

The Case for Adding 1600-nm Channel to MFRXX

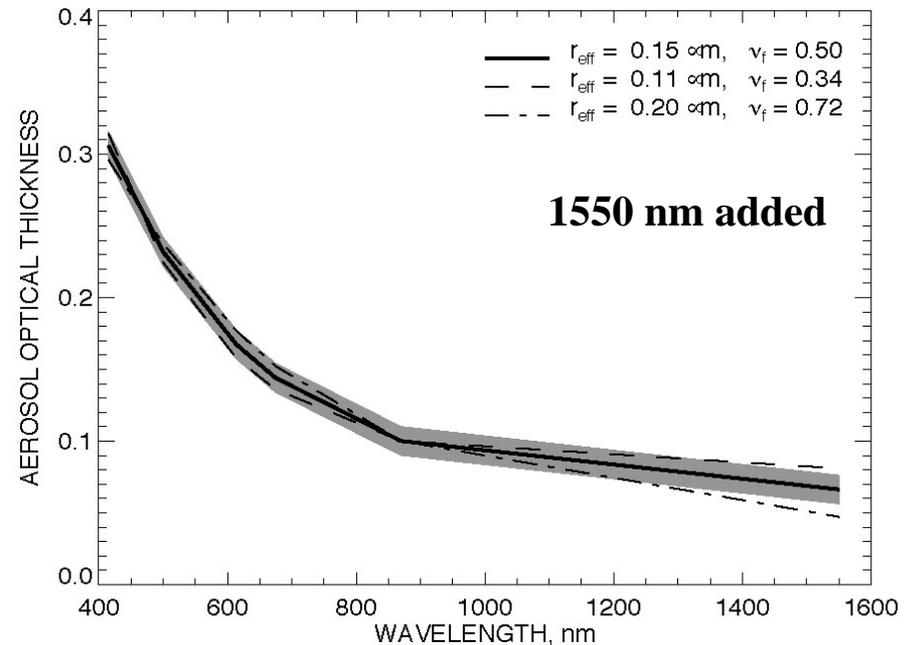
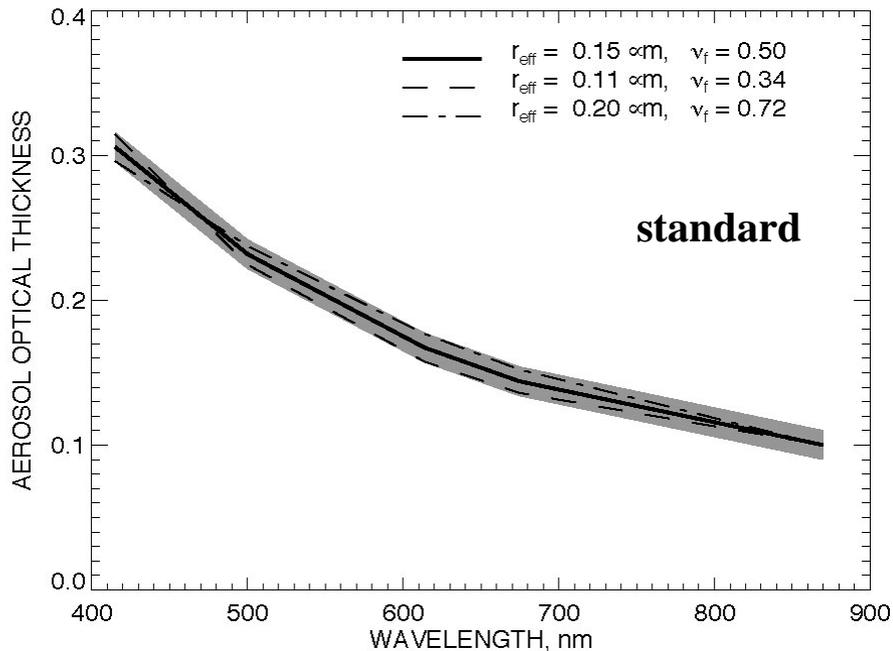
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- Improve aerosol $\langle r_e \rangle$ retrievals
- Improve spectral surface albedo estimates
- Retrieve cloud OD and $\langle r_e \rangle$
- Wavelength selection
- What channel can we give up
- Cost
- Another filter substitution?

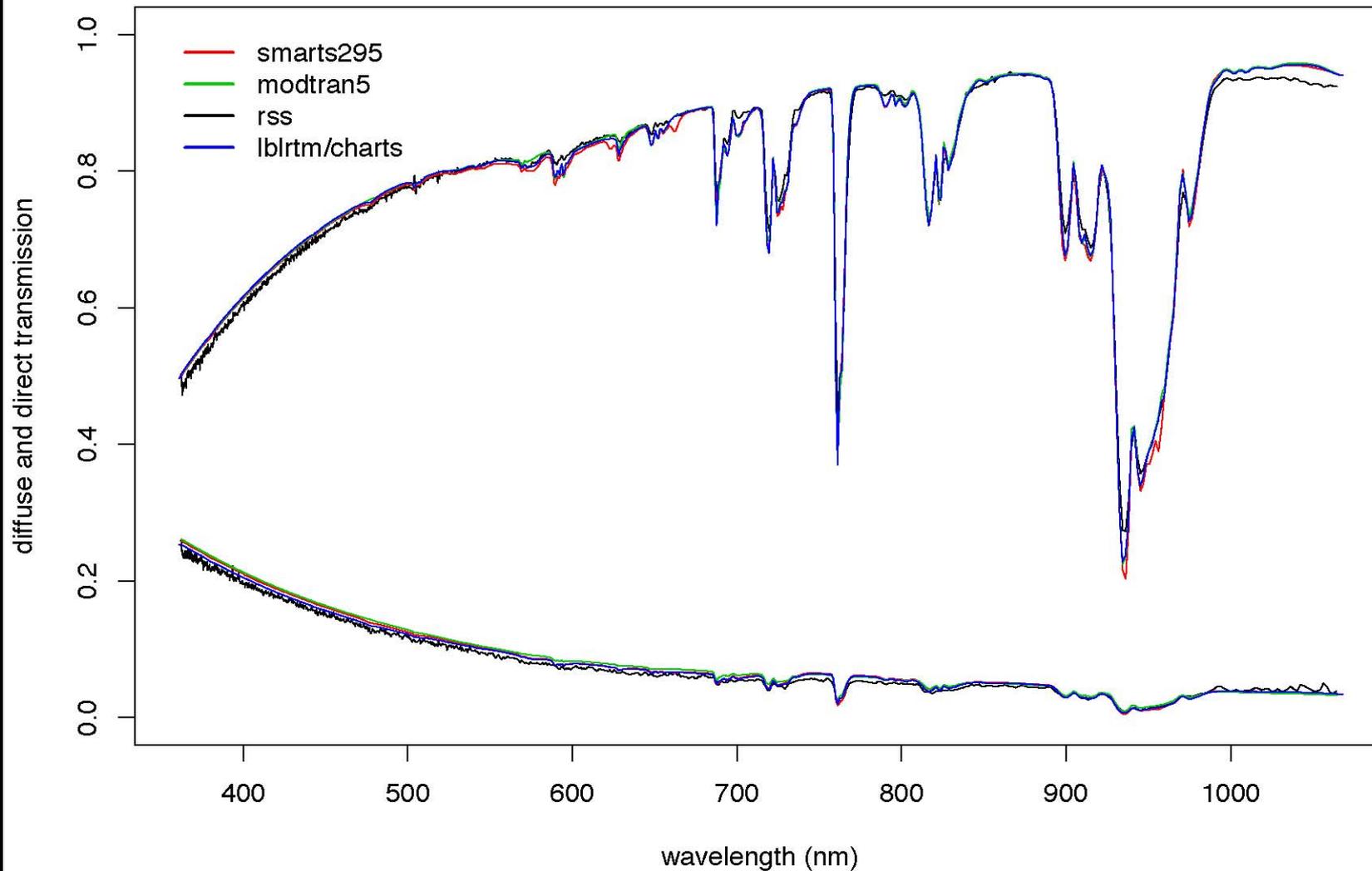
Improving aerosol retrievals

1550 nm channel allows to **separate between aerosol models** that are indistinguishable within the standard MFRSR range and accuracy.

