

# HIRDLS

SW-HIR-2024

## HIGH RESOLUTION DYNAMICS LIMB SOUNDER

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Subject/Title: **General Development strategy and notes on running jobs.**

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Description/Summary/Contents

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Keywords:

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Purpose of this Document:

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## General Development Strategy

- 1) **Development** – Code changes, incorporate new/modified routines from scientists, update compilers and/or mkl library, update to latest Toolkit. I would try to group all of the non-answer changes into one Build and answer-changing into another.
- 2) **Testing** – I would usually just run a simple one orbit test to check my changes quickly.
- 3) **Checkin to StarTeam (Buildxxx)**- Check all changes into StarTeam and create a Build label
- 4) **Run regression testing** – Run all regression tests and compare against previous release. For GPH changes, I have run just a couple of tests by hand since the scope of GPH is limited to the BOP module. For non-answer changing, the results should compare exactly. Answer changing changes require a more detailed analysis. This can be either comparing a run with a run that the scientist made offline or requesting that the scientist view the results and signoff on the run(s).
- 5) **Repeat steps 1-4 until all tests work properly** – There could be several Build labels created before a SIPS delivery is made.
- 6) **Create SIPS Delivery label (Vxx.xx.xx)**
- 7) **Email SIPS and all HIRDLS users about new release**

## **RUNNING JOBS**

**bin/run\_build** - To run L2 in a testing mode in the SCF, use the bin/run\_build command. Its details are documented in bin/run\_build.doc. It calls the rl2 script listed below.

**bin/rl2** - Jobs run in both the SCF and SIPS environments use the rl2 command to translate information from the USF (user setup file) to the CFG (config) and PCF (process control file used by the Toolkit) and it then runs the L2 processor. The SCF or SIPS user should only need to modify the values in the USF. Developers may need to add additional fields to the USF file to allow new fields to be set in the CFG or PCF. Generic CFG and PCF "mask" files are used by rl2, values are overwritten as specified in the USF and new CFG and PCF files are created for use in the run. A separate USF is used for each of the main L2 steps (CLG, RTP/SIM and BOP). Both CLG and BOP can be run with only one thread. RTP and SIM can be run with multiple threads. Threads are enabled by the script calling separate standalone L2 jobs and then merging the output file(s) together at the end. Neither MPI nor OpenMP are used or required to be on the system.

**data/regRuns** – "regRuns Buildxxx Buildyyy" - This script submits the suite of regression tests using Buildxxx. If Buildyyy is supplied then the results are automatically compared to this Build. No changes need to be made by hand to any of these scripts except possibly updating to a newer Toolkit.

## **HIRDLS PROCESSOR SUBDIRECTORIES/MODULES SUMMARY**

**H2** – Module used by the entire L2 processor. Contains type definitions as well as overloaded general purpose routines and parameters.

**H2BOP** – “Build Output” – Converts a HIRPROF (HIRDLS profiles on altitude grid) to HIRDLS2ALL (HIRDLS profiles on pressure grid)

**H2C** – C routine which performs a UNIX system call

**H2CLP** – “Collocate” – Part of CLG step – Creates time/lat/long collocated climatology and apriori files from gridded input files

**H2GMC** – “GMAO Collocator” – Part of CLG step – Creates time/lat/long collocated GMAO file from gridded GMAO input data

**H2LSP** – “Line of Sight” – Called by RTP step – Creates profiles along the line of sight and includes the requested observation profile in the middle. This could be either climatology, model, GMAO or a previously retrieved HIRPROF profile.

**H2LWP** – “Line of sight weighting” – Part of CLG step – Finds the weighting profiles for each point along the line of sight for every profile in the HIRRAD file. Creates the weighting file (H2LSGW)

**H2MET** – “Metadata” – HIRDLS files archived at the Goddard DISC require specific metadata to be attached to the files. This module creates that metadata.

**H2ROE** – science retrieval routine – calls the following modules H2RAL, H2RBA, H2RLD, H2RMA, H2RRC, H2RRN, H2RRT, H2RSS, H2RSU, H2RWF – the specifics of these routines will be described in another document.

