MODIS SEMIANNUAL REPORT
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RSMAS/MPO

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Due to the interlocking nature of a number of projects, this and subsequent reports will contain coding to reflect the funding source. Modis funded activities are designated with an M, SeaWIFS with an S, and Pathfinder with a P. There are several major sections within this report; Database, client/server, matchup database, and DSP support.

A. NEAR TERM OBJECTIVES

A.1 Modis Objectives (M)

A.1.1. Continue to develop and expand the processing environment
- a. increase computational efficiency through concurrent operations
- b. determine and apply more efficient methods of data availability for processes

A.1.2. Begin extensive testing using global CZCS and AVHRR GAC data with database processing to test the following:
- a. algorithm capability
- b. machine and operating system stability
- c. functionality required for the processing and analysis environment

A.2 SeaWIFS Objectives (S)

A.2.1. Continue testing of processing methodology.
A.2.2. Continue to develop relationship between database and in-situ environment.

A.3 Pathfinder Objectives (P)

A.3.1. Expand matchup database as applicable.
A.3.2. Continue testing of methodology.
A.3.3 Train and integrate new personnel into Matchup Database processing scheme.

A.4 DSP Objectives (M)

A.4.1. Continue testing of processing methodology.
A.4.2. Continue to expand the number of sites supported.
A.4.3. Expand the supported hardware/software platforms

B. OVERVIEW OF CURRENT PROGRESS

B.1 Automatic Processing Database (P)

B.1.1 Operational Testing

B1.1.1 January Operational Testing

Jan. 1988 was processed multiple times, using the Walton NLSST SST algorithm and some modifications.

January Product Production and Dissemination:

a. Daily and weekly ascending and descending AVHRR product files from the Nov./Dec. runs were made available for weeks 8801-8844, in several sizes and formats.
b. The files were in three forms: as binned data (what we call the PST files), as DSP images (we are currently mapping into a global cylindrical rectangular coordinate system), or as simple 2 X 2 files (no header data) that can be imported into foreign display systems.
c. Ascending and descending data (day and night) are stored separately, and all files are global, with land masked out.

When files are mapped, there are three "qualities" available:

alpx = all pixels, regardless of data quality
good - pixels flagged good (cloud-free) BEFORE reference masking
dcld - pixels flagged good AFTER reference masking

Files made were:
9 km resolution PST files - daily and weekly 4096 X 2048
DSP images of the daily files - alpx and dcld
(made from the 9 km files above)
18 km resolution PST files - daily and weekly 2048 X 1024
DSP images of the daily and weekly files - alpx, good and dcld
(made from the 18 km files above)
2048 X 1024 noheader files of the 2048's above
1-degree resolution PST files - weekly only
360 X 180 images of the weekly files - for this set, we have mapped SST, standard deviation and count (these are the files corresponding to the Reynolds fields)
2-degree resolution PST files - daily only (for comparison at some point with the new release of the COADS climatology.
A subset of the products was also made available for the one-month tests of the Walton NLSST calculation.

B.1.1.2 February Operational Testing

The operating environment was adjusted to take advantage of software and hardware upgrades. Some jobs have been consolidated and others eliminated. For example, previously there were three

jobs that handled the orbital binned files, one to product them, one to copy them from the local processing disk to the post-processing disk, and one to perform cleanup. Due to improvements in the communications between the processing machines and the post-processing machine, these three have been combined into one job.

Here is the new, streamlined scheme:
1. As before, ingatcor and spacebin on the alphas.

2. One job now runs pathtime, to produce the asc and dsc files for the orbit. These are now written directly to /h/modis4, instead of being written to a local disk. This job also cleans up all intermediate and input files. Previously, there were separate jobs to make the orbital file, copy it to the next step, and clean up.

3. The daily job (currently run on an SGI Challenge) now copies the daily files to the appropriate remote data disk, eliminating the second copy job. These disks are now mounted on three DEC alpha machines for the time being.

Another run was made, of days 88001-88120, during the latter part of the month.

B.1.1.3 March Operational Testing

Early 1988 was calculated several times to test enhanced cloud masking strategies using the Reynolds climatology, correcting some problems that had occurred due to the 1 degree resolution of those fields.

Near the end of the month, a new run was started, and will be continued in April.

B.1.1.4 April Operational Testing

The remainder of 1988 for NOAA-9 was processed, and product files produced for all of 1988. There were numerous hardware changes during this period, that required a number of adjustments in the processing strategies.

B.1.1.5 May Operational Testing

The first half of May was devoted to product production for the 1988 files. One week's worth of product files was copied to DAT tapes, and sent to several researchers, to test this method of file transfer. Processing for 1987 began approximately 14 May, but the processing was slowed when several unanticipated problems occurred with the raw files from laser disk. The laser disk files supply the Level 1B data for the initial processing step. When NOAA/NASA generated these disks, some files were duplicated and some file names were corrupted. The processing had to be halted when one of these times was encountered, until the correct names could be associated with he files, and a new, corrected version

burned onto a disk. By the end of the month, the first 18 weeks had been processed, and the first 8 weeks had been cloud masked.

B.1.1.6 June Operational Testing
The remainder of 1987 (weeks 18-52) was processed and cloud masked with products produced for the first 28 weeks.

B.1.2 Development

B.1.2.1 January Development.
System installation at Jet Propulsion Laboratory.

The database schema was modified to reduce the size of a major field in the PROCESS_CONTROL table. One of the most commonly queried fields, PROCESS_STATUS was reduced from 20 to 3 characters. This improved the efficiency of the string comparison on this field.

Adjustments were made in the SATELLITE and SENSOR tables, and the database interface was modified to hold these static tables in memory, to avoid excessive I/O activity.

Many minor adjustments were made in the interface and DSP command files.

B.1.2.2 February Development

Using a new DSP function, stat, the sizes of input and output files will be compared for file copying jobs, to ensure that the copy completed successfully. This is an example of a function that supplies verification of unreliable operating system facilities (e.g. NFS file copy).

More tables are being streamlined and taken into the server memory.

B.1.2.3 March Development.

A large number of the command files used for post-processing and product production were consolidated and condensed. For example, there were several files used to produce various sizes of maps of SST or SST/standard deviation or count. These were consolidated into two files, pmp-loop.dsp, which sets up the mapping of a number of files, then calls pmp-run.dsp, which creates one map. This consolidation was also performed for files to produce composited (pathcomp-loop), median filtering of PST files (pflt-loop), spatial reduction of PST files (pspc-loop) and image remap (rmp-loop).

The database interface was modified so that all static database tables are now held in memory.

The interface was also modified to permit control over individual

client computers. When a work request is received by the interface, a logical symbol is now checked for that computer. If the symbol for that computer is "R," then operation continues normally. If the symbol is "S," the "stop" signal is returned to the client MCP program, telling it to exit. If it is "P," then the "no work, sleep" signal is returned to the requesting mcp. If it is "F," then processing continues for all jobs except the "init" procedure, to which a stop signal is sent. Since the 'init' job assigns a new orbit file to that computer, this results in completing processing on all files currently assigned to that computer, but assigning no more new ones.