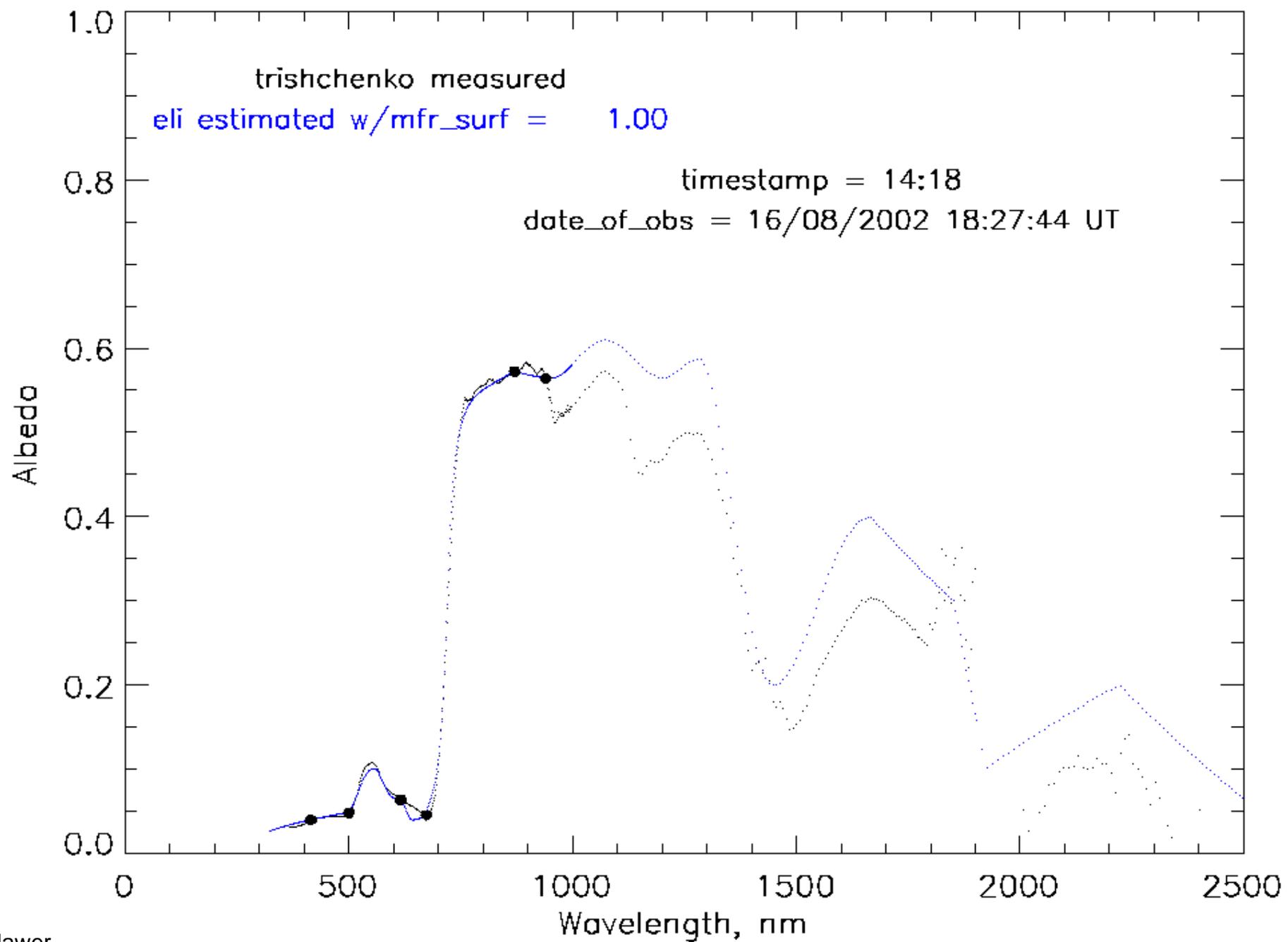


The model spectral AOT curve (solid) derived using Mie theory for bimodal gamma size distribution with fine $r_{\text{eff}} = 0.15 \mu\text{m}$, coarse $r_{\text{eff}} = 1.5 \mu\text{m}$, and 50% fine mode fraction in 870 nm AOT (set to 0.1). AOTs from two competitive aerosol models fitting within 0.01 error margin (grey area) in 415 - 870 nm spectral range are shown by dashed and dash-dotted lines.

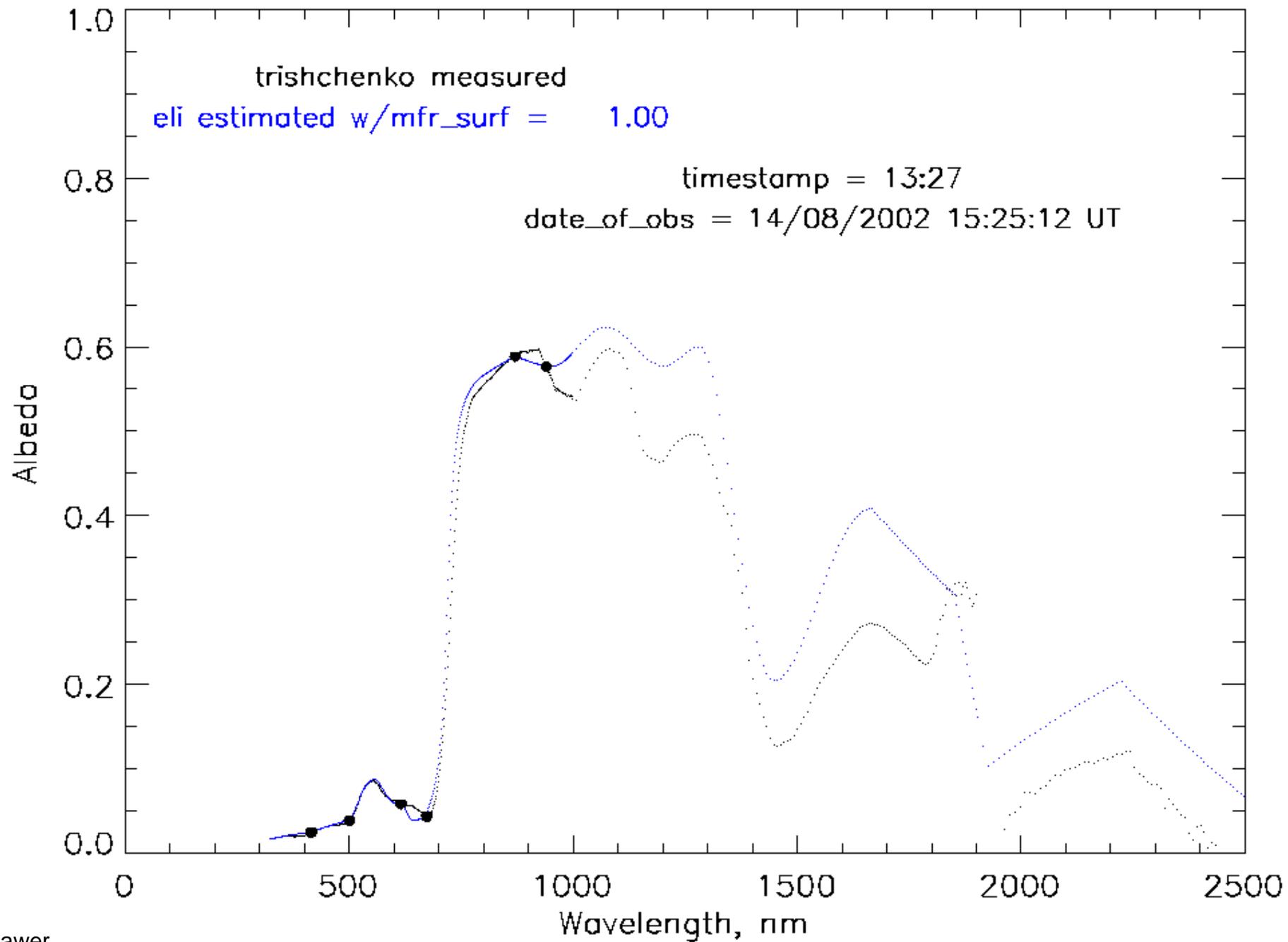
SGP20060608.1730, SZA = 18.88; H2O = 2.26 cm; TAU (500 NM) = 0.083



