

TABLE OF CONTENTS

- 1. [PATMOSX_Aerosol/algorithm_constants.f90](#)
- 2. [PATMOSX_Aerosol/avhrr_calnav_routines.f90](#)
- 3. [PATMOSX_Aerosol/avhrr_diag_routines.f90](#)
- 4. [PATMOSX_Aerosol/avhrr_pixel_aerosol.f90](#)
- 5. [PATMOSX_Aerosol/avhrr_pixel_cloud.f90](#)
- 6. [PATMOSX_Aerosol/avhrr_pixel_common.f90](#)
- 7. [PATMOSX_Aerosol/avhrr_pixel_routines.f90](#)
- 8. [PATMOSX_Aerosol/calibration_constants.f90](#)
- 9. [PATMOSX_Aerosol/cell_hdf_1.f90](#)
- 10. [PATMOSX_Aerosol/clavr_mod.f90.f90](#)
- 11. [PATMOSX_Aerosol/cld_hght_11_12_1dvar.f90](#)
- 12. [PATMOSX_Aerosol/cld_hght_11_12_1dvar.inc](#)
- 13. [PATMOSX_Aerosol/clevernav.f90](#)
- 14. [PATMOSX_Aerosol/cloud_mask.f90](#)
- 15. [PATMOSX_Aerosol/cloud_mask_routines.f90](#)
- 16. [PATMOSX_Aerosol/cloud_tau_re_solar_1dvar.f90](#)
- 17. [PATMOSX_Aerosol/cloud_type.f90](#)
- 18. [PATMOSX_Aerosol/comp_asc_des.f90](#)
- 19. [PATMOSX_Aerosol/comp_monthly.f90](#)
- 20. [PATMOSX_Aerosol/comp_time.f90](#)
- 21. [PATMOSX_Aerosol/constant.f90](#)
- 22. [PATMOSX_Aerosol/elevation_map_hires.f90](#)
- 23. [PATMOSX_Aerosol/elevation_map_lores.f90](#)
- 24. [PATMOSX_Aerosol/equal_angle.f90](#)
- 25. [PATMOSX_Aerosol/equal_area.f90](#)
- 26. [PATMOSX_Aerosol/file_utility.f90](#)
- 27. [PATMOSX_Aerosol/flip_rtc.f](#)
- 28. [PATMOSX_Aerosol/getnumsc.f](#)
- 29. [PATMOSX_Aerosol/gfs_hdf_module.f90](#)
- 30. [PATMOSX_Aerosol/hdf.f90](#)
- 31. [PATMOSX_Aerosol/hdf_params.f90](#)
- 32. [PATMOSX_Aerosol/irtsubn101.f](#)
- 33. [PATMOSX_Aerosol/land_sfc_properties.f90](#)
- 34. [PATMOSX_Aerosol/ncep_reanalysis.f90](#)
- 35. [PATMOSX_Aerosol/num_mod.f90](#)
- 36. [PATMOSX_Aerosol/nwp_common.f90](#)
- 37. [PATMOSX_Aerosol/oisst_analysis.f90](#)
- 38. [PATMOSX_Aerosol/patmosx_clr_comp.f90](#)
- 39. [PATMOSX_Aerosol/pfcomavhrr.f](#)
- 40. [PATMOSX_Aerosol/pixel_hdf.f90](#)
- 41. [PATMOSX_Aerosol/planck.f90](#)
- 42. [PATMOSX_Aerosol/process_avhrr_clavr.f90](#)
- 43. [PATMOSX_Aerosol/re4flip.f](#)

- 44. [PATMOSX_Aerosol/reposition_module.f90](#)
- 45. [PATMOSX_Aerosol/reposnx.f](#)
- 46. [PATMOSX_Aerosol/rt_utils.f90](#)
- 47. [PATMOSX_Aerosol/scaling_params.f90](#)
- 48. [PATMOSX_Aerosol/sfc_emiss.f90](#)
- 49. [PATMOSX_Aerosol/sfc_prop_umd.f90](#)
- 50. [PATMOSX_Aerosol/sort_module.f90](#)
- 51. [PATMOSX_Aerosol/subset_mapped.f90](#)
- 52. [PATMOSX_Aerosol/tranmavhrr.f](#)

1. PATMOSX_Aerosol/algorithm_constants.f90 [Programs]

[[Top](#)] [Programs]

NAME

`algorithm_constants.f90`

LOCATION

`.../PATMOSX_Aerosol/src/algorithm_constants.f90`

PURPOSE

This module serves as a common block for passing the non-cloud algorithm coefficients

DESCRIPTION

This module serves as a common block for passing the non-cloud algorithm coefficients

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

2. PATMOSX_Aerosol/avhrr_calnav_routines.f90 [Programs]

[[Top](#)] [Programs]

NAME

avhrr_calnav_routines.f90

LOCATION

.../PATMOSX_Aerosol/src/**avhrr_calnav_routines.f90**

PURPOSE

AVHRR CALIBRATION AND NAVIGATION ROUTINES

DESCRIPTION

EXPERIMENTAL VERSION = READS LEVEL-1b one segment at a time - not 2 scans

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

Routines in this module and their purpose:

DEFINE_1B_DATA - based on level 1b data type, define some parameters needed to read and unpack the avhrr data
DETERMINE_FILE_TYPE - interrogate header and determine the file type
UNPACK_AVHRR_HEADER_RECORD - unpack level 1b header for pre-klm data
UNPACK_AVHRR_DATA_RECORD - unpack level 1b data for pre-klm data
LAGRANGIAN_ANCHOR_INTERP - perform Lagrangian interpolation of anchors
LINEAR_ANCHOR_INTERP - perform linear interpolation of anchors
COMPUTE_ANGLE_ANCHORS - compute satzen and relaz anchors for pre-klm data
UNPACK_AVHRR_HEADER_RECORD_KLM - unpack level 1b header for klm+ data
UNPACK_AVHRR_DATA_RECORD_KLM - unpack level 1b data for klm+ data
i4word_to_string - convert a 4 byte integer to a string
READ_AVHRR_INSTR_CONSTANTS - read avhrr instrument constant files

READ_CLAVRXORB_DEFAULT_OPTIONS - Opens default file if necessary
QC_CLAVRXORB_OPTIONS - quality control options
REF_CAL - perform the reflectance calibration
REF_CAL_COEFFS - compute the reflectance calibration coefficients
THERM_CAL - perform the thermal calibration
COMPUTE_NEW_THERM_CAL_COEF - compute thermal calibration coefficients
WRITE_HEADER_1BX - write a header to the level 1bx files
READ_AVHRR_LEVEL1B_DATA - read level 1b data records
READ_AVHRR_LEVEL1B_HEADER - read level 1b header records
COMPUTE_GLINTZEN_SCATANGLE - compute the glint and scattering angles
READ_CLAVRXORB_COMMANDLINE_OPTIONS - gathers command line options
and checks the options for errors
HELPER - Displays what each command line option is

3. PATMOSX_Aerosol/avhrr_diag_routines.f90 [Programs]

[[Top](#)] [Programs]

NAME

avhrr_diag_routines.f90

LOCATION

.../PATMOSX_Aerosol/src/**avhrr_diag_routines.f90**

PURPOSE

AVHRR DIAGNOSTIC ROUTINES

DESCRIPTION

this module houses the routines for performance diagnostics

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND
THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE
AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES,
AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE
SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR
THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT
TO USERS.

