MODIS SEMI-ANNUAL REPORT
- Jan 15, 2002 – June 15 2002

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RSMAS/MPO

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A. PERSONNEL

Personnel supported for the first half of 2002 include:

B. Evans (Jan, Feb, Mar., Apr, May, Jun)
- V. Halliwell (Jun)
- K. Kilpatrick (Mar., Apr, May, Jun)
- J. Jacob (Jan, Feb, Mar., Apr, May)
- J. Splain (Jun)

S. Walsh (Jan, Feb, Mar., Apr, May, Jun)
- R. Kolaczynski (Jan, Feb, Mar., Apr, May, Jun)
- D. Wilson-Diaz (Jan, Feb, Mar., Apr, May, Jun)
- J. Brown (Jan, Feb, Mar., Apr, May, Jun)
- E. Kearns (Jan, Feb, Mar., Apr, May, Jun)

B. OVERVIEW OF RECENT PROGRESS

B.1 Processing and Algorithm Development

Ocean color

TERRA

Changes to the Terra MODIS ocean code occurred in four primary areas, a) revised ocean LUT calibration and correction factors, b) updates to individual parameter algorithm coefficients, c) change ancillary input files to use smoothed SeaWiFS NMC and Ozone, and d) minor changes to product metadata and code for cross platform processing compatibility.

The revised calibrations were performed using absolute stray light corrected Moby data and L1b V3 input data. Revised calibrations were developed for each of the 6 time epochs previously identified from time series analysis. Modal time series analysis using granules over the Hawaii Moby site were then used to remove any remaining time trends or discontinuities within and between epochs. In addition to the revised absolute calibrations, inter-detector, cross scan, and mirror side corrections were also revised.

We continued to work on improving the Cox-Munk sun glint correction. Previous analysis of version 3 processing suggested that the shape of the Cox-Munk correction was not appropriate and required an adjustment factor to widen the application of the glint correction based on wind speed, and the development of spectrally based glint coefficients.

In conjunction with Howard Gordon we incorporate an NIR correction in the atmospheric correction algorithm to allow some water leaving radiance to be present in the 678nm, 765,865nm bands. In addition the polarization correction was modified to correct only the Rayleigh portion of the total radiance.

After the improvements mentioned above were incorporated into the code all the derived product algorithms were re-evaluated and adjustments made where appropriate. The Fluorescence Line height algorithm was changed to use glint corrected Lt's and the new v12.56 LUT corrections. Previous versions of the FLH algorithm used a 5x5 pixel average to increase the signal to noise in oligotrophic regions where the FLH signal is very low. We have found that the s/n ration of MODIS appears to be higher than expected and in V4.2 the averaging for FLH has been turned off. This results in the ability to visualize finer spatial scale detail than previous

Dennis Clark's chlor_modis, pigment_c1_total,susp_solids algorithms were changed to allow for hi and low chlorophyll regime coefficients. The algorithm now has the ability to switch between coefficient sets based on certain set points. This change should improve the accuracy of retrievals at very high and very low values. In addition the Chlor_modis product was changed to a 3-banded algorithm to improve accuracy in very low and very high chlorophyll environments

Ken Carder's chlor_a3 was changed to use the Level-2 MODIS 11-12um SST as input for the nitrogen deficit temperature term in the chlor_a3 algorithm. Previously the Reynolds NCEP weekly 1-degree SST product was being used until the MODIS SST could be validated. The high time and space resolution of the MODIS SST improves the performance of the chloro_a3 product . Algorithm coefficients were revised for all of the Carder pigment and absorption products.

Quality level definitions of all chlorophyll products were adjusted to be more consistent between products and two new product specific flags were added for the chlor_a2 (SeaWiFS analog). Product specific flags in the L2B file now includes additional tests: Lw488>nLw443 and nLw532>nLw488, to assist in evaluating the performance of the SeaWiFs analog OC3M algorithm

Previous versions of the MODIS Ocean code used NMC and Ozone ancillary files which had been reformatted into EOS HDF format from data obtained directly from originating meteorological agencies, that is to say no filtering or filling of the global ancillary input fields were performed. In contrast, SeaWiFS ocean color products are produced using ancillary data fields that have been smoothed by the SeaWiFS project office. Tests comparing the use of smooth and unsmoothed ancillary fields showed differences in the retrieved nLw values in regions of high gradients in the ancillary wind fields. Extensive analysis was done comparing MODIS oceans data products using smoothed and unsmoothed input, and comparing those results to same day SeaWiFS retrievals. It is difficult to say which ancillary field is "truly" correct. These ancillary fields are at a coarse time and space resolution and will therefore never exactly match the "true" conditions at the time and higher resolution of satellite overpass. We have therefore decided that it would be best to strive for consistency between the ancillary inputs used by the two sensors. Direct comparisons and merger of MODIS and SeaWiFs data will be facilitated if both projects use the same ancillary input files. In addition the use of the SeaWiFS ancillary HDF versions decreases the processing load at MODAPS as PGE17&19 will not be needed for the current operational re-processing. For the longer term, when SeaWiFS ends, these fields need to be produced using the same methodology either by MODAPS or DAAC.

Minor code changes were made for cross platform compatibility, specifically to enable processing on Linux operating systems in addition to the standard IRIX and Alpha systems. The ability to process on Linux will allow much higher reprocessing rates at MODAPS.

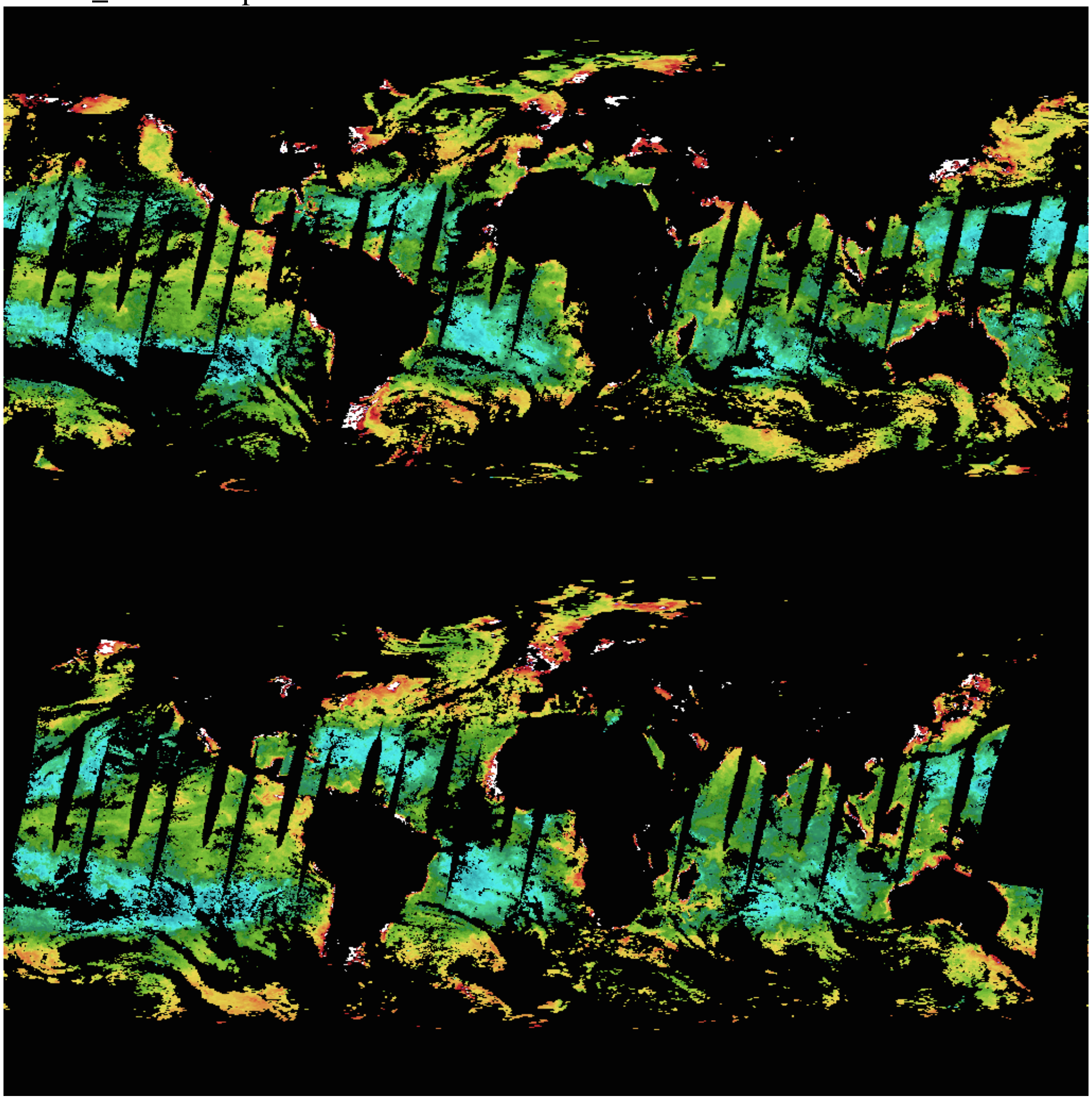
The final Version 4.2 code was extensively tested both at the Miami SCF and MODAPS. The Miami SCF created a global daily time series for the life of the Terra mission by processed 1-2/days per months, for a total of 21 days. Analysis of this data series ensured that calibration trends had been removed to the expected levels. After the V4.2 was delivered to MODAPS for testing and integration a total of 4 Science tests were preformed from level2 -> level 4. These tests verified the integrity of the processing at all time and space resolutions through global weekly files. The MODAPS outputs were verified against a series of 12 days processed at the Miami SCF, including a complete 8-day week, to ensure both MODAPS and the Miami SCF produced the same scientific results.

