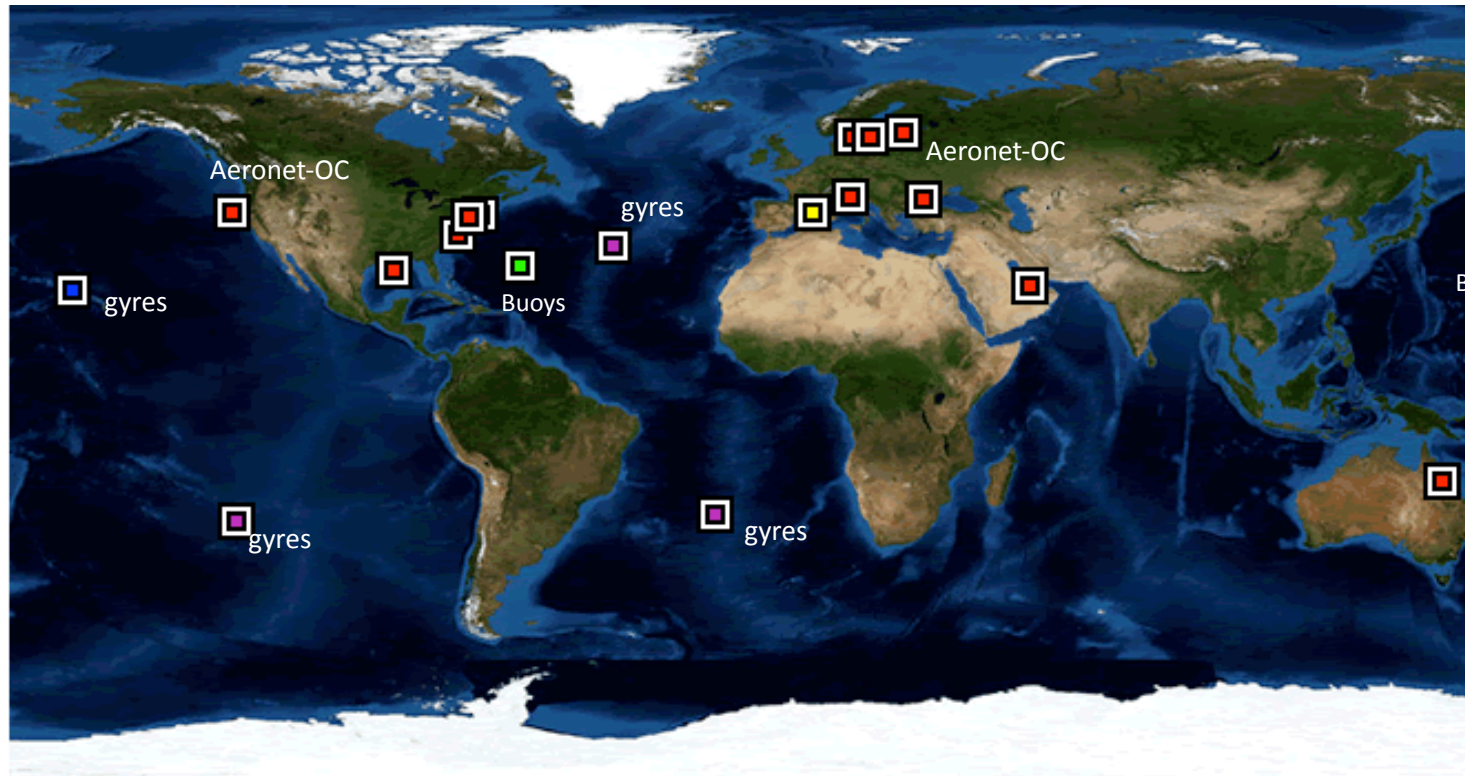


**Spatial and Temporal Uncertainty  
of satellite ocean color :  
Real time Satellite and Aeronet\_OC Matchup**

R. Arnone , G. Fargion, Z. Lee  
P. Martinolich, A. Weidemann, A. Lawson, R. Vaughn, D. Lewis  
Aeronet – site Stakeholders

# Global Network Monitoring Satellite products

## “Real time monitoring capability”



Golden regions		
	Areas	Data
1	Long Island	Aeronet
2	Venice	Aeronet
3	MVCO	Aeronet
4	WaveCIS (Gulf)	Aeronet
5	Lucinda	Aeronet
6	COVE (Chesapeake)	Aeronet
7	Gustav Dalen	Aeronet
8	Helsinki	Aeronet
9	Gloria	Aeronet
10	MOBY - Buoy	cal val Mooring
11	Boussole Buoy france	cal val Mooring
12	South pacific	Gyre
13	North Pacific	Gyre
14	North Atlantic	Gyre
15	South Atlantic G	Gyre
16	West Coast US - Aeronet	Aeronet
17	Abu Al Bukhoosh	Aeronet
18	Palgrunden	Aeronet
19	HOTS	Time Series
20	BATS	Rime Series
21	CalCOFI	Time Series

Real time Observations  
Real time Satellite products

MODIS, MERIS, Proxy NPP



Product evaluation  
Tracking Algorithm  
Stability & Satellite  
calibration



Product  
Uncertainty



Data access underway

# Status

( Feb 17, 2011)

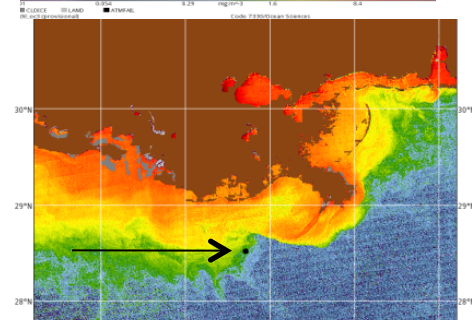
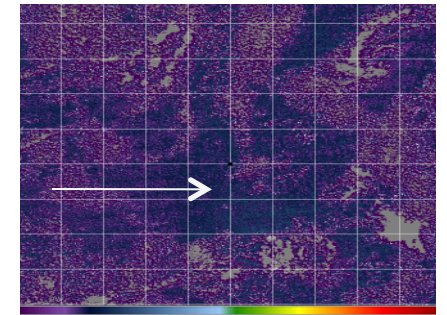
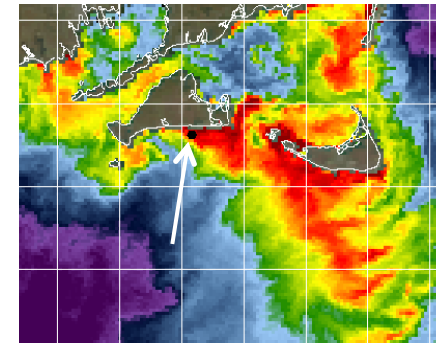
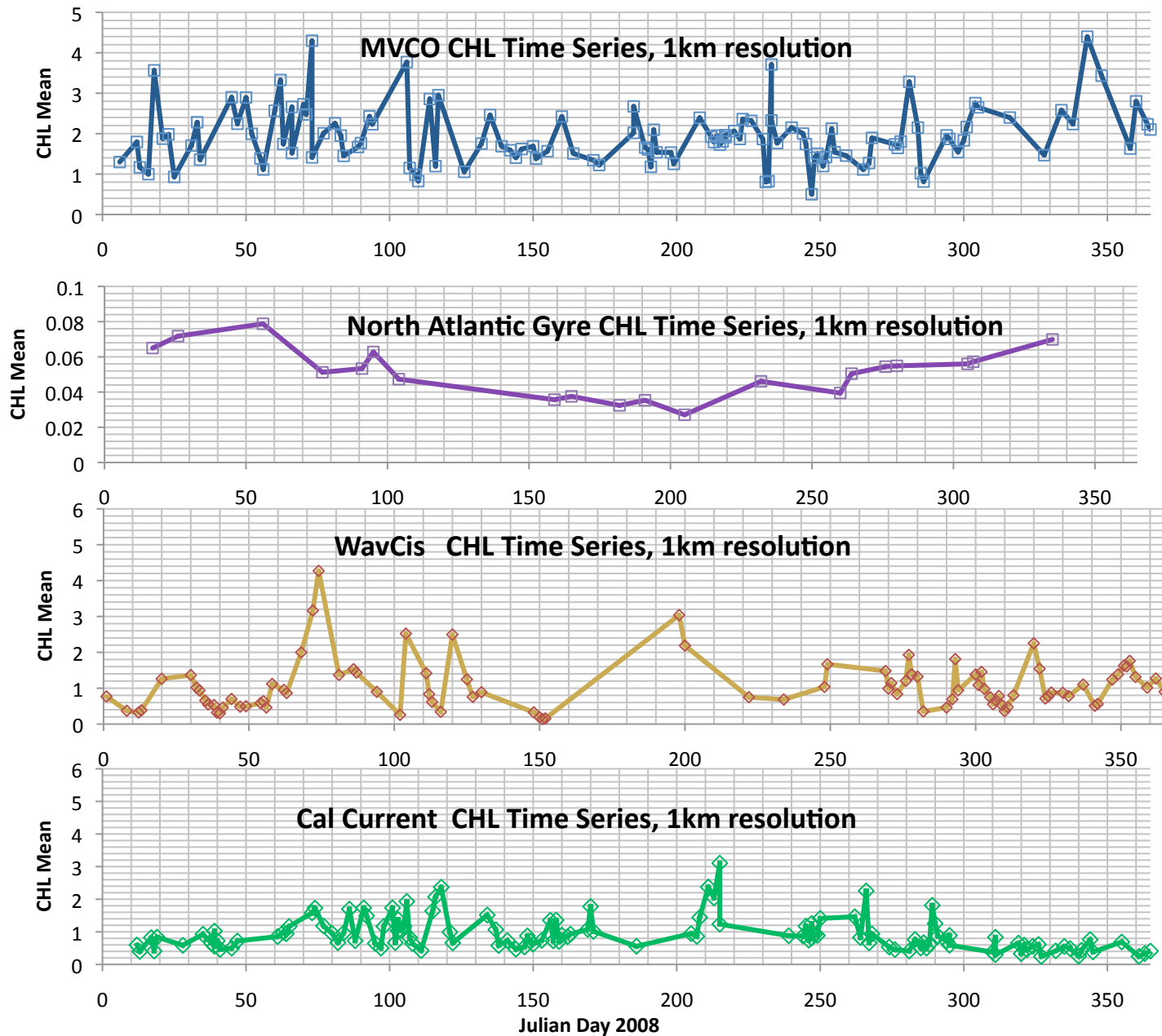
Back to Jan 2010