B.1.2.4 April Development

There were few significant changes this month in the APServer system. These include:

To accommodate the automatic storage of product maps on a magneto-optical device, a command file was developed to automatically rcp (remote copy) files from a staging directory on the SGI computer, andrew, to the appropriate storage directory on "nkk", the MO Jukebox.

During the processing of the latter half of 1988, the disk used to store individual orbits frequently filled, causing errors in those files. A function is being developed to check the free disk space, and checks will be added to all command file to confirm that space is present for output files.

Installation

The most recent version of the APServer system was installed at Jet Propulsion Laboratory. Although the server system had previously been installed there, the software had undergone extensive changes, so this amounted to a new installation. As with the local hardware changes, a large number of minor changes were necessary at both sites, to insure that both sites were using the twin systems.

B.1.2.5 May Development

Development this month centered in three areas.

1. The adjustments in the pre-automatic processing program (getscan and addrecgac) to identify and flag misnamed or duplicate files.
2. Further adjustments to the installation of the autoproc server at the Jet Propulsion Lab. This included a substantial amount of time helping the JPL personnel become familiar with the server operation by e-mail, phone and remote login.
3. Porting of the server system to the DEC Alpha VMS machine was begun. While no major changes will be needed, many minor changes have already been made. The system is not yet operational on the Alpha VMS machine.

B.1.2.6 June Development

Development this month was only minor in nature, other than the adjustments in the pre-automatic processing program (getscan and addrecgac) to identify and flag misnamed or multiple files. The major effort this month was on processing and product production. V. Halliwell made a short (3-day) visit to Jet Propulsion Laboratory to train and consult with the personnel there who will be using the AUTOPROC system. During this visit, a number of changes were discussed in the server operation, to be implemented over the next few months.

B.1.3.1 Algorithm activity

Ran 1988 (Jan-NOV) using algorithm coefficients and model presented at Science Working Group meeting in March.Processing rate, 7.5 days for 140 data days. A new program path filler uses Laplacian relaxation to fill cloud areas. Use of Reynolds 1 deg, 1 week analysis as a quality control reference map does not provide a reasonable average reference value for areas with high gradients, e.g., South Atlantic Bight to Gulf Stream in Winter, Spring. Using filler program on good 3 week data to produce global filled 9km reference map, then run cloud mask program to check data validity, then produce new filled reference and run cloud mask.

Warner converted jukebox software to run on alpha
Vicki converted process control server to run on alpha
Expect that processing rates could double with faster archive access and network delivery, faster process control server response could improved present 15-20 data days/day to 30-40 data days/day.
Vicki processed 1987 and 1988, generated global products at 1 deg, 36, 18 and 9 km, distributed

Using matchup data base and radiative transfer modeling to examine limitations in present sst retrieval equations

Matchup database testing for N-11 from Nov. 88 until June 91. Found change in sensor coinciding with Pinatubo eruption, effects global data by ~0.3C. Started trial N-11 processing to examine transition from N-9 to N-11. Due to difference in nodal time, approximately 1 orbit checking buoy record to determine amount of heating due to time difference, ~0.25c

B.2 Client/Server Status (S)

B.2.1 Client/Server Development

The following is a list of accomplishments for the 1st half of 1994 concerning Client/Server processing:

1. At the end of last year, Dalu Li worked with Mark Ruebens from

GSFC to install the new version of VDC on IRIX version 4.

In addition we ported the VDC from IRIX version 4 to IRIX version 5 because of an OS upgrade; this involves the services functions for the Sybase and a rebuild of VDC applications.

2. The porting of VDC was not complete because the portion of the program written in perl was not functional. Dalu Li contacted Mark and Jibu who are responsible for that program. He was told that they are rewriting that part in C instead of perl and that the program would be provided to RSMAS after testing and check in for version control are completed.

Dalu also installed the browse code that has not been ported to version 5 in SGI 4D/480, under IRIX version 4.

The ap graphics interface was designed and is being implemented to monitor the data processing activities. The design encompasses three parts:

1. Command Display: This part is a general command window, which is basically a key stroke reduction program; clicking buttons to execute specific commands.
2. Processing Graphical Display: The processing display monitors the data file processing, which should provide much better visual indication of the current data file processing status recorded in the RDB database. Using a world map as the background, the status of all active ap processes is displayed. The status of an active process can be ready, being_processed, done, etc.
3. Network Graphical Display: A display that reflects the network connection status through oversight of network activities, connectivity to each node, and the loading of each machine.

These graphics interface programs are related to some extent to VDC's counterpart. Monitor was written in C++ with object oriented approach. The graphical base is Motif/Xt. All the three parts are written, tested, and are working.

The following modifications are required for an ap process to use Monitor:
1. The RDB database for the ap process needs start_time and end_time entries for each scene file; these allow calculation of the location of the scene.
2. The RDB database table PROCESS_CONTROL contains the information for both the active and completed [done] processes. Since the active and done processes are mixed together, the information query into this table would be extremely costly in terms of time. There should be a separate "active process" table for more efficient use of Monitor. Monitor is tested but not put into full use, the reason is that the AVHRR database RDB needs some modification to add additional fields in the two main tables, MAIN and PROCESS_CONTROL. This modification will be implemented in a newer version of ap.

In the latter part of the second quarter, Dalu implemented a gui for the database operations for the RDB database. The RDB gui is fully tested and operational.

B.3 Matchup Database (P)

B.3.1 1st Quarter Matchup Activities

During this quarter, we continued the collection of in situ sea surface temperature (SST) data from various sources, to be used in extending the temporal and geographic coverage of the matchup data bases. With the cooperation of NOAA's National Oceanographic Data Center (NODC), we extended our inventory of data from moored buoys off the US coasts to December 1993. Similarly, drifting buoy data were obtained from NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML) for 1992 and 1993.

A list of times and locations at which NOAA-11 AVHRR data were to be extracted was built from in situ SST data. The extractions were completed, and the matchup database was assembled for this year. This currently gives us an approximately three-year long (December 1988 - December 1991) global matchup database that will be used to develop and validate SST algorithms for NOAA-11. This activity will begin soon, and it will include an examination of the transition between the end of the NOAA-9 and the beginning of the NOAA-11 data series.

As detailed in the last report, we also experimented with the addition of integrated atmospheric water vapor concentrations to the matchup database. The water vapor estimates were derived from data collected by the Special Sensor Microwave/Imager (SSM/I). In the last report, we described a procedure by which three days of SSM/I data were used in a sub-optimal interpolation scheme to produce daily water vapor fields.

The three-day fields ensured almost complete global coverage and captured the large-scale characteristics of the water vapor distribution. However, when examining the association between the 3-day water vapor values and the difference in brightness temperatures in AVHRR channels 4 and 5 (T4 - T5), we noticed a significant amount of spread. It was unclear whether that variability originated in a truly limited association between these two quantities, or, on the other hand, it simply reflected the influence of mesoscale meteorological variability. That is, we were comparing 3-day fields with instantaneous measurements. Passage of fronts within the 3-day period could introduce significant variability in water vapor values, as it was confirmed from an examination of daily weather charts and SSM/I extractions at the moored buoys.

