

The **Community Satellite Processing Package (CSPP)** supports the Direct Broadcast (DB) meteorological and environmental satellite community through the packaging and distribution of open source science software. We have recently updated three NOAA-developed algorithms in our environmental data record (EDR) software suite, namely, **Microwave Integrated Retrieval System (MIRS)**, **Hyper-Spectral Enterprise Algorithm Package (HEAP)** and **Advanced Clear-Sky Processor for Oceans (ACSPO)**. Each is now implemented within a Singularity container which simplifies system requirements and increases portability across Linux distributions and versions.

REQUIREMENTS: SYSTEM + MISSION & ANCILLARY DATA

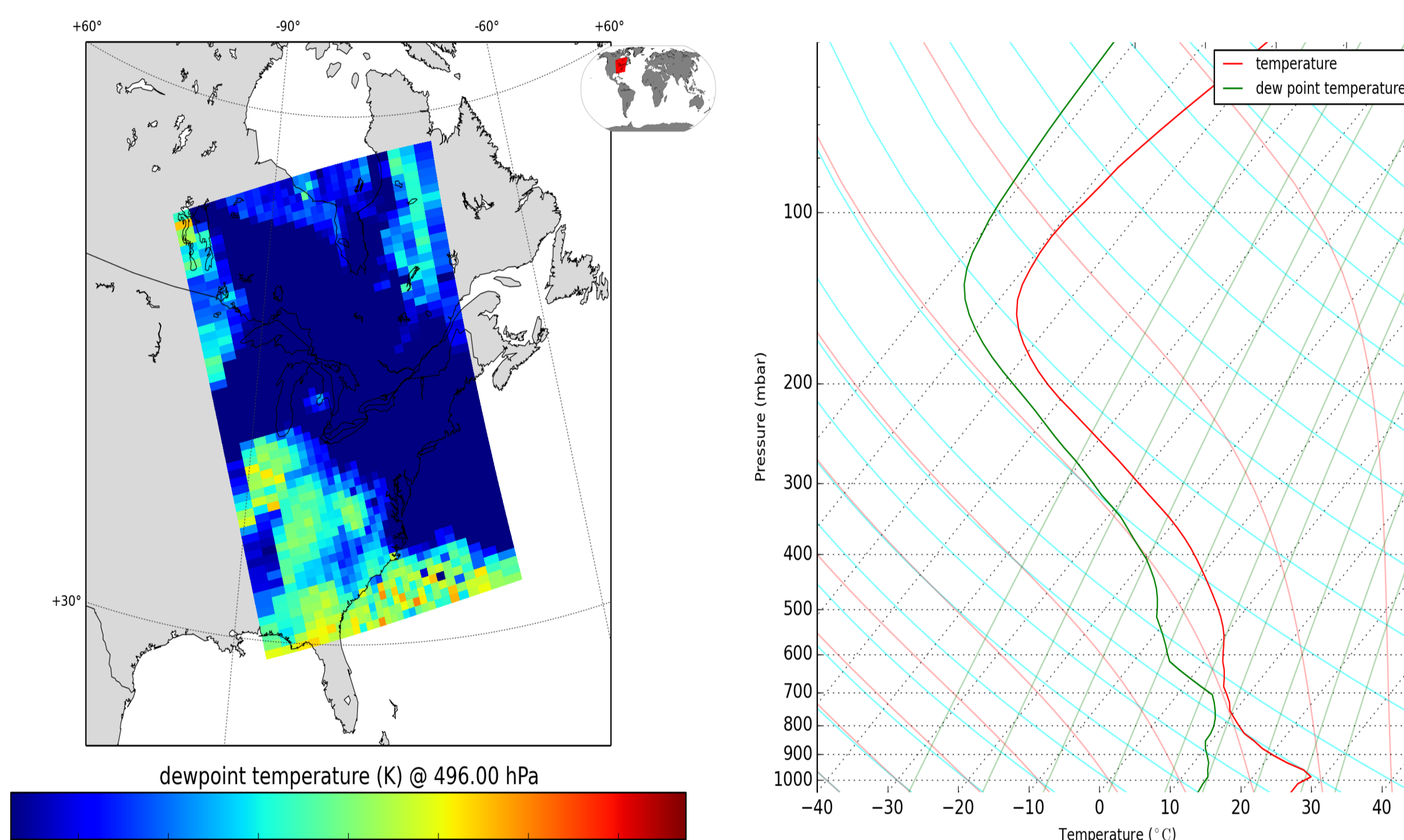
		CSPP_MIRS	CSPP_HEAP	CSPP_ACSP0
OPERATING SYSTEM		Any 64-bit Linux distribution.		
		1GB RAM + 1GB DISK	1GB RAM + 4GB DISK	8GB RAM + 5GB DISK
Additional Software		Singularity version 3.7.3 or above, soon to become Apptainer https://apptainer.org/		
SOFTWARE SITE		http://cimss.ssec.wisc.edu/cspp/		
RELEASE DATE / VERSION [NOAA version]		Mar-2022 / v3.0 [v11.8]	Jan-2022 / v2.0 [v3r1]	Oct-2021 / v2.0 [v2.80]
MISSION DATA	NOAA-15 to NOAA-17	X	X	X
	NOAA-18* & NOAA-19	AMSU-A +MHS	X	X
	Metop-A**, -B & -C	AMSU-A +MHS	AMSU-A + MHS + IASI	AVHRR
	Aqua & Terra	X	X	MODIS
	Suomi-NPP***/NOAA-20	ATMS	ATMS+CrIS	VIIRS
ANCILLARY DATA	SERVER SITE	http://jpssdb.ssec.wisc.edu/cspp_v_2_0/ancillary/		
	National Center for Environmental Prediction (NCEP) Global Forecast System (GFS) 1 degree resolution	✓ Required only for snowfall rate	✓	✓
	Canadian Meteorological Center (CMC) 0.2 deg global sea surface temperature analysis	X	X	✓
PROCESSES ARCHIVE DATA? (i.e. non Direct Broadcast)		✓	✓	✓

