<div style="background-color:#C2A878; height:150px;"></div>

TABLE OF CONTENTS

1. HIRS/calday2date.csh [Scripts]

[[Top](#)] [Scripts]

NAME

```
calday2data.csh
```

LOCATION

```
/hirsoperation/clearsky4/scripts/calday2data.csh
```

PURPOSE

```
Determines if the input of year (4 digit) and julian day is a leap year,
and then finds the month number and day number
```

DESCRIPTION

```
Determines if the input of year (4 digit) and julian day is a leap year,
and then finds the month number and day number
```

AUTHOR

```
Darren Jackson CIRES/ETL
```

CREATION DATE

April 2003

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MODIFICATION HISTORY

Mar 2010 - D. Wunder put in robodoc format

INPUTS

```
year  = 4 digit year
jday  = 3 digit julian day
```

OUTPUTS

```
mon   = 2 digit month
day   = 2 digit day
leap  = 1,0 (true,false)
```

LANGUAGE

C-Shell

2. HIRS/casechange_u2l.ksh [Scripts]

[Top] [Scripts]

NAME

casechange_u2l.ksh

LOCATION

/hirsoperation/clearsky4/scripts/**casechange_u2l.ksh**

PURPOSE

Changes filenames to all lower case

DESCRIPTION

Changes filenames to all lower case

AUTHOR

L. Shi

CREATION DATE

Jan 2007

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MODIFICATION HISTORY

Mar 2010 - D. Wunder put in robodoc format

INPUTS

NSS.HIRX...data files

OUTPUTS

nss.hirx...data files

LANGUAGE

k-shell

3. HIRS/clearlc2nc.c [Scripts]

[[Top](#)] [Scripts]

NAME

clearlc2nc.c

LOCATION

.../hirs/scripts/2nc/**clearlc2nc.c**

PURPOSE

Convert HIRS limb-corrected clear-sky data to NetCDF format

DESCRIPTION

Convert HIRS limb-corrected clear_sky data to NetCDF format

AUTHOR

L. Shi

CREATION DATE

Aug 2005

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

HIRS.$SATID.Y$YY.*.LC = limb-corrected HIRS data, in which
                        SATID = satellite id; YY = two digit year

OUTPUTS

HIRS.$SATID.Y$YY.*.nc = data converted to netCDF format

EXTERNALS

libnetcdf.a

LANGUAGE

C

4. HIRS/create_subdir2 [Scripts]

[Top] [Scripts]

NAME

create_subdir2

LOCATION

/hirsoperation/clearsky4/scripts/**create_subdir2**

PURPOSE

Moves C2, CH and CS data files into monthly subdirectories.

DESCRIPTION

Moves C2, CH and CS data files into monthly subdirectories.
THE CALLING SEQUENCE:
create_subdir2 <data type> <satellite number> <begin month number>
<begin 4 digit year> <end month> <end year>

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

April 2003

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MODIFICATION HISTORY

Mar 2010 - D. Wunder put in robodoc format
Jun 2003 - Darren Jackson, Version 2 loops over months and years.

INPUTS

```
type    ->  Data type for CH,CS,C2 files
sat     ->  NOAA satellite number (5,6,7,...17)
bmonth  ->  Begin month number (1-12)
byear   ->  Four digit begin year
emonth  ->  End month
eyear   ->  End year
```

OUTPUTS

None (files moved to new directoties)

EXTERNALS

date2calday.csh
two_digit_year.csh

LANGUAGE

C-Shell

5. HIRS/date2calday.csh [Scripts]

[Top] [Scripts]

NAME

date2calday.csh

LOCATION

/hirsoperation/clearsky4/scripts/**date2calday.csh**

PURPOSE

Finds calender (Julian) day number (1-366) for a given date

DESCRIPTION

Finds calender (Julian) day number (1-366) for a given date

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

March 2002

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TO USERS.

MODIFICATION HISTORY

Mar 2010 - D. Wunder put in robodoc format

INPUTS

```
year  =    four digit year
month =    month number
day   =    day number
```

OUTPUTS

```
calday =  number of calendar days (Julian day)
```

LANGUAGE

C-Shell

6. HIRS/date_to_julian69.csh [Scripts]

[Top] [Scripts]

NAME

date_to_julian69.csh

LOCATION

/hirsoperation/clearsky4/scripts/**date_to_julian69.csh**

PURPOSE

Script computes the number days from Jan. 1, 1969.

DESCRIPTION

Script computes the number days from Jan. 1, 1969.
Error report status=1   ->   Input year less than 1969

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

April 2003

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MODIFICATION HISTORY

Mar 2010 - D. Wunder put in robodoc format

INPUTS

year =   four digit year
month =   month number; if 1 and day > 31 then assume day = day of year
day   =   day number

OUTPUTS

```
totdays =  number of days since Jan 1, 1969
```

LANGUAGE

```
C-Shell
```

7. HIRS/hirs2hirx.csh [Scripts]

[Top] [Scripts]

NAME

hirs2hirx.csh

LOCATION

/hirsoperation/clearsky4/scripts/**hirs2hirx.csh**

PURPOSE

```
Rename files with hirs to hirx
```

DESCRIPTION

```
Rename files with hirs to hirx
```

AUTHOR

```
L. Shi
```

CREATION DATE

```
Mar 2005
```

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```
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TO USERS.
```

MODIFICATION HISTORY

```
Mar 2010 - D. Wunder put in robodoc format
```

INPUTS

~/hirs1b/n17/nss.hirs...

OUTPUTS

~/hirs1b/n17/nss.hirx...

LANGUAGE

C-Shell

8. HIRS/HIRS_GRID_CS [Scripts]

[Top] [Scripts]

NAME

HIRS_GRID_CS

LOCATION

/hirsoperation/clearsky4/scripts/**HIRS_GRID_CS**

PURPOSE

Makes HIRS clear-sky grid files using hirs grid cs.f. Script loops
through time to make grid files at specified points in time.

DESCRIPTION

Makes HIRS clear-sky grid files using hirs grid cs.f. Script loops
through time to make grid files at specified points in time.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2003

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MODIFICATION HISTORY

    Mar 2010 - D. Wunder put in robodoc format

INPUTS

    bday = julian day start day
    eday = julian day end day
    year = 4 digit year
    tres = 1 - daily, 2 - pentad, 3 - monthly
    isat = satellite number

OUTPUTS

    HIRS_GRID_CS.out   -> HIRS clear-sky grid files

LANGUAGE

    c-shell

9. HIRS/HIRS_GRID_CS2 [Scripts]

  [Top] [Scripts]

NAME

    HIRS_GRID_CS2

LOCATION

    /hirsoperation/clearsky4/scripts/**HIRS_GRID_CS2**

PURPOSE

    Makes HIRS CS grid files using hirs grid cs2.f. Script loops
    through time to construct multiple files.

DESCRIPTION

    Makes HIRS CS grid files using hirs grid cs2.f. Script loops
    through time to construct multiple files.

AUTHOR

    Darren Jackson CIRES/ETL

CREATION DATE

    Apr 2003

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MODIFICATION HISTORY

Mar 2010 - D. Wunder put in robodoc format

INPUTS

```
bday      ->   julian day start day
eday      ->   julian day end day
year      ->   4 digit year
tres      ->   1 - daily, 2 - pentad, 3 - monthly
isat      ->   satellite number
iparm     ->   HIRS channel number (1-19)
angle     ->   10 = 1.0-0.95, 09 = 0.95-0.85, 08 = 0.85-0.75,
               07 = 0.75-0.65
brange    ->   start scan spots (1-28)
erange    ->   end scan spot
```

OUTPUTS

HIRS_GRID_CS2.out   -> HIRS clear-sky grid files

LANGUAGE

c-shell

10. HIRS/hirs_proc_prev_month.csh [Scripts]

[Top] [Scripts]

NAME

hirs_proc_prev_month.csh

LOCATION

hirsoperation/clearsky4/scripts/**hirs_proc_prev_month.csh**

PURPOSE

To process HIRS 1b data into HIRS clear-sky swath data set.

DESCRIPTION

```
Reads HIRS 1b data in following steps:
1.  Grabs 1 day of HIRS 1b orbital files from remote directory
2.  Uses ITPP/AAPP to produce HIRS non-limb corrected TBs
3.  Runs quality control program on all-sky swath data
```

4.   Applies limb correction for channel 8
5.   Applies cloud detection
6.   Outputs HIRS clear-sky swath data set into daily files.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

November 2004

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MODIFICATION HISTORY

March 2010 - D. Wunder put in robodoc format

INPUTS

```
bjday              ->  start day of year (1-366)
ejday              ->  end day of year (1-366)
byear              ->  4 digit start year
eyear              ->  4 digit end year
satid              ->  Satellite number of data to be processed
remove_tmp_files ->  diagnostic tool.  Set to n to see all intermediate files.
copyx              ->  y - copies fortran executables each day from bin directory.
                       n - does not.
```

NOTES

- uses an improved limb correction technique that does not
  use coefficients from channels 13-19.

- uses ITPP preprocessor for HIRS/2 data and
  AAPP preprocessor for HIRS/3 ingestion

EXTERNALS

```
SCRIPTS:
 julian1969_to_date.....Finds year, month, day given julian day from 1/1/69
 date_to_julian1969.....Finds julian day from 1/1/69 given year,month,day
 read_atov..............Runs the AAPP processing code and produces 1c formatted file

ITPP Fortran executables:
 ITPP executables from the ITPP v5.20 code.  These routines have been
 modified to produce different output parameters that are used in this code

 hirsix4253_Hv2........Shortens HIRS 1b data record
 hirsix4256_Hv2........Shortens HIRS 1b data record
 tovinw3_Hv2...........Applies calibration to HIRS data (does not use MSU data)
 tovprw7_Hv2...........Computes bidirectional refl., writes all parameters
                       needed for processing.