To examine the importance of mesoscale variability, we used SSM/I water vapor values extracted from the passes closest in time and the pixels closest in space to observations from the moored buoys off the US east coast and in the Gulf of Mexico. These SSM/I

values were provided by collaborators at NASA's Goddard Space Flight Center. We compared these instantaneous SSM/I extractions with (a) daily median-filtered fields, in which the ascending and descending passes over a grid cell were used together, and (b) the 3-day SSM/I fields described previously. As expected, there is considerably more difference between the instantaneous water vapor values and the 3-day fields than between the instantaneous measurements and the daily fields. The quantification of these differences is currently in progress. Preliminary results suggest that daily water vapor values should be used in SST algorithm work, as the difference between daily and 3-day fields is too large.

Finally, during this period we also initiated a new research line involving the use of atmospheric radiative transfer models. Two radiative transfer models were obtained and implemented: the first was LOWTRAN and the second one was a model developed by the Rutherford-Appleton Laboratory (RAL) in the United Kingdom. The RAL model was tested against using standard atmospheric profiles included with the LOWTRAN code. We expect to be able to report more on the modelling activity in the next quarter, as this effort is just beginning.

B.3.2 Second Quarter

B.3.2.1 Matchup Database and Related Activities

Since the beginning of the year, work has continued on expanding

the temporal coverage of the in situ - AVHRR matchup database. We have now extracted AVHRR data for the NOAA-11 spacecraft for 1989 through 1992. More recent in situ data have been acquired or requested. The 1992 matchups are in the process of being assembled.

A new version of the matchup database has been produced for the NOAA-11 data. This version (number 18) incorporates the slope of the equation used to calibrate AVHRR counts into radiances. The reason for adding this quantity to the matchups is that a change in the operation of the NOAA-11 AVHRR (a sudden increase in the internal blackbody temperature) was noticed in data corresponding to mid-1991. The addition of the calibration slope to the matchup records allowed the detection of a strange behavior in channels 4 and 5. While a time series of the calibration slope values for channel 4 approximately mimics the evolution of the blackbody temperature (as is to be expected), channel 5 apparently shows a smooth decay in the calibration slopes that is unrelated to blackbody temperatures. The reason for this unusual behavior is being investigated.

The matchup data bases were used to estimate an SST algorithm for NOAA-11 using the "modified NLSST" formulation proposed for NOAA-9. The behavior of the algorithm was acceptable with the

exception of the period after June 1991, when the change in internal blackbody temperature (see above) and the atmospheric aerosols injected by the explosion of Mt. Pinatubo caused significant problems in the performance of the algorithm.

B.3.2.2 Atmospheric water vapor estimates

Recently, new SST algorithms have been proposed that make explicit use of estimates of atmospheric columnar water vapor. These estimates are usually derived from the Special Sensor Microwave/Imager (SSM/I), an infrared radiometer onboard spacecraft of the Defense Meteorological Satellite Program (DMSP) series. For that reason, we have undertaken the addition of SSM/I-derived water vapor estimates to the matchup database. To that effect, SSM/I geophysical data tapes were obtained from the Physical Oceanography Distributed Archive Data Center at NASA's Jet Propulsion Laboratory. The tapes were transcribed to permanent archival medium (optical disk).

We produced daily global water vapor fields from which values were to be extracted at the locations of the in situ - AVHRR matchups. Because the sampling pattern of the SSM/I leaves gaps in the daily coverage, we experimented with the generation of daily fields that included data from adjacent days using a semi-optimal interpolation procedure. To investigate the implications of using water vapor fields constructed from several days of data, we compared those values to a set of extractions prepared by collaborators at NASA's Goddard Space Flight Center, which corresponded to the SSM/I values closest in time and space to a subset of the matchups (including only NDBC moored buoys). The results showed that the use of several days of data introduced significant variability in the water vapor estimates, as the decorrelation scales of water vapor concentrations in most parts of the world are relatively short. For that reason, we decided to use only daily data files for the water vapor extractions. Note that the daily data sets include, for some areas, data composited from ascending and descending passes. These observations are separated by only 12 hours, so the compositing should not introduce significant variability.

Water vapor values have been extracted from SSM/I-derived water vapor fields for 1988 (NOAA-9 and NOAA-11), 1989 and 1990 (NOAA-11). We are currently producing data fields for 1987 (NOAA-9) and 1991 (NOAA-11). The water vapor values added to the matchups are being used in the evaluation of algorithms that include water vapor estimates. A manuscript is under preparation describing the findings of the investigation of the association between water vapor concentrations and AVHRR quantities.

B.3.2.3 Radiative transfer modeling

A new line of research that has started since the beginning of this year is the use of radiative transfer (RT) models that

simulate the fate of radiance emitted by the ocean surface as it propagates through the atmosphere and reaches the AVHRR sensor. We obtained a copy of the RTF model developed at the Rutherford-Appleton Laboratory (RAL) in the United Kingdom, and we have implemented it in our computers in Miami. We also obtained a set of world-wide radiosonde measurements, which contain vertical profiles of atmospheric temperature and water vapor concentrations. The radiosonde set has been compiled by NOAA and is supposed to have been quality-controlled. The set includes stations representative of various atmospheric regimes, from polar to tropical.

Preliminary results of the RT simulations have confirmed some of the associations detected earlier between SSM/I water vapor and AVHRR quantities. The fact that the simulated and observed behaviors are similar lends confidence to the results.

B.4 DSP Support (M)

B.4.1 Testing:
None listed

B.4.2 Modifications/Additions to DSP:
MIA2PICT: Program to convert a DSP image file to PICT.
ANLY7D: Merge in support for new ancillary read routines.
COLORSHR7: Merge in new ancillary read routines. Start building 8-channel versions of some files (/usr/dsp/cal/sea*pol.*).
ANLY8D, COLORSHR8: New HDF version.
MAKEPPT7: New orbital element utility. Used to create element data file from ascending time ordered text file of one line elements.
DSP: Add new DSP function "stat" to get information about files.
PATHBIN: Add reference longitude to bin9kminit routine. This is the longitude of the center of the binned image. E.g., ref=0 means left edge is -180 and right edge is +180; ref=+90 means left edge is -90 and right edge is 270 (-90); ref=-180 (or +180) means left edge is 0 and right edge is 360 (0).
JHIST: Add output of ASCII file with histogram data.
JWA: New ingester for Japan format.
LIB/IO/S_RINT.C: Initial release. This adds the missing "rint" function to Apple's A/UX.
PATHFILL: New program to fill in missing and bad data in a PST file.
PATHSPC, PATHMOS, PATHMAP, PATHFLT, PATHCLOUD, PST2OA:
Add the reference quality as the fourth quality value (bits 6,7) in the quality band.
No longer build TCL and TK libraries.
BIT2OA: new program to convert a bit bin mask to a binary oa file.
SSBIN-HDF: spacebin SeaWiFS data using HDF files instead of dsp image files.
STBIN-HDF: time bin SeaWiFS data using HDF files instead of dsp image files.
SMAP9-HDF: map SeaWiFS HDF "pst" files into dsp image files.
AES: ingest 8-bit AES data (Bedford)

