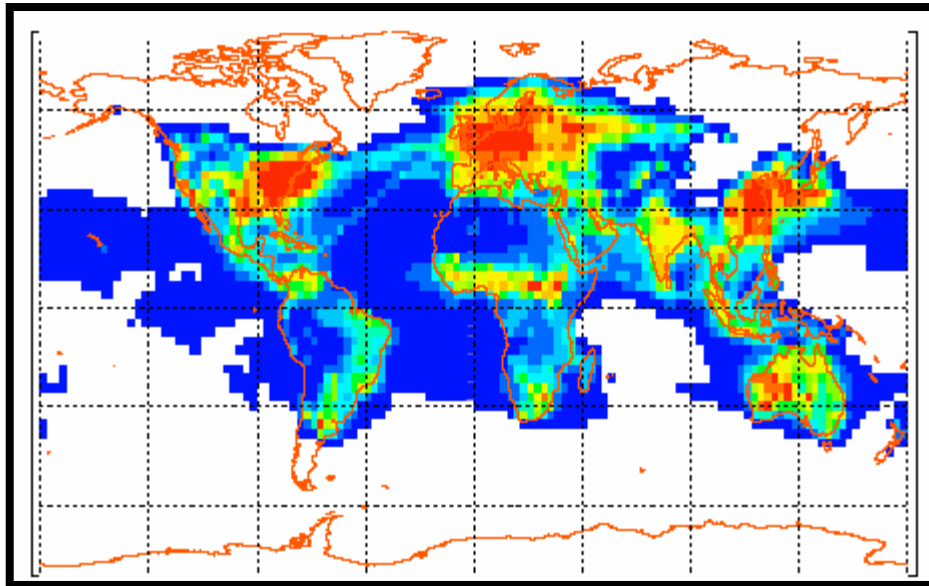


Seasonal variation of tropospheric NO₂ columns from MOZART simulations and retrieved data from GOME measurements

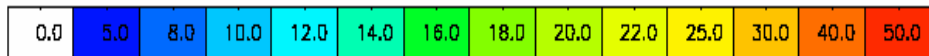
Model simulations:

- Use of MOZART-4 = same as MOZART-3, being coupled with IFS, but with an highest vertical level at ~ 40 km
- Use of runs performed with NCEP meteorology

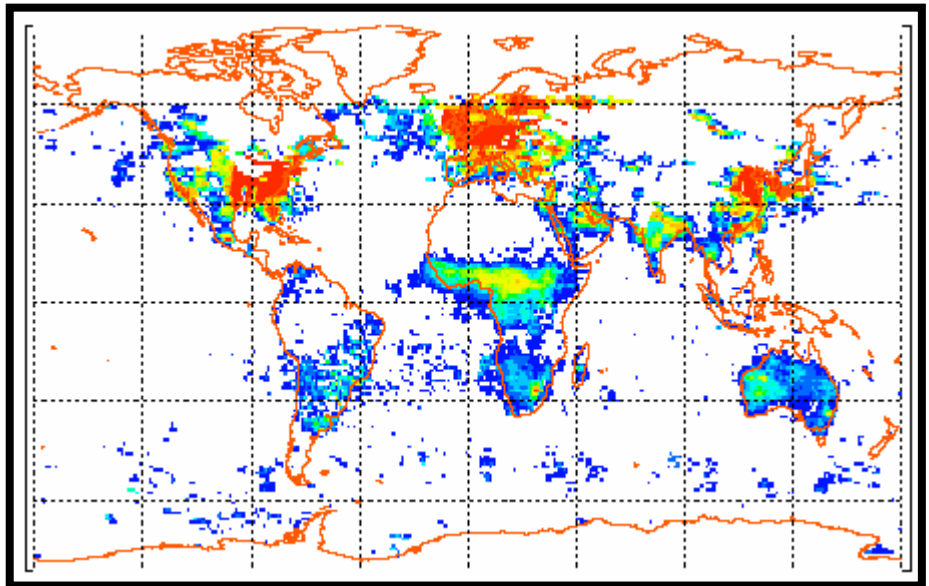
january



MOZART

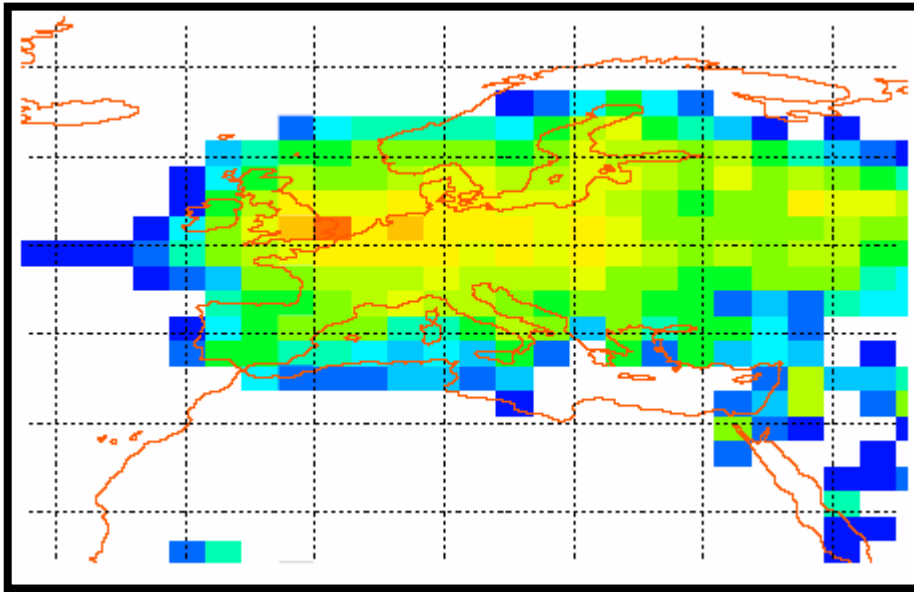


(10^{+14} molec/cm²)



