Assuring Ocean Color Product Consistency of NPOESS Products

1) Define a VIIRS Proxy Data Stream

2) Define the required in situ data

3) Tuning of algorithms and LUTS (Vicarious

4) Ocean Algorithm, stability evaluation and

5) Product validation and product long-term

6) Satellite inter-comparisons, robustness,

Presenter/Affiliation:Tim Wynne, NOAA

Performers: Rick Stumpf, Tim Wynne, Omar Manuar, Cordelia Neff

Thrust area: **Satellite inter- comparisons, robustness, seasonal and product stability**

Award date: May 2009

Total Man-Months Effort:

FY09	FY10	FY11
8 mo	8 mo	12 mo

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Assuring Ocean Color Product Consistency of NPOESS Products

Project Objectives

Deliver protocols and low-cost radiometers to be deployed on NOAA ships of opportunity

Deliver protocols to intercalibrate VIIRS proxy Data and existing ocean color data.

Assure VIIRS products will be useable for NOAA's opperational requirements

Supports: Ocean cal/val plan elements 2, 4,5, 6

Major FY09 Challenges/Issues

Need to be able to process VIIRS proxy Data (APS v 4.0.2 has had various bugs)

Obtaining a pool of radiometers

Coordination within the cal/val team

Milestones / Deliverables

		FY 09 1 2 3 4	FY10 1 2 3 4	FY11 1 2 3 4
1.		2		1
2.			1	
3.				1

Major Progress

Developed framework to process raw radiometeric data into seabass/fcheck compliant files

Most protocols have been written for data Acquisition.

Preliminary image to image comparisons.

Assuring Ocean Color Product Consistency of NPOESS Products

Collaboration and Coordination with Inside and Outside Activities

Need to establish consistent protocols for Rrs between cal/val groups

Discussion on cross-sensor validation strategies

Transition Partners

Engagement of various NOAA field programs
Transition of processing capabilities to NRL, NASA, or NESDIS/STAR

Leveraged RDT&E Projects

Leveraged on other projects in NOAA (Primarily ships of opportunity).

International Partnerships

None identified at this time

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Assuring Ocean Color Product Consistency of NPOESS Products

FY 09- MILESTONES Completed 🟩 In Progress 🟦

- Develop in situ data collection protocol for satellite products validation
  - Calibrate instruments for consistency with cal/val group
  - Review field protocols with NRL
  - Implement post-processing software and protocols used by NRL
  - Conduct test field acquisitions in different sites
  - Deliver in situ data sets to NRL for satellite validation
  - Deliver report on in situ protocols (Draft Done).

- Evaluate ocean color algorithms using VIIRS proxy data and after launch VIIRS data
  - Identify data requirements for NOAA product evaluation
  - Identify formats for analysis in selected coastal regions
  - Assemble a VIIRS proxy data set for coastal region(s) and process for NOAA products
  - Compare VIIRS proxy products with NOAA-MODIS products (presentation)
  - Coordinate inter - satellite comparisons with cal/val group demo and presentation