* NOAA-18 MHS began to experience problems on 20-Oct-2018 and is unsupported beyond that date.
 ** Metop-A instruments were switched off on 15-Nov-2021.
 *** Suomi-NPP CrIS had a Side 2 electronics failure on 22-May-2021.

CSPP_HEAP

SUBSET OF PRODUCT FIELDS

EDR PRODUCT FIELDS		CCR PRODUCT FIELDS	
varName	long_name or description	varName	long_name or description
CH4_MR	Methane mixing ratio (ppb)	CrIS_FORs	The number of the current CrIS FOR for the current FOR
CO2	Carbon dioxide dry mixing ratio (ppm)	CrIS_Frequencies	Frequency at which the radiances are observed (cm-1)
CO_MR	Carbon monoxide mixing ratio (ppb)	CrIS_Radiances	CrIS Radiances for each FOR (mW/(m2 sr cm-1))
H2O_MR	Water vapor mixing ratio (g/g)	CrIS_View_Angle	CrIS View Angles for each FOR
HNO3_MR	Nitric Acid mixing ratio (ppb)	Quality_Flag	Quality flags for retrieval
Ice_Liquid_Flag	Ice liquid flag (0=water, 1=ice)	CSPP_HEAP output files are in netCDF4 format: EDR in filenames indicates files containing all the retrieval (profile) products; CCR indicates cloud-cleared radiance product data. Detailed information on the products and metadata contained in the NetCDF4 output files is provided in the <i>Hyperspectral Enterprise Algorithm Package (HEAP) System Maintenance Manual (SMM)</i> .	
Liquid_H2O_MR	Liquid water mixing ratio (g/g)		
N2O_MR	Nitrous Oxide mixing ratio (ppb)		
O3_MR	Ozone mixing ratio (ppb)		
SO2_MR	Sulfur Dioxide mixing ratio (ppb)		
Skin_Temperature	Skin temperature (Kelvin)		
Temperature	Temperature (Kelvin)		