AES10: ingest 10-bit AES data (Bedford)

B.4.3 Problems fixed:
MIA2PICT: Get rid of inversion logic. Works now for both b/w and color palettes on Mac. Add fixrec for VMS. Acknowledge SGI as origin of PICT output routines.
All Utilities: Modify for dual FORTRAN/explicit FORTRAN main program on OSF.
Change makefiles for either C or FORTRAN main programs and use new.make.c-util vs make.util include file.
PATHMOS, PATHMASK, PATHFLT, PATHCOMP, PATHCLOUD, IMG2PST, IMG2BIT, CZCSMAP9, CSBIN, CMOS, CMAP9, BIT2IMG, PATHTIME, PATHMAP, PATHBIN, PATHSPC, PST2OA, GSFCBIN9, MOSAIC9: Changes for seam longitude.
APP2PPT7: Correct writing of records to orbital element data file.
  Fixes so it builds on Sparcs.
TWOLINE2PPT7: Remove blanks (inserted for debugging) in output record. Add VMS command line file redirection. Fixes for OSF.
Add non-ANSI C support.
  Allow records to not have checksum character.
LIB/FB/X-LIB.C: Don't use alloca with gcc anymore.
  All the ntoh and hton routines are defined by BSDI.
  Don't use alloca with gcc anymore.
LIB/FB/WRKTLK_LINK.C: Fix major typo.
LIB/FB/MAKEFILE: Define SRCDIR since we include "make.0".
CALLER:
  Don't need the special malloc library anymore.
  Block signals when calling malloc. Don't block signals if doing so already.
  Don't call "HoldSignals" on Unix, they are already held.
  Loop on the wait3 call to reap all dead child processes.
  Add libwrktlk since we're using make.c-util now.
  Apple's AUX doesn't have the "atexit" call, fake one up.
  Use "make.c-util" instead of "make.util".
DSP:
  Use our internal popen on all architectures.
  Explicitly refer to RTLIBSHR in the link procedure.
  Code around problem with OpenVMS 2.0's getenv function.
  Reload termcap database after changing terminal type.
  Allocate the memory for the code array before attaching to the shared memory regions. On A/UX, there's something funny going on with shared regions.
  Use "make.c-util" instead of "make.util".
  Use "void *" instead of "char *" for return type of gchunk.
RATFOR: OSF 2.0 has a different prototype for getopt.
PATHTIME: Add messages when a file is closed.
DBMAN: Add debugs and error messages. Initialize TTY to true. Fix string handling; take out Angels testing of TTY.
NDVI: Force type casting.
SMAKE: Fix error and string handling.
TRACE: Fix error message.
MUL: Fix strings.
SCRIPP: Fix strings.
SLD: Take out box outline (since couldn't get color right).

ORBIT: Fix string handling; get around passing two double arrays to dmod.
  Add to error message which decode failed.
11111/PPT7A.F: Get around the Fortran problem with two double arrays passed to dmod.
MIA2TIFF: Don't include some unknown header file.
TBUS2PPT7: Fixes for OSF. Add non-ANSI C support.
PRINTPPT7: Fixes for OSF. Add non-ANSI C support.
LIB/DISPLYSHR: We need REV512 on the Alpha (.opt).
On SGI, use BSD type signal semantics.
  Add casts to the netread/netwrite calls to keep the C compiler quiet.
  In makefile, define SRCDIR since we include "make.0".
LIB/IO/VAX_EXTRACT.C: u_char is already defined on OSF/1 T2.0
LIB/IO/UTILS.C: Use lib$get_vm to allocate memory, don't mix and match.
  MAKE-BSD: Add code to support non-ANSI compilers.
  BSDI defines the 1st argument of wait3 as an int.
  BSDI defines strcasecmp in one of its header.
  In makefile, don't define RANLIBMAG on BSDI, it's already defined.
LIB/IO/ASSOC.C: When copying associated data blocks, we need to allocate an even number of bytes, RMS can't read an odd number.
Add ASCII descriptions for new associated data types in "AssType".
PATHNLC:
  Add NLSST option; uncomment reference image check.
  Valid sst is within 2 deg of reference image (was 3).
  Add second channel 5 uniformity test.
  Change Reynolds interpolation for ".5" pixel centers and correct north pole and south pole grid rows.
  Handle boundary values better for Reynolds interpolation.
  Use 2-d interpolation for one degree Reynolds climatology data.
  Change to new non-linear radiance coefficients (4 Jan. 94 memo from Rao) for NOAA-10, NOAA-11, and NOAA-12.
PATHBIN: Conditionalize debugs; fix I/O status buffer checks.
  Split out AABINS: useful in own right. Clean up code in getmask.
  Rename bin9kmf_def.rat to bin9km_def.rat. Clean up open/get mask routines.
  Quality two is now second channel 5 uniformity is ok, sst is ok, and zenith angle is ok.
CDR: Include <string.h>.
ZIPINVEN, ZIP, TIROS, SHARP, SCRIPP, SATMOS, RLREAD, NMFSSCAN, NMFS, DLR, CZCS:
  Don't call "errset", not portable. Changes for OpenVMS.
TIROSSCAN, NMFSSCAN, SHARP, SATMOS, NMFS, DLR:
  Fix variables being doubly declared.
  Fix up double declaration of IFR.
TIROS, SCRIPP: Added ORBITSHR support for VMS platform.
ORBITSHR:
  Add alpha/VMS and (proto) VAX/VMS shared image support for orbit shared image.
  Comment character in ORBITSHR-ALPHA.OPT-PROG is "!".