NOTES

Routines in this module:

OPEN_DIAG_FILES - open the files used for diagnostic output
WRITE_TO_DIAG_FILES - write chosen fields to diagnostic output
CLOSE_DIAG_FILES - close the files used for diagnostic output
COMPILE_ORBITAL_CLD_MASK_COUNT - compile cloud mask stats

4. PATMOSX_Aerosol/avhrr_pixel_aerosol.f90 [Programs]

[[Top](#)] [Programs]

NAME

avhrr_pixel_aerosol.f90

LOCATION

.../PATMOSX_Aerosol/src/**avhrr_pixel_aerosol.f90**

PURPOSE

a module for pixel level aerosol properties from AVHRR
this is the independent two channel algorithm used in PATMOS for
aerosol optical in ch1 and ch2 over the ocean

DESCRIPTION

a module for pixel level aerosol properties from AVHRR
this is the independent two channel algorithm used in PATMOS for
aerosol optical in ch1 and ch2 over the ocean

AUTHOR

Andrew Heidinger, NOAA/NESDIS
& Tom X.-P. Zhao, NOAA/NESDIS/NCDC

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND
THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE
AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES,
AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE
SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR
THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT
TO USERS.

NOTES

Note, aerosol product quality flags are computed elsewhere.

Lookup tables provided by X.-P. T. Zhao (06/2010)

Input and output to these routines is through public arrays
through the AVHRR_PIXEL_COMMON module.

Public routines used in this module:

READ_AER_CH123A_REF_LUTS - read the lookup tables (LUTS)
PIXEL_AER_RET_OCEAN - perform the estimation of optical depth

Private routines used in this module:

AER_RET - routine used in estimation aerosol optical depth.

File I/O

Logical units 10, 11 and 12 are opened and closed during LUT read.

public variables used

alb1 - channel 1 reflectance (%)
alb2 - channel 2 reflectance (%)
alb3a - channel 3a reflectance (%)
satzen - sensor zenith angle (deg)
solzen - solar zenith angle (deg)
relaz - relative azimuth angle (deg)

output passed through AVHRR_PIXEL_COMMON

aot1 - channel 1 aerosol optical depth
aot2 - channel 2 aerosol optical depth
aot3a - channel 3a aerosol optical depth

aerosol lookup table variables

tau_lut - optical depth used in tables - dimension (ntau)
solzen_lut - solar zenith angles used in tables - dimension (nsolzen)
zen_lut - sensor zenith angles used in tables - dimension (nzen)
az_lut - relative azimuth angles used in tables - dimension (naz)
ref_lut_ch1_aer - ch1 reflectances (0-1) of lookup table -
dimension (nsolzen, nzen, ntau, naz)
ref_lut_ch2_aer - ch2 reflectances (0-1) of lookup table
ref_lut_ch3a_aer - ch3a reflectances (0-1) of lookup table

5. PATMOSX_Aerosol/avhrr_pixel_cloud.f90 [Programs]

[[Top](#)] [Programs]

NAME

avhrr_pixel_cloud.f90

LOCATION

.../PATMOSX_Aerosol/src/**avhrr_pixel_cloud.f90**

PURPOSE

This module holds the algorithms to estimate cloud properties

DESCRIPTION

This module holds the algorithms to estimate cloud properties

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

6. PATMOSX_Aerosol/avhrr_pixel_common.f90 [Programs]

[[Top](#)] [Programs]

NAME

`avhrr_pixel_common.f90`

LOCATION

`.../PATMOSX_Aerosol/src/avhrr_pixel_common.f90`

PURPOSE

AVHRR PIXEL COMMON

DESCRIPTION

This module houses routines used to handle the pixel level arrays that are based through this module

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Public routines in this module:

CREATE_PIXEL_ARRAYS - allocate memory for pixel level arrays
DESTROY_PIXEL_ARRAYS - deallocate memory for pixel level arrays
RESET_PIXEL_ARRAYS_TO_MISSING - set pixel arrays to missing

File I/O: None

7. PATMOSX_Aerosol/avhrr_pixel_routines.f90 [Programs]

[[Top](#)] [Programs]

NAME

avhrr_pixel_routines.f90

LOCATION

.../PATMOSX_Aerosol/src/**avhrr_pixel_routines.f90**

PURPOSE

AVHRR PIXEL LEVEL ROUTINES

DESCRIPTION

this module houses routines for computing some needed pixel-level arrays

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Public routines used in this module:

```
READ_AVHRR_ALGO_CONSTANTS - read coefficients from AVHRR algo files
COMPUTE_PIXEL_ARRAYS - compute some commonly used arrays
OPERATIONAL_SST - compute an sst using the NESDIS oper. equations
COMPUTE_TSFC - combine sst, lst and ist into a single surface
                temperature and derive an estimate of total prec. water
COMPUTE_ERB - compute outgoing longwave radiation (OLR)
ATMOS_CORR - perform atmospheric correction
NORMALIZE_REFLECTANCES - divide reflectances by cosine solar zenith angle
CH3B_ALB - compute the channel 3b reflectance
COMPUTE_SPATIAL_UNIFORMITY - compute metrics of radiance and reflectance
                            spatial uniformity
CONVERT_COUNTS_SINGLE_GAIN - convert dual gain counts to single gain for
                            calibration diagnostics
SPECTRAL_CORRECT_NDVI - apply a spectral correct to ndvi to look like
                        NOAA14
ASSIGN_CLEAR_SKY_QUALITY_FLAGS - assign quality flags to clear-sky
                                products
COMPUTE_DATA_MASK - compute data mask used in cloud mask - holds flags
                    telling processing path (day/land/coast/...)
CONVERT_TIME - compute a time in hours based on millisecond time in
              level1b
COMPUTE_SNOW_FIELD - based on snow information, make a snow field.
---- constants needed in this module
```

8. PATMOSX_Aerosol/calibration_constants.f90 [Programs]

[[Top](#)] [Programs]

NAME

calibration_constants.f90

LOCATION

.../PATMOSX_Aerosol/src/**calibration_constants.f90**

PURPOSE

This module serves as a common block for passing the instrument and calibration coefficients

DESCRIPTION

This module serves as a common block for passing the instrument and calibration coefficients

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

none

INPUTS_OUTPUTS

none

MODIFICATION HISTORY

9. PATMOSX_Aerosol/cell_hdf_1.f90 [Programs]

[[Top](#)] [Programs]

NAME

cell_hdf_1.f90

LOCATION

.../PATMOSX_Aerosol/src/**cell_hdf_1.f90**

PURPOSE

CELL_HDF_ROUTINES

DESCRIPTION

This module write CLAVR-x SDS's to orbital grid file in HDF format.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Public routines used is this module:

```
COMPILE_GRIDCELL_ARRAYS - compile gridcells stats from pixel parameters
COMPUTE_GRIDCELL_ARRAYS - once all pixels are processed, compute the final
                          gridcell parameters
CREATE_GRIDCELL_ARRAYS  - allocate memory for grid-cell arrays
DESTROY_GRIDCELL_ARRAYS - deallocate memory for grid-cell arrays
INITIALIZE_GRIDCELL_ARRAYS - initialize the values of the grid-cell
                          parameters
READ_GRIDCELL_SFCTYPE  - read the gridcell surface type which is
                          precomputed for each grid format and resolution
```

Private routines used is this module: None

11. PATMOSX_Aerosol/cld_hght_11_12_1dvar.f90 [Programs]

[[Top](#)] [Programs]

NAME

`cld_hght_11_12_1dvar.f90`

LOCATION

`.../PATMOSX_Aerosol/src/cld_hght_11_12_1dvar.f90`

PURPOSE

This module holds the algorithms to estimate cloud properties

DESCRIPTION

This module holds the algorithms to estimate cloud properties

Assumptions

- 1) No scattering
- 2) cloud is 1 km thick and emission varies linear with emissivity
- 3) single layer cloud for cloud type /= 6
- 4) for cloud type = 6, an opaque cloud 200 mb above the surface lies below

Limitations

- 1) sensitivity to T_c is low for thin clouds

2) little emissivity sensitivity for low clouds

Input to the retrieval

y(1) = t4 - 11 micron brightness temperature

y(2) = t4-t5 - the split window temperature

Output of the retrieval

x(1) - the cloud temperature

x(2) - the 11 micron emissivity at nadir

x(3) - the beta ratio for 11 and 12 microns

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

This routine uses a 1d-var retrieval approach as outlined in Rodger (1976)

Input to the 1d-var approach

y - the vector of observations

x_ap - the a priori estimates of x

Sa - the error covariance matrix of x_ap

Sy - the error covariance of y (included calibration, forward model)

Internal matrices in the 1d-var approach

f- the forward model estimate of y

K - the kernel matrix - df/dx

Output from the 1d-var approach

x - the vector of parameters to retrieve

Sx - the error covariance of x

A - observation weight matrix - 1.0 means total reliance on obs.