**H2RTP** – “Retrieval wrapper” – The module which handles the I/O for the science retrieval routines

**MERGE** – Standalone routines which run outside of L2. Routines provided to merge HIRPROF and HIRRAD. The HIRRAD merging is used for HIRRDSIM and HIRRDSYN files.

**SWATH** – “Swath routines” – Routines to handle reading/writing of HDF-EOS5 Swath formatted files. Uses definition files to drive the specific fields which are read/written. Also can be driven by PROFILEIDs.

## **USF FILES – General info**

%XXXX% are strings which are substituted within SIPS. These strings should not be removed.

# indicates a comment

Fields which are routinely changed during SCF development are highlighted. Any field may be changed though. Use of the run\_build script changes a number of fields which would need to be changed by hand.

*Italicized descriptions are comments that are added for this document and do not appear in the USF files*

## USF FILES – CLG step

TOOLKIT = /usr/local/TOOLKIT5.2.17n *Identifies toolkit (must match the toolkit used in the compilation step as well as the one named in rl2)*

RUNCLP = .true. *Runs CLP section*

RUNGMC = .true. *Runs GMC section*

RUNLWP = .true. *Runs LWP section*

RTPRARLoop01 = " *Blank string indicates to not run RTP section*

RUNBOP = .false. *Does not run BOP section*

RUNTAG = TESTX *Tag identified – substituted with –t flag in run\_build, PGE version in SIPS*

EXEC = time ./H2Main *execute command*

#DEBUGXEXEC = totalview ./H2Main\_debug *#DEBUG is removed in run\_build if –d is specified*

# NUMBER OF PROCESSORS

NTHREADS = 1 *May only run one thread for CLG step*

RUNSCRIPT= l2.ksh *Name of run script – don't change*

# OUTPUT CAPTURED SCREEN FILE

SCREENOUT= level2-%FULLJOBID%.out *Name of file where screen output is redirected*

# RUN SUPPORT FILES

HIR2CFG\_MASK = %DATA%/HIR2CFG-Mask.txt *Name of mask configuration file*

HIR2PCF\_MASK = %DATA%/HIR2PCF-Mask.txt *Name of mask PCF file*

HIR2CFG = HIR2CFG-%FULLJOBID%.txt *Name of final (substituted) configuration file*

HIR2PCF = HIR2PCF-%FULLJOBID%.txt *Name of final (substituted) PCF file*

# INPUT FILES

HIRRAD = /sips/prod/web/nls/HIRRAD/2006/05/18/00/HIRRAD\_v05-00-00-c01\_2006d138.he5

# If GEOS72 is true, then GEOS5 must also be true!!!

GEOS5 = .true. *If true, use GMAO5. If false, use GMAO4*

GEOS72 = .true. *If true, use 72 level GMAO. If false, use 36 level GMAO*

GEOS72aFILES =  
/sips/prod/web/nls/D5HIRDL4v10/2006/05/18/D5HIRDL4.ops.asm.tavg3d\_dyn\_v.GEOS510.20060518\_0000.V01c1.hdf,/sips/prod/web/nls/D5HIRDL4v10/2006/05/18/D5HIRDL4.ops.asm.tavg3d\_dyn\_v.GEOS510.20060518\_0600.V01c1.hdf,/sips/prod/web/nls/D5HIRDL4v10/2006/05/18/D5HIRDL4.ops.asm.tavg3d\_dyn\_v.GEOS510.20060518\_100.V01c1.hdf,/sips/prod/web/nls/D5HIRDL4v10/2006/05/18/D5HIRDL4.ops.asm.tavg3d\_dyn\_v.GEOS510.2006051\_1800.V01c1.hdf,/sips/prod/web/nls/D5HIRDL4v10/2006/05/19/D5HIRDL4.ops.asm.tavg3d\_dyn\_v.GEOS510.2006519\_0000.V01-c1.hdf