Assuring Ocean Color Product Consistency of NPOESS Products
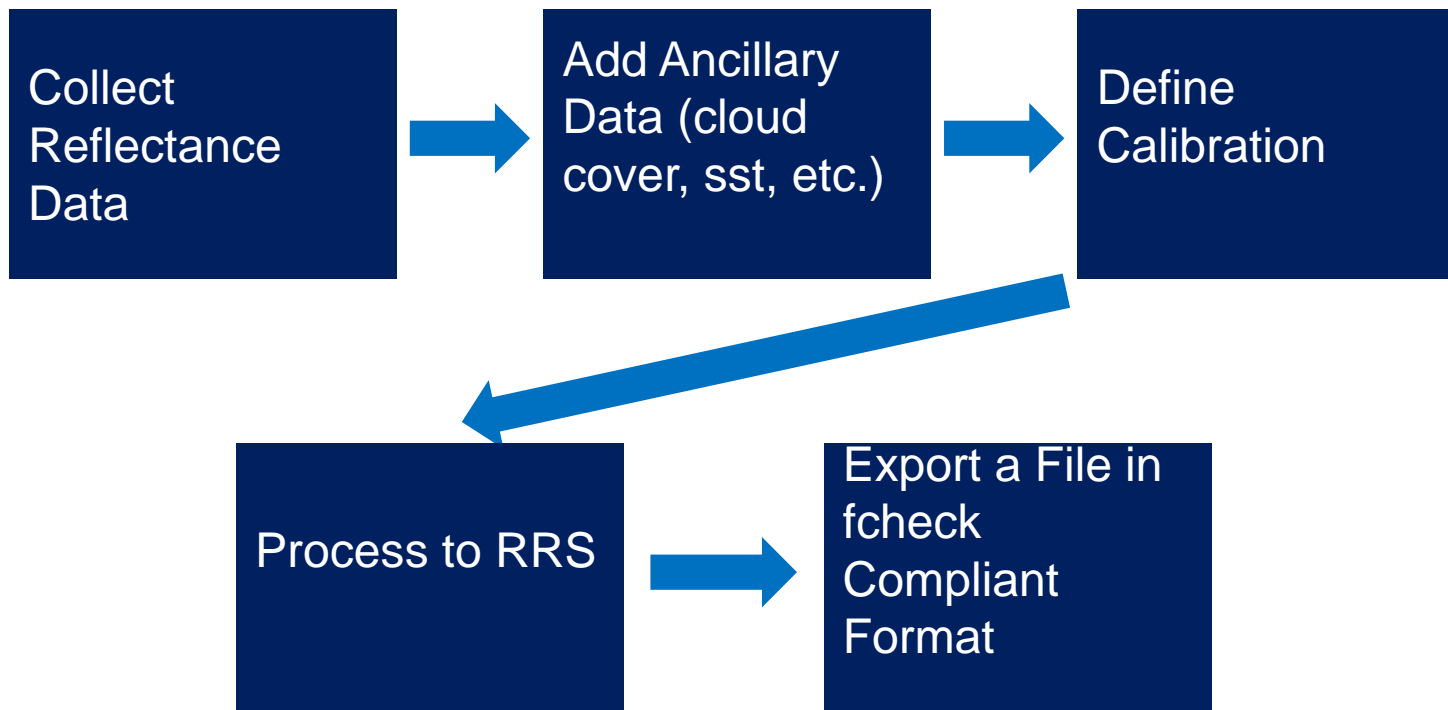
FY 09- MILESTONES Continued.

- Create protocols for evaluating continuity and consistency of ocean color products between sensors for NOAA applications.

  - Identify product types and requirements for inter-satellite comparison

  - Design protocols for inter-satellite comparison   (statistical relationships etc)

  - Assemble regional data sets (seasonal time series)

  - Define statistical relationships / methods between data sets (analyses)

  - Evaluate / test analyses with other product analyses in cal/val program for consistency (report, demo)

Assuring Ocean Color Product Consistency of NPOESS Products

Milestone 1

-Developed protocols for TriOS and ASD radiometers
-Conducted shore based field acquisitions
-Compiling a report on protocols to NRL
- Developing a prototype of a in situ radiometric processing system

Collect Reflectance Data → Add Ancillary Data (cloud cover, sst, etc.) → Define Calibration → Process to RRS → Export a File in fcheck Compliant Format

