

**IRF WG, Washington, DC, 2006**

Ozone daily variation at Table Mt., Boulder, CO and at SGP, OK  
June 2003-July 2006

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## UV-RSS104: Shadowbanding



**RSS104 at Table Mountain, Colorado since June 2003**

**Nominal range: 297nm-385nm =734 pixels      At 300nm fwhm=0.311nm=3.69pix      Stray light = $0.5 * 10^{-5}$  from 325nm HeCd laser**  
**Noise limited at 297 and filter limited at 385nm      At 380nm fwhm=0.613nm=3.57pix      Slit function is approximately Gaussian**

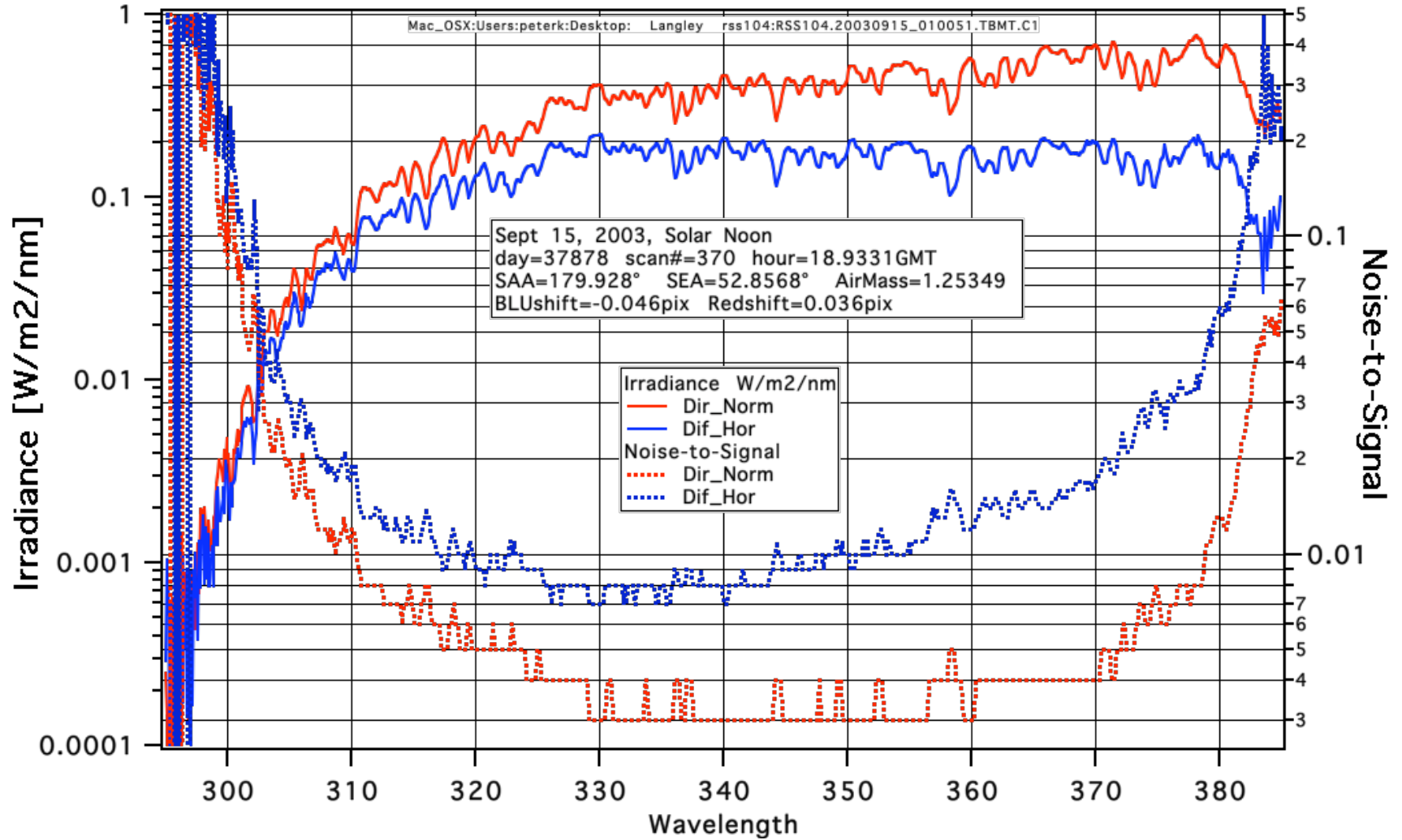
### Deployments

**10/97 Intercomparison, Table Mt., CO**  
**Prototype NMOS: 512 pixels**

**09/01 Diffuse IOP, SPG, OK**  
**05/03 Aerosols IOP, SPG, OK**  
**06/03 Intercomparison, Table Mt., CO**

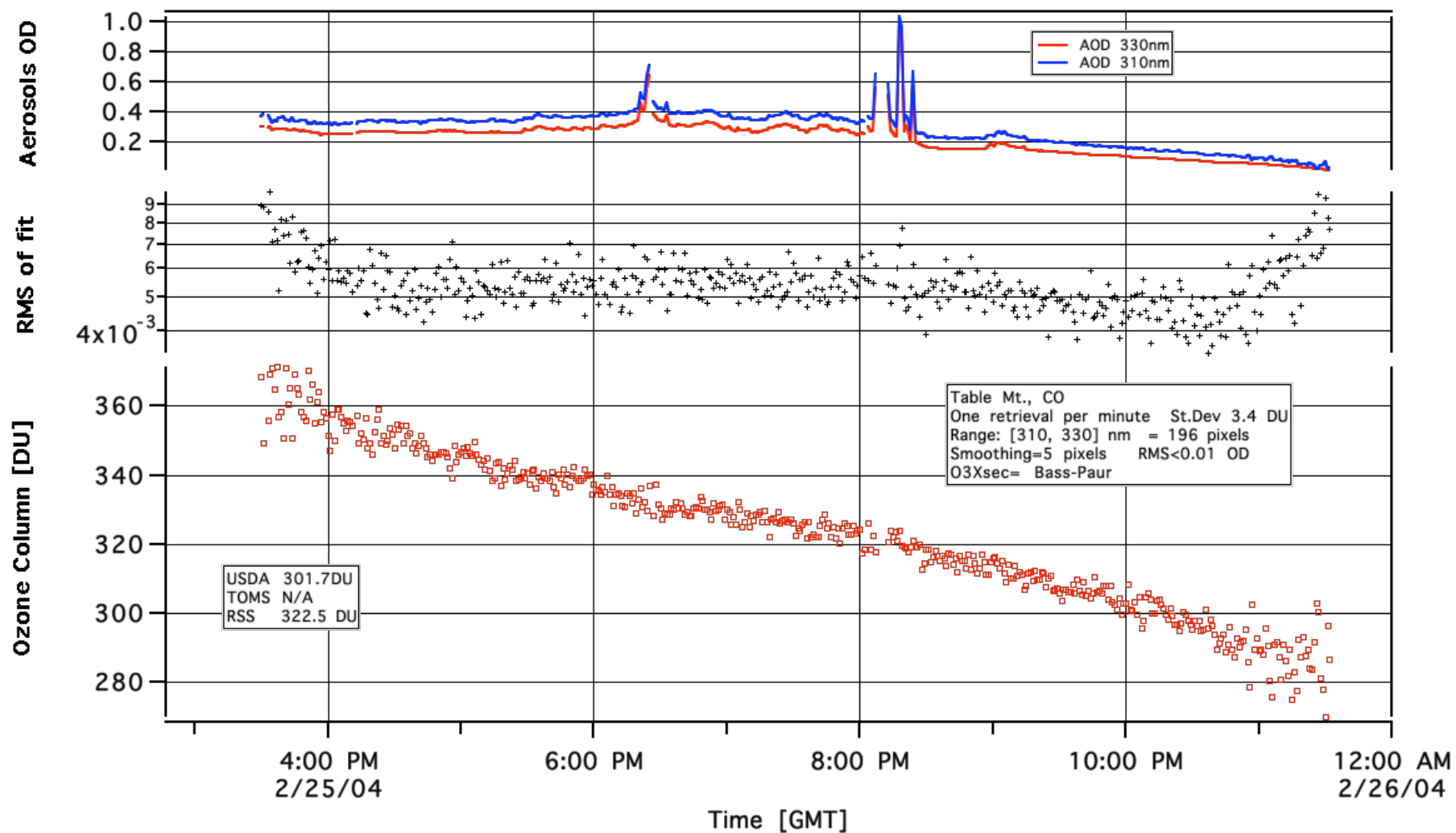
# Examples of irradiance and noise-to-signal from RSS

## Log Scale



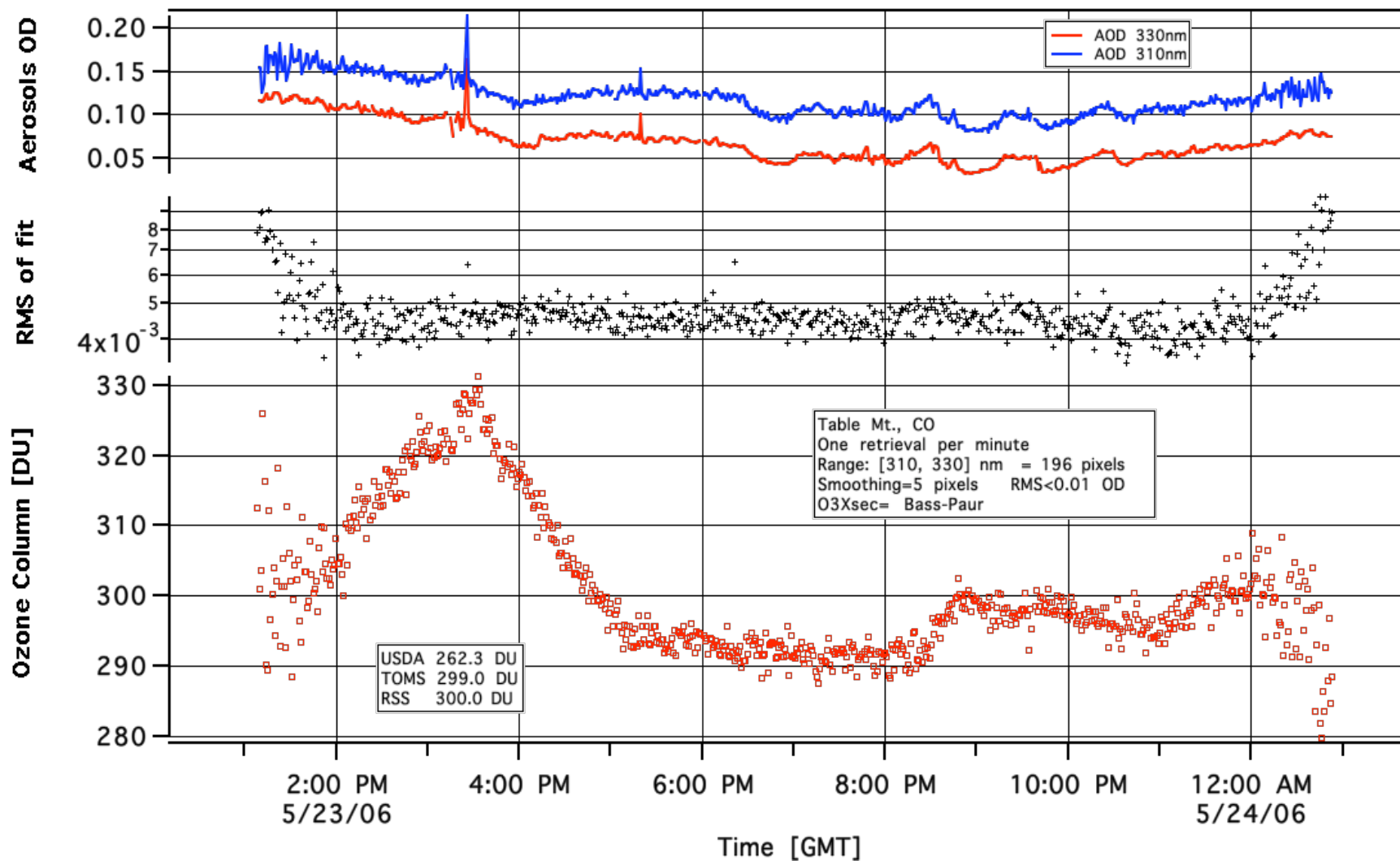
# Examples of scan by scan daily ozone and AOD retrievals