In addition to the standard IRIX science testing, Linux produced L2's binned to Level 3 on IRIX were compared to the standard IRIX processing chain. Comparisons made both on the MODAPS IRIX/Linux systems and equivalent Miami systems produced the same results. While small 1 and 2 count differences are present in L2's produced on the two operating systems these differences do not affect the science quality or interpretation of the data at either Level 2 or Level 3

Reprocessed Collection IV represents a significant improvement over previous versions. Analysis of the global time series at 36km is consistent across time, and indicates that the 36km images are suitable for global long-term studies, although detailed analysis from matchup datasets remains to be done before derived products can be declared validated. Figure 1 shows inter annual comparisons for several of the products for April 2001 and April 2002. Retrievals show remarkable coherence between Chlorophyll products and Fluorescence Line Height (FLH) even for the most oligotrophic waters where the FLH is extremely low and was expected to be marginal relative to the signal to noise of the sensor. The surprising coherence in oligotrophic regions indicates that the s/n in the sensor is sufficiently high to enable FLH retrievals in very demanding low signal circumstances, at least at lower spatial resolution where averaging neighboring pixels minimizes the effect of sensor noise. A complete time series of global mean nLw at 443 and 551 is shown in Figure 2 and indicates previous biases between instrument calibration epochs have been significantly reduced. Comparison between MODIS derived chlorophyll products and SeaWiFS derived chlorophyll shown in Figure 3 demonstrate good agreement between the 2 sensors for the selected dates examined. However, visual examination of the daily MODIS global time series over a period of two years indicates that a small East-West cross-scan imbalance between adjacent orbits may occasionally be present.

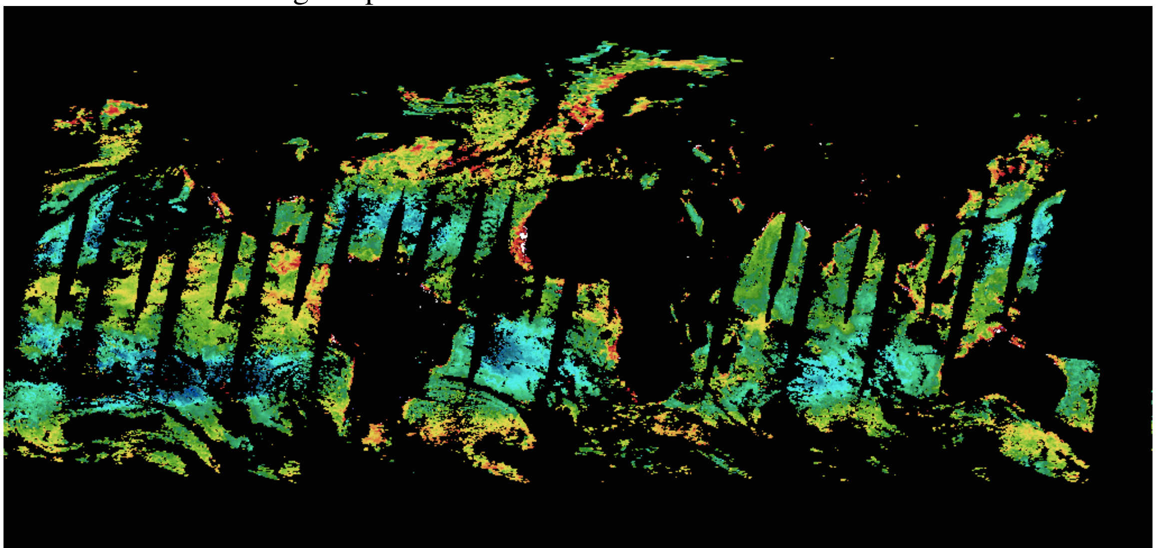
Figure 1 April2001-April 2002 global 36km comparisons