The quality flags are determined as follows

3 - estimated error < 1/3 a priori error

2 - estimated error < 2/3 a priori error

1 - any other converged retrieval

0 - a failed or unattempted retrieval

MODIFICATION HISTORY

July 2006 - Added beta as an element of x

October 2006 - Added cloud lapse rate to make Tc more related to true cloud-top temperature

12. PATMOSX_Aerosol/cld_hght_11_12_1dvar.inc [Programs]

[[Top](#)] [Programs]

NAME

`cld_hght_11_12_1dvar.inc`

LOCATION

`.../PATMOSX_Aerosol/src/cld_hght_11_12_1dvar.inc`

PURPOSE

This module serves as a common block for define the constant parameters used by the subroutine: [cld_hght_11_12_1dvar.f90](#)

DESCRIPTION

This module serves as a common block for define the constant parameters used by the subroutine: [cld_hght_11_12_1dvar.f90](#)

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

13. PATMOSX_Aerosol/cleavernav.f90 [Programs]

[[Top](#)] [Programs]

NAME

`cleavernav.f90`

LOCATION

`.../PATMOSX_Aerosol/src/cleavernav.f90`

PURPOSE

This module is used to processing CLAVER-x navigation

DESCRIPTION

This module is used to processing CLAVER-x navigation

AUTHOR

Aleksandar Jelenak, NOAA/NESDIS <Aleksandar.Jelenak@noaa.gov>

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

14. PATMOSX_Aerosol/cloud_mask.f90 [Programs]

[[Top](#)] [Programs]

NAME

cloud_mask.f90

LOCATION

.../PATMOSX_Aerosol/src/**cloud_mask.f90**

PURPOSE

This module performs a cloud mask

DESCRIPTION

This module performs a cloud mask on 2 by 2 pixel arrays resulting in cloud mask codes. In addition, this module it applies each test to each pixel and each test has its

own byte which is also an output of this routine.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Subroutines included in module:
CLOUD_MASK_3x3

DEPENDENCIES:
CONSTANTS
CLOUD_MASK_THRESHOLDS
AVHRR_PIXEL_COMMON
NWP_COMMON
CLOUD_MASK_ROUTINES

15. PATMOSX_Aerosol/cloud_mask_routines.f90 [Programs]

[[Top](#)] [Programs]

NAME

cloud_mask_routines.f90

LOCATION

.../PATMOSX_Aerosol/src/**cloud_mask_routines.f90**

PURPOSE

Calculation of the reflectance thresholds, dust detection, fire detection, probably clear pixels, clear restorals, and putting bits into cloud mask bits

DESCRIPTION

This module contains several subroutines needed for both cloud mask modules. They include the calculation of the reflectance thresholds, dust detection, fire detection, probably clear pixels, clear restorals, and putting bits into cloud mask bits

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Subroutines included in module:

COMPUTE_2BIT_CLOUD_MASK, COMPUTE_2BIT_CLOUD_MASK_IR
COMPUTE_PROBABLY_CLOUDY
DUST_DETECTION_ALGORITHM
SMOKE_DETECTION_ALGORITHM
FIRE_DETECTION_ALGORITHM
COMPUTE_PROBABLY_CLEAR_RESTORAL

DEPENDENCIES:

CONSTANTS
AVHRR_PIXEL_COMMON
NWP_COMMON

16. PATMOSX_Aerosol/cloud_tau_re_solar_1dvar.f90 [Programs]

[[Top](#)] [Programs]

NAME

`cloud_tau_re_solar_1dvar.f90`

LOCATION

`.../PATMOSX_Aerosol/src/cloud_tau_re_solar_1dvar.f90`

PURPOSE

This module contains the routine to compute daytime microphysical properties

DESCRIPTION

This function retrieves the cloud microphysical properties optical depth, effective radius and water path (liquid and solid)
This algorithm uses the 0.6 and 3.75 (1.6 for 3a periods) micron channels with optimal estimation inversion to retrieve the cloud microphysics

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

1. channel 6 is not included yet because not available on SEVIRI.
2. Error handling needs to be included.
3. GEOCAT hdf routines should be used.
4. All channels referenced to ABI (2=0.6 um, 5 = 1.6 um, 6 = 2.3, 7 = 3.9 um)

EXTERNALS

public routines:
CLOUD_TAU_RE_SOLAR - estimate tau and re from solar reflectance only
- needs Tc for upstream algorithm

17. PATMOSX_Aerosol/cloud_type.f90 [Programs]

[[Top](#)] [Programs]

NAME

cloud_type.f90

LOCATION

.../PATMOSX_Aerosol/src/**cloud_type.f90**

PURPOSE

This module performs a cloud typing decision on pixel by pixel basis

DESCRIPTION

This module performs a cloud typing decision on pixel by pixel basis

AUTHOR

Michael Pavolonis, Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Subroutines included in module:
CLOUD_TYPE

DEPENDENCIES:
CONSTANTS
AVHRR_PIXEL_COMMON

MODIFICATION HISTORY

October 2006, Added retype routine - Heidinger
August 2007 - Added IR cloud type/layer - Heidinger

18. PATMOSX_Aerosol/comp_asc_des.f90 [Programs]

[[Top](#)] [Programs]

NAME

comp_asc_des.f90

LOCATION

.../PATMOSX_Aerosol/src/**comp_asc_des.f90**

PURPOSE

A main code generated one of the executables in the CLAVR-x processing system.

DESCRIPTION

This code takes the level-3 files created for each orbit for one day from one satellite and writes separate level3 files for the ascending and descending nodes. This code runs after clavrxb has processed the level-1b files for one day. This program reads input (directories and filenames) from a file called comp_asc_des_input. Currently, there are no command line arguments.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

May 2004

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

Reference: Level3 file contents are given on
<http://cimss.ssec.wisc.edu/patmosx>

Format of Required Input File:

line 1: directory of orbital level3 files (input)
line 2: directory of daily level3 files (output)
line 3: year
line 4: julian day
line 5: satellite number (i.e. 18 = NOAA-18)
line 6: level-3 grid resolution (input files with different resolution are skipped in the processing)
line 7: level-3 grid format. 0 = equal-area, 1 = equal-angle (input files with differnt format are skipped)
line 8+: orbital level3 file (one file per line)

Reference: Level3 file contents are given on
<http://cimss.ssec.wisc.edu/patmosx>

Calling Sequence:

comp_asc_des_level2 node nav_flag geo_flag

EXTERNALS

Dependencies: (The following are names of modules)
CONSTANTS
HDF

HDF_PARAMS
NUMERICAL_ROUTINES
SCALING_PARAMETERS

MODIFICATION HISTORY

August 2004 - Added error messaging (D. Donahue - STC)
June 2006 - Rewrote for version 4 CLAVR-x using standardized HDF read/write commands

19. PATMOSX_Aerosol/comp_monthly.f90 [Programs]

[[Top](#)] [Programs]

NAME

comp_monthly.f90

LOCATION

.../PATMOSX_Aerosol/src/**comp_monthly.f90**

PURPOSE

This code compute monthly files from daily files.