GOME

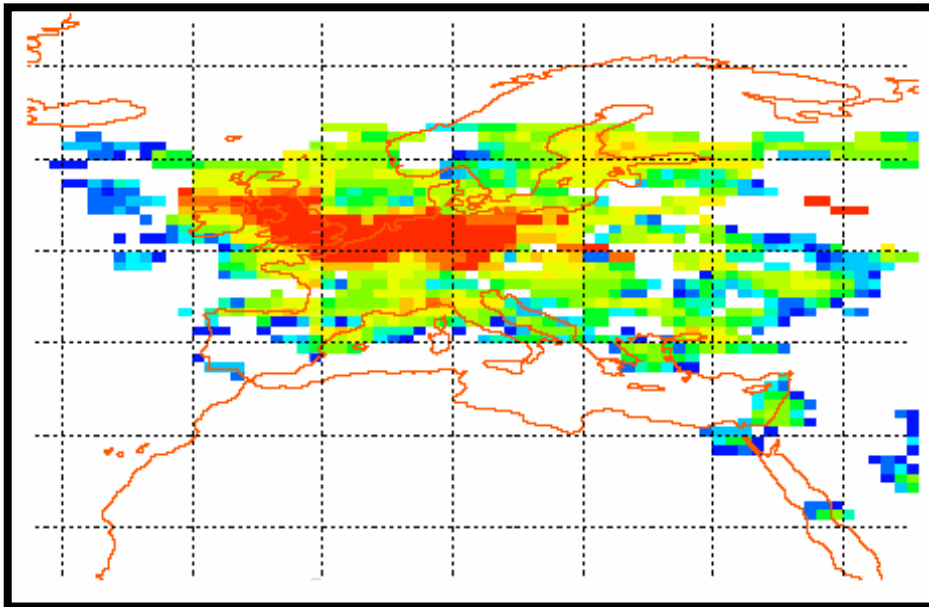
january



MOZART

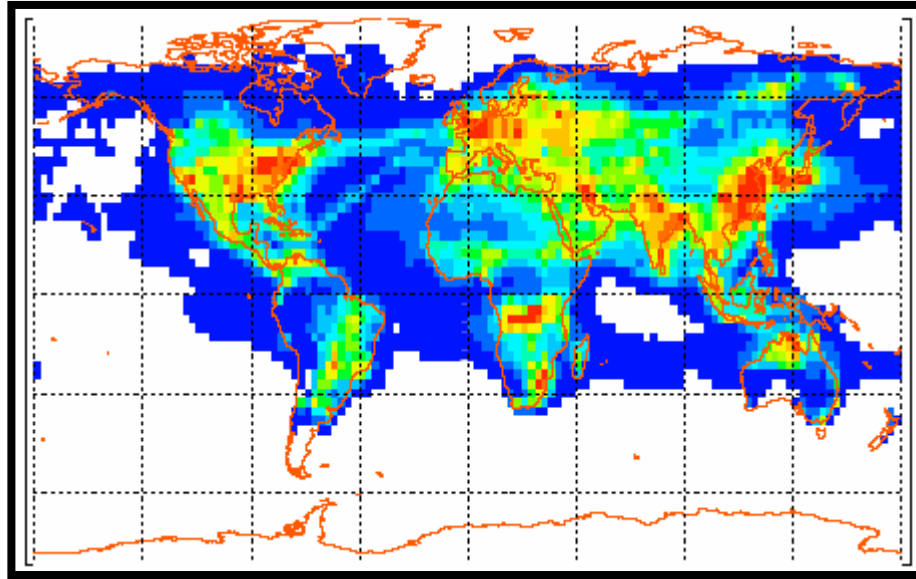


(10+14 molec/cm²)