Extremely rapid ozone trend case

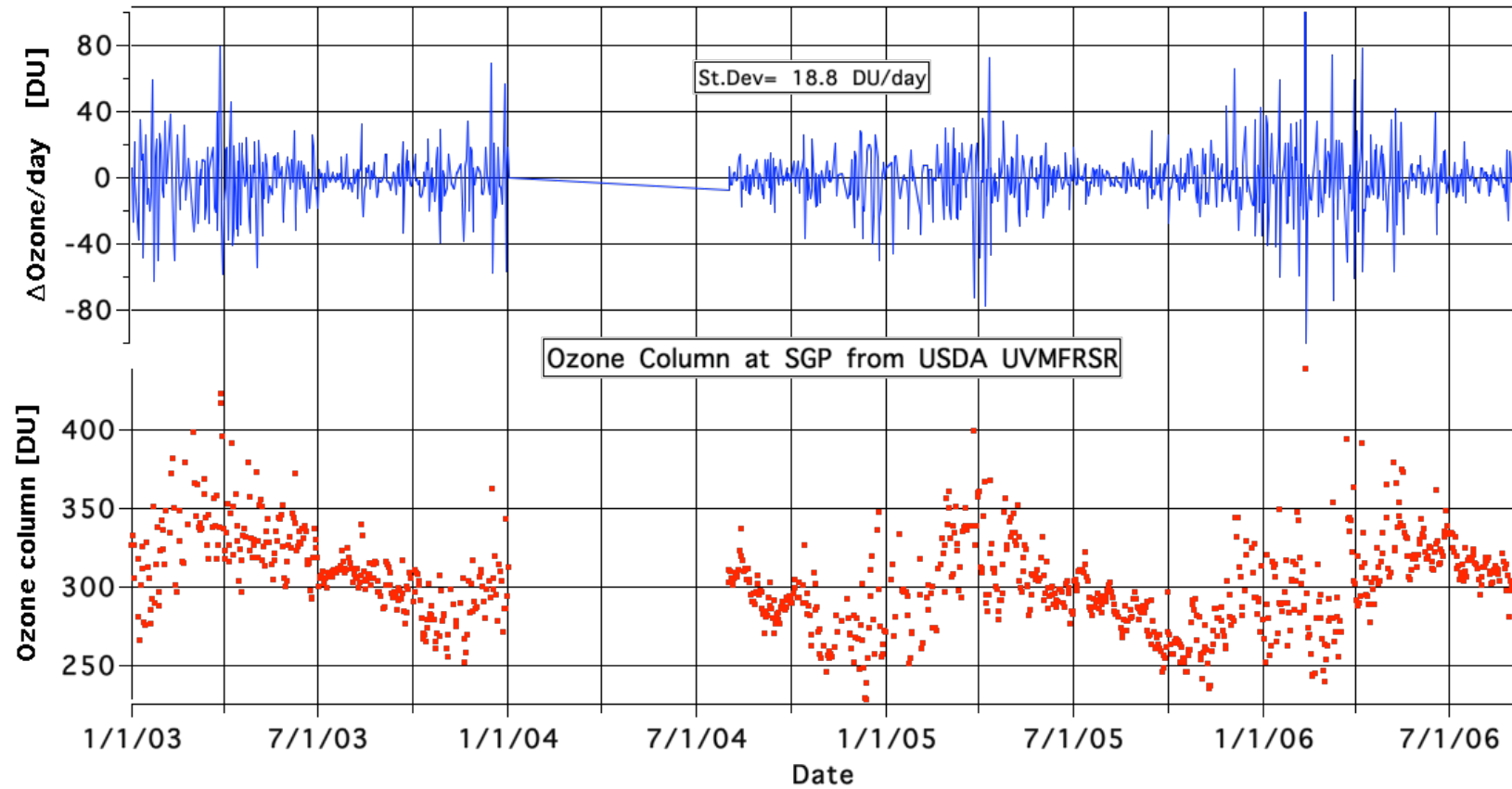


# Examples of scan by scan daily ozone and AOD retrievals

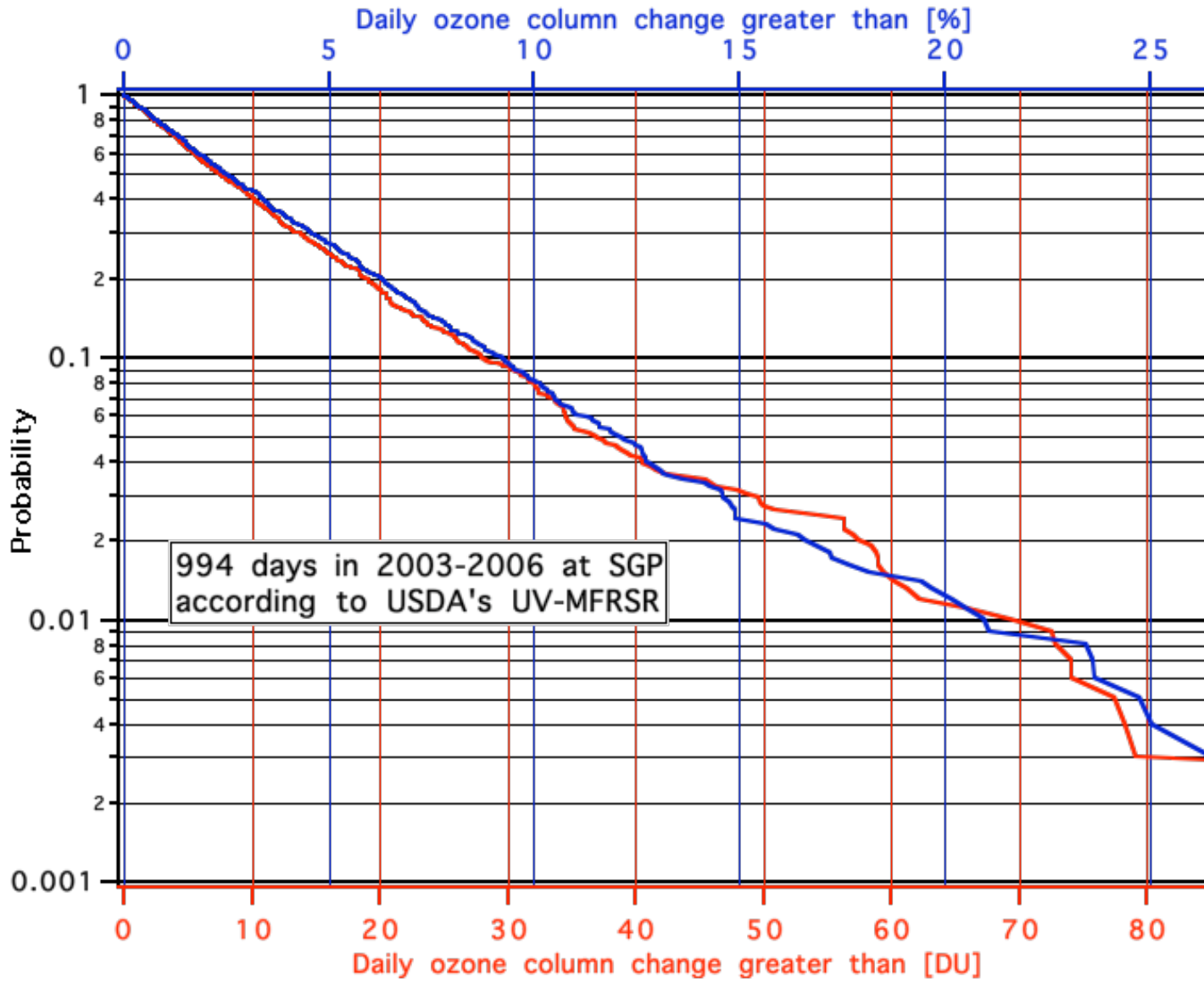
Unusual ozone short term fluctuation case