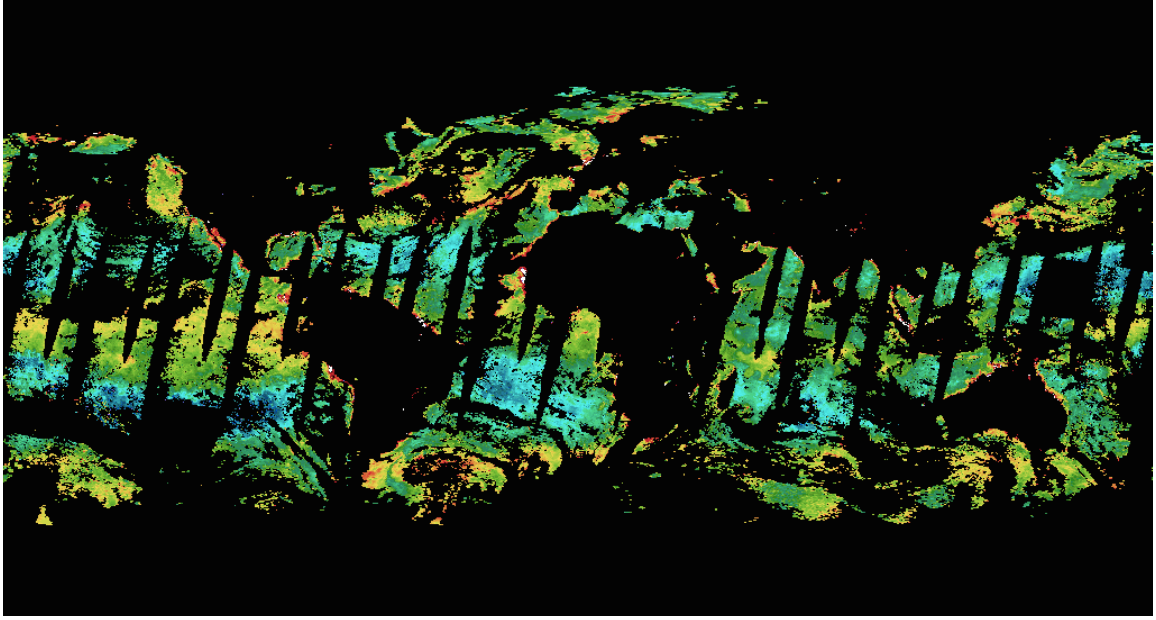
Chloro_MODIS April 2001



Chlor_Modis April 2002

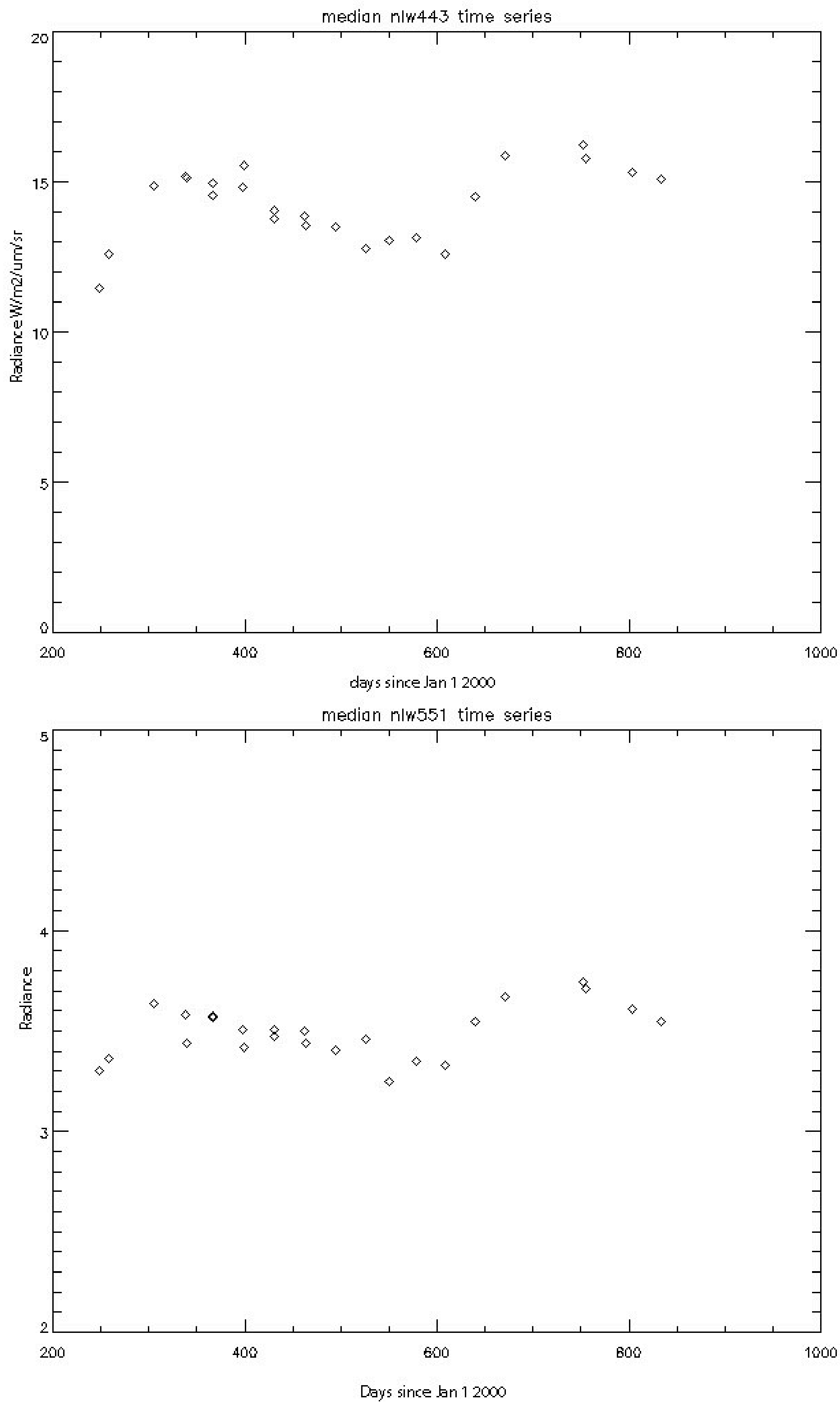
Fluorescence Line Height April 2001





Fluorescence Line Height April 2002

Figure 2 Time series of Median nlw 443 and 551



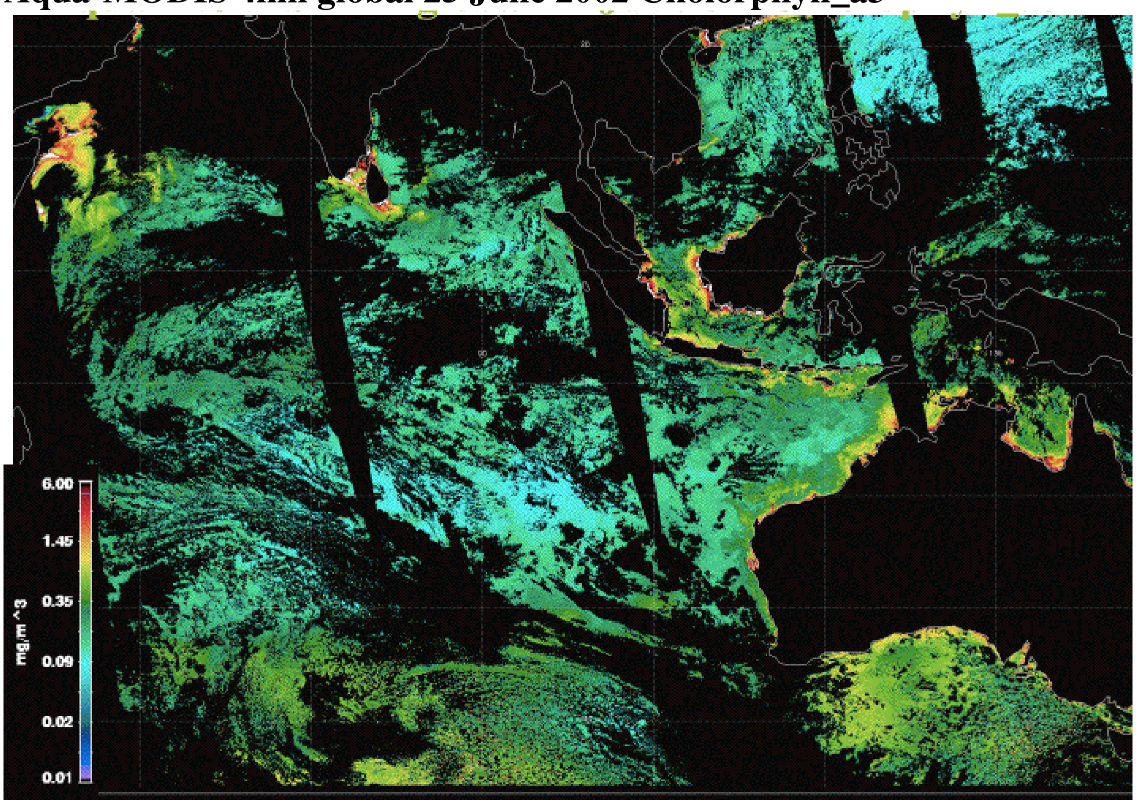
AQUA

AQUA MODIS was launch on May 4th 2002. The Nadir aperture door was opened on June24th 2002. Within 24hrs of first light the University of Miami SCF had produced global images of Ocean products. Samplings of these dramatic first light images (un-calibrated) are shown below for the chlorophyll and SST products. Compared to the “first light “ images from Terra, AQUA MODIS ocean visible channels demonstrates little to no mirror side offset, East-West discontinuities are much smaller, and very little residual sun glint contamination is apparent in most products. Only two detectors appear to be offset from the others with some remaining trends for all detectors, these inter-detector effects are not noticeable at the 4km resolution.

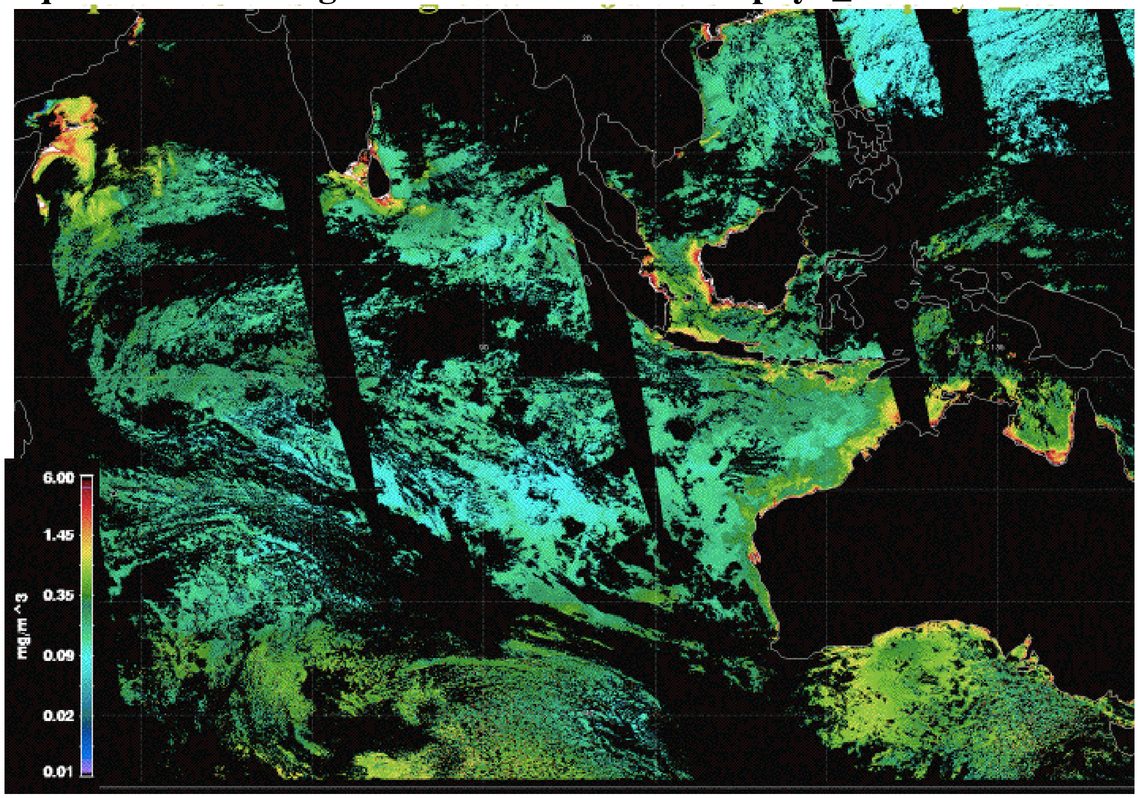
The SST products show no edge of scan problems and good continuity between swaths. No mirror side offset is apparent and only small detector offsets, which again are not visible at 4kms. The SST algorithm coefficients will require adjustments but overall values are in a rational range.