Pathfinder Fortran executables:
```

```
       HIRS Pathfinder executables

       hirs1c...............Applies QC, limb correction to chn 8, creates
                            daily tb max/vis refl min grids, outputs orbit mean
                            statistics, pixel level all-sky data.
       hcloud...............Applies space and time contrast test using all-sky
                            data and grids from hirs1c for cloud detection.
       multi_day_grid.......Combines daily max/min TB grids into longer time periods.
       hcloudcomp...........Produces clear-sky TB 5-day grid by using 5-,15-, and
                            35-day composite grids from multi_day_grid.
       hcloud_lt............Performs second cloud detection test using long-term
                            TB statistics from hcloudcomp.  Output from this file
                            is the final HIRS clear-sky swath data.
```

VARIABLES

```
    tape            Number of tapes to process (only used 1 so far)
    daycnt          Counts number of days processed.  Starts with 1
    day             Day number (1-366) of current day being processed from tape
    year            2 digit year number of current day being processed from tape
    readfile        1 for successful read of tape.  2 to 3 for tar read errors.
    name            list of HIRS 1b file names for the current day being processed.
    year4           4 digit year number of current day being processed from tape
    jday69          julian day number of current day being processed (referenced from 1/1/69)
    fname           List of current day HIRS 1b files without ?? station designation
    cnt             Counter used to name HIRS output files from ITPP processing
    input           name used in foreach loop of fname list
    orb             orbit id number given to each 1b file
    jday69_m1       julian day before jday69 (m1 = minus 1)
    jday69_m1_prv   julian day previous to jday69_m1.  Not always 1 less than jday69_m1 if
                    missing day occurs on tape or read errors occur with tape
    prv_yyddd       list containing two digit year [1] and day of year [3] for jday69_m1
    rem             remainder to test for end of pentad (5-day) period
    bjday69         begin day of 5-,15- or 35-day period for compute HIRS8 grid statistics
    ejday69         end day of 5-,15- or 35-day period for compute HIRS8 grid statistics
    jday_17         julian day that is at center of 35-day period for hcloudcomp grid
statistics
    jday_34         julian day that is 34 days less than current day being processed for
clouds/cs
    jday_30
""""""""""""""""""""30""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
    jday_24
""""""""""""""""""""24""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
    jday_10
""""""""""""""""""""10""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
    yr_mn_day       Finds year, month, and day for julian day parameters shown above
    bday            begin day taken from yr_mn_day
    eday            end day taken from yr_mn_day
    gfile           Name of temporary grid file to be removed
    biyr2           begin year (2 digit) used for name of temporary grid file
    eiyr2           end year (2 digit) used for name of temporary grid file
    jday19          julian day used to process the clear-sky and cloud swath data.
    yr_mon_day      finds year,month,day for julian day defined by jday19
    yr2             2 digit year from yr_mon_day
    mon             2 digit month from yr_mon_day
    yr_day          gives year and day of year from jday19
    file            used to construct file name
    cs_file         clear-sky swath full path file name
    tfile           Temporary file name used to remove files


  FILES
    tar.out                 Gives output results of tar read
    tar_error.out           Gives location on tape where tar error occurred
    tovprw7_Hv2.input       Input parameters for ITPP executable tovprw7_Hv2
    tmp.list                List of current day HIRS 1b files without ?? station designation
    hirsix.out              Output from the hirsix42**_Hv2 ITPP program
    tovinw3.out             Output from the tovinw3_Hv2 ITPP program
    tovprw7.out             Output from the tovprw7_Hv2 ITPP program
    tmp3.list               Output of the orbit id numbers from all files for processing day
    hirs_**.dat             Output TB data from ITPP.  ** are numbered from 1 to ~20 for one
day
    tov_itpp_save.out       Output information about ITPP processing errors
    nss.*                   1b data file names
    hirs1c.input/out        Input/output files needed for hirs1c
    hcloud.input/out        Input/Output files for hcloud
    multi_day_grid.input/out  Input/Output files for multi_day_grid
    hcloud_lt.input/out       Input/Output files for hcloud_lt
```

```
     Directory name description:
       data_l    parent directory on lhotse where data sets and executables reside during
     processing
       itpp      directory where ITPP processing code resides
       src       directory location of source code and scripts uses to run processing
       hirs_BIN_DIR  directory where all fortran executables are found
       hirs_SCRIPT_DIR   directory where all processing scripts are found
       bin_dir   directory where all executables are run from during processing
       log_dir   directory where all log files are written
       grid_dir  directory where grid data during processing are placed
       tmp_dir   directory where all-sky and short term cloud swath data reside
       orb_dir   directory where orbit statistics are placed.
       itpp_bin  directory where all the ITPP executables live
       itpp_run  directory where all the ITPP data results reside
       cs_dir    directory where the clear-sky swath data is placed during processing
```

11. HIRS/hirsclearskyproc_m2.csh [Scripts]

[Top] [Scripts]

NAME

hirsclearskyproc_m2.csh

LOCATION

hirsoperation/clearsky4/scripts/**hirsclearskyproc_m2.csh**

PURPOSE

To process HIRS 1b data into HIRS clear-sky swath data set.

DESCRIPTION

```
     Reads HIRS 1b data in following steps:
     1.  Grabs 1 day of HIRS 1b orbital files from remote directory
     2.  Uses ITPP/AAPP to produce HIRS non-limb corrected TBs
     3.  Runs quality control program on all-sky swath data
     4.  Applies limb correction for channel 8
     5.  Applies cloud detection
     6.  Outputs HIRS clear-sky swath data set into daily files.
```

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

November 2004

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```
             TO USERS.
```

MODIFICATION HISTORY

```
     March 2010 - D. Wunder put in robodoc format
```

INPUTS

```
     bjday              ->   start day of year (1-366)
     ejday              ->   end day of year (1-366)
     byear              ->   4 digit start year
     eyear              ->   4 digit end year
     satid              ->   Satellite number of data to be processed
     remove_tmp_files ->   diagnostic tool.  Set to n to see all intermediate files.
     copyx              ->   y - copies fortran executables each day from bin directory.
                             n - does not.
  <auto prev month> Using this block will run the proc for the previous month
  </auto prev month>
  <manual> Or use this block to specify the time range to run
  </manual>
   echo $year
   @ year = ($year + 1)
```

NOTES

```
     - uses an improved limb correction technique that does not
       use coefficients from channels 13-19.

     - uses ITPP preprocessor for HIRS/2 data and
       AAPP preprocessor for HIRS/3 ingestion
```

EXTERNALS

```
     SCRIPTS:
      julian1969_to_date.....Finds year, month, day given julian day from 1/1/69
      date_to_julian1969.....Finds julian day from 1/1/69 given year,month,day
      read_atov..............Runs the AAPP processing code and produces 1c formatted file

     ITPP Fortran executables:
      ITPP executables from the ITPP v5.20 code.  These routines have been
      modified to produce different output parameters that are used in this code

      hirsix4253_Hv2........Shortens HIRS 1b data record
      hirsix4256_Hv2........Shortens HIRS 1b data record
      tovinw3_Hv2...........Applies calibration to HIRS data (does not use MSU data)
      tovprw7_Hv2...........Computes bidirectional refl., writes all parameters
                            needed for processing.

     Pathfinder Fortran executables:

      HIRS Pathfinder executables

      hirs1c................Applies QC, limb correction to chn 8, creates
                             daily tb max/vis refl min grids, outputs orbit mean
                             statistics, pixel level all-sky data.
      hcloud...............Applies space and time contrast test using all-sky
                             data and grids from hirs1c for cloud detection.
      multi_day_grid........Combines daily max/min TB grids into longer time periods.
      hcloudcomp...........Produces clear-sky TB 5-day grid by using 5-,15-, and
                             35-day composite grids from multi_day_grid.
      hcloud_lt.............Performs second cloud detection test using long-term
                             TB statistics from hcloudcomp.  Output from this file
                             is the final HIRS clear-sky swath data.
```

