# CSPP (Community Satellite Processing Package) Sounder Packages in Direct Broadcast


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## Install and Run

| CSPP HEAP NUCAPS CrIS/ATMS IASI/AMSUA/MHS Retrieval Package Version 1.0.2 18 November 2020 | Filename | File size |
|---|---|---|
| HEAP NUCAPS V1.0.2 EDR Software Installation Instructions | CSPP_HEAP_Installation_Guide_v1.0.2.pdf | |
| HEAP NUCAPS V1.0.2 EDR Retrieval Software for Linux | CSPP_HEAP_V1.0.2.tar.gz (sha1) | 1.1 GB |
| HEAP NUCAPS V1.0.2 EDR Retrieval Test Data | CSPP_HEAP_TESTDATA_V1.0.2.tar.gz (sha1) | 1.4 GB |

```
tar -xzf CSPP_HEAP_V1.0.2.tar.gz
export CSPP_HEAP_HOME=$PWD/CSPP_HEAP_1_0
source $CSPP_HEAP_HOME/scripts/cspp_heap_env.sh
run_heap.bash -s j01 -i /SDR/cris_atms
```

| CSPP UW Hyperspectral Retrieval Package Version 2.0 22 June 2018 | Filename | File size |
|---|---|---|
| CrIS, AIRS and IASI Wisconsin Dual Regression Retrieval Software Installation Instructions | CSPP_HSRTV_Installation_Guide_v2.0.pdf | |
| CrIS, AIRS and IASI EDR Dual Regression Retrieval Software for Linux | CSPP_UW_HSRTV_V2.0.tar.gz (sha1) | 1.5 GB |
| CrIS, AIRS and IASI EDR Dual Regression Coefficient Files | CSPP_UW_HSRTV_V2.0_COEFFS.tar.gz (sha1) | 2.4 GB |

```
tar -xzf CSPP_UW_HSRTV_V2.0.tar.gz
tar -xzf CSPP_UW_HSRTV_V2.0_COEFFS.tar.gz
export HS_RET_DIR=$PWD/CSPP_UW_HSRTV_2_0
source $HS_RET_DIR/env/uw_hs_12.bash_env
run_HSRTV.scr 3 /home/noaa20/cris_fsr/
```

| CSPP MiRS Microwave Retrieval Software Version 2.4 14 October 2020 | Filename | File size |
|---|---|---|
| MiRS Retrieval Software Installation Instructions | CSPP_MIRS_Installation_Guide_v2.4.pdf | |
| MIRS Retrieval Software for Linux | CSPP_MIRS_V2.4.tar.gz (sha1) | 320 MB |
| MIRS Retrieval Test Files | CSPP_MIRS_TESTDATA_V2.4.tar.gz (sha1) | 1.0 GB |

```
tar -xzf CSPP_MIRS_V2.4.tar.gz
export CSPP_MIRS_HOME=$PWD/CSPP_MIRS_2_4
source $CSPP_MIRS_HOME/scripts/cspp_mirs_env.sh
run_mirs.bash -s n19 -i /n19/amsua_mhs -d /dynamic_anc
```

| CSPP IAPP Software Version 1.1 3 March 2017 | Filename | File size |
|---|---|---|
| IAPP Retrieval Software Installation Instructions | CSPP_IAPP_Installation_Guide_v1.1.pdf | |
| IAPP Retrieval Software for Linux | CSPP_IAPP_v1.1.tar.gz (sha1) | 431 MB |
| IAPP Retrieval Test Files | CSPP_IAPP_v1.1_TEST_DATA.tar.gz (sha1) | 380 MB |

```
tar -xzf CSPP_IAPP_v1.1.tar.gz
export CSPP_IAPP_HOME=$PWD/CSPP_IAPP_1_1 source $CSPP_IAPP_HOME/
cspp_iapp_env.sh
iapp_level2.sh hirsl1d_M01_20150126_0204_12223.l1d 'metopb'
```

