Solar Spectral Flux Radiometer (SSFR)

ARC Radiation Group: P. Pilewskie, W. Gore, M. Rabbette, L. Pezzolo, J. Pommier, S. Howard, R. Bergstrom

- wavelength range
  300 nm to 1700 nm
- spectral resolution
  8-12 nm
- simultaneous zenith and nadir viewing
- hemispheric FOV
- Accuracy: 3-5%; precision: 0.5%

ER-2 heritage

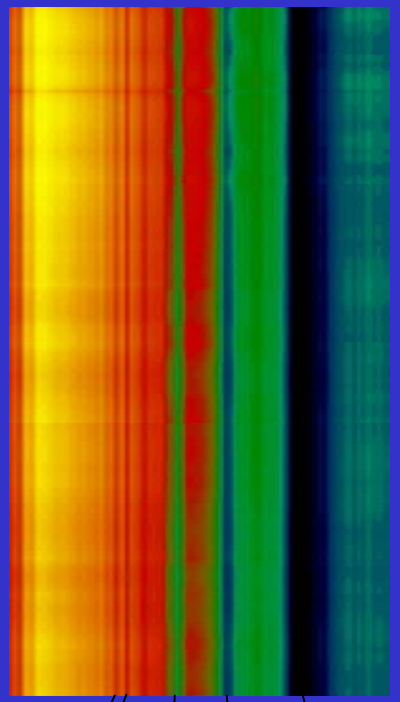
FIRE-ACE (1998)

SAFARI-2000 (2000)

Solar Spectral Flux Radiometer (SSFR)

- Measure Quantities: Upwelling ($F\uparrow$) and down-welling ($F\downarrow$) spectral Irradiance [$Wm^{-2}nm^{-1}$]
- Derived Quantities
  - Spectral Albedo: $F\uparrow / F\downarrow$
  - Net Flux: $F\downarrow - F\uparrow$
  - Flux Divergence (absorption): $(F\downarrow - F\uparrow)_{top} - (F\downarrow - F\uparrow)_{bottom}$
  - Fractional absorption: $(F\downarrow - F\uparrow)_{top} - (F\downarrow - F\uparrow)_{bottom} / F\downarrow_{top}$
- Retrieved Quantities: r_e, τ, LWP

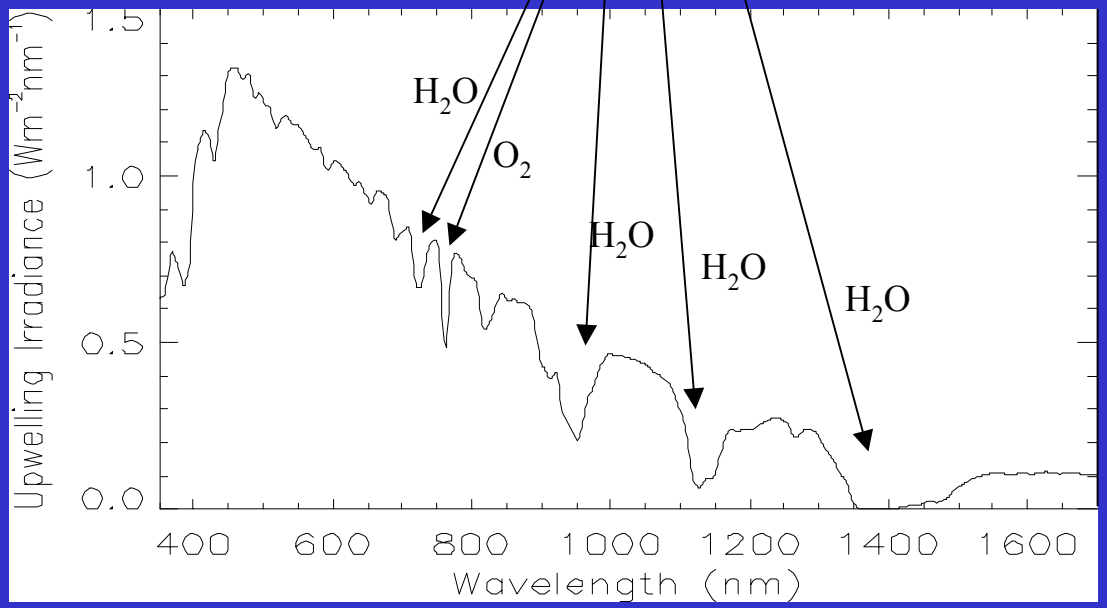
Columns: 350 – 1700 nm



Start time= 18.6 GMT

Rows: 4760 Spectra

End time= 21 GMT



ARESEII

Retrieved:

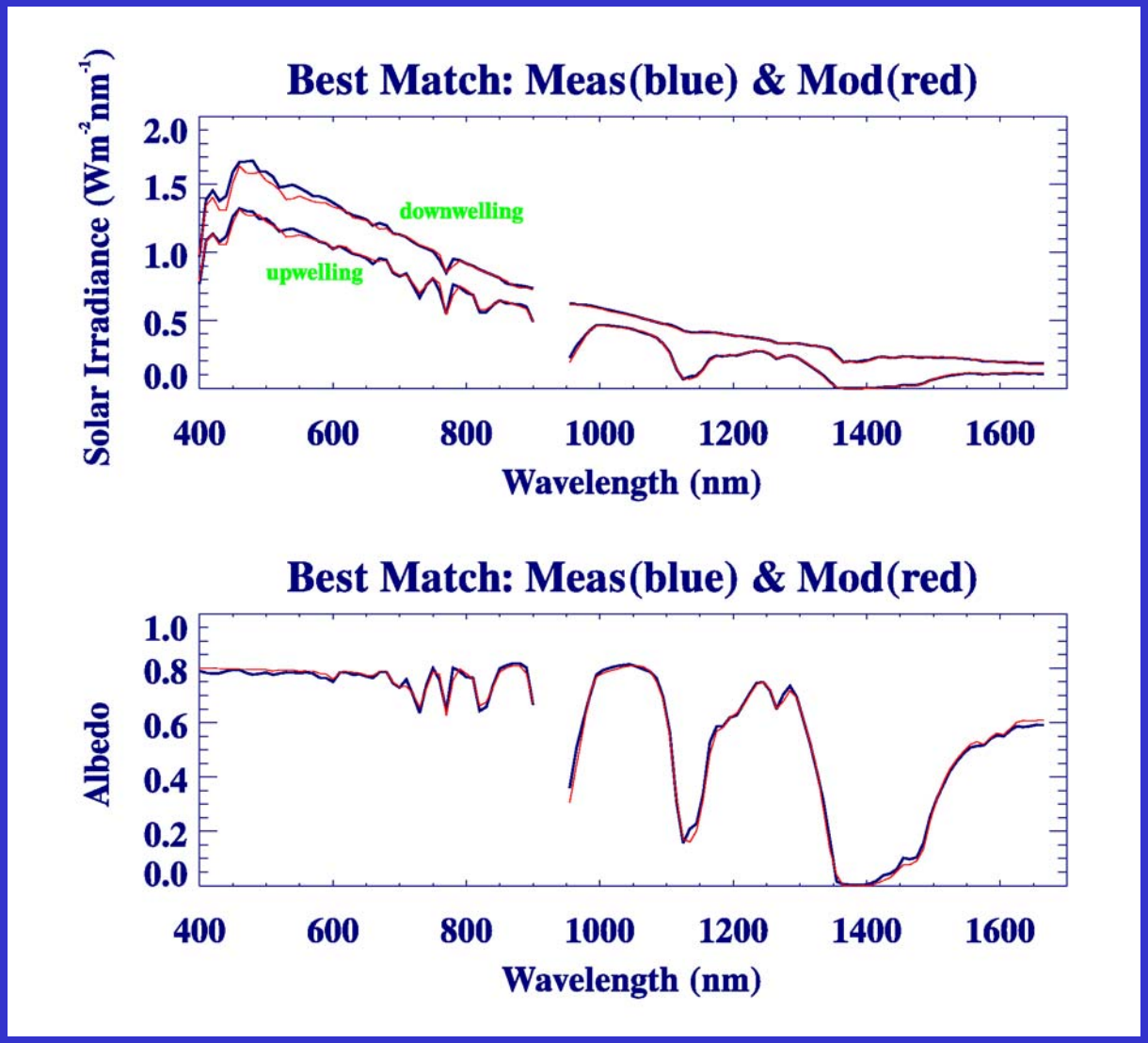
r=8.7 μm

τ=45