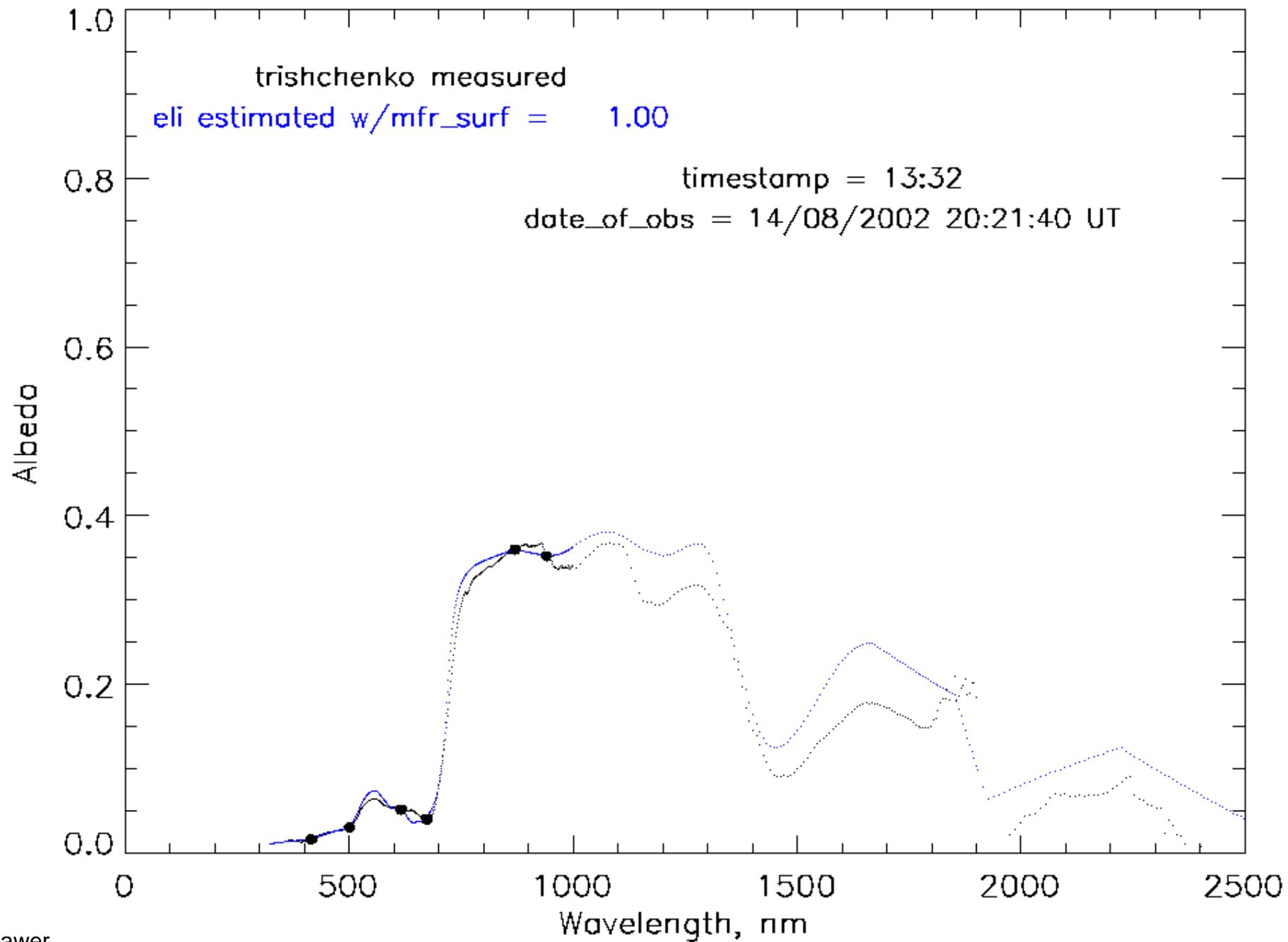
ALFALFA01, FOV03, 18 Jul 1970



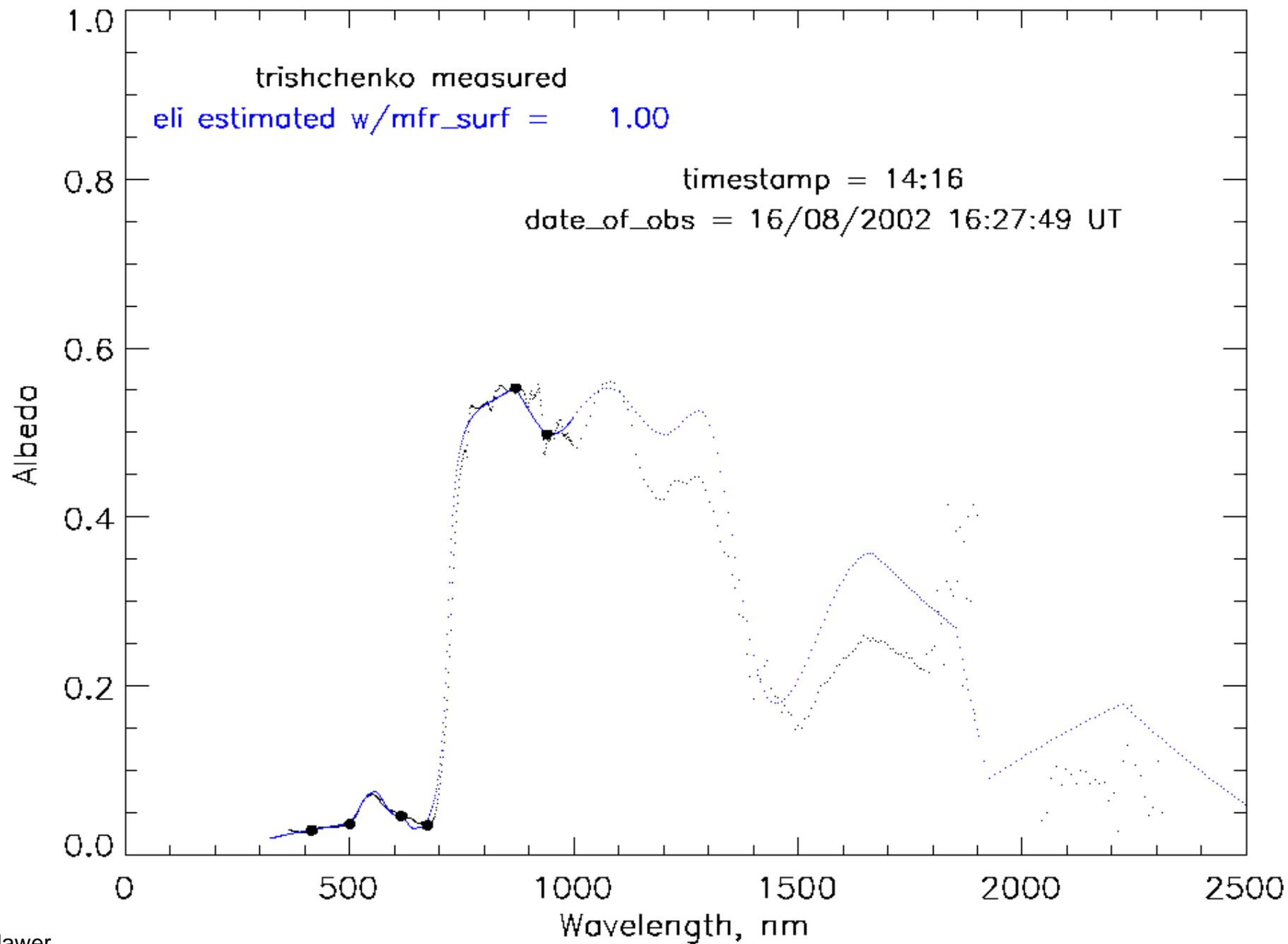
GRASS01, FOV03, 18 Jul 1970



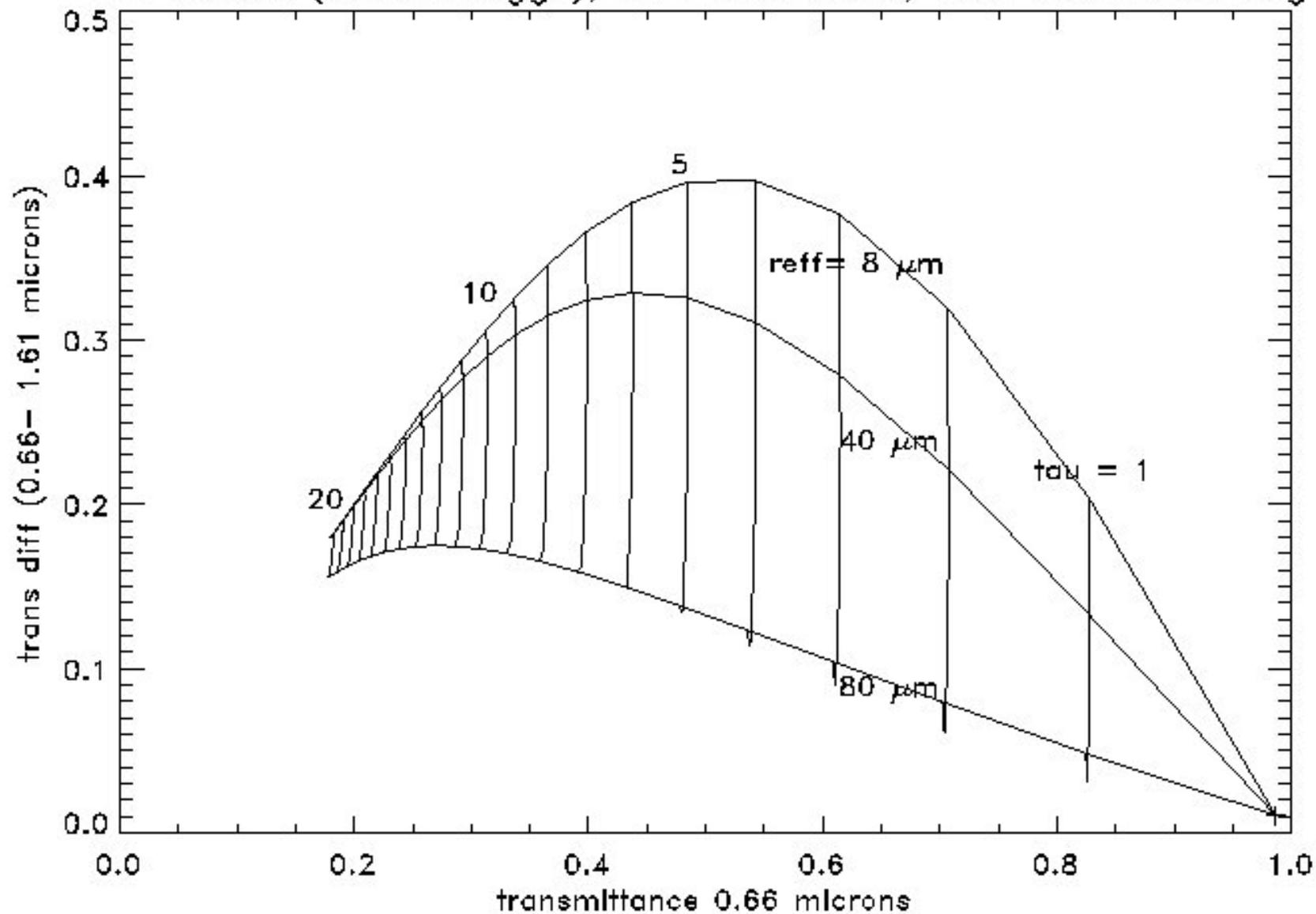
