

Chesapeake Lighthouse &  
Aircraft Measurements for  
Satellites (CLAMS)



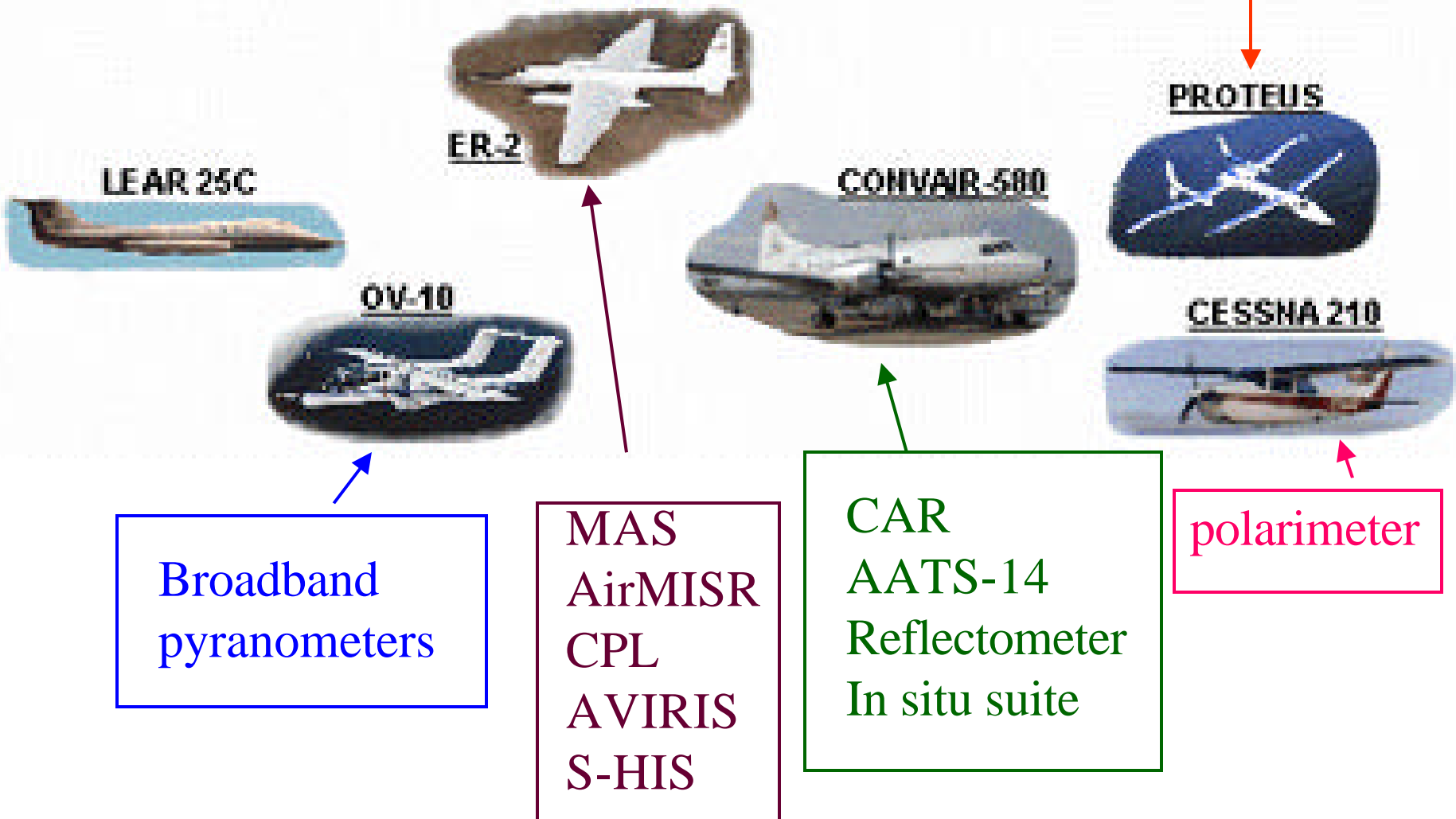
J. Vanderlei Martins, Lorraine Remer and Yoram Kaufman  
MODIS Aerosol Team

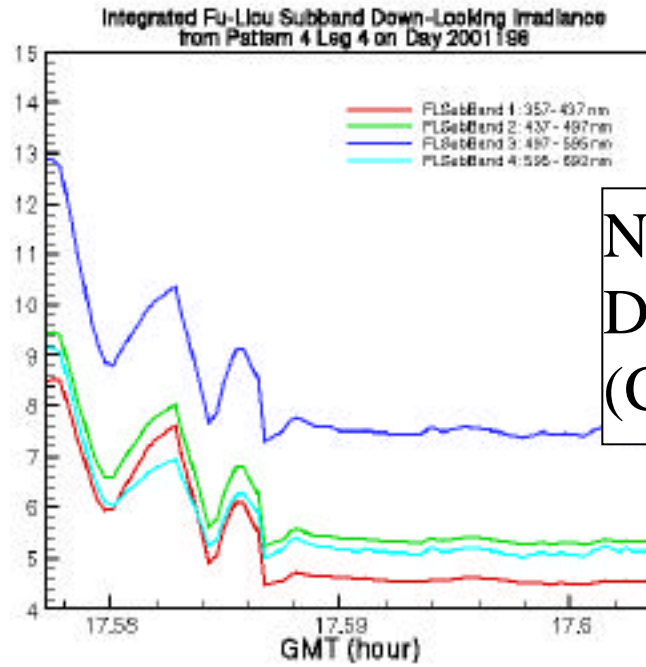
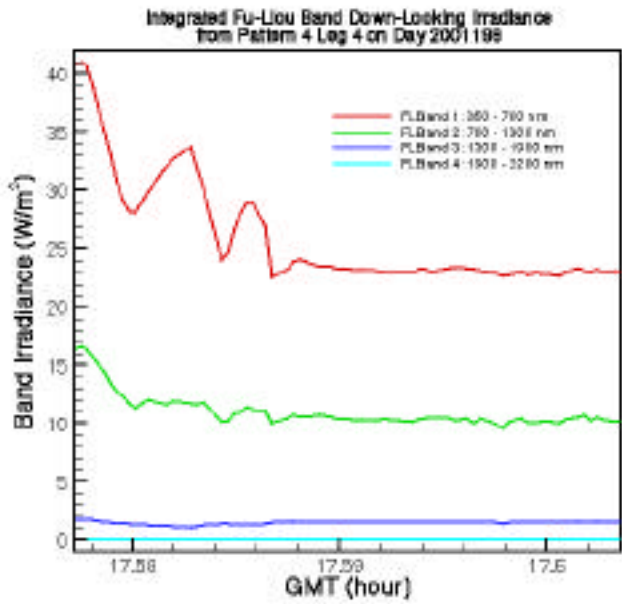
With Yamasoe, Castanho, Fattori (USP)  
Kleidman, Levy, Li, Ichoku

Other Participants: CERES Team (Smith Jr., Charlock etc.)  
MISR Team (Kahn), GSFC BRDF (Gatebe, King),  
U. Washington (Hobbs), NASA Ames (Redemann, Russell),  
NASA Langley Proteus Team (Smith Sr.), NASA GISS (Mischenko, Cairns)

Note the 'A' in CLAMS does NOT stand for 'aerosol'

# CLAMS Participating Aircraft

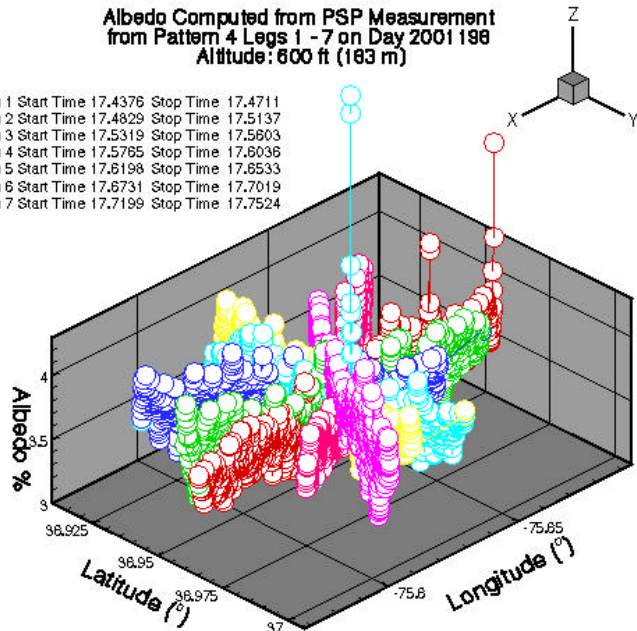




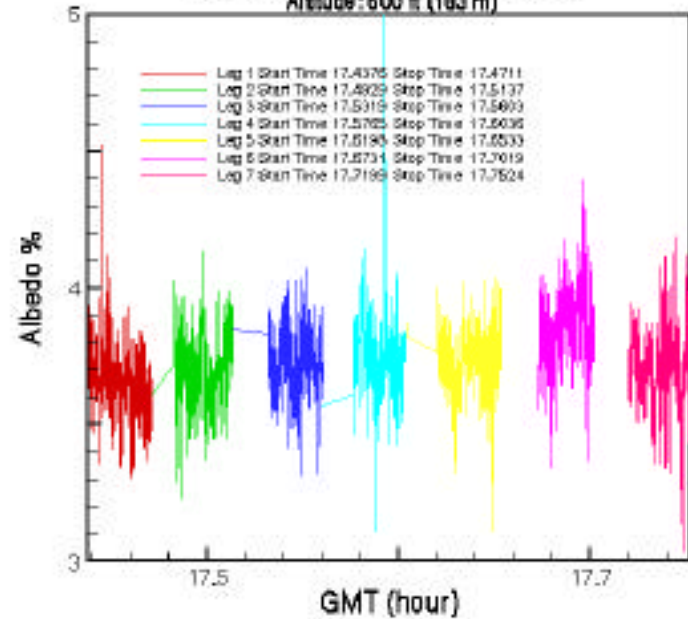
NASA Langley  
Data from OV-10  
(Charlock, Smith Jr.)

