

AIRBORNE MEASUREMENTS OF
AEROSOL MASS AND COMPOSITION

and

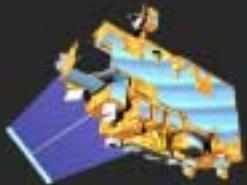
AEROSOL LIGHT SCATTERING AND ABSORPTION

OFF THE UNITED STATES EAST COAST IN CLAMS

by

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THE CHESAPEAKE LIGHTHOUSE AND AIRCRAFT MEASUREMENTS FOR SATELLITES (CLAMS) EXPERIMENT



EOS-TERRA



NASA ER-2

MAS, AirMISR, S-HIS

A Radiative Closure Experiment for Satellite Product Validation

Cessna 210



Scanning Polarimeter



Proteus LW, MW Spectra

Lear 25C



A-band Spectrometer

University of Washington
Convair 580



In-situ Aerosols
Sun-photometry
BRDF

NASA OV-10



SW Spectra, Broadband Radiation



CERES Ocean Validation Experiment (COVE) at the Chesapeake Lighthouse

Meteorology

- RAOB
- T, Td, Wind
- GPS H2O_(v)

Radiation

- BSRN
- Spectral SW

Aerosols

- Aeronet
- MPL
- Chemistry

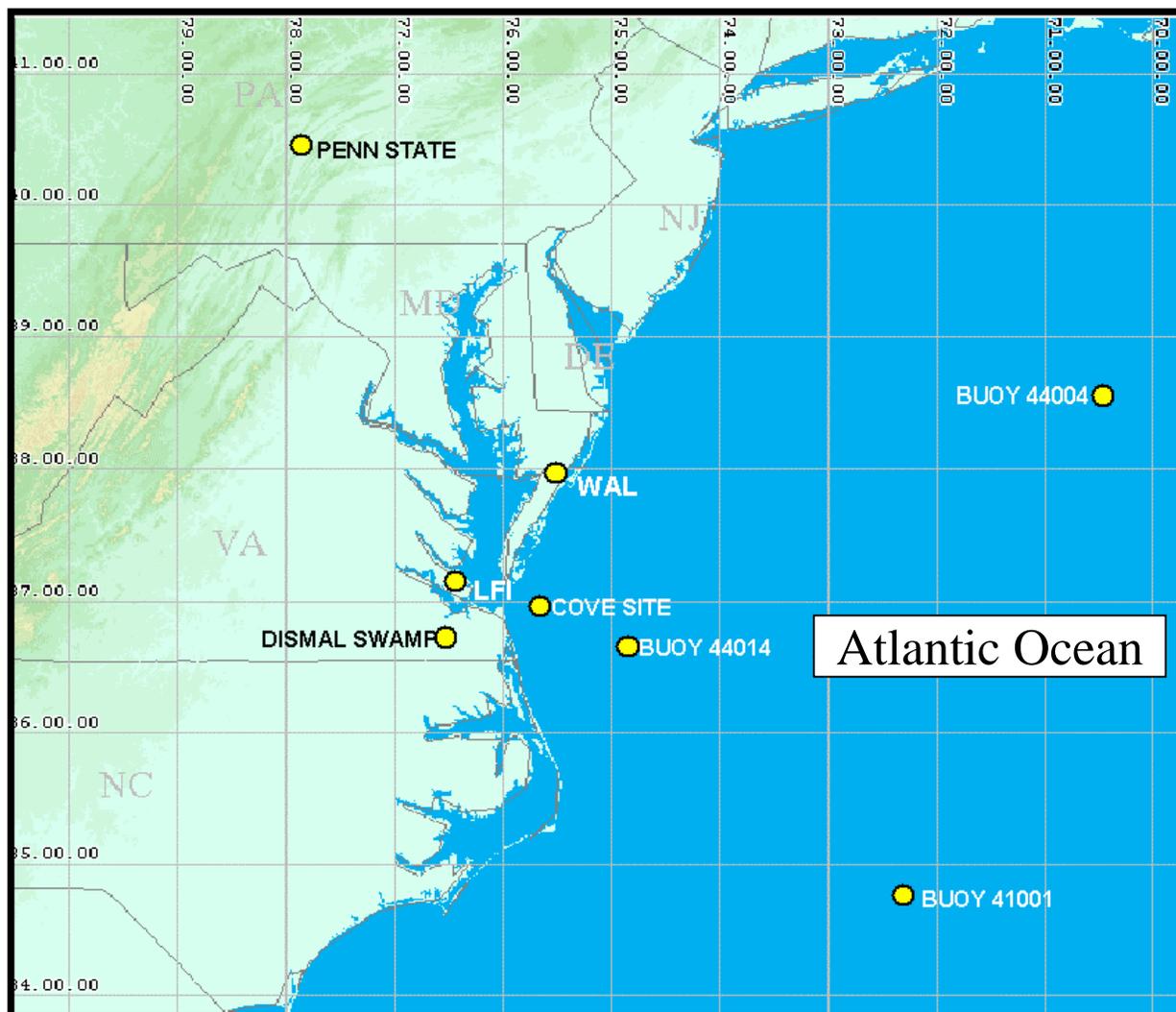
Oceanography

- Optical
- Biological/Chemical
- Physical



CLAMS 2001 MISSION

CLAMS OPERATIONS AREA WITH MAJOR CLAMS NAVAIDS