## Golden Regions

	Areas	Data	Map	Lat/Lon (Rounded)	Date Online	SeaWiFS 1Km	MODIS 1km	MODIS 250m	MERIS 1km	MERIS 300m	NPP Proxy
1	Long Island Sound	AERONET OC	MVCOX (MVX)	N/S 40; E/W -73	Jan 2010	X	x	X	X	X	X
2	Venice	AERONET OC	AAOT (AOT)	N/S 45; E/W 12	Jan 2010	X	x	X	X	X	X
3	MVCO	AERONET OC	MVCOX (MVX)	N/S 41; E/W -70	Jan 2010	X	x	X	X	X	X
4	Wave CIS (Gulf)	AERONET OC	WaveCIS (WCS)	N/S 29; E/W -90.5	Jan 2010	X	x	X	X	X	X
5	Lucinda	AERONET OC	LucindaJetty (LJY)	N/S -18; E/W 146.4	Jan 2010	X	x	X	X	X	X
6	COVE (Chesapeake)	AERONET OC	COVE (COV)	N/S 36.9; E/W -75.7	Jan 2010	X	x	X	X	X	X
7	Gustav Dalen	AERONET OC	GDAT (GDT)	N/S 58.6; E/W 17.5	Jan 2011	Na	x	X	X	X	X
8	Helsinki	AERONET OC	Helsinki (HLH)	N/S 59.9; E/W 24.9	Jan 2011	Na	x	X	X	X	X
18	Gloria	AERONET OC	Gloria (GAS)	N/S 29.36; E/W 44.6	Jan 2011	Na	x	X	X	X	X
9	MOBY - Buoy	Cal/Val Mooring	MOBY (M)	N/S 20.5; E/W -157.19	Jan 2011	Na	x	X	X	X	X
17	Boussole Buoy	Cal/Val Mooring	Boussole Buoy (BOB)	N/S 42.37; E/W 7.9	Jan 2011	Na	x	X	X	X	X
10	South Pacific	Gyre	SouthPacific Gyre (SPG)	N/S -26.5; E/W -135.5	Jan 2011	Na	x	X	X	X	X
11	North Pacific	Gyre	NorthPacific Gyre (NPG)	N/S 32.1; E/W 178.1	Jan 2011	Na	x	X	X	X	X
12	North Atlantic	Gyre	NorthAtlantic Gyre (NAG)	N/S 25; E/W -42	Jan 2011	Na	x	X	X	X	X
13	South Atlantic	Gyre	SouthAtlantic Gyre (SAG)	N/S -36.5; E/W -20.1	Jan 2011	Na	x	X	X	N/A	X
14	West Coast US – Eureka (spring 2011)	AERONET OC	Eureka	N/S 33; E/W 118	Feb 2011	Na	x	X	X	X	X
15	Abu Al Bukhoosh	AERONET OC	AbuAlBukhoosh (AAB)	N/S 25.5; E/W 53.1	Jan 2011	Na	x	X	X	N/A	X
16	Palgrunden	AERONET OC	Palgrunden (PAL)	N/S 58.75; E/W 13.15	Jan 2011	Na	x	X	X	N/A	X
19	HOTS	Time Series	HOTS	N 23.75; S 23.5; W -158.75 ; E -157.5	Jan 2011	Na	X	X	X	N/A	X
20	BATS	Time Series	BATS (B)	N 34; S 30; W -66; E -62	Jan 2011	Na	X	X	X	X	X
21	CalCOFI	Time Series	CalCOFI (C)	N 34; S 29; W -124.5; E -118.5	Jan 2011	Na	X	X	X	X	X

## Examples MODIS – Chlorophyll 1 km Time series (5x5 box mean)

### All Golden Regions satellite products running Now - Feb 2011



**Additional, satellite  
Bio-optical Products,  
Aerosol Properties**

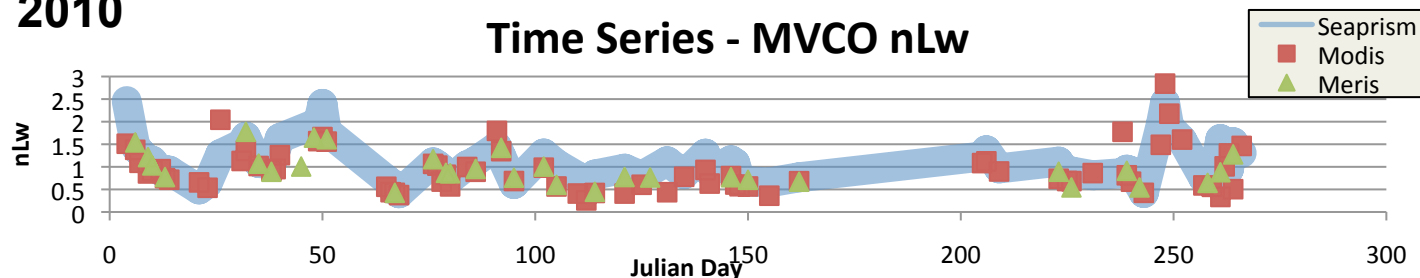
**All satellites .**



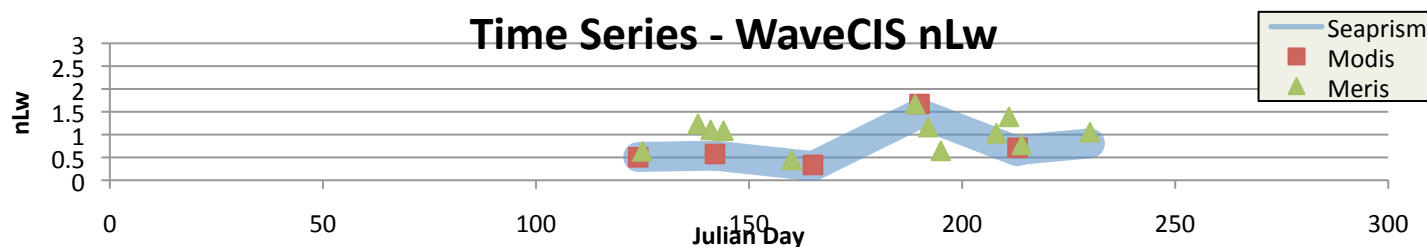
# Daily updates from Aeronet –OC and Satellite - Running Now – Feb 2011!

2010

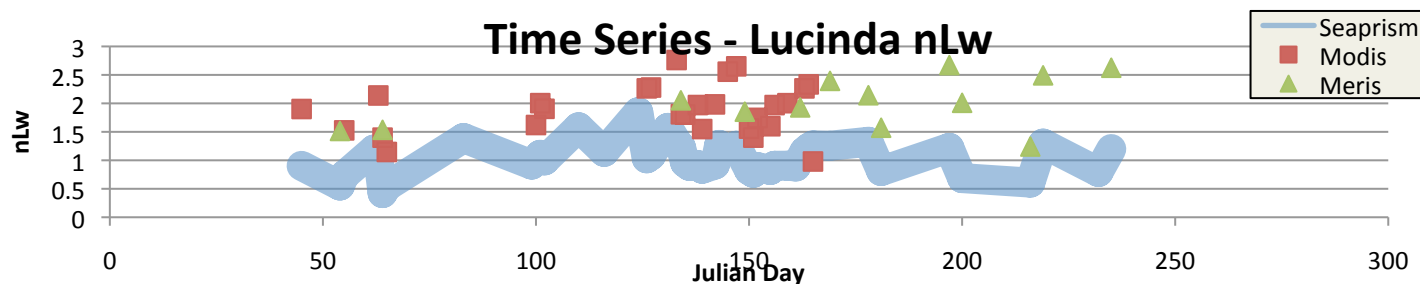
Time Series - MVCO nLw



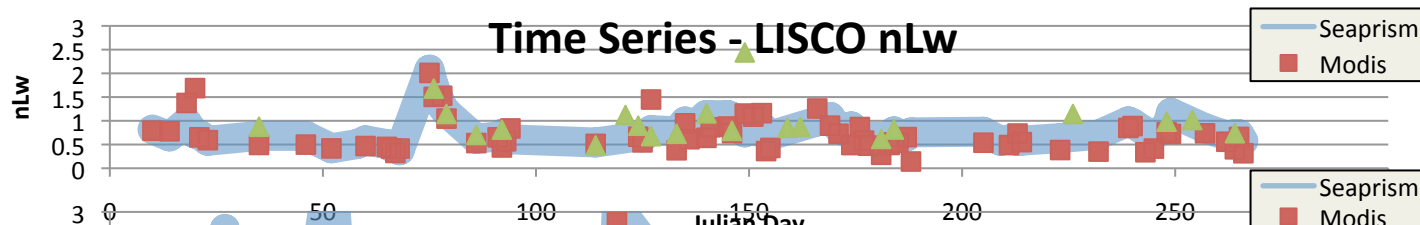
Time Series - WaveCIS nLw



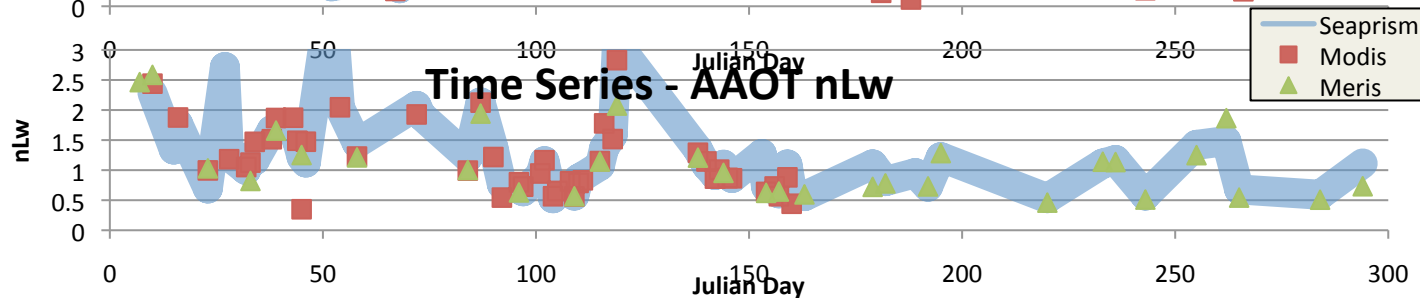
Time Series - Lucinda nLw



Time Series - LISCO nLw



Time Series - AAOT nLw



**Aeronet –OC**  
**MODIS 1 km**  
**MERIS 1 km**

Matchup  
Constraints

- + 1 hour
- 5x5 box (25 km)
- Mean nLw
- Std- 0.02
- 50% valid
- SAngle – 30°
- SpAngle - <30°
- LV1.5
- Start 1/1/2010
- End 1/10/2010
- Wind – NA
- No spectral shift

# Matchup Tool for Golden Regions



## NRL Cal/Val Matchup Tool

Naval Research Laboratory Code 7331  
Bio-Optical Physical Processes and Remote Sensing, Bldg 1009  
Stennis Space Center, MS 39529



Compare Satellite and In Situ Products

### Validate a Product

This section compares a satellite sensor to the SeaPRISM of certain locations. Simply choose the details of your timeframe and what you want to compare, and a new window/tab will appear with all of the comparisons within the selected timeframe. The data is output into a comma delimited format with the details listed [below](#). The Time Difference criteria is + or - from the time of the satellite pass.

