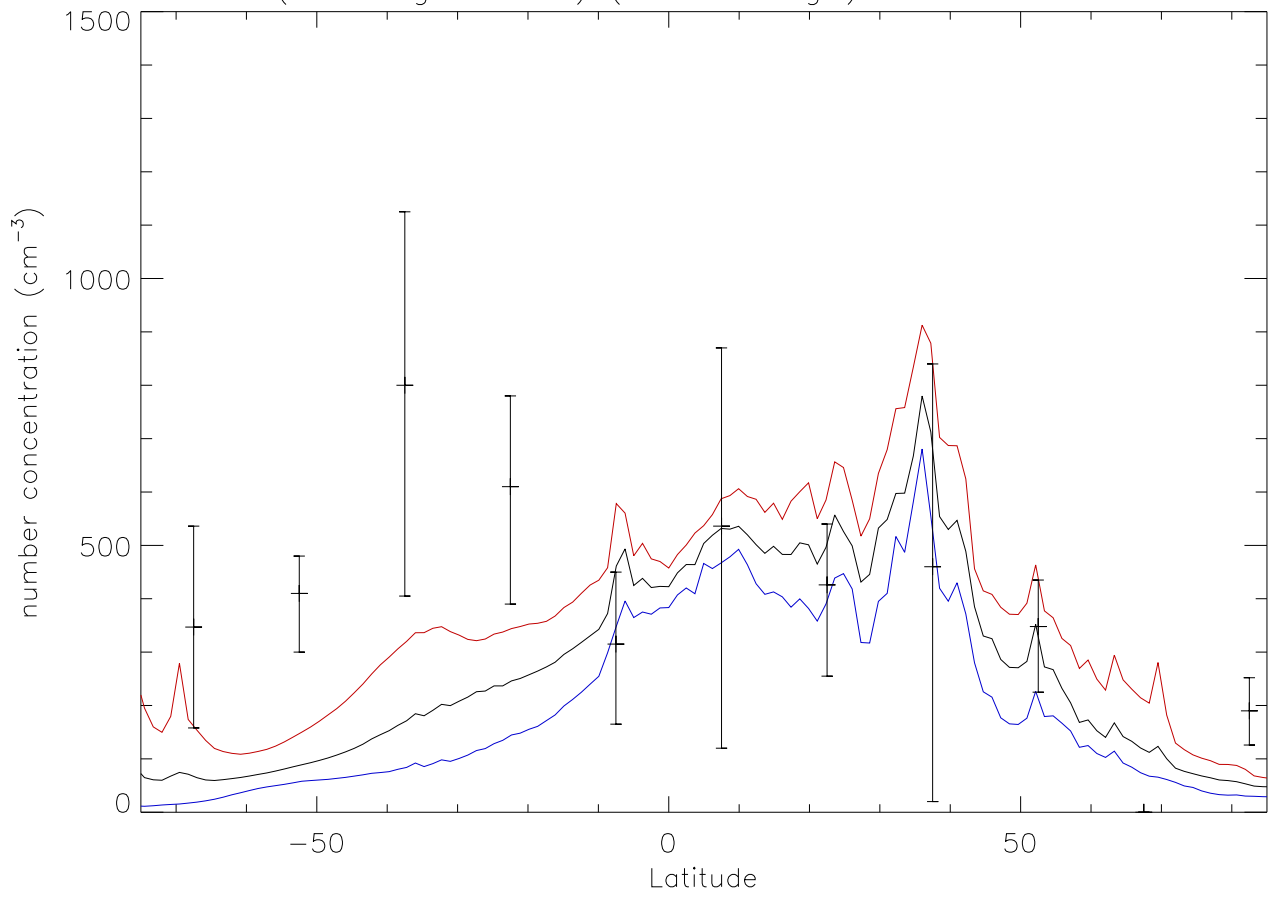






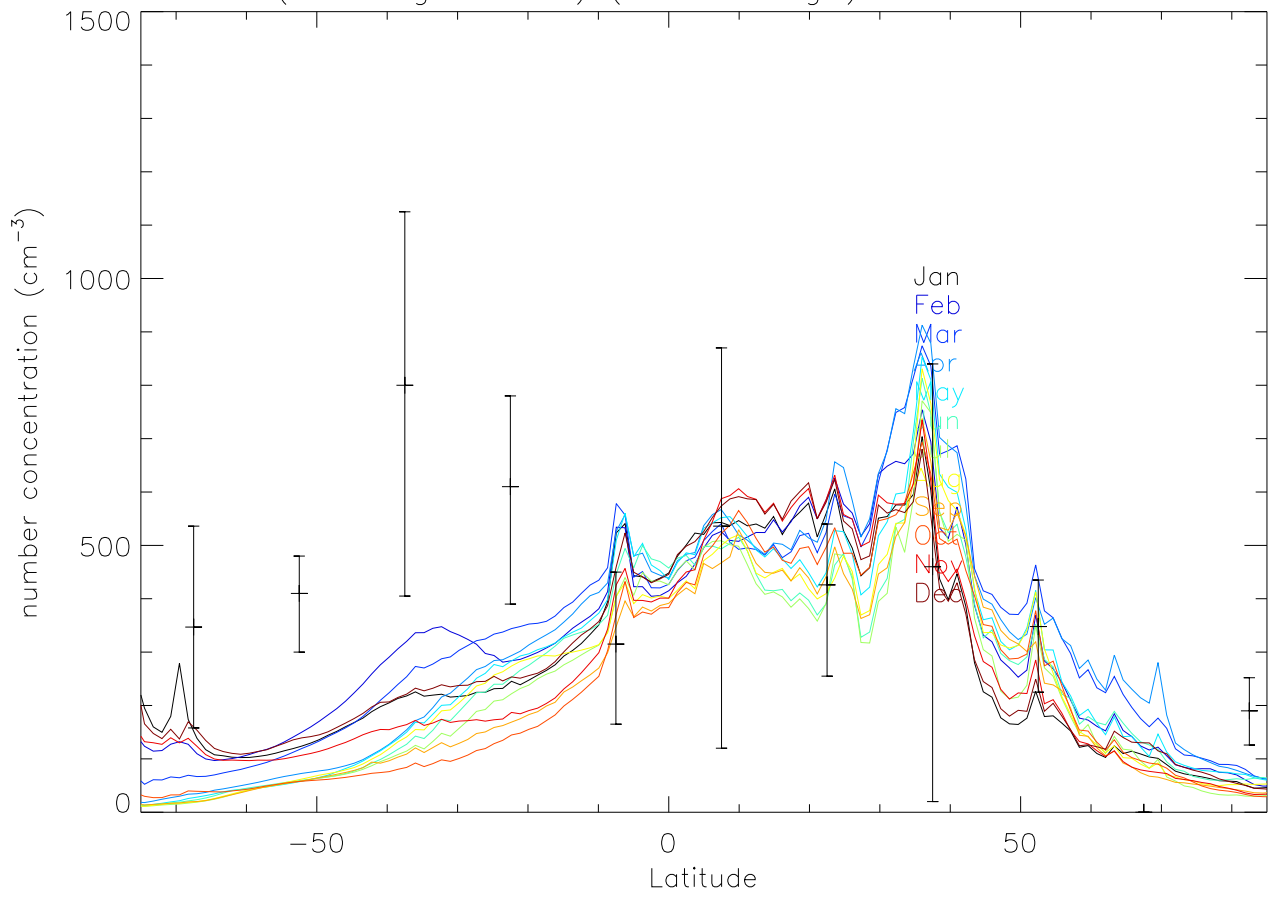


CN no. conc. (ocean gridboxes) (Heintz00Fig2): HadGEM3UKCA\_XKAWA\_2008

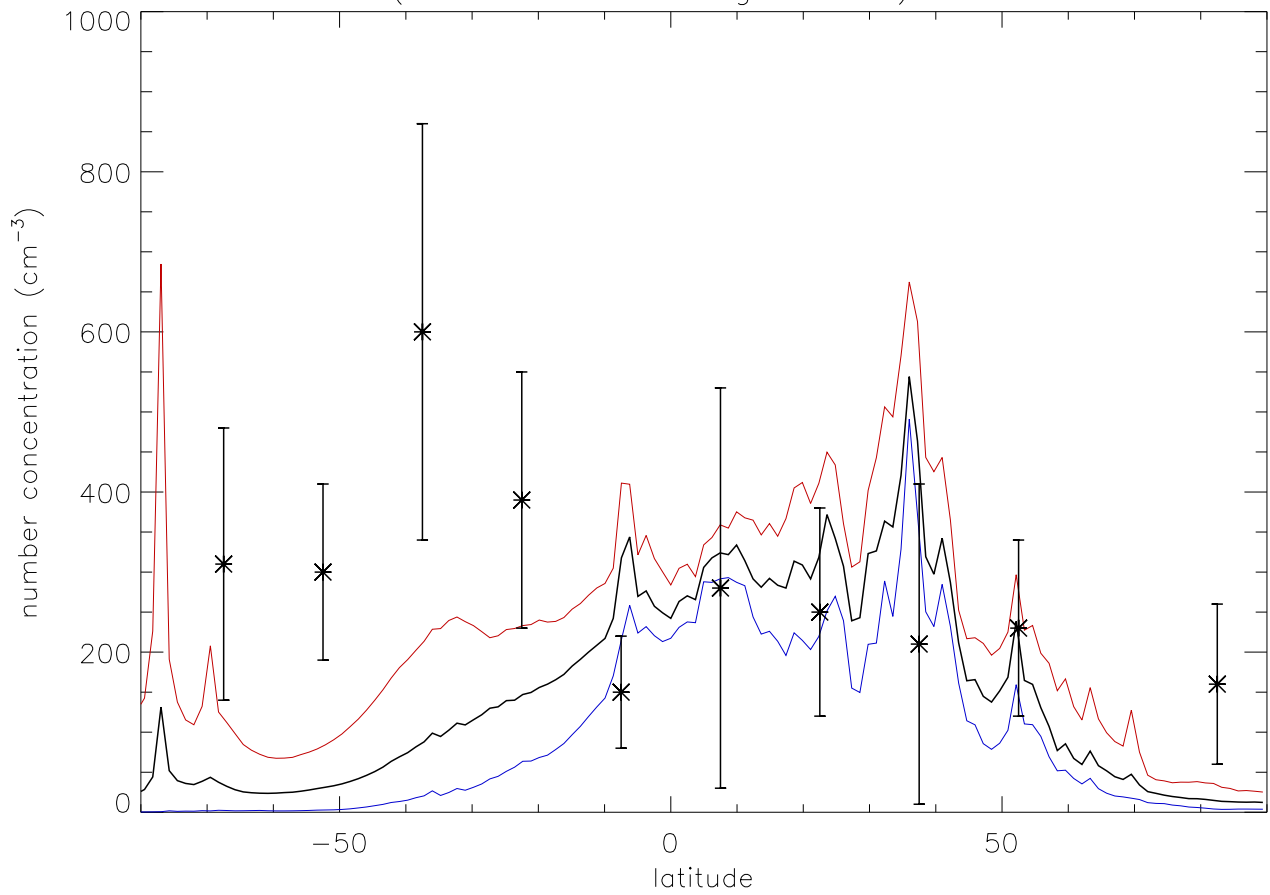




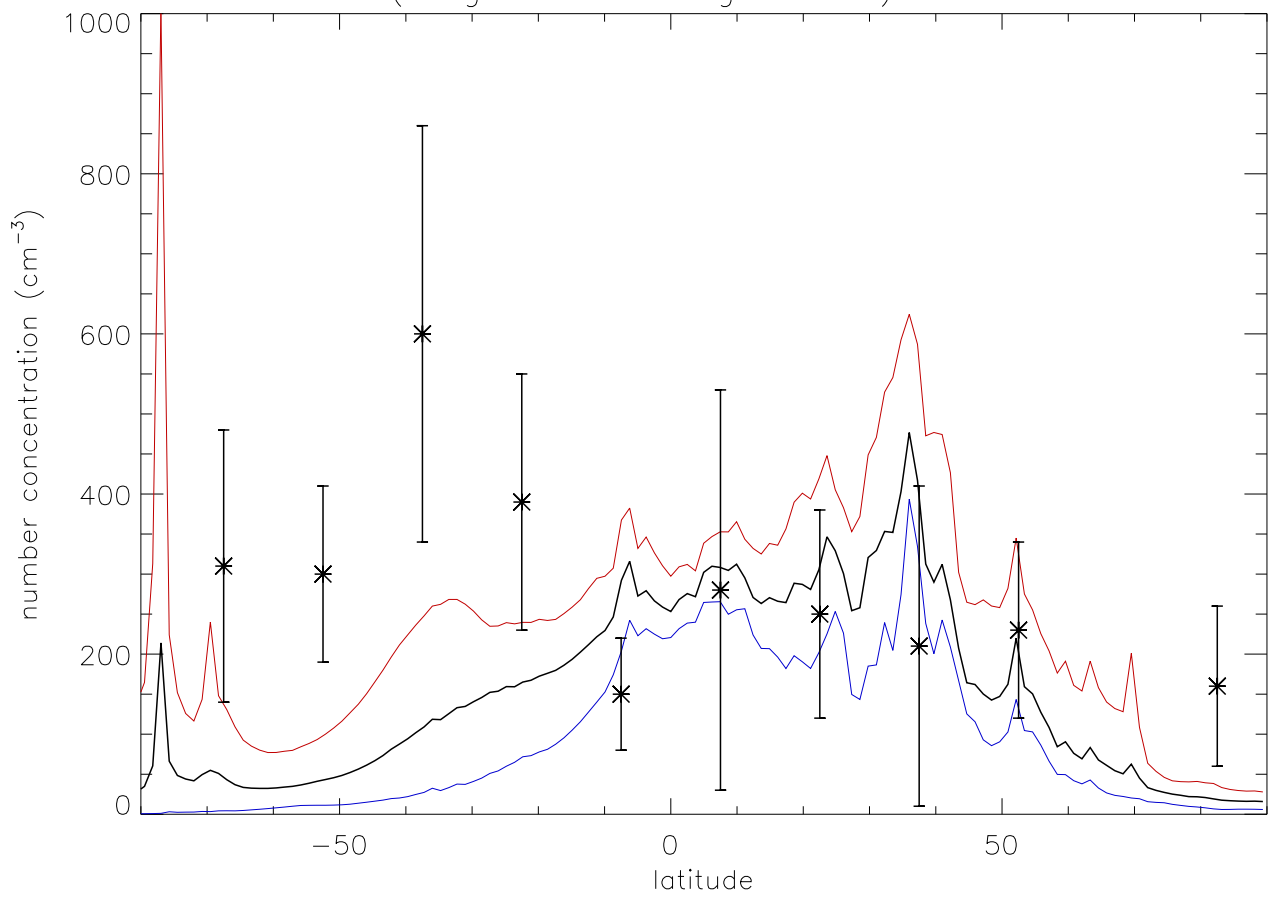
CN no. conc. (ocean