AEROSOL PROPERTIES
from MFRSR networks

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New York

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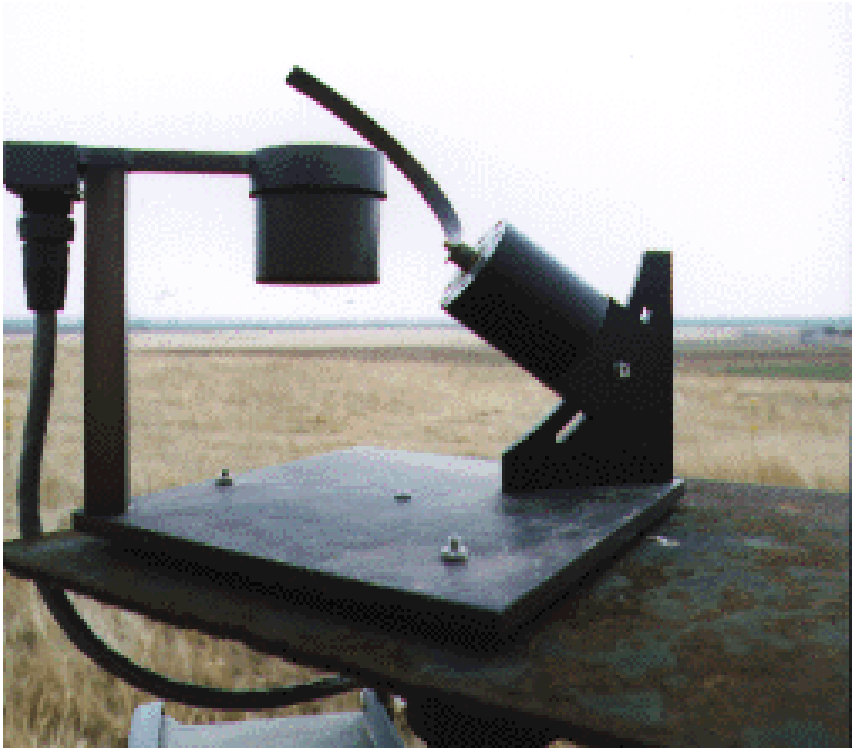
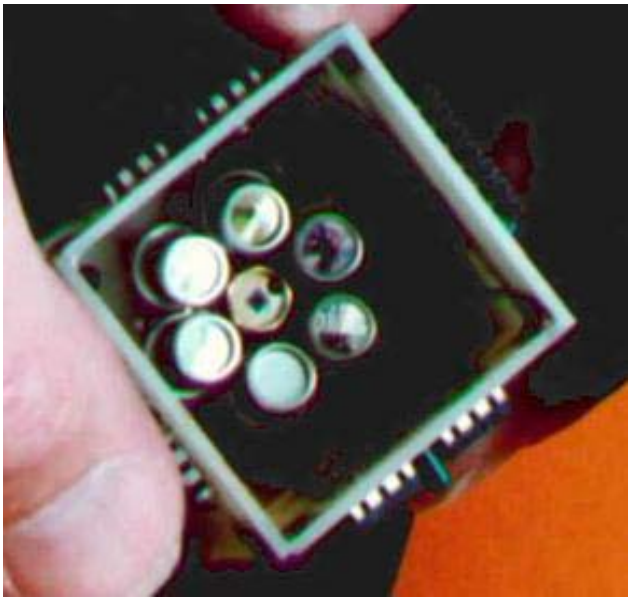
MFRSR-Instrument