Due to the nature of subsampling a box for the database there is a delay when getting any subsample of the higher resolution 25km<sup>2</sup> box. Also, at the higher resolution there is a slight offset due to spatial geometry and the station won't be exactly at the far corner pixel. The Corner referred to is which corner to place the in situ sensor in the box.

### Choose the satellite information

The 'H' indicates High Resolution.

<input type="radio"/> VIIRS	547	Normalized Water Leaving Radiance
null		
<input checked="" type="radio"/> MODIS	547	Normalized Water Leaving Radiance
null		
<input type="radio"/> MERIS	555	Normalized Water Leaving Radiance
null		
<input type="radio"/> HMODIS	555	Normalized Water Leaving Radiance
null		
<input type="radio"/> HMERIS	555	Normalized Water Leaving Radiance
null		

\* Does not have a wavelength; choose "0"

\*\* Has an algorithm; change from null.

See table below for algorithm-wavelength-product combinations.

Minimum Satellite Zenith Angle: -180

Maximum Satellite Zenith Angle: 180

APS Processing Version:  
v4.0

Max Satellite Coefficient of  
Variance: 1

Satellite Standard  
Deviation: 0.0

\*The default of 0.0 will  
show all the values and  
not exclude anything.

Minimum Percent Valid  
Satellite Pixels: 50.0

Box Size\*:  
25km

Time Difference:  
+/- 6 hr

Minimum Solar Zenith  
Angle: -180

Maximum Solar Zenith  
Angle: 180

### Choose the meta information:

Select What to Display: <input type="radio"/> In situ Only <input type="radio"/> Satellite Only <input checked="" type="radio"/> Both (Matchups only)	Choose a Location: WaveCIS Site 6 * Indicates a satellite only area.	Year: 2011
	Start Time: Jan 1	End Time: Feb 15

### Choose the in situ information

Choose a Seaprisim Product: <input type="radio"/> Aerosol Optical Thickness <input checked="" type="radio"/> Chlorophyll-a * <input type="radio"/> Water Leaving Radiance <input type="radio"/> Normalized Water Leaving Radiance <input type="radio"/> Normalized Water Leaving Radiance (f/Q) <input type="radio"/> Water Leaving Radiance (Q) <input type="radio"/> Ozone Optical Thickness <input type="radio"/> Sea_Surface_Reflectance *	SeaPRISM Level: <input type="radio"/> 1.0 <input checked="" type="radio"/> 1.5 <input type="radio"/> 2.0
	SeaPRISM Wavelength: 442 * Select wavelength 0 for products marked by an asterisk (*) as they have no given wavelength.

# Matchup Tool for Golden Regions

## Ocean Cal Val – Data base Query

This section compares a satellite sensor to the SeaPRISM or certain locations. Simply choose the details of your timeframe and what you want to compare, and a new window/tab will appear with all of the comparisons within the selected timeframe. The data is output into a comma delimited format with the details listed [below](#). The Time Difference criteria is + or - from the time of the satellite pass.

Due to the nature of subsampling a box for the database there is a delay when getting any subsample of the higher resolution 25km<sup>2</sup> box. Also, at the higher resolution there is a slight offset due to spatial geometry and the station won't be exactly at the far corner pixel. The Corner referred to is which corner to place the in situ sensor in the box.

#1

Select One

Golden Regions

<input type="radio"/> Insitu Only (i.e Aeronet)	Choose a Location: WaveCIS Site 6	Year: 2011
<input type="radio"/> Satellite Only	* Indicates a satellite	
<input checked="" type="radio"/> Both (Matchups only)	Start Time: Jan	End Time: Feb 15

Select Insitu data

SeaPrism Product

☐ Aerosol Optical Thickness

☐ Chlorophyll-a \*

☒ Water Leaving Radiance

☐ Normalized Water Leaving Radiance

☐ Normalized Water Leaving Radiance (fQ)

☐ Water Leaving Radiance (Q)

☐ Ozone Optical Thickness

☐ Sea\_Surface\_Reflectance \*

Wind speed

Long Island Sound

Helsinki

Gloria

Gustav Dalen Tower

Chesapeake Bay

Venice

Abu Al Bukhoosh

MOBY\*

North Pacific Gyre\*

South Pacific Gyre\*

South Atlantic Gyre\*

North Atlantic Gyre\*

Boussole Buoy\*

BATS\*

Level:

Wavelength: 442

wavelength 0 for products marked by an asterisk (\*) as they have no given wavelength.

### Select Satellite data

The 'H' indicates High Resolution.

<input type="radio"/> VIIRS	547	Normalized Water Leaving Radiance	null
<input checked="" type="radio"/> MODIS	443	Normalized Water Leaving Radiance	null
<input type="radio"/> MERIS	555	Normalized Water Leaving Radiance	null
<input type="radio"/> HMODIS	555	Normalized Water Leaving Radiance	null
<input type="radio"/> HMERIS	555	Normalized Water Leaving Radiance	null

\* Does not have a wavelength; choose "0"

\*\* Has an algorithm; change from null.

See table below for algorithm-wavelength-product combinations.

Minimum Satellite Zenith Angle: -180

Maximum Satellite Zenith Angle: 180

Min Satellite Azimuth Angle: -180

Max Satellite Azimuth Angle: 180

APS Processing Version: v4.0

Max Satellite Coefficient of Variance: 1

Satellite Standard Deviation: 0.0

\*The default of 0.0 will show all the values and not exclude anything.

Minimum Percent Valid Satellite Pixels: 50.0

Box Size\*: 25km

Time Difference: +/- 6 hr

Minimum Solar Zenith Angle: -180

Maximum Solar Zenith Angle: 180

Minimum Solar Azimuth Angle:

-180

Maximum Solar Azimuth Angle:

180

Reset

Get Data File

\*Due to the number of look up options, this may take a couple of minutes. Please be patient.

# Web page Matchup Tool for Golden Regions

## Ocean Cal Val – Data base Query

This section compares a satellite sensor to the SeaPRISM of certain locations. Simply choose the details of your timeframe and what you want to compare, and a new window/tab will appear with all of the comparisons within the selected timeframe. The data is output into a comma delimited format with the details listed [below](#). The Time Difference criteria is + or - from the time of the satellite pass.

Due to the nature of subsampling a box for the database there is a delay when getting any subsample of the higher resolution 25km<sup>2</sup> box. Also, at the higher resolution there is a slight offset due to spatial geometry and the station won't be exactly at the far corner pixel. The Corner referred to is which corner to place the in situ sensor in the box.

#1

Select One

Golden Regions

Choose a Location: WaveCIS Site 6  
\* Indicates a satellite only area.

Year: 2011

Start Time: Jan 1  
End Time: Feb 15

Choose the in situ information

**Select Insitu data**

**SeaPrism Product**

☒ Water Leaving Radiance  
☐ Normalized Water Leaving Radiance  
☐ Normalized Water Leaving Radiance (f/Q)  
☐ Water Leaving Radiance (Q)  
☐ Ozone Optical Thickness  
☐ Sea\_Surface\_Reflectance \*

Wind speed

SeaPRISM Level:  
☐ 1.0  
☒ 1.5  
☐ 2.0

SeaPRISM Wavelength: 442  
\* Select wavelength 0 for products marked by an asterisk (\*) as they have no given wavelength.

Reset Get Data File

*\*Due to the number of look up options, this may take a couple of minutes. Please be patient.*

### Select Satellite data

The 'H' indicates High Resolution.

☐ VIIRS 547 Normalized Water Leaving Radiance null

☒ MODIS 443 Normalized Water Leaving Radiance amone

☐ MERIS 555 Backscattering \*\* null

☐ HMODIS 555 Chlorophyll \* \*\* qaa

☐ HMERIS 555 Remote Sensing Reflectance Normalized Water Leaving Radiance oc3

Aerosol Optical Thickness lee

Aerosol Models Used carder

\* Does not have a w  
\*\* Has an algorithm; change from null.

See table below for algorithm-wavelength-product combinations.

Minimum Satellite Zenith Angle: -180  
Maximum Satellite Zenith Angle: 180  
Min Satellite Azimuth Angle: -180  
Max Satellite Azimuth Angle: 180

APS Processing Version: v4.0

Max Satellite Coefficient of Variance: 1

Satellite Standard Deviation: 0.0

\*The default of 0.0 will show all the values and not exclude anything.

Minimum Percent Valid Satellite Pixels: 50.0

Box Size\*: 25km

Time Difference: +/- 6 hr

Minimum Solar Zenith Angle: -180

Maximum Solar Zenith Angle: 180

Minimum Solar Azimuth Angle: -180

Maximum Solar Azimuth Angle: 180

### Vicarious calibration

Top of Atm radiances -  
TOAv and TOAs

443

nLw<sub>v</sub> and nLw<sub>s</sub>

443

Satellite  
products

Chlorophyll  
Absorption (total) (I) –  
Backscattering (I)  
nLw (I)  
Rrs (I)  
Aerosol Optical Depth (I)  
2 Aerosol Models