TIROS, SHARP, SCRIPP, SATMOS, RLREAD, NMFSSCAN, NMFS, DLR,
CZCSSCAN:
Add changes for ORBITSHR.EXE on VMS platforms.
RLREAD: Fix maximum buffer size.
CZCS: Don't use "flag" use "logical".
COLORSHR7:
  Add HDF support for alpha/OSF platform.
  Assume ancillary datasets are accessed through
usr/dsp/cal/ancillary instead of using a hard-coded local path
name.
  Add whitecap parameter value correction.
  Add debugging. Add support for daily ancillary files.
  Fix comments.
Multiple file dimensions not handled properly.
Add caldob, clean up code 'a la' colorsub8.c.
COLORSHR: removeComma is now separate.
ANLY7D:
  Added bands for bounding model numbers.
  Add whitecap parameter value correction. Add new output band
(ratio).
INGEST/LIB/NETSTUFF.MAR: Modify code to 'assemble' on AXP/VMS.
LOADNOHED: Add overwrite option.
TIROSSCAN, SATMOS, CZCSSCAN: No longer need sublib.olb on VMS.
INGEST/LIB/ASCEBC.C,EVCASC.C: Add new routines needed by the
ingesters that are usually found in sublib.olb on VMS.
OFEN: Don't restore terminal; fix subroutine common areas.
LIB/SATELLITE/GREJUL.RAT: Can't use nargs, so always use grejul
as a function.
SSBIN: Use grejul as a function. The 4 argument call is passe.
SMAP9: Use grejul as a function. The 4 argument call is passe.
GETCOM: Alpha/VMS page size is different and sys$crmpsc was
changed to care about it. Don't define htonl on BSDI.
  Fix for VAX/VMS.
LIB/DISPLYSHR/MPSECT.C: Alpha/VMS page size is different and
sys$crmpsc was changed to care about it.
  Fix up for VAX/VMS.
LIB/WRKTLK/MKSECT.C, MPSECT.C: Alpha/VMS page size is
different and sys$crmpsc was changed to care about it. Fix up for
VAX/VMS.
LIB/WRKTLK/WRKSPC.H: Apple's AUX needs <time.h> to define the
"tm" structure.
LIB/WRKTLK/LOCK.C: Retry the lock if we get interrupted.
LIB/WRKTLK/MAKEFILE: Define SRCDIR since we include "make.0".
LIB/IO/MATH.C: Only use these routines on a VAX running VMS.
LIB/IO/UTILS.C: Use the dumb emalloc routines on Alpha.
LIB/IO/CALEVAL.C: Use the Fortran versions of the math routines,
just as in evlcal.
LLIB/IO/MAKEFILE: Use "s_rint.c" on Apple's A/UX.
IB/IO/HEADER.C,IMAGEWRITE.C,MAKEFILE: Suppress compile
warnings. Correct make include path.
XAMIN: Fix to print last character of audit records.
TIROS: Add unpacked GAC and LAC formats.
    One logical record per physical record for packed and
unpacked.

LIB/TCL/TCLUNIX.H: Small change for IRIX 5.
LIB/TK/TKCONFIG.H: Small change for IRIX 5.
XFBD: Define the macro sigmask if not defined by the system headers.
   Make the action for SIGIO "ignore" rather than "default". We really want ignore.
   Don't re-enable SIGIO after it has been set to "ignore". Fix up #endif's.
SMAP9-HDF: New fake HDF routines.
SSBIN-HDF: Add the fake HDF routines. Change the output to not reverse the order of the input bands.
PATHFILL: Access correct input band. Speed up filling. Terminate looping at 1/2 bit error level.
MIA2CDF: Malloc really needed to be declared. Don't need to declare malloc().
LIB/SPHLIB: Remove -O0 from makefile. Add debugging code. Correct make include path.
ANLY8D: Checkpoint changes. Most of calibration integrated. HDF coding continues. Various speed ups: only compute cos(x)'s once, collapse other simple factors. Complete separation of navigation & I/O from processing code. Add manual page. Split out navigation. Make more HDF compatible.
   Continue reorganizing program.
COLORSHR8: Split out navigation (pointing calculations). Make more HDF compatible. Complete separation of navigation into separate module.
   Add caldob routine. Clean up code.
   Need SeaWIFS version of raygetpol.rat.
COLORSHR5: Add removecomma.c from colorshr. Add removecomma.c from colorshr.
HLPDS: Use the shorter name of libscreendpy.a on Apple's AUX.
LIB/SCREEN/MAKEFILE: Truncate the name of the library on Apple's AUX.
LIB/SATELLITE/MAKEFILE: Truncate the name of the library on Apple's AUX.
WRKSPC: Apple's AUX doesn't have the atexit call, fake one up.
BANDLIST: OSF doesn't need the declaration of malloc.
MIA2HDF: Those "useless" defines were really needed.
LIB/HDF/DFI.H: On OSF/1, malloc returns "void *".
MICE: Use make.c-util.
LIB/TK/TKBIND.C: IRIX 5.2 hides some of the X structures like OSF.
VHRR: Fix string handling.
GRID: Remove unused common block (conflicts on OSF V2.0).
INGEST/LIB/LGNGST.RAT: Fix string handling.
HIST: Conditionalize the NCAR calls. Only available on VAX/VMS for now.
JULIAN: Fix string handling.
PATHFILL: If no land mask then don't try to access its pieces/parts. Make sure error status is set for all errors. Take out debugs.
XFBD: Don't declare ntohl and friends on BSDI. On OpenVMS T6.1 dnetlib.c needs special treatment. Correct graphic binary writes. On OpenVMS/Alpha, we have to explicitly state where to store dnetlib.obj. Return image offsets as base-1. Add casts to keep

the C compiler quiet. Range check the start value of scroll-bars. Don't register channel if its zero. xfbd will no longer try to read from the terminal if run interactively. Last change was wrong, zero is a valid descriptor, check for -1. Add casts to keep the compiler quiet. Addresses passed to PlanewidgetNewStartXY are zero-based. Use the DP size when creating a plane. Resize the plane if the new DP size is larger than the physical plane size. Don't play with the scrollbar's min/max values, leave them zero-based. Set the border_width of the planewidget to zero.
LIB/WRKTLK: Alpha and VMS figure out their pagesizes differently.
Found another "long" variable declaration.
Double the size of the WRKSPC region on OSF/1 and Alpha.
Change lock/unlock to w_lock/w_unlock, there are conflicts on Ultrix 4.3.
PATHBIN: Fix the new include file name bin9km_def.
Only output given pixel to same bin once (no multiple counts).
Force duplicates to avoid gaps. Filter out duplicates.
Set "firstTime" to true for all continuity breaks.
Make sure input parameters are valid; abort if calculate bad bin number.
Don't use ibits; don't assume size of mask file.
TWOLINE2PPT7: Typo in value decoding from input file for Mean-motion-ddot variable. Add VMS specific module.
DSP: Use new routine wrktlk_wmsg for writes to WRKSPC. The directory being printed out in the ".cd" command was wrong. mergeb must ignore blanks and unprintables (wasn't ignoring blanks). Alpha OSF wants stdlib.h. Also need -Olimit 650 for si_tab.c. Use [.dsp.dspmenu] for the menu saved answer directory. Skip all arguments to the "write" function call before setting return status. Fix typo in error message.
SHPSPH: Don't need TIATT and TIDET.
LIB/IO/IMAGEIOSHR-ALPHA.OPT: Add "extract_long" and "extract_float" to the shareable image.
LIB/IO/EVLCAL.C: Alpha/VMS doesn't need "rint".
LIB/IO/DSPLIB.C: Don't use the for$ routines on Alpha/VMS, use the C runtime.
LIB/IO/OPEN.C: Force open error on all (?) failure cases.
LIB/IO/OPENOLD.C: Don't return SUBIMGPROT if only reading old style image and open will otherwise succeed.
LIB/IO/CLOSE.C: GRAPHIC0: also uses hedfiles, close and rename the temp file.
CALLER: Don't need libwrktlk.a on VMS.
Remove hard-coded /usr/dsp/lib from makefile.
ORBITSHR: Fix linking on VAX. Don't make "PCAP" an external entry point. Forgot to add the transfer vector. Flag PSECT 'SAVEIT' as NOSHR
(don't want any writeable shared PSECTs).
Make writeable common areas NOSHARE (like VAX).
ORBIT: Add EOS to an error message.
DLR: Fix up double declarations.
MAKE-BSD: Change the way we check for Alpha vs. VAX. Don't prototype unlink, it's a macro on VAX/VMS. IRIX 5.2 has different definition for wait3.