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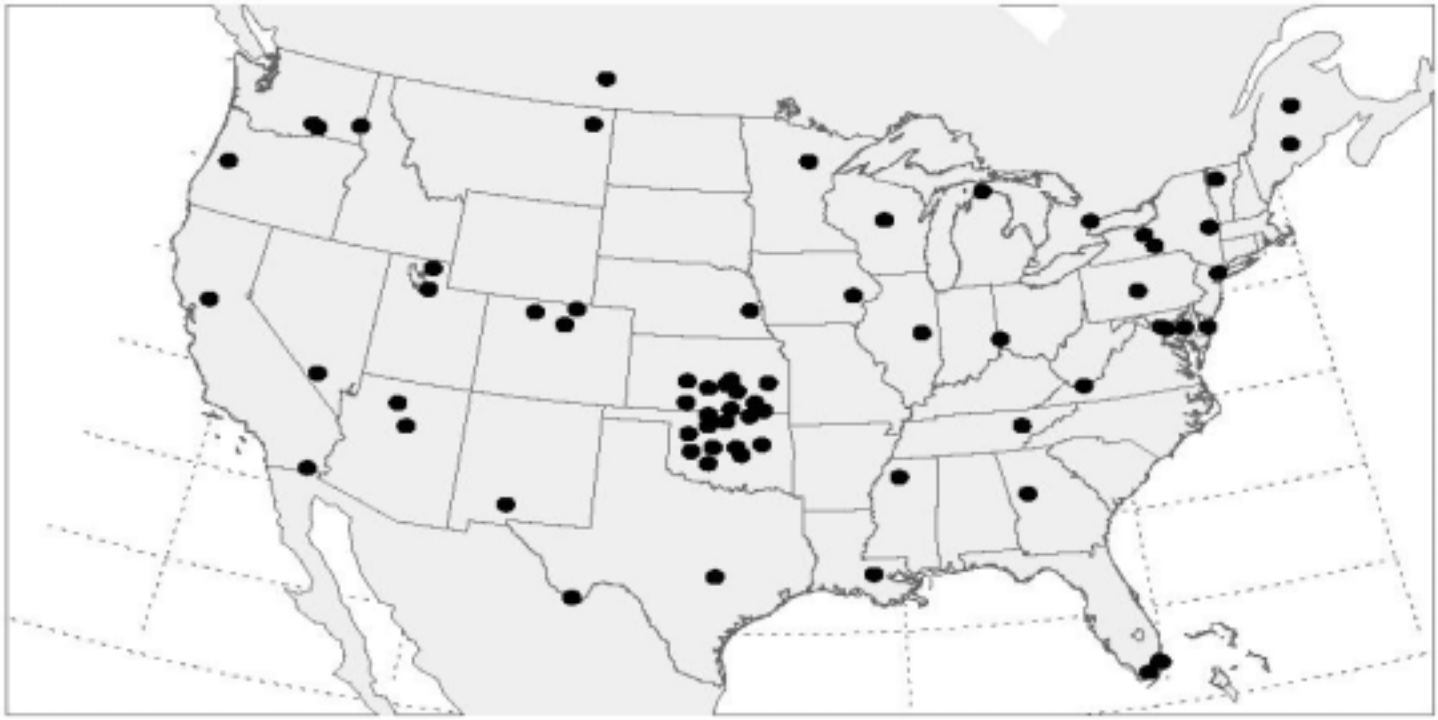
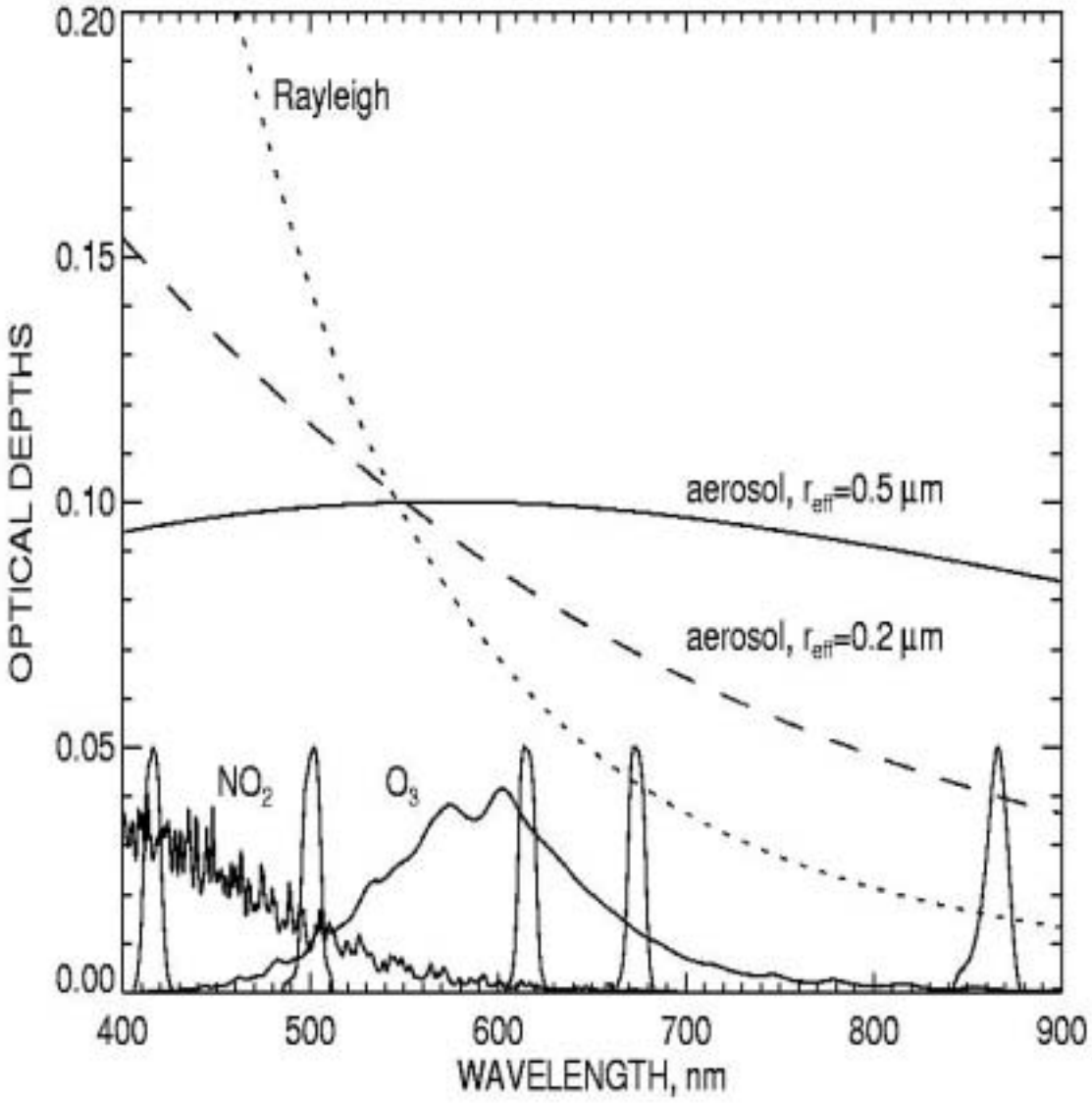
MFRSR locations