GRASS04, FOV03, 18 Jul 1970



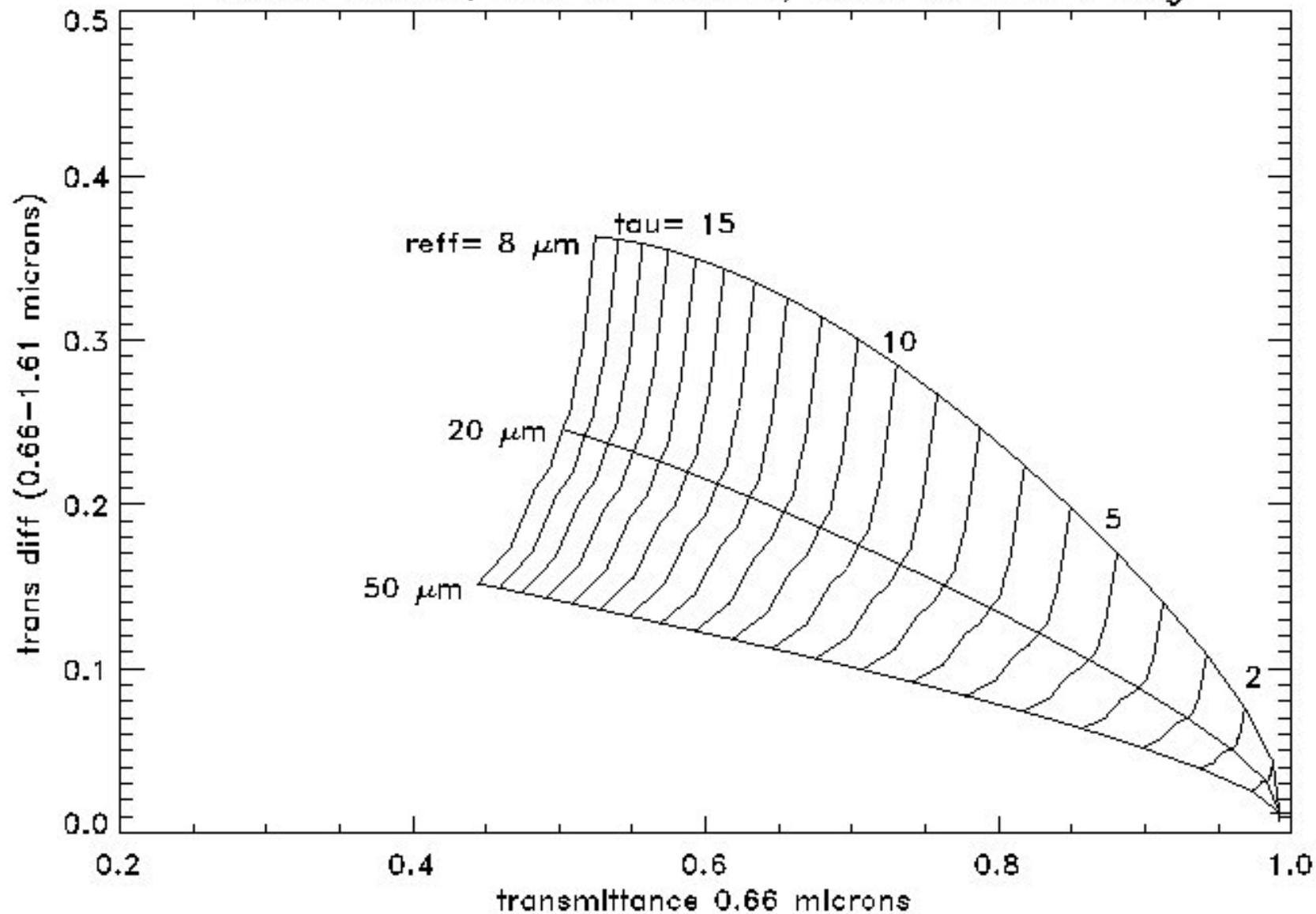
SOYABEAN01, FOV03, 18 Jul 1970



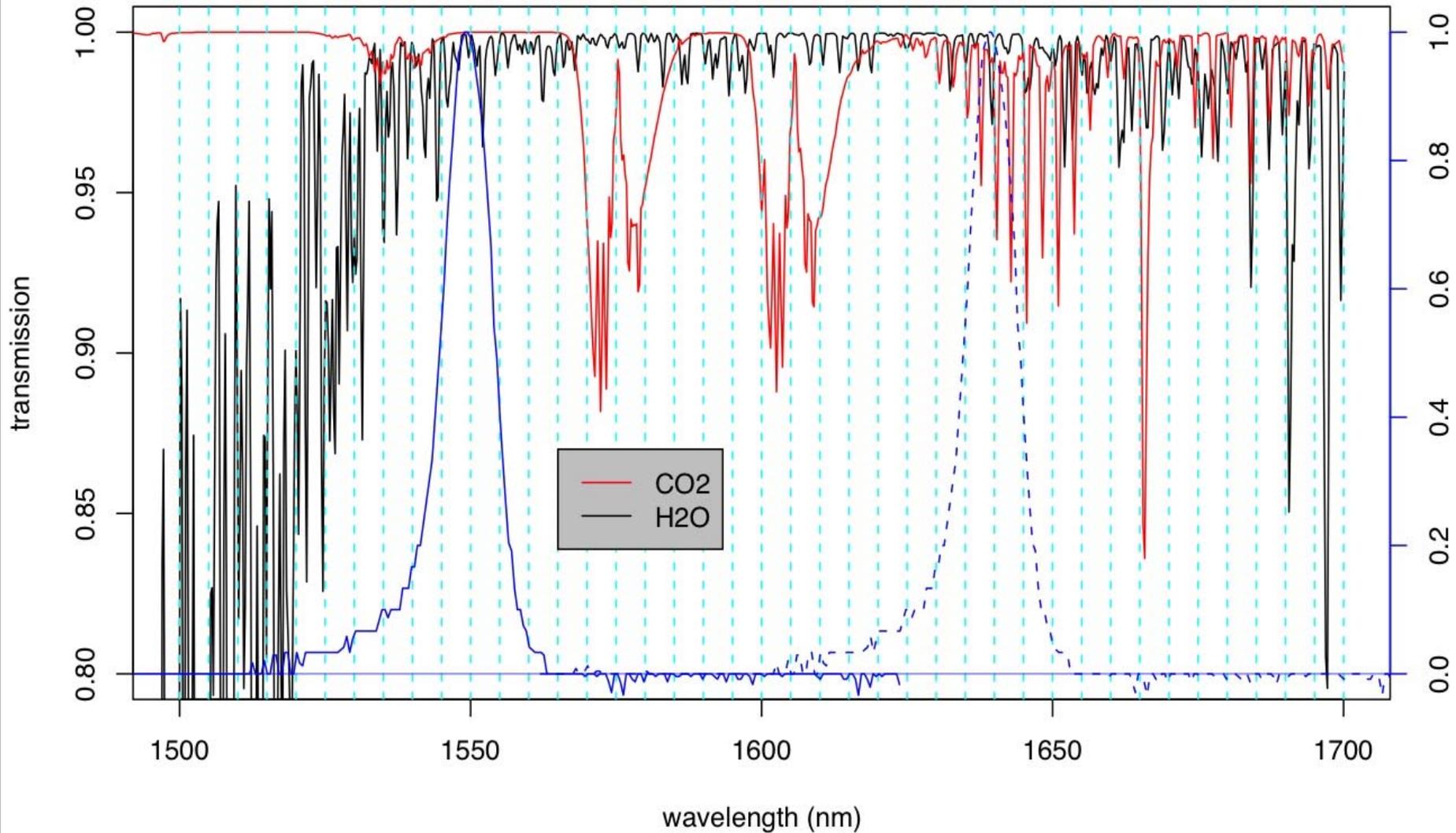
Ice Clouds (Smooth Aggs), NK Plot Ground, solar zenith= 0 deg