Ocean Cal Val EDR Program Review, 2010

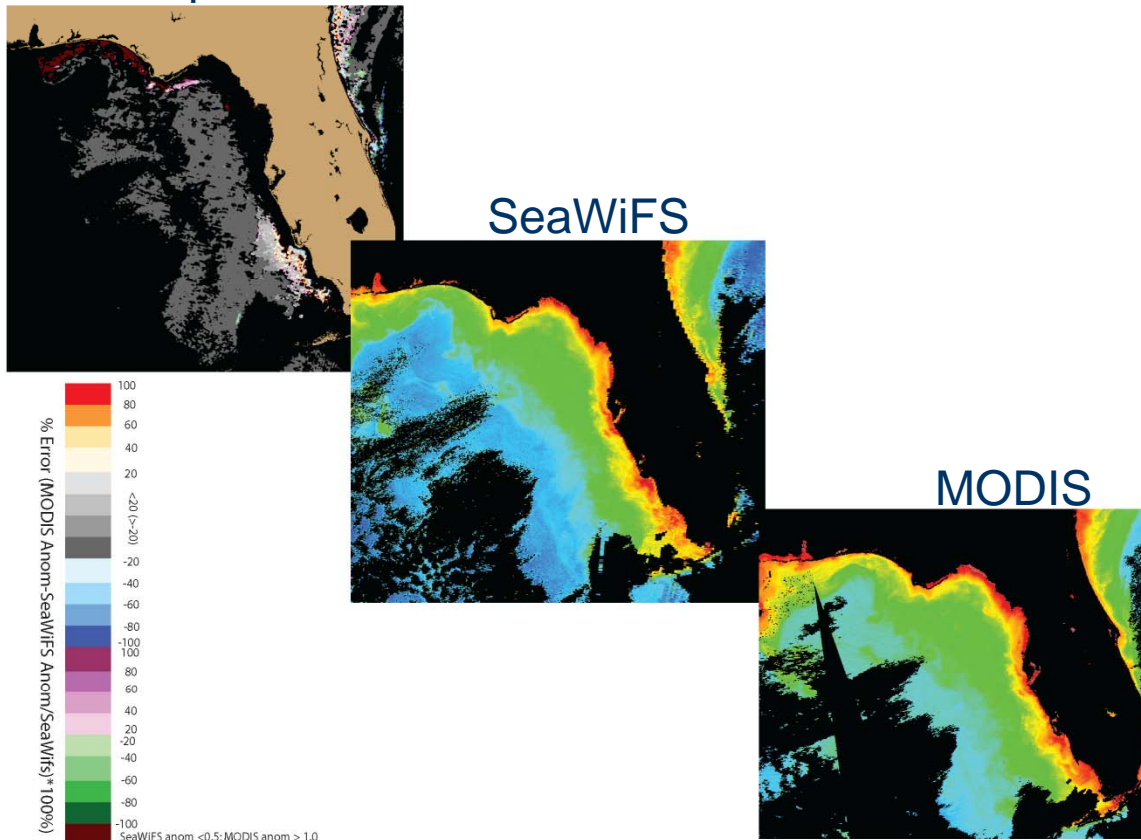# Assuring Ocean Color Product Consistency of NPOESS Products

Milestone 2&3

NOAA needed products have been identified

VIIRS proxy data has been downloaded from GRAVITE

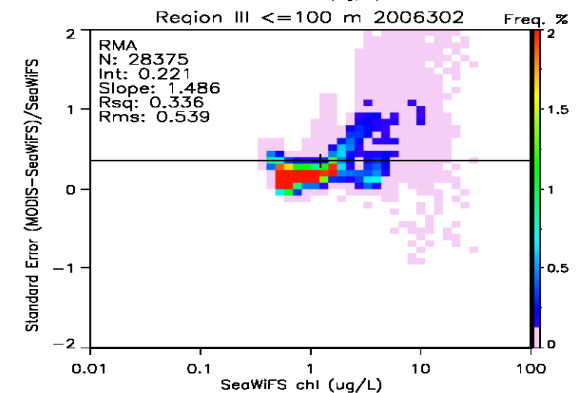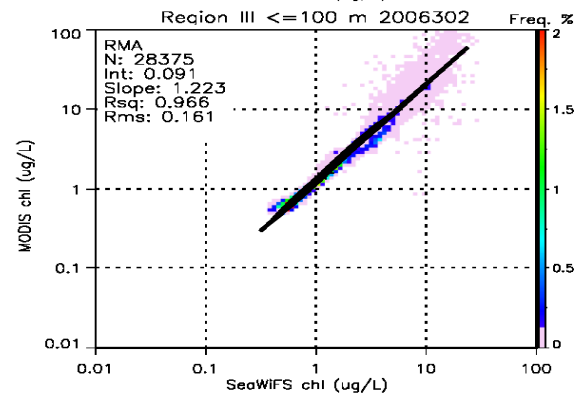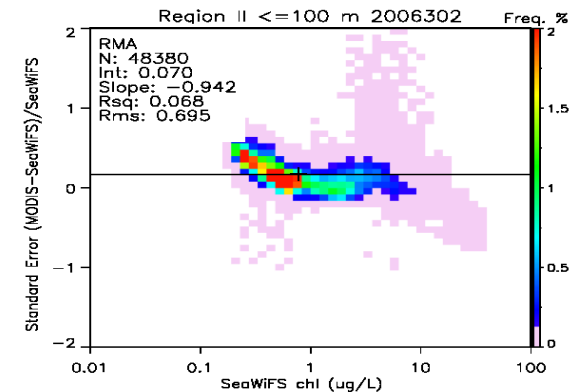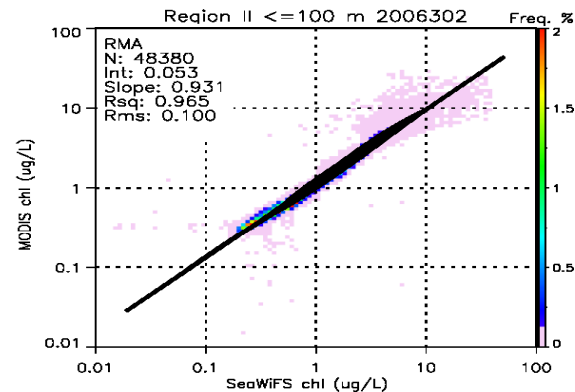Comparison with MODIS to SeaWiFS has been done until APS is used to process VIIRS.