- **SIRN** (Solar Irradiance Res. Network) *(GISS, B. Carlson)*
- **ASRC** network *(SUNY Albany, J. Michalsky)*
- **SURFRAD** *(NOAA, J. Michalsky)*
- **USDA UVB** program *(CO State U., J. Slasser)*
- **CART-site (OK)** - cluster of 21instruments



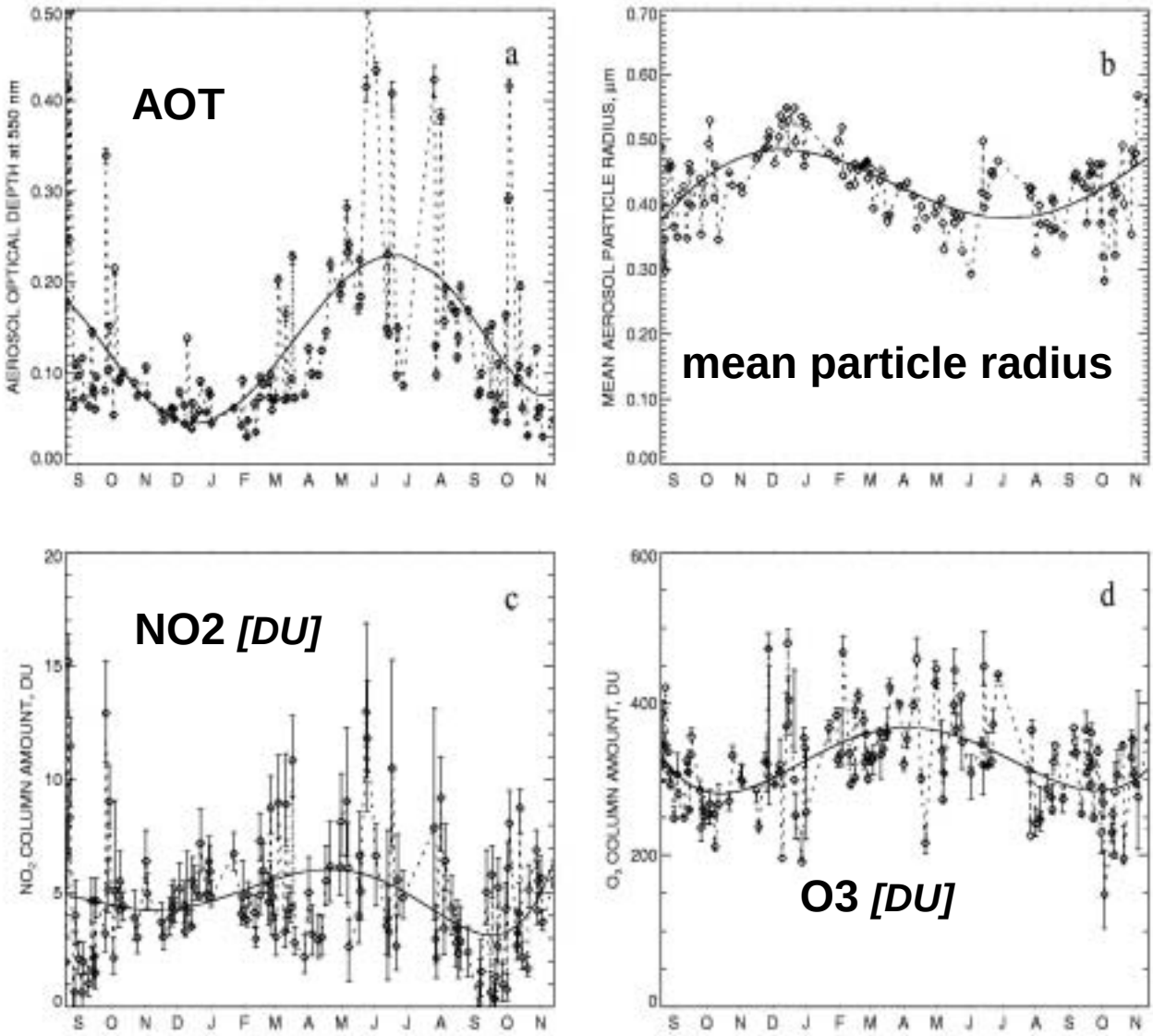
- mostly in US (probably about 100 total)
- some in Russia, Italy, Australia, and other countries.