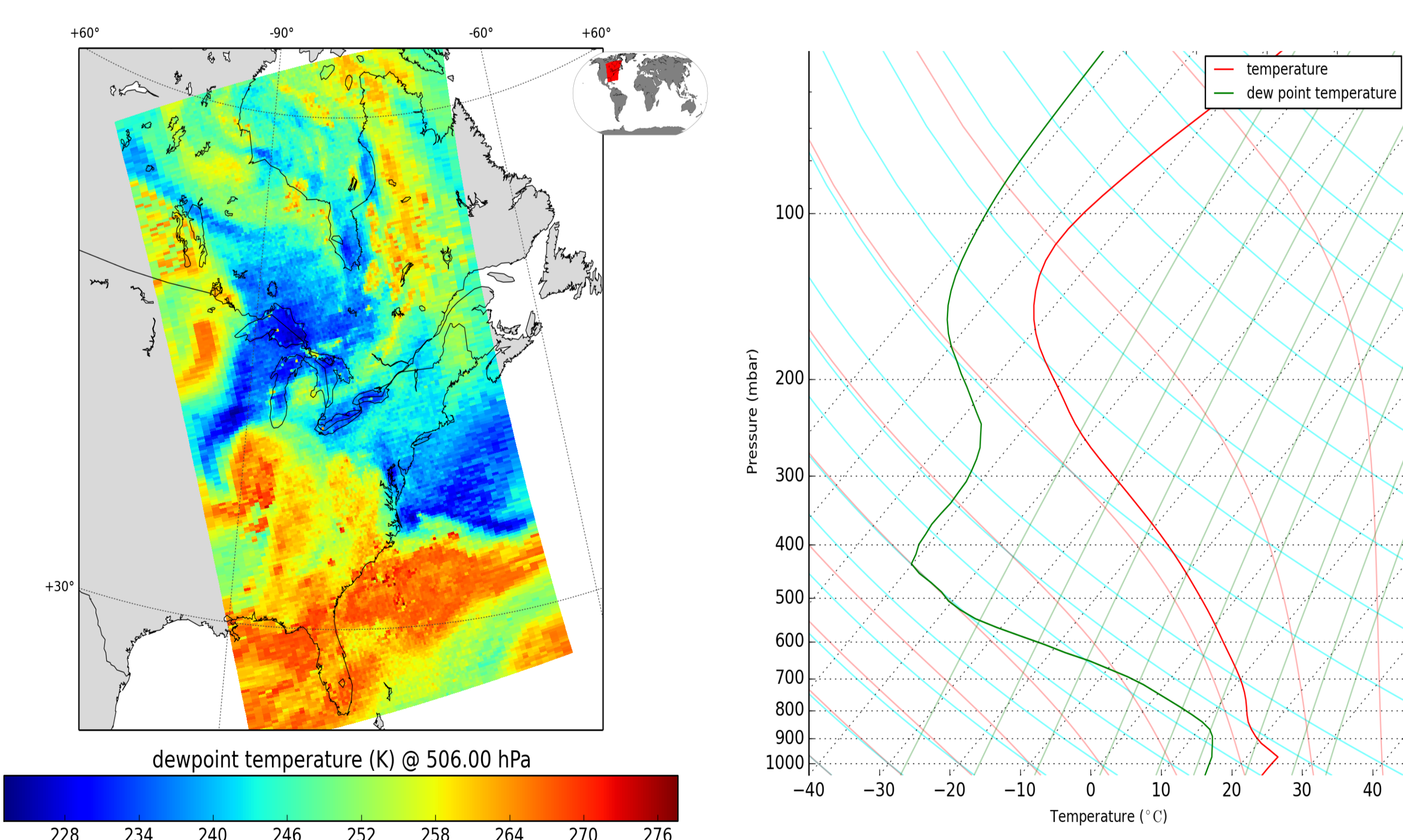


NUCAPS 496 hPa dew point (left) and Skew-T diagram (right) from example Suomi NPP ATMS+CrIS overpass. Imagery made with CSPP Sounder QuickLook package, http://cimss.ssec.wisc.edu/cspp/sounder_ql_v1.0.shtml.

CSPP_MIRS

SUBSET OF PRODUCT FIELDS

IMAGE PRODUCT FIELDS		SOUNDER PRODUCT FIELDS	
varName	long_name or description	varName	long_name or description
BT	Channel Temperature (K)	ChiSqr	Convergency rate: <3-good,>10-bad
CLW	Cloud liquid Water (mm)	PClw	Cloud liquid water profile (mm)
GWP	Graupel Water Path (mm)	PGraupel	Graupel mass profile (mm)
LWP	Liquid Water Path (mm)	PRain	Rain mass profile (mm)
RR	Rain Rate (mm/hr)	PTemp	Temperature profile (K)
RWP	Rain Water Path (mm)	PVapor	Water vapor profile (g/kg)
Slice	Sea Ice Concentration (%)	Qc	Qc(0): 0-good, 1-usable with problem, 2-bad
Snow	Snow Cover (%)		
SnowGS	Snow Grain Size (mm)	CSPP_MIRS output files are in netCDF4 format: IMG in filename indicates image products. SND in filename indicates sounder products. Detailed information on the products and metadata contained in the NetCDF4 output files is provided in the <i>MIRS Interface Control Document</i> .	
SWP	Snow Water Path (mm)		
TPW	Total Precipitable Water (mm)		
TSkin	Skin Temperature (K)		