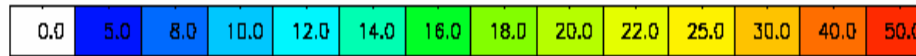


GOME

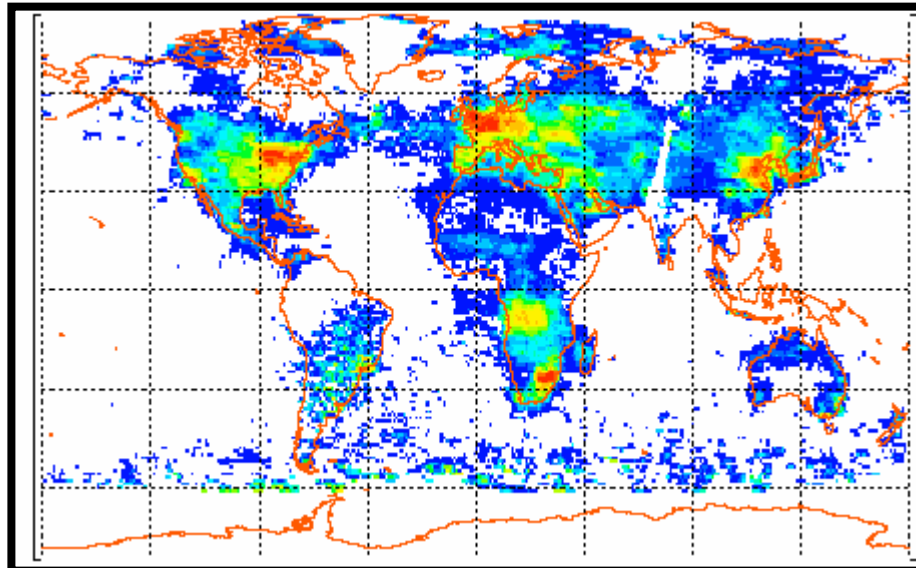
july



MOZART

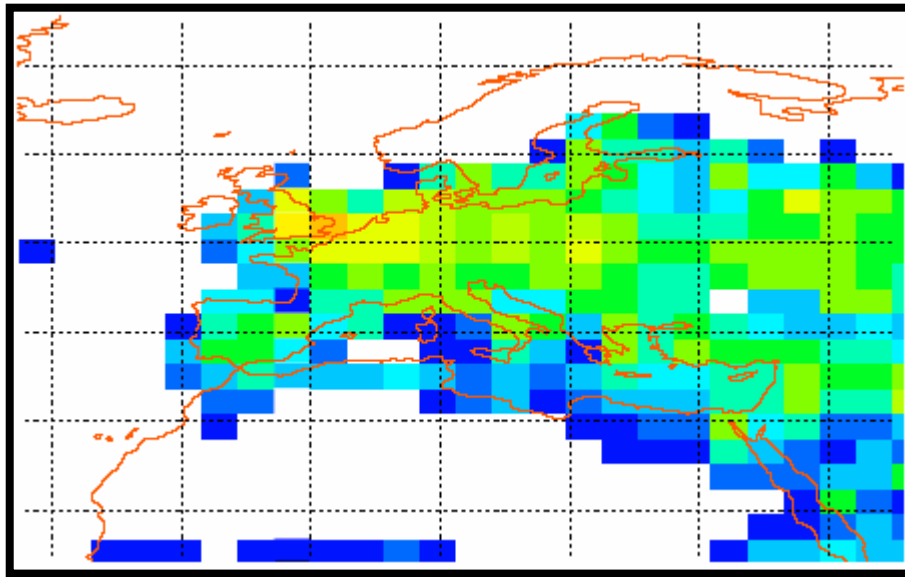


(10+14 molec/cm²)

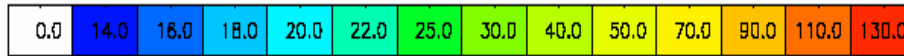


GOME

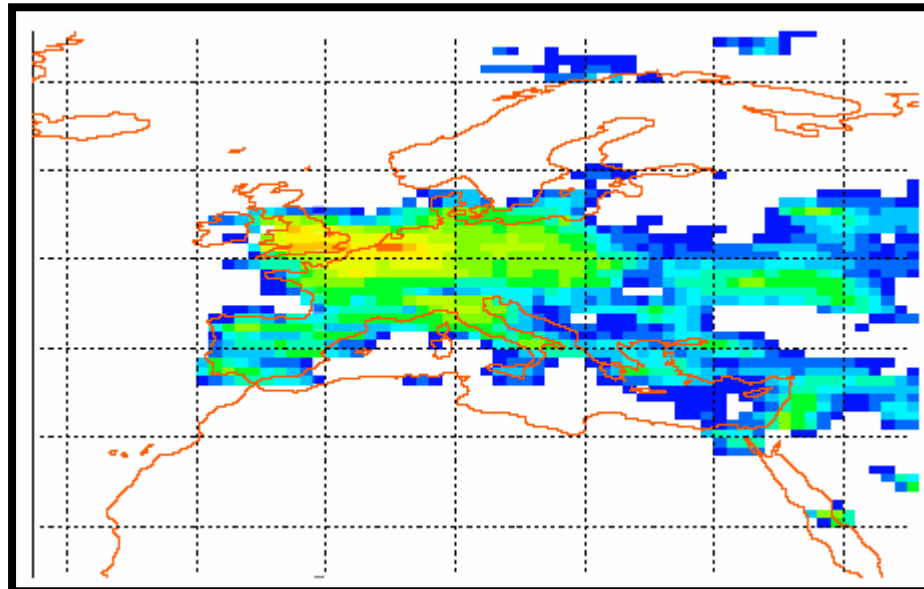
july



MOZART



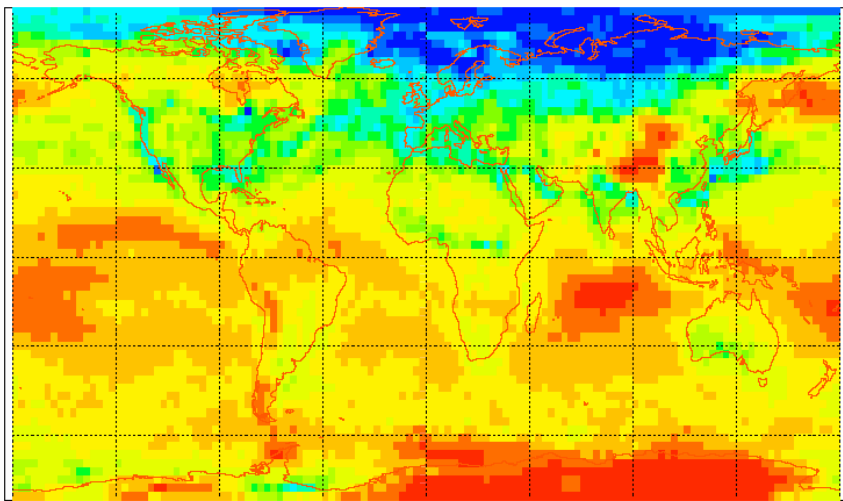
(10+14 molec/cm²)