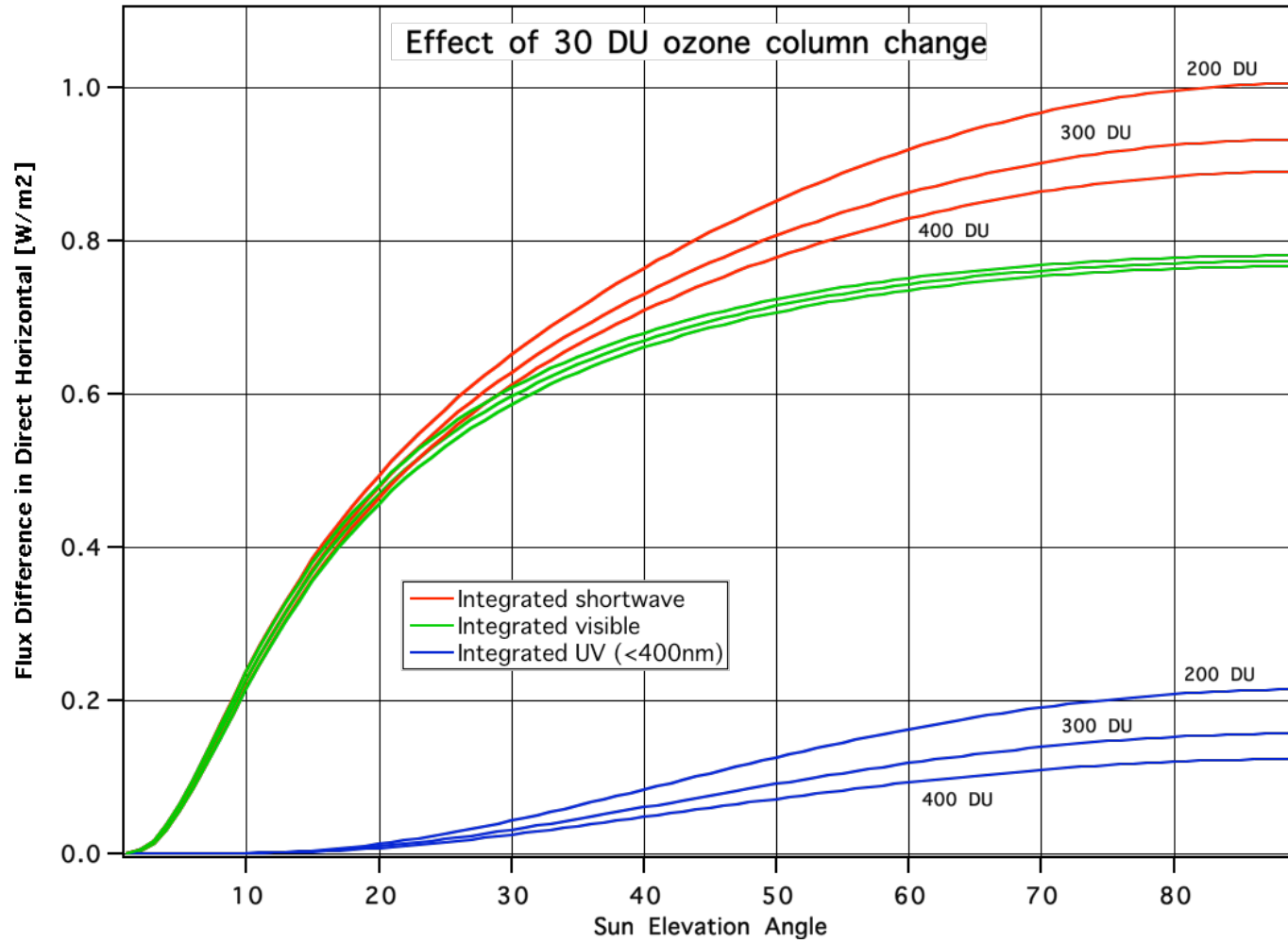
## Ozone column variation at SGP, 2003-2006