VARIABLES

```
     tape              Number of tapes to process (only used 1 so far)
     daycnt            Counts number of days processed.  Starts with 1
     day               Day number (1-366) of current day being processed from tape
```

```
      year            2 digit year number of current day being processed from tape
      readfile        1 for successful read of tape.  2 to 3 for tar read errors.
      name            list of HIRS 1b file names for the current day being processed.
      year4           4 digit year number of current day being processed from tape
      jday69          julian day number of current day being processed (referenced from 1/1/69)
      fname           List of current day HIRS 1b files without ?? station designation
      cnt             Counter used to name HIRS output files from ITPP processing
      input           name used in foreach loop of fname list
      orb             orbit id number given to each 1b file
      jday69_m1       julian day before jday69 (m1 = minus 1)
      jday69_m1_prv   julian day previous to jday69_m1.  Not always 1 less than jday69_m1 if
                      missing day occurs on tape or read errors occur with tape
      prv_yyddd       list containing two digit year [1] and day of year [3] for jday69_m1
      rem             remainder to test for end of pentad (5-day) period
      bjday69         begin day of 5-,15- or 35-day period for compute HIRS8 grid statistics
      ejday69         end day of 5-,15- or 35-day period for compute HIRS8 grid statistics
      jday_17         julian day that is at center of 35-day period for hcloudcomp grid
statistics
      jday_34         julian day that is 34 days less than current day being processed for
clouds/cs
      jday_30
""""""""""""""""""""""30"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
      jday_24
""""""""""""""""""""""24"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
      jday_10
""""""""""""""""""""""10"""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""""
     yr_mn_day        Finds year, month, and day for julian day parameters shown above
     bday             begin day taken from yr_mn_day
     eday             end day taken from yr_mn_day
     gfile            Name of temporary grid file to be removed
     biyr2            begin year (2 digit) used for name of temporary grid file
     eiyr2            end year (2 digit) used for name of temporary grid file
     jday19           julian day used to process the clear-sky and cloud swath data.
     yr_mon_day       finds year,month,day for julian day defined by jday19
     yr2              2 digit year from yr_mon_day
     mon              2 digit month from yr_mon_day
     yr_day           gives year and day of year from jday19
     file             used to construct file name
     cs_file          clear-sky swath full path file name
     tfile            Temporary file name used to remove files


    FILES
    tar.out                    Gives output results of tar read
    tar_error.out              Gives location on tape where tar error occurred
    tovprw7_Hv2.input          Input parameters for ITPP executable tovprw7_Hv2
    tmp.list                   List of current day HIRS 1b files without ?? station designation
    hirsix.out                 Output from the hirsix42**_Hv2 ITPP program
    tovinw3.out                Output from the tovinw3_Hv2 ITPP program
    tovprw7.out                Output from the tovprw7_Hv2 ITPP program
    tmp3.list                  Output of the orbit id numbers from all files for processing day
    hirs_**.dat                Output TB data from ITPP.  ** are numbered from 1 to ~20 for one
day
    tov_itpp_save.out          Output information about ITPP processing errors
    nss.*                      1b data file names
    hirs1c.input/out           Input/output files needed for hirs1c
    hcloud.input/out           Input/Output files for hcloud
    multi_day_grid.input/out   Input/Output files for multi_day_grid
    hcloud_lt.input/out        Input/Output files for hcloud_lt

   Directory name description:
    data_l    parent directory on lhotse where data sets and executables reside during
processing
    itpp      directory where ITPP processing code resides
    src       directory location of source code and scripts uses to run processing
    hirs_BIN_DIR  directory where all fortran executables are found
    hirs_SCRIPT_DIR   directory where all processing scripts are found
    bin_dir   directory where all executables are run from during processing
    log_dir   directory where all log files are written
    grid_dir  directory where grid data during processing are placed
    tmp_dir   directory where all-sky and short term cloud swath data reside
    orb_dir   directory where orbit statistics are placed.
    itpp_bin  directory where all the ITPP executables live
    itpp_run  directory where all the ITPP data results reside
    cs_dir    directory where the clear-sky swath data is placed during processing
```

12. HIRS/hirslc2nc_m.csh [Scripts]

[Top] [Scripts]

NAME

hirslc2nc_m.csh

LOCATION

.../hirs/scripts/2nc/**hirslc2nc_m.csh**

PURPOSE

Convert HIRS limb-corrected Tb data to NetCDF format

DESCRIPTION

Convert HIRS limb-corrected Tb data to NetCDF format

AUTHOR

L. Shi

CREATION DATE

Aug 2005

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

SATNUM = Satellite id
SATID = Satellite id
YY   = 2 digit year

OUTPUTS

HIRS.$SATID.Y$YEAR.D$DAY.LC .... limb corrected Tb data

EXTERNALS

clearlc2nc.c

LANGUAGE

C-Shell

13. HIRS/hirx2hirs.csh [Scripts]

[[Top](#)] [Scripts]

NAME

hirx2hirs.csh

LOCATION

/hirsoperation/clearsky4/scripts/**hirx2hirs.csh**

PURPOSE

Rename files with hirx to hirs

DESCRIPTION

Rename files with hirx to hirs

AUTHOR

L. Shi

CREATION DATE

Mar 2005

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MODIFICATION HISTORY

Mar 2010 - D. Wunder put in robodoc format

INPUTS

~/hirs1b/nss.hirx...

OUTPUTS

~/hirs1b/nss.hirs...

LANGUAGE

C-Shell

14. HIRS/julian69_to_date.csh [Scripts]

[Top] [Scripts]

NAME

julian69_to_date.csh

LOCATION

/hirsoperation/clearsky4/scripts/**julian69_to_date.csh**

PURPOSE

Script computes the day, month and year given the julian day from Jan. 1, 1969.

DESCRIPTION

Script computes the day, month and year given the julian day from Jan. 1, 1969

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

April 2003

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TO USERS.

MODIFICATION HISTORY

Mar 2010 - D. Wunder put in robodoc format

INPUTS

```
julian1969  = julian day since 1969
```

OUTPUTS

```
year  =     four digit year
month =     month number
day   =     day number
```

LANGUAGE

```
C-Shell
```

15. HIRS/one_digit_year.csh [Scripts]

[Top] [Scripts]

NAME

one_digit_year.csh

LOCATION

/hirsoperation/clearsky4/scripts/**one_digit_year.csh**

PURPOSE

Returns the last two digits of a four digit year (one digit returned for 2000-2009)

DESCRIPTION

Returns the last two digits of a four digit year (one digit returned for 2000-2009)

AUTHOR

L. Shi

CREATION DATE

Jan 2008

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```
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TO USERS.
```

MODIFICATION HISTORY

    Mar 2010 - D. Wunder put in robodoc format

INPUTS

    iyr4 = for digit year

OUTPUTS

    iyr1 = last digit(s) of year

LANGUAGE

    C-Shell

16. HIRS/regiontb_m2.c [Scripts]

[[Top](#)] [Scripts]

NAME

    regiontb_m2.c

LOCATION

    .../hirs/scripts/mstep2/**regiontb_m2.c**

PURPOSE

    Put together monthly means from several satellites for a lat/lon region

DESCRIPTION

    Put together monthly means from several satellites for a lat/lon region
    It doesn't work for 5 or more overlapping satellites

AUTHOR

    L. Shi

CREATION DATE

    Dec 2008

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

HIRS.Y??.MG.TB.24 ... gridded monthly mean data from overlapping satellites

OUTPUTS

```
allch.dat    ... zonal mean for channel 1-12
meansats.dat ... zonal mean for channel 12 only
```

EXTERNALS

LANGUAGE

C

17. HIRS/runlimbcor_as.csh [Scripts]

[Top] [Scripts]

NAME

runlimbcor_as.csh

LOCATION

.../hirs/lcproc/work/**runlimbcor_as.csh**

PURPOSE

Perform limb-correction for all-sky data.

DESCRIPTION

Perform limb-correction for Metop-A HIRS using the method developed by
Jackson, D. L., D. P. Wylie, and J. J. Bates (2003), The HIRS Pathfinder
radiance data set (1979-2001), paper presented at 12th Conference on
Satellite Meteorology and Oceanography, Long Beach, California, February
10-13, 2003.

AUTHOR

L. Shi

CREATION DATE

Sep 2008

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

SATID = satellite id
YY   = two digit year

OUTPUTS

HIRS.$SATID.Y$YY.*.LC

LANGUAGE

C-Shell

18. HIRS/runlimbcor_m.csh [Scripts]

[[Top](#)] [Scripts]

NAME

runlimbcor_m.csh

LOCATION

.../hirs/lcproc/work/**runlimbcor_m.csh**

PURPOSE

Perform limb-correction for Metop-A HIRS.

DESCRIPTION

Perform limb-correction for Metop-A HIRS using the method developed by

Jackson, D. L., D. P. Wylie, and J. J. Bates (2003), The HIRS Pathfinder
radiance data set (1979-2001), paper presented at 12th Conference on
Satellite Meteorology and Oceanography, Long Beach, California, February
10-13, 2003.

AUTHOR

L. Shi

CREATION DATE

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

SATID = satellite id
YY   = two digit year

OUTPUTS

HIRS.$SATID.Y$YY.*.LC = limb-corrected HIRS data

LANGUAGE

C-Shell

19. HIRS/runmcalib.csh [Scripts]

[Top] [Scripts]

NAME

runmcalib.csh

LOCATION

.../hirs/scripts/mstep2/**runmcalib.csh**

PURPOSE

Intercalibration for METOP HIRS

DESCRIPTION

Run .../hirs/scripts/mstep2/bar/mcalib.c

AUTHOR

L. Shi

CREATION DATE

Dec 2008

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

SATID = satellite ID

OUTPUTS

HIRS.$SATID.Y$yy.D$ddd.BN12 ... Intersatellite calibrated to N12

EXTERNALS

mcalib.c

LANGUAGE

C

20. HIRS/runregiontb.csh [Scripts]

[Top] [Scripts]

NAME

runregiontb.csh

LOCATION

.../hirs/scripts/mstep2/**runregiontb.csh**

PURPOSE

Put together monthly means from several satellites for a lat/lon region

DESCRIPTION

Run regiontb_m2.c

AUTHOR

L. Shi

CREATION DATE

Dec 2008

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

year = two digit year

OUTPUTS

HIRS.SATS.TB.ALLCH.24 ... zonal mean for channel 1-12
HIRS.SATS.TB.REGION.24 ... zonal mean for channel 12 only

EXTERNALS

regiontb_m2.c

LANGUAGE

C-Shell

21. HIRS/runtbbsatdaily2000.csh [Scripts]

[Top] [Scripts]

NAME

runtbbsatdaily2000.csh

LOCATION

.../hirs/scripts/mstep2/**runtbbsatdaily2000.csh**

PURPOSE

Map daily swath HIRS channel data to global grid

DESCRIPTION

Daily gridding of HIRS ch1-12 from clear-sky swath ch1-12 data to 2.5x2.5
lat/lon grids

AUTHOR

L. Shi

CREATION DATE

Dec 2008

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

SATID = satellite ID
YY   = two digit year

OUTPUTS

HIRS.$SATID.Y$YY.TB24 ... 24-hour daily gridded data.

EXTERNALS

None

LANGUAGE

C-Shell

22. HIRS/runtbmonthly.csh [Scripts]

[Top] [Scripts]

NAME

runtbmonthly.csh

LOCATION

.../hirs/scripts/mstep2/**runtbmonthly.csh**

PURPOSE

Calculate monthly from daily data for the entire series of one satellite

DESCRIPTION

Run tbmonthly.c (Compute monthly grid and global mean Tb based on daily gridded data).

AUTHOR

L. Shi

CREATION DATE

Dec 2008

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TO USERS.

MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

