

Aerosol and NO₂ Retrievals Using RSS 105 Data

Scott M. Gianelli

Columbia University, NASA GISS

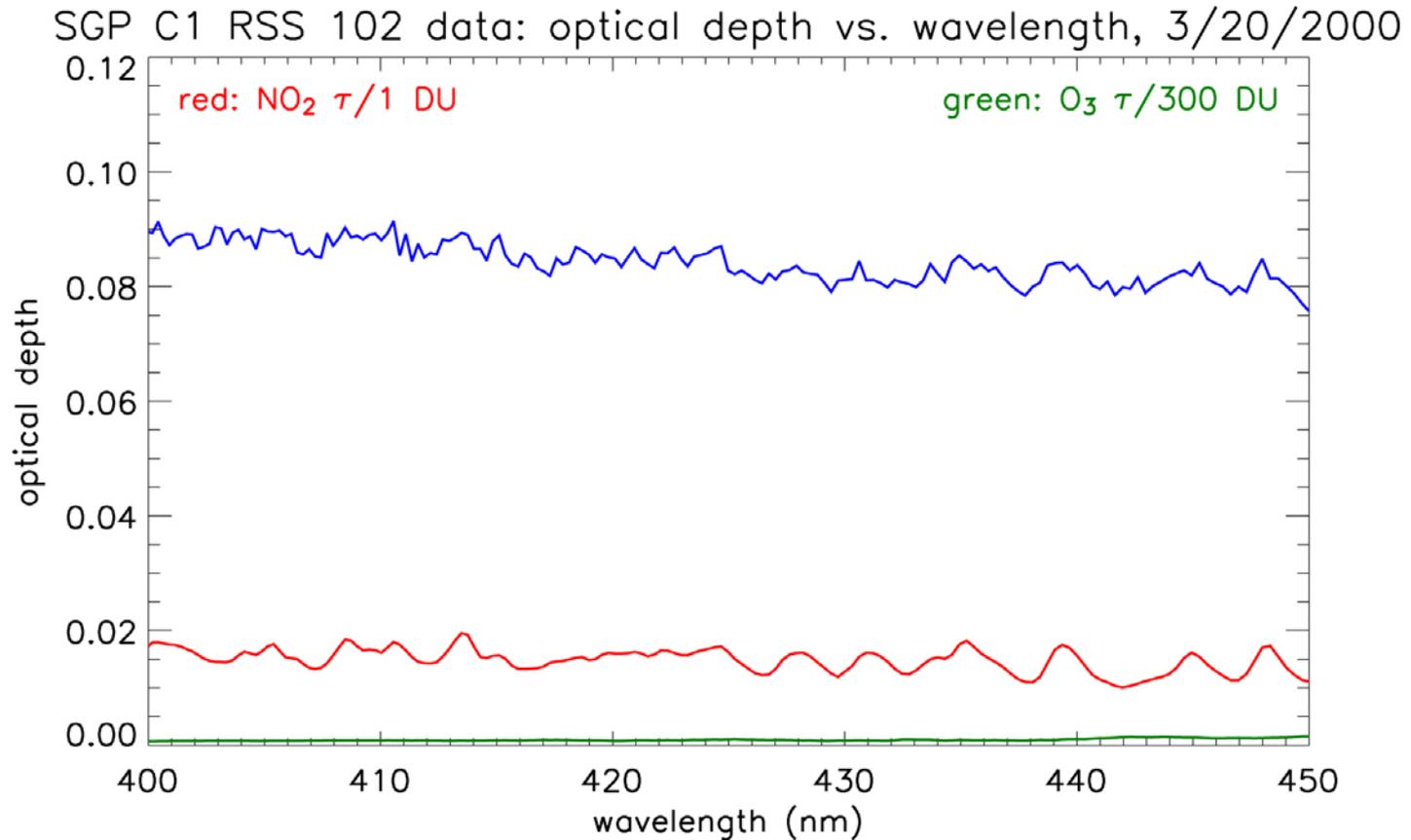
Andrew Lacis and Barbara Carlson

NASA GISS

Review of RSS 102 Retrievals

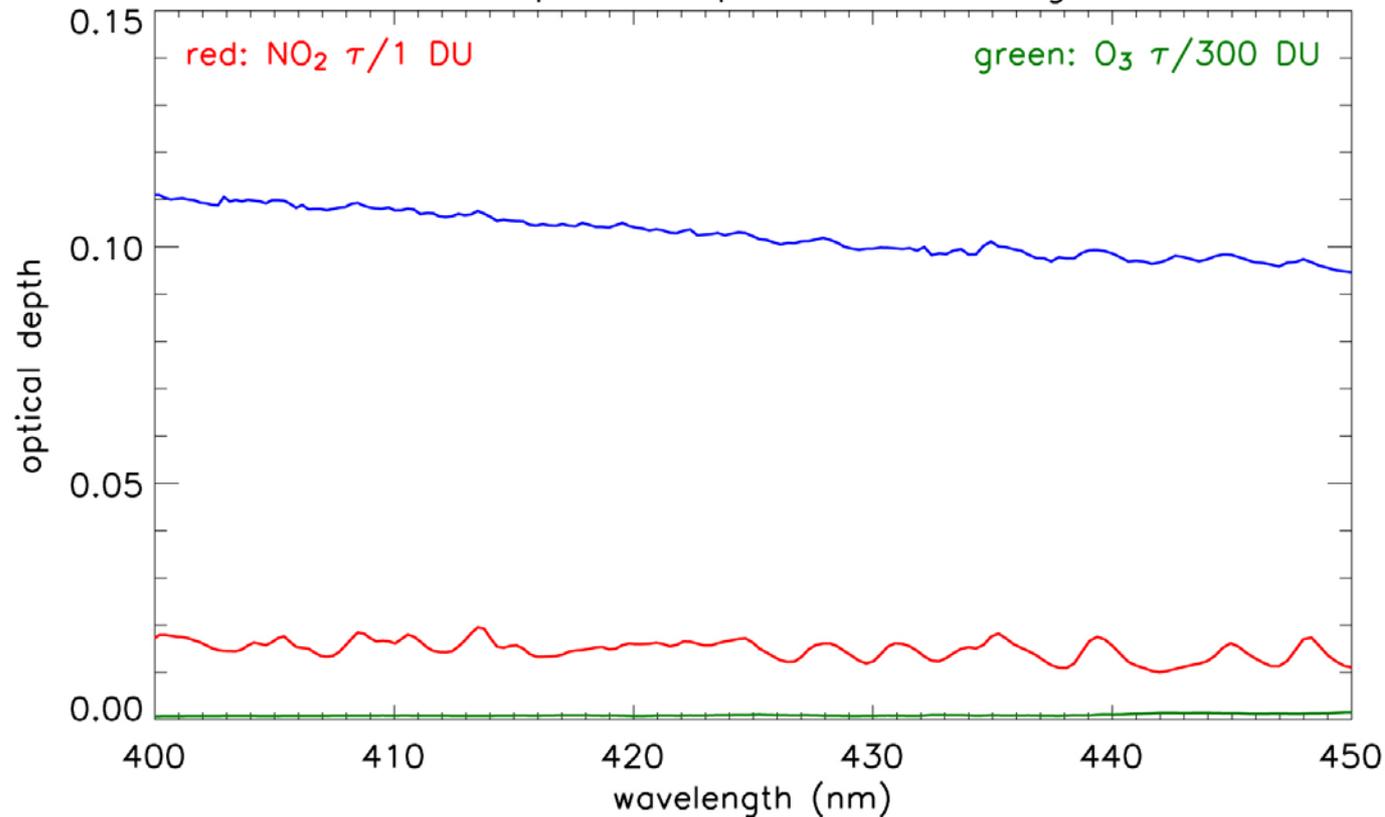
- Langley-derived optical depth data
- NO₂ retrieved using DOAS
- Random noise
 - Affects quality of NO₂ retrievals
 - Somewhat dependent on optical depth
- TOMS ozone used
- Retrieved values of coarse and fine mode optical depth, fine mode effective radius
- Pixel wavelengths remained stable