Given the lessons learned from TERRA and these promising AQUA first light images we expect that the length of time required to calibrate and produce provisional AQUA products will be much more rapid than that experienced for TERRA.

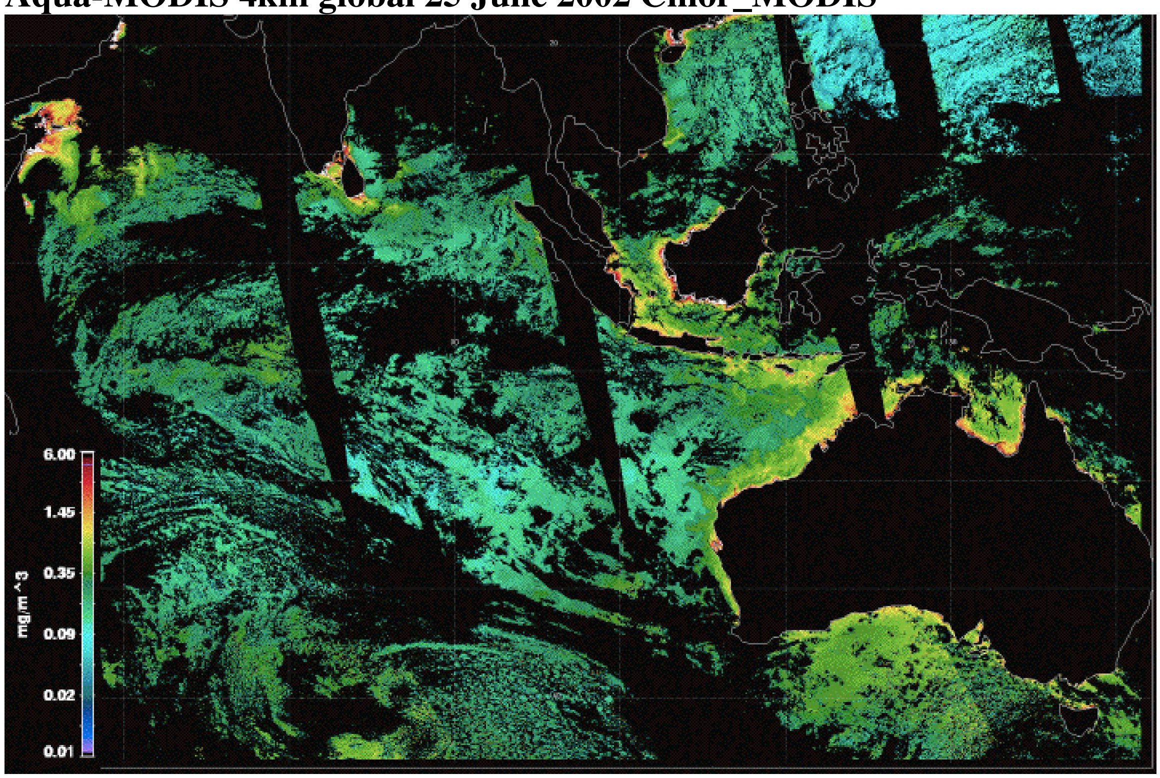
Aqua-MODIS 4km global 25 June 2002 Cholorphyll_a3



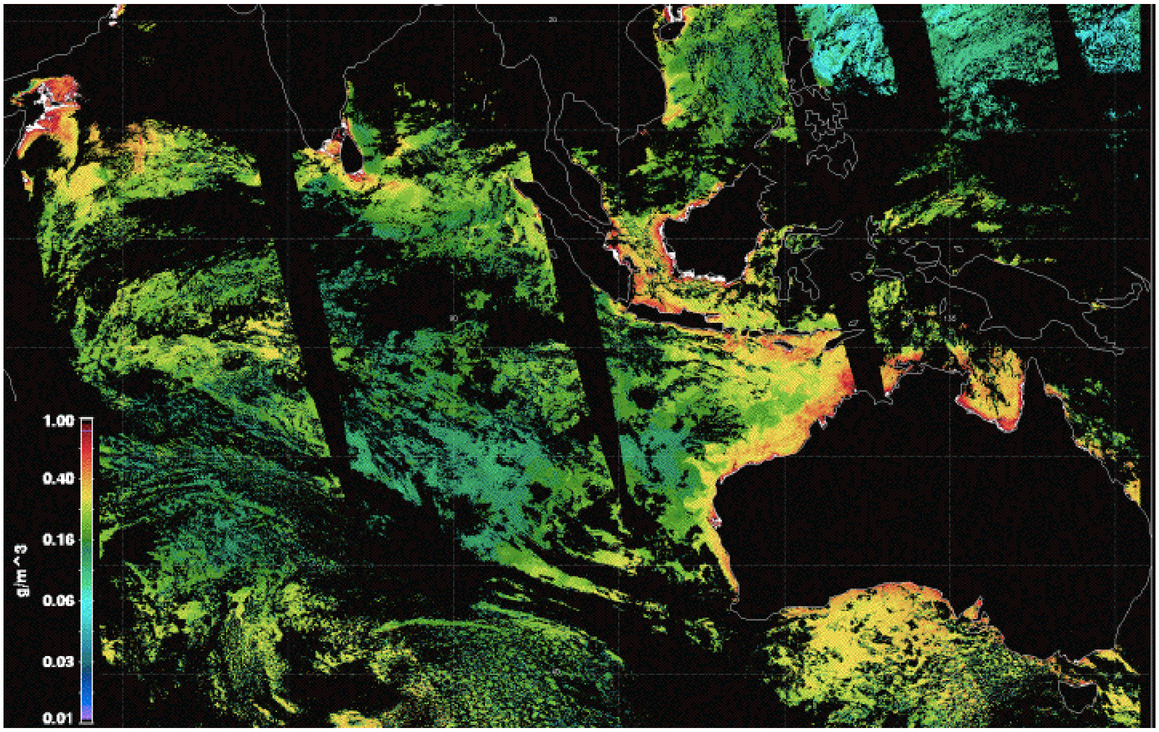
Aqua-MODIS 4km global 25 June 2002 Cholorphyll_a2



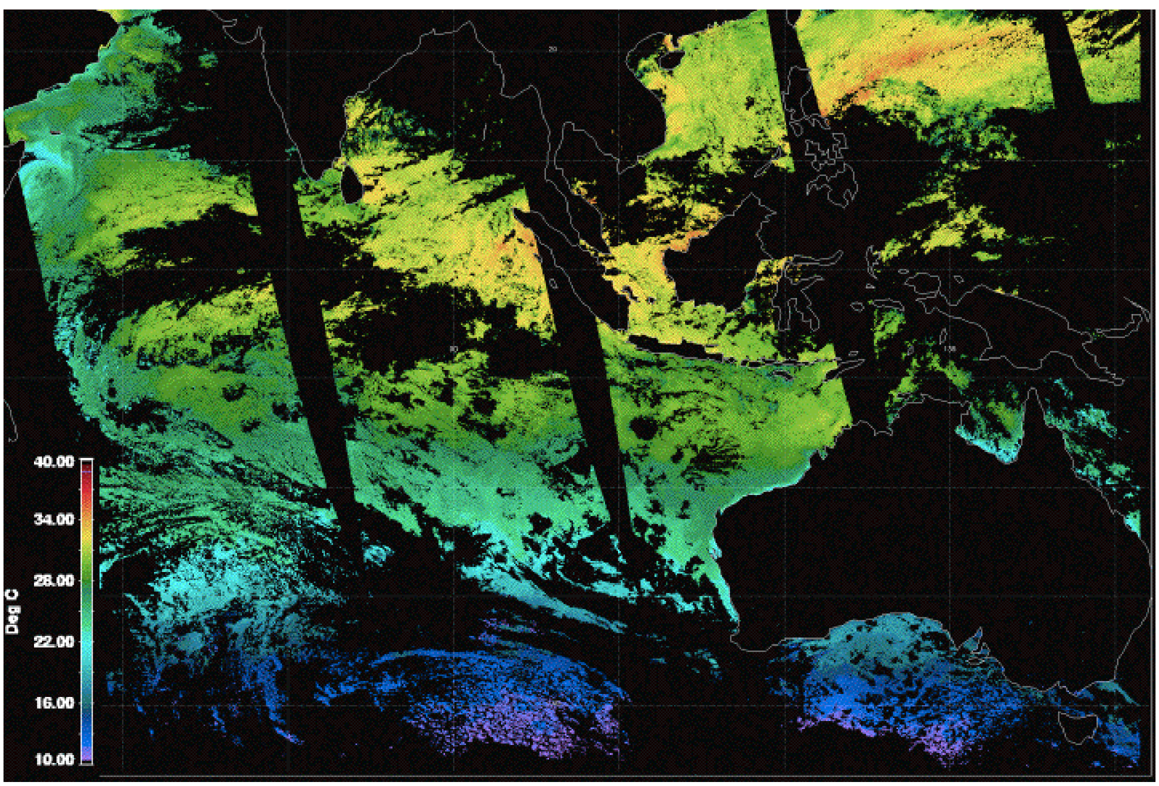
Aqua-MODIS 4km global 25 June 2002 Chlor_MODIS