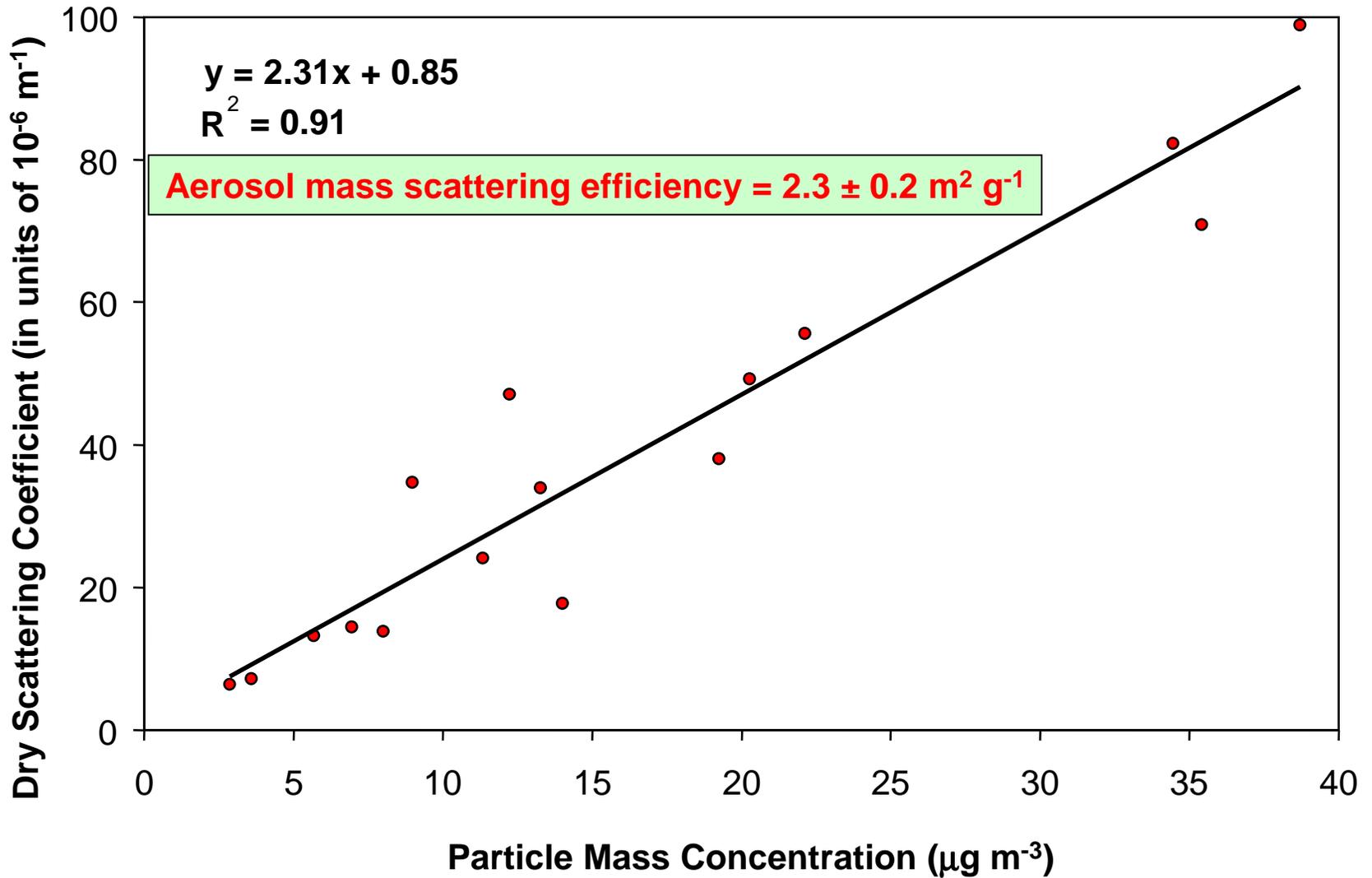
SOME ACCOMPLISHMENTS OF THE CONVAIR-580 FLIGHTS IN CLAMS

- **Aerosol and trace gas measurements, and sunphotometer measurements of aerosol optical depth and column water vapor and ozone, from close to ocean surface to ~10,000 ft off Delmarva Peninsula on *thirteen* occasions from July 10-August 2, 2001.**
- **Measurements of aerosol properties on *seven* occasions beneath the Terra satellite, once beneath AVHRR, and *five* times beneath the ER-2 aircraft.**
- **Measurements of aerosol properties in the vicinity of the (CERES instrumented) Chesapeake Bay lighthouse (COVE) on *nine* occasions and over instrumented buoys 44014, 44004 and 41001.**
- **Measurements of BRDF of the ocean surface on *fifteen* occasions and over Great Dismal Swamp on *two* occasions.**
- **On July 17 (a CLAMS "Golden Day") *six* aircraft, including the Convair-580 and ER-2, were stacked above the Chesapeake Bay lighthouse under clear skies at the time of the Terra overpass.**