Observing NO₂ in the data: a “good” day

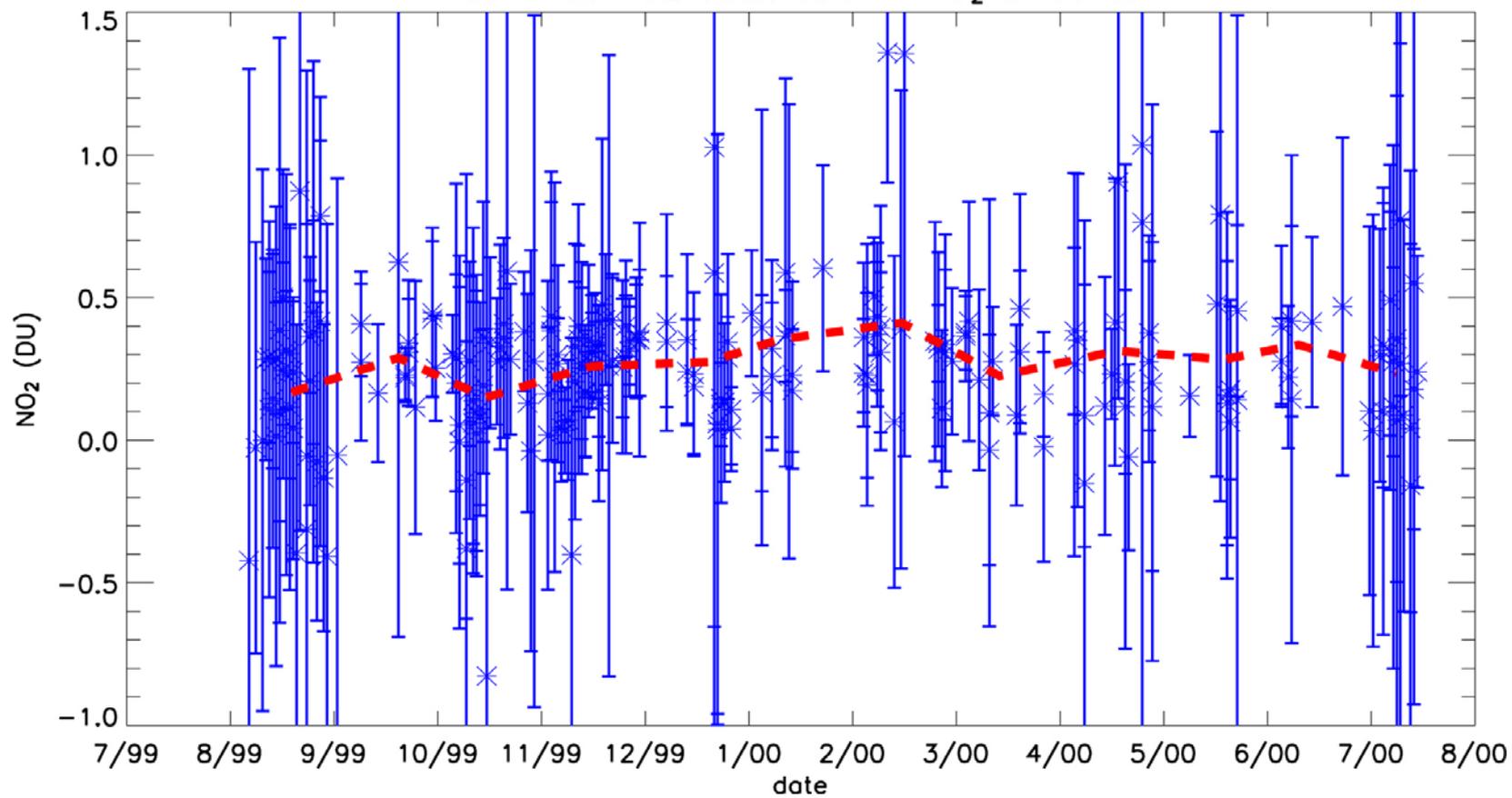


Mean optical depth cancels out noise

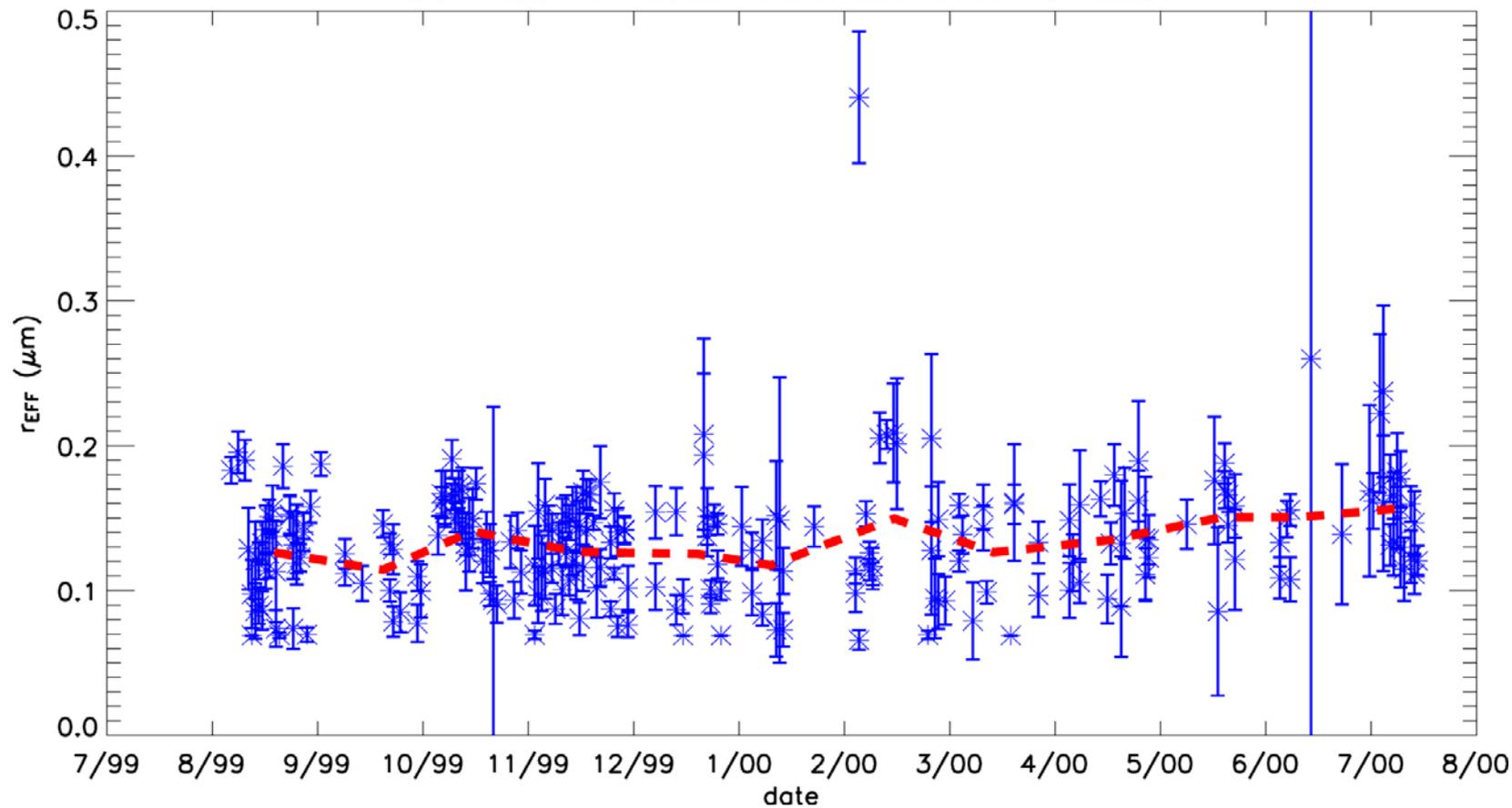
SGP C1 RSS 102 data: optical depth vs. wavelength, mean for full set