| CSPP Sounder QuickLook (QL) Software for NUCAPS, HSRTV, MIRS and IAPP Retrievals 16 July 2015 | Filename | File size |
|---|---|---|
| Sounder Quicklook Software Installation Instructions | CSPP_Sounder_QL_Installation_Guide_v1.0.pdf | |
| Sounder Quicklook Software for Linux | CSPP_Sounder_QL_v1.0.tar.gz (sha1) | 269 MB |
| Sounder Quicklook Test Files | CSPP_Sounder_QL_v1.0_SAMPLE_DATA.tar.gz (sha1) | 111 MB |

```
tar xzf CSPP_Sounder_QL_v1.0.tar.gz
export CSPP_SOUNDER_QL_HOME=$PWD/Sounder_QL_1_0
source $CSPP_SOUNDER_QL_HOME/cspp_sounder_ql_env.sh
ql_level2_image.sh . . .
ql_level2_skewt.sh . . .
```


This work is supported by JPSS


## Mission/Instrument

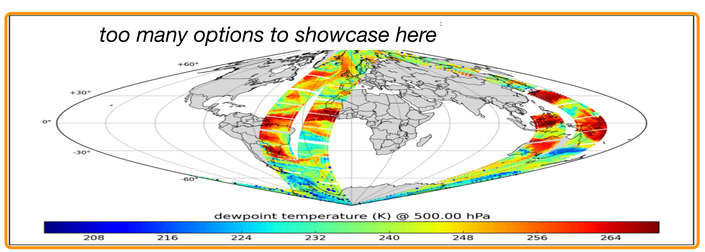
| Satellite | Instrument | Direct Broadcast Processing Software | Required Satellite Data Input Filemasks |
|---|---|---|---|
| Suomi-NPP & NOAA-20 (JPSS-1) | ATMS | CSPP SDR v2+ (or IDPS SDR) | Antenna temperature, geolocation: TATMS*.h5, GATMO*.h5 |
| | CrIS | | Radiance, geolocation: SCRIS*.h5, SCRIF*.h5, GCRSO*.h5 |
| Metop-A, Metop-B & Metop-C | IASI | AAPP v7.15 or higher | IASI_xxx_1C_{M01,M02}_* |
| | AMSUA | | amsual1b_M0{1,2,3}_*.l1b or ???.AMAX.M{1,2,3}.* |
| | MHS | | mhsl1b_M0{1,2,3}_*.l1b or ???.MHSX.M{1,2,3}.* |

```
-------------------------------------------------------------------------------
run_HSRTV.scr

Usage: run_HSRTV.scr  INSTRUMENT_ID  INPUT_DIR

where

INSTRUMENT_ID is 1 (AIRS), 2 (IASI) or 3 (CrIS)
INPUT_DIR is the full path and name of input file directory
-------------------------------------------------------------------------------
```

| Satellite | Instrument | Direct Broadcast Processing Software | Required input: Example Filenames (Direct Broadcast form) |
|---|---|---|---|
| Suomi-NPP | ATMS | CSPP SDR v3.x (or IDPS SDR) | Radiance, antenna temperature, geolocation: SATMS_npp*.h5, TATMS_npp*.h5, GATMO_npp*.h5 |
| NOAA-20 | ATMS | CSPP SDR v3.x (or IDPS SDR) | Radiance, antenna temperature, geolocation: SATMS_j01*.h5, TATMS_j01*.h5, GATMO_j01*.h5 |
| NOAA-21 | ATMS | CSPP SDR v3.x (or IDPS SDR) | Radiance, antenna temperature, geolocation: SATMS_j02*.h5, TATMS_j02*.h5, GATMO_j02*.h5 |
| NOAA-18* | AMSUA-A + MHS | AAPP v8 | Level 1B: amsual1b_noaa18*.l1b, mhsl1b_noaa18*.l1b |
| NOAA-19 | AMSUA-A + MHS | AAPP v8 | Level 1B: amsual1b_noaa19*.l1b, mhsl1b_noaa19*.l1b |
| Metop-A | AMSUA-A + MHS | AAPP v8 | Level 1B: amsual1b_M02*.l1b, mhsl1b_M02*.l1b |
| Metop-B | AMSUA-A + MHS | AAPP v8 | Level 1B: amsual1b_M01*.l1b, mhsl1b_M01*.l1b |
| Metop-C | AMSUA-A + MHS | AAPP v8 | Level 1B: amsual1c_M03*.l1b, mhsl1c_M03*.l1c |