SOME RESULTS ON AEROSOLS FROM
IN SITU MEASUREMENTS ABOARD THE
UNIVERSITY OF WASHINGTON'S
CONVAIR-580 AIRCRAFT IN CLAMS

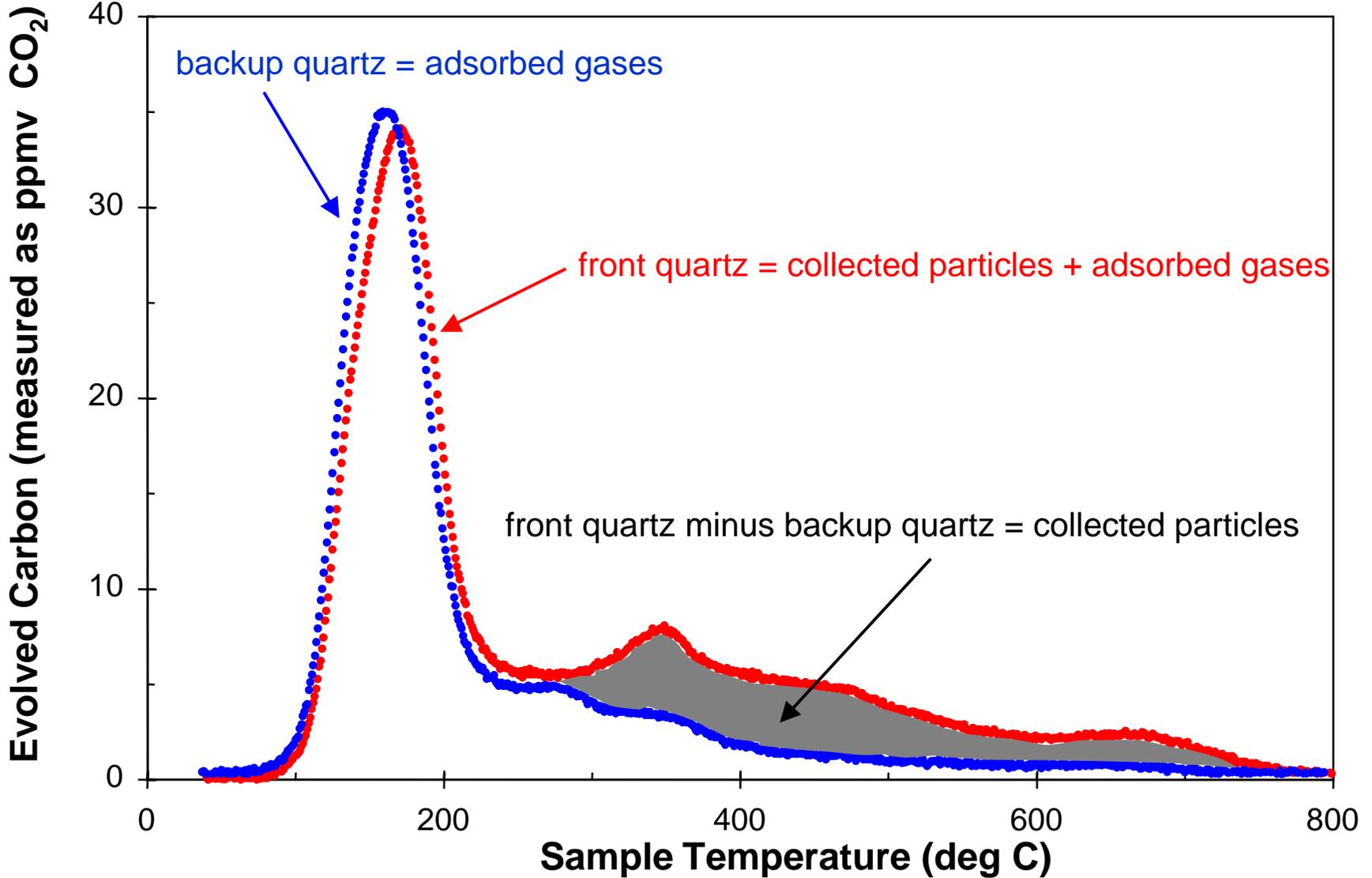


Particle Mass Concentration vs. Dry Light Scattering Coefficient