DESCRIPTION

This code compute monthly files from daily files.
For each parameter in the daily files, it computes

- the mean
- the standard deviation
- the maximum value
- the minimum value
- the number of daily values used

This code takes input from a comp_monthly_input file that is composed of the following elements:
month (1-12)
year (1981-200X)
node - asc, des, all
orbit - aft,mor,mid,all,two

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

August 2006

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND
THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE
AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES,
AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE

SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

1-the attributes for the first relevant file are used for the monthly files.
For files with multiple satellites, then calibration attributes are not meaningful - maybe set to missing? What does this mean for radiance?

parameters

n_files_max - the maximum number of files that should be used to construct a monthly average. For 3 satellites with 2 files per day for 31 days - that gives about 200.

min_count - minimum number of values required to make a monthly average

satzen_thresh - maximum sensor zenith angle allowed in values used for monthly stats.

monthly_type

1 - afternoon ascending	aft_asc
2 - afternoon descending	aft_des
3 - afternoon combined	aft
4 - morning ascending	mor_asc
5 - morning descending	mor_des
6 - morning combined	mor
7 - mid-morning ascending	mid_asc
8 - mid-morning descending	mid_des
9 - mid-morning combined	mid
10 - spare ascending	nxx_asc
11 - spare descending	nxx_des
12 - spare combined	nxx
13 - all	
14 - afternoon + morning	ampm
15 - morning + mid + afternoon	ammidpm

20. PATMOSX_Aerosol/comp_time.f90 [Programs]

[[Top](#)] [Programs]

NAME

comp_time.f90

LOCATION

.../PATMOSX_Aerosol/src/**comp_time.f90**

PURPOSE

This module takes the orbital gridcell files, combines them and writes separate gridcell files for the ascending and descending nodes

DESCRIPTION

This module takes the orbital gridcell files, combines them and writes separate gridcell files for the ascending and descending nodes. The format of the files are the same. The number of gridcells in the orbital files is variable but the number of gridcells in the asc/des files is the maximum number (full global coverage).

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

May 2004

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

MODIFICATION HISTORY

August 2004 - Added error messaging (D. Donahue - STC)

June 2006 -Rewrote for version 4 CLAVR-x using standardized HDF read/write commands

21. PATMOSX_Aerosol/constant.f90 [Programs]

[[Top](#)] [Programs]

NAME

constant.f90

LOCATION

.../PATMOSX_Aerosol/src/**constant.f90**

PURPOSE

A module with the CLAVR-x processing system

DESCRIPTION

Store and serve various constants for use in the CLAVR-x system

AUTHOR

Paul van Delst, CIMSS/SSE

CREATION DATE

April 2003

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

Calling Sequence:
use CONSTANTS

22. PATMOSX_Aerosol/elevation_map_hires.f90 [Programs]

[[Top](#)] [Programs]

NAME

elevation_map_hires.f90

LOCATION

.../PATMOSX_Aerosol/src/**elevation_map_hires.f90**

PURPOSE

This module provide the digital elevation map (DEM)

DESCRIPTION

This module provide the digital elevation map (DEM).
The digital elevation map (DEM) used here is derived from the USGS GTOPO30 data available from: <<http://edcdaac.usgs.gov/gtopo30/gtopo30.html>>.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT

TO USERS.

NOTES

Information about the digital elevation map:
columns: 5760
rows: 2880
record length: two bytes
record type: integer
record unit: meter
tile lon. size: 1/16 degree
tile lat. size: 1/16 degree
map coverage: global

IMPORTANT: The DEM must be in the 0-360 longitude range form!

DEM created by: Aleksandar Jelenak <Aleksandar.Jelenak@noaa.gov>

23. PATMOSX_Aerosol/elevation_map_lores.f90 [Programs]

[[Top](#)] [Programs]

NAME

elevation_map_lores.f90

LOCATION

.../PATMOSX_Aerosol/src/**elevation_map_lores.f90**

PURPOSE

This module provide the digital elevation map (DEM)

DESCRIPTION

This module provide the digital elevation map (DEM).
The digital elevation map (DEM) used here is derived from the USGS GTOPO30 data available from: <<http://edcdaac.usgs.gov/gtopo30/gtopo30.html>>.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT

TO USERS.

NOTES

Information about the digital elevation map:
columns: 2160
rows: 1080
record length: two bytes
record type: integer
record unit: meter
tile lon. size: 1/6 degree
tile lat. size: 1/6 degree
map coverage: global

IMPORTANT: The DEM must be in the 0-360 longitude range form!

DEM created by: Aleksandar Jelenak <Aleksandar.Jelenak@noaa.gov>

24. PATMOSX_Aerosol/equal_angle.f90 [Programs]

[[Top](#)] [Programs]

NAME

equal_angle.f90

LOCATION

.../PATMOSX_Aerosol/src/**equal_angle.f90**

PURPOSE

This set of routines in this modules is used when the equal angle options selected for the clavr-x gridcell

DESCRIPTION

This set of routines in this modules is used when the equal angle options selected for the clavr-x gridcell
This cell-ordering is the same as the PATMOS ordering
first cell is at 0 longitude (the prime meridian) and at the south pole. Cells go east then north.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND
THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE
AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES,

AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Dependencies: (The following are names of modules used in CLAVR-x)
CONSTANTS

Public Routines within this module:

SETUP_EQUAL_ANGLE
PLACE_EQUAL_ANGLE_CELL
FIND_EQUAL_ANGLE_CELL
DESTROY_EQUAL_ANGLE

Calling Sequence:

use EQUAL_ANGLE_GRID

25. PATMOSX_Aerosol/equal_area.f90 [Programs]

[[Top](#)] [Programs]

NAME

equal_area.f90

LOCATION

.../PATMOSX_Aerosol/src/**equal_area.f90**

PURPOSE

This set of routines in this modules is used when the equal area options selected for the clavr-x gridcell

DESCRIPTION

This set of routines in this modules is used when the equal area options selected for the clavr-x gridcell
This cell-ordering is the same as the PATMOS ordering
first cell is at 0 longitude (the prime meridian) and at the south pole. Cells go east then north.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Dependencies: (The following are names of modules used in CLAVR-x)
CONSTANTS

Calling Sequence:
use EQUAL_AREA_GRID

Public Routines within this module:
SETUP_EQUAL_AREA
PLACE_EQUAL_AREA_CELL
FIND_EQUAL_AREA_CELL
DESTROY_EQUAL_AREA

26. PATMOSX_Aerosol/file_utility.f90 [Programs]

[[Top](#)] [Programs]

NAME

file_utility.f90

LOCATION

.../PATMOSX_Aerosol/src/**file_utility.f90**

PURPOSE

Module containing generic file utility routines

DESCRIPTION

Module containing generic file utility routines
CATEGORY:
NCEP RTM
CALLING SEQUENCE:
USE file_utility

AUTHOR

Paul van Delst, CIMSS@NOAA/NCEP

CREATION DATE

12 July 2000

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

CONTAINS:

get_lun: PUBLIC function to return a free logical unit number for file access.
file_exists: PUBLIC function to determine if a named file exists.