Water Clouds, NK Plot Ground, solar zenith= 0 deg

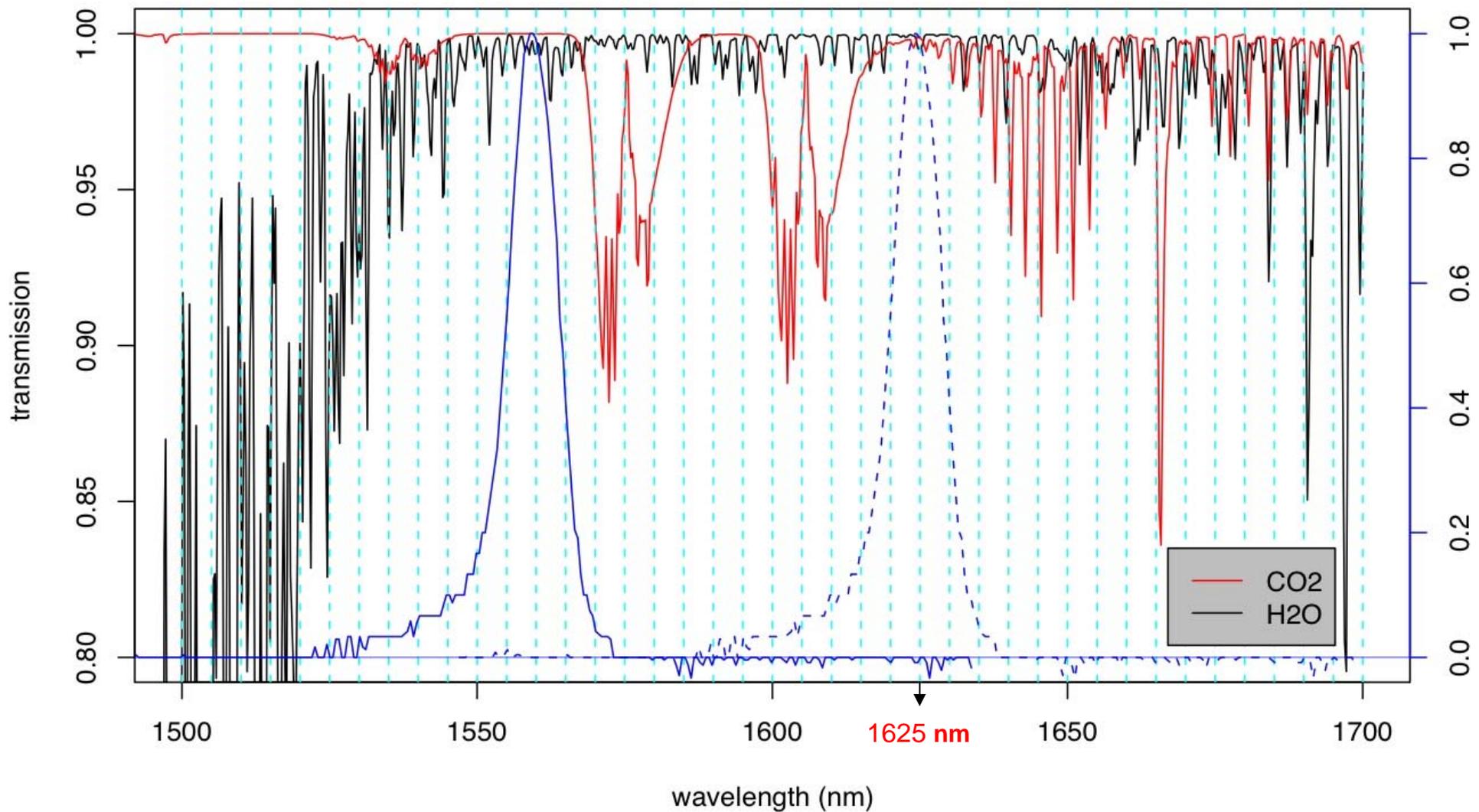


Mid-latitude Summer 30 deg SZA

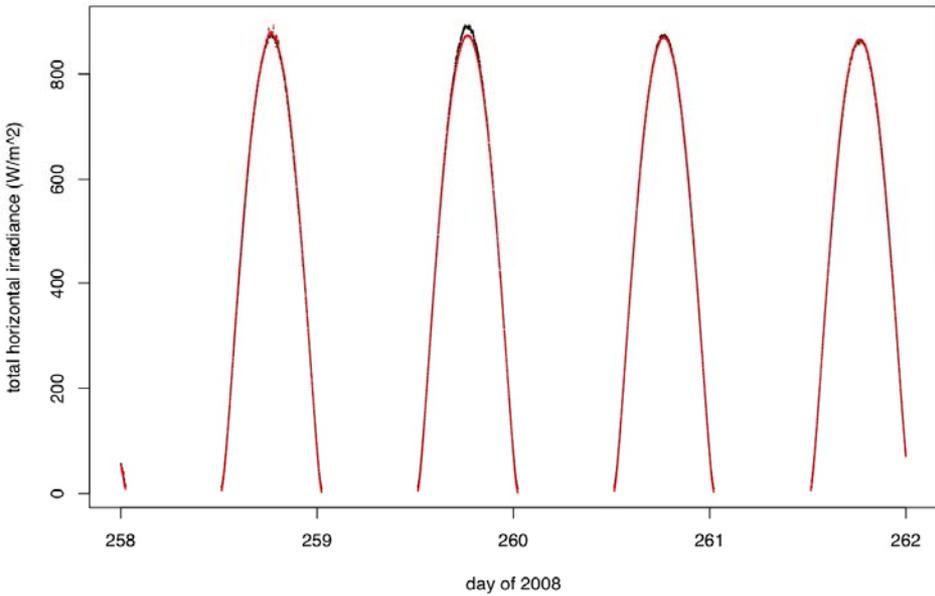


This plot shows the CO₂ and H₂O transmission (for summer conditions) and the filter profile (solid blue) for the tested instrument. The