

Ocean Discipline Report
MODIS-VIIRS Science Team Meeting
Jan. 26-28, 2010

Chuck McClain
NASA Ocean Biology Processing Group
GSFC

Discipline Sessions Agendas

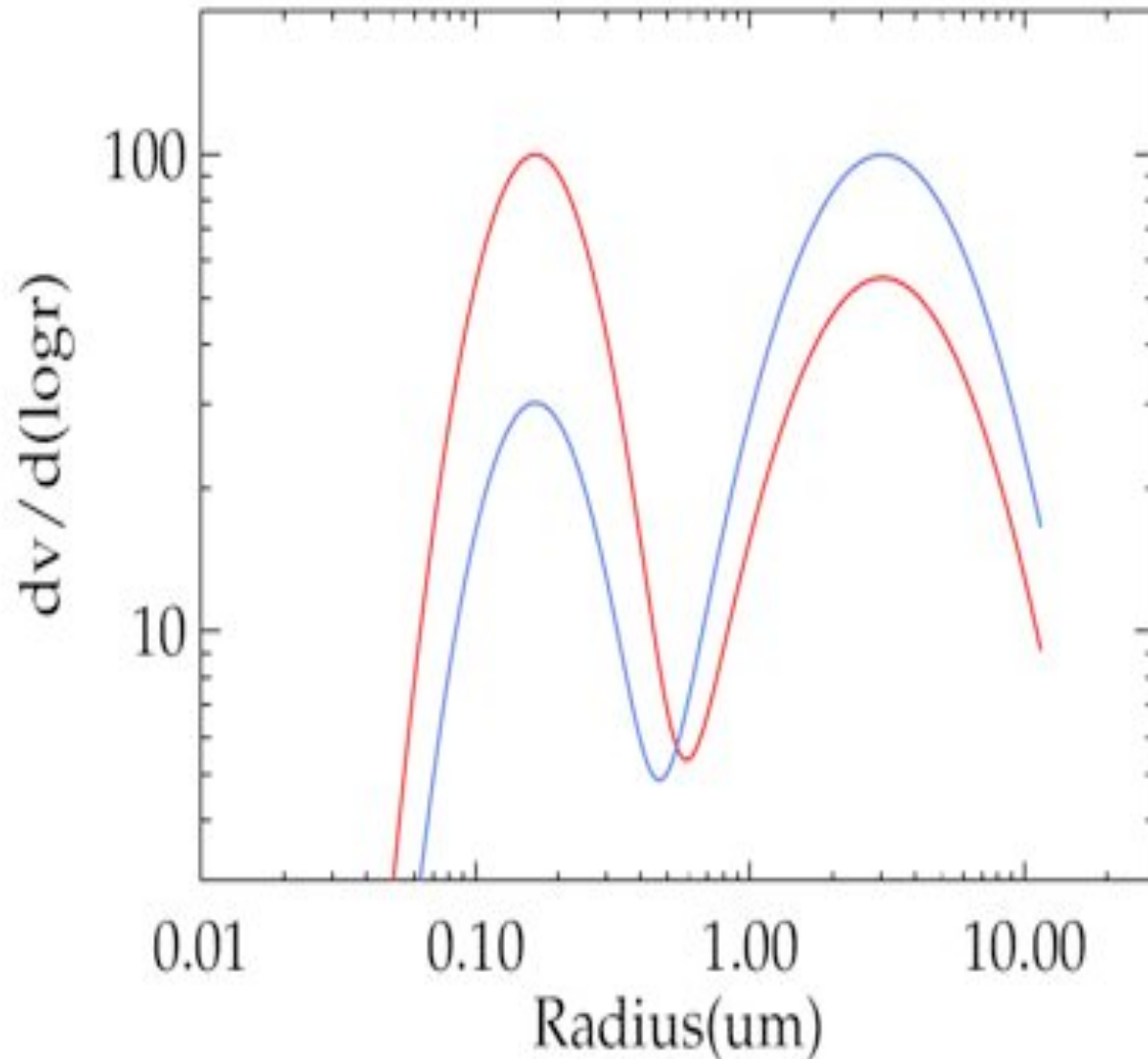
- MODIS
 - OBPG
 - Aerosol models - Ahmad
 - Calibration - Meister
 - Reprocessing - Franz
 - SeaWiFS status - Patt
 - Team Members
 - SST update - Evans/Minnett
 - Chl-a algorithm - Szeto
 - Calcite algorithm - Balch
 - Functional groups & particle size distributions - Siegel
 - Data merging - Frouin
 - Optical classification - Moore
- VIIRS
 - OBPG
 - IOP community algorithm - Werdell
 - VIIRS assessment - Turpie
 - VIIRS simulator - Robinson
 - Ocean PEATE - Patt
 - Community
 - NPOESS ocean cal/val planning - Arnone
 - SWIR-based atmospheric correction - Wang
 - 2nd generation MOBY - Johnson
 - Discussion