**Albedo Computed from PSP Measurement from Pattern 4 Legs 1 - 7 on Day 2001198**  
Altitude: 800 ft (183 m)

- Leg 1 Start Time 17.4376 Stop Time 17.4711
- Leg 2 Start Time 17.4829 Stop Time 17.5137
- Leg 3 Start Time 17.5319 Stop Time 17.5603
- Leg 4 Start Time 17.5785 Stop Time 17.6036
- Leg 5 Start Time 17.6198 Stop Time 17.6533
- Leg 6 Start Time 17.6731 Stop Time 17.7019
- Leg 7 Start Time 17.7199 Stop Time 17.7524

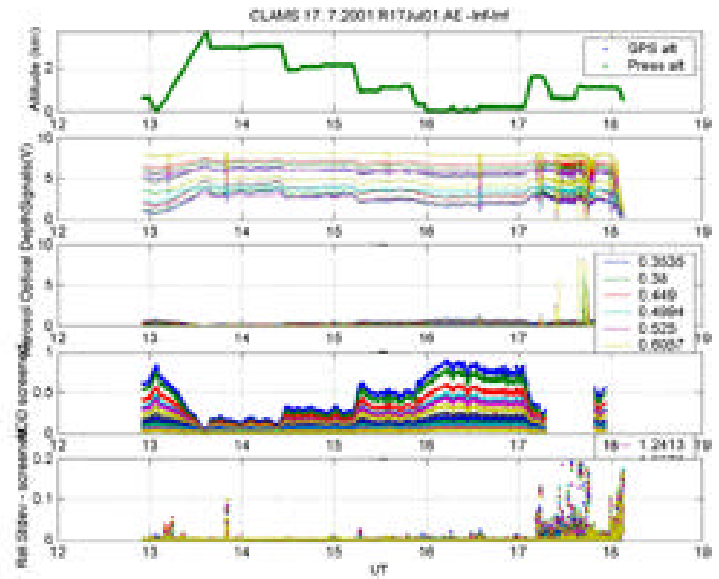
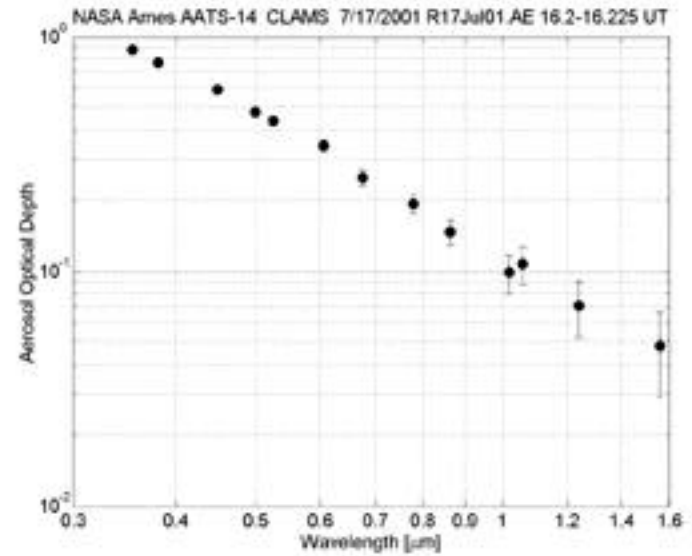


**Albedo Computed from PSP Measurement from Pattern 4 Legs 1 - 7 on Day 2001198**  
Altitude: 800 ft (183 m)





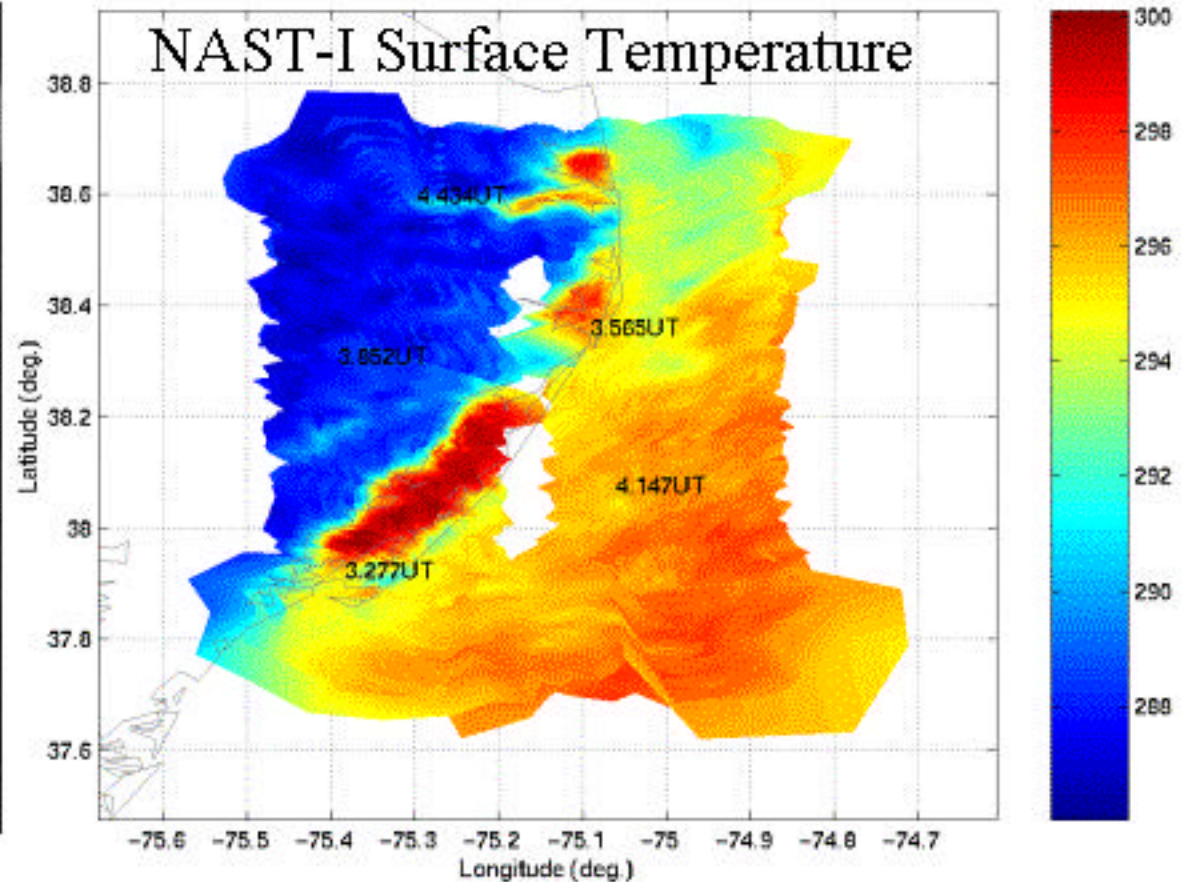
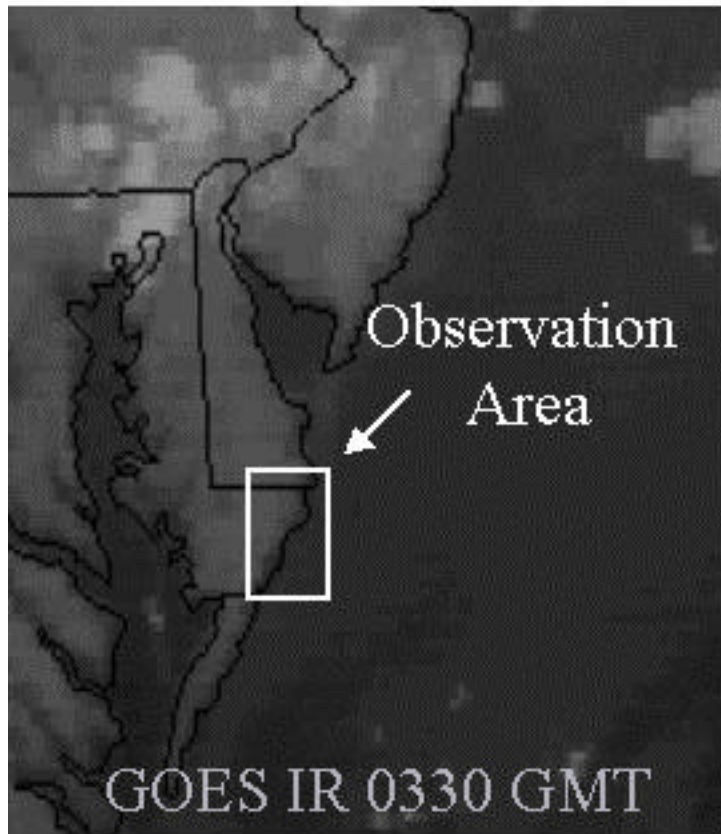
NASA Ames  
AATS-16  
(Redemann and Russell)