Comparison

SeaWiFS

MODIS

% Error (MODIS Anom-SeaWiFS Anom/SeaWifs)* 100%)

SeaWiFS anom <0.5; MODIS anom > 1.0

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Assuring Ocean Color Product Consistency of NPOESS Products

Milestone 2 & 3 continued

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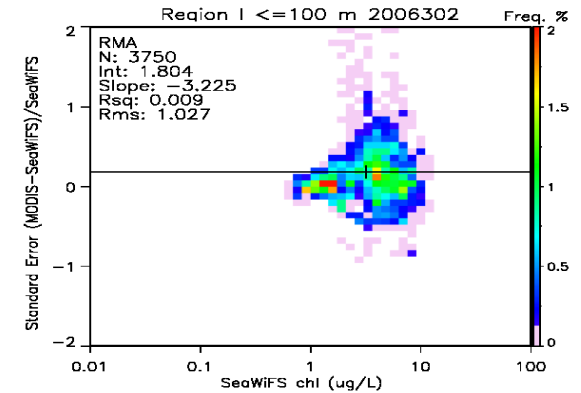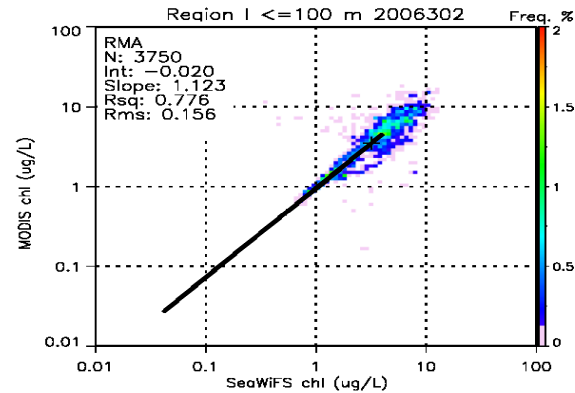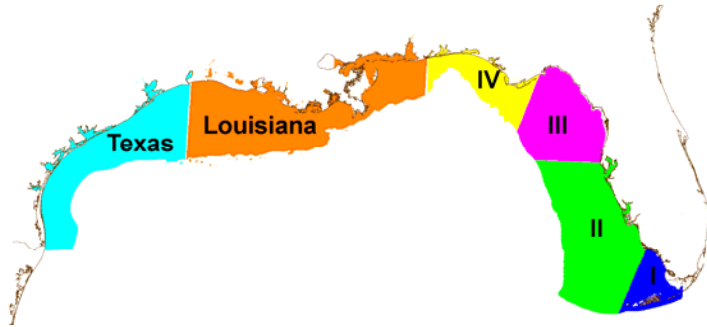
Assuring Ocean Color Product Consistency of NPOESS Products

FY 10 - Milestones

- Develop in situ data collection protocol for satellite products validation
  - Maintain calibration of instruments for consistency with cal/val group
  - Review field protocols with NRL
  - Implement post-processing software and protocols used by NRL (operational)
  - Conduct test field acquisitions in different sites (small boat, ship)
  - Deliver in situ data sets to NRL for satellite validation, demonstrate rapid turnaround
  - Deliver report on in situ protocols