# Ozone column variation statistic

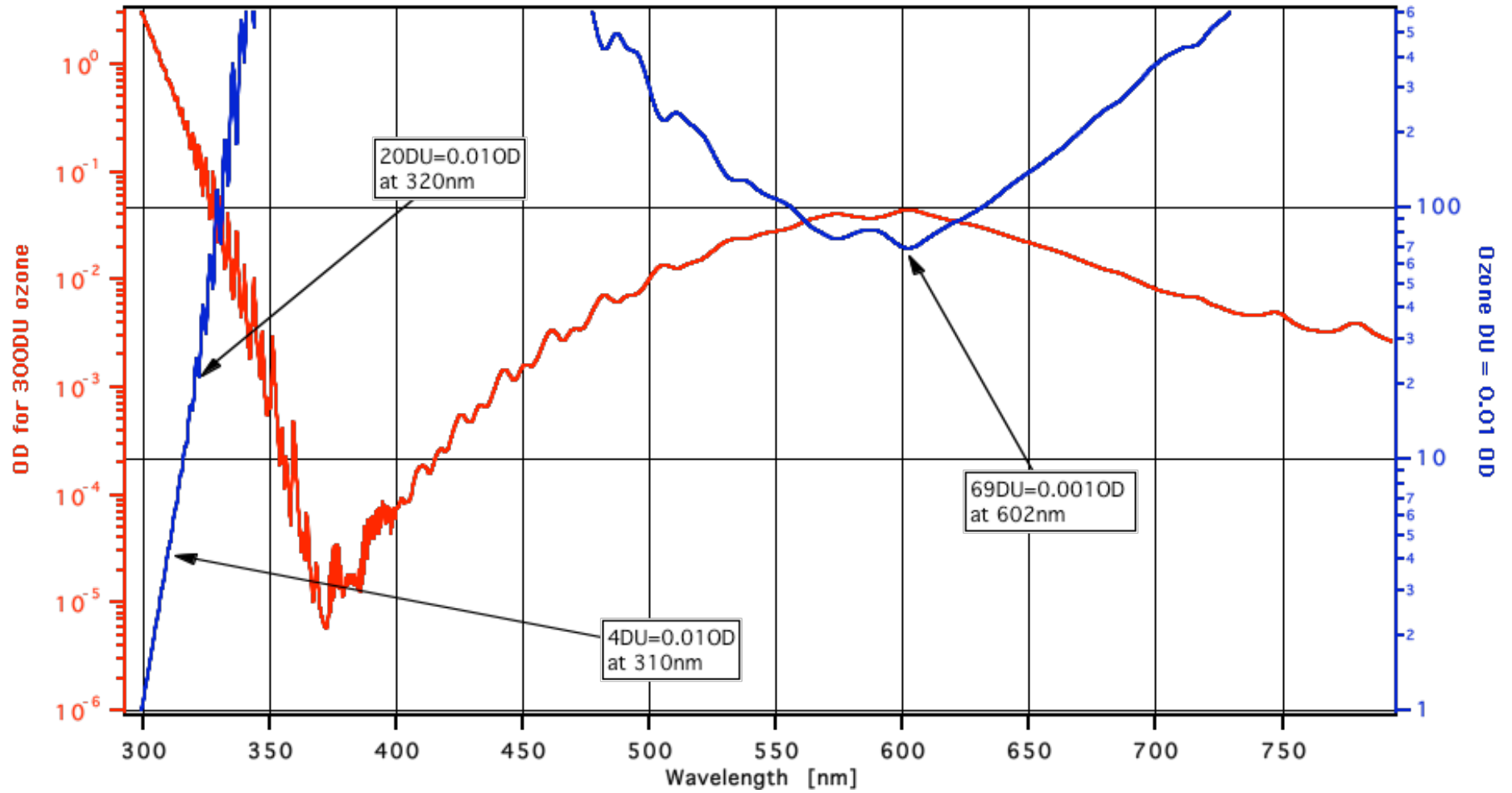


# Flux sensitivity to ozone variation

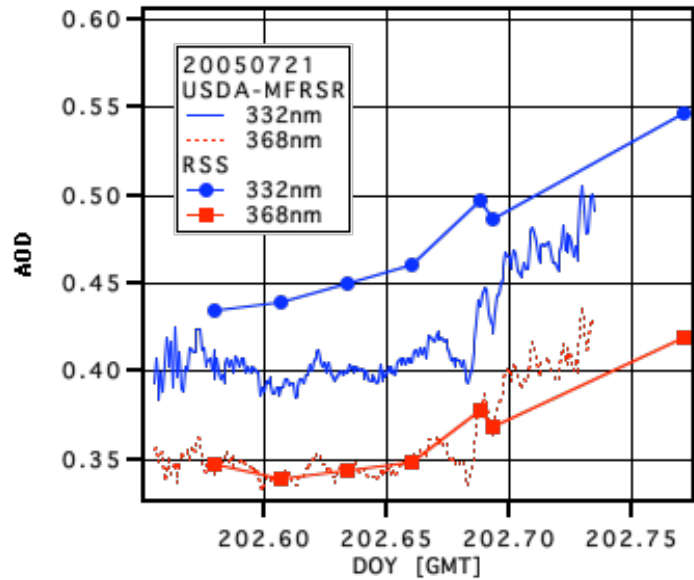