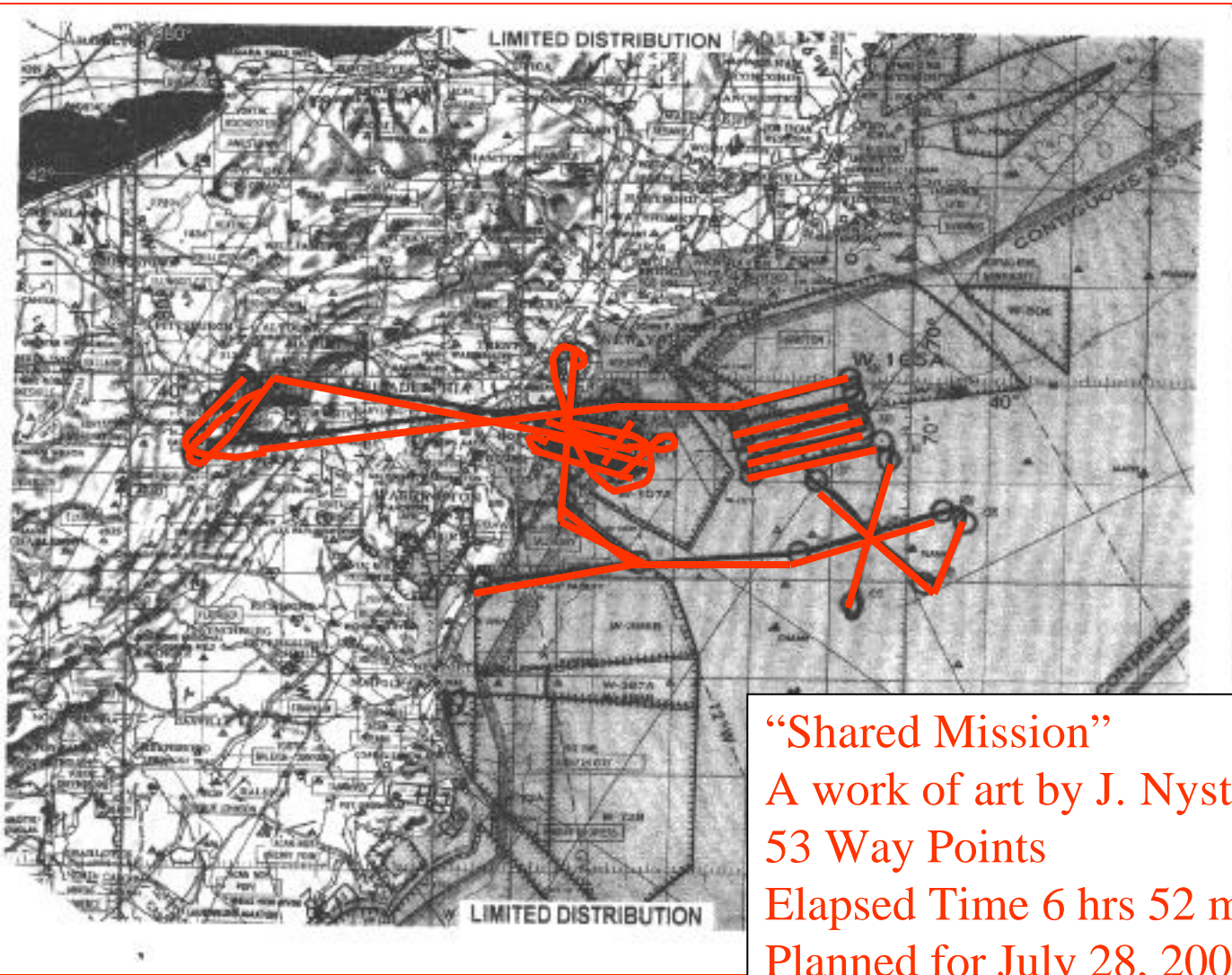




# Land Breeze Proteus Flight Track

## July 14, 2001





“Shared Mission”

A work of art by J. Nystrom

53 Way Points

Elapsed Time 6 hrs 52 minutes

Planned for July 28, 2001

Never flown

CLAMS = “Validation experiment”

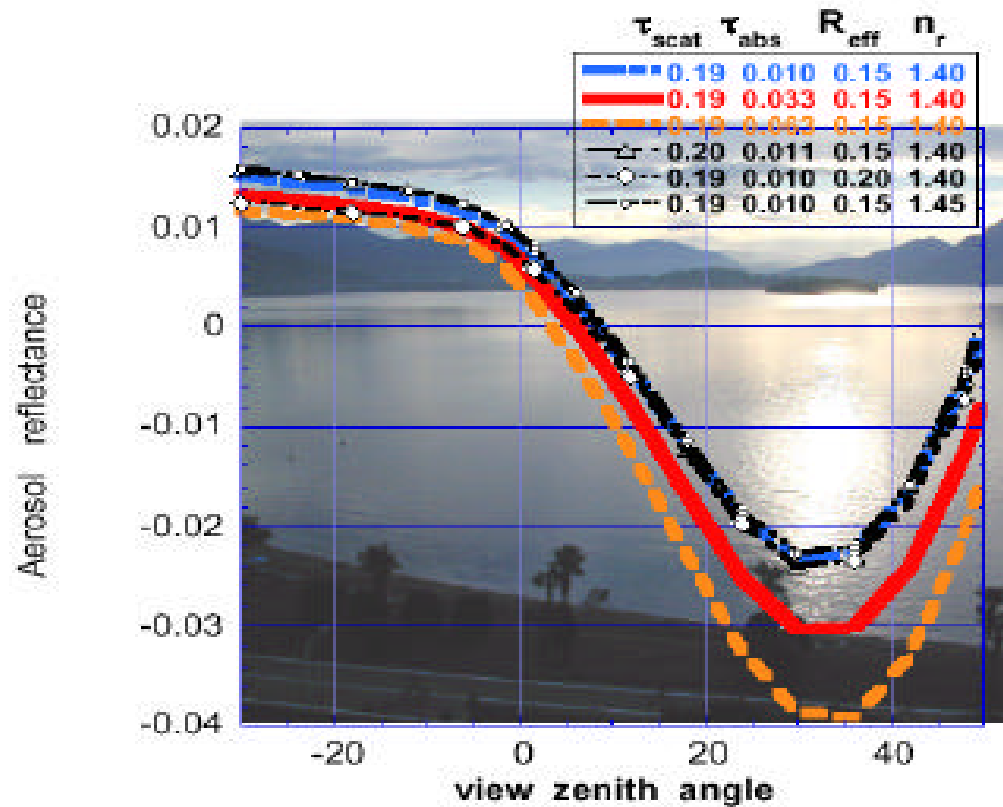
MODIS Aerosol group

CLAMS ≠ “Validation experiment”

CLAMS = “Developmental Experiment”

- Remote sensing of Light Absorption: Cobra Concept
- Glint Mask Development
- Aerosol retrievals over Sun Glint
- Cloud Mask Validation and Developments
- Spatial Variability
- Water Vapor