| Satellite | Launch Date | NOAA Operational Dates |
|---|---|---|
| NOAA-15 | 13 May 1998 | 15 Dec 1998 – 15 Oct 2002 |
| NOAA-16 | 21 Sep 2000 | 20 Mar 2001 – 29 Aug 2005 |
| NOAA-18 | 20 May 2005 | 30 Aug 2005 – 1 Jun 2009 |
| NOAA-19 | 06 Feb 2009 | 2 Jun 2009 - Present |
| Metop-A | 19 Oct 2006 | 21 May 2007 – 23 Apr 2013 |
| Metop-B | 17 Sep 2012 | 24 Apr 2013 - Present |

*too many options to showcase here*



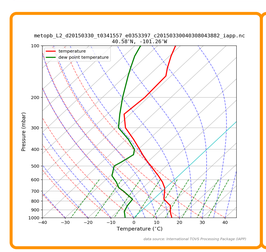

## Products

| Description |
|---|
| Atmospheric temperature [K] at 100 pressure levels |
| Atmospheric moisture [g/g] at 100 pressure levels |
| Atmospheric ozone [ppb] at 100 pressure levels |
| Atmospheric liquid water [g/g] at 100 pressure levels |
| Carbon dioxide dry mixing ratio [ppm] at 100 pressure levels |
| Trace gas mixing ratios: CO, CH4, HNO3, N2O, SO2* [ppb] at 100 pressure levels. [*Metop-A, B, and C return climatological values for SO2] |
| Surface skin temperature [K] |
| Microwave surface emissivity |
| Column averaged CO2 per ATMS or AMSU FOV [ppm] |
| Cloud top pressure for up to two cloud layers [hPa] |
| Cloud top fractional coverage for up to two cloud layers |
| Stability parameters |

Atmospheric temperature [K] at 101 pressure levels
Atmospheric humidity [g/kg] at 101 pressure levels
Atmospheric ozone [ppmv] at 101 pressure levels
Atmospheric relative humidity [%] at 101 pressure levels
Atmospheric dew point temperature [Degrees Kelvin] at 101 pressure levels
Surface skin temperature [Degrees Kelvin]
Surface emissivity at instrument spectral resolution [cm$^{-1}$]
Total precipitable water (vertically integrated from 100 hPa to surface) [cm]
Precipitable water 1 (vertically integrated from 900 hPa to surface) [cm]
Precipitable water 2 (vertically integrated from 700 to 900 hPa) [cm]
Precipitable water 3 (vertically integrated from 300 to 700 hPa) [cm]
Total ozone amount (vertically integrated) [Dobson units]
Lifted index [Degrees Celsius]
Convective available potential energy [J/kg]
CO2 amount [ppmv]
Cloud top pressure [hPa]
Cloud top temperature [Degrees Kelvin]
Cloud optical thickness
Effective cloud emissivity
Cloud mask (Values: 0 Clear, 1 Cloud)