SPECTRAL FEATURES



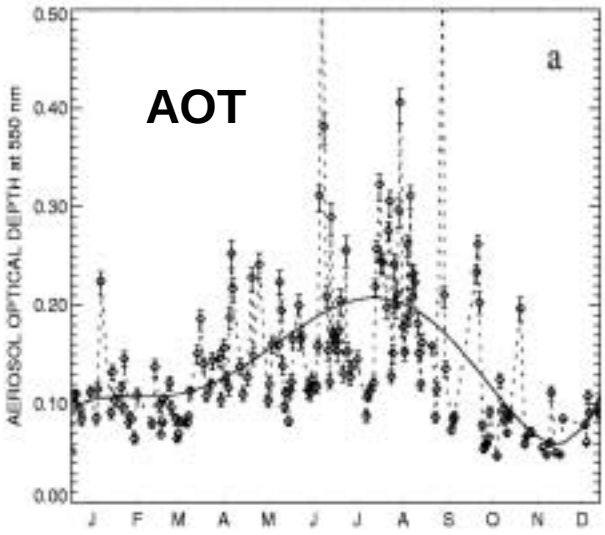
SAMPLE STATISTICS (1)

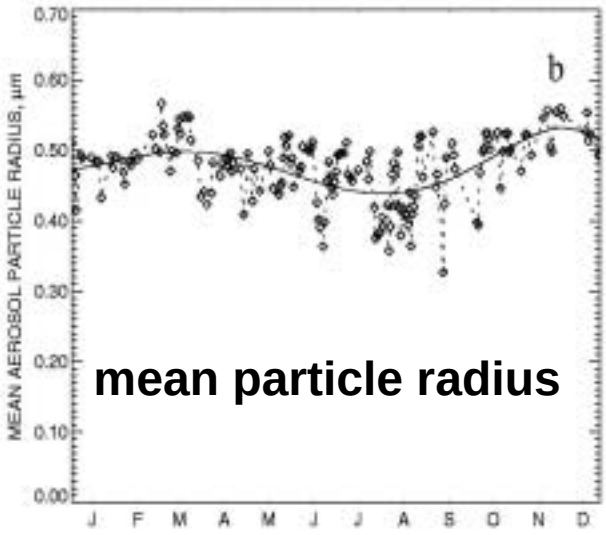
New York, NY (Sept/95 – Nov/96)