```
SATID = satellite ID
YY    = two digit year
```

OUTPUTS

```
HIRS.$SATID.MS.TB.24     ... time series of global mean Tb
HIRS.$SATID.Y??.MG.TB.24 ... gridded monthly mean Tb
```

EXTERNALS

tbmonthly.c

LANGUAGE

```
C-Shell
```

23. HIRS/tbbsatdaily.c [Scripts]

[[Top](#)] [Scripts]

NAME

tbbsatdaily.c

LOCATION

.../hirs/scripts/mstep2/**tbbsatdaily.c**

PURPOSE

```
Daily gridding of HIRS ch1-12 from clear-sky swath ch1-12 data
```

DESCRIPTION

```
Daily gridding of HIRS ch1-12 from clear-sky swath ch1-12 data to 2.5x2.5
lat/lon grids
```

AUTHOR

```
L. Shi
```

CREATION DATE

```
Dec 2008
```

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

HIRS.$SATID.Y$yy.D$ddd.BN12 ... Intersatellite calibrated to N12

OUTPUTS

tgrid.dat ... gridded data

EXTERNALS

None

LANGUAGE

C

24. HIRS/tbdaily2000.csh [Scripts]

[Top] [Scripts]

NAME

tbdaily2000.csh

LOCATION

.../hirs/scripts/hirstb/tb/**tbdaily2000.csh**

PURPOSE

Map daily swath HIRS channel data to global grid.

DESCRIPTION

Map daily swath HIRS channel data to global grid. Process one year data.
Works for Metop as well as NOAA satellites.
Works for year 2000 and later only.

AUTHOR

L, Shi

CREATION DATE

April 2005

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

SATID = satellite ID
YY   = two digit year

OUTPUTS

HIRS.$SATID.Y$YY.TB24 ... 24-hour daily gridded data.

EXTERNALS

tbdaily24.c

LANGUAGE

C-Shell

25. HIRS/tbdaily24.c [Scripts]

[Top] [Scripts]

NAME

tbdaily24.c

LOCATION

.../hirs/scripts/hirstb/tb/**tbdaily24.c**

PURPOSE

Daily gridding of HIRS ch1-12 from clear-sky swath data

DESCRIPTION

```
Daily gridding of HIRS ch1-12 from clear-sky swath data
After compiling, manually copy the executable to tbdaily24
```

AUTHOR

```
L. Shi
```

CREATION DATE

```
Apr 2005
```

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```
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TO USERS.
```

MODIFICATION HISTORY

```
May 2010 - D. Wunder put in robodoc format
```

INPUTS

```
HIRS.$SATID.Y$yy.D$ddd.LC ... Limb corrected HIRS channel Tb
```

OUTPUTS

```
tgrid.dat ... gridded data
```

EXTERNALS

```
none
```

LANGUAGE

```
C
```

26. HIRS/tbmonthly.c [Scripts]

[[Top](#)] [Scripts]

NAME

tbmonthly.c

LOCATION

.../hirs/scripts/mstep2/**tbmonthly.c**

PURPOSE

Compute monthly grid and global mean Tb

DESCRIPTION

Compute monthly grid and global mean Tb based on daily gridded data.

AUTHOR

L. Shi

CREATION DATE

Dec 2008

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

HIRS.$SATID.Y$YY.TB24 ... 24-hour daily gridded data for channels 1-12.

OUTPUTS

mean.dat ... gridded monthly Tb data for channels 1-12.
gmean.dat ... global mean Tb

EXTERNALS

None

LANGUAGE

C

27. HIRS/tbmonthly.csh [Scripts]

[Top] [Scripts]

NAME

tbmonthly.csh

LOCATION

.../hirs/scripts/hirstb/tb/**tbmonthly.csh**

PURPOSE

Calculate monthly from daily data of one satellite

DESCRIPTION

Calculate monthly from daily data of one satellite
Works for Metop as well as NOAA satellites

AUTHOR

L. Shi

CREATION DATE

Apr 2005

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MODIFICATION HISTORY

May 2010 - D. Wunder put in robodoc format

INPUTS

SATID = satellite ID
YY   = two digit year

OUTPUTS

HIRS.$SATID.MS.TB.24   ... time series of global mean Tb
HIRS.$SATID.Y??.MG.TB.24 ... gridded monthly mean Tb

EXTERNALS

tbmonthly.c

LANGUAGE

C-Shell

28. HIRS/two_digit_year.csh [Scripts]

[[Top](Top)] [Scripts]

NAME

two_digit_year.csh

LOCATION

/hirsoperation/clearsky4/scripts/**two_digit_year.csh**

PURPOSE

Returns the two digit year given the four digit year input

DESCRIPTION

Returns the two digit year given the four digit year input

AUTHOR

L. Shi

CREATION DATE

Apr 2005

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MODIFICATION HISTORY

Mar 2010 - D. Wunder put in robodoc format

INPUTS

```
   iyr4      ->   four digit year
```

OUTPUTS

```
   iyr2      ->   two digit year
```

LANGUAGE

```
   C-Shell
```

29. HIRS/date_to_julian69.f [Programs]

[Top] [Programs]

NAME

date_to_julian69.f

LOCATION

/crystal/san3/clearsky4/source/**date_to_julian69.f**

PURPOSE

Computes the julian day starting from Jan 1, 1969.

DESCRIPTION

Computes the julian day starting from Jan 1, 1969.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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```
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TO USERS.
```

MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
name     date type     dimension     description
-------------------------------------------------
iyr4    integer      scalar        4 digit year
mon     integer      scalar        month number (1 if day is day of year)
day     integer      scalar        day number (day of month if mon > 1 or
                                    day of year if mon=1)
```

OUTPUTS

```
jday69 integer      scalar        julian day from jan 1, 1969
```

EXTERNALS

```
None
```

LANGUAGE

```
Fortran
```

30. HIRS/daygrid.f [Programs]

[Top]] [Programs]

NAME

daygrid.f

LOCATION

/crystal/san3/clearsky4/source/**daygrid.f**

PURPOSE

Computes daily grids for either the all-sky data in hirs1c.f (l=0)
or the clear-sky data in hcloud.f (l=1).

DESCRIPTION

Computes daily grids for either the all-sky data in hirs1c.f (l=0)
or the clear-sky data in hcloud.f (l=1).

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
l.....................l=0 all-sky grids, l !=0 clear-sky grids
n.....................number of spots
bad_data.............flagged bad data values are true
time.................time in seconds from midnight
xlon.................longitude (0 to 360 going east)
xlat.................latitude (-90 to 90)
szen.................solar zenith angle in degrees
refl.................HIRS20 reflectance
tblc.................limb corrected HIRS channel 8 BT.
```

OUTPUTS

```
xmxmn................Grid of HIRS 8 Max,sum,#obs, and minimum HIRS20
```

EXTERNALS

```
hirs1c.inc
binit.f
```

NOTES

```
For the all-sky data, the gridded values are
(1) maximum TBs for HIRS8
(2) Minimum reflectances for HIRS Chn 20
(3) # of obs. for HIRS8

For the clear-sky data, the gridded values are
(1) sum of TBs for HIRS8
(2) # of obs. for HIRS8
```

LANGUAGE

Fortran

31. HIRS/fscale.f [Programs]

[Top] [Programs]

NAME

fscale.f

LOCATION

/crystal/san3/clearsky4/source/**fscale.f**

PURPOSE

Makes integer*2 value from real.

DESCRIPTION

Makes integer*2 value from real.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
int2.................integer*2 value to be restored to float
offset...............offset factor
sfactor..............scale factor
```

OUTPUTS

```
fscale...............scaled value (int*2)
```

LANGUAGE

Fortran

32. HIRS/get_grid_files.f [Programs]

[[Top](#)] [Programs]

NAME

get_grid_files.f

LOCATION

/crystal/san3/clearsky4/source/**get_grid_files.f**

PURPOSE

fills grid of TB max/min values constructed from max_grid.f.

DESCRIPTION

fills grid of TB max/min values constructed from max_grid.f.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

iog.........file number for max/min grid files (int)

OUTPUTS

gmxmn........max/min grid data (real)

EXTERNALS

hirs1c.inc

NOTES

Reads 3 days of data for use in time_constraint.f routine. Also checks
all-sky grid box count values. If number from daily grid file exceeds 50,
then assume navigation error and assign grid box TBmax with missing data value.

LANGUAGE

Fortran

33. HIRS/gmax_r.f [Programs]

[Top] [Programs]

NAME

gmax_r.f

LOCATION

/crystal/san3/clearsky4/source/**gmax_r.f**

PURPOSE

Finds the maximum grid point value of input 2D array grid given the
center point indices i0,j0 and the range in both i (irange) and j (jrang).