GEOS72bFILES =  
/sips/prod/web/nls/D5HIRDL6v10/2006/05/18/D5HIRDL6.ops.asm.tavg3d\_dyn\_v.GEOS510.20060518\_0000.V01c01.hdf,/sips/prod/web/nls/D5HIRDL6v10/2006/05/18/D5HIRDL6.ops.asm.tavg3d\_dyn\_v.GEOS510.20060518\_0600.V01c01.hdf,/sips/prod/web/nls/D5HIRDL6v10/2006/05/18/D5HIRDL6.ops.asm.tavg3d\_dyn\_v.GEOS510.20060518\_1200.V01c01.hdf,/sips/prod/web/nls/D5HIRDL6v10/2006/05/18/D5HIRDL6.ops.asm.tavg3d\_dyn\_v.GEOS510.20060518\_1800.V01c01.hdf,/sips/prod/web/nls/D5HIRDL6v10/2006/05/19/D5HIRDL6.ops.asm.tavg3d\_dyn\_v.GEOS510.20060519\_0000.V01-c01.hdf

HIR2CLIM = DATECHOICE *rl2 script selects correct file based on date in HIRRAD*  
1993-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2004/HIR2CLIM-BCK-v5.he5  
2005-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2005/HIR2CLIM-BCK-v5.he5  
2006-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2006/HIR2CLIM-BCK-v5.he5  
2007-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2007/HIR2CLIM-BCK-v5.he5  
2008-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2008/HIR2CLIM-BCK-v5.he5  
ENDCHOICE

HIR2APR = DATECHOICE *rl2 script selects correct file based on date in HIRRAD*  
1993-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2004/HIR2APR-BCK-v5.he5  
2005-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2005/HIR2APR-BCK-v5.he5  
2006-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2006/HIR2APR-BCK-v5.he5  
2007-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2007/HIR2APR-BCK-v5.he5  
2008-01-01 /%host%/cacraig/COMMON/WACCM93/monthlyClimApr/2008/HIR2APR-BCK-v5.he5  
ENDCHOICE

#### # INPUT/OUTPUT FILES

HIR2CLCC = HIR2CLCC-%FILE%.he5 *output collocated climatology file*  
HIR2CLCG = HIR2CLCG-%FILE%.he5 *output collocated GMAO file*  
HIR2CLCA = HIR2CLCA-%FILE%.he5 *output collocated apriori file*  
HIR2LSGW = HIR2LSGW-%FILE%.he5 *output line of sight weighting file*  
HIRDLS2D = HIRDLS2D-%FULLJOBID%.txt *output diagnostic file (contains information from the run)*

#### # HDF-EOS AND METADATA SUPPORT FILES

HIRRADDEF = %DATA%/HIRRAD\_def.txt *definition file for HIRRAD*  
HIR2CLCCDEF = %DATA%/HIR2CLCC\_def.txt *definition file for CLCC file*  
HIR2CLCGDEF = %DATA%/HIR2CLCG\_def.txt *definition file for CLCG file*  
HIR2CLCADEF = %DATA%/HIR2CLCA\_def.txt *definition file for CLCA file*  
HIR2LSGWDEF = %DATA%/HIR2LSGW\_def.txt *definition file for LSGW file*

#### # FLAGS

AprErrAdj = .true. *If true, adjusts the apriori errors*  
GMAOTinAPR = .true. *If true, puts GMAO temperature in apriori file*  
GMAOO3inAPR = .true. *If true, puts GMAO O3 in apriori file*  
GMAOH2OinAPR = .false. *If true, puts GMAO H2O in apriori file*  
SMTHTEMP = .true. *If true, then boxcar smooths GMAO temperature*

## USF FILES – RTP step

**TOOLKIT = /usr/local/TOOLKIT5.2.17n** *Identifies toolkit (must match the toolkit used in the compilation step as well as the one named in rl2)*

**MERGE\_HIRRAD\_EXE = MERGE\_HIRRAD** *Name of HIRRAD merge executable*  
**MERGE\_HIRPROF\_EXE = MERGE\_HIRPROF** *Name of HIRPROF merge executable*

**RUNCLP = .false.** *Do not run CLP step*  
**RUNGMC = .false.** *Do not run GMC step*  
**RUNLWP = .false.** *Do not run LSGW step*  
**NSTAGES=3** *Number of separate RTP stages*  
**RTPRARLoop01 = 'R01'** *R01 = use HIR2CTRL01 control file*  
**RTPRARLoop02 = 'R02'** *R02 = use HIR2CTRL02 control file – IF ONLY ONE RETRIEVAL STEP, DELETE THIS LINE*  
**RTPRARLoop03 = 'A01'** *A01 = use HIR2RARCO1 control file*  
**RUNBOP = .false.** *Do not run BOP*  
**RUNTAG = TESTX** *Tag identified – substituted with –t flag in run\_build, PGE version in SIPS*