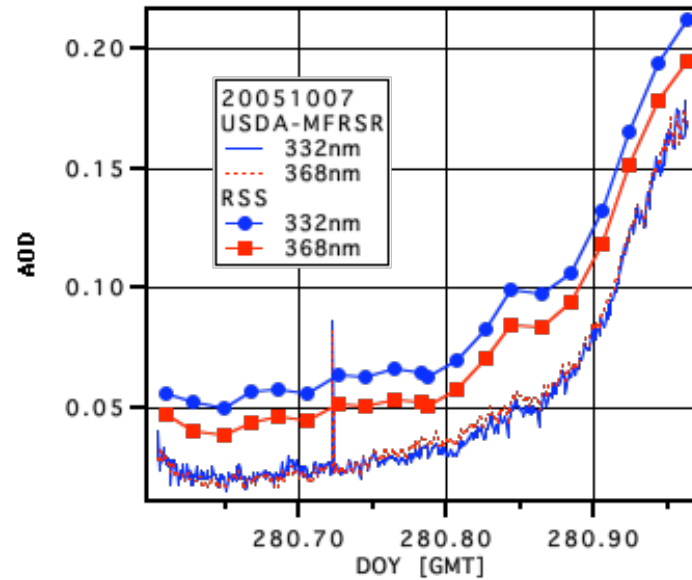
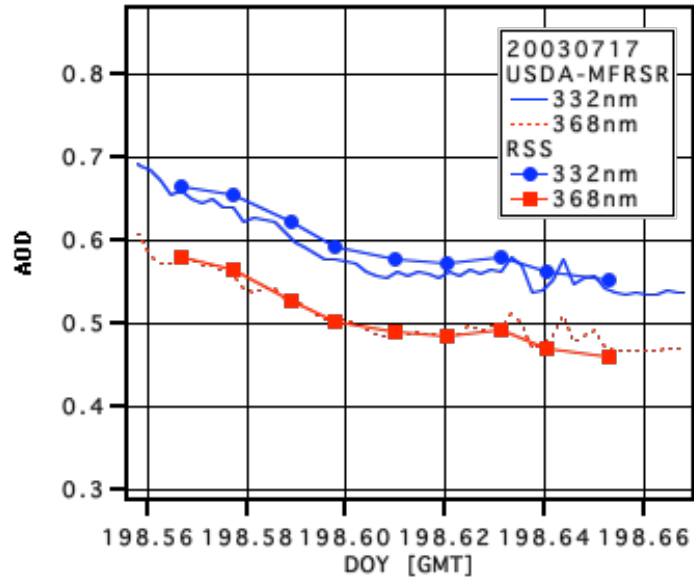
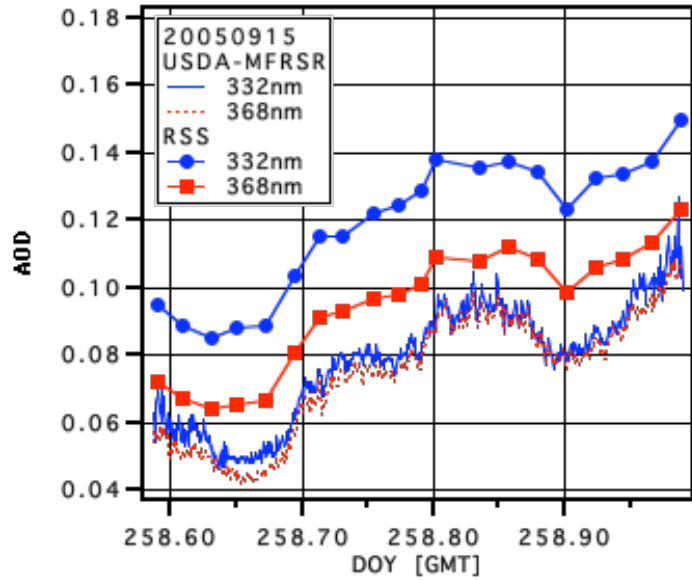