MODIS Highlights

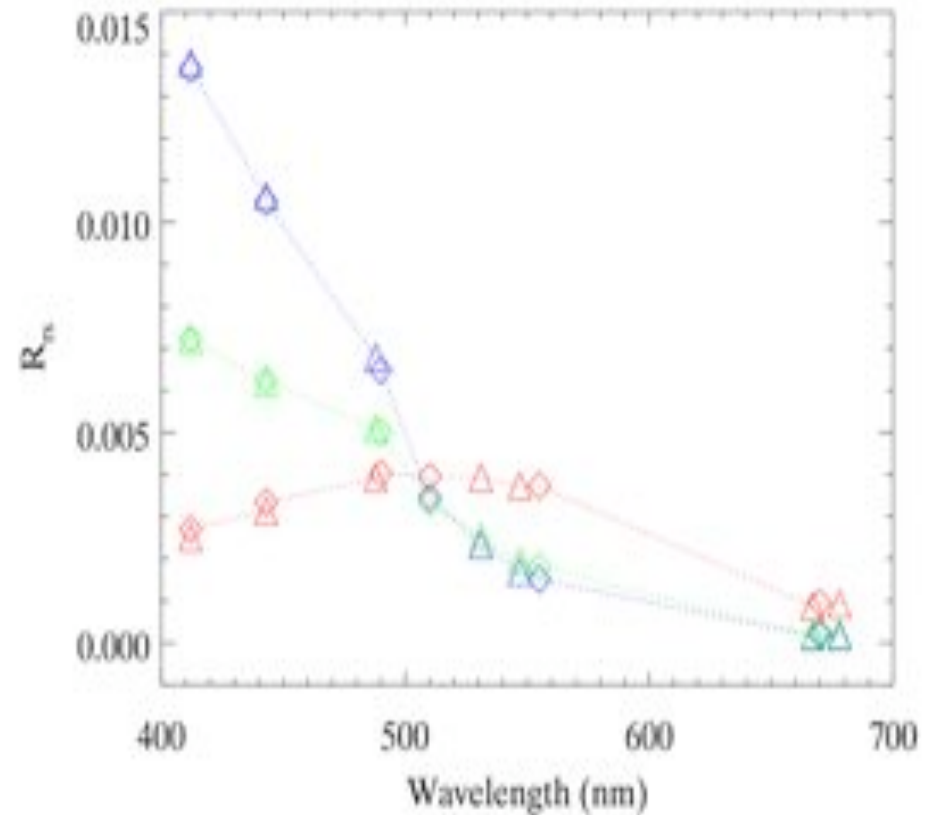
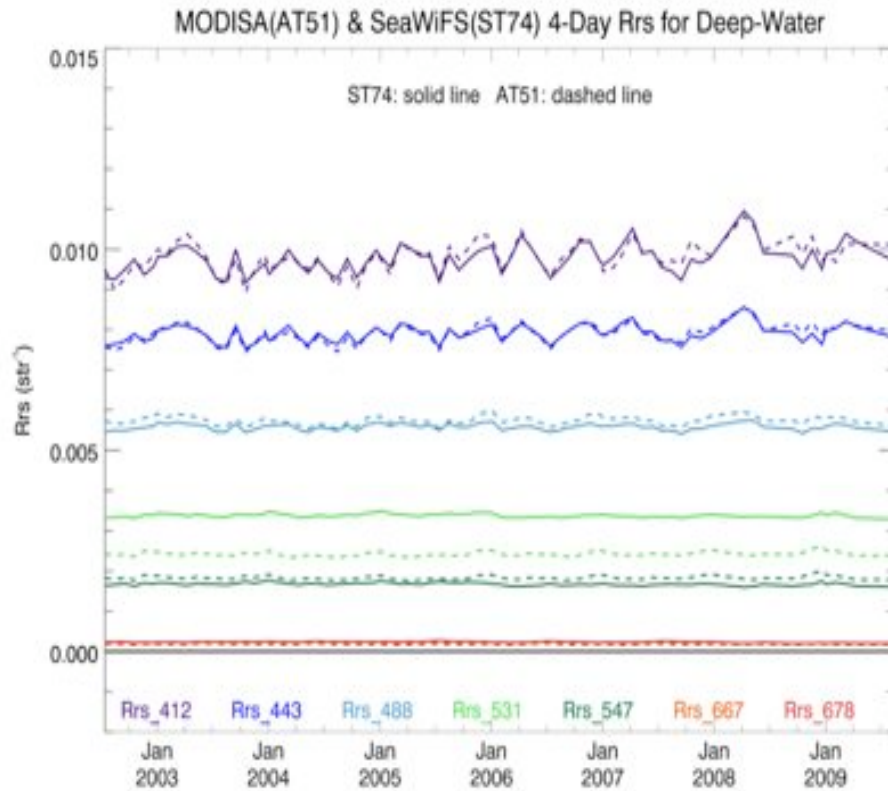
- MODIS Aqua reprocessing status
 - OC testing complete
 - Actual production to start with days
 - SeaWiFS & MODIS water-leaving radiances and chlorophyll-a are nearly identical
 - **2-3 years of constant “peeling the onion” to achieve this level of agreement...unprecedented**