27. PATMOSX_Aerosol/flip_rtc.f [Programs]

[[Top](#)] [Programs]

NAME

flip_rtc.f

LOCATION

.../PATMOSX_Aerosol/src/**flip_rtc.f**

PURPOSE

This subroutine flip the Byte of radiative-transfer coefficients

DESCRIPTION

This subroutine flip the Byte of radiative-transfer coefficients

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND

THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

28. PATMOSX_Aerosol/getnumsc.f [Programs]

[[Top](#)] [Programs]

NAME

getnumsc.f

LOCATION

.../PATMOSX_Aerosol/src/**getnumsc.f**

PURPOSE

This subroutine get "satellite number" for use in radiation transfer code

DESCRIPTION

This subroutine get "satellite number" for use in radiation transfer code
For all spacecraft from TIROSN through METOPCC
... Input name may contain any combination of upper and lower case.
... NOAA s/c prior to NOAA10 may be input as either noaa0n or noaa-n
If given s/c not found, routine returns number = -1

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

27 July, 2006

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

29. PATMOSX_Aerosol/gfs_hdf_module.f90 [Programs]

[[Top](#)] [Programs]

NAME

`gfs_hdf_module.f90`

LOCATION

`.../PATMOSX_Aerosol/src/gfs_hdf_module.f90`

PURPOSE

This module houses all routines related to the GFS data

DESCRIPTION

This module houses all of the routines used to read and process the GFS NWP data. The data used here are already in hdf format from the `convert_grib_to_hdf` utility.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Dependencies:
CONSTANTS
NUMERICAL_ROUTINES
Sort_Module
NWP_COMMON

HDF

Calling Sequence:
use GFS

Public Routines within this module:
READ_GFS_DATA

30. PATMOSX_Aerosol/hdf.f90 [Programs]

[[Top](#)] [Programs]

NAME

hdf.f90

LOCATION

.../PATMOSX_Aerosol/src/**hdf.f90**

PURPOSE

Fortran header file for HDF routines

DESCRIPTION

This file is a modularized version of the '**hdf.f90**' file from the 'include' directory of the standard HDF library installation. This version of the file is taken from the HDF4.2r0 library distribution.

AUTHOR

Aleksandar Jelenak, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

Contents:

- Tag definitions
- Error return codes
- Logical constants

Remarks:

This file can be included with Fortran user programs. As a

general rule, don't use DFNT constants that don't include a number in their name. E.g., don't use DFNT_FLOAT, use DFNT_FLOAT32 or DFNT_FLOAT64. The DFNT constants that don't include numbers are for backward compatibility only. Also, there are no current plans to support 128-bit number types. For more information about constants in this file, see the equivalent constant declarations in the C include file 'hdf.h'

MODIFICATION HISTORY

08 Apr 2004 Aleksandar Jelenak

31. PATMOSX_Aerosol/hdf_params.f90 [Programs]

[[Top](#)] [Programs]

NAME

hdf_params.f90

LOCATION

.../PATMOSX_Aerosol/src/**hdf_params.f90**

PURPOSE

This module contains routines used to read and write to the hdf output files from CLAVR-x

DESCRIPTION

This module contains routines used to read and write to the hdf output files from CLAVR-x

AUTHOR

A. Walther
andi.walther@ssec.wisc.edu

CREATION DATE

28 Mar 2010

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

Dependencies: (The following are names of other CLAVR-x modules)

CONSTANTS
HDF
SCALING_PARAMETERS

Calling Sequence:

use HDF_PARAMS

Public Routines within this module

SCALE_VECTOR_I1_RANK1
SCALE_VECTOR_I1_RANK2
SCALE_VECTOR_I1_RANK3
SCALE_VECTOR_I2_RANK1
SCALE_VECTOR_I2_RANK2
SCALE_VECTOR_I2_RANK3
UNSCALE_VECTOR_I1_RANK1
WRITE_CLAVRX_HDF4_SDS
HDF_TSTAMP
GET_MACHINE_NAME
WRITE_CLAVRX_HDF_GLOBAL_ATTRIBUTES
READ_CLAVRX_HDF_GLOBAL_ATTRIBUTES
READ_CLAVRX_HDF4_SDS_RANK1

32. PATMOSX_Aerosol/irtsubn101.f [Programs]

[[Top](#)] [Programs]

NAME

irtsubn101.f

LOCATION

.../PATMOSX_Aerosol/src/**irtsubn101.f**

PURPOSE

This subroutine is used to get infrared transmittance at 101-level of SPACECRAFT pressure coordinate.

DESCRIPTION

This subroutine is used to get infrared transmittance at 101-level of SPACECRAFT pressure coordinate.

AUTHOR

unk

CREATION DATE

unkC
version of 13.08.03

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

```
block data reference_atmosphere
subroutine calpir
subroutine conpir
subroutine gphite
subroutine taudoc
subroutine tauwtr
subroutine gphite - calculates geopotential height given profile data
```

33. PATMOSX_Aerosol/land_sfc_properties.f90 [Programs]

[[Top](#)] [Programs]

NAME

land_sfc_properties.f90

LOCATION

.../PATMOSX_Aerosol/src/**land_sfc_properties.f90**

PURPOSE

This module contains contains the subroutines necessary to reading in the gloabl land surface files, determination of the snow mask file name.

DESCRIPTION

This module contains contains the subroutines necessary to reading in the gloabl land surface files, determination of the snow mask file name.

AUTHOR

unk

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

34. PATMOSX_Aerosol/ncep_reanalysis.f90 [Programs]

[[Top](#)] [Programs]

NAME

`ncep_reanalysis.f90`

LOCATION

`.../PATMOSX_Aerosol/src/ncep_reanalysis.f90`

PURPOSE

This module houses all of the routines necessary to interface with NCEP Reanalysis Data

DESCRIPTION

This module houses all of the routines necessary to interface with NCEP Reanalysis Data

Note this is hardcoded for the current 2.5x2.5 degree data. It checks to make sure that this is the case, if not, it reports this and stops

this restriction comes from the mapping of the T62 gaussian fields to to the 2.5x2.5 fields. This step uses a nearest neighbor approach and should be revisited or this step should be moved outside of CLAVR-x.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE

AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

```
use CONSTANTS
use HDF
use NWP_COMMON
use SORT_MODULE
use NUMERICAL_ROUTINES
```

Public Routines

READ_NCEP_REANALYSIS_DATA - main routine to read in the fields from the NCEP Reanalysis

Private Routines

READ_DATA_1D - routines to read in one-dimensional fields
READ_DATA_2D - routines to read in two-dimensional fields
READ_DATA_3D - routines to read in three-dimensional fields
LOCATE_OUR_TIME - given a time, locate the correct NCEP Reanalysis fields

INPUTS_OUTPUTS

Two netcdf files are opened and closed used HDF routines

35. PATMOSX_Aerosol/num_mod.f90 [Programs]

[[Top](#)] [Programs]