- Temperature profile over open water ocean
- Humidity profile over open water ocean
- Humidity Profile over non-coastal Land
- Total Precipitable Water (TPW) over open water ocean
- Total Precipitable Water over non-coastal land
- Land surface temperature
- Surface Emissivity over land and snow
- Surface Type Classification
- Snow Water Equivalent (SWE)
- Sea Ice Concentration (SIC)
- Snow Cover Extent (SCE), based on the SWE
- Vertically-Integrated Non-precipitating Cloud Liquid Water (CLW) over open water ocean
- Vertically-Integrated Ice Water Path (IWP)
- Vertically-Integrated Rain Water Path (RWP)
- Rainfall Rate (RR) over open water ocean and non-coastal, non-snow-covered land surface types
- Effective grain size of snow (over snow-covered land surface)*
- Multi-Year (MY) Type Sea Ice Concentration*
- First-Year (FY) Type Sea Ice Concentration*
- Snow fall rate and Probability of falling snow (SFR and Prob_SF)***

| | |
|---|---|
| Temperature_Retrieval | Skin_Temperature |
| WaterVapor_Retrieval | Ancillary_Data_Used |
| Dew_Point_Temp_Retrieval | Surface_Pressure |
| Total_Ozone | Surface_Temperature |
| Cloud_Fraction | Surface_Water_Vapor |
| Microwave_Emissivity | Temperature_Guess_Profile |
| Cloud_Top_Pressure_CO2 | WaterVapor_Guess_Profile |
| Cloud_Top_Temperature_CO2 | Dew_Point_Temp_Guess |
| Clear_Cloudy_Index_CO2 | Ozone_Guess |
| Effective_Cloud_Amount_CO2 | Guess_Precip_Water |
| Cloud_Top_Pressure_O2 | HIRS_Brightness_Temperatures |
| Cloud_Top_Temperature_O2 | AMSUA_Brightness_Temperatures |
| Effective_Cloud_Amount_O2 | MHS_Brightness_Temperatures |
| Total_Precip_Water | Surface_Elevation |
| Rainfall | Land_Ocean_Index |

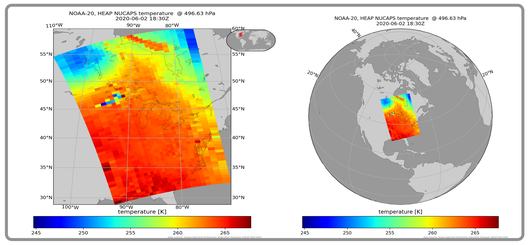


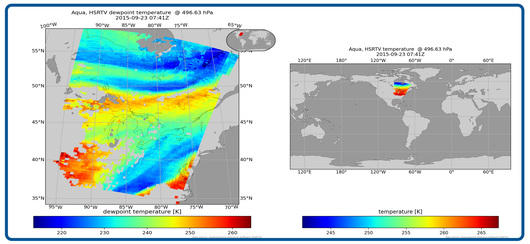

PROFILES

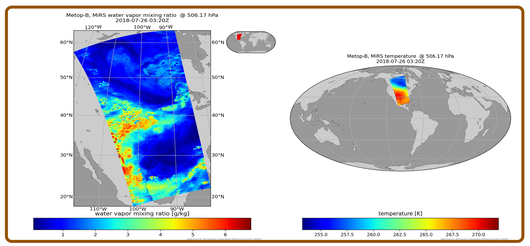
and

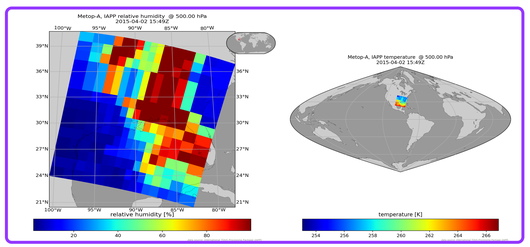
IMAGE SLICES

## QuickLook Images




## CONCLUDING REMARKS

CSPP Sounder packages are pre-compiled and very easy to install and run. SSEC maintains a server of global dynamic ancillary data that can be accessed automatically during package execution. The Sounder QuickLook package can generate images of temperature, dew point, water vapor, relative humidity at a specified pressure level. It can also make SkewT plots and supports multiple map projections with local & global views.

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