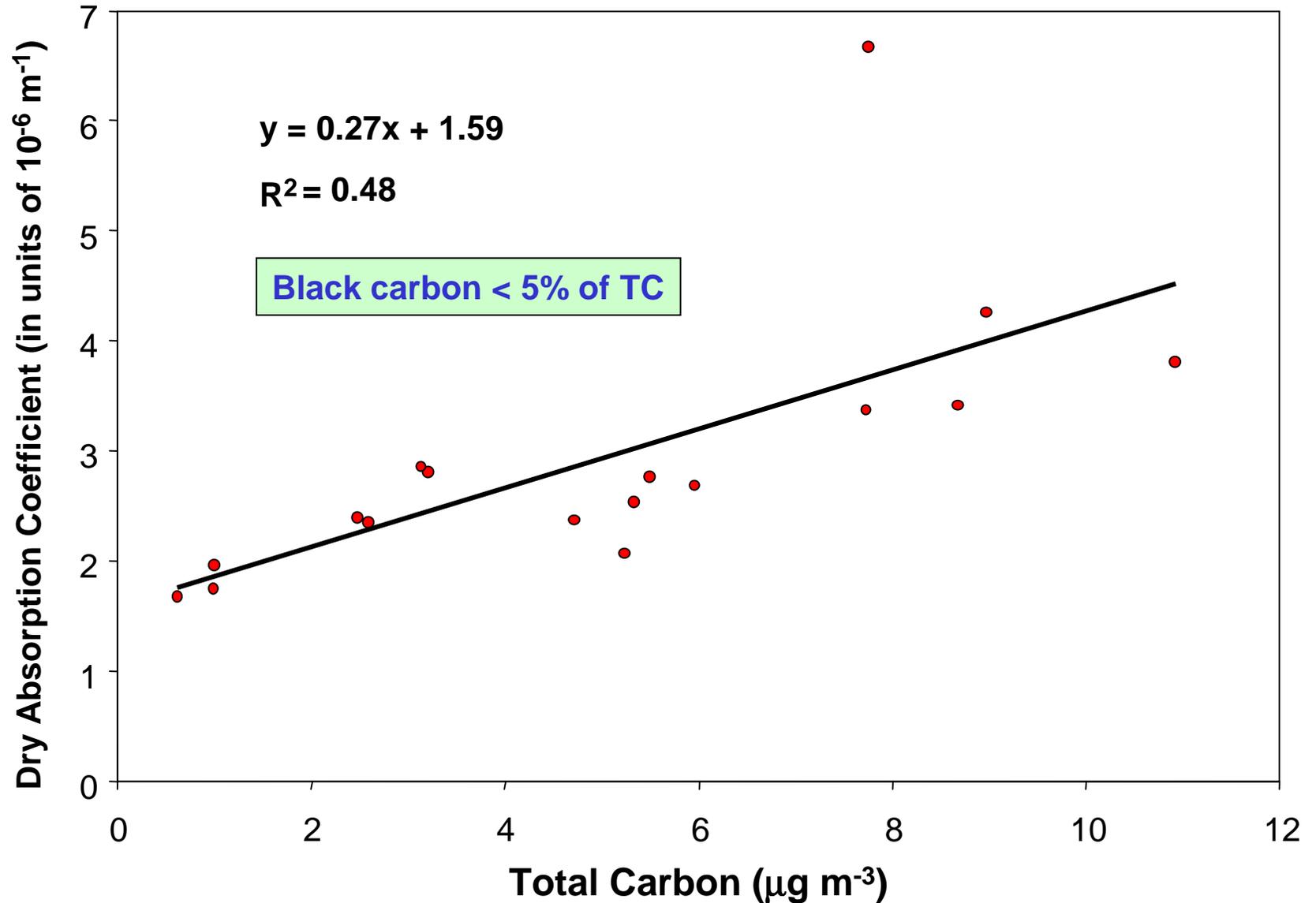


Carbon Determination by Evolved Gas Analysis

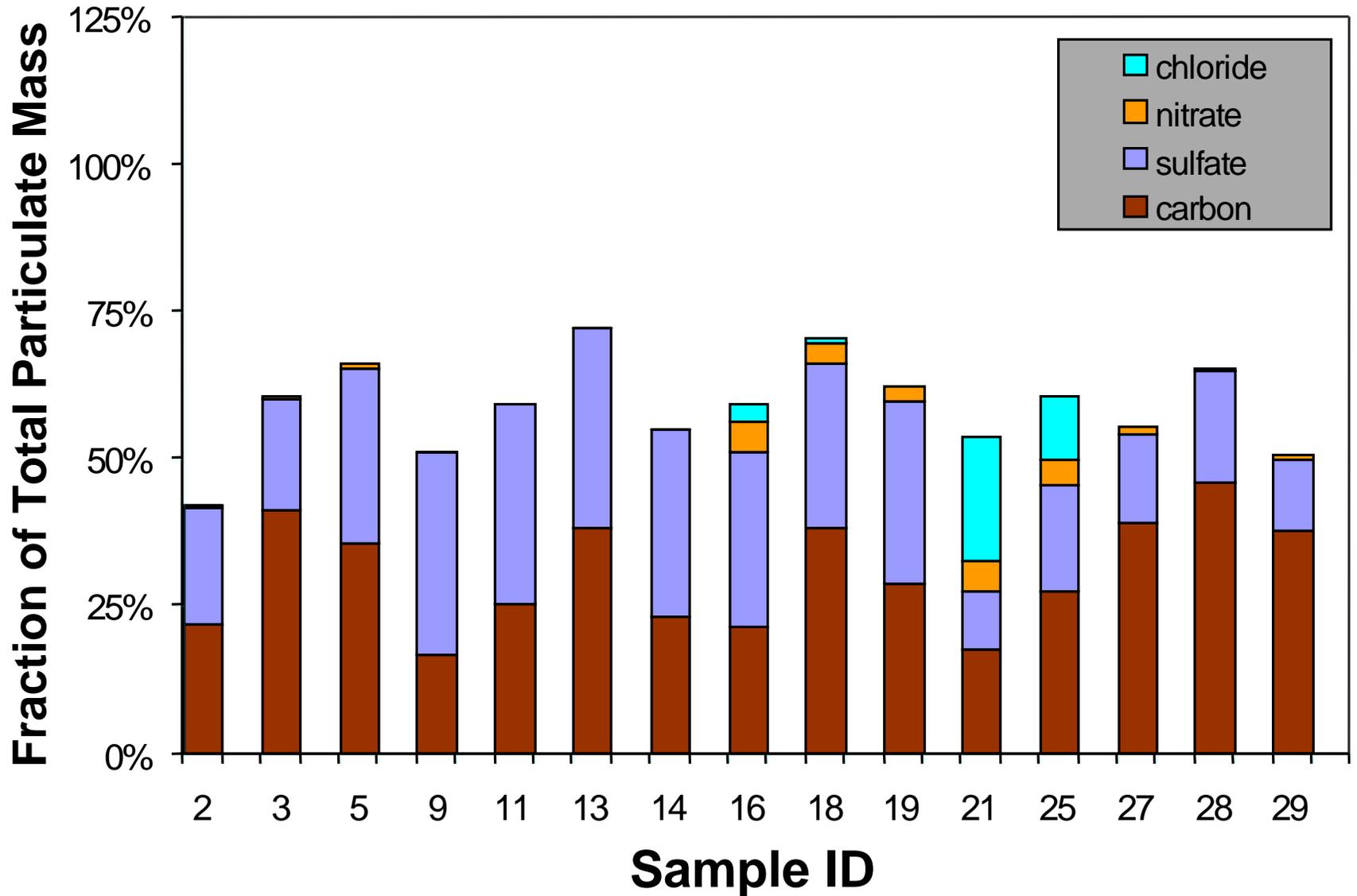
(University of Washington Flight 1881: Sample #27)