Oc3, Oc4  
Arnone, Qaa ,Carder, Gsm  
n ,QAA , Carder, gsm



# Spatial Uncertainty

Martha's Vineyard

October 31, 2008

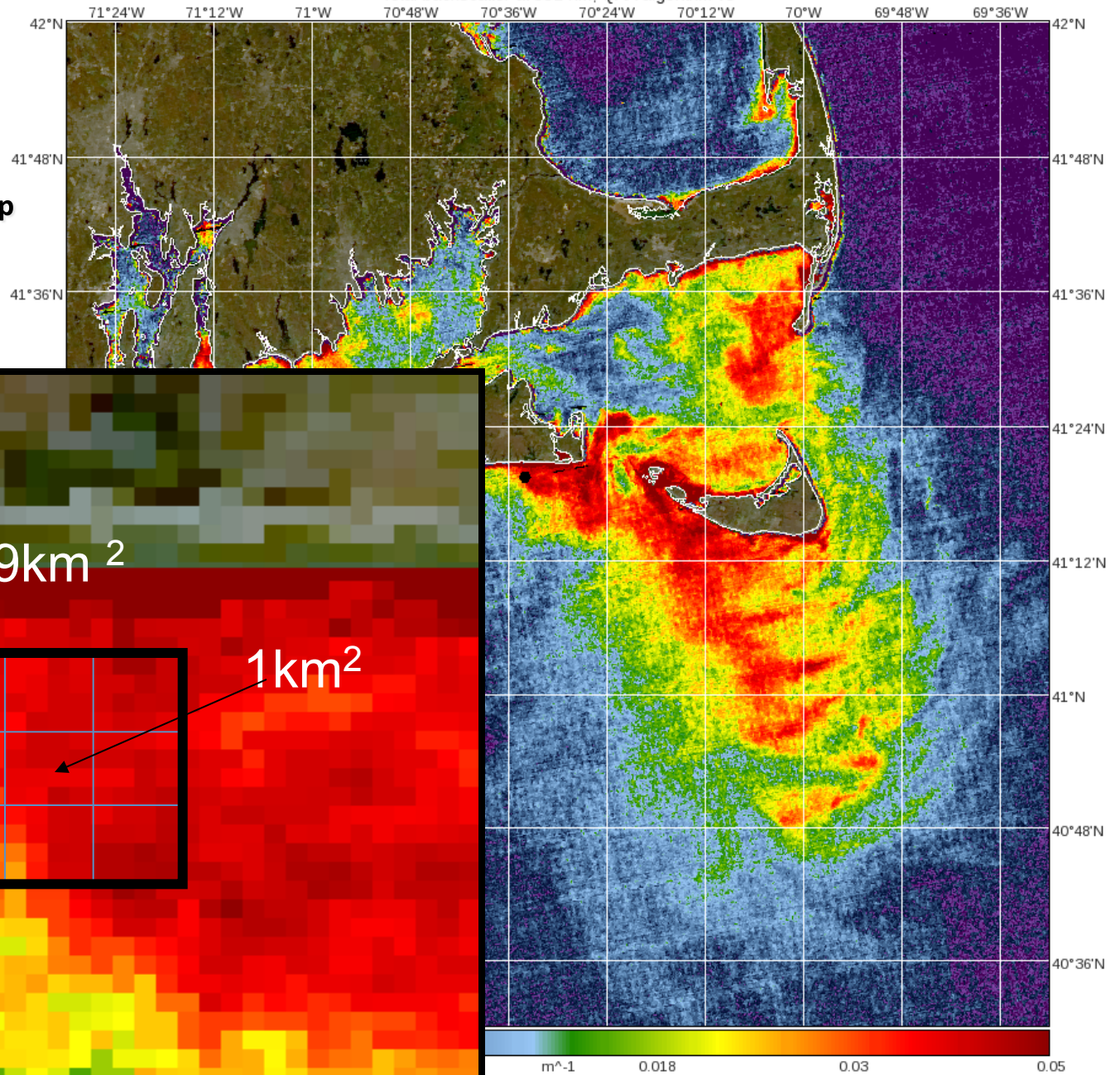
**Automated – real time Match-up**

- 1- aerosol optical depth
2. Remote sensing reflectance
3. In- water optics

aqua.2008305.1031.D.L3\_Mosaic.hmodis.MVO.v08.250m.hdf

Total backscatter at 551 nm, QAA algorithm v5

Fri Oct 31 2008 Mosaic



9km<sup>2</sup>

1km<sup>2</sup>

S9km<sup>2</sup> S1.5km<sup>2</sup>

13x13 and 5x5

1) Center

Pixel

2) Mean

3) Variance

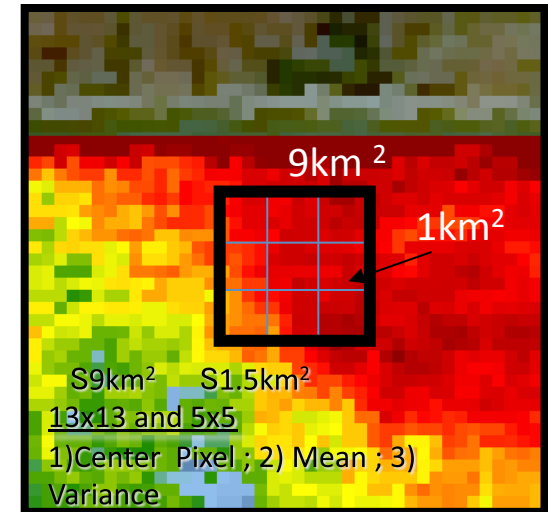
Code 7330/Ocean Sciences  
Naval Research Laboratory  
Stennis Space Center, MS



# Satellite Product - Spatial Uncertainty

## Spatial analyses in data base

Information Given	Details/Definition
Year	The year of the comparison.
Wavelength	The wavelength of the SeaPRISM in nanometers.
Julian Day	The day of the SeaPRISM observation.
Observation Time	The time the SeaPRISM observation was taken, given in hours:minutes format.
Value	The value from the SeaPRISM observation.
Number of Observations in a Day	The total number of valid observations the SeaPRISM took for the given julian day.
Daily Mean	The mean of the SeaPRISM's valid observations for the specified julian day.
Daily Standard Deviation	The standard deviation of the SeaPRISM's valid observations for the specified julian day.
Satellite Wavelength	The wavelength of the specified satellite in nanometers.
Satellite Julian Day	The julian day of the satellite.
Observation Time	The time of the satellite observation, given in hours: minutes format.
Number of Valid Pixels	From a 5x5 box with the center pixel being the location of the SeaPRISM, the number of good, unflagged pixels from the satellite data.
Center Pixel Value	The center pixel from the 5x5 box. It is the satellite's value at the specified SeaPRISM location.
5x5 Box Mean	The average of all the valid, unflagged pixels from the 5x5 box of the satellite pass.
Standard Deviation	The standard deviation of all the valid, unflagged pixels from the 5x5 box of the satellite pass.



# Matchup Tool for Golden Regions

Reports back ASCII file of the matchup



Excel and plot generation

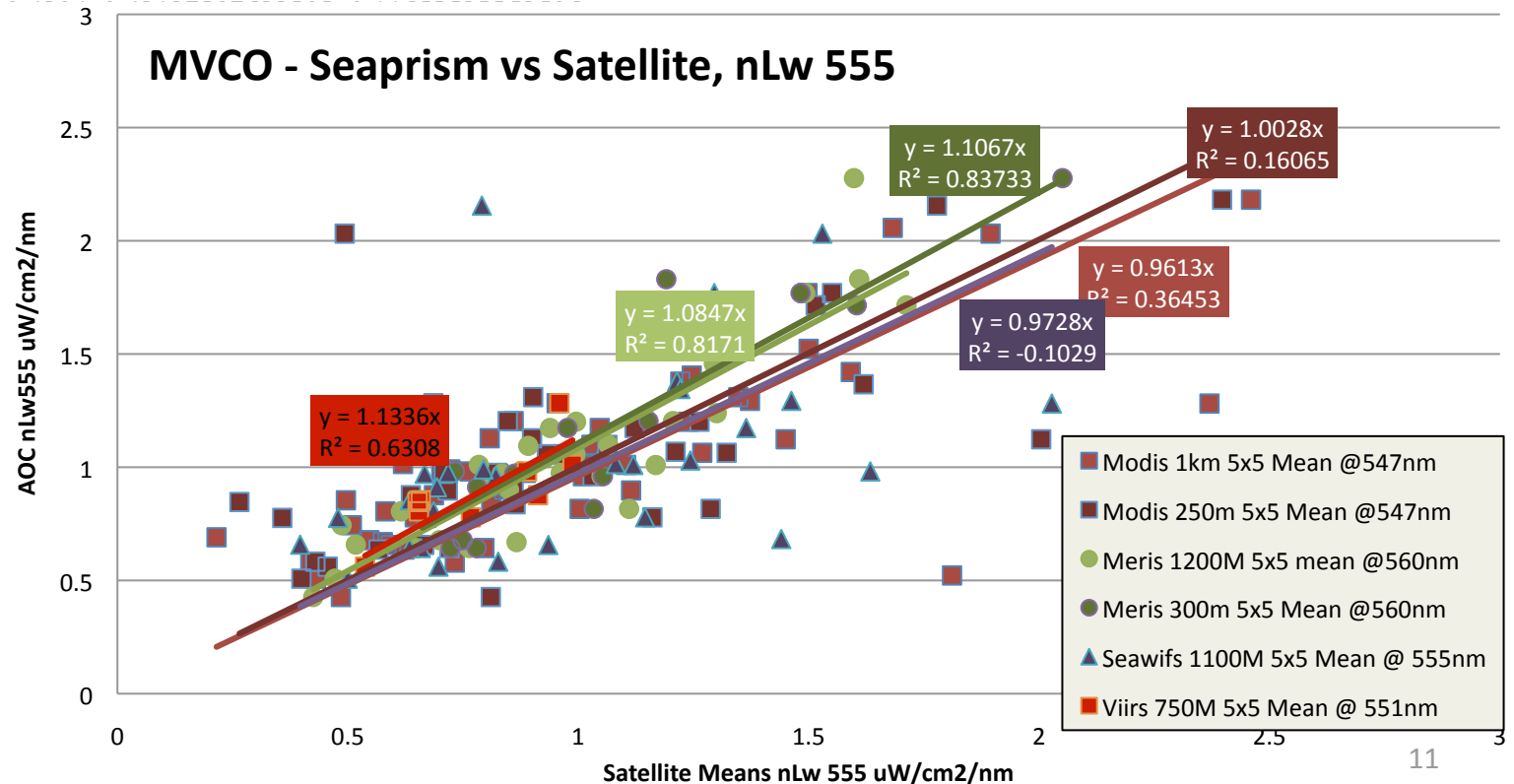
Lwn\_fQ Data for Martha's Vineyard at Wavelength 412 (nm)

Julian Day, # Valid Observations, Daily Mean, Daily Standard Deviation, MODIS Julian Day, # Valid Pixels, Center Pixel Value, 5x5 Mean, Standard Deviation

```
4, 2, 0.578622, 0.003854, 4, 26, 0.3437, 0.40483076923077, 0.15546920488842
6, 2, 0.491799, 0.000222, 6, 26, 0.7656, 0.75851538461538, 0.17793221201066
7, 5, 0.5070244, 0.021958018695684, 7, 26, 0.6048, 0.68447307692308, 0.18241960622884
9, 2, 0.398855, 0.076868, 9, 26, 0.2927, 0.33406153846154, 0.064745335899276
10, 8, 0.333815, 0.08307959790466, 10, 26, 0.5162, 0.6037, 0.20081583985946
11, 11, 0.27754890909091, 0.057774160878143, 11, 5, 0.5162, 1.75342, 0.31868344418874
12, 4, 0.29243025, 0.033045384574665, 12, 26, 1.0465, 1.2163346153846, 0.39995732747604
32, 2, 0.203186, 0.051745, 32, 30, 1.5637, 0.56688333333333, 0.40575648286736
```