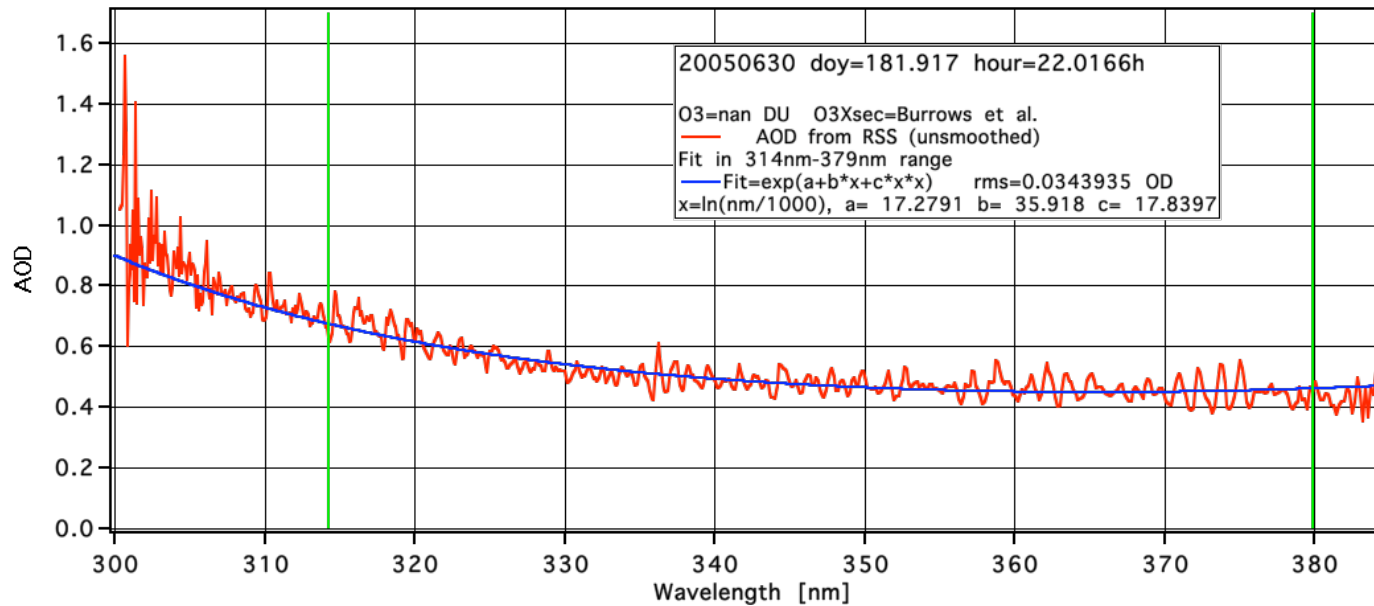
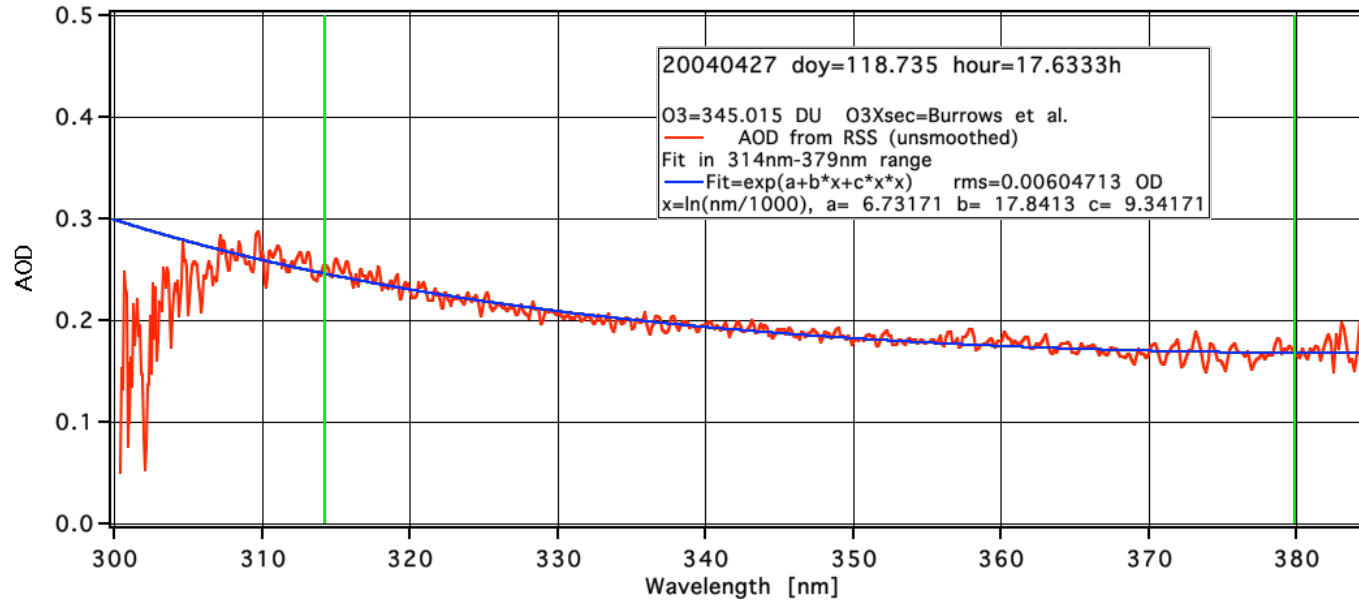
## Ozone absorption and DU equivalent to OD=0.01