# Glint / off-glint measurements to detect aerosol absorption over the ocean



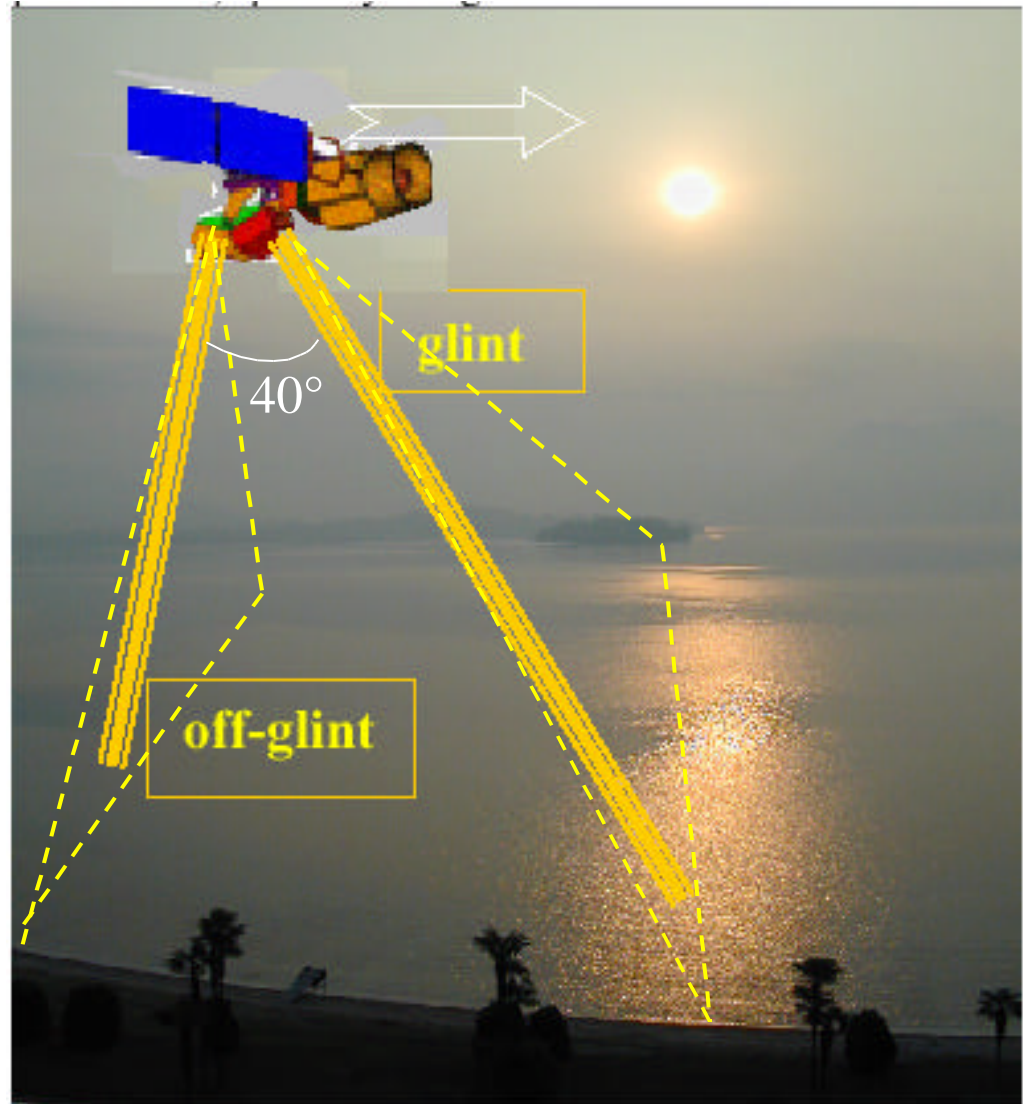


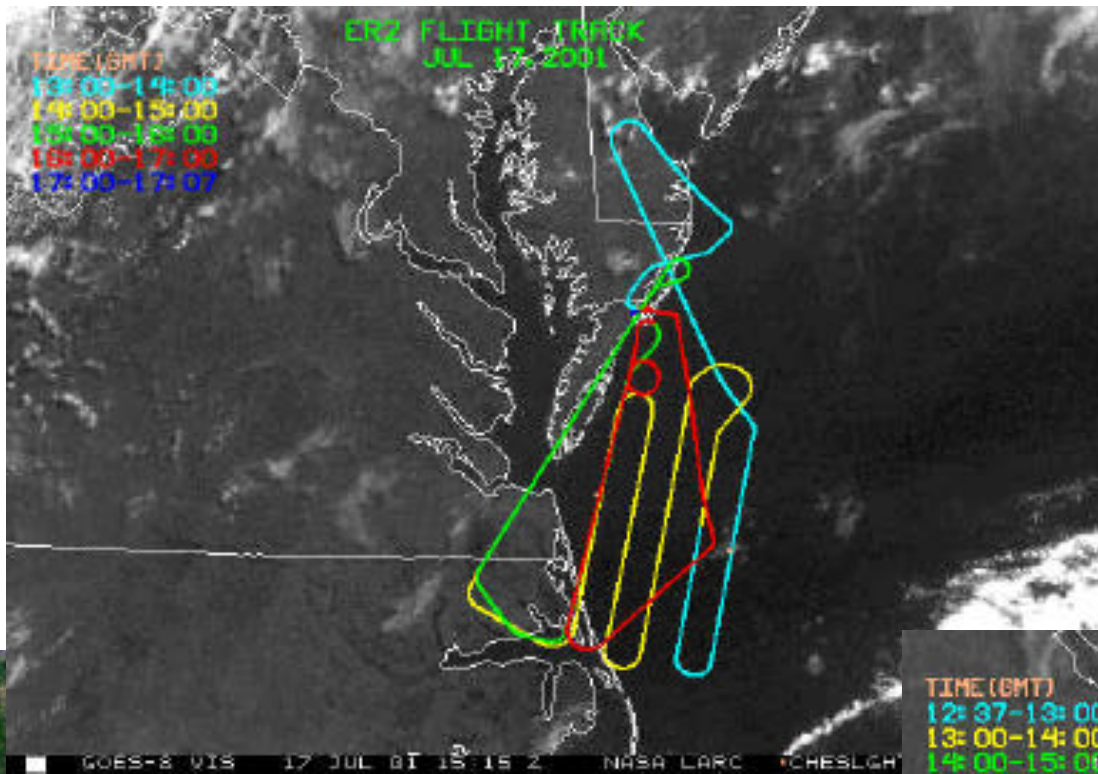
# DDF proposal for developments with CLAMS data

## Research plan:

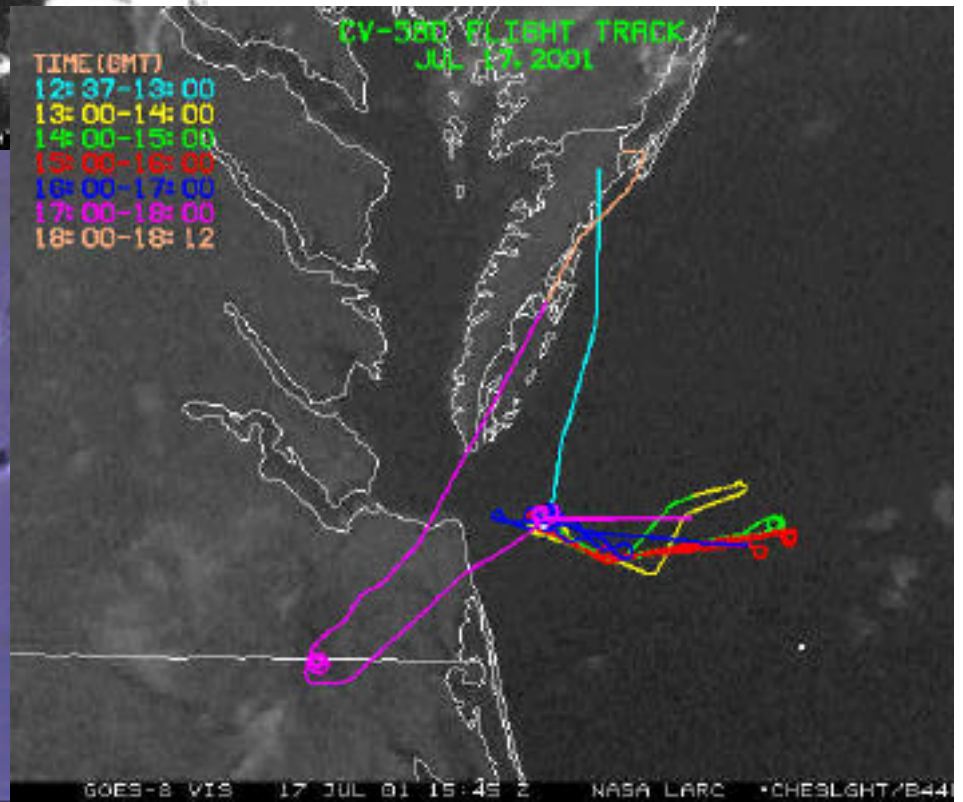
1. Use CLAMS aircraft data over ocean to derive aerosol absorption
2. Develop new standard in-situ measurement of aerosol absorption
3. Inter-compare in-situ techniques
4. Validate CLAMS remote sensing data

Satellite concept to measure aerosol absorption over the bright oceanic sun-glint





July 17  
The perfect day



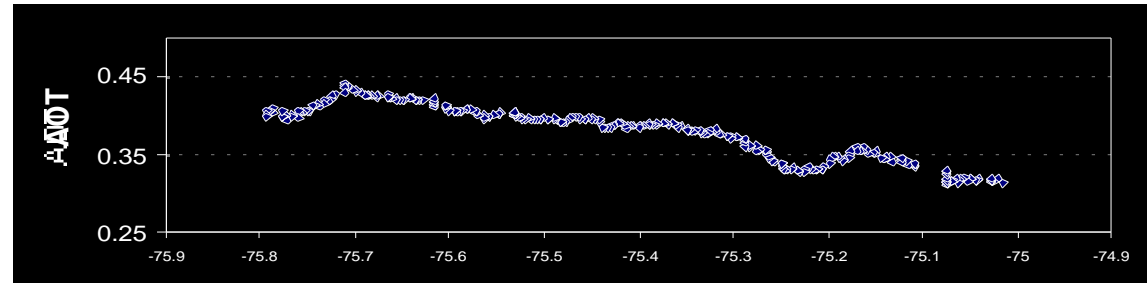


**July 17<sup>th</sup> case:**

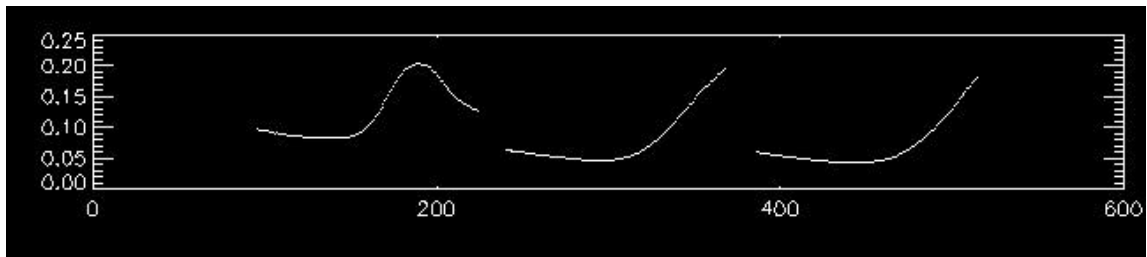
**“CLAMS  
geometry allowed  
for glint and non  
glint retrievals  
with MAS over  
the same area”**

Each track is  
displaced by \_  
swatch

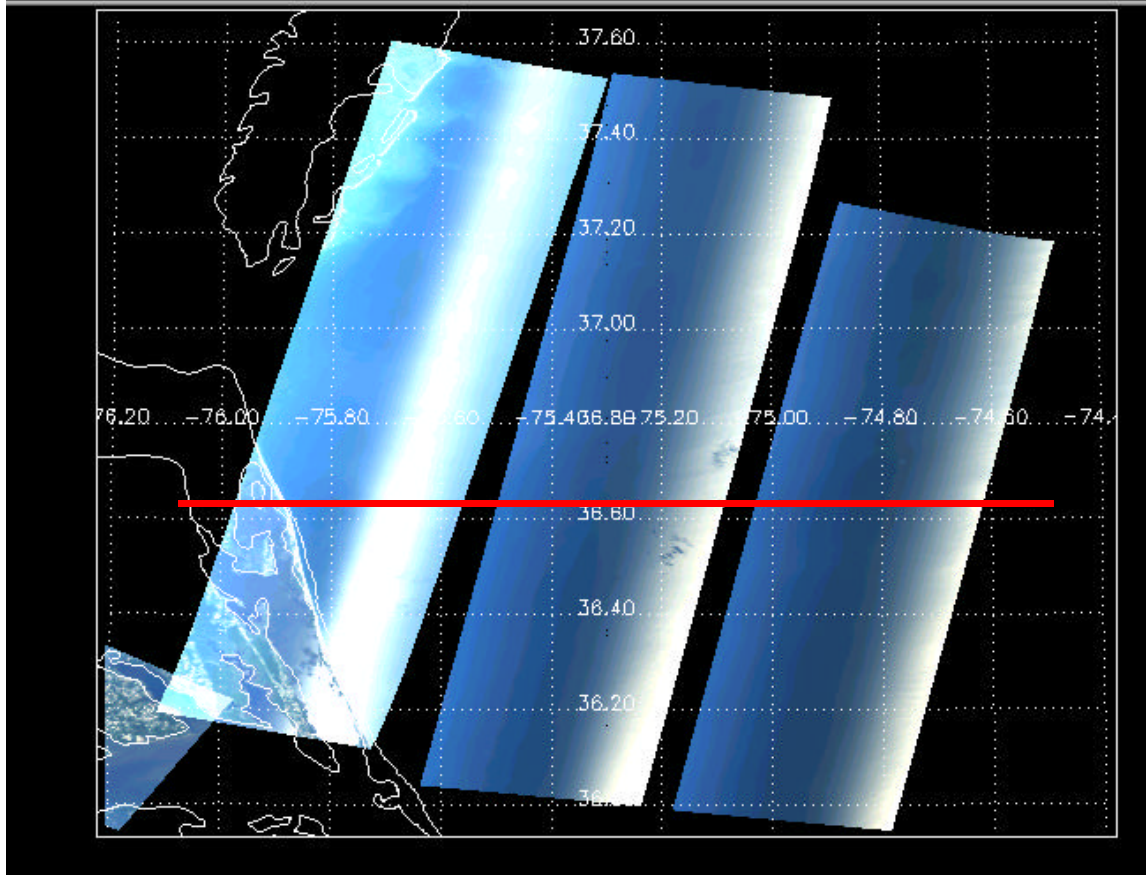
(It is showed here only every other  
image for simplicity)