gridboxes) (Heintz00Fig2): HadGEM3UKCA\_XKAWA\_2008



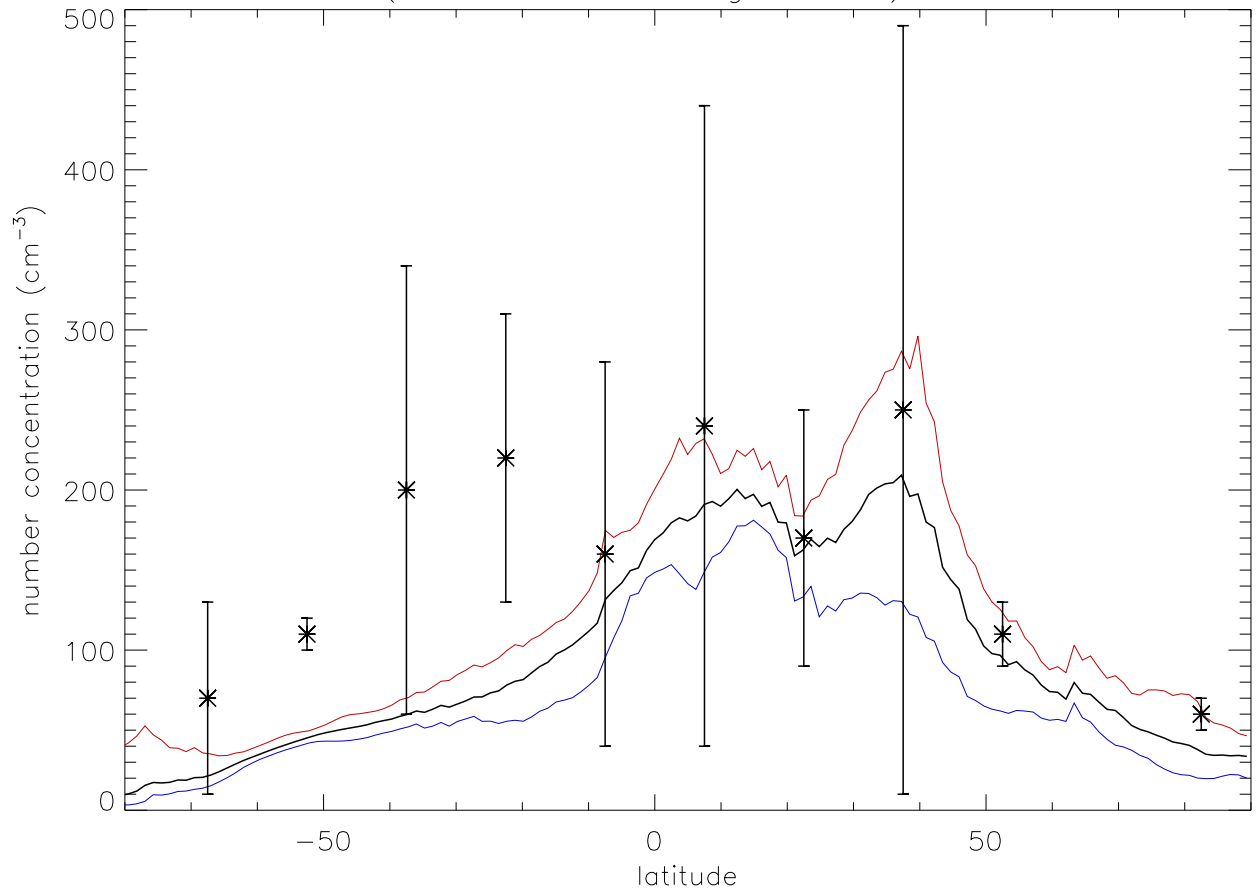
Aitken mode no. conc. (modes -- ocean gridboxes): HadGEM3UKCA\_XKAWA\_2008



Aitken mode no. conc. (range -- ocean gridboxes) : HadGEM3UKCA\_XKAWA\_2008



accumn mode no. conc. (modes -- ocean gridboxes) : HadGEM3UKCA\_XKAWA\_20



accumn mode no. conc. (range -- ocean gridboxes) : HadGEM3UKCA\_XKAWA\_200