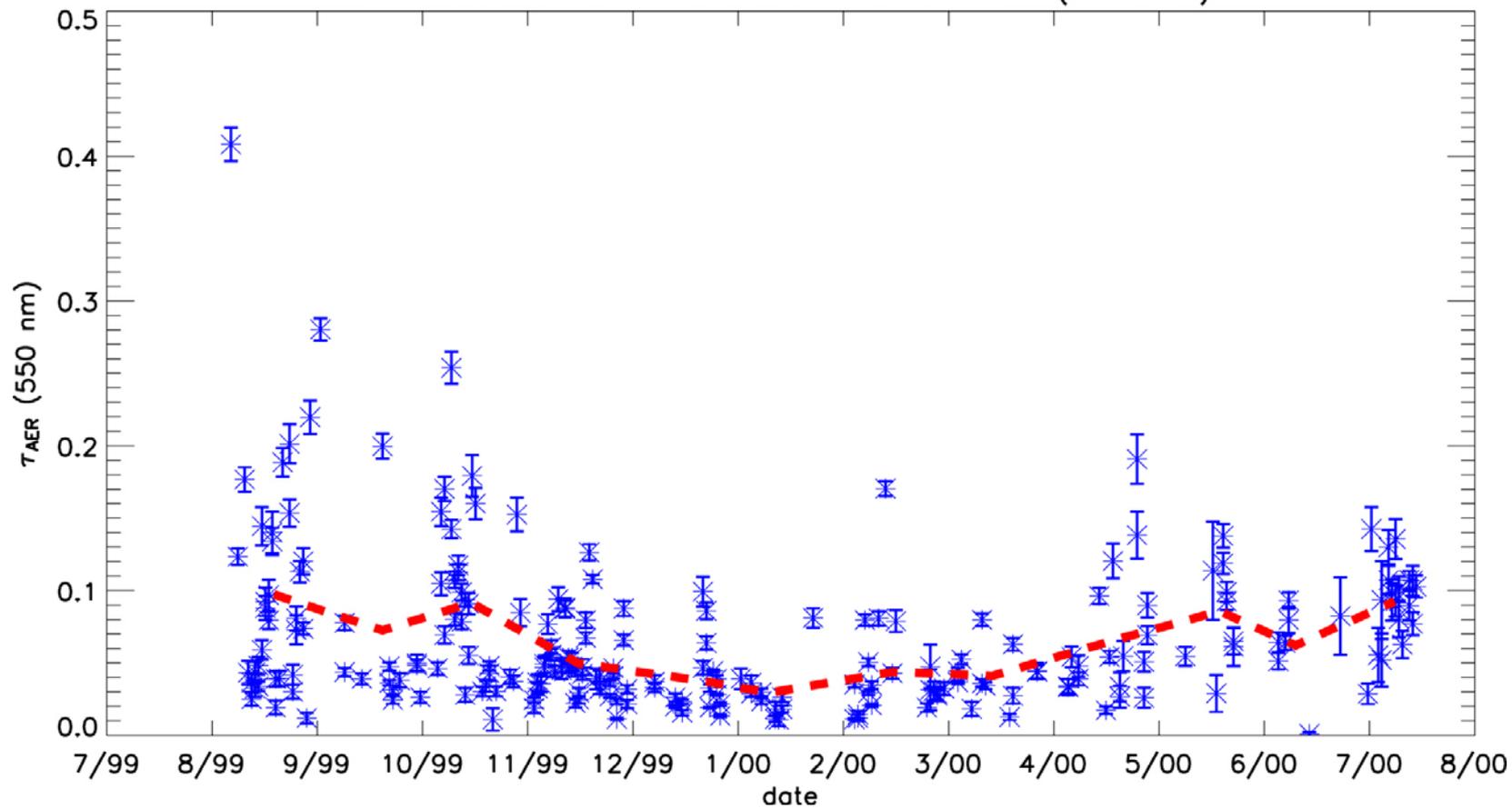
SGP RSS 102 data: column NO₂ amounts



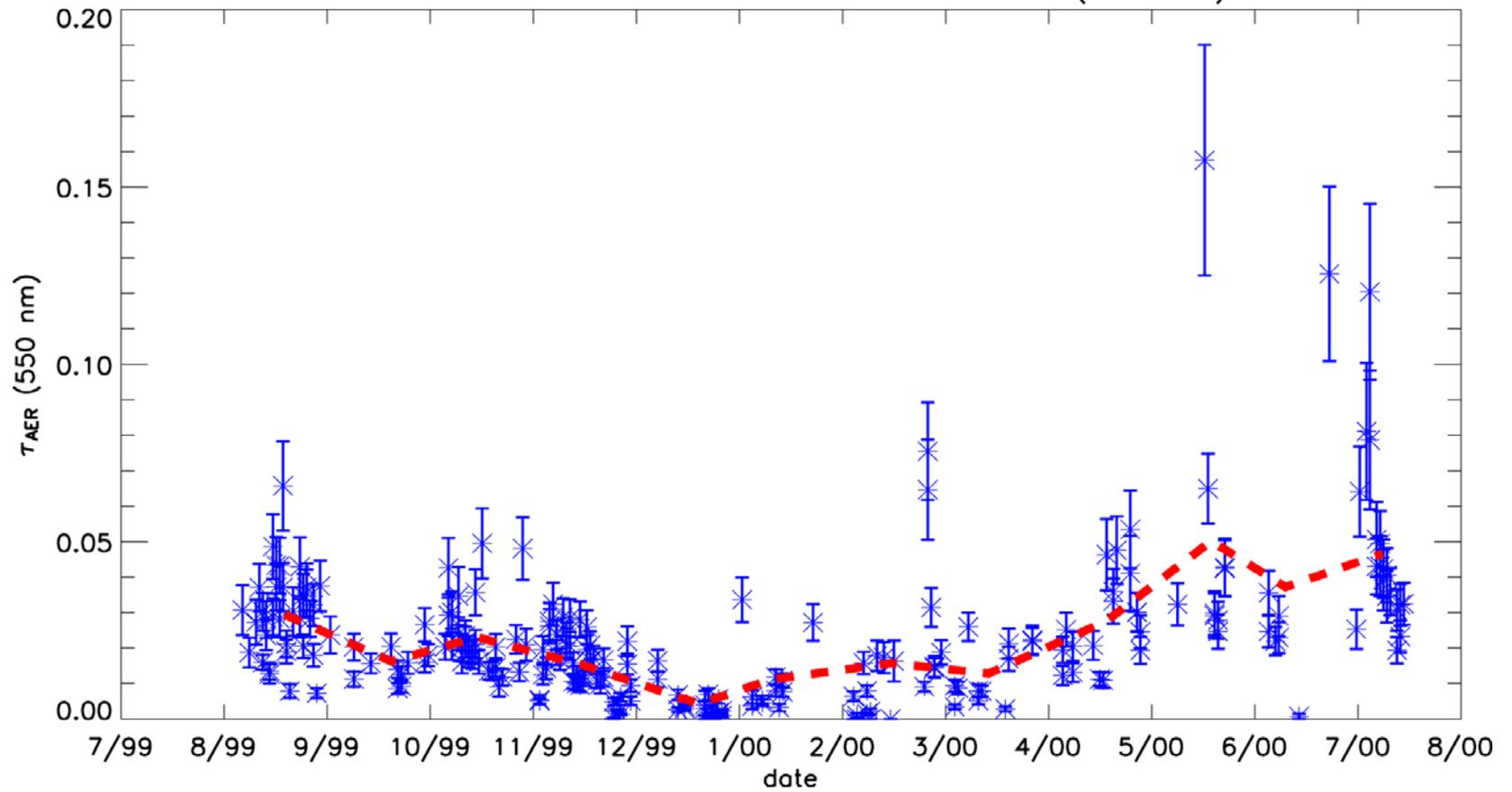
SGP RSS 102 data: fine mode effective radius



SGP RSS 102 data: fine mode aerosol τ (550 nm)



SGP RSS 102 data: coarse mode aerosol τ (550 nm)