## Matchup Constraints

- + 1 hour
- 5x5 box mean
- Std- 0.02
- 50% valid
- SAngle – 30°
- SpAngle - <30°
- LV1.5
- Start 1/1/2010
- End 1/10/2010
- Wind – NA

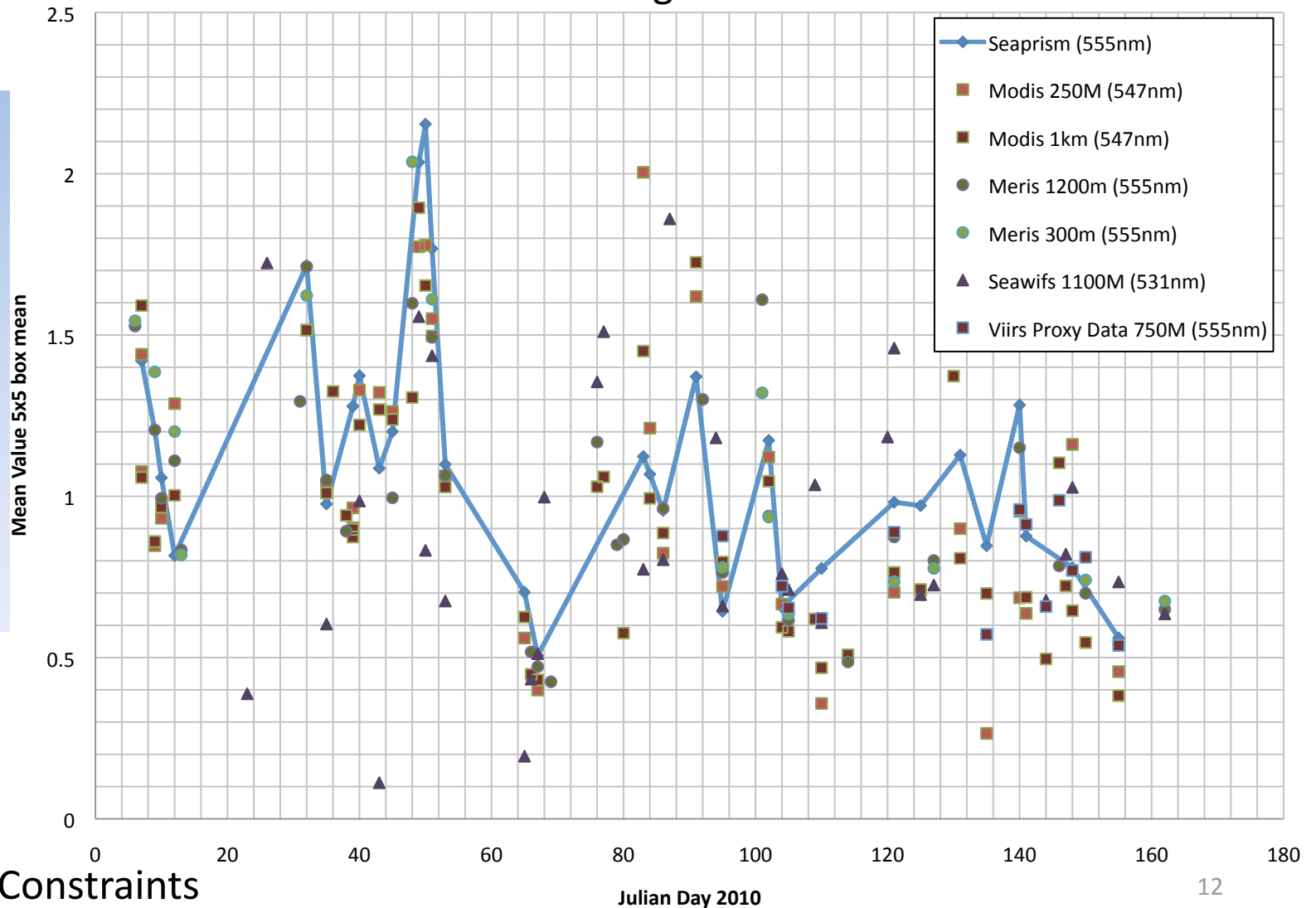


# Spatial uncertainty from different satellites

## 25 km Box surrounding MVCO Aeronet

### Matchup Constraints

- + 1 hour
- 5x5 box (25 km)
- Mean nLw
- Std- 0.02
- 50% valid
- SAngle – 30°
- SpAngle - <30°
- LV1.5
- Start 1/1/2010
- End 1/10/2010
- Wind – NA
- No spectral shift

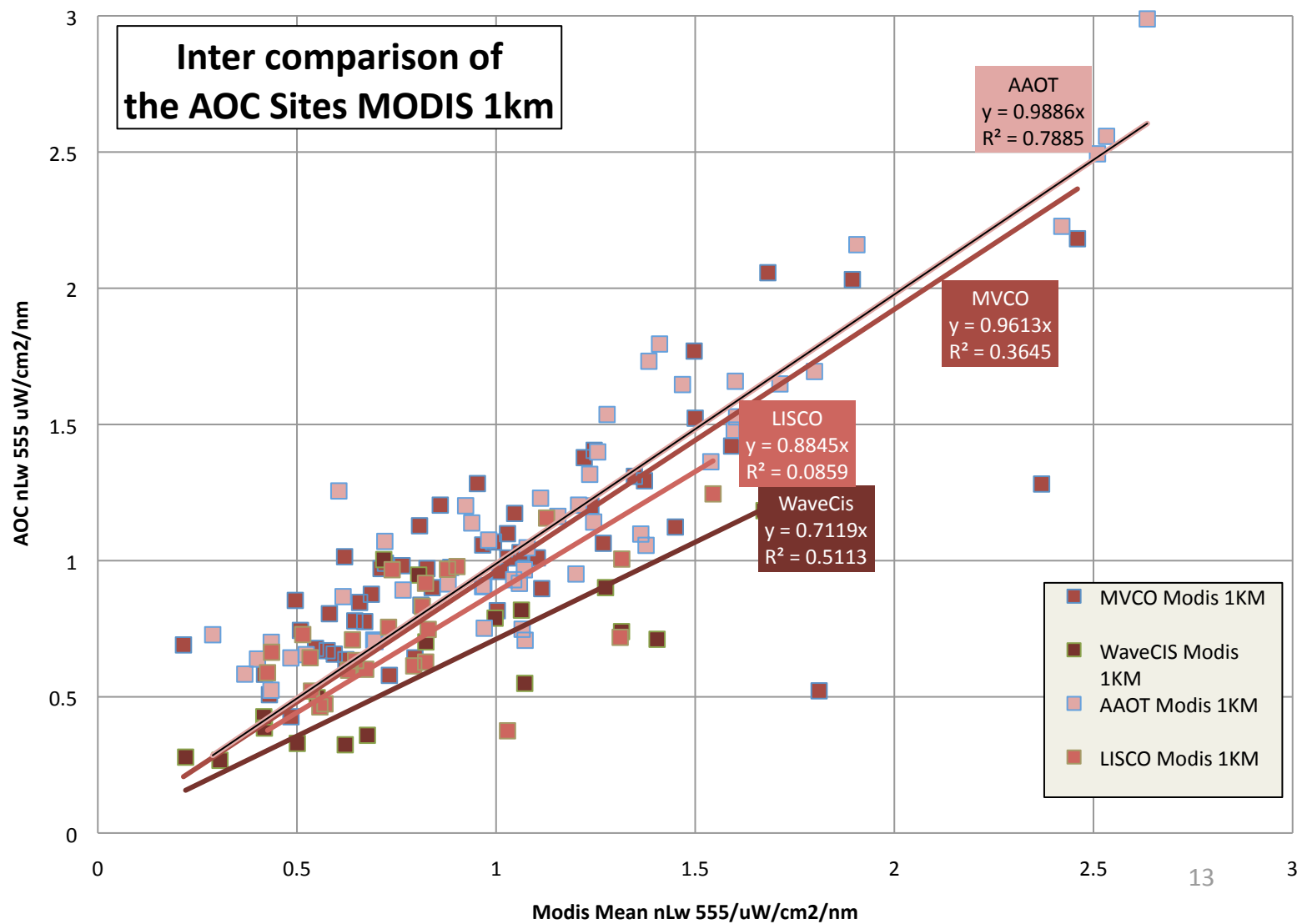


Tighten the Constraints

# Comparison of different sites for MODIS nLw 550

## Matchup Constraints

- + 1 hour
- 5x5 box (25 km)
- Mean nLw
- Std- 0.02
- 50% valid
- SAngle – 30°
- SpAngle - <30°
- LV1.5
- Start 1/1/2010
- End 1/10/2010
- Wind – NA
- No spectral shift



# Matchup requires the Spectral Shift

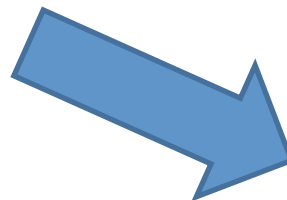
Adjust the SeaPrism channels to the Satellite Channels