NMFS, SATMOS, SHARP: Fix multiple declarations of variables.
NMFSSCAN, TIROSSCAN: Declare "scopy" as external.
IMG2BIT: Change integer*1 to char for sun.
Fix last line written out.
COLORSHR7: Updated to allow build on OSF.
Add branch for SUN. Change to build on Alpha OSF as well as SGI IRIX.
ANLY7D: Use "-lsun" on SGI's only.
Use new variables $(HDFLIB), $(HDFINC), etc. from $DSPROOT/make.1 instead
of hard-coding directories. COLORSHR8: Add conditionals for SUN.
Added debugging for HDF conversion. Moved dsp-nav.c to anly8d/.
Further changes for science/qc output fields.
Force good (default) value if pressure or ozone ancillary data is missing. Pass correct time variable to ancillary data extraction routine.
Change to build on Alpha OSF as well as SGI IRIX (math function names have changed, e.g. fsqrt is now sqrtf. Add variable to COLOOP for albedo calculation. Remove VPATH hold overs.
VHRR: Don't need setuppn anywhere.
Put all ASCII strings in character strings (not double arrays).
SLD: Remove unnecessary code and allow SLD to work on any size display. Don't use cdlib (libcd) any more. We don't need the complications. Fix color handling and string decoding.
Fix LINE binary writes. Remove old code.
LIB/DISPLYSHR/ITESTD.C: On OpenVMS, use the C runtime to sleep.
Fix up call to rsx$wait, don't know how it ever worked.
PATHNLC: Fix string handling. Change some of the debugs.
TIROS: Fix missing line handling (lac). Fix unpacked data handling
(GAC). Fix indexing for unpacked GAC data. Restore deleted INIT line for CURVEX vector. Correct GAC unpacked record data extraction. Change GAC output record counting. Initialize packed to true for all inputs, not just from disk; fix error message.
DATSTART: Ignore missing navigation status, doesn't affect location of subimage in file.
ANLY8D: Checkpoint changes. Program running HDF in and HDF out. Adding SeaWIFS specific science algorithms. Move dsp-nav.c here to localize changes. Add land/shallow water masking. Add initial ghosting algorithm. Change to build on Alpha OSF as well as SGI IRIX. Add cloud (albedo 865) and coccolithophorid tests. Update DSP output support to match current HDF output file format. Merge DSP and HDF output routines in HDF-io1.rat and use compile option to select output method. Pressure and Humidity were in wrong slots in QC output file. Correct land/water masking including array loading and indexing. Modify flagging algorithm to allow multiple conditions to be checked before not processing a pixel. Add turbid water check. Add HDF 3.3r3p1 hooks (even thought it doesn't work). Output values for La670 and La865 in slots 7 and 8. Add fresnel module to support new tests. Fix/enhance options for HDF-io2.c compile. Add three more flags. Add check for solar zenith angle > 70.; change flag bits so flags that cause the data to not be binned are first. Put

flags' descriptions in include file. Correct check for flag bit set, must compare to 0.
SSBIN: Take out HDF stuff; change in to iin for easier debugging.
Change the binary name back to ssbin (from ssbinn).
Use grejul as a function; add some debugs. Take out a debug.
PATHTIME: Add to the command line which quality value to use for summing "best" values. Check for bad quality values. Fix bad quality check: allow up to 6 quality values in this band, we use 4 now.
Change default for which quality from "F" to "B". Fix string
handling. PATHCLOUD: Set new quality to medium if the temperature is close to the reference and the original quality were not good.
Make sure all errors exit with proper number.
PATHCOMP: Add input files to audit records.
PATHSPC: Check for bad quality values; fix handling of count value; change CNT and QUAL too long; only sum one band.
SMAP9: Take out the HDF stuff.
HIST: Remove unnecessary common block (WRKSPC). Pass vector explicitly to iaccum. Add include file for shared common block to force compliance between modules. Change makefile to allow shared libraries. Change variable X to XX and Y to YY; fix mixing of reals and integers. Add another ASCII output which outputs line latitude with line average or frequencies as percent of total (first ASCII output uses percent of largest); fix mixing of integers and reals.
EXAMIN: Add creation date to old style image header dump.
NEW2OLD: Adapt to changes in imgdesc.h (structure changed from *OLD to *ORIG). SSBIN-HDF: Lots of little fixes; make binit look more like pathbin's.
Take out debugs; exit if a bad bin number is calculated.
Fix error handling if bad bin sequence is found.
SMAP9-HDF: Use lunout instead of istdout for the output DSP image. Make time_rec a short int. Change a comment. Use lunin instead of istdin; use nrows and seam_lon from input file; calculate how many bins are left for last read.
GETCOM: Force dp through to XFBD. Output more data on GETCOM errors. Don't do deflu or defgr for fb type x. Change new messages.
INGEST/BLD*: Correct various typos.
MIA2GIF: Force umask() on VMS to propagate group access to output file. Add ability to read a palette from an image file. Use the correct constant for the length of a title.
PST2OA: Make sure mask file was specified before using it. WHERE: Fix string handling.
PATHMAP: Take out debugs.
IMG2OA: Change name of mask in command line from land to water; and specification of mask bit to command lnie; take out asynch I/O; fix pix/lin to lon/lat conversion.
CONVRT: Allow real*4 input data and apply linear bias and slope to convert it to 8 bits. Add option to mask out upper bits instead of bound data. Add bound option.

DBMAN: Fix error handling. Take out debugs; fix one debug message.
Use only lower case in file names.
REMAP: Lon adjustment is part of the calculations, don't do it if read them from the transformation save file.
STBIN-HDF: Fix time_rec definition; increase size of some message arrays.

B.5 Direct Project Support

B.5.1 SeaWIFS (S)

B.5.1.1 1st Quarter Efforts

Received new ancillary data routines. Jim integrated into ANLY, discovered problems with HDF routine when trying to access all 4 data fields, routine returned zero data. SeaWiFS resolved problems and new routines successfully integrated.

Received new L1 and L2 HDF routines. Working with SeaWiFS project to resolve difficulties in linking routines with ANLY.

3/23 Carder Telecon algorithm code to be available by end of march - Steve (SKA)

3/17 Jim able to link test program with HDF routines, sue to continue working with test program to verify L2 read and write with typical ANLY files.