Aeronet-based aerosol models:

An outgrowth of first ACE science team meeting

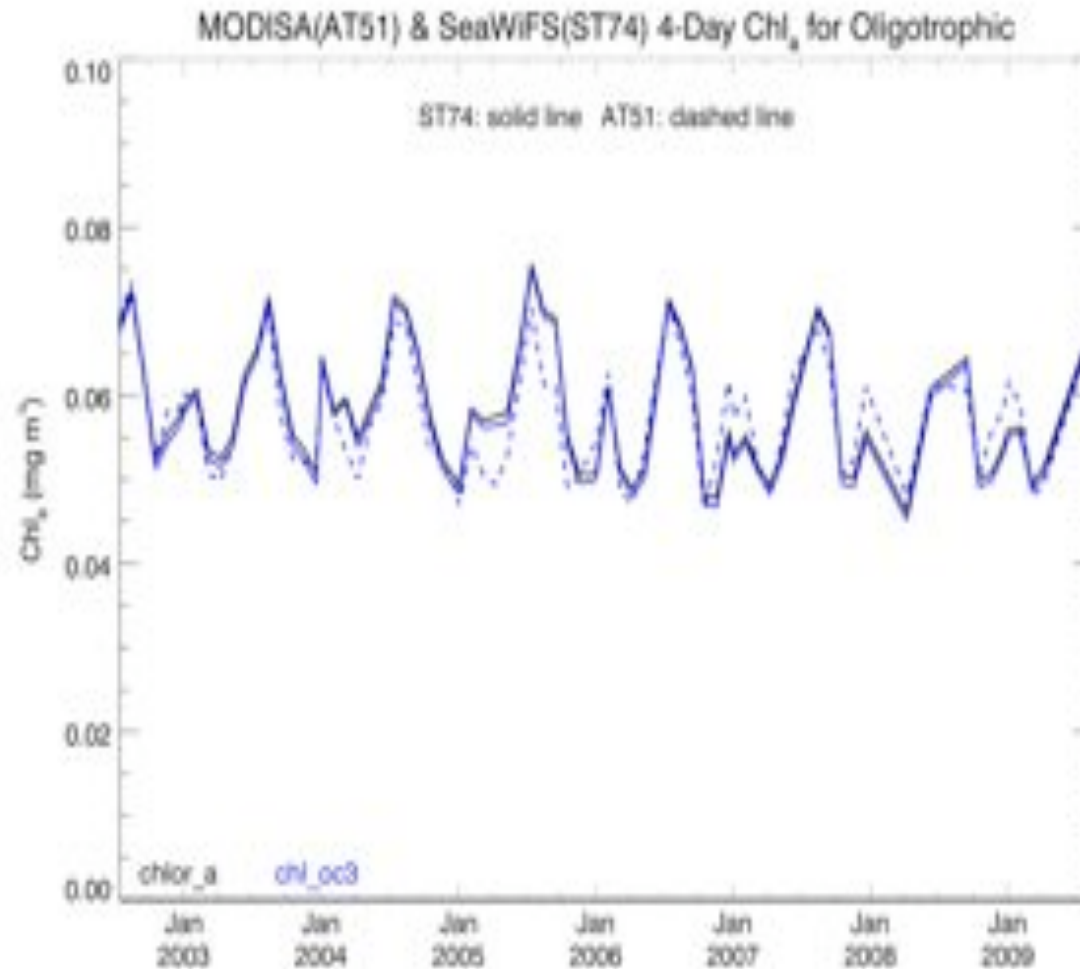


SeaWiFS-MODIS Comparisons



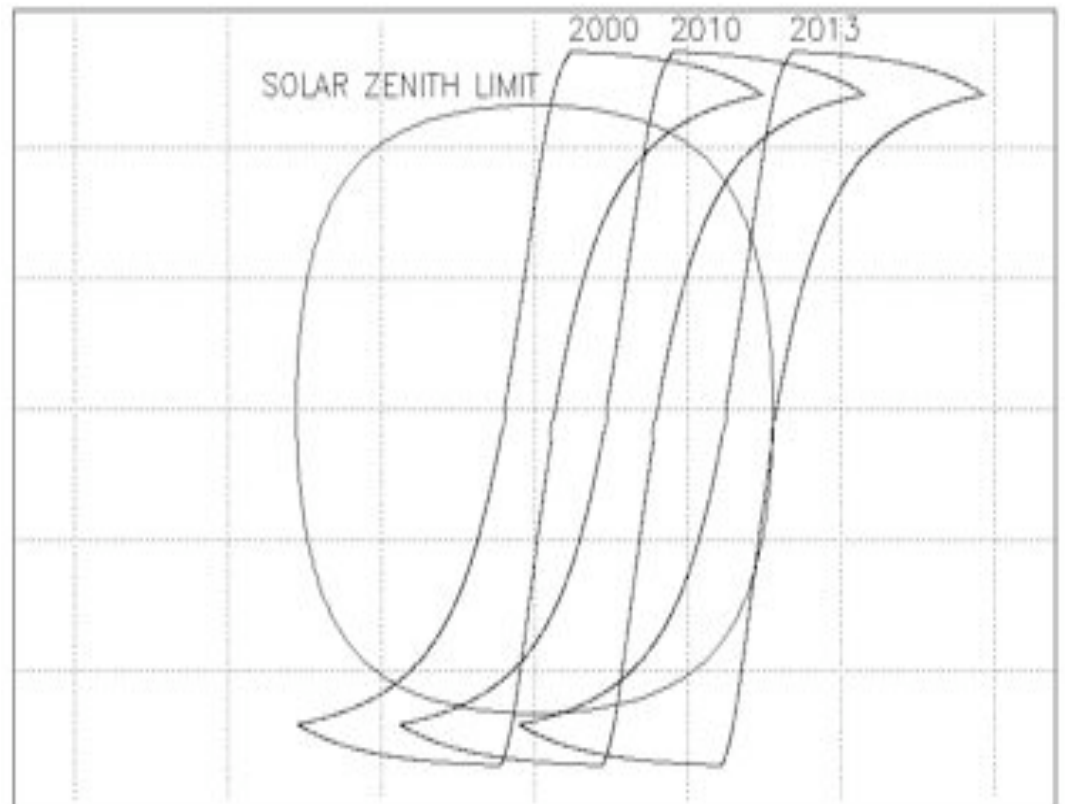
SeaWiFS-MODIS Comparisons cont.

Oligotrophic Ocean
Chl-a < 0.1 mg/m³



SeaWiFS Status

- Instrument performing perfectly
- Orbit drifting: nodal crossing now ~ 2:00 pm
- Orbit raising planned this spring
- Otherwise,
no data and no
navigation in 2013!