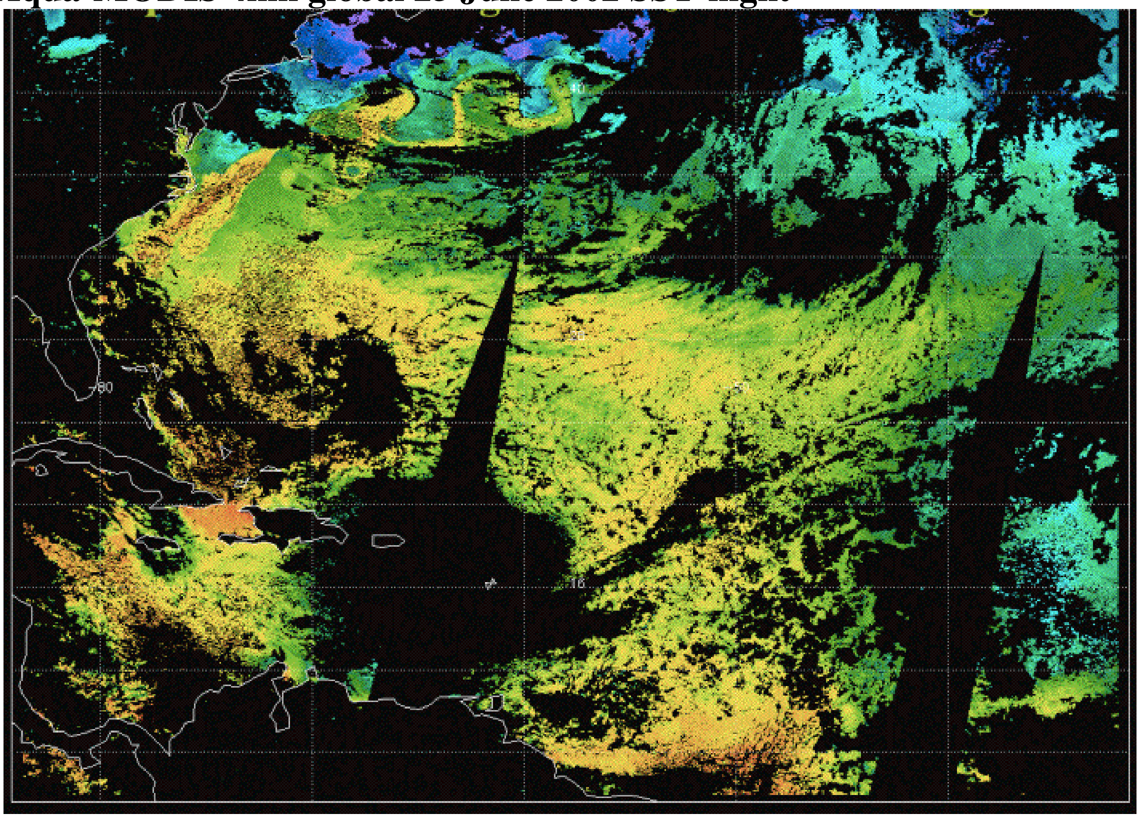
Aqua-MODIS 4km global 25 June 2002 Suspended_Solids



Aqua-MODIS 4km global 25 June 2002 SST day



Aqua-MODIS 4km global 25 June 2002 SST-night

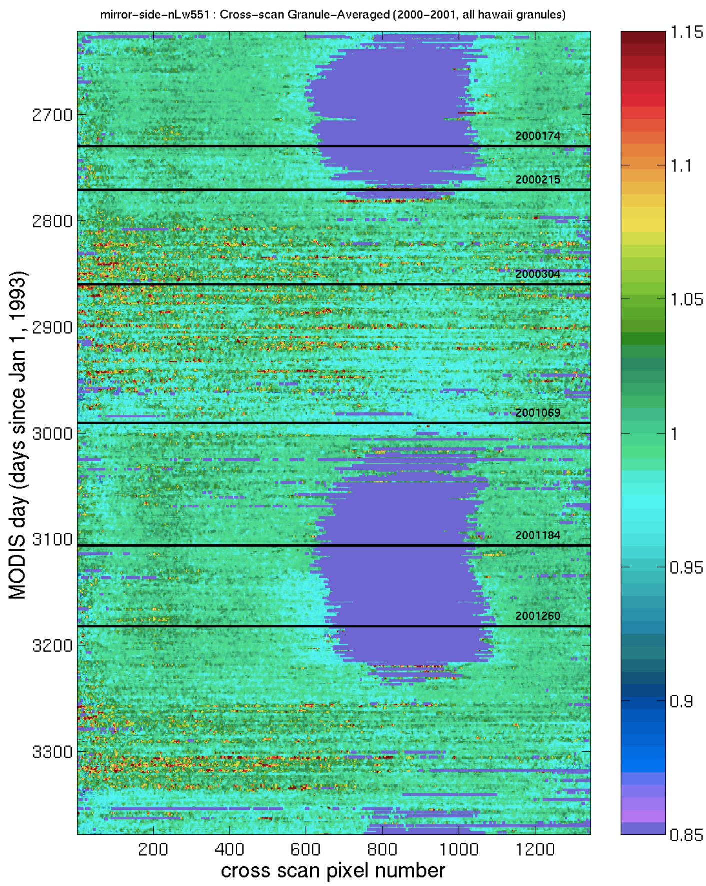


B2. Matchup databases and Validation activities

TERRA

Retrieved top of the atmosphere Lt's have an apparent stability floor of 0.1-0.3%. This translated to nLw uncertainty as a 2-3% RMS for the blue bands and 20-30% for the red band and applies at both detector to detector and mirror side errors. These uncertainties redistribute with time such that different detectors within a scan, cross scan behavior, and mirror side balance will shift in time. At this moment, these instabilities have no obvious correlation to any known factors. An example of this type of instability can be seen in the mirror-side waterfall plots for granules over the Hawaii Moby validation site in Figure 4.

Figure 4 Mirror side Waterfall plots for the nLw551 time series. The cross-scan (abscissa) behavior of the mirror side difference (colors) in mission time (ordinate). Each time record is a complete granule average. Changes in mirror-side/cross-scan behavior apparent within each calibration epoch is to noise at the 0.1-0.3% level in Lt.



Mirror side and inter-detector balances were adjusted for the mean behavior for each calibration epoch, for an individual granule it is expected that Lt's will show departures on the order of 0.1%-0.3% for a given mirror side or detector and may result in striping. Cross scan normalization in V4.2 is applied as a single factor to all detectors within a given spectral band. Recent analysis shows that cross scan behavior could be improved by developing a cross scan normalization based on each individual detector.

Not withstanding these uncertainties which manifest themselves as coherent noise or stripes at higher resolutions, comparison to in situ measurements at the MOBY buoy site show excellent agreement with RMS values on the order of 2x in situ measurement RMS (Table 1). For comparison the errors in MODIS are on the order of the least significant count of the SeaWiFS sensor.

It is in theory possible to remove all artifacts from an individual granule but unless every granule with in an epoch was individually corrected any mean set of correction factors will result in random instability due to instrument behavior. . Thus, the current set of correction factors minimizes the overall error for all granules although imperfections will remain at a low level within any particular granule.