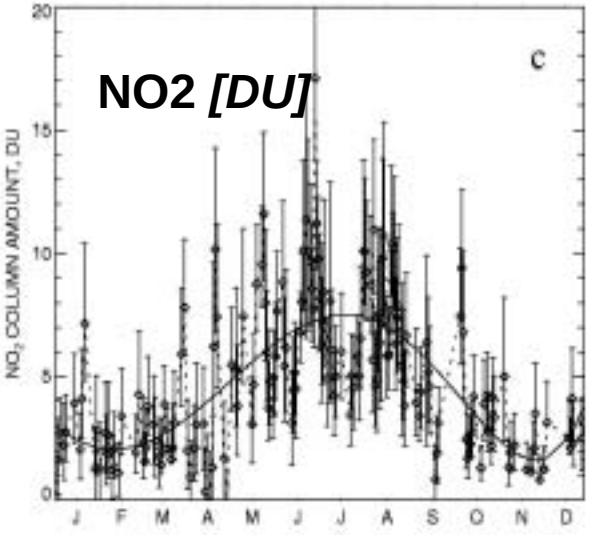


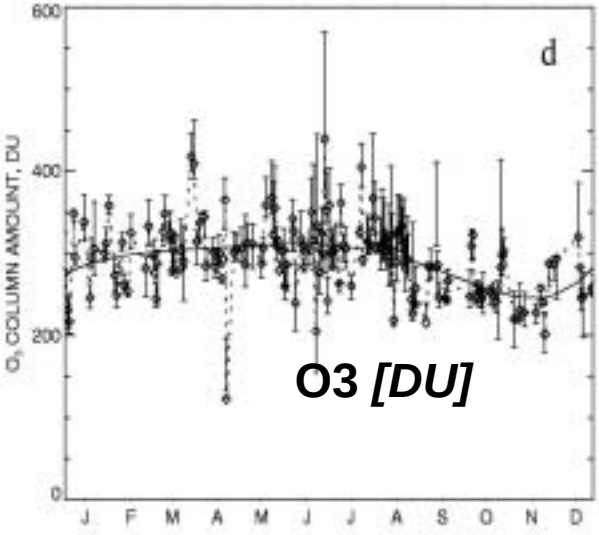
SAMPLE STATISTICS (2)

CART-site. OK (Jan/94 – Dec/94)