**EXEC = time ./H2Main** *execute command*  
**#DEBUGXEXEC = totalview ./H2Main\_debug** *#DEBUG is removed in run\_build if –d is specified*

**# IDENTIFY FILE TO GET THE VERSION/CYCLE/DATE INFO FROM - ONLY USED WITHIN SIPS**  
**# WITH FILES WHICH ARE NOT STORED BY SIPS**  
**FULLJOBIDFILE=HIRPROF**

**# NUMBER OF PROCESSORS**  
**NTHREADS = 20** *Number of threads for job*  
**RUNSCRIPT=l2.ksh** *Name of run script – don't change*

**# OUTPUT CAPTURED SCREEN FILE**  
**SCREENOUT= level2-%FULLJOBID%.out** *Name of file where screen output is redirected*

**# RUN SUPPORT FILES**  
**HIR2CFG\_MASK = %DATA%/HIR2CFG-Mask.txt** *Name of mask configuration file*  
**HIR2PCF\_MASK = %DATA%/HIR2PCF-Mask.txt** *Name of mask PCF file*  
**HIR2CFG = HIR2CFG-%FULLJOBID%.txt** *Name of final (substituted) configuration file*  
**HIR2PCF = HIR2PCF-%FULLJOBID%.txt** *Name of final (substituted) PCF file*

**# INPUT FILES**  
**HIRRAD = /sips/prod/web/nls/HIRRAD/2006/05/18/00/HIRRAD\_v05-00-00-c01\_2006d138.he5**  
**#HIRRAD = /hir1t/cacraig/HIRRAD.5151.2006d138.he5**

**HIR2CLCC = HIR2CLCC-%FILE%.he5** *input collocated climatology file*  
**HIR2CLCG = HIR2CLCG-%FILE%.he5** *input collocated GMAO file*  
**HIR2CLCA = HIR2CLCA-%FILE%.he5** *input collocated apriori file*  
**HIR2CLCM = /hir1t/cacraig/Build106/SIPS\_2006d138/HIR2CLCM-SIPS\_b106\_2006d138.he5** *input collocated model file*

HIR2LSGW = HIR2LSGW-%FILE%.he5	<i>input line of sight weighting file</i>
HIR2CTRL01 = %DATA%/HIR2CTRL-RTP-SIPS-FM1.txt	<i>Control file for retrieval step 1</i>
HIR2CTRL02 = %DATA%/HIR2CTRL-RTP-SIPS-FM2.txt	<i>Control file for retrieval step 2</i>
HIR2RARCO1 = %DATA%/HIR2CTRL-RTP_RAR.txt	<i>Control file for RAR step 1</i>
HIR2ARSP = /%host%/cacraig/COMMON/HIR2ARSP_c5_na.he5	<i>input aerosol spectrum data (for RAR step)</i>
HIR2TRA = /%host%/cacraig/COMMON/HIR2TRA_c23_na.hdf	<i>input transmittance table</i>
# INPUT/OUTPUT FILES	
HIRPROF = HIRPROF-%FILE%.he5	<i>output HIRPROF</i>
HIRDLS2 = HIRDLS2-%FILE%.he5	<i>output HIRDLS2 – not created if only RTP step</i>
HIRRETD = HIRRETD-%FULLJOBID%.bin	<i>output retrieval diagnostic file - optional</i>
HIRDLS2D = HIRDLS2D-%FULLJOBID%.txt	<i>output diagnostic file (contains information from the run)</i>
HIRRDSIM = HIRRDSIM-%FILE%.he5	<i>output simulated data (with noise)</i>
HIRRDSYN = HIRRDFIT-%FILE%.he5	<i>output simulated data (no noise)</i>
HIRLOS2D = HIRLOS2D-%FILE%.he5	<i>output LineOfSight diagnostic information</i>
# HDF-EOS AND METADATA SUPPORT FILES	
MCFWRITETEMP = MCFWRITE.temp	<i>temporary file for metadata writing</i>
HIRRADDEF = %DATA%/HIRRAD_def.txt	<i>definition file for HIRRAD (HIRRDSIM and HIRRDSYN)</i>
HIRLOS2DDEF = %DATA%/HIRLOS2D_def.txt	<i>definition file for HIR2LOS2D</i>
HIRPROFDEF = %DATA%/HIRPROF_def.txt	<i>definition file for HIRPROF</i>
# Flags	
HIRPROFNEW = 'Y'	<i>Create a HIRPROF from scratch (if starting a second retrieval step, then this is 'N')</i>
STARTPROF = 0	<i>Start ProfileID</i>
STOPPROF = 0	<i>Stop ProfileID (if both 0,0 then process all of data)</i>
REPROCESSINGPLANNED = 'further update anticipated using enhanced PGE'	<i>for metadata</i>
REPROCESSINGACTUAL = 'processed once'	<i>for metadata</i>
PGEVERSION = '1.6.0'	<i>for metadata</i>
HIRRADFIT = 'YES'	<i>If 'YES' produce a HIRRADFIT file</i>