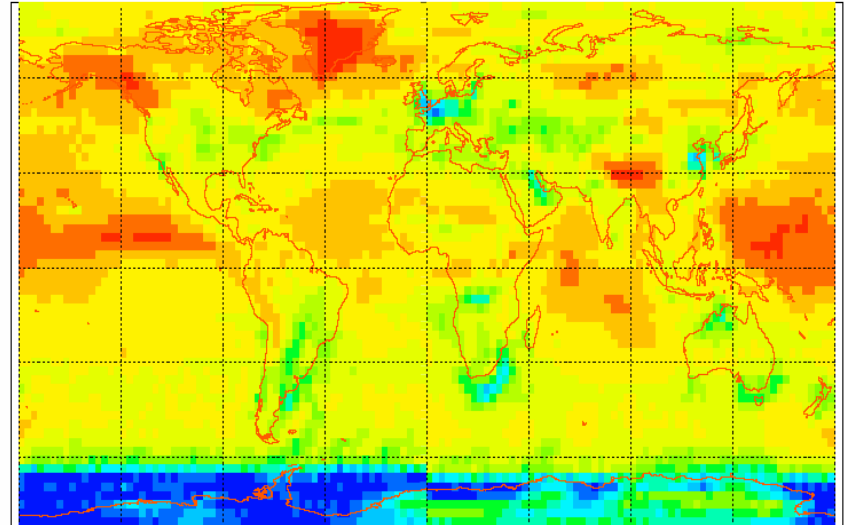
GOME

Differences between daily average values of tropospheric NO2 columns and local time columns (10h30) from MOZART simulations