dashed filter profile is plotted for AERONET's stated wavelength center.

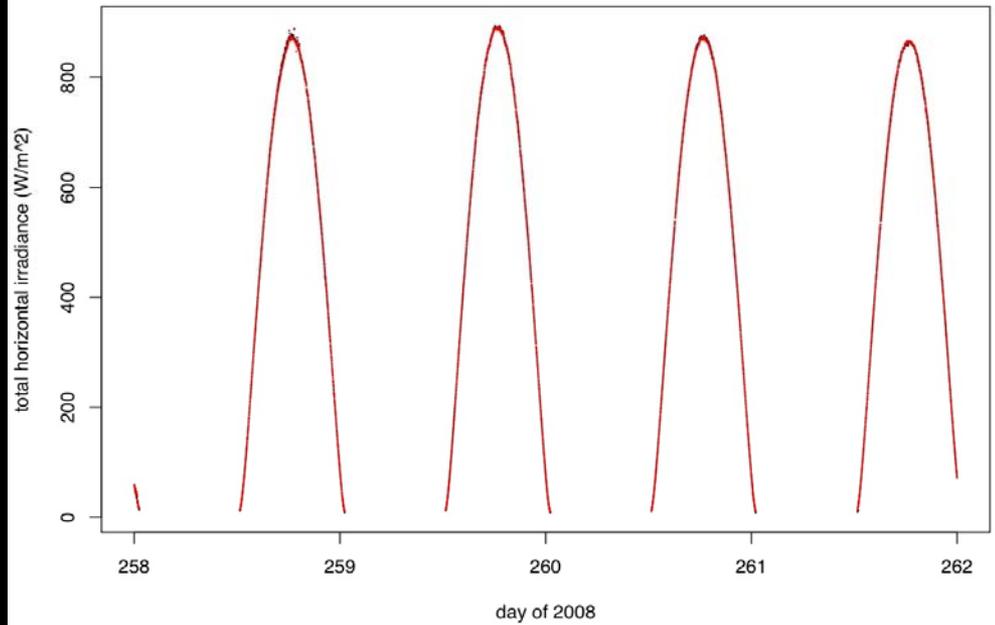
Mid-latitude Summer 30 deg SZA

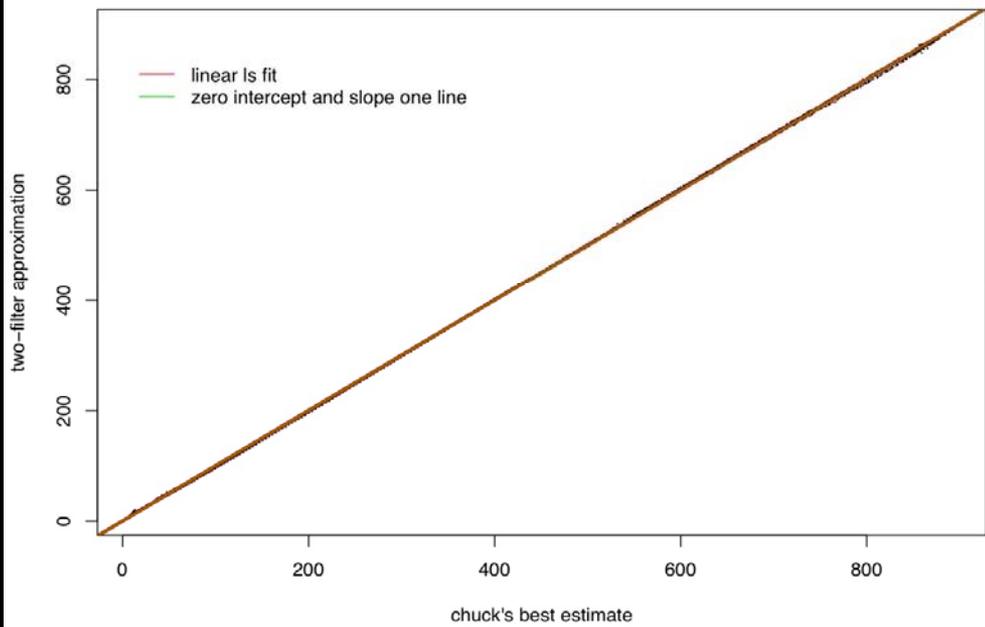
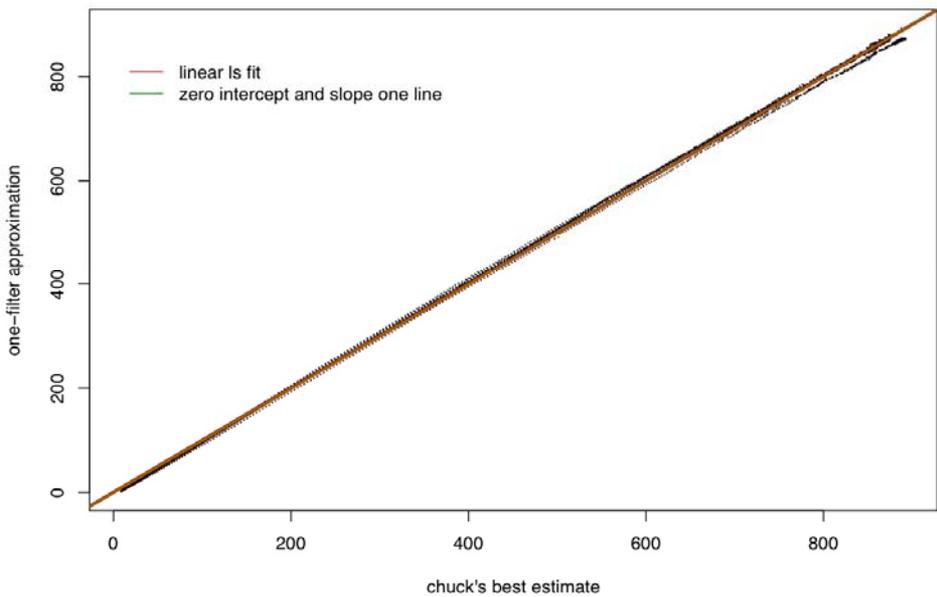


Chuck's Best Estimate (Blk) and 673-calibrated Proxy (Red)