Table 1 MOBY-MODIS RMS

nLw band	**% RMS**
412nm	10.5
443nm	7.5
488nm	4.5
531nm	6.7
551nm	7.3

MODIS /SeaWiFs global matchup comparisons

In conjunction with Ewa Kwiatkowska of the SeaWiFs/ SYMBIOS project three days of MODIS 4.63km binned products were compared to same day retrieval SeaWiFS products binned to the same 4.63km spatial resolution as MODIS, Figure 4. The SeaWiFS data was from reprocessing 4 calibrated against stray light correct in situ data. The MODIS/SeaWiFS matchups include only collocated bins that had been assigned the highest quality for both sensors.

For the linear fits shown the bisector of the MODIS vs. SeaWiFS and SeaWiFs vs. MODIS was determined and the distance perpendicular to this line was used in calculating the weights. Thus, there is no true independent variable and the presence of errors in both sensors is assumed.

The nLw comparisons show good agreement, generally <3% difference. The MODIS OC3M chlorophyll algorithm (chlor_a2) produces results consistent with SeaWiFS, <10% difference depending on the retrieval day. Additional comparisons will be needed to evaluate any systematic differences between the two sensors.

Figure 4   nLw 412 and nlw443 Modis-SeaWifs comparisons

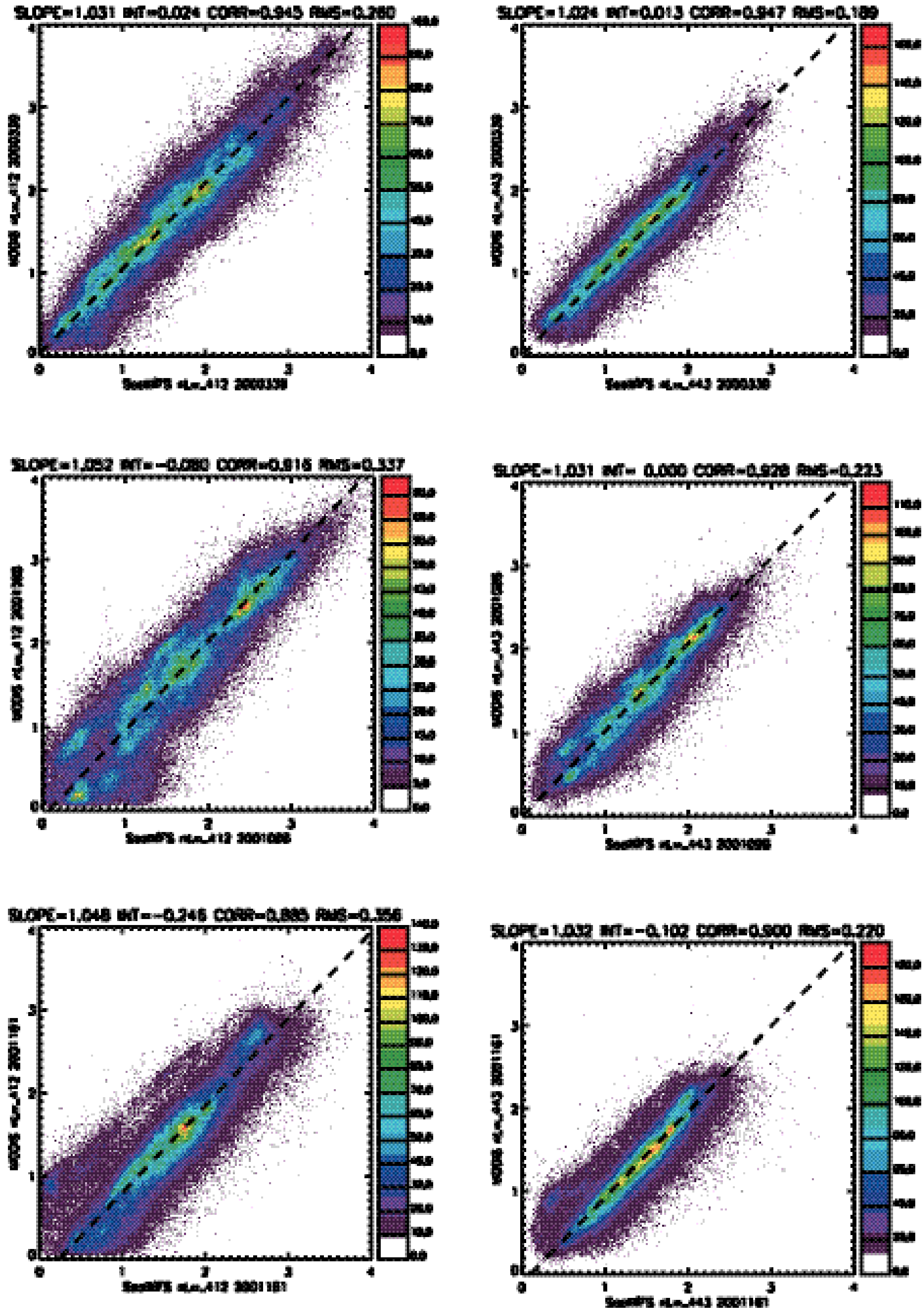


Figure 4b nLw 490 and nlw551 Modis-SeaWifs comparisons

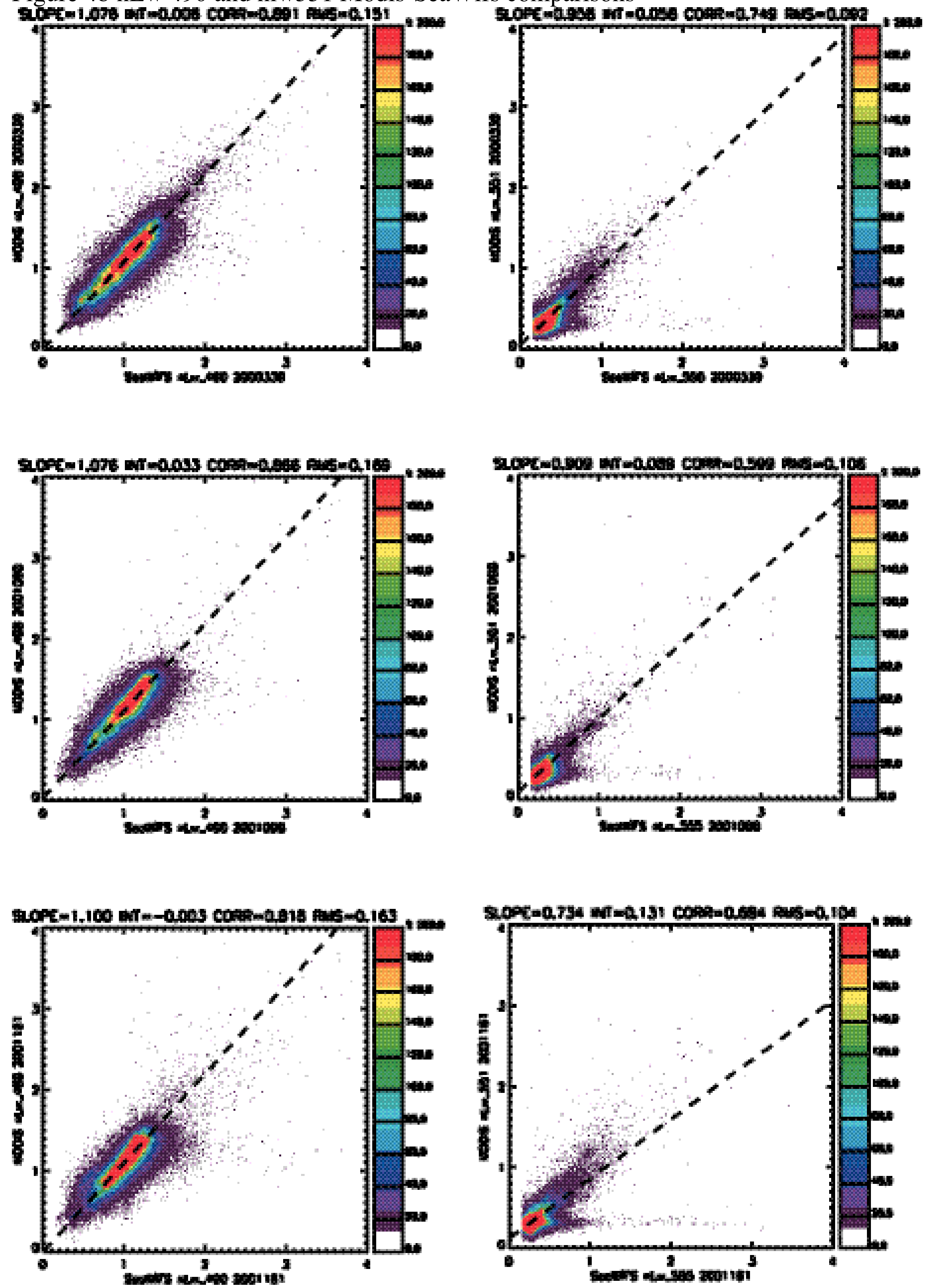
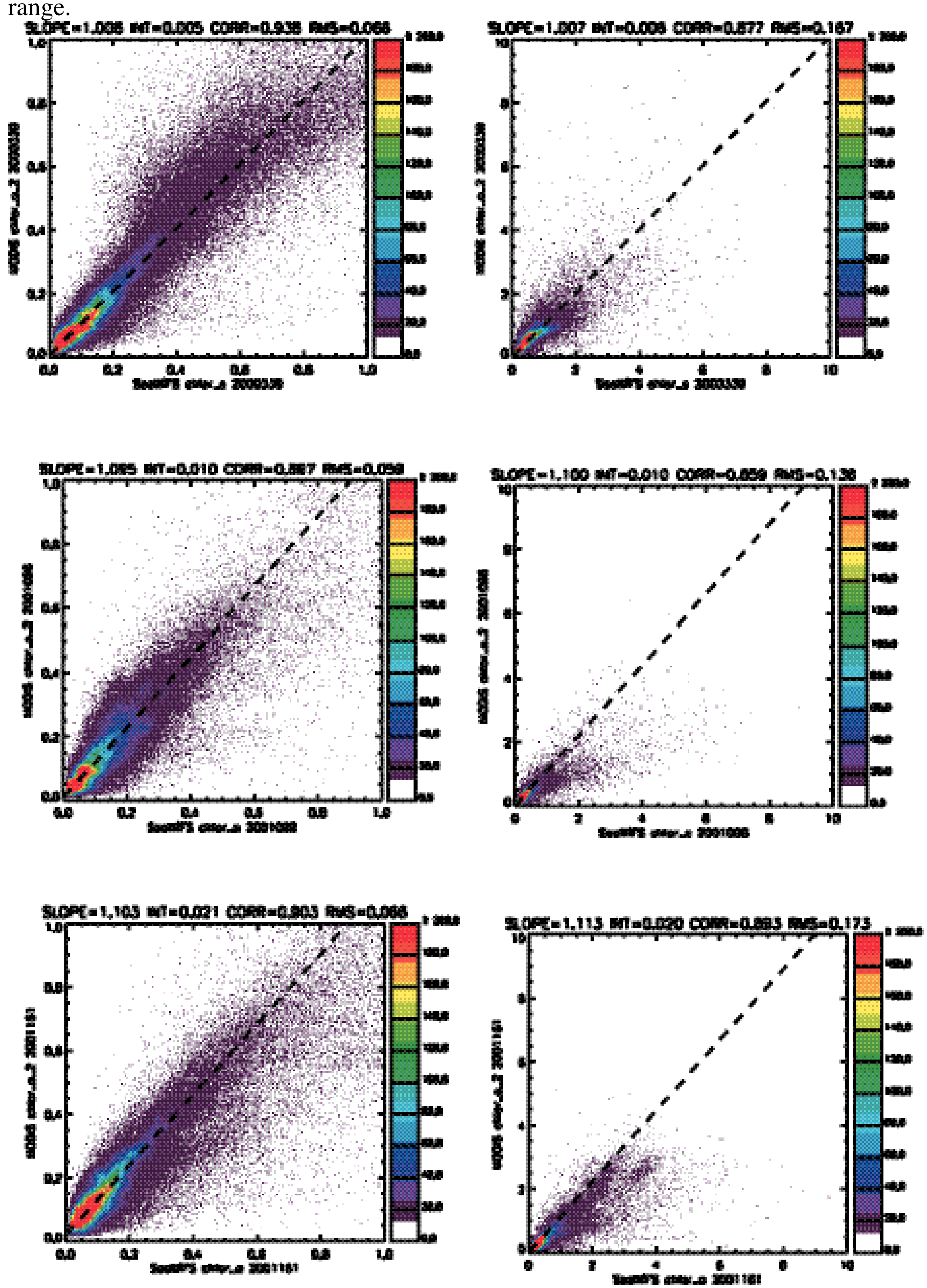


Figure 4c Chlorophyll Modis-SeaWifs comparisons column 1:full data range Column 2 reduced range.



MODIS SST matchups

Validation activities associated with the 11-12um algorithm continued. Over 28,000 matchups were collected covering the period Jan –May 2002. The process of extracting satellite data and creating near-real time SST matchups was completely automated. L1a extractions are currently performed at the University of Miami with a 10-day lag behind spacecraft. This lag allows for the collection and processing of both the in situ buoy data posted to the GTS and real-time transmission of the daily Maeri cruise track data from the Explorer of the Sea. These level-1 extractions are then archived and processed to level-2 as individual records. Daily matchups files are then assembled which contain the level-1 brightness temperatures (bands 20,22,23,31,32), SST, SST4, and quality level for a 3x3 box surrounding the matchup locations. Generally 400-600 matchups are collected globally each day. In situ Matchups are required to meet the criteria of being within +-30 minutes of overpass and 0.1 degrees of latitude and longitude. Cloud-free quality level 0 matchups comprise about 10% of the total matchups collected. We are currently in the process of creating leve1-1a extractions for all the in situ buoy and Maeri data collected since launch. This level 1 extraction archive will be invaluable for validation activities and provide a rapid test environment for any changes in IR calibration or algorithms and coefficients.

B3. Direct Broadcast

TERRA