Jim is restructuring ANLY to separate program sections dealing with calibration, navigation, I/O, atmospheric correction, and product generation. This will allow program to use either CZCS or SeaWiFS I/O and data.

Jim computed Rayleigh tables for all SeaWiFS bands, added ozone tau coefficients, Rayleigh tau coefficients, and computed data day limits for SeaWiFS project.

Jim added capability to change reference longitude for equal area coordinate conversion routines. Use 180 for Pathfinder and SeaWiFS.

ANLY adjusted to work with eight bands, SeaWiFS ozone, Rayleigh. new coefficients correct for most of out of band radiance.

ANLY extended to 8 bands from 4 using single -> multi scattering doubled run time, ran experiment where fourier order reduced from 15 to 10, suggest that ~60% of time spent in calculating aerosol_rayleigh aerosol contribution. Howard working on new method to compute this section; it will likely double required table space.

Gordon's u/v wind component glitter algorithm integrated with u/v wind field from ancillary data file.

We received the Challenge upgrade to 480. We installed IRIX 5.2 operating system and returned 480 to SGI.
Ported dsp to new version of IRIX.
Need fb program.

We received Sybase for 5.2 and installed. converted VDC to 5.2, Dalu sent copy of changes to mark, need conversions to scheduler for 5.2

SGI tape problems: SGI changed standard format definitions between v4 and v5 IRIX, e.g. DAT and Exabyte fixed and variable files. SGI new compilers: To date, there has been no improvement in run times. We requested IRIX 6, tfp class compilers and Fortran 90 implementation.

We continue to run ANLY timings. Further testing for run time indicates a run time of 170 pix/sec (150 MHz processor) and presume 100 pix/sec (for 100 MHz) for the pixels that undergo atmospheric correction; a 2 min cpu requirement for all other activities for a GAC (1800 scans).

ATM availability: Circuits should be installed beginning of June. Fore switch at NRL being tested with their network.

Submitted request to purchase raid disk system and high density data tape drives.

Delivered first generation ANLY, spacebin and time bin programs to SeaWiFS. A template script file to run ANLY and spacebin was produced and sent to Gene together with the current ANLY and spacebin programs. New ANLY supports: algorithms from Darzi for albedo, ghost test for GAC resolution, along scan line only, no test for adjacent scan lines, Lt above knee for rejection, cloud test, mask land mask against 9 km pst bit map, C Brown coccolithiphore algorithm (flag), sun glint, Gordon algorithm (mask). Shallow water flag produced by examining 9km mask. Rayleigh scattering calculation uses pressure and ozone inputs, includes coefficients to correct for filter performance. Jim has added the land and shallow water flags, reading the 9km files that Sue has produced using the WBD2 for land definition and the NOAA bathymetry files for depth.

Ran simulated SeaWiFS data through program suite to generate a daily global field.

Simulated input files contain many clouds. Testing to determine pixel time for atmospheric correction and pixel time for other operations (HDF i/o, nav, cal, flag generation and testing).

Held discussions with Howard Gordon concerning update to atmospheric correction.Howard Gordon will develop subroutine package that Jim will need to convert and integrate into ANLY

Need to get tau routine from Howard Gordon, chlorophyll routine

from Carder, new cal routine that includes along scan calibration, L1 input that gives engineering and flag, new output routines that have correct product fields

L3 flag fields, combination rules, strawman send to McClain, into TM chapter

Sue developed new version of space and time bin incorporating binning rules. Will need l3 i/o routines supporting flag field

Discussed option to reduce atmospheric correction computation time by remembering bounding aerosol models and trying on next pixel. if fail, then compute for all models. Jim will implement with revised Howard Gordon correction routine.

SeaWiFS coding support:

ANLY7D: Merge in support for new ancillary read routines.
COLORSHR7: Merge in new ancillary read routines. Start building 8-channel versions of some files (/usr/dsp/cal/sea*pol.*).
ANLY8D, COLORSHR8: New HDF version.
PATHBIN: Add reference longitude to bin9kminit routine. This is the longitude of the center of the binned image. E.g., ref=0 means left edge is -180 and right edge is +180; ref=+90 means left edge is -90 and right edge is 270 (-90); ref=-180 (or +180) means left edge is 0 and right edge is 360 (0).
SSBIN-HDF: space bin SeaWiFS data using HDF files instead of dsp image files.
STBIN-HDF: time bin SeaWiFS data using HDF files instead of dsp image files.
SMAP9-HDF: map SeaWiFS HDF "pst" files into dsp image files.
Changes for seam longitude.COLORSHR7:
  Add HDF support for alpha/OSF platform.
  Assume ancillary datasets are accessed through usr/dsp/cal/ancillary instead of using a hard-coded local path name.
  Add whitecap parameter value correction.
  Add debugging. Add support for daily ancillary files.
  Fix comments.
Multiple file dimensions not handled properly.
Add caldob, clean up code 'a la' colorsub8.c.
COLORSHR: removeComma is now separate.
ANLY7D:
  Added bands for bounding model numbers.
  Add whitecap parameter value correction. Add new output band (ratio).
SSBIN: Use grejul as a function. The 4 argument call is passe.
SMAP9: Use grejul as a function. The 4 argument call is passe.
SMAP9-HDF: New fake HDF routines.
SSBIN-HDF: Add the fake HDF routines. Change the output to not reverse the order of the input bands.
ANLY8D: Checkpoint changes. Most of calibration integrated. HDF coding continues. Various speed ups: only compute cos(x)'s once, collapse other simple factors. Complete separation of navigation &

I/O from processing code. Add manual page. Split out navigation. Make more HDF compatible.
  Continue reorganizing program.
COLORSHR8: Split out navigation (pointing calculations). Make more HDF compatible. Complete separation of navigation into separate module.
  Add caldob routine. Clean up code.
  Need SeaWIFS version of raygetpol.rat.
COLORSHR8: Add conditionals for SUN.
Added debugging for HDF conversion. Moved dsp-nav.c to anly8d/.
        Further changes for science/qc output fields.
Force good (default) value if pressure or ozone ancillary data is missing. Pass correct time variable to ancillary data extraction routine.
ANLY8D: Checkpoint changes. Program running HDF in and HDF out. Adding SeaWIFS specific science algorithms. Move dsp-nav.c here to localize changes. Add land/shallow water masking. Add initial ghosting algorithm. Change to build on Alpha OSF as well as SGI IRIX. Add cloud (albedo 865) and coccolithophorid tests. Update DSP output support to match current HDF output file format. Merge DSP and HDF output routines in HDF-io1.rat and use compile option to select output method. Pressure and Humidity were in wrong slots in QC output file. Correct land/water masking including array loading and indexing. Modify flagging algorithm to allow multiple conditions to be checked before not processing a pixel. Add turbid water check. Add HDF 3.3r3p1 hooks (even thought it doesn't work). Output values for La670 and La865 in slots 7 and 8. Add fresnel module to support new tests. Fix/enhance options for HDF-io2.c compile. Add three more flags. Add check for solar zenith angle > 70.; change flag bits so flags that cause the data to not be binned are first. Put flags descriptions in include file. Correct check for flag bit set, must compare to 0.
SSBIN: Take out HDF stuff; change in to iin for easier debugging.
        Change the binary name back to ssbin (from ssbinn).
        Use grejul as a function; add some debugs. Take out a debug.
SMAP9-HDF: Use lunout instead of istdout for the output DSP image. Make time_rec a short int. Change a comment. Use lunin instead of istdin; use nrows and seam_lon from input file; calculate how many bins are left for last read.
STBIN-HDF: Fix time_rec definition; increase size of some message arrays.