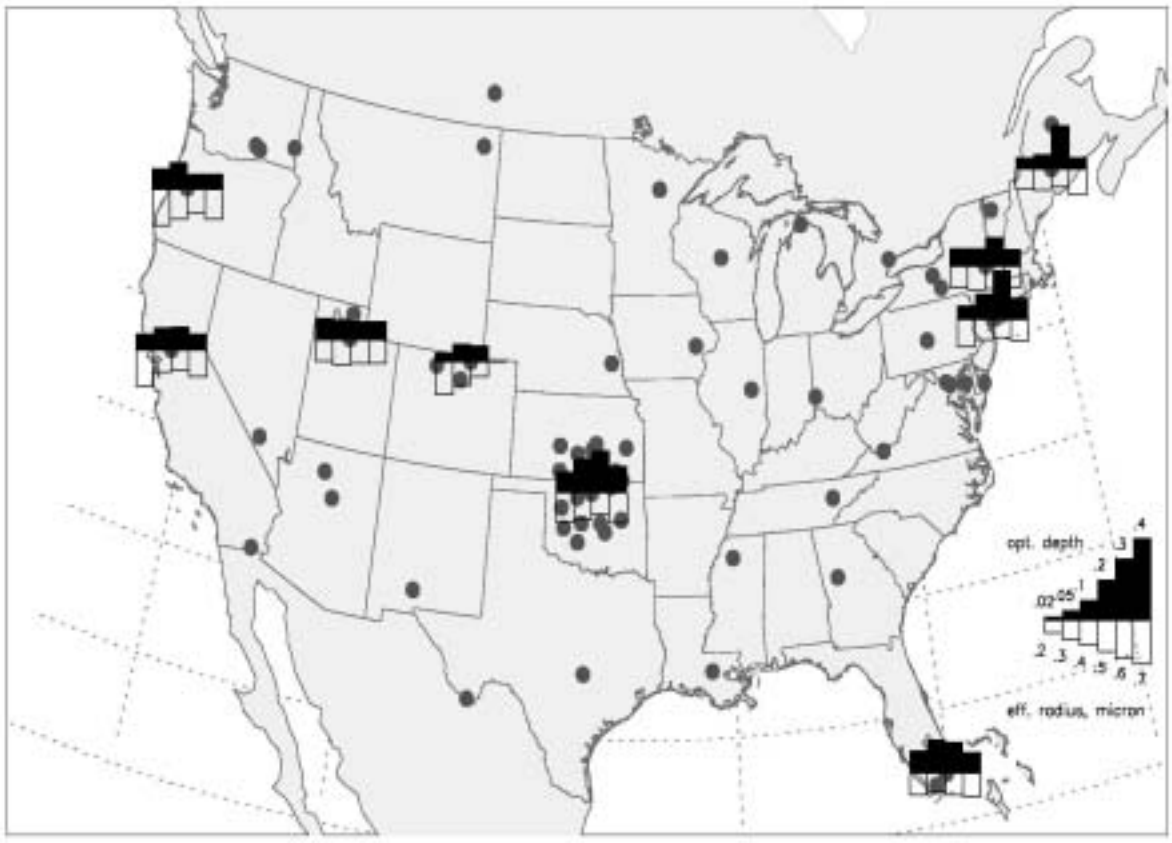






SEASONAL TRENDS

- **Optical Depth, AOT** (black) max on scale is 0.7
- **Aerosol Radius** (white) max on scale is 0.4um



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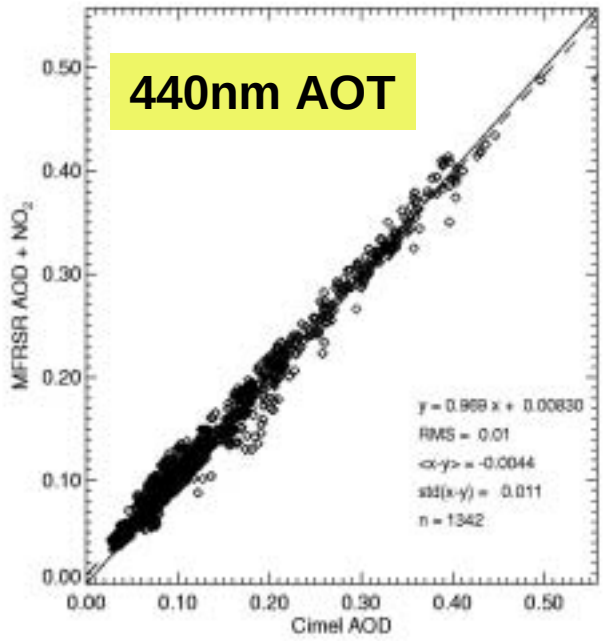
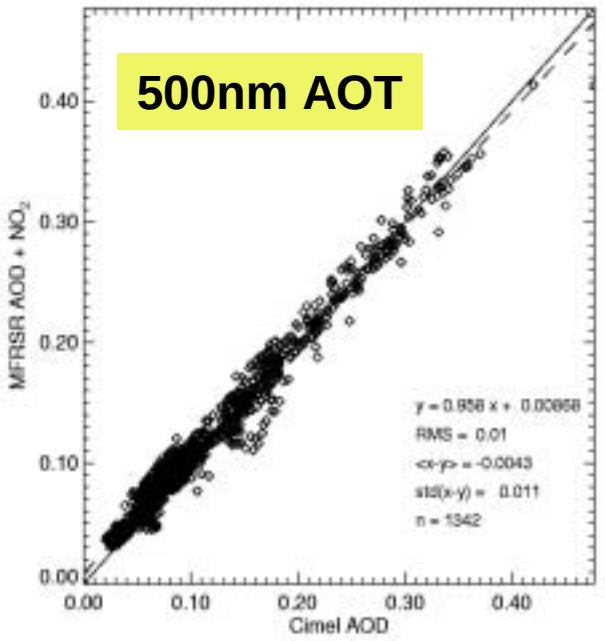
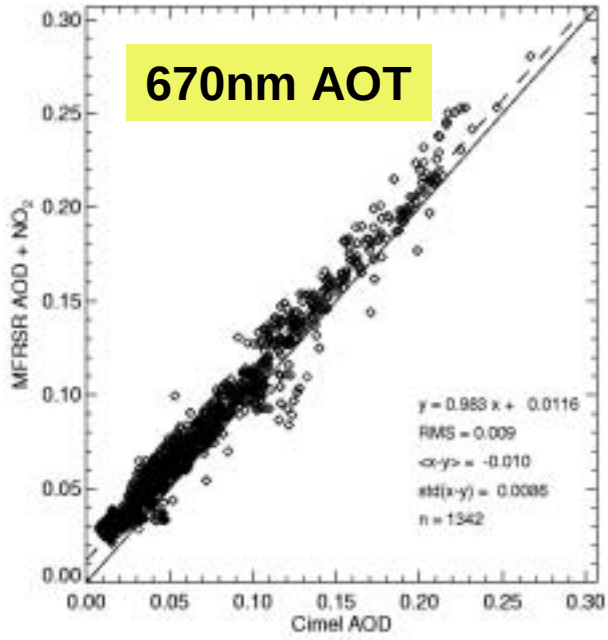
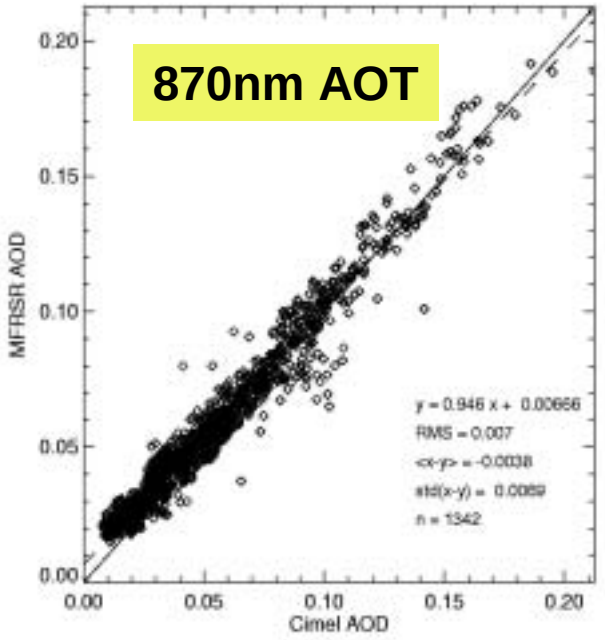
MFRSR - AERONET