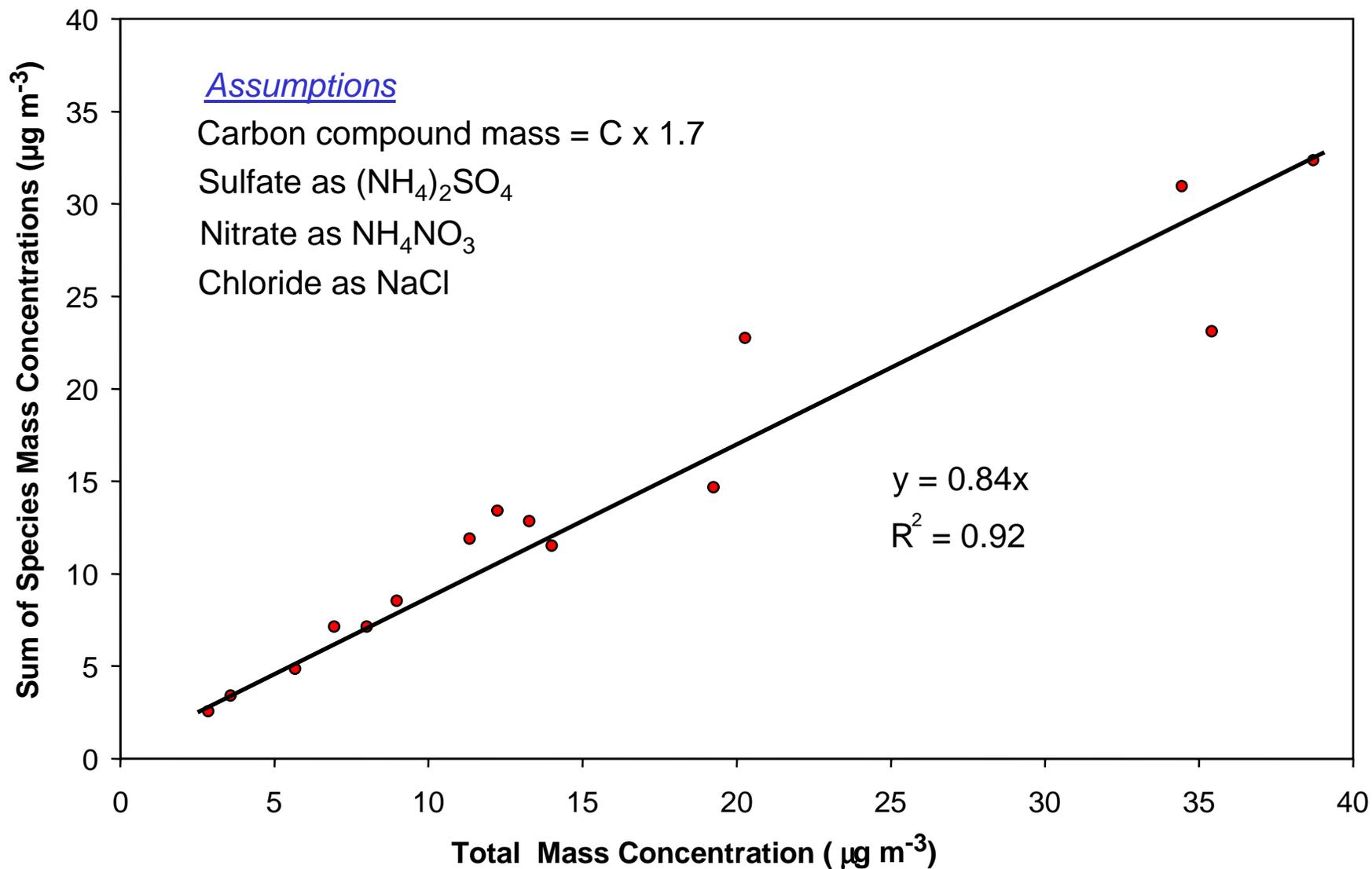
Total Carbon Concentration vs. Dry Light Absorption Coefficient