january

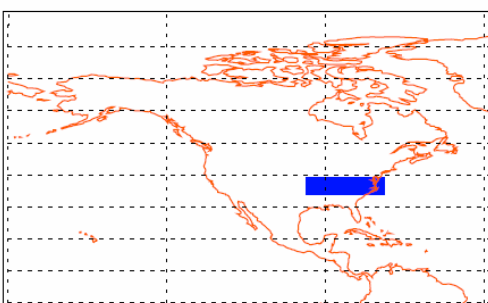


july

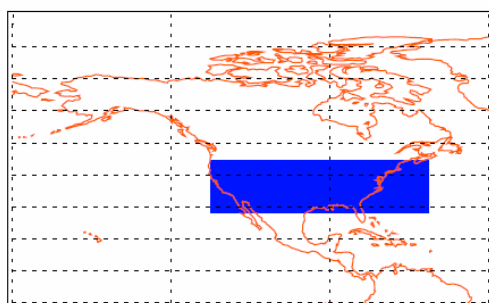


%

$$100 * \text{abs}(\text{NO2_average} - \text{NO2_local}) / \text{NO2_average}$$

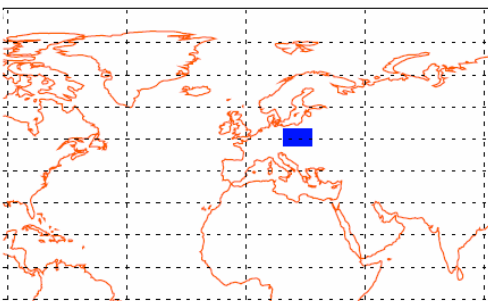


reg1

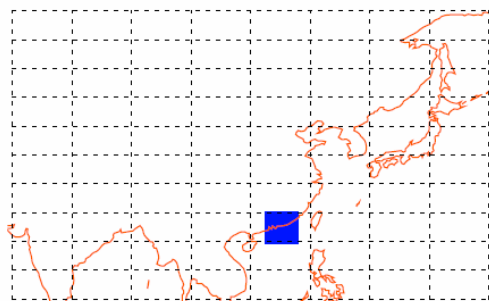


reg2

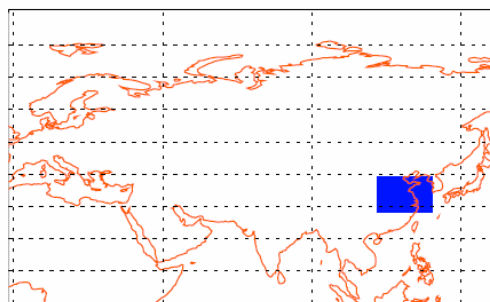
Selected regions



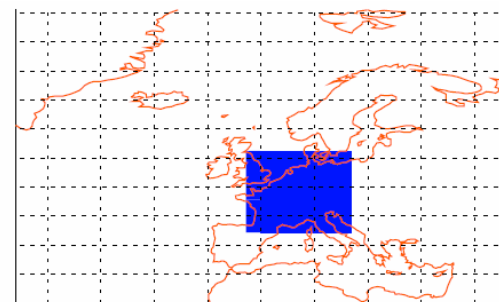
reg3



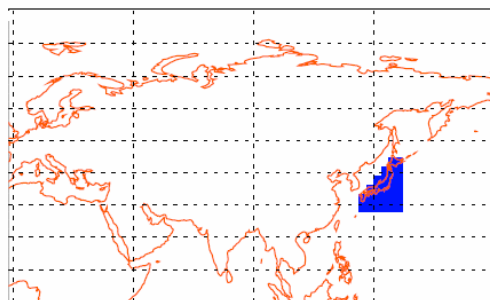
reg4



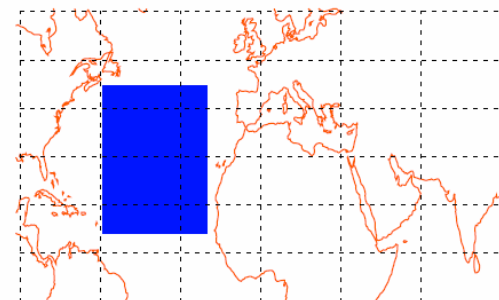
reg5



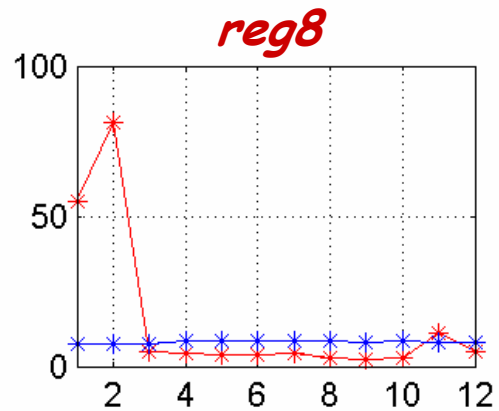
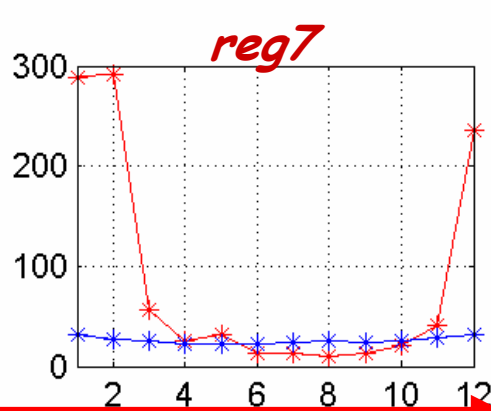
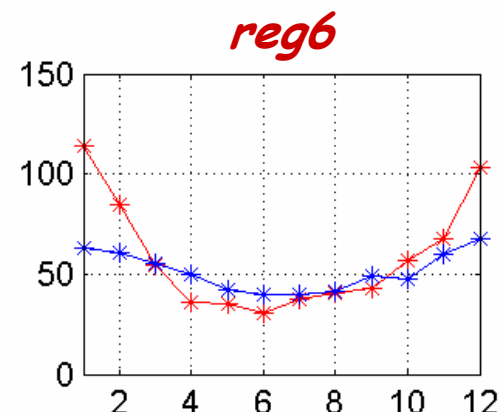
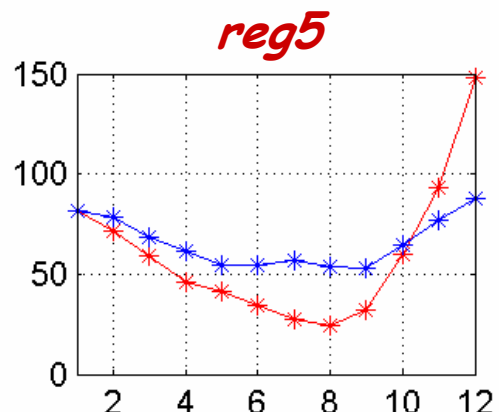
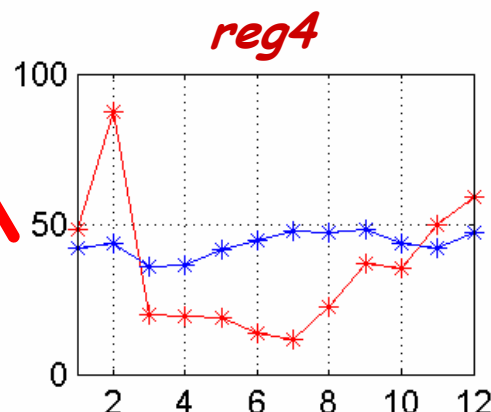
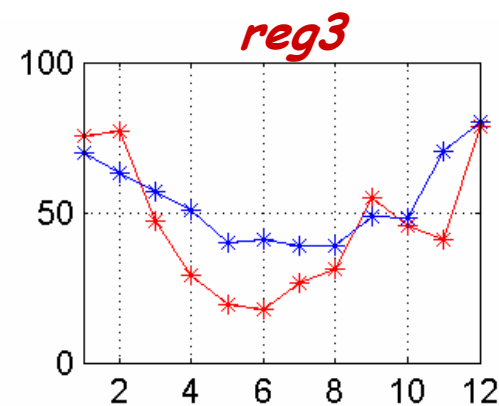
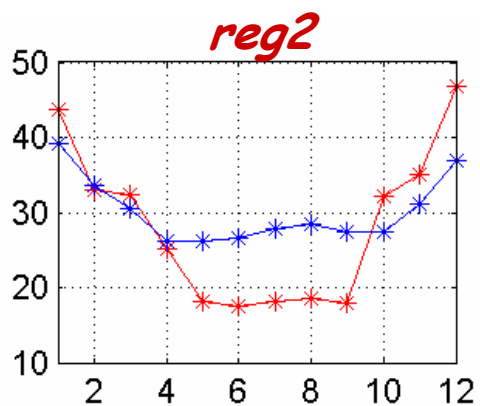
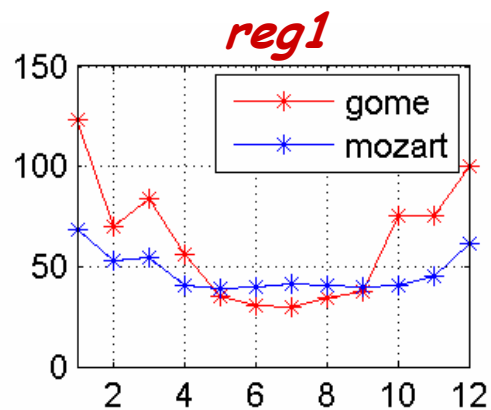
reg6