DESCRIPTION

Finds the maximum grid point value of input 2D array grid given the
center point indices i0,j0 and the range in both i (irange) and j (jrang).

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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TO USERS.

MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
    name    data type    dimension    description
    ----------------------------------------------------------
    grid     real          n x m       array of Tb data
      n      integer                   # of longitude points
      m      integer                   # of latitude points
     i0      integer                   longitude index where observation exists
     j0      integer                   latitude index where observation exists
   irang     integer                   longitude range (smaller for land, larger for ocean)
   jrang     integer                   latitude range
 missing     real                      missing value
```

OUTPUTS

```
    gmax     real                      Maximum Tb in region defined around grid box (i0,j0)
```

EXTERNALS

```
    none
```

LANGUAGE

```
    Fortran
```

34. HIRS/grid_cs2.f [Programs]

[ ] [Programs]

NAME

grid_cs2.f

LOCATION

/crystal/san3/clearsky4/source/**grid_cs2.f**

PURPOSE

Grids HIRS clear-sky scan line data and bins into grid. Separates ascending and descending nodes.

DESCRIPTION

Grids HIRS clear-sky scan line data and bins into grid. Separates ascending and descending nodes.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format
Sep 2002 - Version 2 computes array of observation times
Sep 2002 - Version 2 identifies asc/des passes
Sep 2002 - Version 2 Adapted from grid_ch4.f

INPUTS

day_file.........File name of daily clear-sky file
jday.............julian day of year
iyr4.............4 digit year
nlon.............number of longitude grid points
nlat.............number of latitude grid points
max_cnt..........Maximum number of observations in time array
ichn.............Channel to grid (1-19)
s_range(2).......Range of scan points (1-28)
gres.............grid resolution

OUTPUTS

sum..............sum of the values
sumsq............sum squared of values
obs_time.........array of observation times in julian days from Jan 1, 1969.
icnt.............number of points.

EXTERNALS

hirs_grid.inc
recl_parms.inc
binit.f
date_to_julian69.f
nodalpass.f

NOTES

No limb correction is available in this code

LANGUAGE

Fortran

35. HIRS/grid_moment_cs.f [Programs]

[Top] [Programs]

NAME

grid_moment_cs.f

LOCATION

/crystal/san3/clearsky4/source/**grid_moment_cs.f**

PURPOSE

Computes mean and standard deviation from summed arrays.

DESCRIPTION

Computes mean and standard deviation from summed arrays.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
name      data type    dimension    description
----------------------------------------------------------
nlon      integer      scalar       number of longitude points
nlat      integer      scalar       number of latitude points
nchn      integer      scalar       number of HIRS channels
sum       real         3D           summed value at given gridpoint
sumsq     real         3D           sum**2 value at given gridpoint.(float)
count     real         3D           total number of points.(Int*4)
```

OUTPUTS

```
imn    integer*2    3D           mean value
isd    integer*2    3D           standard deviation
ict    integer*2    3D           total number of points

3D = nlon x nlat x nchn
```

EXTERNALS

```
hirs_grid.inc
iscale.f
```

LANGUAGE

```
Fortran
```

36. HIRS/grid_moment_cs2.f [Programs]

[Top] [Programs]

NAME

grid_moment_cs2.f

LOCATION

/crystal/san3/clearsky4/source/**grid_moment_cs2.f**

PURPOSE

Computes mean and standard deviation from summed arrays.

DESCRIPTION

Computes mean and standard deviation from summed arrays.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format
Jan 2004 - version 2, takes into account asc/des passes for clear-sky grid data

INPUTS

```
name     data type    dimension    description
-----------------------------------------------------------
nlon     integer      scalar       number of longitude points
nlat     integer      scalar       number of latitude points
sum      real         3D           summed value at given gridpoint
sumsq    real         3D           sum**2 value at given gridpoint.(float)
count    real         3D           total number of points.(Int*4)
```

OUTPUTS

```
imn      integer*2    3D           mean value
isd      integer*2    3D           standard deviation
ict      integer*2    3D           total number of points

3D = nlon x nlat x nchn
```

EXTERNALS

```
hirs_grid.inc
iscale.f
```

LANGUAGE

```
Fortran
```

37. HIRS/gridit.f [Programs]

[Top] [Programs]

NAME

gridit.f

LOCATION

/crystal/san3/clearsky4/source/**gridit.f**

PURPOSE

Read and grid HIRS scan line data for one day

DESCRIPTION

Read and grid HIRS scan line data for one day

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
day_file.........File name of daily clear-sky file
nolimb..........T -> no limb cor., F -> limb correction
rcoef...........Regression coefficient array
chnord..........Regression channel order array
npred...........Number of predictors array
nlon............number of longitude grid points
nlat............number of latitude grid points
nchn............number of channels
gres............grid resolution
```

OUTPUTS

```
sum.............sum of the TB values for each channel and gridpoint
sumsq...........sum squared of TB values
icnt............number of points.
```

EXTERNALS

```
hirs_grid.nc
binit.f
hlimb.f
```

LANGUAGE

Fortran

38. HIRS/hcloud.f [Programs]

[[Top](#)] [Programs]

NAME

hcloud.f

LOCATION

/crystal/san3/clearsky4/source/**hcloud.f**

PURPOSE

This program reads TOVS1B pixel and gridded data from hirs1c.f data
and applies spatial and time contrast tests for cloud detection.

DESCRIPTION

This program reads TOVS1B pixel and gridded data from hirs1c.f data
and applies spatial and time contrast tests for cloud detection.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format
Feb 2002 - Lei Shi, Include M02,M01,N18

INPUTS

(via hcloud.input)
isat -> Satellite number (2,5-17)
iyr4 -> 4 digit year
jday -> day of the year (1-366)
HIRS all-sky swath data (*.AS)

OUTPUTS

HIRS temporary clear-sky swath data (*.CS1)
Adds clear-sky statistics for temporary grid file (*.GRD)

EXTERNALS

(see README for description of these routines)
physical_constants.h
hirs1c.inc
open_read.f
get_grid_files.f
swap16.f
binit.f
spatial_contrast.f
time_contrast.f
daygrid.f

LANGUAGE

Fortran

39. HIRS/hcloud_lt.f [Programs]

[Top] [Programs]

NAME

hcloud_lt.f

LOCATION

/crystal/san3/clearsky4/source/**hcloud_lt.f**

PURPOSE

Performs second cloud test on the clear-sky data so to remove
regions of persistent cloud cover.

DESCRIPTION

Performs second cloud test on the clear-sky data so to remove
regions of persistent cloud cover.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format
Mar 2008 - Lei Shi, Include Metop (satellites before N5)

INPUTS

(via hcloud_lt.input)

```
    isat    ->  Satellite number
    jday    ->  julian day from jan 1, 1969
    Input files: TBC and CS1 data files
```

OUTPUTS

```
    Output files: CS data files
```

EXTERNALS

```
    (description given in README)
    julian69_to_date.f
    binit.f
```

LANGUAGE

```
    Fortran
```

40. HIRS/hcloudcomp.f [Programs]

[Top] [Programs]

NAME

hcloudcomp.f

LOCATION

`/crystal/san3/clearsky4/source/`**hcloudcomp.f**

PURPOSE

```
    Program produces a HIRS chn 8 IR clear-sky brightness temperature 5-day
    grid by using 5-, 15-, and 35-day composite grids.
```

DESCRIPTION

```
    Program produces a HIRS chn 8 IR clear-sky brightness temperature 5-day
    grid by using 5-, 15-, and 35-day composite grids.
```

AUTHOR

```
    Darren Jackson CIRES/ETL
```

CREATION DATE

```
    Apr 2002
```

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MODIFICATION HISTORY

```
Jan 2010 - D. Wunder put in robodoc format
Mar 2008 - Lei Shi, Include Metop
```

INPUTS

```
(via hcloudcomp.input)
isat  -> satellite number
jday  -> julian day from Jan 1, 1969
5-day, 15-day and 35-day *.GRD files
```

OUTPUTS

```
TBC* data files
```

EXTERNALS

```
hirs1c.inc
julian69_to_date.f
tb_clear.f
two_digit_year.f
```

LANGUAGE

```
Fortran
```

41. HIRS/hirs1c.f [Programs]

[Top] [Programs]

NAME

hirs1c.f

LOCATION

/crystal/san3/clearsky4/source/**hirs1c.f**

PURPOSE

```
Reads calibrated, geolocated brightness temperatures from ITPP or
AAPP orbit files, performs QC on TB data,  performs limb correction
on channel 8, and writes all-sky swath data file and grid statistics
for cloud detection.
```

DESCRIPTION

Reads calibrated, geolocated brightness temperatures from ITPP or
AAPP orbit files, performs QC on TB data, performs limb correction
on channel 8, and writes all-sky swath data file and grid statistics
for cloud detection.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
(via hirs1c.input file)
      nfiles          ->   (INT*4)     number of files to read
      orbnum(nfiles)  ->   (CHAR*7)    Orbit ID number for each file
      jday            ->   (INT*4)     julian day (day of year 1-366)
      iyr             ->   (INT*4)     two digit year
      isat            ->   (INT*4)     satellite number (5=TIROS-N,6=NOAA-6,etc.)
```

OUTPUTS

1. pixel level data of cloud-free/limb corrected HIRS data
2. daily grid files of TB max/Vis refl min
3. Orbit statistics data for all-sky data

EXTERNALS

```
(see README for description of their function)
aapp1c.inc
hirs1c.inc
init_grid.f
daygrid.f
open_qc.f
qc_histo.f
open_regcoef.f
open_hirs.f
horb.f
unpack_hirs.f
hqc.f
hlimb1c.f
daygrid.f
open_asd.f
moment.f
maxmin_vec.f
```

NOTES

1. Could compute orbit statistics but currently turned off.
2. I may want to reproduce the orbit statistics files since one of the columns
   indicating missing/erroneous data always indicates 3000-4000 bad data
   points per orbit. This is due to counting the calibration orbits as bad data.