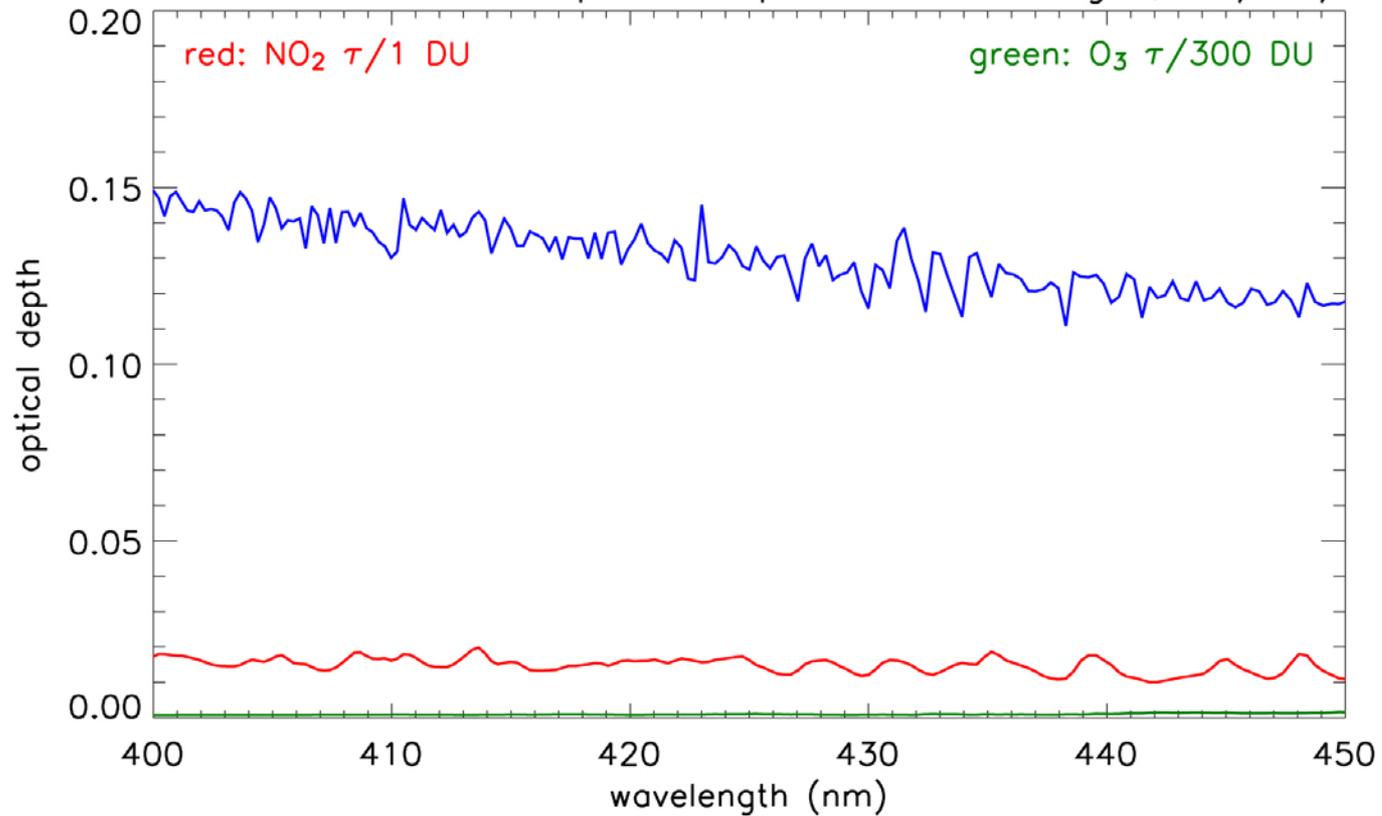


What changes/remains same with RSS 105

- Pixel wavelength very unstable
- Still random noise, with τ dependence
- More data: starting in May 2003 and continuing up to present

A “good” day?