NAME

num_mod.f90

LOCATION

.../PATMOSX_Aerosol/src/**num_mod.f90**

PURPOSE

Library of useful numerical functions

DESCRIPTION

Library of useful numerical functions

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

```
private::
  PIX_SWAP
  PIX_SORT
  OPT_MEDIAN9_INT8
  OPT_MEDIAN9_FLOAT32

public::
  LOCATE
  POSSOL
  JULIAN
  COMPUTE_MONTH
  COMPUTE_DAY
  VAPOR
  VAPOR_ICE
  INVERT_2x2
  INVERT_3x3
  FIND_BOUNDS
  PACK_BYTES
  COMPUTE_TIME_HOURS
  COMPUTE_SPATIAL_UNIFORMITY_NxN_WITH_INDICES
  GRADIENT_MEANDER
  COMPUTE_MEDIAN
  COMPUTE_MEDIAN_SEGMENT
  GRADIENT2d
  GRADIENT2d_REVERSE
  MEDIAN_FILTER
  GREAT_CIRCLE
  POLYNOMIAL
  LOGNORMAL_MODE_RADIUS
  LOGNORMAL_DIST
  OPTICAL_DEPTH_TO_NUM_DEN
  CALCULATE_MASS_LOADING
  LEAP_YEAR_FCT
  GET_REGULAR_LUT_INDEX
  GET_IRREGULAR_LUT_INDEX
  SDEV_FROM_SUMS
  MEAN_FROM_SUM
  PDF_TO_NORMALIZED_CDF
  NORMALIZED_CDF_TO_TILE
  BYTESCALE_VALUE
```

36. PATMOSX_Aerosol/nwp_common.f90 [Programs]

[[Top](#)] [Programs]

NAME

`nwp_common.f90`

LOCATION

`.../PATMOSX_Aerosol/src/nwp_common.f90`

PURPOSE

This module holds the radiative transfer quantities needed for the algorithms

DESCRIPTION

This module holds the radiative transfer quantities needed for the algorithms

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

There two type of nwp data
1- the pressure level data
2- the data on different surface grid

the only data assumed to be a on the surface grid are
- surface temperature
- weasd depth
- u and v wind speed at 10m

the surface and pressure level grid may be different
`i_nwp`, `j_nwp` points to a cell in the pressure level data

In the GFS data, the pressure and surface grids are the same, in the NCEP reanalysis, they differ

EXTERNALS

```
public::  
CREATE_NWP_ARRAYS  
DESTROY_NWP_ARRAYS  
FIND_NWP_GRID_CELL  
MAP_PIXEL_NWP
```

KNOWING_P_COMPUTE_T_Z_NWP
KNOWING_Z_COMPUTE_T_P_NWP
KNOWING_T_COMPUTE_P_Z_NWP
FIND_NWP_LEVELS
INTERPOLATE_NWP
INTERPOLATE_PROFILE
INTERPOLATE_NWP_TZ_PROFILES
COMPUTE_COAST_MASK_NWP
QC_NWP
COMPUTE_NWP_CLOUD_PARAMETERS
COMPUTE_TSFC_NWP
PROF_LOOKUP_USING_P
PROF_LOOKUP_USING_T
PROF_LOOKUP_USING_T_LAPSE
PROF_LOOKUP_USING_T_PROF
PROF_LOOKUP_USING_Z
TEMPORAL_INTERP_TMPSFC_NWP

37. PATMOSX_Aerosol/oisst_analysis.f90 [Programs]

[[Top](#)] [Programs]

NAME

oisst_analysis.f90

LOCATION

.../PATMOSX_Aerosol/src/**oisst_analysis.f90**

PURPOSE

Routine to handle the Reynolds OISST analysis

DESCRIPTION

Routine to handle the Reynolds OISST analysis
data is one degree resolution
http://www.emc.ncep.noaa.gov/research/cmb/sst_analysis
global (89.875S - 89.875N) (1440 x 720) starts at 89.5S and GM

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND
THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE
AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES,
AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE
SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR
THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT
TO USERS.

NOTES

DESCRIPTION OF THE DAILY OI SEA SURFACE TEMPERATURE (SST) ANALYSIS Version2

The SST analysis is computed daily on a 0.25 degree latitude/longitude grid. This is version 1.0. There are two products with different satellite data. Both products use in situ data from ships and buoys. Also SSTs are generated for sea-ice concentrations above 50%. The sea ice for 1981-2004 is from <http://nsidc.org/data/nsidc-0051.html>

(Cavalieri D., C. Parkinson, P. Gloerson, and H.J. Zwally. 1997, updated 2005. Sea ice concentrations from Nimbus-7 SMMR and DMSP SSM/I passive microwave data, June to September 2001. Boulder, CO, USA). The sea ice from 2005 to present is from <http://polar.ncep.noaa.gov/seaice/>

(Grumbine, R. W., 1996: Automated passive microwave sea ice concentration analysis at NCEP, 13pp. Unpublished manuscript available from NCEP/NWS/NOAA, 5200 Auth Road, Camp Springs, MD, 20746, USA.)

The first product uses NODC's AVHRR Pathfinder Version 5

<http://pathfinder.nodc.noaa.gov>

for September 1, 1981 through December 31, 2005 and the operational US Navy AVHRR data (May, D.A., M. M. Parmeter, D. S. Olszewski and B. D. McKenzie, 1998: Operational processing of satellite sea surface temperature retrievals at the Naval Oceanographic Office, Bull. Amer. Met. Soc., 79, 397-407) from January 1, 2006, through present. This product will henceforth be referred to as the AVHRR product.

The second product adds AMSR-E version 5 data obtained from

<http://www.remss.com/>

along with the AVHRR data used in version 1a and is available from June 1, 2002, (the start of AMSR-E) through present. This product will henceforth be termed the AVHRR + AMSR product.

Both analyses include a bias correction of the satellite data with respect to in situ data using an empirical orthogonal teleconnection (EOT) algorithm. A short description of the complete analysis procedure can be found in the AMS extended abstract file (Reynolds-reviewed-rev.pdf).

The SST analyses are available in individual daily files. The AVHRR product is named avhrr-only-v2.YYYYMMDD where YYYY is the year, MM is the month, and DD is the day. The files can be found on <ftp://eclipse.ncdc.noaa.gov/pub/OI-daily-v2/IEEE/YYYY/AVHRR> where YYYY is the year: 1981 to present. The files were written in IEEE binary (big-endian) and must be decompressed using gunzip. The AVHRR + AMSR-E product is written with the same format as the AVHRR product. However, the file names are avhrr-only-v2.YYYYMMDD. The files can be found on <ftp://eclipse.ncdc.noaa.gov/pub/OI-daily-v2/IEEE/YYYY/AVHRR-AMSR> where YYYY is the year: 2002 to present.

Each file contains 4 records with integer*4 year, month, day, followed by a gridded integer*2 array. The first array is SST. The second array is the SST anomaly with respect to a 1971-2000 base period. The third array is the sea ice concentration. The fourth array is the standard deviation of the analysis error which includes sampling, random and bias error.

Note: The SST, SST ANOMALY AND ERROR ARRAYS MUST BE MULTIPLIED BY 0.01 TO CONVERT THE VALUES TO DEGREE C. The sea ice concentration array is in per cent (0-100). Missing values are -999.

All arrays consist of 1440 spatial points in longitude from 0.125E to 359.875E in intervals of 0.25 increasing eastward, and 720 spatial points in latitude from 89.875S to 89.875N in intervals of 0.25 increasing northward.

Each day consists of four FORTRAN records:

1. Three 4-byte integers for the year, month and day followed by 1440*720 2-byte integer SST values.
2. Three 4-byte integers for the year, month and day followed by 1440*720 2-byte integer SST anomaly values.
3. Three 4-byte integers for the year, month and day followed by 1440*720 2-byte integer error values.
4. Three 4-byte integers for the year, month and day followed by 1440*720 2-byte integer ice concentration values.

Each record is written with a FORTRAN unformatted write which adds an extra 4 byte header and trailer word to the total record.