**AATs  
AOD**

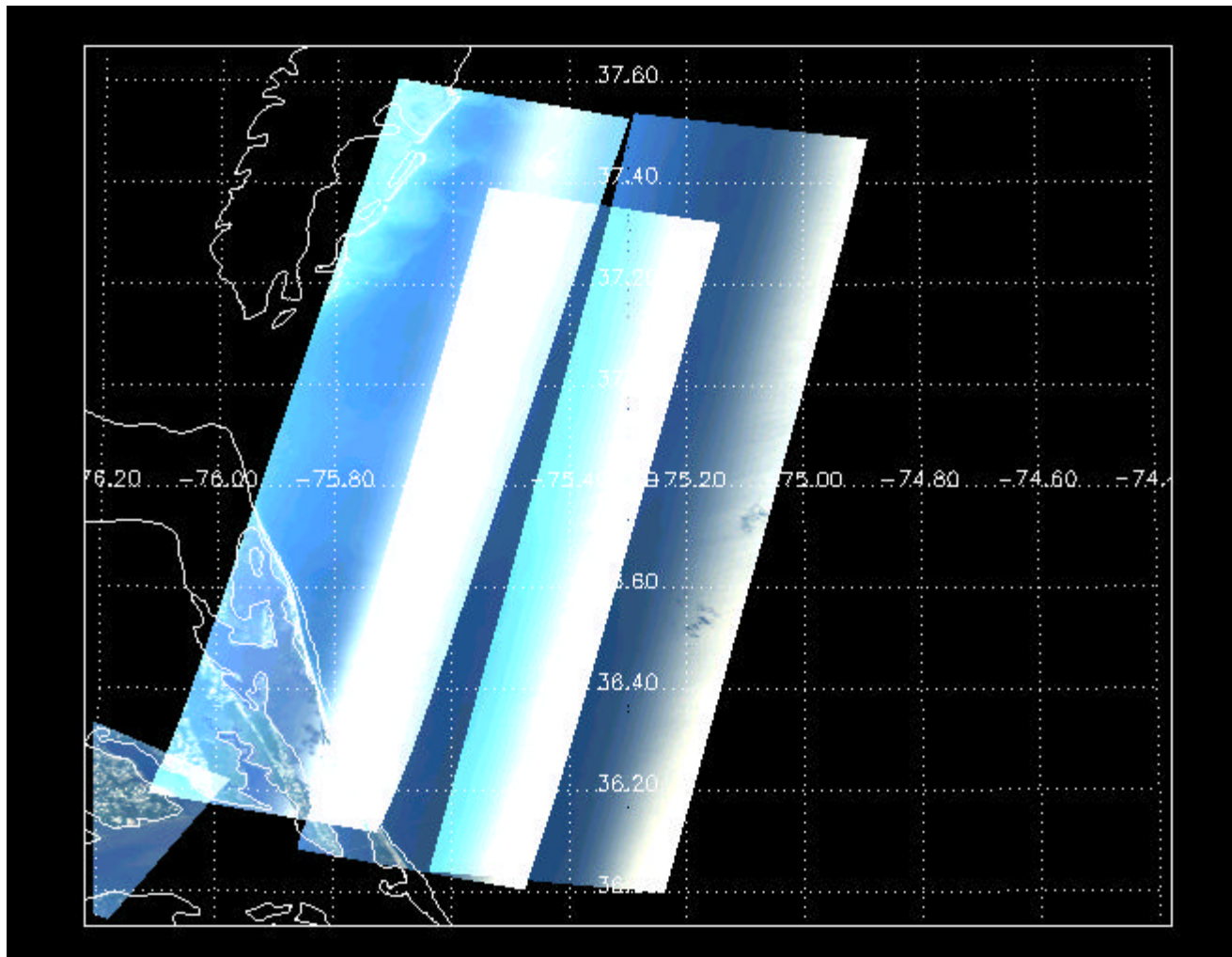


**Reflectance**



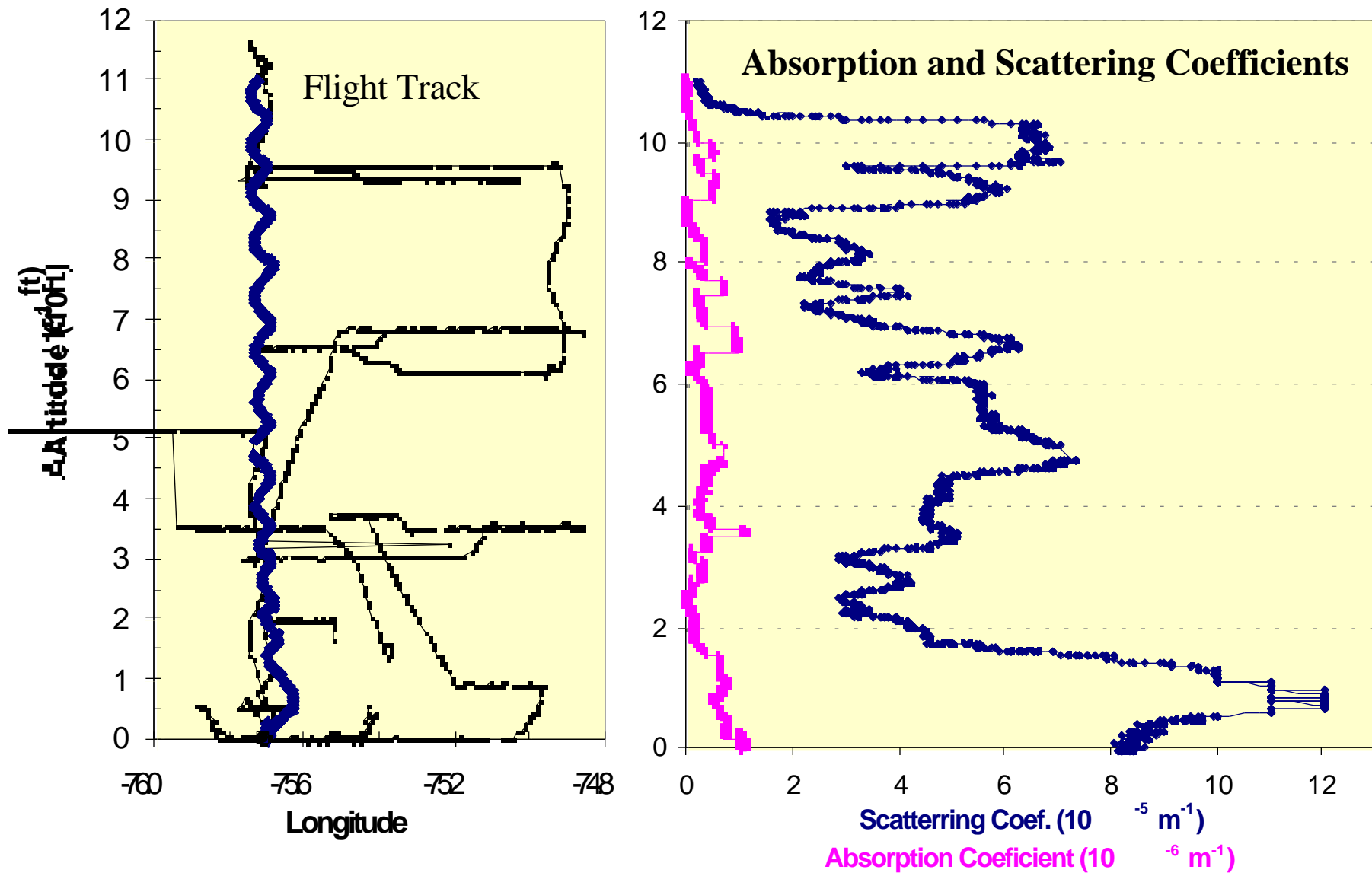
# Image Overlap for Sun Glint Studies During CLAMS

This geometry allow for aerosol retrievals in the whole area: glint and non-glint over the same spot