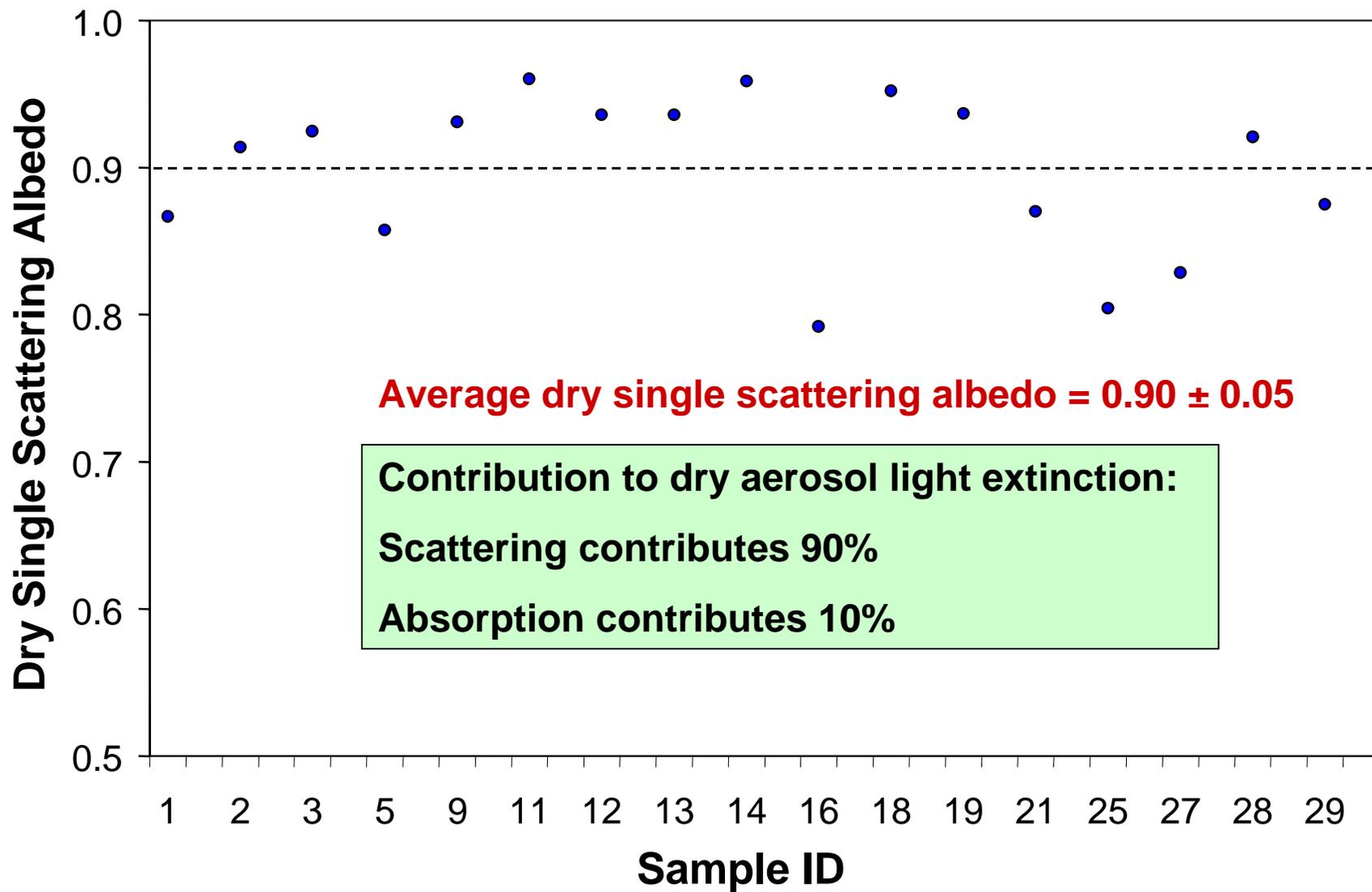
CLAMS Aerosol Composition



Sum of Species Mass Concentration vs Total Mass Concentration



CLAMS: Dry Aerosol Single Scattering Albedo



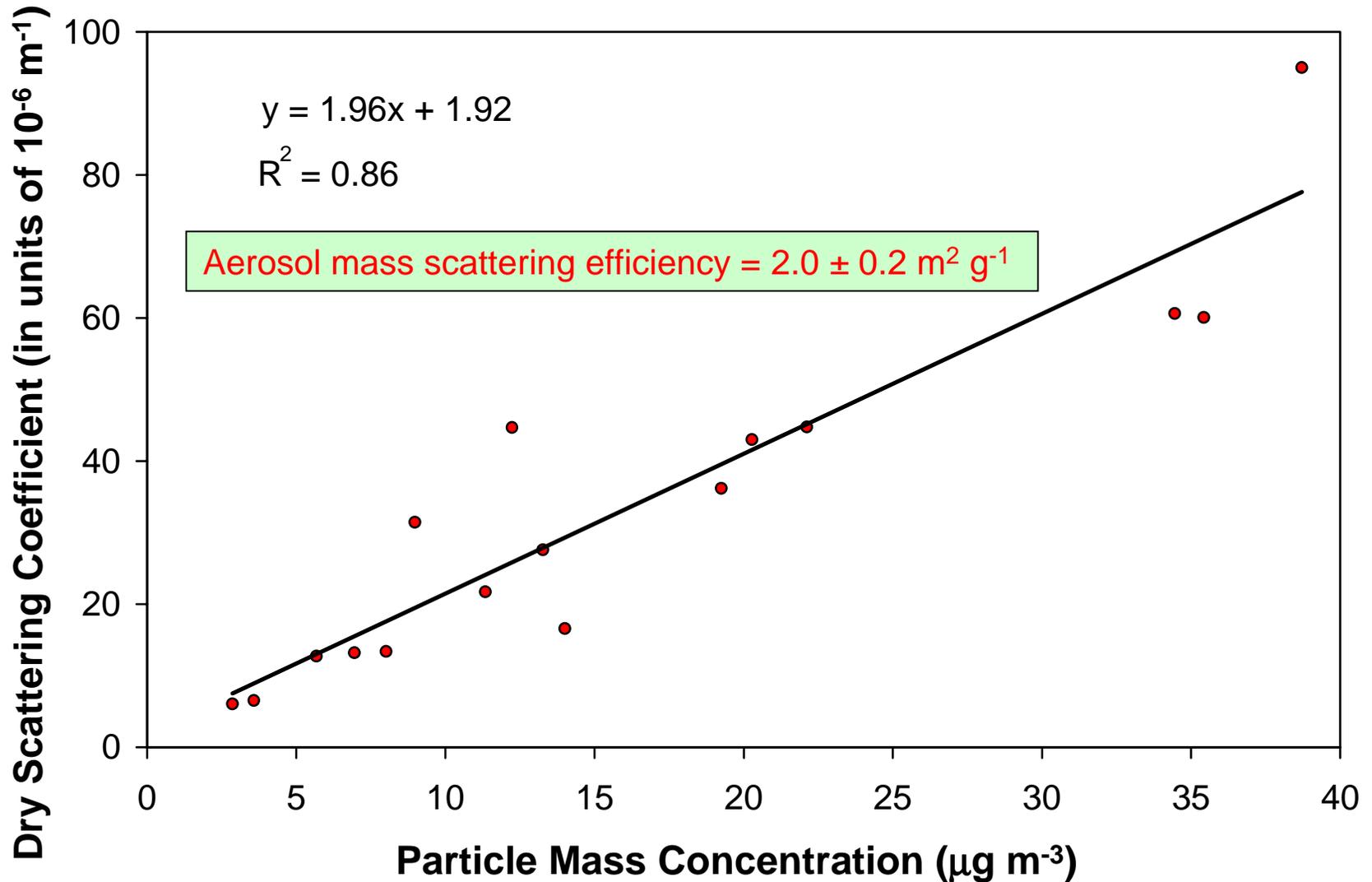
FUTURE WORK