SGP C1 RSS 105 data: optical depth vs. wavelength, 10/21/2003



Optical depth comparisons between RSS and CIMEL

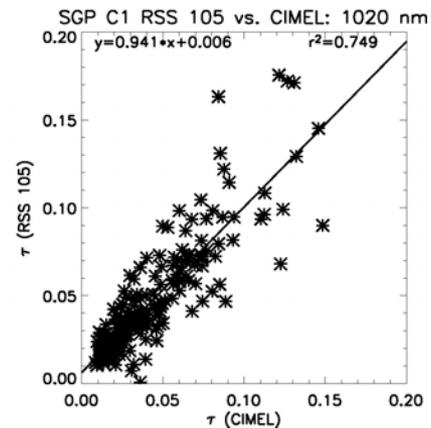
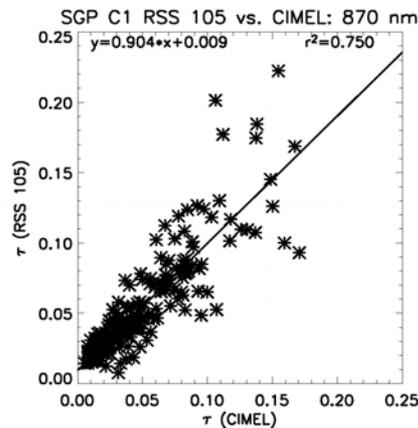
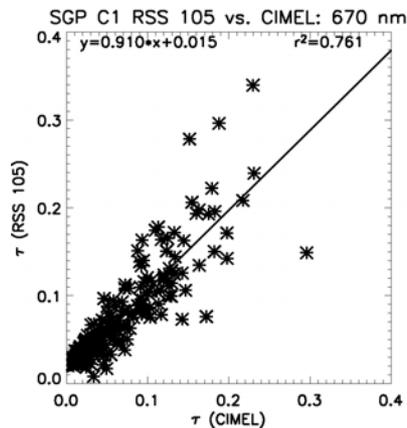
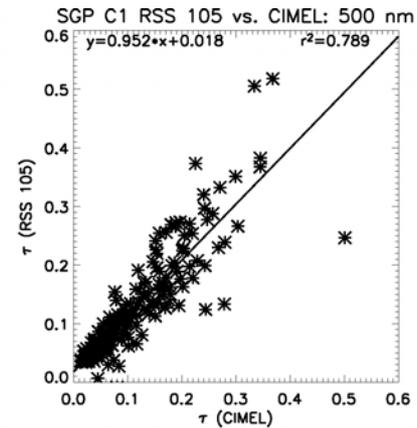
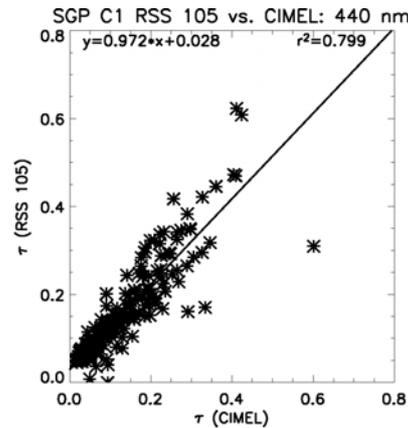
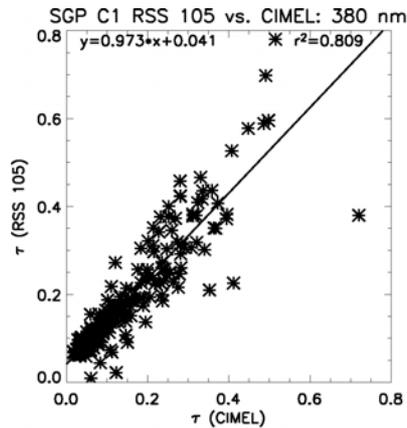
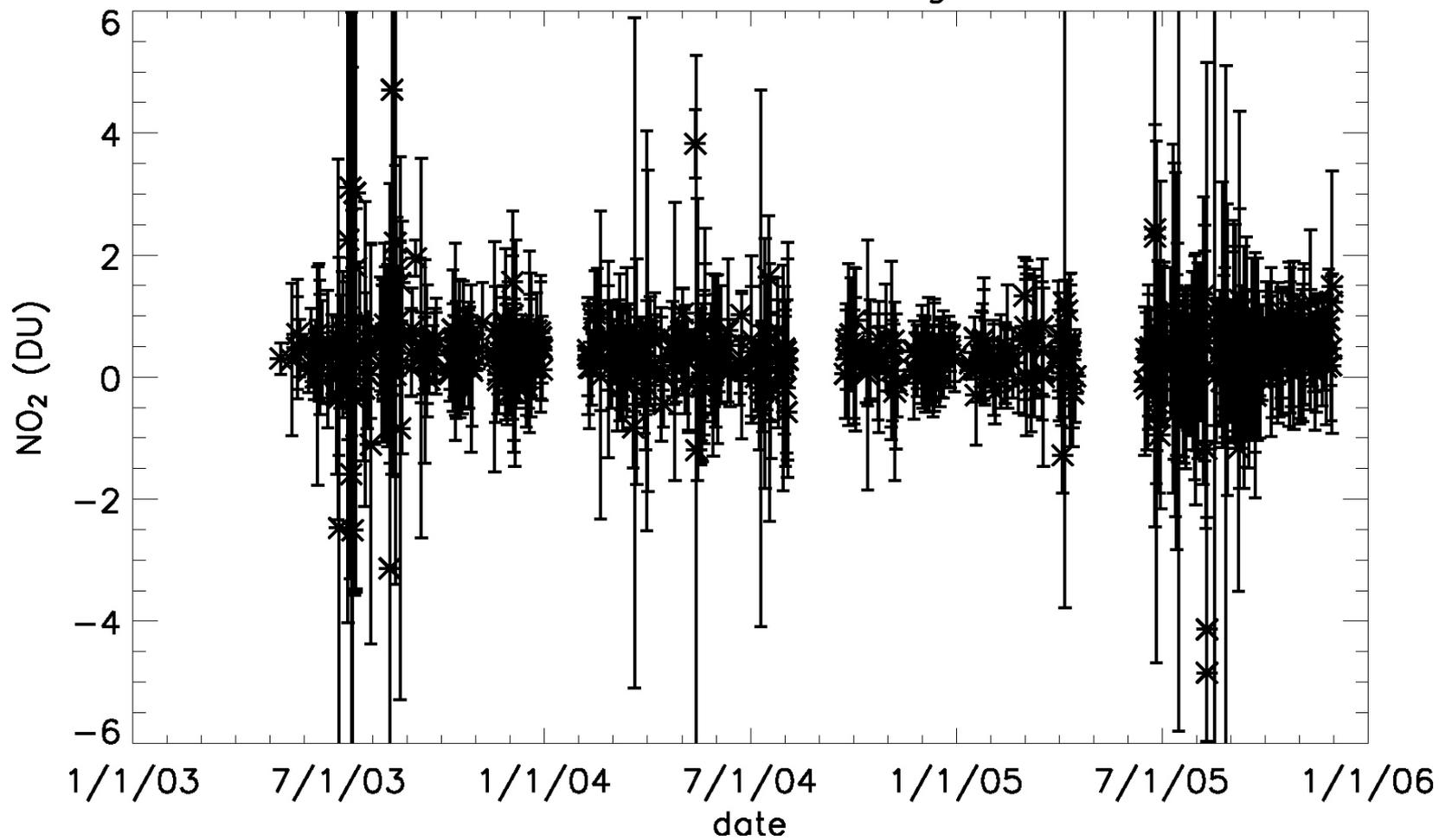