Similar problem with the VIIRS proxy data  
took MODIS TOA

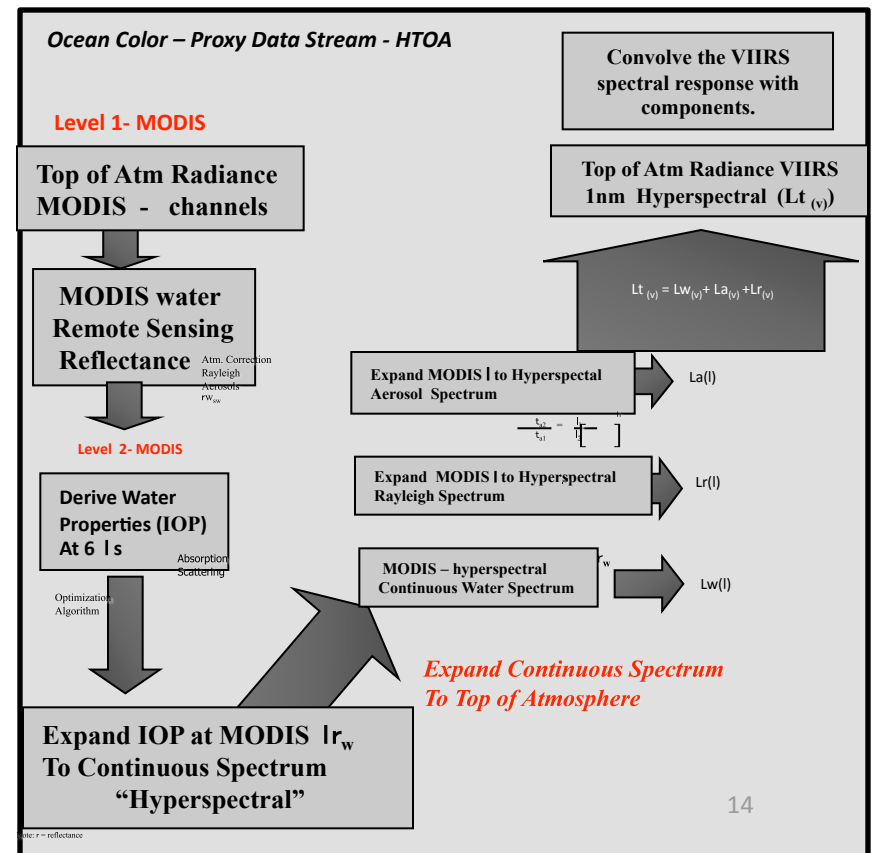


NPP data

Use this for the  
Spectral shift



Lee et al, 2011





# Hyperspectral Rrs (Lw)

Step 1: From Aeronet Rrs, calculate parameter \_ equivalent Chlorophyll Conc “Z”:

$$x = \log\left(\frac{Rrs(443) + Rrs(488)}{Rrs(557) + Rrs(667)}\right)$$

$$y = 10^{-0.407 - 1.574x + 0.531x^2};$$

← total absorption at 443 nm - at

$$z = \left(\frac{y - 0.00635}{0.110}\right)^{\frac{1}{0.672}}.$$

← equivalent chlorophyll conc.

Step2: Total Absorption coefficient: Using “z”, generate (hyperspectral and MODIS bands)

$$a(H) = a_w(H) + K(H)z^{e(H)}$$

Values of K and e are based on Morel et al (2001)  
H = Hyperspectral B= Band

Step 3: Backscattering - Using a(B) and Aeronet Rrs at each band, Rrs(B), calculate  $b_{bp}(B)$

$$b_{bp}(B) = R_{rs}(B)a(B)/0.05 - b_{bw}(B)$$

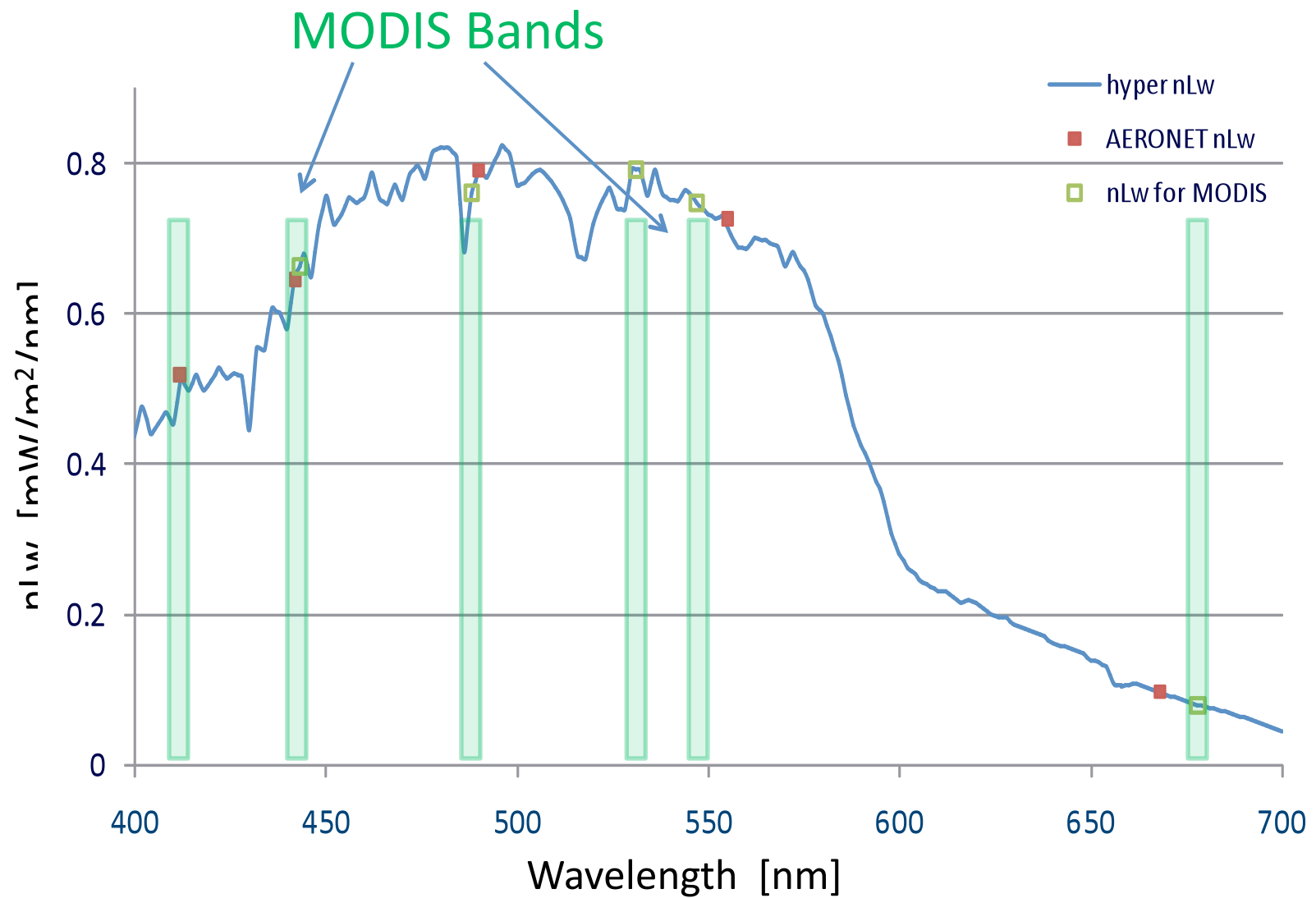
Hyperspectral backscattering  $b_{bp}(H)$   
Interpolate the above (every 1 nm)

Step 4: From the above a(H) and  $b_{bp}(H)$ , calculate hyperspectral Rrs(H):