## USF FILES – BOP step

### # Run-time

TOOLKIT = /usr/local/TOOLKIT5.2.17n

RUNCLP = .false.

*Do not run CLP step*

RUNLWP = .false.

*Do not run LWP step*

RTPRARLoop01 = "

*Do not run RTP/RAR step*

RUNBOP = .true.

*Run BOP step*

RUNTAG = TESTX

*Tag identified – substituted with –t flag in run\_build, PGE version in SIPS*

EXEC = time ./H2Main

*execute command*

#DEBUGEXEC = totalview ./H2Main\_debug

*#DEBUG is removed in run\_build if –d is specified*

# IDENTIFY FILE TO GET THE VERSION/CYCLE/DATE INFO FROM - ONLY USED WITHIN SIPS

# WITH FILES WHICH ARE NOT STORED BY SIPS

FULLJOBIDFILE=HIRDLS2

# NUMBER OF PROCESSORS

NTHREADS = 1

*May only run one thread for CLG step*

RUNSCRIPT= l2.ksh

*Name of run script – don't change*

# OUTPUT CAPTURED SCREEN FILE

SCREENOUT= level2-%FULLJOBID%.out

*Name of file where screen output is redirected*

# RUN SUPPORT FILES

HIR2CFG\_MASK = %DATA%/HIR2CFG-Mask.txt

*Name of mask configuration file*

HIR2PCF\_MASK = %DATA%/HIR2PCF-Mask.txt

*Name of mask PCF file*

HIR2CFG = HIR2CFG-%FULLJOBID%.txt

*Name of final (substituted) configuration file*

HIR2PCF = HIR2PCF-%FULLJOBID%.txt

*Name of final (substituted) PCF file*

# INPUT FILES

HIRPROF = HIRPROF-%FILE%.he5

*Input HIRPROF*

EGM96 = %DATA%/EGM96-1.txt

*Input file for GPH calculation*

CORRCOEF = %DATA%/CORRCOEF.txt

*Input file for GPH calculation*

# OUTPUT FILES

HIRDLS2ALL = HIRDLS2ALL-%FILE%.he5

*Output HIRDLS2ALL file*

HIRDLS2D = HIRDLS2D-%FULLJOBID%.txt

*output diagnostic file (contains information from the run)*

# HDF-EOS AND METADATA SUPPORT FILES

MCFWRITETEMP = MCFWRITE.temp

*temporary file for metadata writing*

HIRDLS2ALLDEF = %DATA%/HIRDLS2ALL\_def.txt

*definition file for HIRDLS2ALL file*

HIRDLS2MCF = %DATA%/HIRDLS2.mcf

*metadata control file for HIRDLS2ALL file*

# FLAGS

REPROCESSINGPLANNED = 'further update anticipated using enhanced PGE' *for metadata*  
REPROCESSINGACTUAL = 'processed once' *for metadata*  
PGEVERSION = 'TestBuild' *for metadata*  
BUILDNUMBER = '%pgeversion%' *for metadata (SIPS replaces this with their PGE name)*