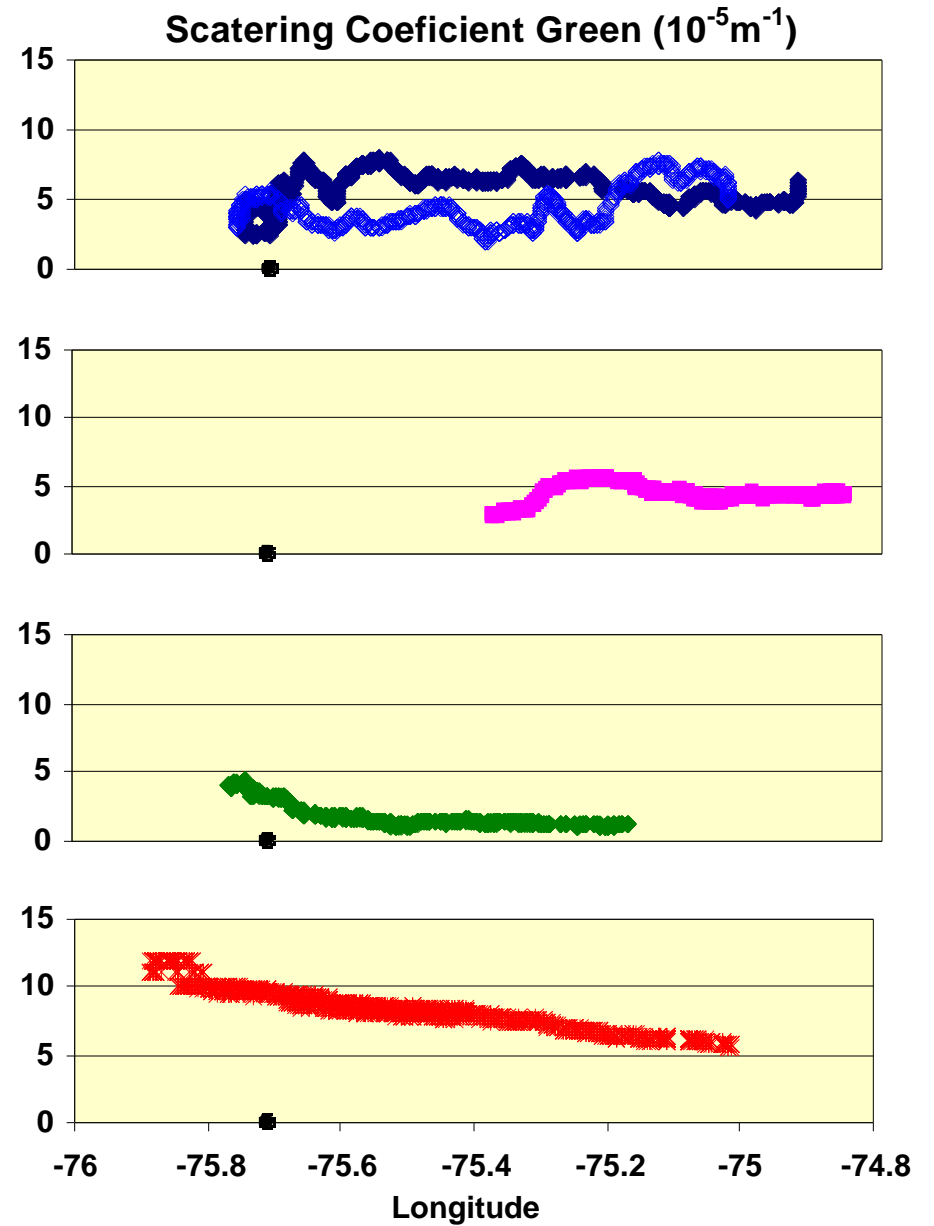
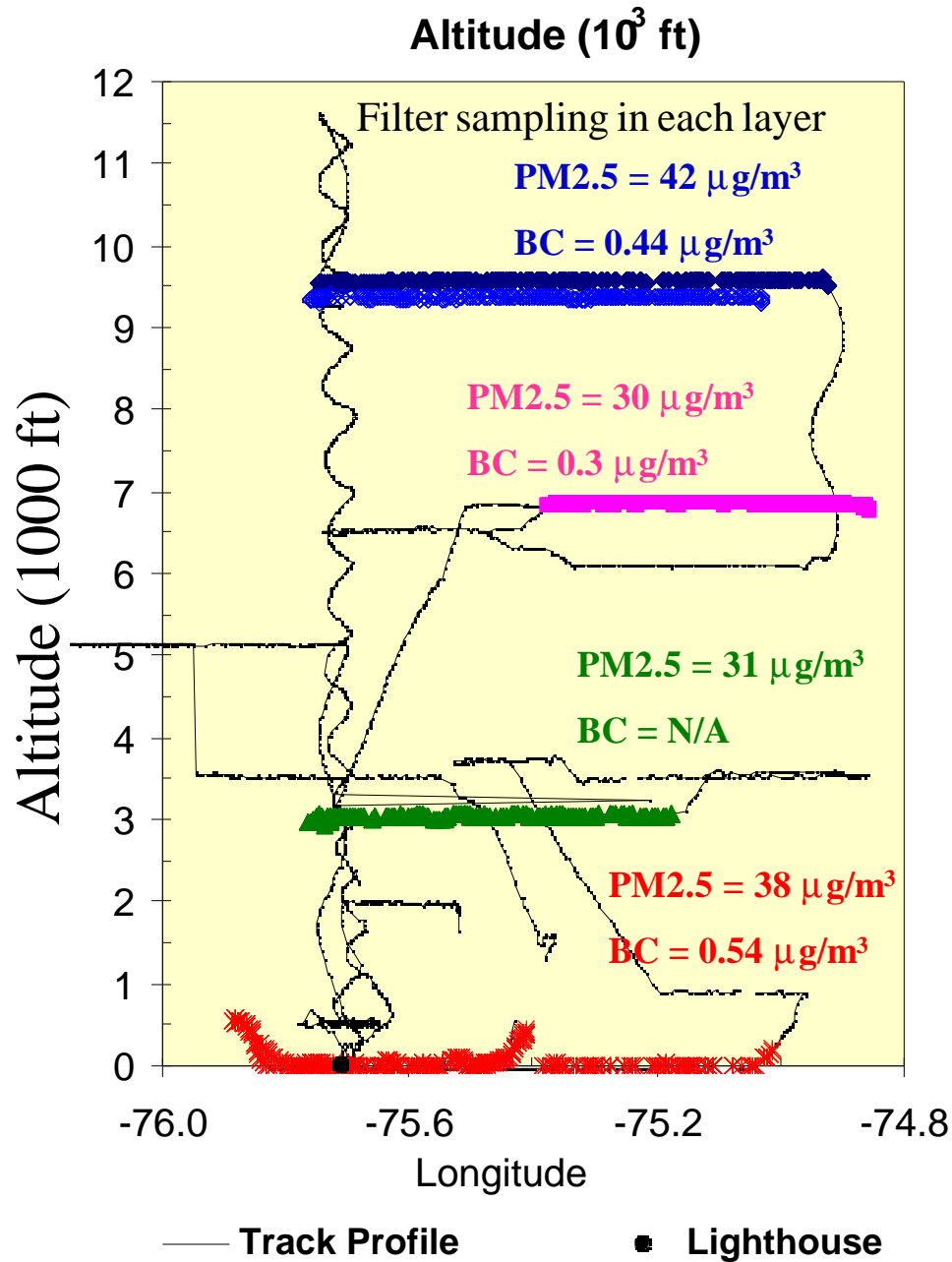




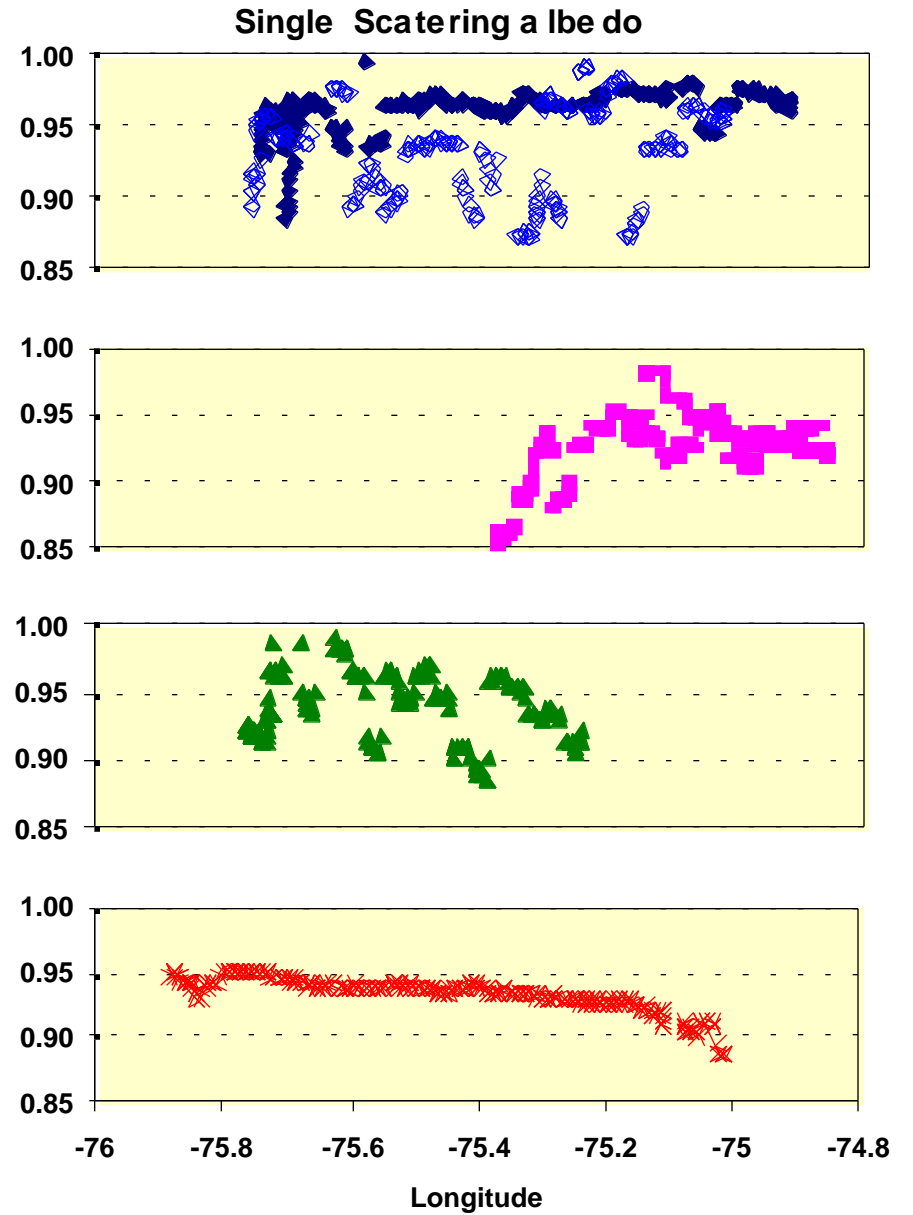
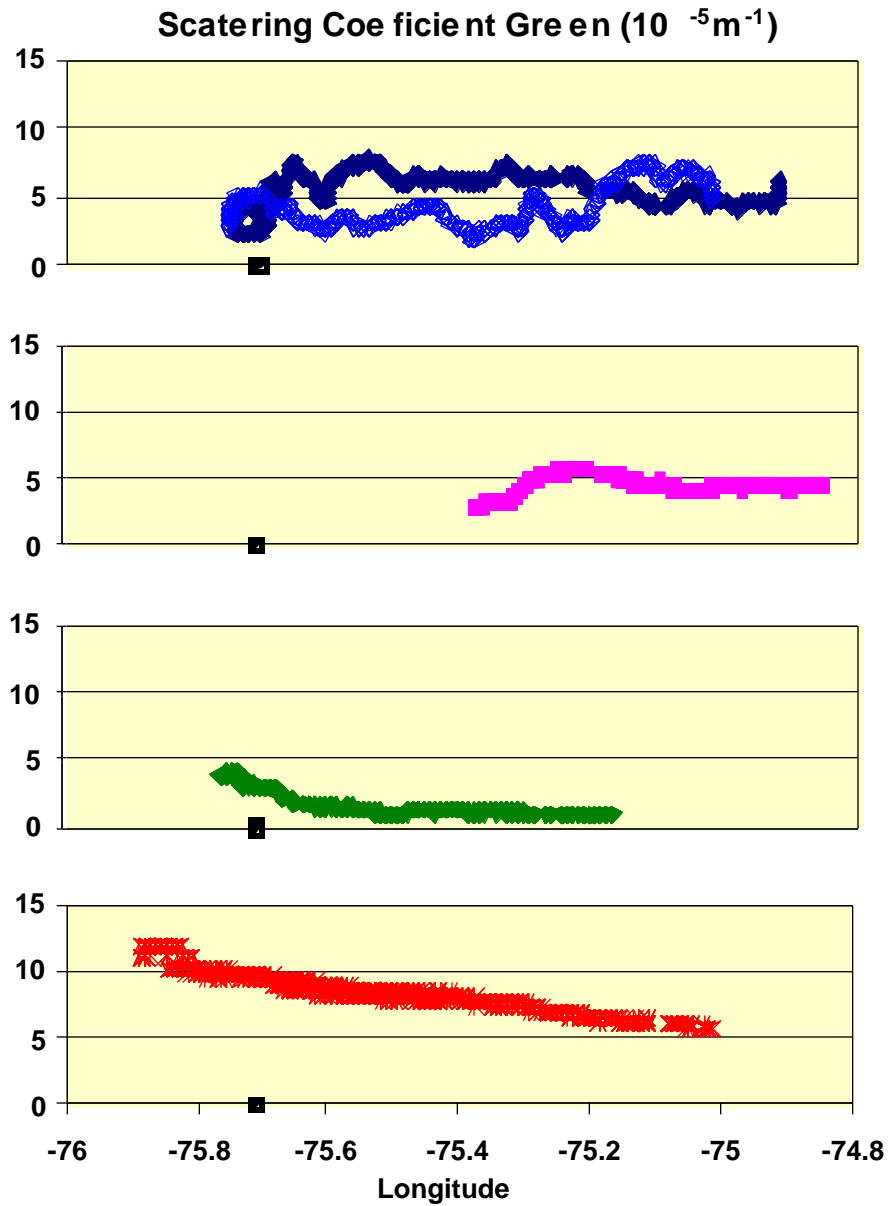
# Vertical Profile of Scattering and Absorption Coefficients UW CV580