LANGUAGE

    Fortran

42. HIRS/hirs_grid_cs.f [Programs]

[Top] [Programs]

NAME

    hirs_grid_cs.f

LOCATION

    /crystal/san3/clearsky4/source/**hirs_grid_cs.f**

PURPOSE

    Reads HIRS Ver2.2 clear-sky scan line files and constructs grid files.

DESCRIPTION

    Reads HIRS Ver2.2 clear-sky scan line files and constructs grid files.

AUTHOR

    Darren Jackson CIRES/ETL

CREATION DATE

    Apr 2002

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MODIFICATION HISTORY

    Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
(via HIRS GRID CS.input):
  jday......Julian day
  iyr4......4 digit Year (ie. 1980)
  id........1-daily average,2-pentad average,3-monthly average
  isat......NOAA satellite id (4=ALL,5=TN,6=NOAA-6,etc)
  nolimb....T - no limb correction
            F - limb correction for chns 1-12, no correction for chns 13-20

  Input Data
  Daily scan line data files are raw binary files (direct access).
  Daily input files must have following name convention:
      (instrument.satellite.year.Dxxx.V22.CS)
  Examples
      HIRS scan line data for NOAA7 for 360 day of 1982 - HIRS.NO7.82.D360.V22.CS
```

OUTPUTS

```
Data:
  This program outputs INTEGER*2 scaled and offset values of the
  mean, standard deviation and total # of points.  The scale and offset
  can be adjusted in file hirs_grid.inc.  These three variables are outputed
  to separate files each having record length = nlon*nlat*nchn*2.

  Grid files with name convention:
      (instrument.satellite.year.averaging period.resolution.data_type.statistic)
  Examples
   1980 HIRS 0.5 degree means for NOAA6 for pentad 2 ->
                                            HIRS.N06.80.P02.R05.CS.MN
   1992 HIRS 2.5 degree std for NOAA12 for february ->
                                            HIRS.N12.92.M02.R25.CS.SD
```

EXTERNALS

```
hirs_grid.inc
datapaths.inc
julian2.f
open_regcoef.f
gridit.f
grid_moment_cs.f
write_gridstat.f
two_digit_year.f
```

LANGUAGE

```
Fortran
```

43. HIRS/hirs_grid_cs2.f [Programs]

[Top] [Programs]

NAME

hirs_grid_cs2.f

LOCATION

/crystal/san3/clearsky4/source/**hirs_grid_cs2.f**

PURPOSE

Reads HIRS clear-sky swath files and constructs the grid files.
Writes observation times for each grid box.
Writes grids for ascending/descending nodes.

DESCRIPTION

Reads HIRS clear-sky swath files and constructs the grid files.
Writes observation times for each grid box.
Writes grids for ascending/descending nodes.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format
Jan 2004 - Adapted from hirs_grid_ch4.f
Jan 2004 - Version 2, adds ability for grids of asc/des nodes

INPUTS

```
(via hirs_grid_ch4.input):
  jday...... Julian day
  iyr4...... 4 digit Year (ie. 1980)
  id........ 1-daily average,2-pentad average,3-monthly average
  isat...... NOAA satellite id (4=ALL,5=TN,6=NOAA-6,etc)
  iparm..... Parameter type
              1  = cloud top pressure (mb)
              2  = cloud top temperature (K)
              3  = effective emissivity
              4  = Tb channel 4 (K)
              5  = Tb channel 5 (K)
              6  = Tb channel 6 (K)
              7  = Tb channel 7 (K)
              8  = Tb channel 8 (K)
              10 = Tb channel 10 (K)
              12 = Tb channel 12 (K)
              20 = Surface temperature (K)
              24 = Rclr-Rcld channel 4
              25 = Rclr-Rcld channel 5
              26 = Rclr-Rcld channel 6
              27 = Rclr-Rcld channel 7
              30 = total cloud frequency (%)
              31 = high cloud frequency (%)
  angle..... cosine of scan angle (10=1.0-0.95, 09=0.95-0.85,
                              08=0.85-0.75,07=0.75-0.65)
  s_range... start and end scan spots away from nadir (1-28)
```

```
        Input File
                *.CS clear-sky swath files
        Daily input files must have following name convention:
                (instrument.satellite.year.day.CS)
```

OUTPUTS

```
        This program outputs INTEGER*2 scaled and offset values of the
        mean, standard deviation and total # of points.  The scale and offset
        can be adjusted in file msu.inc.  These three variables are outputed
        to separate files each having record length = nlon*nlat*nparm*2.

        Statistic name table:   Txx = HIRS channel x (x=4-8,10,12)
                                CP  = Cloud top pressure
                                CT  = Cloud top temperature
                                EM  = effective emissivity
                                TS  = surface temperature from NCEP Reanalysis
                                DRx = Rclr-Rcld signal (x=4-7)
                                FR  = Cloud frequency

        Grid files with name convention:
            instrument.satellite.year.averaging period.resolution.
                    .<file angle> or <spot range>.CH parameter.node.statistic.
                    .clear/cloudy data (CS or AS)
        Examples
         1980 HIRS 0.5 degree emissivity pentad 2 average for NOAA6, angle 1.0-0.95
           and 6Z  -> HIRS.N06.Y80.P02.R05.06Z.A10.EM.A.MN.CS
         1983 HIRS 1.0 degreee descend nodes only
                    HIRS.N08.Y83.M12.R10.S02.T04.D.SD.CS
```

EXTERNALS

```
        hirs_grid.inc
        datapath.inc
        julian2.f
        grid_cs2.f
        grid_moment_cs2.f
        write_gridstat5.f
        two_digit_year.f
```

LANGUAGE

```
        Fortran
```

44. HIRS/hlimb.f [Programs]

[Top] [Programs]

NAME

hlimb.f

LOCATION

/crystal/san3/clearsky4/source/**hlimb.f**

PURPOSE

```
    Routine uses multiple regession to compute limb corrected Tbs for HIRS
    channels.  Uses regression coefficients derived from hirs_limb_coef2.pro.
```

DESCRIPTION

    Routine uses multiple regession to compute limb corrected Tbs for HIRS
    channels. Uses regression coefficients derived from hirs_limb_coef2.pro.

AUTHOR

    unk

CREATION DATE

    unk

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    TO USERS.

MODIFICATION HISTORY

    Jan 2010 - D. Wunder put in robodoc format

INPUTS

    isp(nspot)................HIRS scan position (1-56)
    alt(nspot)................altitude
    bad(nspot)................Bad values
    rcoef(ncoef,nang,nchn2)...regression coefficients
    chnord(ncoef-1,nang,nchn2)..Channel number for coefficients
    npred(nang,nchn2)...........Number of predictors
    tb(nspot,nchn).....HIRS Tbs for all HIRS channels

OUTPUTS

    tblc(nspot,nchn)....HIRS limb corrected Tbs

LANGUAGE

    Fortran

45. HIRS/hlimb1c.f [Programs]

 [Top] [Programs]

NAME

    hlimb1c.f

LOCATION

/crystal/san3/clearsky4/source/**hlimb1c.f**

PURPOSE

Routine uses multiple regession to compute limb corrected Tbs for HIRS
channel 8. Uses regression coefficients derived from IDL procedure
hirs_limb_coef5.pro.

DESCRIPTION

Routine uses multiple regession to compute limb corrected Tbs for HIRS
channels. Uses regression coefficients derived from hirs_limb_coef2.pro.

AUTHOR

unk

CREATION DATE

unk

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
isp(nspot)...............HIRS scan position (1-56)
alt(nspot)...............altitude
lz(nspot)................local zenith angle
bad(nspot)...............Bad values
rcoef(ncoef,nang,nchn2)...regression coefficients
chnord(ncoef-1,nang,nchn2)..Channel number for coefficients
npred(nang,nchn2)...........Number of predictors
tb(nspot,nchn).....HIRS Tbs for all HIRS channels
```

OUTPUTS

```
tblc(nspot,1)....HIRS limb corrected Tb for HIRS channel 8
```

LANGUAGE

Fortran

46. HIRS/horb.f [Programs]

[[Top](#)] [Programs]

NAME

horb.f

LOCATION

/crystal/san3/clearsky4/source/**horb.f**

PURPOSE

Quality control subroutine for the HIRS scan line data. Uses statistics
derived from the orbit mean files to assess the quality of the data
from the given orbit.

DESCRIPTION

Quality control subroutine for the HIRS scan line data. Uses statistics
derived from the orbit mean files to assess the quality of the data
from the given orbit.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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TO USERS.

MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
head(trec)....................header record (int)
ioq...........................file number
qcmn(nchn,nsat,nyr,nmon).......mean value
qcsd(nchn,nsat,nyr,nmon).......standard deviation
qcct(nchn,nsat,nyr,nmon).......number of orbits
```

OUTPUTS

```
oqc...........................orbit quality control flag (byte)
                    = 0 to 40 with 0 being best data and 40 the worst.
                      Weight is applied to each channel.
                          0 ->   inside 1 std
                          1 ->   2 std > x > 1 std
                          2 ->    > 2 std
                    = 99 ->   No log file found
                    = 98 ->   No match orbit statistics in log file
                    = 97 ->   No monthly mean statistics computed
```

NOTES

Currently not used in processing code for version 2.2

LANGUAGE

Fortran

47. HIRS/hqc.f [Programs]

[Top] [Programs]

NAME

hqc.f

LOCATION

/crystal/san3/clearsky4/source/**hqc.f**

PURPOSE

Quality control subroutine for the HIRS scan line data

DESCRIPTION

Quality control subroutine for the HIRS scan line data

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
name      data type  dimension           description
-------------------------------------------------------------
time      real       1D (nspot)          GMT time in seconds from midnight
xlon      real       1D (nspot)          longitude in degrees
xlat      real       1D (nspot)          latitude in degrees
alt       real       1D (nspot)          altitude in km
lz        real       1D (nspot)          local zenith angle in degrees
line      integer    1D (nspot)          line number
isp       integer    1D (nspot)          scan position
tb        real       2D (nspot x nchn2)  brightness temperatures
```

OUTPUTS

```
bad     logical    1D (nspot)          bad pixel flag (T = bad pixel)
```

EXTERNALS

hirs1c.inc

NOTES

```
Tests the following QC problems.
Gross errors in latitude and time field.
Compute time in seconds from beginning of year.
HIRS12 test added to remove data from 3rd calibration line.
Altitude test added after finding missing values in TIROS-N data
Missing data for channels 1,4 but not 5 removes 1st calibration line.
HIRS8 test for excessively warm value
```

LANGUAGE

Fortran

48. HIRS/init_grid.f [Programs]

[Top] [Programs]

NAME

init_grid.f

LOCATION

/crystal/san3/clearsky4/source/**init_grid.f**

PURPOSE

    Initialize max/mean/min grid for cloud clearing

DESCRIPTION

    Initialize max/mean/min grid for cloud clearing

AUTHOR

    unk

CREATION DATE

    unk

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MODIFICATION HISTORY

    Jan 2010 - D. Wunder put in robodoc format

INPUTS

    grid(nlon,nlat,ntim,as)......Initialize this grid.
                        (1).......chn 8 Max grid initialized to -999
                        (2).......chn 8 sum grid set to 0
                        (3).......chn 8 count grid set to 0
                        (4).......chn 20 min grid set to 999

OUTPUTS

    grid(nlon,nlat,ntim,as)......Initialize this grid.
                        (1).......chn 8 Max grid initialized to -999
                        (2).......chn 8 sum grid set to 0
                        (3).......chn 8 count grid set to 0
                        (4).......chn 20 min grid set to 999

LANGUAGE

    Fortran

49. HIRS/julian69_to_date.f [Programs]

[Top] [Programs]

NAME

julian69_to_date.f

LOCATION

/crystal/san3/clearsky4/source/**julian69_to_date.f**

PURPOSE

Computes the year, month and day given the a julian date that starts on 1/1/69.

DESCRIPTION

Computes the year, month and day given the a julian date that starts on 1/1/69.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
outtype                 1 = returns day of year, 2 = returns month and day
julian69                julian day starting from 1/1/69
```

OUTPUTS

```
year                    4 digit year
month                   month number; 1 if outtype = 1
iday                    day of month; day of year if outtype = 1
```

LANGUAGE

Fortran

50. HIRS/multi_day_grid.f [Programs]

[ ] [Programs]

NAME

multi_day_grid.f

LOCATION

/crystal/san3/clearsky4/source/**multi_day_grid.f**

PURPOSE

Combines the daily max TB grids into longer time periods.

DESCRIPTION

Combines the daily max TB grids into longer time periods.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format
Mar 2008 - Lei Shi, Added M01-02 (sats before N5)

INPUTS

(via multi_day grid.input)
period.......period of output grid (5, 15 or 30)
bday.........beginning julian69 day
eday.........end julian69 day
isat.........satellite id (number)
Input Data: daily *.GRD files

OUTPUTS

Writes new multi-day grid file for 5-, 15- or 35-day period (*.GRD)

EXTERNALS

```
hirs1c.inc
init_grid.f
julian69_to_date.f
two_digit_year.f
```

LANGUAGE

```
Fortran
```

51. HIRS/nodalpass.f [Programs]

[Top] [Programs]

NAME

nodalpass.f

LOCATION

`/crystal/san3/clearsky4/source/`**nodalpass.f**

PURPOSE

```
Determines from HIRS scan line data if observations are from ascending
or descending pass.
```

DESCRIPTION

```
Determines from HIRS scan line data if observations are from ascending
or descending pass.
```

AUTHOR

```
Darren Jackson CIRES/ETL
```

CREATION DATE

```
Mar 2001
```

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MODIFICATION HISTORY

```
Jan 2010 - D. Wunder put in robodoc format
Jan 2003 - D. Jackson, Repaired test for observations straddling GM
```

INPUTS

```
itime.............time in seconds from start of day
xlon..............longitude( 0 to 360)
iline.............line number
nd................Nodal index from previous observation (1 or 2)
prvtime...........previous pixel time stamp
prvlon............previous pixel longitude
prvline...........previous line number
prvnd.............previous node index
```

OUTPUTS

```
nd ............. 1 = ascending, 2 = descending
```

NOTES

```
 - This code assumes that the input nodal index
   is correct value from the previous observation.  The node is
   assumed to remain the same until this code changes it.
 - Longitude test will allow a very small number of observations
   slip through with the wrong nodal index.  This will work if
   fine if working with large number of data.
```

LANGUAGE

```
Fortran
```

52. HIRS/open_asd.f [Programs]

[Top] [Programs]

NAME

open_asd.f

LOCATION

/crystal/san3/clearsky4/source/**open_asd.f**

PURPOSE

This routine opens output files for hirs1c.f

DESCRIPTION

This routine opens output files for hirs1c.f

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Mar 2001

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
iog..........file number for max/min grid files (int)
ion..........file number for temporary scan line file (int)
satid........satellite character id (character*3)
iyr2.........two digit year (int)
jday.........julian day (int)
```

OUTPUTS

Opens files for hirs1c.f

EXTERNALS

```
hirs1c.inc
recl_parms.inc
julian2.f
```

LANGUAGE

Fortran

53. HIRS/open_hirs.f [Programs]

[[Top](#)] [Programs]

NAME

open_hirs.f

LOCATION

/crystal/san3/clearsky4/source/**open_hirs.f**

PURPOSE

Opens HIRS data files from ITPP output

DESCRIPTION

Opens HIRS data files from ITPP output

AUTHOR

unk

CREATION DATE

unk

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
isat...........satellite number
iou............file number for the input HIRS data files from ITPP
k..............orbit index number (beginning at 1) for the input ITPP data files.
```

OUTPUTS

Opens ITPP HIRS data file

LANGUAGE

Fortran

54. HIRS/open_read.f [Programs]

[Top] [Programs]

NAME

open_read.f

LOCATION

/crystal/san3/clearsky4/source/**open_read.f**

PURPOSE

This routine opens output files for <u>hcloud.f</u>

DESCRIPTION

This routine opens output files for <u>hcloud.f</u>

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
iom..........file number for land mask file for time constrast test
ion..........file numbers for temp. scan line file (int)
iog(3).......file number for max/min grid files (int)
iof..........file number for final scan line output file
ioh..........file number of error messages
iol..........file number for land mask file for space constrast test
satid........satellite character id (character*3)
iyr4.........4 digit year (int)
jday.........julian day (int)
ierr.........error status 0 -> no errors
                   1 -> scan line file does not exist
                   2 -> grid file for -1 day does not exist
                   3 -> grid file for 0 day does not exist
                   4 -> grid file for +1 day does not exist
```

OUTPUTS

Opens output files for <u>hcloud.f</u>

EXTERNALS

```
hirs1c.inc
recl_parms.inc
date_to_julian69.f
julian69_to_date.f
```

LANGUAGE

Fortran

55. HIRS/open_regcoef.f [Programs]

[Top] [Programs]

NAME

open_regcoef.f

LOCATION

/crystal/san3/clearsky4/source/**open_regcoef.f**

PURPOSE

```
Opens and reads HIRS limb regression coefficients for computed from
IDL procedure hirs_limb_coef5.pro.  These regression coefficients
do not use the HIRS 13-19 channels are predictors for regression.
```

DESCRIPTION

```
Opens and reads HIRS limb regression coefficients for computed from
IDL procedure hirs_limb_coef5.pro.  These regression coefficients
do not use the HIRS 13-19 channels are predictors for regression.
```

AUTHOR

Darren Jackson

CREATION DATE

Nov 2004

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```

MODIFICATION HISTORY

```
Jan 2010 - D. Wunder put in robodoc format
Feb 2008 - Changed 'hirs_limb_..._n' to 'hirs_limb_..._m' for Mrtop
```

INPUTS

```
iok..........Regression coefficient files
isat.........Satellite number
chnord.......Regression channel order array
npred........Number of predictors
```

OUTPUTS

```
rcoef.......Regression coefficient array
```

LANGUAGE

```
Fortran
```

56. HIRS/qc_histo.f [Programs]

[[Top](#)] [Programs]

NAME

qc_histo.f

LOCATION

/crystal/san3/clearsky4/source/**qc_histo.f**

PURPOSE

Reads statistics file derived from the orbit mean statistics data.