Work was completed on the Miami direct broadcast web site, www.rsmas.miami.edu/groups/rrsl/modis/, for rapid delivery of Oceans level –2 products for the East coast of the United States. A 14-day rolling archive of true color, daytime and nighttime sea surface temperature and chlorophyll from Terra are made available generally within in 12hrs of overpass. Data are provided as either standard direct broadcast 2.5min granules or as composites for the region between 15N to 50N latitude and 95W to 50W longitude. Data may be obtained as graphic images in JPEG or GIF format, or data values in either binary or HDF formats. All files are made available to the public by anonymous FTP.

B.4 Systems Support

Code revision history for all modules is listed below.

Modifications/Additions to DSP:
modcol:
Add ability to read modis SST instead of Reynolds.
Add NIR correction.
Fix interpolation into crossscan and mirrorside corrections.
Change RRS min value check from 1.e-5 to 1.e-6.
Add sstval to F4, slot 9.
Add sst qc input file for two brightness temperatures.
Only call StripAndAppend if the file name is not empty.

Change glintsc to be one value per band.
Band order is 8,9,10,11,12,13l,13h,14l,14h,15,16.
Add lgcalc option to use Cox-Munk or brights to calculate Lg865.
Zero some more variables if atmospheric correction fails.
Change FLH inputs to include glint correction.
Use new coccolith calculation and coeffs.
SST glint equation should have been to calculate zglint, not Lg865 directly.
Fix sst quality to use just sst qual.
Add a debug to show glint values.
Add a bias correction to zglint.
Add set points and high and low sets of coeffs for Clarks products.
Fix sstqual.
Replace unused flags B_Dr2_chl_quality and B_Dr2_hi_scat with B_Dr2_hi_488 (set if nLw488 > nLw443) and B_Dr2_hi_532 (set if nLw532 > nLw488).
Change valid ranges for K490.
Put sstqual in F4 file (in band 11 instead of bright22).
Fix comments for fluor. code to make it clear that Lt-Lr-Lg is used instead of Lt-Lr.
Read in set points and high and low sets of coeffs for Clarks products.
Fix quality bit attribute for chlor_a_2.
Replace unused flags B_Dr2_chl_quality and B_Dr2_hi_scat with B_Dr2_hi_488 (set if nLw488 > nLw443) and B_Dr2_hi_532 (set if nLw532 > nLw488).Change quality algorithms for Clark's products (pig_c, pig_total,susp_solid, k490, chl_modis) and chlor_a_2 (SeaWiFS oc3m).
Set chlor_a_3 to -1 if it's below the minimum valid value.
Reset model search on failure.
Fix error status for cocco_conc and calcite_conc.
In FLH box, don't use bad data: add checks for most common flags and cloudy.
Initialize more variables so they are set to bad/invalid in case an error occurs.
Bound check K_490 (Diffuse_Attn).
Fix error reporting for newatm errors.
Add wind speed multiplier for Cox-Munk glint calculation.
Echo value for wsfactor.
Change quality for Carder's chl_a3 ag400,aphi675,atot_mod* products (all share the same quality bits).
Change default for wsfactor.
Add ability to compute glint based on wind direction (VECGLINT).
Put MOD28 inputs in metadata InputPointer.
Add debug (debugt) statements.
Add DOAVGFLH option to disable averaging of FLH inputs.
Fix check to make sure an sst reference file was specified.
Fix upper limit for pigment_c1_total to 200.0.
Read bitQAflags so someday we can check for maneuvers.
Change pigment_c1_total upper limit to 200.0.
Change limits for susp_solids_conc.