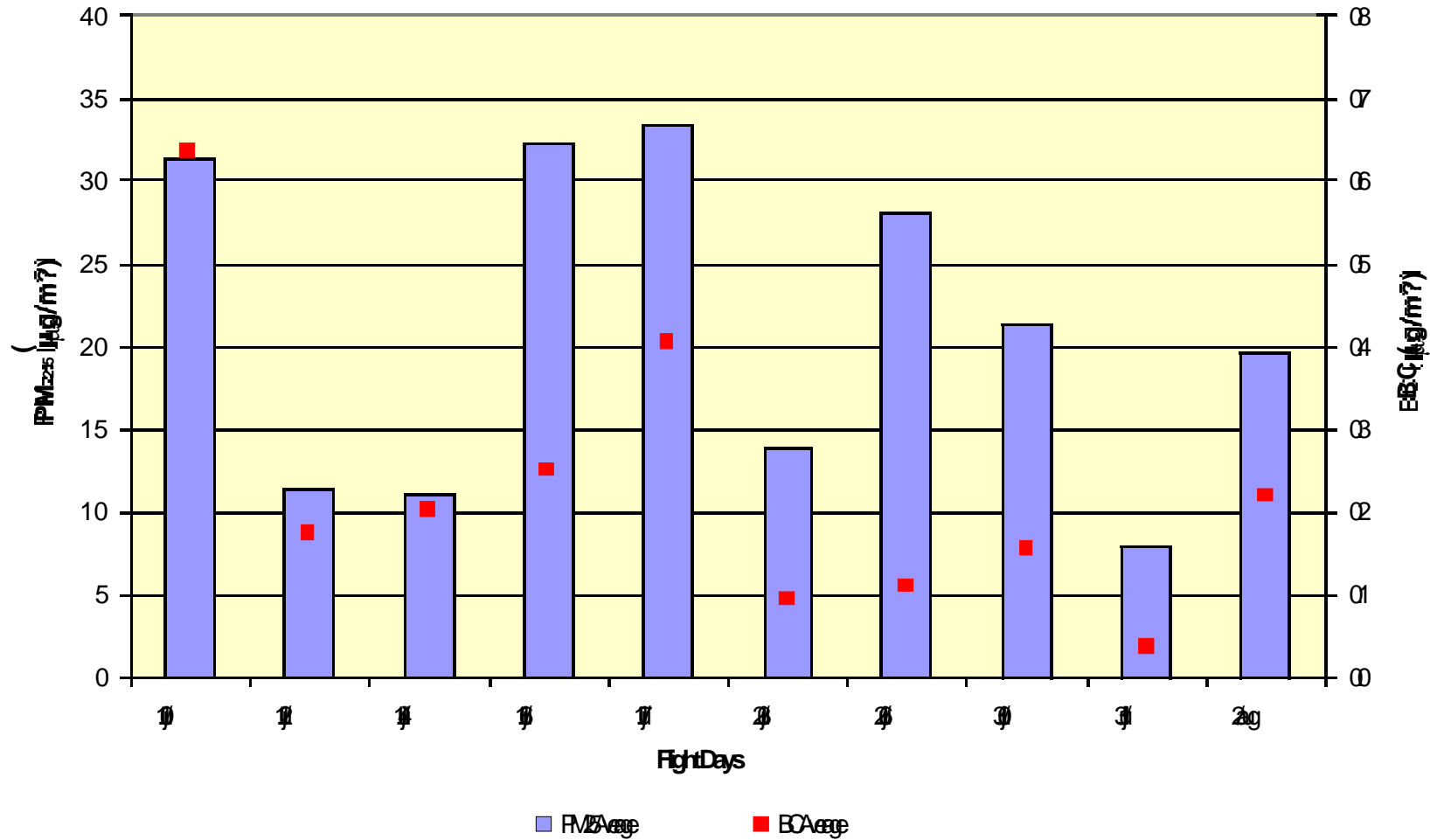
# Vertical Profile by the CV580 – July 17th



# Physical Properties in Each Layer



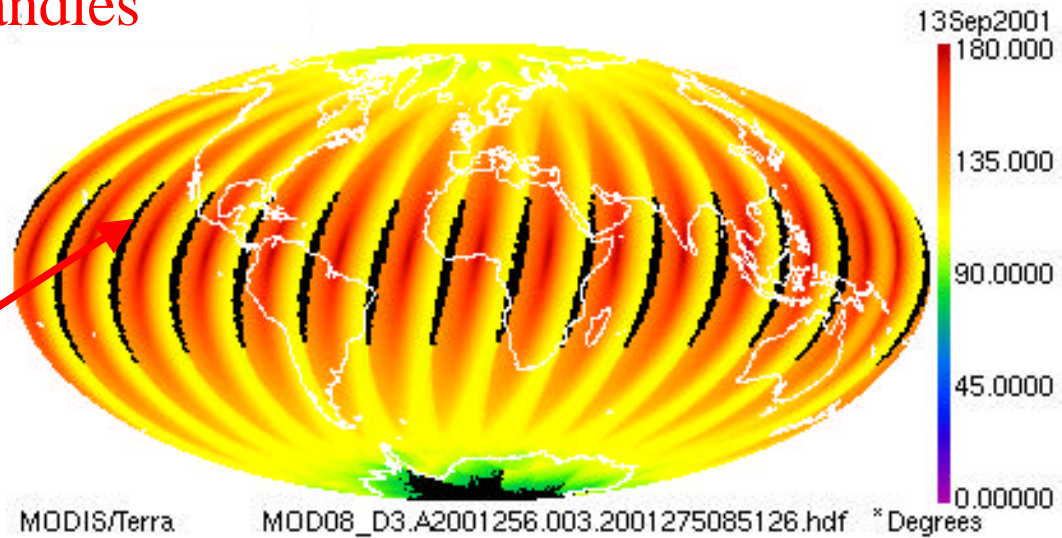
# Flight Average BC and Fine Particle Mass Concentration



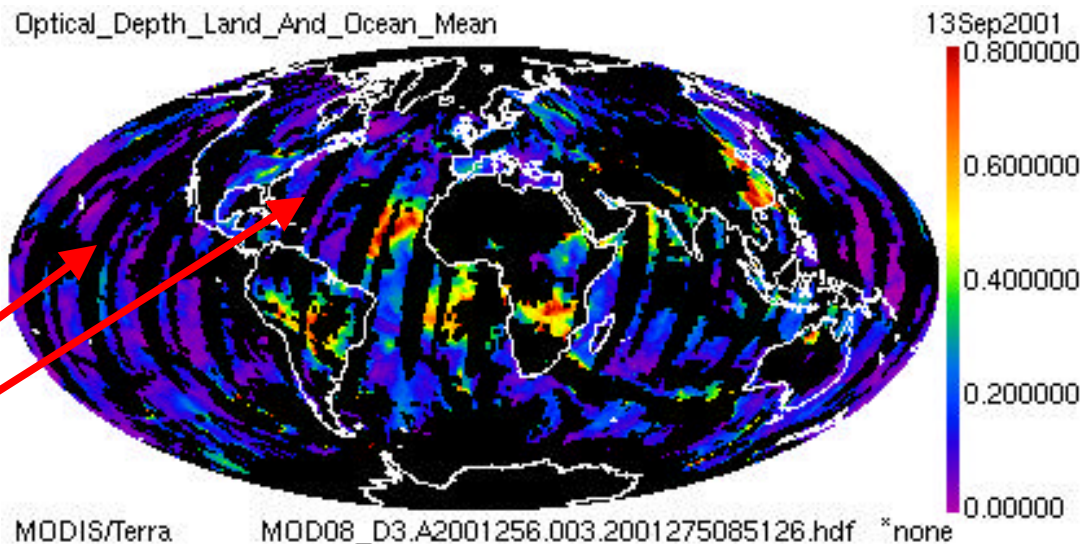


Another interest during CLAMS was to re-examine how the present algorithm handles glint.