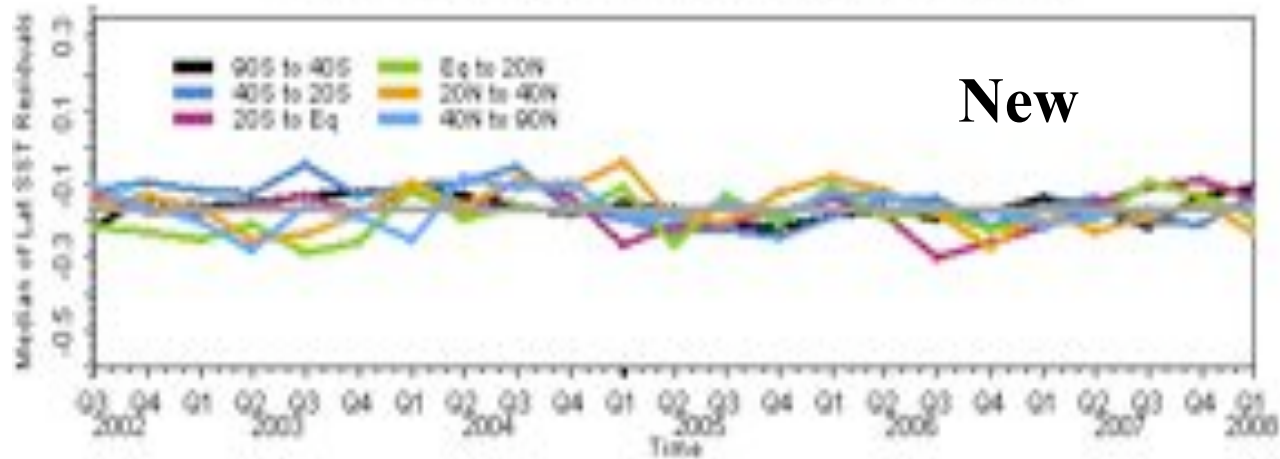


SST Update: U. Miami

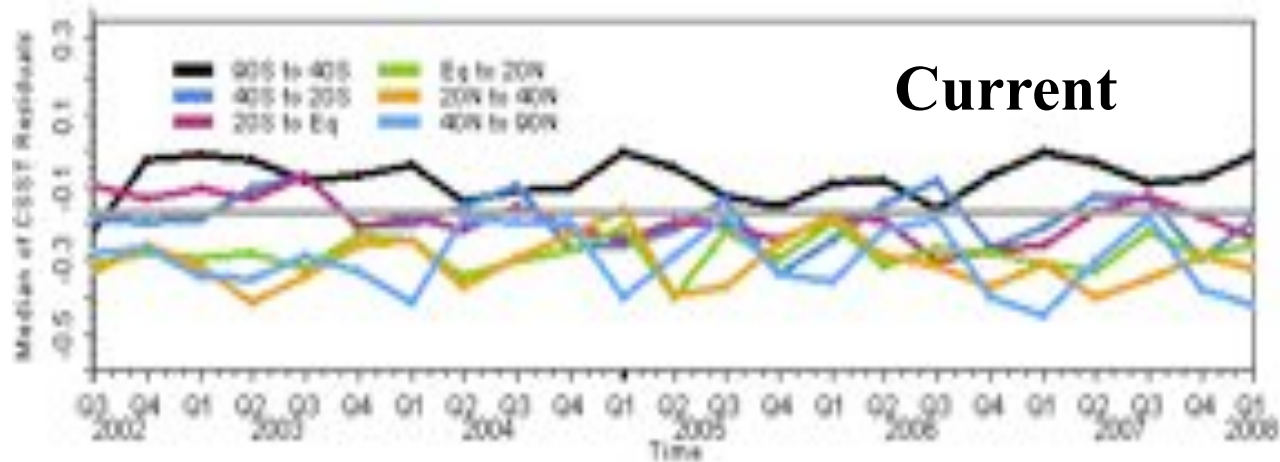
- 3rd IR radiometry workshop held in 2009 (at RSMAS)
- Field data collection continues using both manned (M-AERI) and automated (ISAR) systems
- M-AERI Mk2 under development (NASA funded)
- New SST coefficients derived using MODIS Version 6 calibration
 - **Mean SST residuals roughly -0.2°C**