Fix checks for geolocation flags.'bitQAflags' wasn't completely added.it needs to get back to anly8dbl.
Don't check geo flags bit 5 (no valid terrain data).
Fix Lw L2 flag to say 'Restrict' instead of 'UNUSED'.

msbin:
Fix comments in header: binside is input not output.
Put character zero instead of integer zero (NULL) in strings.
Add FFLHPIX, first flh pixel, and LFLHPIX, last flh pixel, keywords to edge restrict the FLH and CFE products.
Add 'L2 Input Files' attribute to L3 files.
Add flh bounds to processing log attribute.
Fix default data day bounds for aqua.

mtbin:
Add line number to error messages.
Add 'L2 Input Files' attribute to L3 files.

modinc/ocean_lun*:
Add OC_POLARIZATION2_LUN. Add PROC_ENV_LUN, 'uname -a' output, set by modaps scripts, for keeping track of linux vs unix.

modinc/commoninout.*:
Update commoninout.h to match commoninout.rat.
Update lots of long names. Replace B_Dr2_chl_quality and B_Dr2_hi_scat, which were unused, with B_Dr2_hi_488 and B_Dr2_hi_532.
Add L2INSIZ for size of 'L2 Input Files' attribute.
Add Lw L2 Restrict flag name.

modinc/meta.rat:
Collection (granule ID) version to 4.*_GRAN_ID are no longer used, we read VersionID from mcf file instead.

modinc/mocean.h:
Use MAX_DSP_NAME instead of MAX_NC_NAME to assure same length on all platforms.

modisio/v2_meta.c:
Add optional Processing Environment metdata field (value from pcf).
Write Archive metadata to all L3 files.
Read collection VersionID and use it in LocalGranuleID instead of version passed in from calling routine.
Put character zero instead of integer zero (NULL) in strings.
Correct testing of attr for string "ProcessingEnvironment".
modisio/L1B_Geo_Cld_Interface.c modisio_v2.h
Read bitQAflags from L1b to check for maneuvers.

mocean:
Use MAX_DSP_NAME instead of MAX_NC_NAME since MAX_NC_NAME is different lengths in different version of HDF.
Save info for up to 16 files instead of 6. Use MAX_DSP_NAME instead of MAX_NC_NAME because it's the same length on all machine types.
Fix error check after call to SDgetinfo.

modsst:
Set edge pixels to quality 3.
Add wind speed multiplier for Cox-Munk glint calculation.
Change default for wsfactor and add wsfactor to the processing log.
Add ability to compute glint based on wind direction (VECGLINT).
Read bitQAflags so someday we can check for maneuvers.
Fix checks for geolocation flags. Don't process pixel if can't calculate median average of differences for either set of input bands.
Don't check geo flags bit 5 (no valid terrain data).
Some silly changes to get modsst to compile with optimization on modaps old compiler.

binshr/settbinmeta.rat:
Write Archive metadata to all L3 files.

binshr/makefile:
Remove reference to mapi since we don't use it.
binshr/l3in.c:
Put character zero instead of integer zero (NULL) in strings.

binshr/l3in.c l3out.rat:
Add 'L2 Input Files' attribute to L3 files.

mfill:
Add check for linux.
Add 'L2 Input Files' attribute to L3 files.

modlib/anc:
Put character zero instead of integer zero (NULL) in strings.

mcolshr8:
Add wind speed multiplier for Cox-Munk glint calculation.
Add ability to compute glint based on wind direction (VECGLINT).

atmcorshr:
Add ability to compute glint based on wind direction (VECGLINT).

mspc:
Add 'L2 Input Files' attribute to L3 files.
mmap:
Add 'L2 Input Files' attribute to L3 files.

msstcloud:
Add 'L2 Input Files' attribute to L3 files.

ratfor,ratf90:
Validate digits in radix value field (exclude invalid and out of range).

pathnlc:
Different set points for noaa-16 coeffs. Add noaa-16 tree test. Debugs will need to be removed after testing.
Change the tree test for noaa-16, and change it's set point back to 0.7.
Don't calculate channel 3 values if there's no data (noaa-16).
Add noaa-17 using values for noaa-16 for now.
Remove debug use of mask bits.
Always output satz as -90 to 90 and an intercept of -128.0.
Fix check for channel 3 and noaa-16. Change some debugs.

pathbin:
binit requires satz at the end of 'value' for minang/maxang test.

sdremapn:
Fix check for 'mask' bandname. Comment out check for invalid navigation flag (nflag) since sremapnh works without checking it.

pathsst:
Correct call to ftrim().
Use correct format for NOAA-15/16 calibration data header line.
Correct calls to ftrim().

anly8d:
Reset model search on failure.

reclen:
Allow larger tape records.

reformat_sm-mod:
new program.

reformat_so-mod:
new program.

B.5 Team Interactions

Participated in weekly teleconferences with MCST, PIP , and Oceans science team. Intermittent teleconferences and meetings with MODIS QAWG and interactions with MODIS Ocean PI's to coordinate algorithm and quality level and flag definition updates. A three day meeting was held at the University of Miami with personnel from the SeaWiFS project office to discuss future collaborations and joint interactions. In January Dr. Evans attended the SeaWiFS/SymBios ocean color meeting in Baltimore and in February Dr. Evans and Dr. Kearns presented several papers at the 2002 ocean sciences AGU/ASLO meeting in Hawaii

C. Future Activities

C.1 Processing Development

While the reprocessed V4.2 Terra will be a dramatic improvement over the previous version we expect some problems to still exist. We believe that to completely eliminate the striping in the level-2 products will require unique per detector cross scan and mirror side correction factors, not the average behavior to be used in V4.2. We also believe that polarization is playing a role in some of the remaining problems.

MCST has delivered new Level-1b v4 LUT's. Each new MSCT delivery requires Oceans to completely evaluate correction and calibration tables. Preliminary analysis shows the v4 L1b LUT to be superior to previous versions. Much of the time tends and RVS problems present in the v3 LUT are corrected in this new V4 table. Oceans will develop new calibration and correction factors for this version of the l1b. The current Oceans LUTs are only correct until March of 2002. We plan on using the new L1b in the reprocessing stream begin on April 2002 data.

We will begin beta calibration and evaluation of Aqua products. As an initial beta calibration Aqua will be cross-calibrated against Terra same day collocated retrievals. Once a revised L1b calibration has been developed by MCST and sufficient numbers of MOBY matchups are collected (~6 months) a preliminary calibration will be developed. We will also begin to explore techniques for creating combined merged AQUA and TERRA and SeaWiFS global products

C.2 Matchup Database

Continued work with D. Clark to collect MOBY and MOCE visible in situ data and examine MODIS cookie matchups from the standard and variable SeaWiFS validation sites. In regard to SST, we will continue to routinely extract 5x5 boxes of MODIS pixels for MAERI and buoy matchups for SST. All Matchup databases will be expanded to include both Aqua and Terra sensors. Validation also continue by comparing retrievals from other sensors, eg. SeaWifs, AVHRR

C.3 Direct Broadcast

We plan to expand our direct broadcast web pages to include Aqua as well as Terra when the Aqua level-1 direct broadcast data becomes routinely available. This will include composite images for the U.S. East coast to be made available in GIF images, and binary format in addition to the standard EOS HDF of the 2.5min level 2 granules. Depending on user demand we may explore adding additional products to the current suite of available composites.

C.4 Systems Support

We plan to continue upgrading the RSMAS SCF with additional computational resources to support the demands of both AQUA and TERRA. These additional CPU's will be needed to support the calibration, testing, algorithm development, and quality assurance activities associated with the two data streams. AQUA and TERRA tape jukeboxes have been acquired and brought on-line to assist in the L1 storage and retrieval tasks.

C.5 Team Interactions

Continue participate in weekly teleconferences with MCST, PIP and Oceans and intermittent teleconferences and meetings with MODIS QAWG and interactions with MODIS Ocean PI's to coordinate algorithm and quality level and flag definition updates. We will also continue to interact with the PR office as needed. We have also begun strong interactions with the SeaWiFs product office in regard to activities relating to merged SeaWiFS MODIS products, and Ocean color validation activities.