DESCRIPTION

Reads statistics file derived from the orbit mean statistics data.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
name     data type    dimension    description
---------------------------------------------
iom      integer      scalar       file number for HIRS histogram stat file
```

OUTPUTS

```
name     data type    dimension    description
---------------------------------------------
qcmn     integer      4D           mean values
qcsd     integer      4D           standard deviation values
qcct     integer      4D           total number of observations
```

NOTES

1. Not used in current version (ver 2.2) of processing code
2. These data were computed using IDL procedure *.pro. These data
   are used later in routine horb.f to determine whether the current
   data being processed are exceptable.

LANGUAGE

Fortran

57. HIRS/spatial_contrast.f [Programs]

[Top] [Programs]

NAME

spatial_contrast.f

LOCATION

/crystal/san3/clearsky4/source/**spatial_contrast.f**

PURPOSE

Determines if given HIRS pixel is cloudy or undecided using HIRS
IR surface channel using spatial contrast test. See Rossow and
Gardner (1993,JClim).

DESCRIPTION

Determines if given HIRS pixel is cloudy or undecided using HIRS
IR surface channel using spatial contrast test. See Rossow and
Gardner (1993,JClim).

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
pixel  -> HIRS8 brightness temperature (K)
chn    -> HIRS channel
ii     -> longitude index corresponding to pixel
jj     -> latitude index corresponding to pixel
lmask  -> land mask array of dimension nlon x nlat
          2=coastal,1=land,0=ocean
region -> gridded max TB values
```

OUTPUTS

space : 0 -> cloudy, 1 -> undecided, 2 -> coastal region

EXTERNALS

hirs1c.inc
qmax_r.f

LANGUAGE

Fortran

58. HIRS/tb_clear.f [Programs]

[Top] [Programs]

NAME

tb_clear.f

LOCATION

/crystal/san3/clearsky4/source/**tb_clear.f**

PURPOSE

Test used to determine HIRS-8 TB clear-sky value from composite grids.
Performs long-term cloud test for Pathfinder cloud detection.

DESCRIPTION

Test used to determine HIRS-8 TB clear-sky value from composite grids.
Performs long-term cloud test for Pathfinder cloud detection.

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

Apr 2002

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
name       data type  description
-----------------------------------------------------
lmask      byte       land mask id (2=coastal,1=land,0=water)
nclrst     real       # clear short-term clear-sky obs.
nclrlt     real       # clear long-term clear-sky obs.
tavgst     real       Average clear-sky short-term temperature
tavglt     real       Average clear-sky long-term temperature
tmaxst     real       Maximum clear-sky short-term temperature
tmaxlt     real       Maximum clear-sky long-term temperature
```

OUTPUTS

```
tbclear real       Gives clear-sky temperature using composite statistics
tbid    int*2      Gives method used to arrive at clear-sky temperature
                   4 -> Tavg-st
```

```
                        3 -> Tmax-st - Del2
                        2 -> Tavg-lt
                        1 -> Tmax-lt - Del3
```

NOTES

```
Typically the short term statistics (tbid = 4,3) when persistent clouds not
an issue.  Long-term statistics are needed for the persistent cloud regions.
Del2 or Del3 are used for samples with relatively few observations.
```

LANGUAGE

```
Fortran
```

59. HIRS/time_constrast.f [Programs]

[Top] [Programs]

NAME

time_constrast.f

LOCATION

/crystal/san3/clearsky4/source/**time_constrast.f**

PURPOSE

```
Applies time constrast test to specified pixel.  Uses HIRS IR surface
channel information.  Compares previous and next day grid to current
observations.  See Rossow and Garder (1993, JClim).
```

DESCRIPTION

```
Applies time constrast test to specified pixel.  Uses HIRS IR surface
channel information.  Compares previous and next day grid to current
observations.  See Rossow and Garder (1993, JClim).
```

AUTHOR

```
Darren Jackson CIRES/ETL
```

CREATION DATE

```
Apr 2002
```

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       TO USERS.

MODIFICATION HISTORY

       Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
name      data type  description
----------------------------------------------------------
pixel     real       Brightness temperature of observation (K)
ichn      integer    HIRS channel number
lmask2    byte       land/sea designation (2=coastal,1=land,0=ocean)
tb_time   real       Max. Brightness temperatures from grid
                     for previous,current, and next day
```

OUTPUTS

       time: 0 -> cloudy, 1 -> undecided, 2 -> mixed, 3 -> clear

EXTERNALS

       hirs1c.inc

LANGUAGE

       Fortran

60. HIRS/unpack_hirs.f [Programs]

   [Top] [Programs]

NAME

   unpack_hirs.f

LOCATION

   /crystal/san3/clearsky4/source/**unpack_hirs.f**

PURPOSE

   unpacks itpp tovprw5_h data information for one MSU scan line

DESCRIPTION

   unpacks itpp tovprw5_h data information for one MSU scan line

AUTHOR

   unk

CREATION DATE

unk

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
l........................block number            (int*4)
isat.....................satellite number        (int*4)
iou......................file number index       (int*4)
```

OUTPUTS

```
xlat(nspot)..............latitude (-90 to 90)     (float)
xlon(nspot)..............longitude (0 to 359.99)  (float)
ispot(nspot).............scan position            (int*4)
line(nspot)..............line number              (int*4)
iyr(nspot)...............year-1900                (int*4)
idy(nspot)...............julian day               (int*4)
time(nspot)..............seconds in the day       (float)
tb(nspot,nchn)...........TBs                      (float)
szen(nspot)..............solar zenith angle (degrees) (float)
lz(nspot)................local zenith angle (degrees) (float)
alt(nspot)...............altitude (km)            (float)
refl(nspot)..............reflectance (HIRS/2 only) (float)
```

LANGUAGE

Fortran

61. HIRS/write_gridstat.f [Programs]

[Top] [Programs]

NAME

write_gridstat.f

LOCATION

/crystal/san3/clearsky4/source/**write_gridstat.f**

PURPOSE

Writes gridded output files

DESCRIPTION

Writes gridded output files

AUTHOR

unk

CREATION DATE

unk

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

```
nlat...................number of latitude points
nlon...................number of longitude points
nchn...................number of channels (if nchn = 8, assume CM data
                         if nchn < 8 assume CH data)
id.....................desired averaging period (int*4)
                         1-daily,2-pentad,3-monthly
ires...................resolution
                         1-0.5, 2-1.0, 3-2.0, 4-2.5
satid..................satellite id (int*4)
iyr....................year-1900 (int*4)
jday...................julian day (int*4)
imn(nlon,nlat,nchn)....TB mean (int*2)
isd(nlon,nlat,nchn)....Standard deviation (int*2)
ct(nlon,nlat,nchn).....counts (int*2)
gmt....................Time of observation for CH files (int*4)
angle..................Angle of observation for CH files (ch*2)
```

OUTPUTS

```
writes desired grid files.  This program assumes for
pentad and monthly mean data that jday is the final day of the
specified period.  I have hard coded in the removal of grid boxes
poleward of 70 degrees.
```

LANGUAGE

Fortran

62. HIRS/write_gridstat5.f [Programs]

[[Top](#)] [Programs]

NAME

write_gridstat5.f

LOCATION

/crystal/san3/clearsky4/source/**write_gridstat5.f**

PURPOSE

Writes gridded output files with asc/des node information

DESCRIPTION

Writes gridded output files with asc/des node information

AUTHOR

Darren Jackson CIRES/ETL

CREATION DATE

January 2003

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TO USERS.

MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format
Jan 2004 - version 5, adapted from write_gridstat4.f, gmt has been removed as argument

INPUTS

```
nlat..................number of latitude points
nlon..................number of longitude points
max_cnt...............Maximum number of Obs. for time array
id....................desired averaging period (int*4)
                       1-daily,2-pentad,3-monthly
ires..................resolution
                       1-0.5, 2-1.0, 3-2.0, 4-2.5
iparm
s_range
satid..............satellite id (int*4)
```

```
iyr....................year-1900 (int*4)
jday...................julian day (int*4)
imn(nlon,nlat,node)....TB mean (int*2)
isd(nlon,nlat,node)....Standard deviation (int*2)
ct(nlon,nlat,node).....counts (int*2)
obs_time(nlon,nlat,max_cnt,node)...Observation time grid array
```

OUTPUTS

```
writes desired grid files.  This program assumes for
pentad and monthly mean data that jday is the final day of the
specified period.  I have hard coded in the removal of grid boxes
poleward of 70 degrees.
```

LANGUAGE

```
Fortran
```

63. HIRS/iscale.f [Functions]

[Top] [Functions]

NAME

iscale.f

LOCATION

/crystal/san3/clearsky4/source/**iscale.f**

PURPOSE

```
Makes integer*2 value from real.
```

DESCRIPTION

```
Makes integer*2 value from real.
```

AUTHOR

```
unk
```

CREATION DATE

```
unk
```

COPYRIGHT

```
    TO USERS.
```

MODIFICATION HISTORY

```
    Jan 2010 - D. Wunder put in robodoc format
```

INPUTS

```
    x....................value to be scaled and offset (float)
    offset...............offset factor
    sfactor..............scale factor
```

OUTPUTS

```
    iscale...............scaled value (int*2)
```

LANGUAGE

```
    Fortran
```

64. HIRS/lza.f [Functions]

[ ] [Functions]

NAME

lza.f

LOCATION

/crystal/san3/clearsky4/source/**lza.f**

PURPOSE

```
    Computes local zenith angle for HIRS observation
```

DESCRIPTION

```
    Computes local zenith angle for HIRS observation
```

AUTHOR

```
    Darren Jackson CIRES/ETL
```

CREATION DATE

```
    Apr 2002
```

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MODIFICATION HISTORY

Jan 2010 - D. Wunder put in robodoc format

INPUTS

alt.......Altitude in km
isp.......HIRS scan position (1-56)

OUTPUTS

local zenith angle in degrees

LANGUAGE

Fortran