Application of LATBAND to MODIS AQUA, V5 LUT

AQUA - Median of Lat SST Residuals by Latitude Band

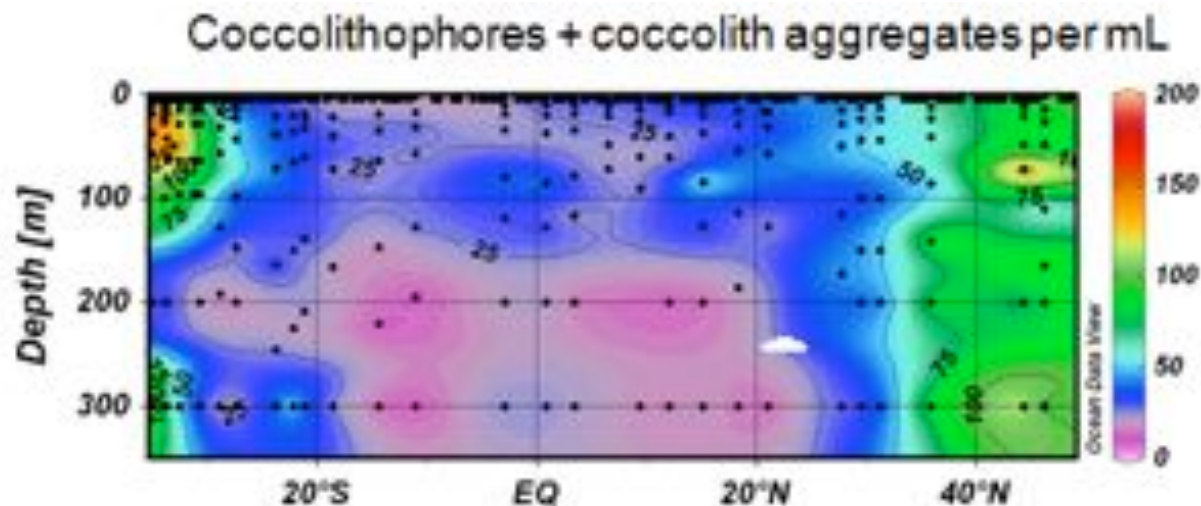


AQUA - Median of CSST Residuals by Latitude Band



Calcite Algorithm: Balch

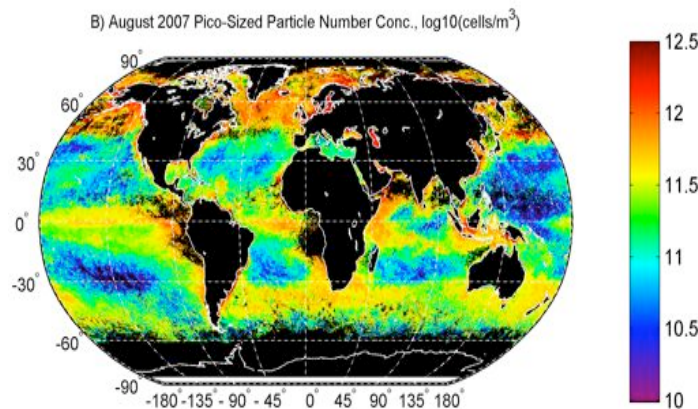
- Very active field program including several basinscale data sets collected (Atlantic Meridional Transect, etc.)
- Emerging picture of calcite distributions and calcification rates...particularly in ocean “deserts”
- Calcite included in ocean color archive product suite (SeaWiFS and MODIS)



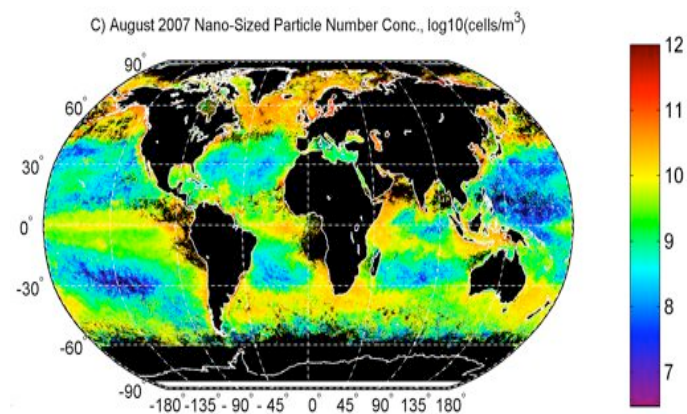
Spatial Distribution of Particles: Siegel

Partitioning Number Concentration

Pico-particles (0.5 μ m to 2 μ m)



Nano-particles (2 μ m to 20 μ m)