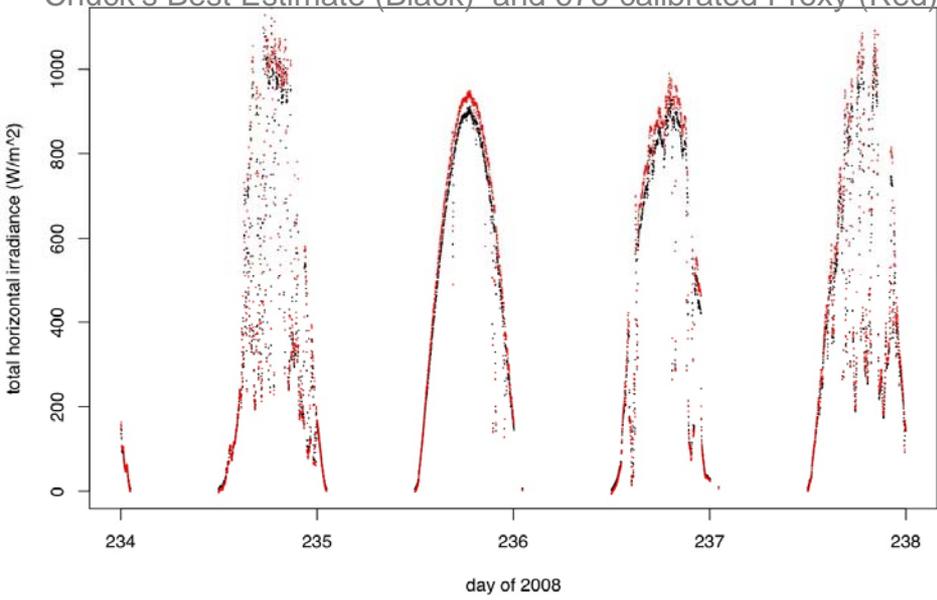
Chuck's Best Estimate (Blk) and 673+940-calibrated Proxy (Red)





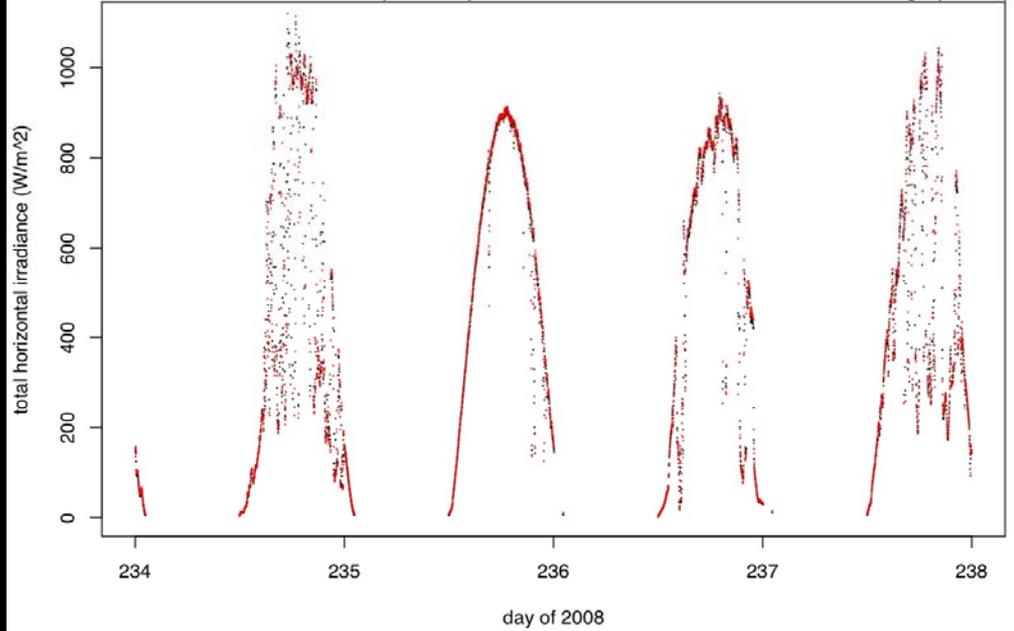
Previous Cal Applied; 3-pt Avg Compared to 60-pt Avg

Chuck's Best Estimate (Black) and 673-calibrated Proxy (Red)

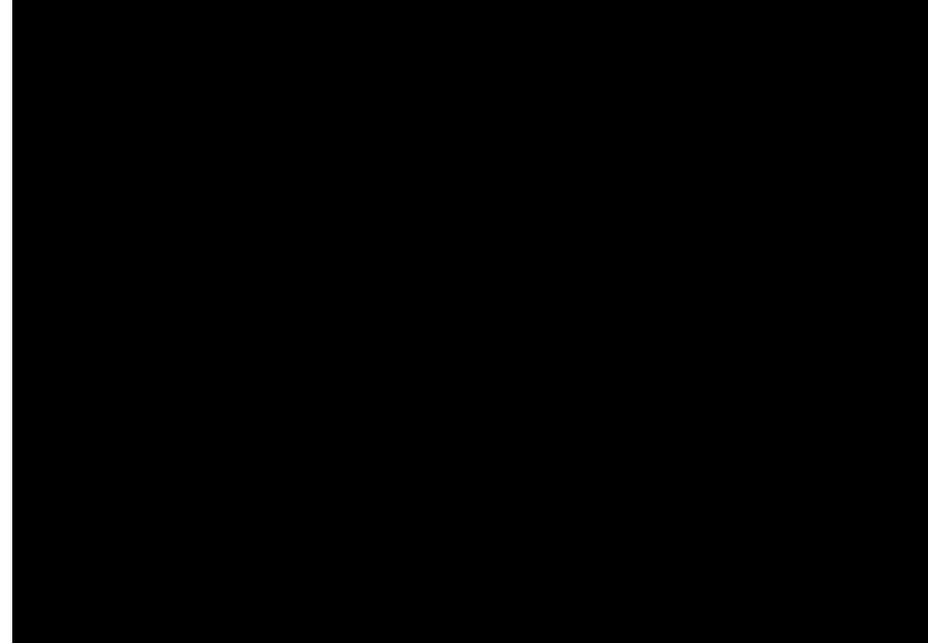
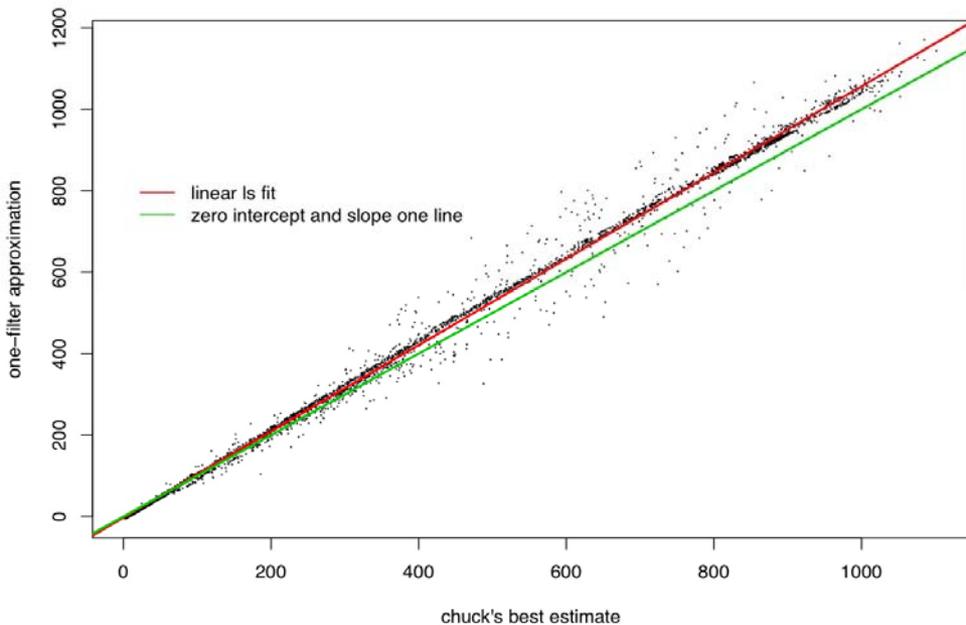