MODIFICATION HISTORY

Jul 2004 - modified to look for previous file if nearest is not present
Apr 2007 - Lahey fortran does not all byte swapping at compilation so it requires
the CONVERT="BIG_ENDIAN" in the open statement. This is not standard.
Oct 2009 - moved to daily 0.25 degree Reynolds SST

38. PATMOSX_Aerosol/patmosx_clr_comp.f90 [Programs]

[[Top](#)] [Programs]

NAME

`patmosx_clr_comp.f90`

LOCATION

`.../PATMOSX_Aerosol/src/patmosx_clr_comp.f90`

PURPOSE

This module serves to house routines to read in clear sky composites generated by PATMOS-x

DESCRIPTION

This module serves to house routines to read in clear sky composites generated by PATMOS-x
v01 data is 0.25 degree equal angle and is from 1996 to 1998
global (89.5S - 89.5N) - 1.0' (360 x 180) starts at 89.5S and GM

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND
THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE
AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES,
AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE
SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR
THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT
TO USERS.

NOTES

None

39. PATMOSX_Aerosol/pfcomavhrr.f [Programs]

[[Top](#)] [Programs]

NAME

pfcomavhrr.f

LOCATION

.../PATMOSX_Aerosol/src/**pfcomavhrr.f**

PURPOSE

This subroutine Input AVHRR Planck-function and band-correction coefficients.

DESCRIPTION

This subroutine Input AVHRR Planck-function and band-correction coefficients.
---for TIROS-N, NOAA-6 ... NOAA-18, METOP-A, ff.
craft = spacecraft: tirosn,noaa06...noaa18, metopa, ... upper or lower case

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

June 6, 2006

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

40. PATMOSX_Aerosol/pixel_hdf.f90 [Programs]

[[Top](#)] [Programs]

NAME

pixel_hdf.f90

LOCATION

.../PATMOSX_Aerosol/src/**pixel_hdf.f90**

PURPOSE

This module hosts the routines used in the pixel level HDF files.

DESCRIPTION

This module hosts the parameters used in the pixel level HDF files.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

12/28/2004 - AKH - Modified global attributes in OBS file to include the

41. PATMOSX_Aerosol/planck.f90 [Programs]

[[Top](#)] [Programs]

NAME

planck.f90

LOCATION

.../PATMOSX_Aerosol/src/**planck.f90**

PURPOSE

This module holds the routine to do rapid Planck

computations using a table lookup approach.

DESCRIPTION

This module holds the routine to do rapid Planck computations using a table lookup approach. This has been shown to speed up CLAVR-x over using the explicit planck function with exponentials. This routine is a modification of that in GEOCAT.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

August 2006

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

```
public::  
POPULATE_PLANCK_TABLES  
PLANCK_RAD_FAST  
PLANCK_TEMP_FAST  
PLANCK_RAD  
PLANCK_TEMP
```

42. PATMOSX_Aerosol/process_avhrr_clavr.f90 [Programs]

[[Top](#)] [Programs]

NAME

process_avhrr_clavr.f90

LOCATION

.../PATMOSX_Aerosol/src/**process_avhrr_clavr.f90**

PURPOSE

This code generates the executable, clavrORB, in the CLAVR-x processing system

DESCRIPTION

This code serves as the NESDIS operational AVHRR cloud processing system (CLAVR-x) and the AVHRR climate data generation system (PATMOS-x)

The input to this code is controlled through three mechanisms

1. command-line options (type clavrORB --help to see documentation)
2. a FILELIST - a list of level-1b files and directories (default name is clavrORB_file_list)
3. a OPTIONSLIST - a list of processing options (default is clavrORB_default_options)

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

2004

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

Clouds from AVHRR Extended (CLAVR-x) 1b PROCESSING SOFTWARE Version 5.2

Overview of capabilities.

CLAVRXORB can

- use level-1b calibration or apply new calibration routines
- use level-1b geolocation or apply new geolocation routines
- generate pixel level cloud, aerosol and surface products
- write to a series of pixel-level hdf files
- write a level-3 file (gridded data for each orbit)
- write to optional binary diagnostic files

In general, CLAVRXORB uses global data arrays and structures to pass data

CLAVRXORB operates on all NESDIS Level-1b formats and on AAPP data

Note, comments the begin with "Marker" refer to flowchart

Web-page: <http://cimss.ssec.wisc.edu/clavr> or <http://cimss.ssec.wisc.edu/patmosx>

Other points of contact: William Straka, CIMSS, wstraka@ssec.wisc.edu

43. PATMOSX_Aerosol/re4flip.f [Programs]

[[Top](#)] [Programs]

NAME

re4flip.f

LOCATION

.../PATMOSX_Aerosol/src/**re4flip.f**

PURPOSE

This subroutine flip the byte

DESCRIPTION

This subroutine flip the byte

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

44. PATMOSX_Aerosol/reposition_module.f90 [Programs]

[[Top](#)] [Programs]

NAME

reposition_module.f90

LOCATION

.../PATMOSX_Aerosol/src/**reposition_module.f90**

PURPOSE

This module houses the non-Nagle routines for repositioning the AVHRR lat and lon values for time corrections.

DESCRIPTION

This module houses the non-Nagle routines for repositioning the AVHRR lat and lon values for time corrections.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

Note, the mjd numbers vary in this module. The values used to record the clock errors are referenced to Wednesday November 17, 1858

The values used by Fred Nagles routines are referenced to 12 Z January, 1970

The offset between the two is 40,587.5

In INTERPOLATE_CLOCK_ERROR, I will use the standard definition
In REPOSITION_FOR_CLOCK_ERROR, I will use Nagle's definition

EXTERNALS

```
use CONSTANTS
use AVHRR_PIXEL_COMMON
use NUMERICAL_ROUTINES
```

```
public:: REPOSITION_FOR_CLOCK_ERROR, &
         SETUP_CLOCK_CORRECTIONS, &
         INTERPOLATE_CLOCK_ERROR
```

REPOSITION_FOR_CLOCK_ERROR - compute the time for each pixel from the scan value

45. PATMOSX_Aerosol/reposnx.f [Programs]

[[Top](#)] [Programs]

NAME

reposnx.f

LOCATION

.../PATMOSX_Aerosol/src/**reposnx.f**

PURPOSE

This subroutine is used to reposition AVHRR or other data arrays to correct timing error.

DESCRIPTION

This subroutine is used to reposition AVHRR or other data arrays to correct timing error. The times, latitudes, and longitudes are adjusted and returned by this routine.

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

This routine was originally written in Meteorological Fortran (MeteFor), an extension of Fortran-77, in order to utilize the vector and matrix notation available in MeteFor. This routine is also maintained in MeteFor. Some of the original MeteFor code may appear in statements which have been commented out. The original MeteFor source (suffix .hlf) is more readable and self-documenting. See the document MeteFor.doc.

INPUTS_OUTPUTS

dts(imax,jmax) - an array of FOV times in MJDN, possibly erroneous
slats(imax,jmax) - an array of FOV geodetic latitudes to be adjusted
slongs(imax,jmax) - an array of FOV longitudes to be adjusted
timerr - Timing error in seconds; a positive value means the spacecraft clock is too fast.
imax,jmax - the cross-scan and along-scan dimensions of the above arrays

46. PATMOSX_Aerosol/rt_utils.f90 [Programs]

[[Top](#)] [Programs]

NAME

`rt_utils.f90`

LOCATION

`.../PATMOSX_Aerosol/src/rt_utils.f90`

PURPOSE

This module holds the routines needed to compute the clear-sky RT parameters

DESCRIPTION

This module holds the routines needed to compute the clear-sky RT parameters
RT_UTILITIES houses most routines used for processing the RTM data structure

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND
THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE
AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES,
AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE
SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR
THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT
TO USERS.