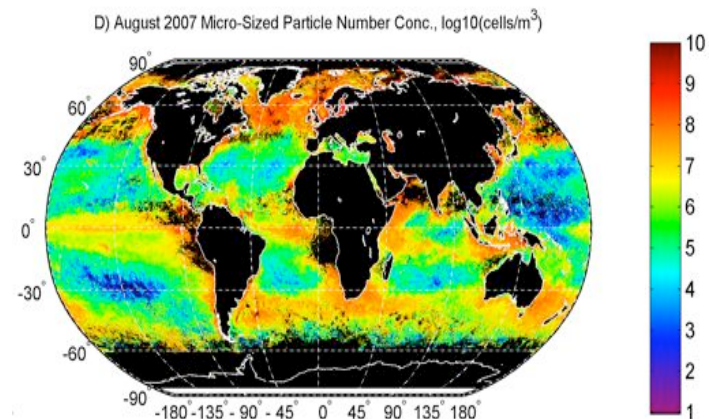
Pico's vary ~ 100 times

Nano's vary $\sim 10,000$ times

Micro's vary $\sim 10^6$ times

$\log_{10}(\text{particles}/\text{m}^3)$

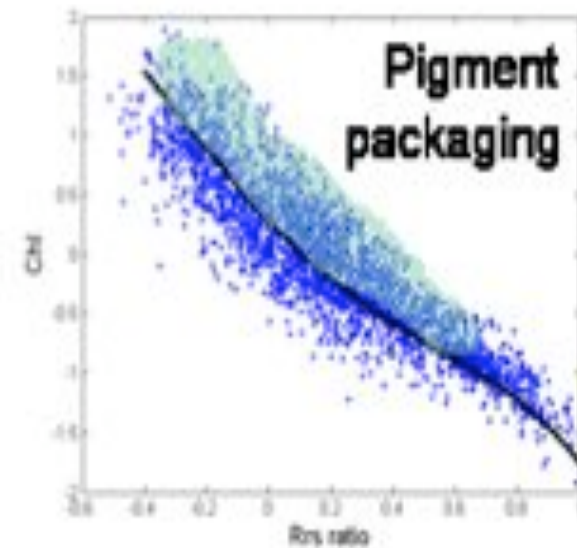
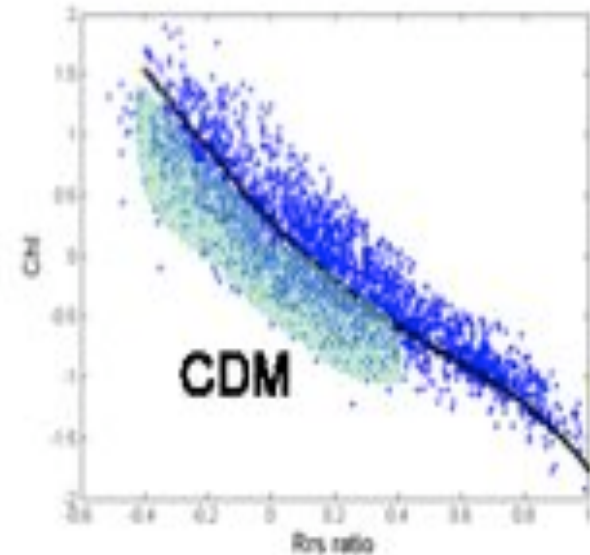
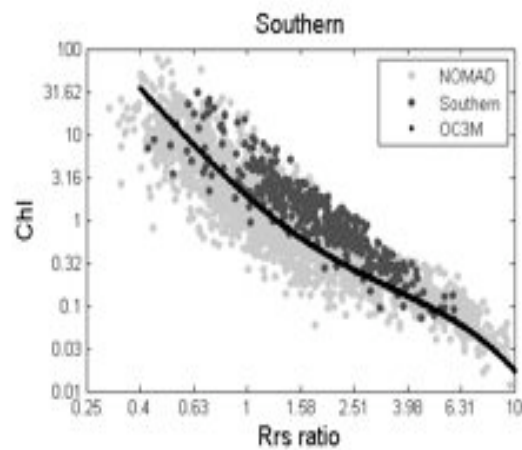
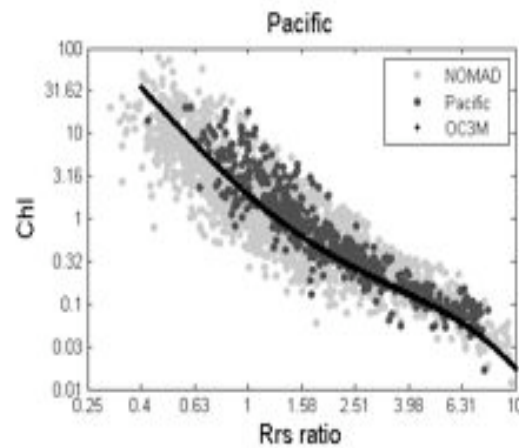
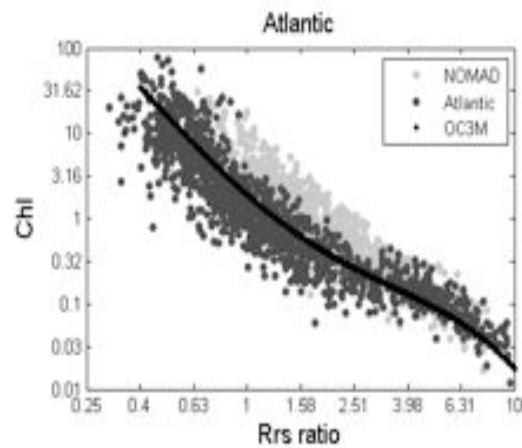
Micro-particles (20 μ m to 50 μ m)



Kostadinov et al. [2009 - JGR]

Chlorophyll Algorithm: Regional Biases

Mimi Szeto/UNH



Ocean basins are optically different. Chl-a algorithm has regional biases due to CDM & pigment packaging.