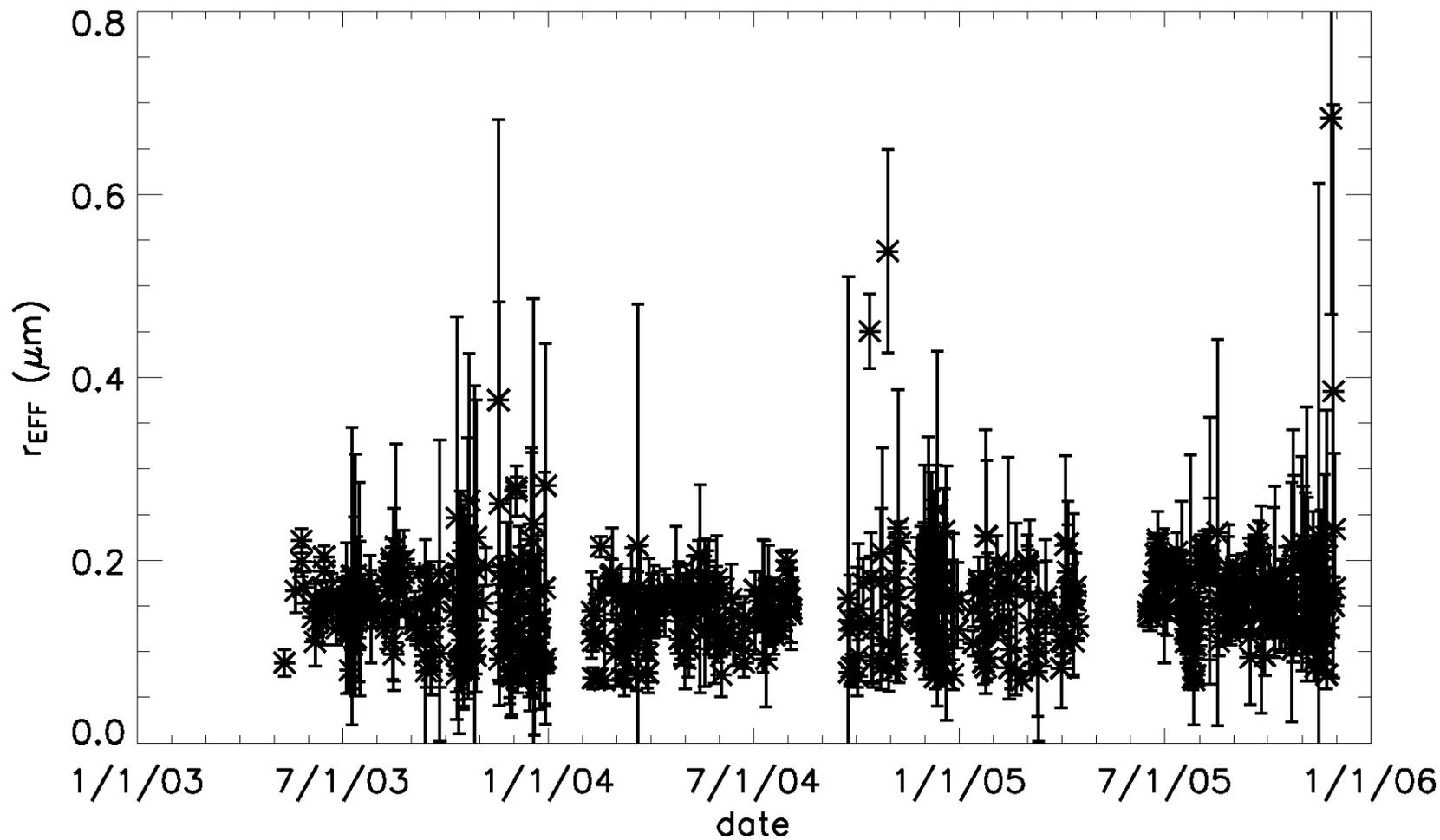
Table of Mean Values

	NO ₂ (DU)	Noise in NO ₂ (DU)	R _{eff} (μm)	Fine mode τ (550 nm)	Coarse mode τ (550 nm)
RSS 102	0.26	0.50	0.13	0.067	0.023
RSS 105	0.37	1.00	0.15	0.089	0.034

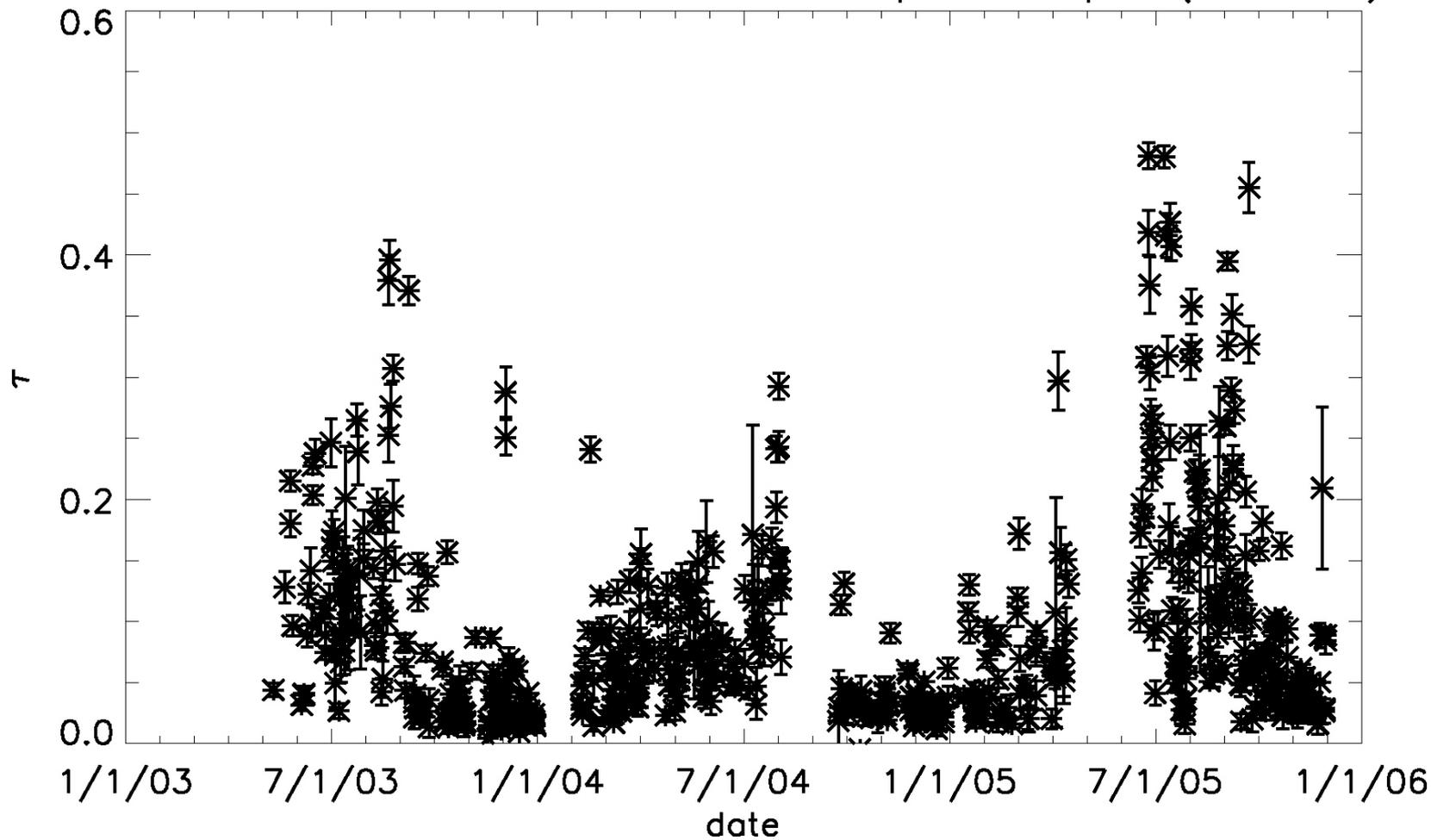
SGP C1 RSS 105 data: column nitrogen dioxide amounts