reg7



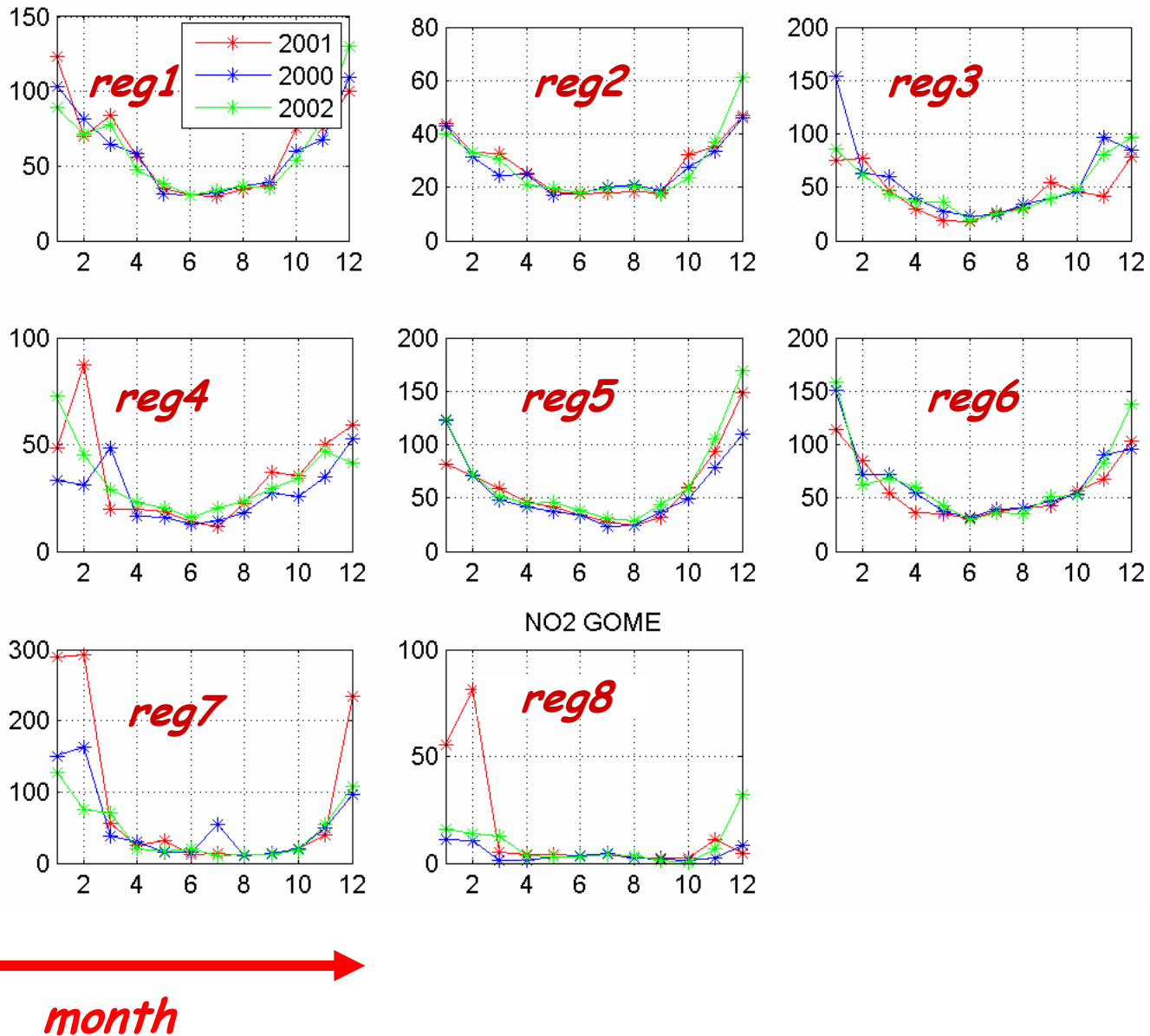
reg8

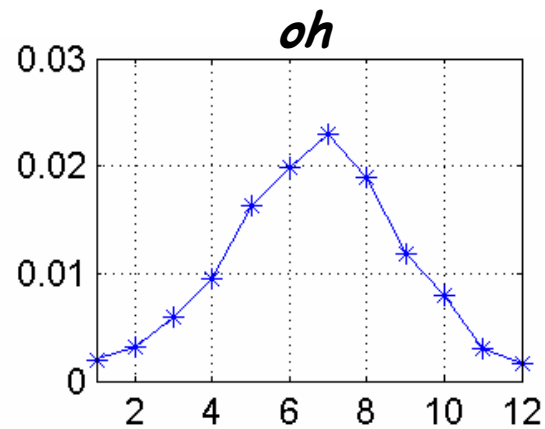
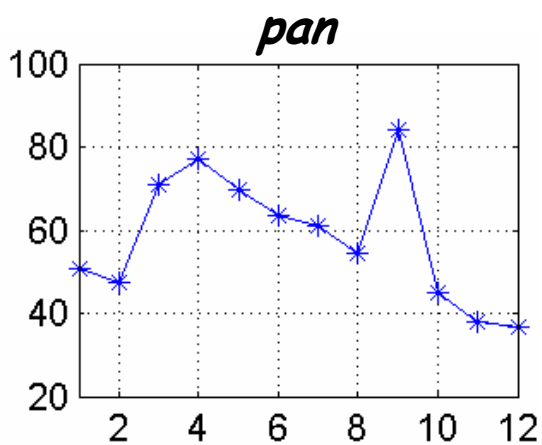
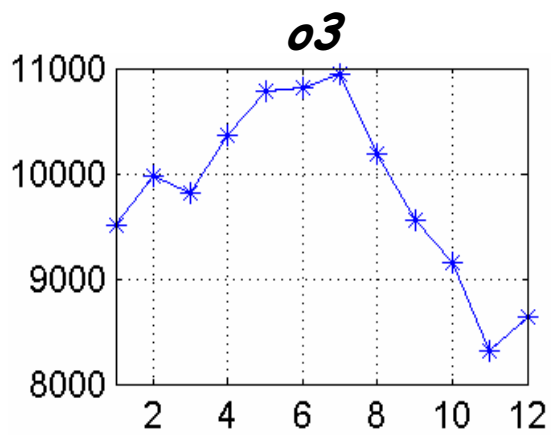
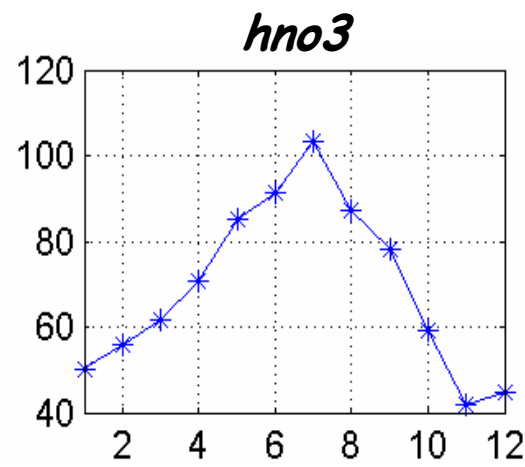
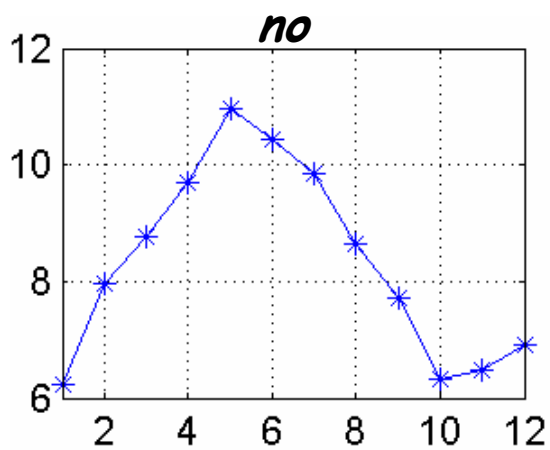