Previous Cal Applied; 3-pt Avg Compared to 60-pt Avg

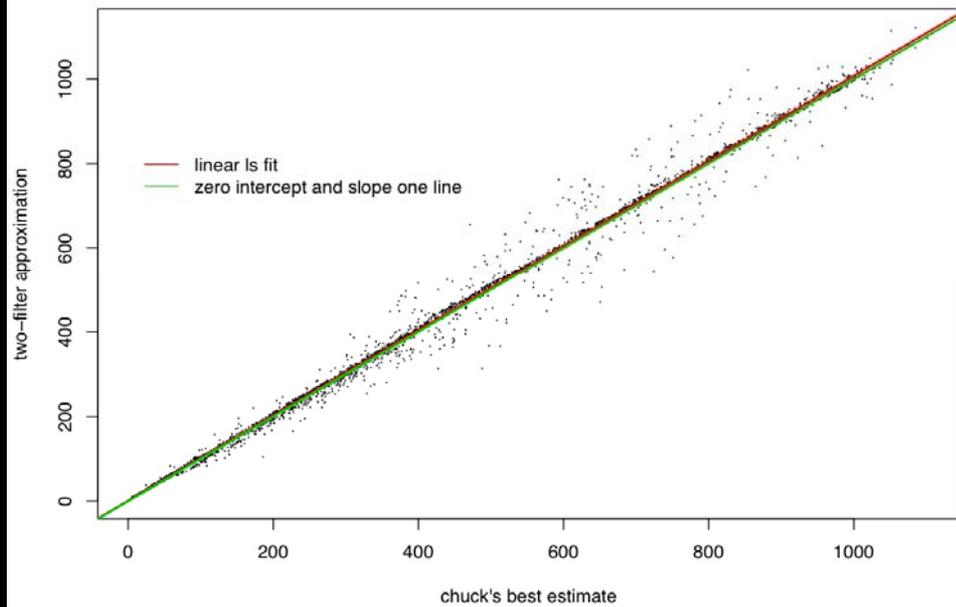
Chuck's Best Estimate (Black) and 673+940-calibrated Proxy (Red)



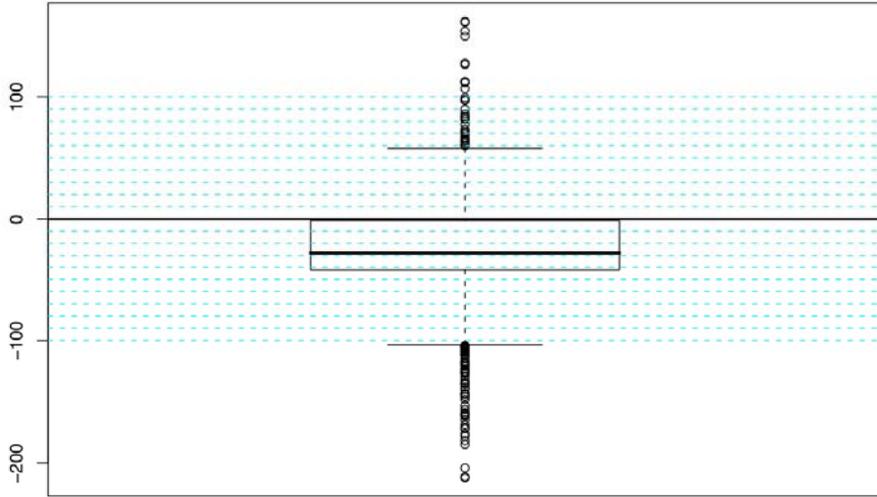
Previous Cal Applied; 3-pt Avg Compared to 60-pt Avg



Previous Cal Applied; 3-pt Avg Compared to 60-pt Avg

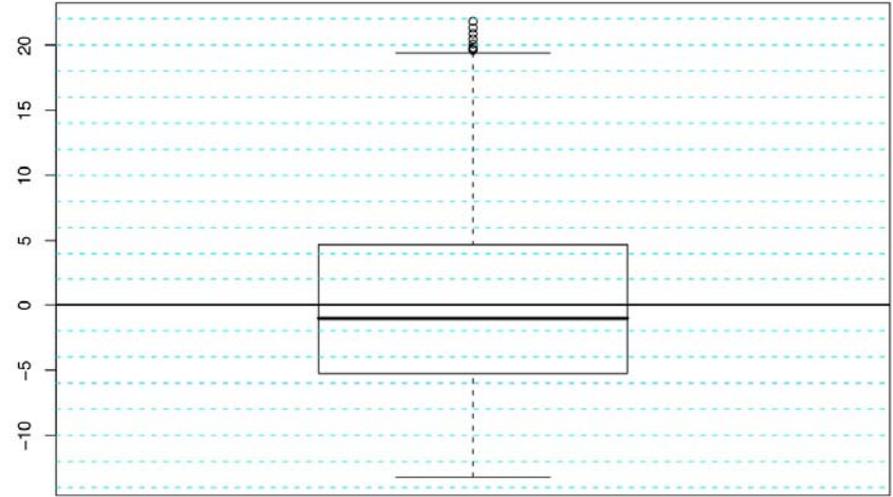


Partly Cloudy Days

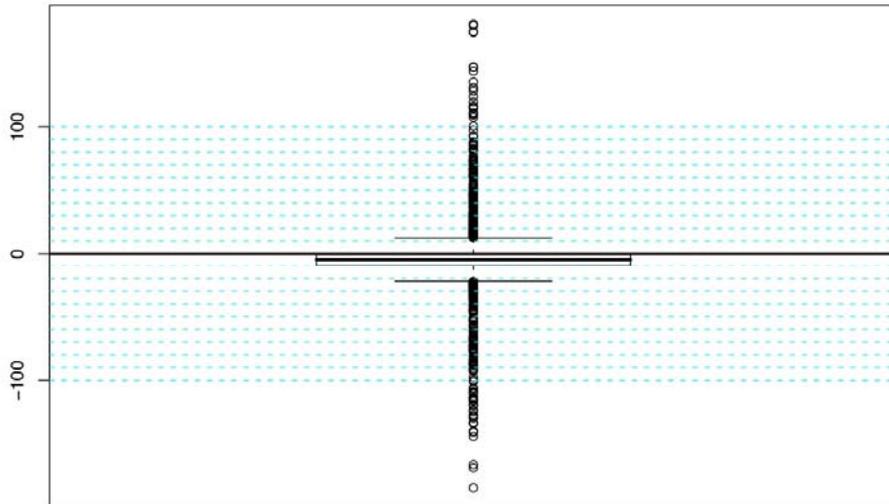


Single Variable

Clear Days

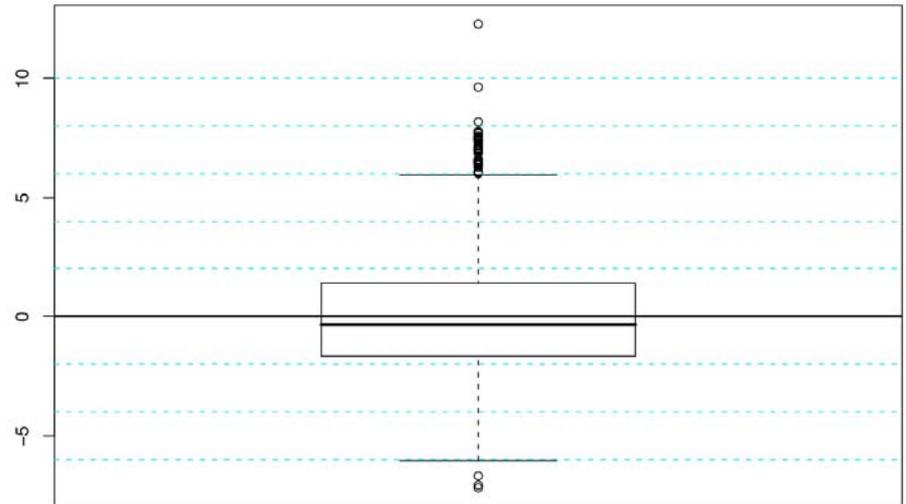


Partly Cloudy Days



Multi Variable

Clear Days



What Will It Cost?

- Intor, Inc. - \$1000 set-up charge
- \$10.50 per filtered diode for 1st 100, but we supply diodes
- GPD Optoelectronics - InGaAs diodes for fewer than 50 are \$121 each
- Labor to get it to work in MFRXX heads

1045