B.5.1.2 Outstanding items:
continue to integrate l1 and l2 routines,

have received SeaWiFS calibration subroutine, need to integrate
        need to include calibration equations from Barnes' report
        specifying scan dependent calibration modification.
Need to get copies of McClain et al and Woodward et al.
from Gordon
Need out of band radiance corrections .(eps calculations)
O2 corrections for 760 band (long term)

Tau 865 algorithm add code to compute percent data rejected

Will need to restructure chlorophyll algorithm (from Carder),
interfacing with the Carder algorithm, pi factor, what about band 6 la/lw

Processing scripts vs what programs need, e.g. ancillary file, cal file,
setting of workspace symbols

Data day limits for space bin.

We need to discuss flag algorithms with cal/val group at GSFC

Sue is trying to test l2 HDF routines with simple program before integrating with ANLY and space bin programs. Sue's test does not include valid nav vector.
time/GAC scan line = 2.7 sec.
timing = 180 pixels/sec l2read
processing 130 pixels/sec actual data, 2x including clouds/land on
Challenge
Next tests are with SeaWiFS Program and simulated GAC data.

3/23 Jim copied HRPT HDF file, also needs GAC test file

B.5.1.3 Darzi Masks and Flags

*miami -- Lt over knee (which Lt, 865,765,665,440,5xx), set flag, do not compute (mask) one
.
*ghost -- fixed number of pixels around knee pixels, before and after, need number. calval (mask until correctable) two

*land mask -- from wdb II, done, need to integrate (mask) three
built land and water depth mask for SeaWiFS at 9km resolution.
land- from land mask
shallow water-from land mask

*ice mask -- need ice mask from calval, (mask) four

bathy -- done, set flag (compute??) five

glitter -- uses u/v wind field, set flag six

if mask set, move L1 data to output, set L1 flag?
else compute L2 data.

invalid Lw, Lw <0 flag calval seven
quality flag, tau 865>threshold (from Gordon, need t algorithm) eight

cocco flag - from Gordon, Balch, C.Brown, need coccolithiphore

algorithm and flag algorithm. flag. nine

turbid case 2, Bricaud & morel: nlw550> threshold and no coccolithiphore. need algorithm. flag ten

tilt - 2 bits flag, need to define bit selection for forward, down, back eleven, twelve

aerosol - 2 bits useless twelve models (2 bits)
compute pigments.
---
variables for ANLY output 16 bit, HDF 12 product and 15 QC
need 13 product and 12 qc
nlw 1-6
la 670, 865
CZCS pigment
chlor-a Carder
k490
flags
---
2 8 bit fields
tau-a 865
eps from selected model

---
qc products, real
u component of wind
v component of wind
relative humidity
pressure
ozone
lat
lon
sat zenith
sat azimuth
solar zenith
solar azimuth
la 750

---
availability of other routines:

lat,lon <-> scan,elt
read routine for l2qc fields.

B.5.2 MODIS (M)

ATBD was revised and submitted; participated in ATBD review.

Purchase Requests: The request for purchase approval was submitted for high speed networking (ATM) using a 10 gigabit/sec switch and 155 M bit/sec channels to the computers. Our group is participating in a high speed ATM network communication test using

NRL supplied DS3 circuit connecting Miami, NRL and OSU (Abbott). Possible future interactions include EOS.

Requested approval to purchase additional disk channels and memory for SGI Challenge; this machine will provide file server access to the distributed workstations.

Examining DEC DLT technology for near-line storage. DEC has a 5 terabyte tape robot with client-server load/restore software. This approach appears to offer a good compromise between the high speed/high capacity and expensive D1/D2 technology and the low cost but slow 4mm/8mm approach. The DLT storage unit uses 3 medium speed 1-2 megabyte/sec 10-20 gigabyte tape drives and stores 264 tape cartridges.

Ordered, received and installed DEC 2100 multiprocessor. This machine and the SGI Challenge form the processor framework for MODIS algorithm development and testing.

RRSL received a test version of a Fortran 90 compiler for DEC OSF alphas. We are examining programming strategy for visible and infrared routines. We will use Pathfinder sst program for the initial coding.

Bob Evans and Pete Evans attended EOS architecture meeting March 7,8. Hughes is adopting an object oriented approach. Bob suggested that PGS toolkit needed to reflect a similar approach. Participated in Hughes/project sdr. Working with Barkstrom to define processing environment as part of the Ad Hoc Working Group on Production. Discussed with Ed Masuoka need for standard file formats, process control, set up future telecon.

Jim Brown participated in Dennis Clark's Feb. cruise.

B.5.3 Pathfinder (P)

Jim Brown added capability to change reference longitude for equal area coordinate conversion routines. Use 180 longitude for Pathfinder and SeaWiFS.

The March 9, 94 Pathfinder Science Working Group meeting. Accepted the algorithm approach presented in the Pathfinder report.

Bob Evans presented path approach at Navy/NOAA shared processing meeting at San Diego AGU; it was well received and reviewed by John Bates, NOAA, Peter Minnet, and Bill Emery

B.6 Team Interactions

Bob Evans Peter Evans participated in both the DOAFT and DPFT sessions and a EOSDIS architecture review and teleconferences.

Robert Evans attended a meeting of the Data Processing Focus Team.

A number of teleconferences and phone conferences have occurred on support of SeaWiFS.

C. FUTURE ACTIVITIES

C.1 Database Future Work

C.2 Client/Server Future Work
Continue development of programs to support SeaWiFS in the VDC environment.

C.3 Pathfinder (P)
C.3.1 Continue development with 1 deg (360x180) spatial resolution maps produced by Dick Reynolds.
C.3.2 Continue algorithm tests and Pathfinder-Reynolds comparisons.

C.4 Modis (M)
C.4.1. Create tools to assist in result's interpolation.
C.4.2. Verify workstation DSP (SGI, SUN, DECstation, VAXstation) by comparing each program's output with the Adage system.
C.4.3. Use test data sets developed to continue test criteria.
C.4.4 Continue ATBD exchanges and reviews.

C.5 SeaWIFS (S)
C.5.1 Continue testing of Gordon's algorithms and its interaction with HDF ancillary routines.
C.5.2 Continue timing tests with CZCS and SeaWiFS algorithms.

D. PROBLEMS

D.1 Database Problems

None listed separately

D.2 Client/Server Problems

None listed separately

D.3 Matchup Database Problems

None listed separately

D.4 DSP Related Problems

None listed separately