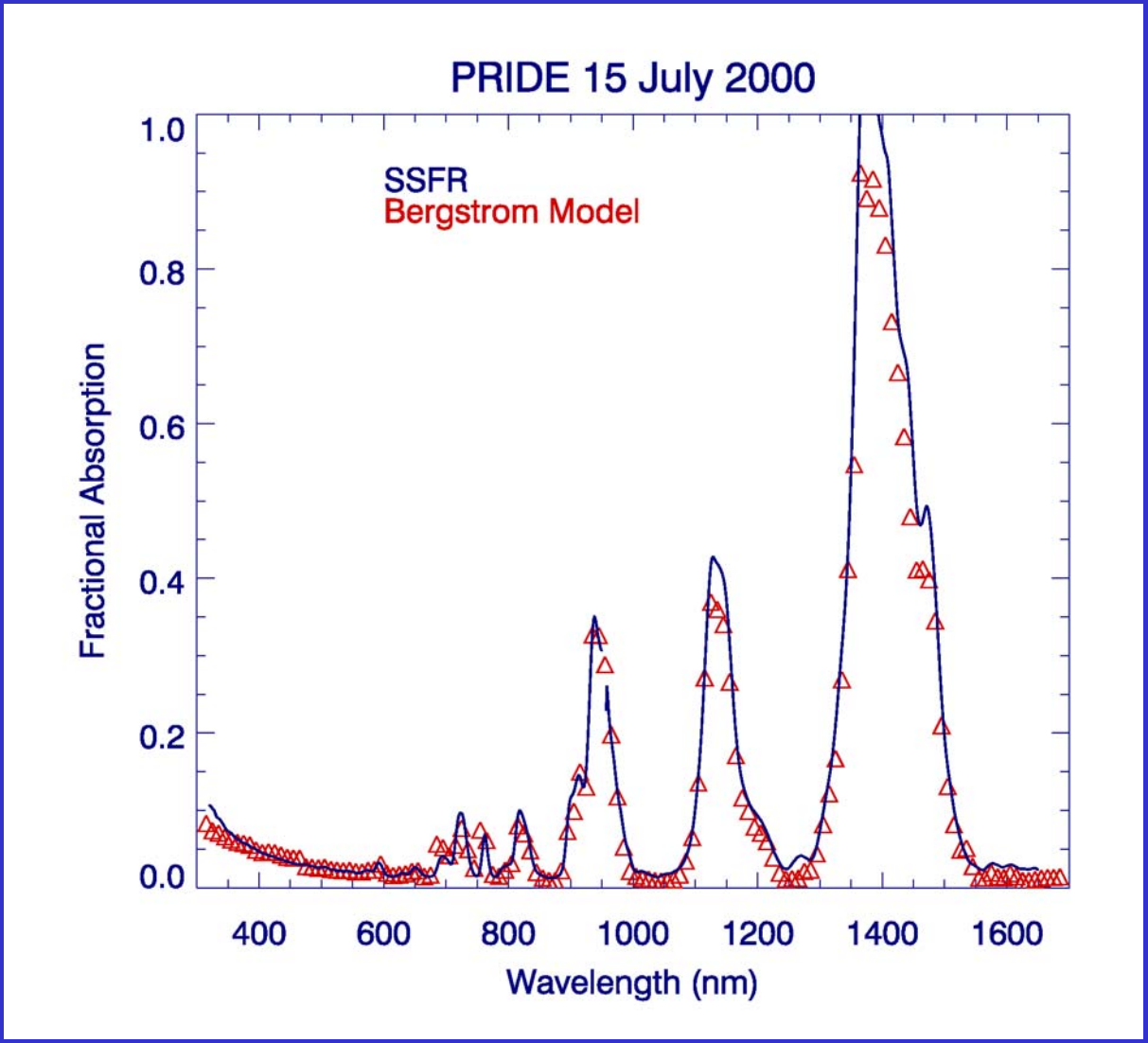
Retrieved:

r=9.5 μm

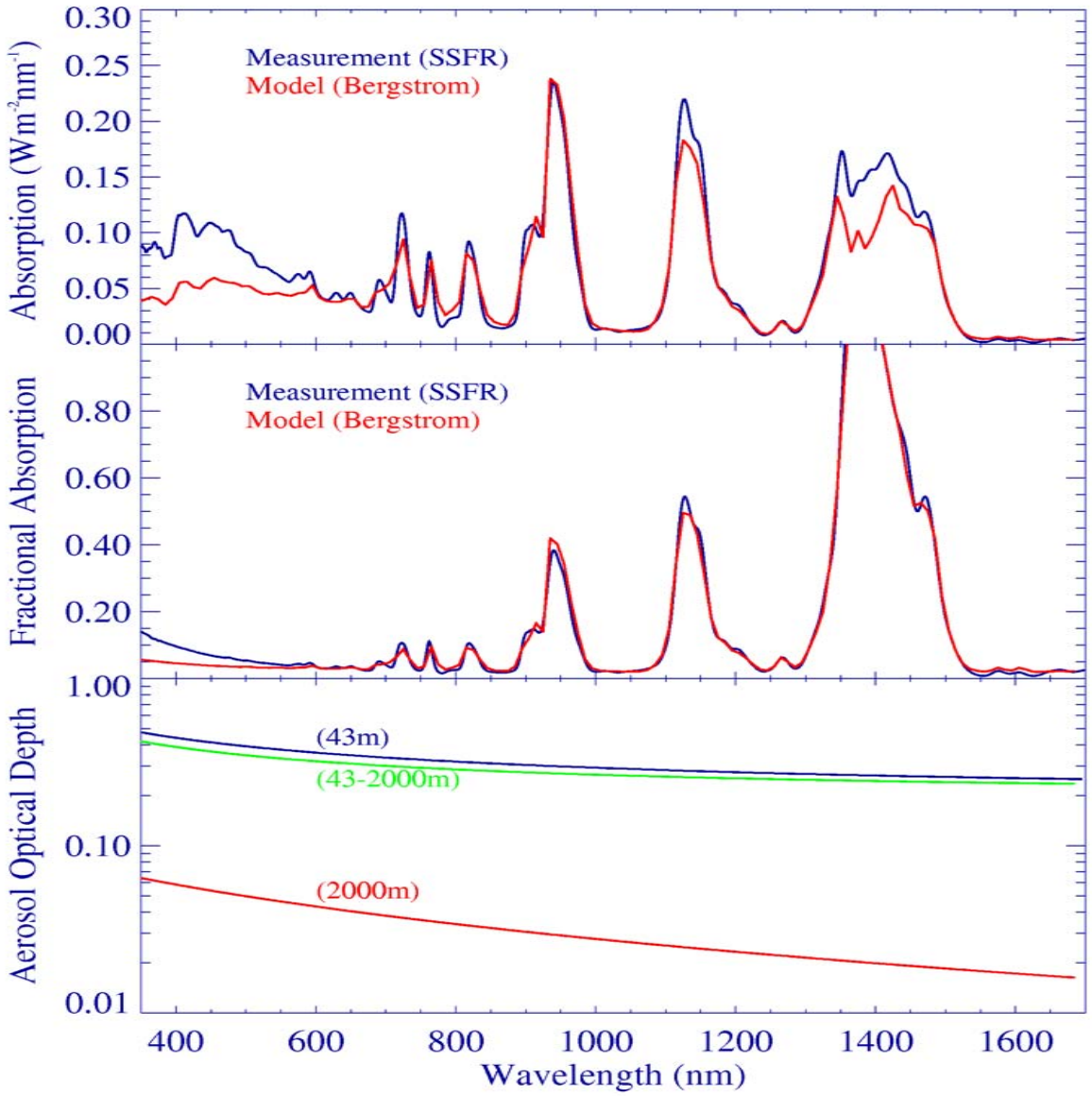
τ=43



Puerto Rico Dust Experiment



ACE-Asia


Measurement (SSFR)
Model (Bergstrom)
Absorption (Wm^{-2}nm^{-1})
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Measurement (SSFR)
Model (Bergstrom)
Fractional Absorption
0.80
0.60
0.40
0.20
1.00
(43m)
(43-2000m)
(2000m)
Aerosol Optical Depth
0.10
0.01
400
600
800
1000
1200
1400
1600
Wavelength (nm)