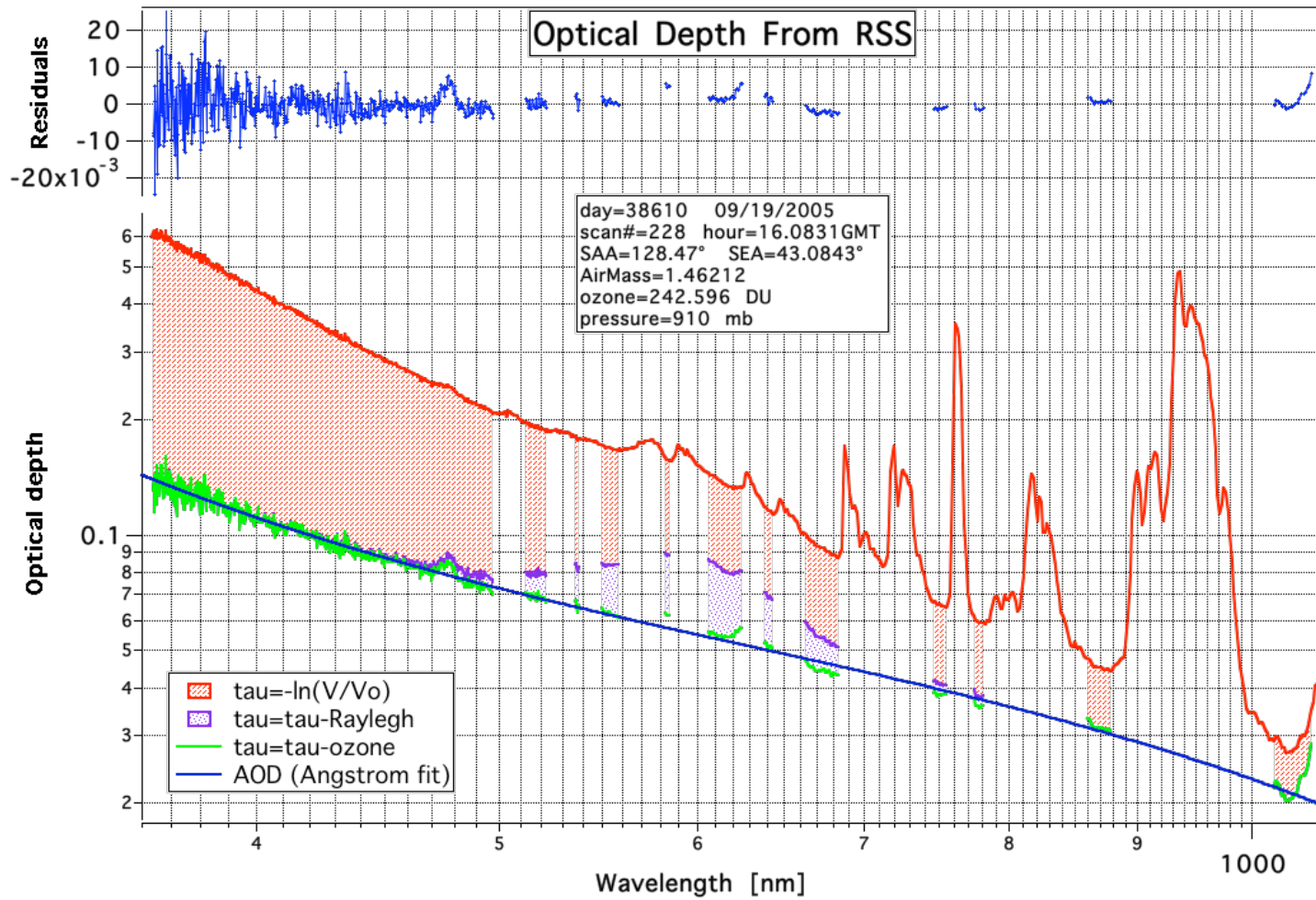
# AOD at 332nm and 368nm from UV-MFRSR compared with RSS



# AOD retrieval by fitting trinomial Angstrom formula in 314nm-379nm range



# AOD retrieval from RSS105 360nm-1050nm



Ozone can be retrieved from Chappuis band but it may interfere with nonlinearity AOD function.

## Conclusions

- Daily ozone variation larger than  $\pm 30$ DU in 10% cases.
- Approximately only  $\pm 1$  W/m<sup>2</sup> (80% in Chappuis band) impact on integrated flux.
- $\pm 30$ DU change causes only  $\pm 0.005$  OD uncertainty around 600nm. Exact ozone knowledge not necessary for most applications.
- At 310nm  $\pm 4$ DU change results in  $\pm 0.01$  OD uncertainty. Accurate ozone retrieval is necessary for retrieval of aerosol optical depth in UV.
- RSS105 permits to remove ozone uncertainty from OD but there is a danger of overcorrection.
- What is impact on aerosol particle size distribution algorithms?