- Evaluate ocean color algorithms using VIIRS proxy data and after launch VIIRS data.
  - Evaluate algorithms based on year 1 data requirements for NOAA product
  - Identify formats for analysis in selected coastal regions
  - Assemble a VIIRS proxy data set for coastal region(s) and process for NOAA products
  - Improve VIIRS proxy products with NOAA-MODIS products (presentation)
  - Coordinate inter - satellite comparisons with cal/val group, algorithm exam. and presentation

Assuring Ocean Color Product Consistency of NPOESS Products

FY 10 Milestones cont.

Create protocols for evaluating continuity and consistency of ocean color products between sensors for NOAA applications.

  -The efforts will enable an evaluation consistency of the satellite ocean products and help

   to determine the operational utility of these products.

  -Reconfirm product types and requirements for inter-satellite comparison

  - Implement protocols for inter-satellite comparison (statistical relationships etc)

  - Assemble regional data sets (seasonal time series)

  - Define statistical relationships / methods between data sets (analyses)

  - Evaluate / test analyses with other product analyses in cal/val program for consistency (report, demo)

Assuring Ocean Color Product Consistency of NPOESS Products

Status and Issues:

- Deliverable: Develop in situ data Protocols

  1. Dates Achieved: January 2010

  2. Development status: 100%

  3. Major technical issues and their impacts: Mechanism to coordinate protocols with other members of cal/val group

- Deliverable: Evaluate VIIRS proxy data

  1. Dates Achieved: Not complete

  2. Development Status: 75%

  3. Major technical issues: Installation of APS with capability to routinely process VIIRS proxy data.

Assuring Ocean Color Product Consistency of NPOESS Products

Status and Issues:

- Deliverable: Create protocols to evaluate inter satellite comparisons for NOAA products

    1. Dates Achieved: January 2010

    2. Development status: 100%

    3. Major technical issues and their impacts: None

- Deliverable: Assure consistency between ca/val groups

    1. Dates Achieved: Not complete

    2. Development Status: 0%

    3. Major technical issues: Have not worked directly with any other PIs in the group

Assuring Ocean Color Product Consistency of NPOESS Products

Summary :   Impact of Deliverables on Program:

1.) There is a limited number of in situ radiometeric observations, by formulating a method to take advantage of NOAA ships of opportunity the number of in situ radiometric observations will be improved.

2.) Assure VIIRS provides useful ocean color products to continue a timeseries able to answer climatological questions on decadal scales.

3.) Assure that the opperational needs of NOAA ecological forecasting capabilities will be met through VIIRS
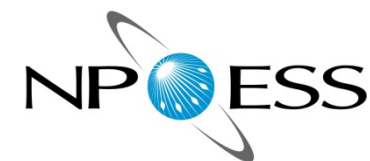
Assuring Ocean Color Product Consistency of NPOESS Products
Schedule with Major Deliverables

Red background indicates delays and green indicates on or ahead of schedule (as compared to FY09 DD1498)

Title																				
Milestones	FY08				FY09				FY10				FY11				FY12			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Establish data collection methods						S							T			R				
Evaluate algorithms with VIIRS proxy								S							T					R
Create protocols to evaluate product consistency						S						T			R					
Assure consistency with methods with the cal/val team												S								R

Note: Timeliness of deliverables science and transition (i.e., documents/demo/software, etc). Indicate changes from FY09 1498 by highlighting original planned time in red. You can use this table legend:
S – Start, C – Complete, D – Demo, I-Issues, M - Manual/Documentation, R – Final Report, T- Transition

Ocean Cal Val EDR Program Review, 2010

Assuring Ocean Color Product Consistency of NPOESS Products

1) Define a VIIRS Proxy Data Stream

2) Define the required in situ data stream for Cal/Val

3) Tuning of algorithms and LUTS (Vicarious calibration and SDR feedback)

4) Ocean Algorithm, stability evaluation and uncertainty

5) Product validation and product long-term stability

6) Satellite inter-comparisons, robustness, seasonal and product stability

Questions ?