Scattering angle plot shows small strips unavailable due to orbital geometry.

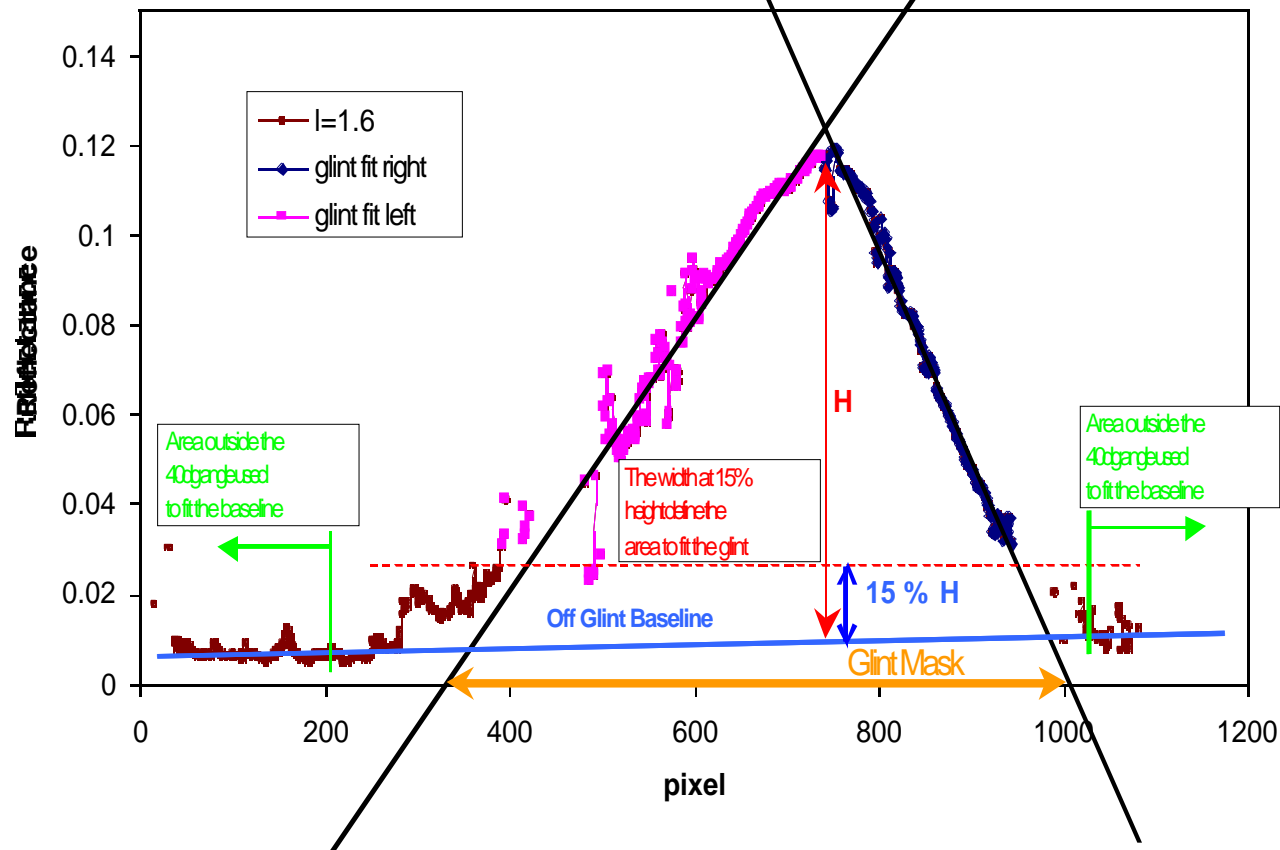


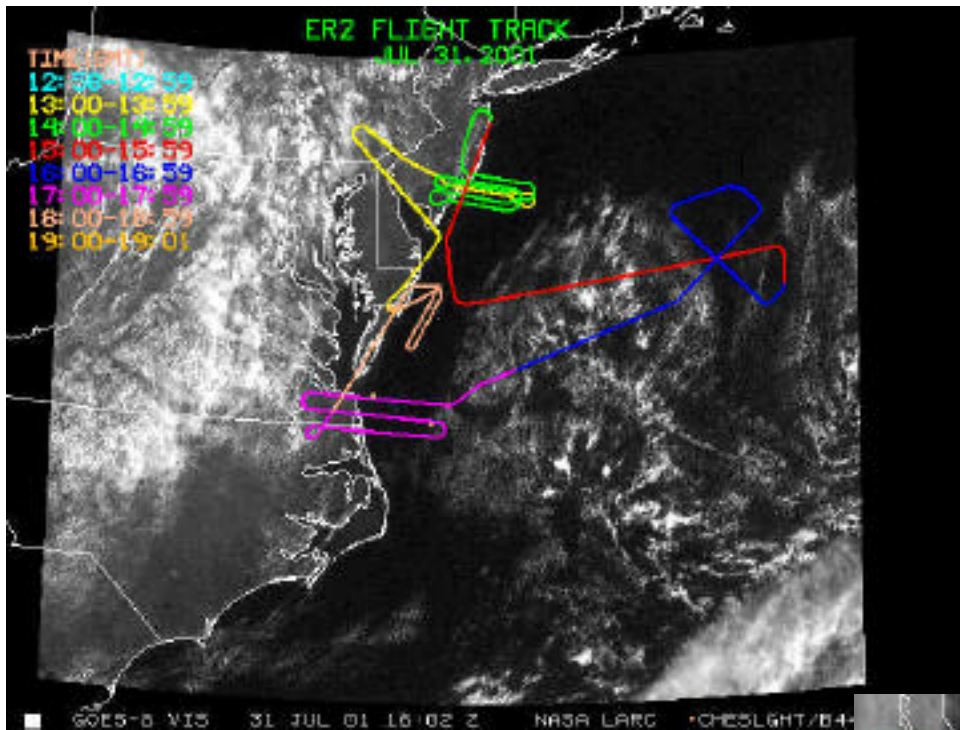
Static glint mask at 40 degrees cuts out an additional significant portion of ocean retrievals.



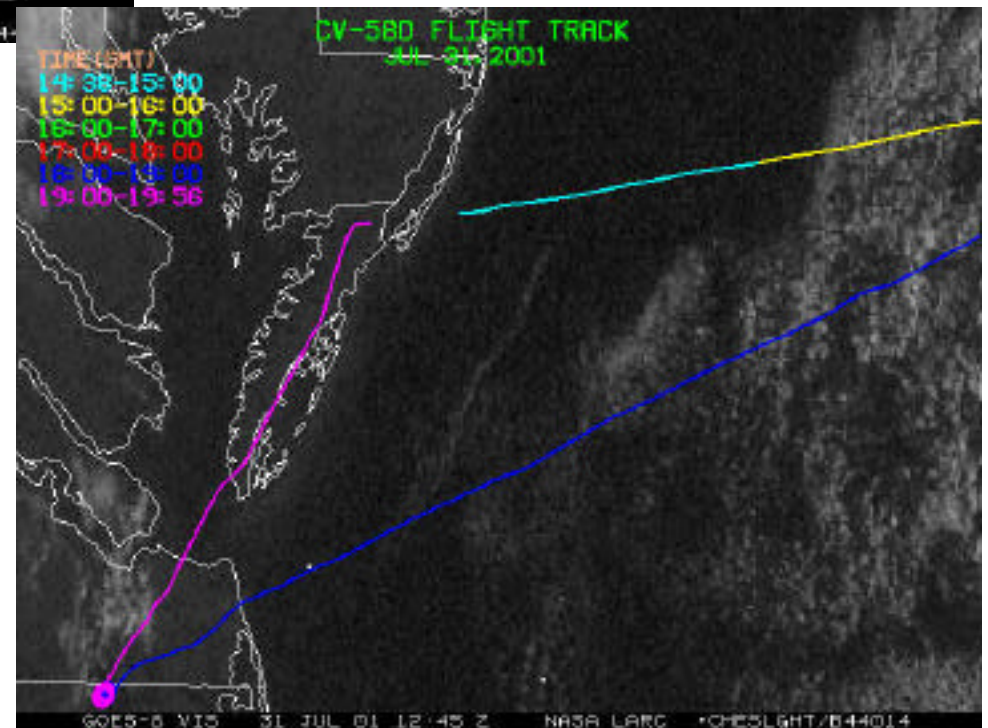
# Dynamic Glint Mask for MODIS

Glint Profiles for Clear region (day 110)





July 31





ER2 FLIGHT TRACK  
JUL 12, 2001

- TIME (GMT)
- 12: 25-12: 59
- 13: 00-13: 59
- 14: 00-14: 59
- 15: 00-15: 59
- 16: 00-16: 59
- 17: 00-17: 59