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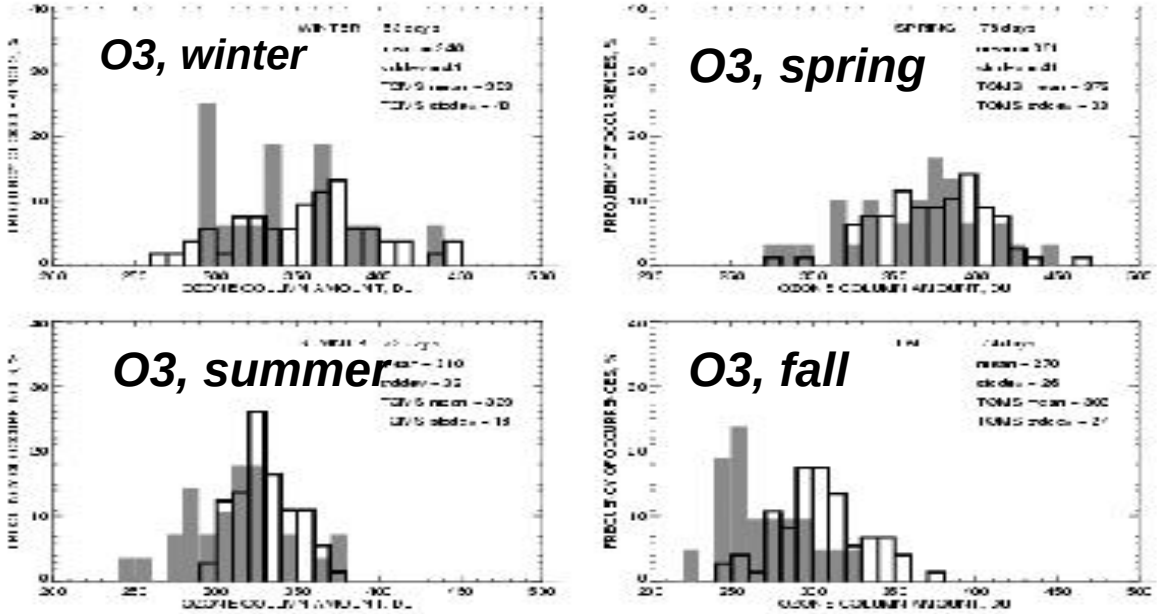
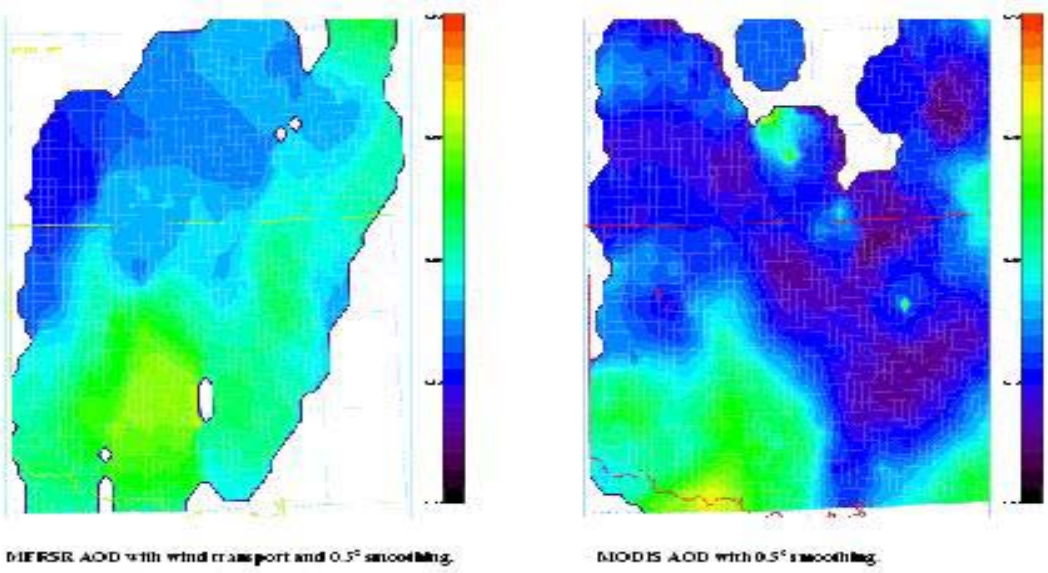
MFRSR - Satellite