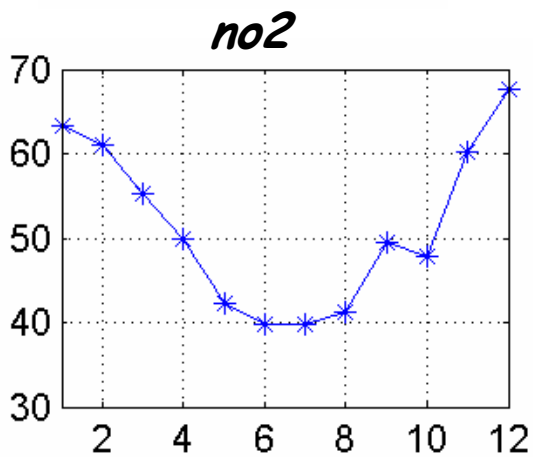
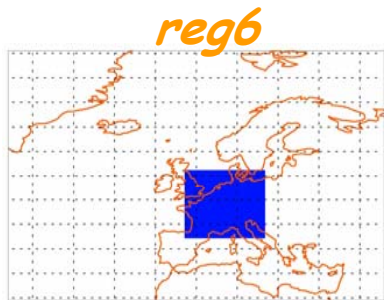


tropospheric column (10^{+14})

month

Interannual variations of NO₂ from GOME observations





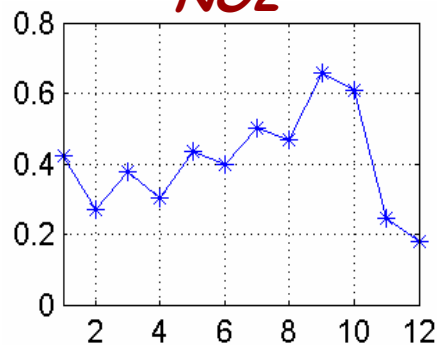
tropospheric column (10¹⁴)