VIIRS: EDRs to CDRs

The Ocean Color Mantra (since science team inception):

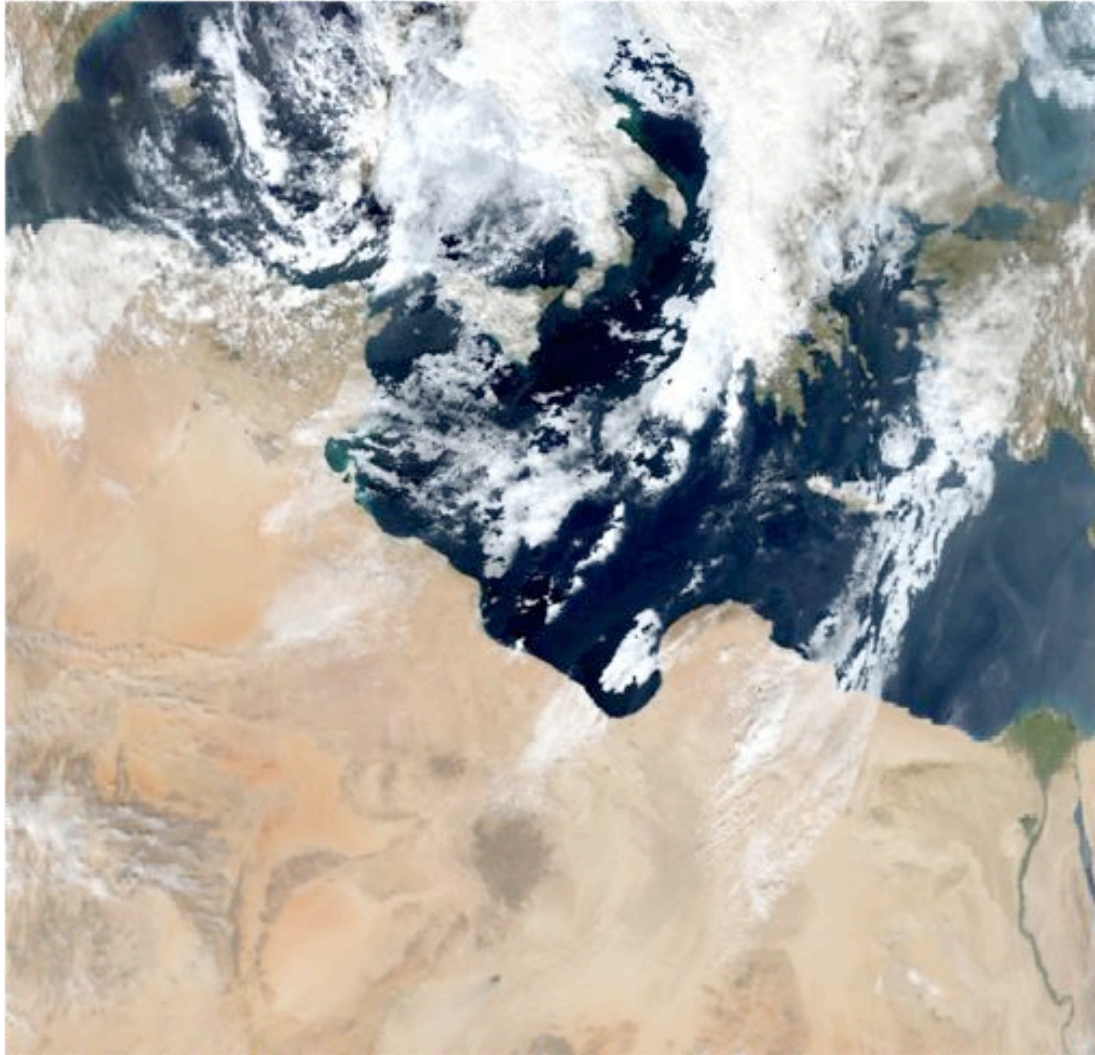
Thorough, complete & accurate calibration/characterization

Lunar calibration & maneuvers

Consistent atmospheric correction & bio-optical algorithms

Reprocessing

VIIRS Simulator



Ocean Team Discussion

VIIRS: Provide near-term, mid-term & long-term requirements to phase program to meet climate data record requirements at least to extend SeaWiFS/MODIS time series & perhaps other community needs.