$$R_{rs}(H) = 0.05 \frac{b_{bw}(H) + b_{bp}(H)}{a(H)}$$

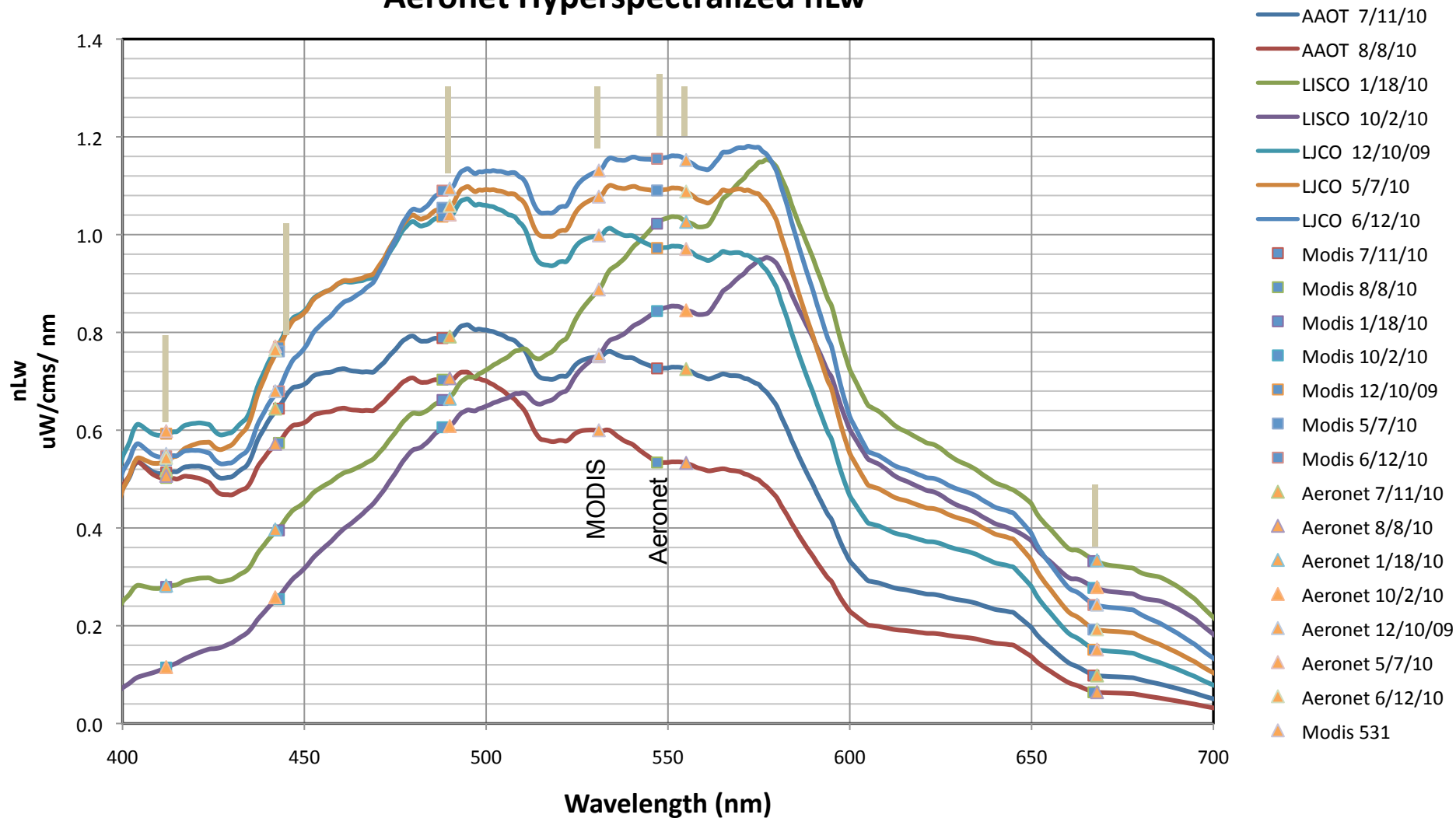
***Hyperspectral Rrs !!!***

## Example of band shift of Aeronet nLw

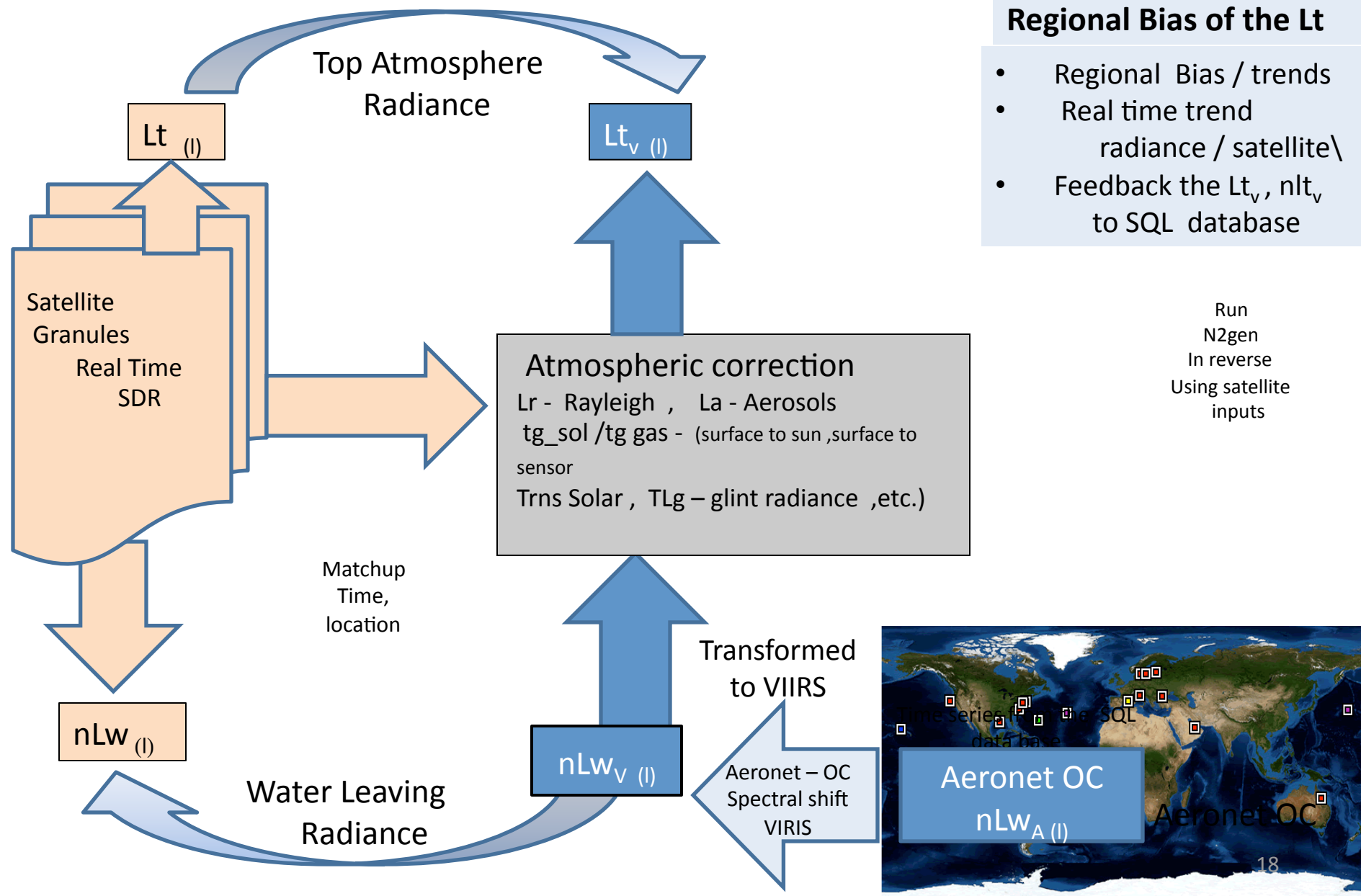


# Spectral Shift of water leaving radiance

Aeronet Hyperspectralized nLw



# Monitoring a Vicarious Regional matchup Lt and nLw



# Vicarious Matchup $\rightarrow L_t$

$$vL_t = [(TL_g + L_a)t_{o2} + tL_f + L_r]polcor\ tg_{sol}\ tg_{sen} \\ + vnL_w / brdf_{sensor}\ polcor\ t_{sen}\ t_{sol}\ tg_{sol}\ tg_{sen}\ cos(\theta)f_{sol}$$

- $TL_g$  - TOA Glint Radiance
- $L_a$  - Aerosol Radiance
- $tL_f$  - White-cap Radiance
- $L_r$  - Rayleigh Radiance
- $t_{o2}$  - Total Oxygen Transmittance
- $t_{sol}$  - Rayleigh-Aerosol Diff. Trans., Sun to Surface
- $t_{sen}$  - Rayleigh-Aerosol Diff. Trans., Surface to Sensor
- $tg_{sol}$  - Gaseous Transmittance, Sun to Surface
- $tg_{sen}$  - Gaseous Transmittance, Surface to Sensor
- $brdf$  - Bi-directional
- $\theta$  - Solar Zenith Angle
- $f_{sol}$  - Earth-Sun distance correction
- $polcor$  - polarization correction

Parameters integrated into  
the SQL data base  
Plus: file, date, Level-2 flags,  
aeronet instrument, data level

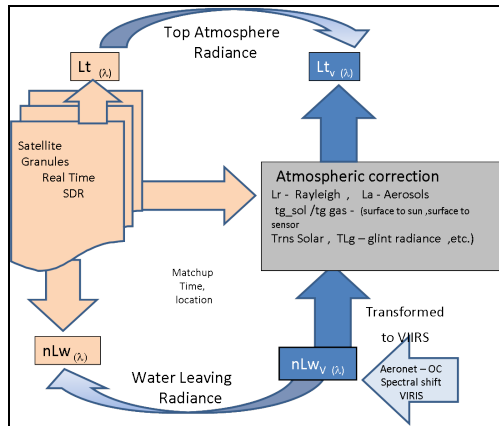


# Automated Regional Vicarious Matchup at “vLt”

Script to produce vicarious matchups.

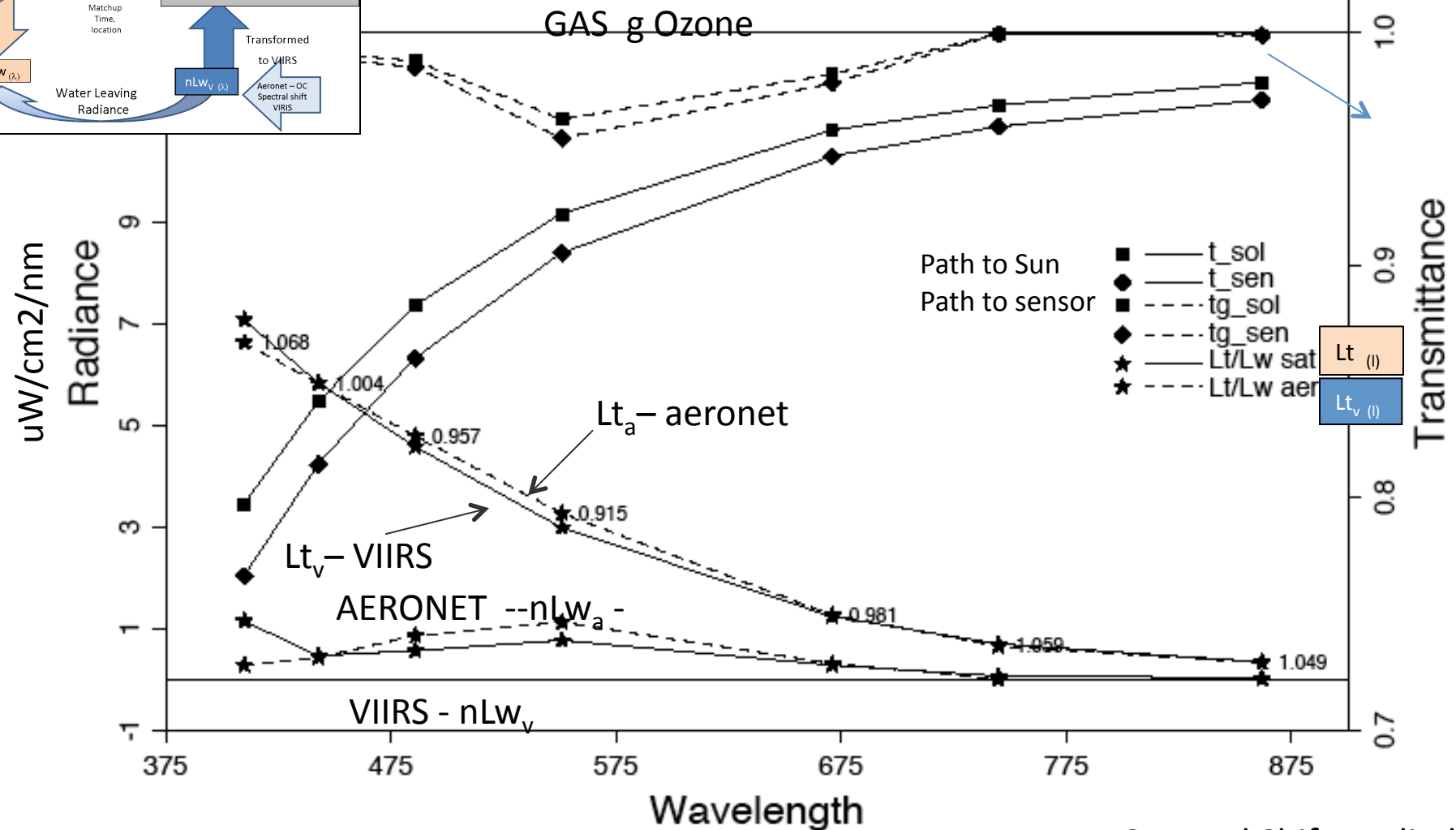
1. Input is configuration file and list of satellite file(s).
2. Time, wavelengths are extracted from satellite.
3. Aeronet database queried for all matching locations and time.
4. For each aeronet–site and satellite match:
  - a. Find closest aeronet record and satellite based on time.
  - b. Get nLw from aeronet record
  - c. Create vicarious matchup parameter file (Lt, vLt, La, Lr, etc.)
  - d. Run vicarious mode to get vLt (see next slide)
  - e. Pull results from file
  - f. Push results back to database (Lt, vLt, La, Lr, solzen, etc.)
5. Generate Plots of gain ratios (Lt/vLt)
6. Perform regression to obtain vicarious gains/offsets (use quality checks)