month

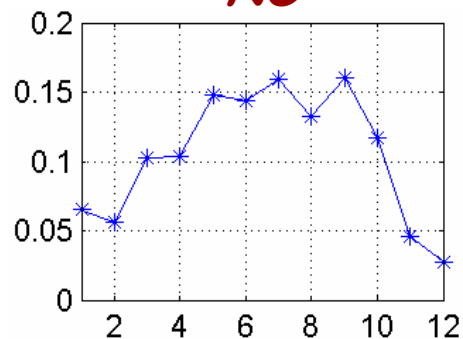
reg6



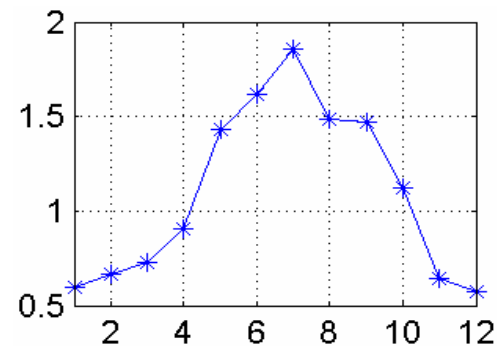
NO2



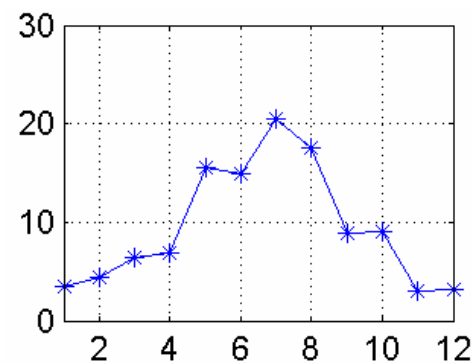
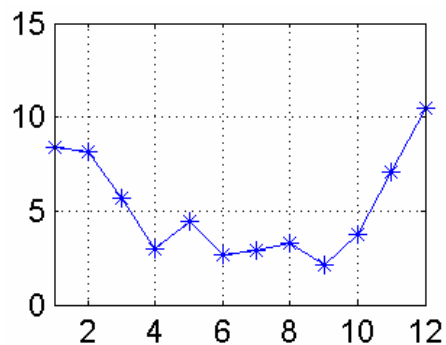
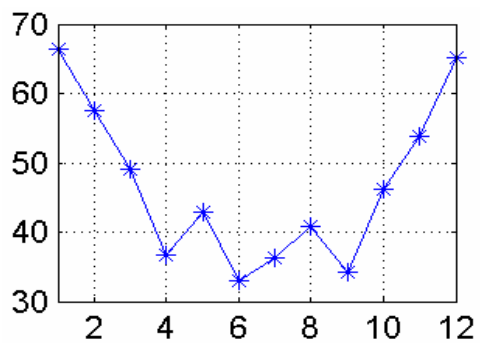
NO



HNO3



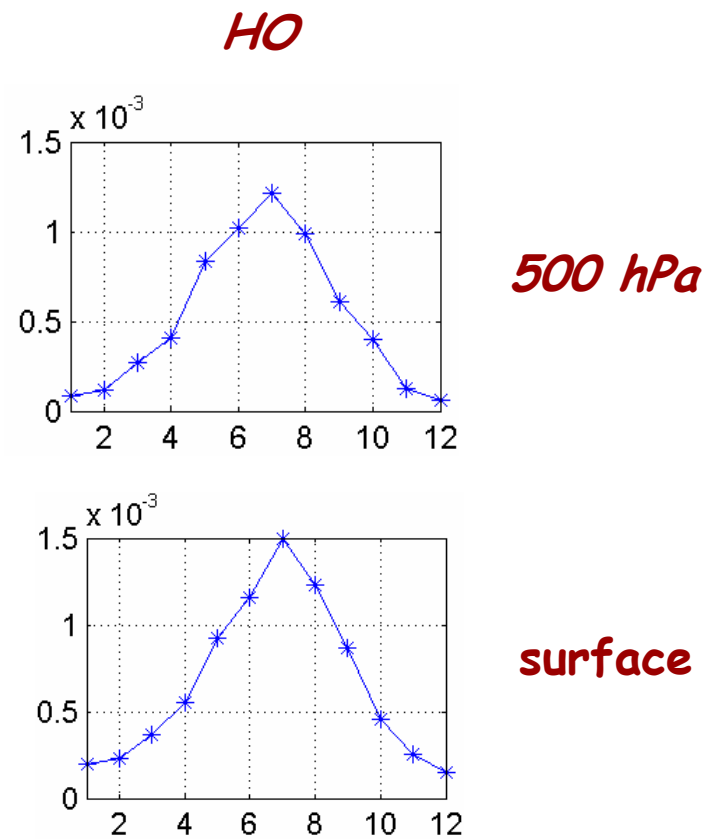
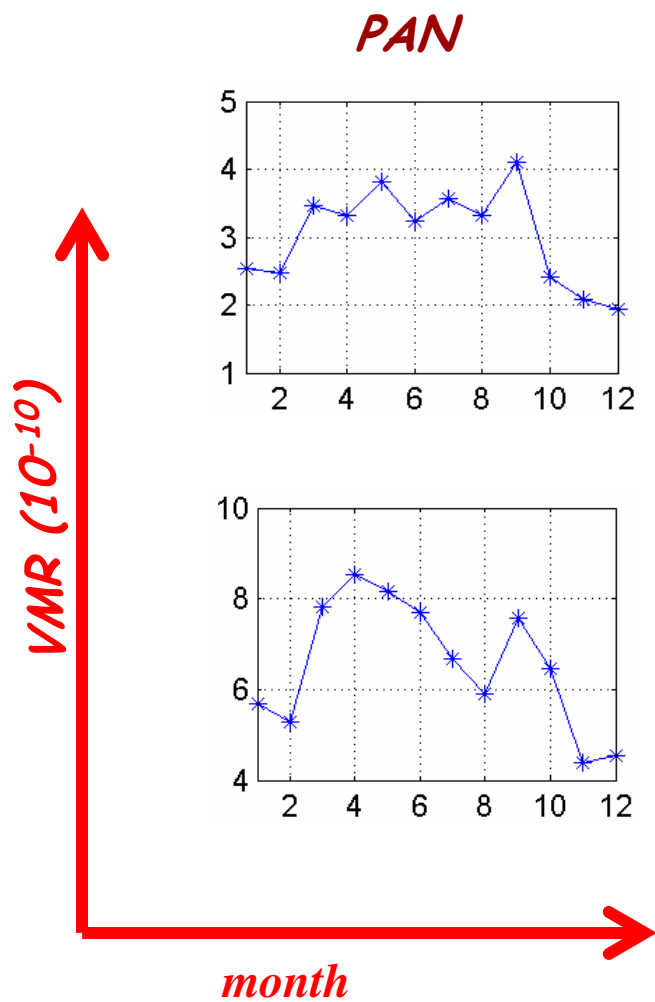
500 hPa



surface

VMR (10⁻¹⁰)

month



Work to be done over the next few months:

- Perform a new MOZART simulation using
 - ECMWF meteorology
 - 2001-2004?
 - RETRO emissions
 - including seasonal variation of anth. emissions
 - removing seasonal variation
 - Biomass burning emissions: GFED (if available) or POET
- Analysis: to be further discussed
 - Seasonal variations using Bremen + KNMI data
 - Look at other available observations (CH₂O?)