NOTES

None

EXTERNALS

Dependencies: (Following are names of other CLAVR-x modules)

CONSTANTS
NWP_COMMON
AVHRR_PIXEL_COMMON
NUMERICAL_ROUTINES
PLANCK
SURFACE_PROPERTIES

Calling Sequence:
use RT_UTILITIES

Public Routines within this Module:

MAP_NWP_RTM
CREATE_TEMP_NWP_VECTORS
DESTROY_TEMP_NWP_VECTORS
CONVERT_ATMOS_PROF_NWP_RTM
COMPUTE_CLEAR_RAD_PROFILES_RTM
GET_PIXEL_NWP_RTM
COMPUTE_TPW_PROFILE_NWP

```
CONVERT_NWP_H2O
ALLOCATE_RTM
DEALLOCATE_RTM
DEALLOCATE_RTM_VARS
ALLOCATE_RTM_CELL
DEALLOCATE_RTM_CELL
INTERP_RTM_KNOWING_Z
FIND_RTM_LEVELS
KNOWING_T_COMPUTE_P_Z_RTM
KNOWING_P_COMPUTE_T_Z_RTM
KNOWING_Z_COMPUTE_T_P_RTM
calculate_cloud_emissivity
nadir_cloud_emissivity
calculate_cloud_beta
calculate_demiss_dBsf
calculate_demiss_dTsfc
calculate_dbeta_demiss
calculate_dbeta_dTsfc
calculate_demiss_dBcld
calculate_demiss_dTcld
calculate_demiss_dRcld
apply_rtm_sensitivity
bias_correct_radiance_using_bt
get_cloud_emissivity_level
Scaled_Reflectance_Ratio
```

47. PATMOSX_Aerosol/scaling_params.f90 [Programs]

[[Top](#)] [Programs]

NAME

scaling_params.f90

LOCATION

.../PATMOSX_Aerosol/src/**scaling_params.f90**

PURPOSE

Contains the scaling parameters for all scaling/unscaling performed in CLAVR-x

DESCRIPTION

Contains the scaling parameters for all scaling/unscaling performed in CLAVR-x

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND

THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

48. PATMOSX_Aerosol/sfc_emiss.f90 [Programs]

[[Top](#)] [Programs]

NAME

sfc_emiss.f90

LOCATION

.../PATMOSX_Aerosol/src/**sfc_emiss.f90**

PURPOSE

Routines for opening, reading and closing the SEEBOR Emissivity database

DESCRIPTION

Routines for opening, reading and closing the SEEBOR Emissivity database

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

```
use HDF
use CONSTANTS
use NUMERICAL_ROUTINES

private :: read_integrated_seebor_hdf
public  :: open_seebor_emiss, close_seebor_emiss, read_seebor_emiss
```

49. PATMOSX_Aerosol/sfc_prop_umd.f90 [Programs]

[[Top](#)] [Programs]

NAME

sfc_prop_umd.f90

LOCATION

.../PATMOSX_Aerosol/src/**sfc_prop_umd.f90**

PURPOSE

This is a module of surface properties (reflectance, emissivity) for the UMD surface type classification

DESCRIPTION

This is a module of surface properties (reflectance, emissivity) for the UMD surface type classification
Note: surface albedoes range from 0 to 1.0

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

- 0: Water
- 1: Evergreen Needleleaf Forests
- 2: Evergreen Broadleaf Forests

3: Deciduous Needleleaf Forests
4: Deciduous Broadleaf Forests
5: Mixed Forests
6: Woodlands
7: Wooded Grasslands/Shrubs
8: Closed Bushlands or Shrublands
9: Open Shrublands
10: Grasses
11: Cropland
12: Bare
13: Urban and Built
14: Snow (not in original, based on input snow data)
15: Sea_Ice (not in original, based on input snow data)

EXTERNALS

SETUP_UMD_PROPS - assign values to radiative properties for each land type
READ_LAND_COVER_UMD - read the 8km UMD land cover type
GET_PIXEL_SFC_TYPE - spatially interpolate lower cover to each pixel

INPUTS_OUTPUTS

Unit 7 is opened and closed in READ_LAND_COVER_UMD

50. PATMOSX_Aerosol/sort_module.f90 [Programs]

[[Top](#)] [Programs]

NAME

sort_module.f90

LOCATION

.../PATMOSX_Aerosol/src/**sort_module.f90**

PURPOSE

This module holds routines for performing sort.

DESCRIPTION

This module holds routines for performing sort.

AUTHOR

unk

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

51. PATMOSX_Aerosol/subset_mapped.f90 [Programs]

[[Top](#)] [Programs]

NAME

subset_mapped.f90

LOCATION

.../PATMOSX_Aerosol/src/**subset_mapped.f90**

PURPOSE

This Module contains the subroutines needed to subset the HD4 files

DESCRIPTION

This Module contains the subroutines needed to subset the HD4 files

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

October 2007

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES, AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT TO USERS.

NOTES

None

EXTERNALS

READ_CLAVRX_HDF_GLOBAL_ATTRIBUTES
WRITE_CLAVRX_HDF_GLOBAL_ATTRIBUTES

52. PATMOSX_Aerosol/tranmavhrr.f [Programs]

[[Top](#)] [Programs]

NAME

tranmavhrr.f

LOCATION

.../PATMOSX_Aerosol/src/**tranmavhrr.f**

PURPOSE

Calculate AVHRR transmittances, version of 01.08.06
for TIROS-N, NOAA-6 ... NOAA-18, METOP-A, ff

DESCRIPTION

Calculate AVHRR transmittances, version of 01.08.06
for TIROS-N, NOAA-6 ... NOAA-18, METOP-A, ff
LarrabeeStrow/HalWoolf/PaulVanDelst regression model based on
LBLRTM line-by-line transmittances.
Input temperatures, and water-vapor and ozone mixing ratios, must
be defined at the pressure levels in array 'pstd'
(see block data 'reference_atmosphere').

AUTHOR

Andrew Heidinger, NOAA/NESDIS

CREATION DATE

unk

COPYRIGHT

THIS SOFTWARE AND ITS DOCUMENTATION ARE CONSIDERED TO BE IN THE PUBLIC DOMAIN AND
THUS ARE AVAILABLE FOR UNRESTRICTED PUBLIC USE. THEY ARE FURNISHED "AS IS." THE
AUTHORS, THE UNITED STATES GOVERNMENT, ITS INSTRUMENTALITIES, OFFICERS, EMPLOYEES,
AND AGENTS MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE USEFULNESS OF THE
SOFTWARE AND DOCUMENTATION FOR ANY PURPOSE. THEY ASSUME NO RESPONSIBILITY (1) FOR
THE USE OF THE SOFTWARE AND DOCUMENTATION; OR (2) TO PROVIDE TECHNICAL SUPPORT
TO USERS.

NOTES

Units: temperature, deg-K; water vapor, g/kg; ozone, ppmv.
Logical units 71-75 are used for coefficient files.

Component tau's are returned through common, product in 'taut'.

INPUTS_OUTPUTS

Inputs:

temp = temperature profile (degK)
wvmr = water-vapor mixing-ratio profile (g/kg)
ozmr = ozone mixing-ratio profile (ppmv)
zena = local zenith angle in degrees
craft = spacecraft: tirosn,noaa06...noaa18, metopa, ... upper or lower case
kban = band number: 3...5

Outputs:

taut = total transmittance
* = alternate return if any coefficient-file I/O problems
in common/taudwo/
taud = transmittance due to uniformly mixed gases
tauw = transmittance due to water vapor
tauo = transmittance due to ozone