# Example from LISCO Aeronet using VIIRS Proxy Scene.



## Vicarious Matchup

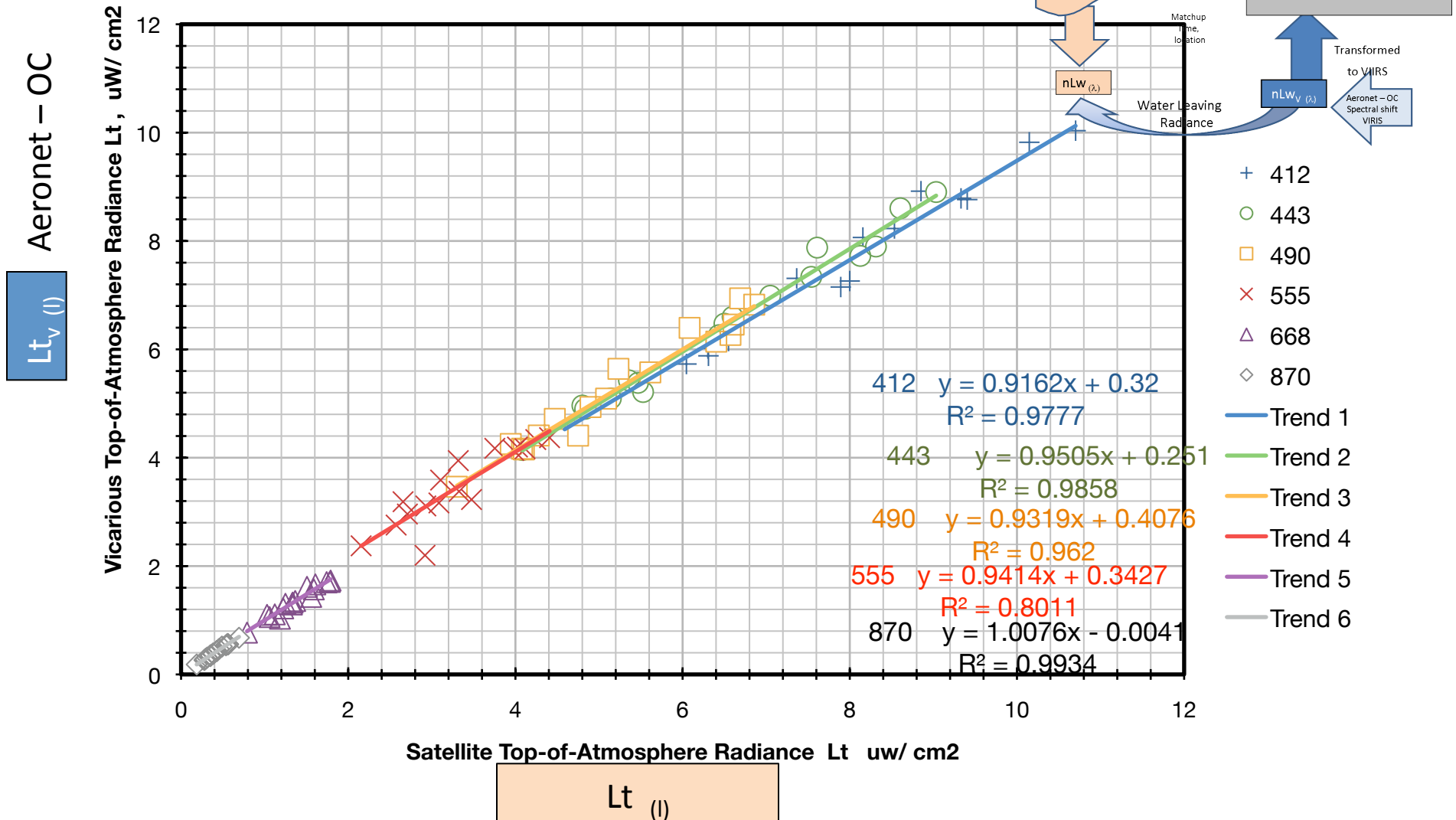
npp.2010275.1002.172010.D.L2.viirs.LISCO.v01.750m.hdf



No Spectral Shift applied !

# Automated the Vicarious Matchup --

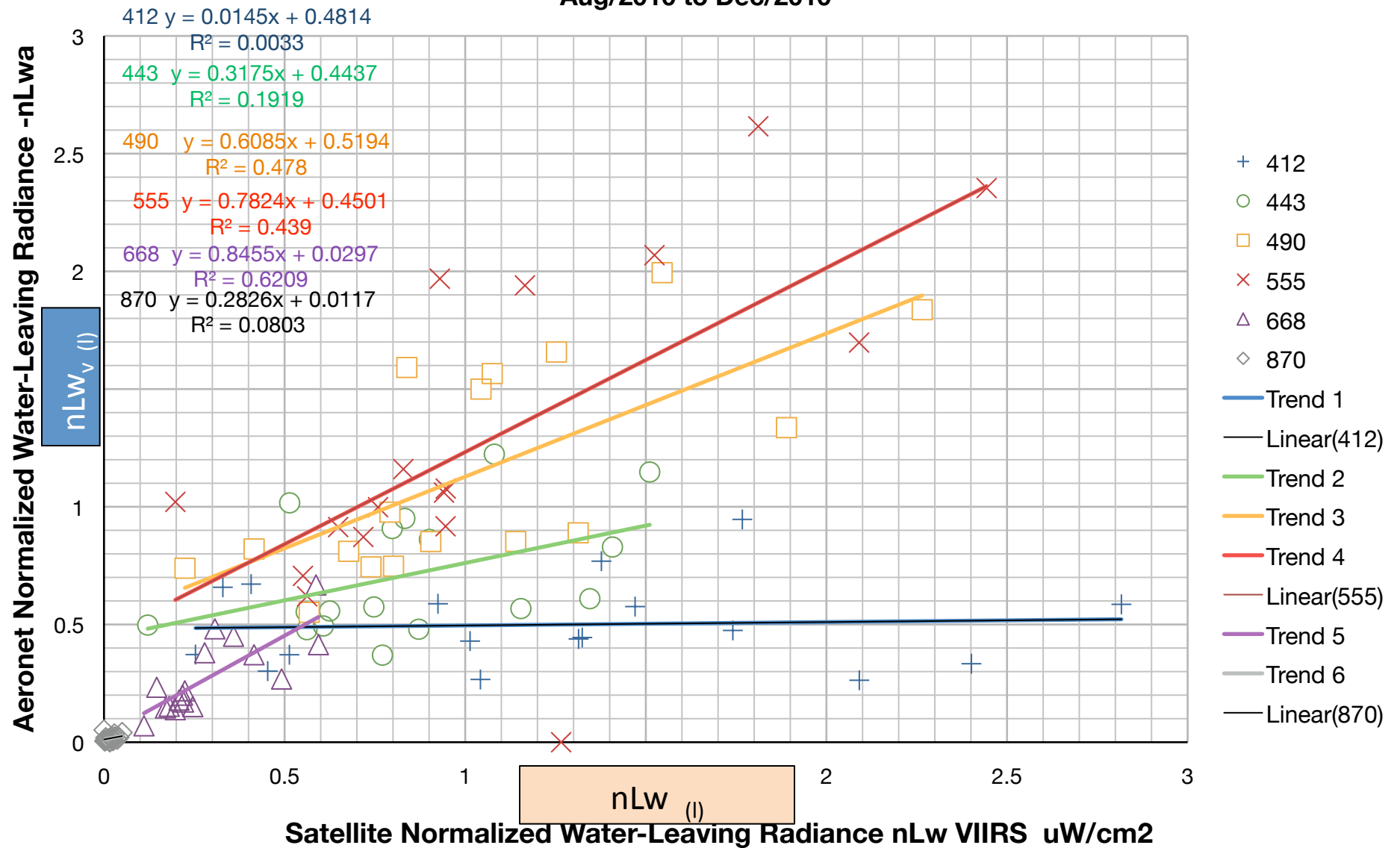
**MVCO Aeronet and MODIS /VIIRS matchup**  
**Aug/2010 to Dec/2010 n=15**  
**" No constraints "**



# Automated the Vicarious Matchup --

## MVCO Aeronet and MODIS VIIRS match “No Constraints”

Aug/2010 to Dec/2010



# **Applications for monitoring the “Golden Regions”**

- **Determine satellite product trending both seasonally and in different coastal and open ocean regions**
- **Examine in real time (2 weeks) vicarious matchups - track regional validation**
  - **Assess the regional Bias at different sites (globally)**
  - **Determine the impact of new LUT using the matchup**
    - **Maintain “golden site” reprocessing .**
      - **Demonstration in Summer.**



**Spatial and Temporal Uncertainty  
of satellite ocean color :  
Real time Satellite and Aeronet\_OC Matchup**

## **Summary**

- Aeronet – OC and observation data streams being assembled with satellite data streams
- Developing real time Match –up
  - Satellite products validation
  - Inter- satellite comparison and product consistency
  - Spatial and temporal uncertainty in coastal areas being addressed, using “constraints”
- Coordinate with national and international collaborators

**Questions ?**

## - Golden Regions Satellite Processing -

### NPP – VIIRS proxy data processing

	Parent Directory	
1-	AAOT/	11-Feb-2011 15:01
2-	AbuAlBukhoosh/	22-Jan-2011 06:49
3-	BATS/	21-Jan-2011 14:07
4-	BoussoleBuoy/	22-Jan-2011 09:46
5-	CalCOFI/	21-Jan-2011 19:21
6-	ChesapeakeBay/	14-Feb-2011 11:35
7-	Cove/	14-Feb-2011 11:22
8-	GDAT/	22-Jan-2011 10:57
9-	Gloria/	22-Jan-2011 08:12
10-	Gomex/	14-Feb-2011 11:26
11-	GreatLakes1km/	14-Feb-2011 12:40
12-	GulfOfMaine/	11-Feb-2011 15:04
13-	Helsinki/	22-Jan-2011 10:57
14-	HelsinkiLH/	11-Feb-2011 15:04
15-	LigurianSea/	11-Feb-2011 15:04
16-	LucindaJetty/	22-Jan-2011 02:49
17-	MOBY/	21-Jan-2011 21:23
18-	MVCO/	14-Feb-2011 11:23
19-	MVCOX/	14-Feb-2011 11:21
20-	MissBight/	14-Feb-2011 11:24
21-	NYBight/	14-Feb-2011 11:24
22-	NorthAtlanticGyre/	21-Jan-2011 14:31
23-	NorthEastAustralia/	11-Feb-2011 15:08
24-	NorthEastAustralia/	11-Feb-2011 15:08
25-	NorthPacificGyre/	23-Jan-2011 00:42
26-	Palgrunden/	22-Jan-2011 10:57
27-	PersianGulf/	11-Feb-2011 15:08
28-	SouthAtlanticGyre/	21-Jan-2011 12:30
29-	SouthPacificGyre/	21-Jan-2011 20:58
30-	WaveCIS/	14-Feb-2011 11:22

### Reprocessing

-Level 0 –

-Level 1b –

-Level 3 - daily imagery

-And mosaics

-Level 4 – composites daily,

Weekly , months

7 day latest pixel