O3: MFRSR *(shaded)* vs **TOMS**



AOT: MFRSR *(left, wind-advected)* vs **MODIS** *(right)*



area around the DOE-CART site , May9, 2001

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SUMMARY

- **Problems and Limitations**
  - needs periodical inspections of alignment *(so shadowband does not partly miss the sun)*
  - changing angular response *(calibrations are overdue for many instruments)*
  - no operational cloud-screen method *(so far)*
  - spectral slope interpretation *(NO2 or size?)*
  - a-priori assumptions
  - poor regional representation outside US

- **DATA**
  - Sept. 2000 data for the SGP site cluster [ARM]
  - 30 minute AOT data available at
    - *ASRC*: http://hog.asrc.cestm.albany.edu/~rsr/
  - raw radiances available at….
    - *SIRN*: http://sunphoto.giss.nasa.gov
    - *ARM*: http://www.archive.arm.gov
    - *USDA*: http://uvb.nrel.colostate.edu
    - *SURFRAD*: http://www.srrb.noaa.gov/surfrad/

DATA-Overview

DATA *(processed)*

- **Albany, NY** (ASRC): jan 94 - jul 97
- **Bermuda** (UM): jul 94 - jun 95
- **Barbados** (UM): may 95 - aug 95 (few good days)
- **Davis, CA** (USDA): jan 96 - dec 96
- **CPER, CO** (USDA): jan 96 - jun 96
- **COVE** platform (LARC): aug 99 - dec 99 (not proc.)
- **Howland, ME** (ASRC): jan 95 - dec 95
- **Ithaca, NY** (ASRC): jan 95 - sep 95
- **Kumukahi, HI** (UH): jun-jul 99 & mar-may 00
- **Miami, FL** (UM): may 94 - dec 95
- **New York, NY** (SIRN): sep 95 - sep 98 & more
- **Eugene, OR** (SIRN): may 97 - may 98
- **SGP CF, OK** (ASRC, ARM): jan 93 - dec 99 (gaps)
- **Salt Lake City**, (SIRN): jan 97 - dec 98
- **Texas** (USDA): jan 99 - may 99
- **Santa Barbara**, (SIRN): sep-oct 99 & feb-apr 00

  - *UM = U. of Miami (Ken Voss)*
  - *UH = U. of Hawaii (Tony Clarke)*

REFERENCES

- Alexandrov, M.D., A.A. Lacis, B.E. Carlson, and B. Cairns 2002. Remote sensing of atmospheric aerosols and trace gases by means of multifilter rotating shadowband radiometer. ***Part I: Retrieval algorithm***. *J. Atmos. Sci.* **59**, 524-543, 2002.

- Alexandrov, M.D., A.A. Lacis, B.E. Carlson, and B. Cairns 2002. Remote sensing of atmospheric aerosols and trace gases by means of multifilter rotating shadowband radiometer. ***Part II: Climatological applications.*** *J. Atmos. Sci.* **59**, 544-566, 2002.