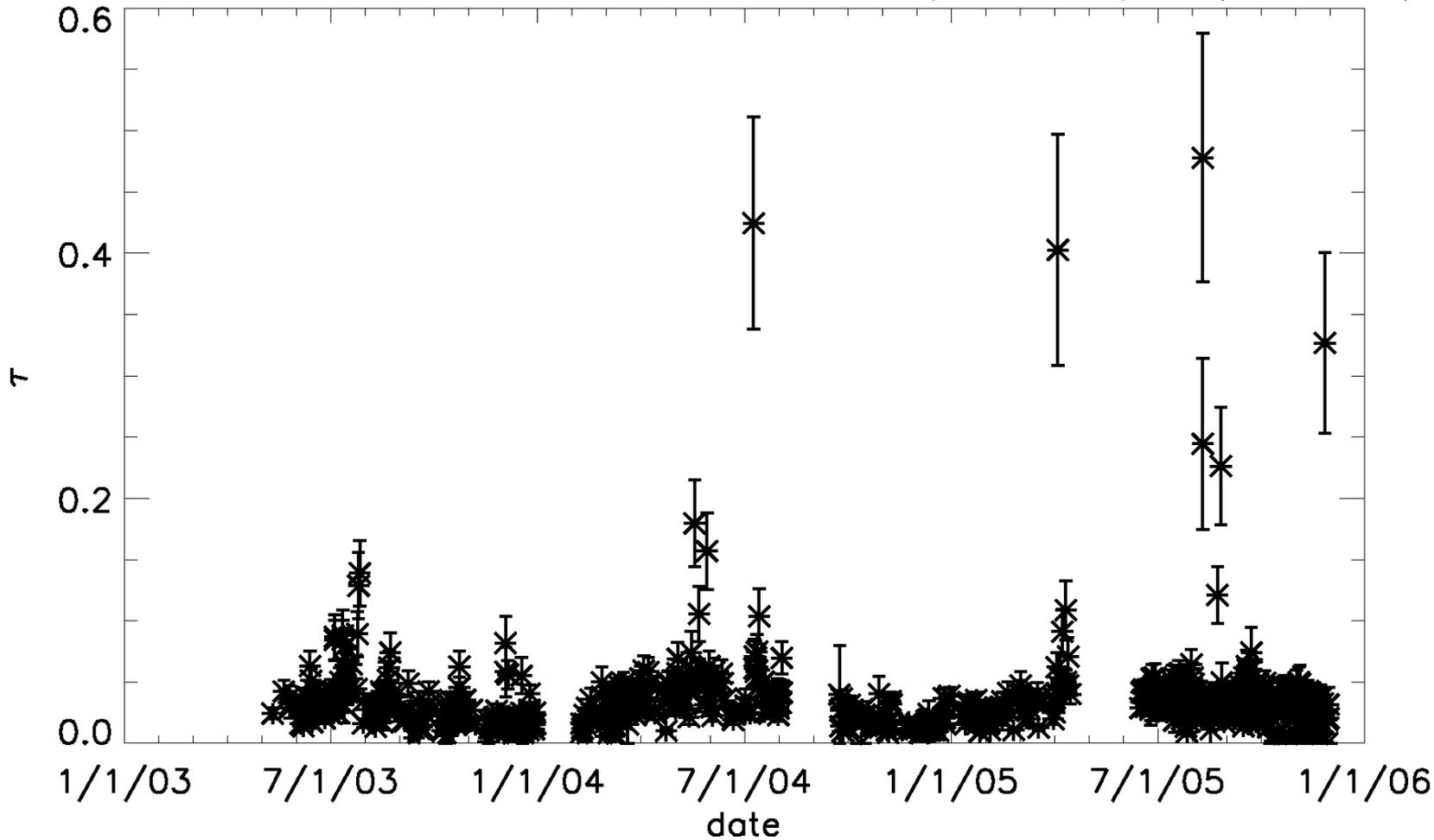
SGP C1 RSS 105 data: fine mode effective radius