- **Partition aerosol optical depth by chemical species**
- **Calculate aerosol radiative forcing for the region and partition by chemical species**
- **Compare in situ measurements with simultaneous remote sensing measurements**

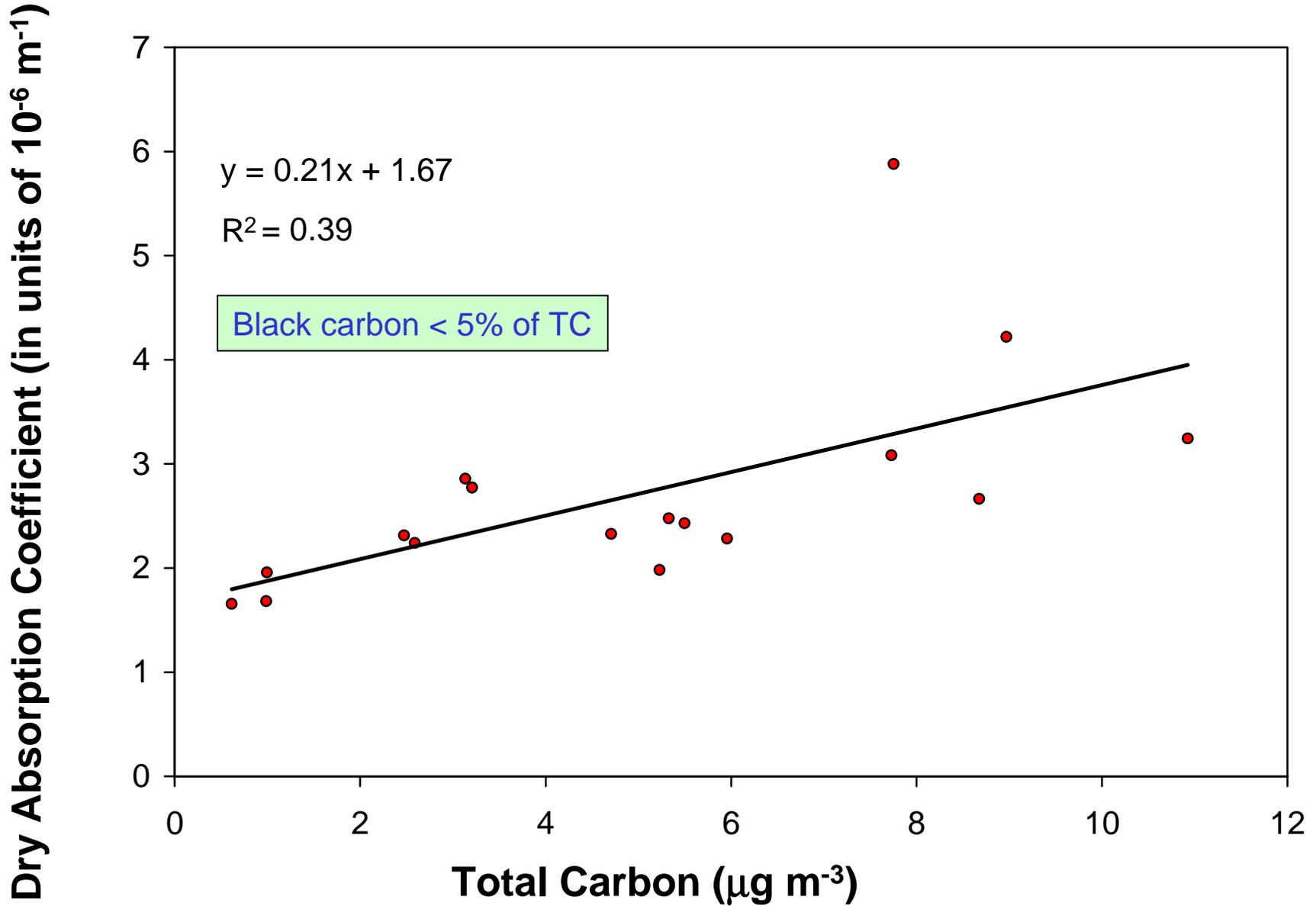


"That's all Folks!"

Particle Mass Concentration vs. Dry Light Scattering Coefficient



Total Carbon Concentration vs. Dry Light Absorption Coefficient



CLAMS: Dry Aerosol Single Scattering Albedo