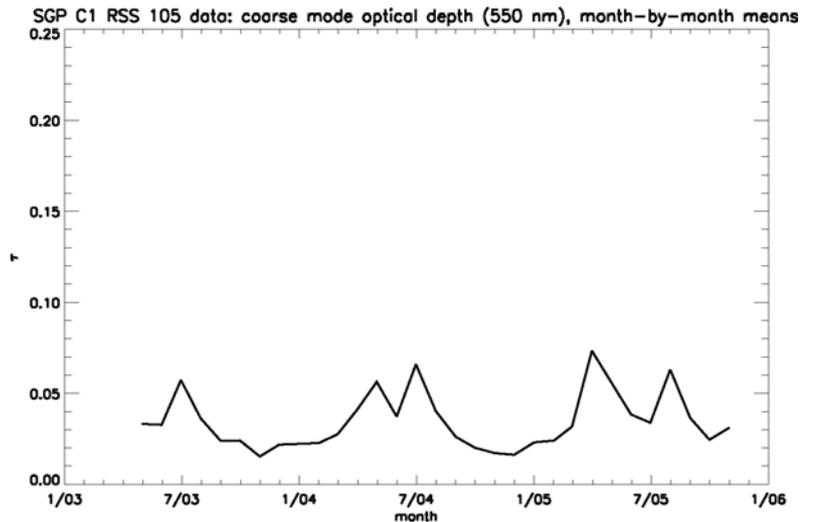
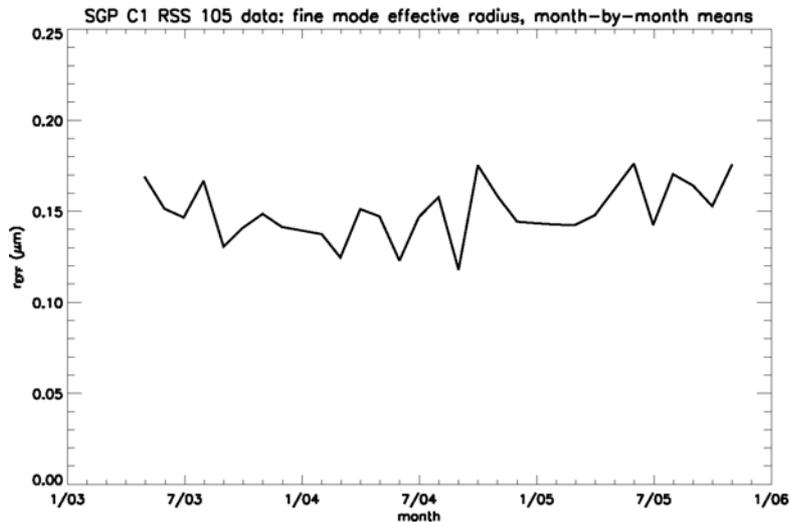
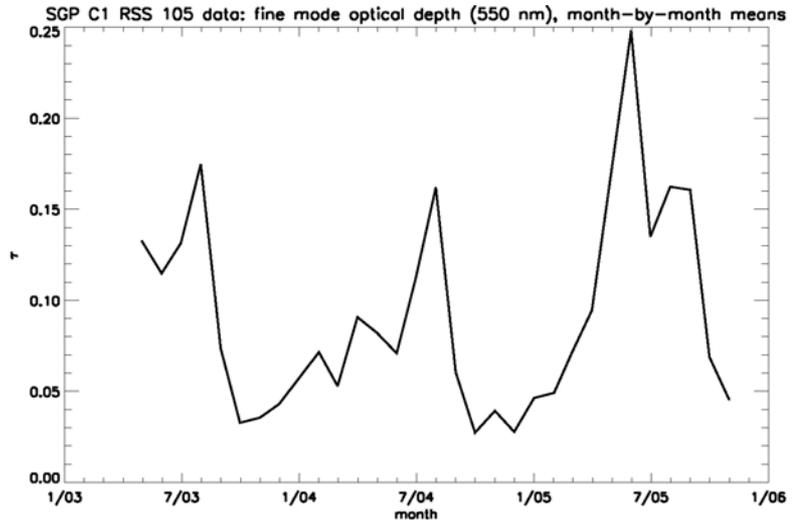
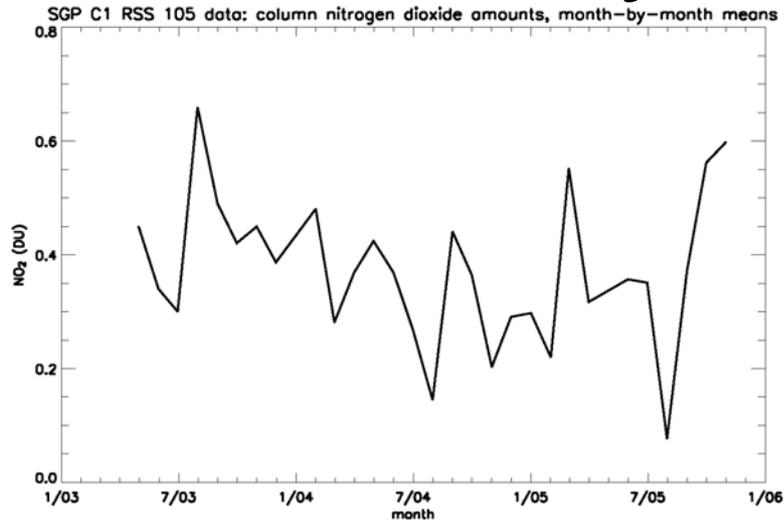
SGP C1 RSS 105 data: fine mode optical depth (550 nm)



SGP C1 RSS 105 data: coarse mode optical depth (550 nm)



Month-by-month means



Monthly means over full set

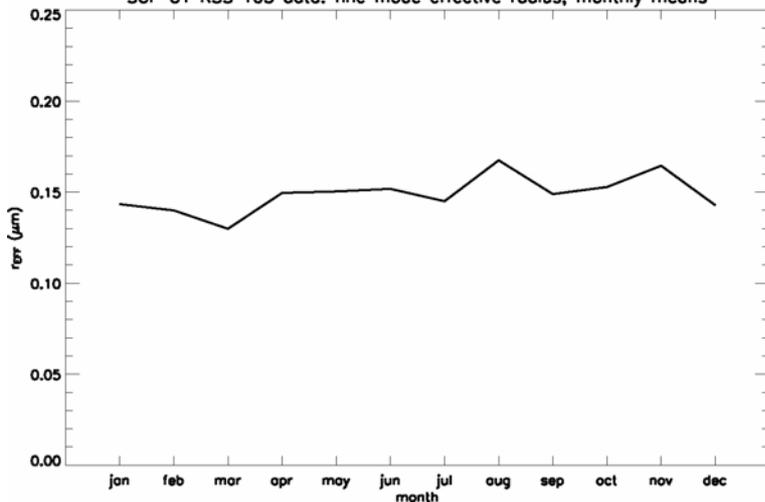
SGP C1 RSS 105 data: column nitrogen dioxide amounts, monthly means



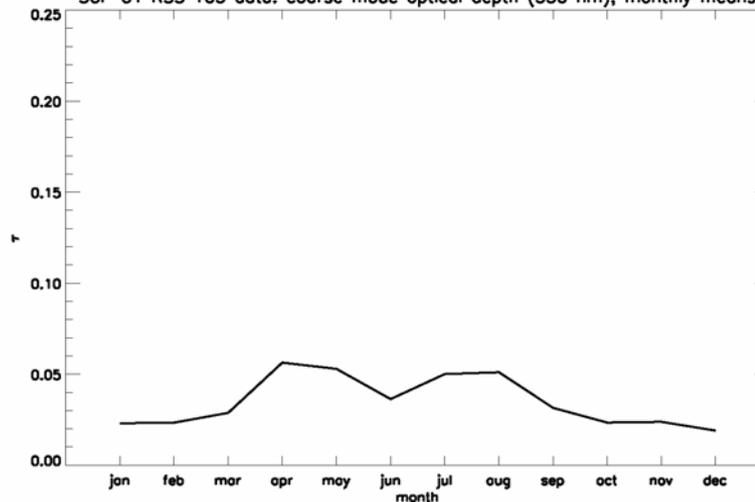
SGP C1 RSS 105 data: fine mode optical depth (550 nm), monthly means



SGP C1 RSS 105 data: fine mode effective radius, monthly means



SGP C1 RSS 105 data: coarse mode optical depth (550 nm), monthly means



For future:

- Can NO₂ algorithm be improved?
- In particular, can wavelength shifts be better accounted for?
- Look over full day, not just Langley values
- Will using airmass values for individual gases improve retrievals?
- Start using diffuse
- Add 2006 data