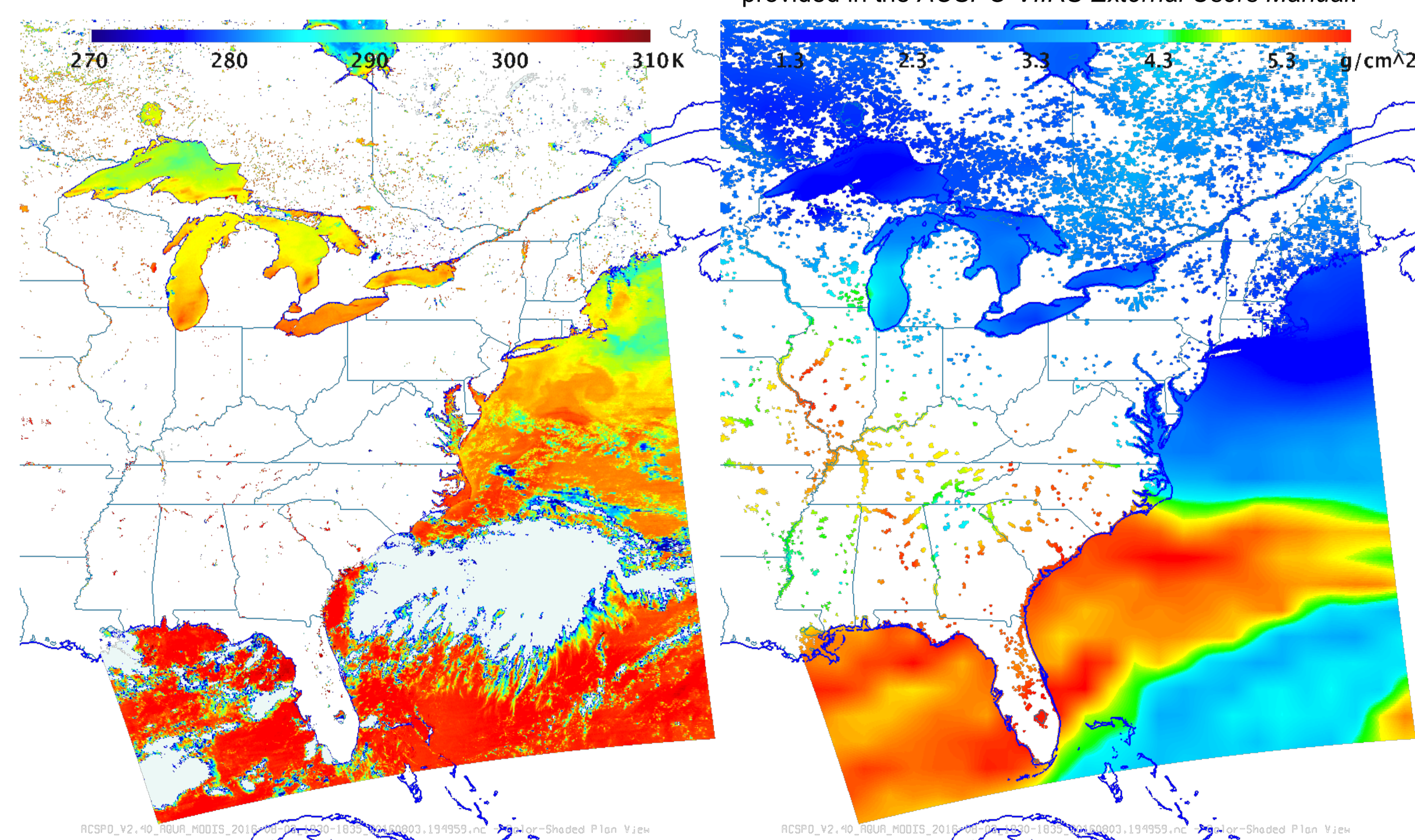


MIRS 506 hPa dew point temperature (left) and single pixel Skew-T diagram (right) from and example Suomi NPP ATMS overpass. Imagery made with CSPP Sounder QuickLook package, http://cimss.ssec.wisc.edu/cspp/sounder_ql_v1.0.shtml.

CSPP_ACSP0

SUBSET OF PRODUCT FIELDS

ACSP0 PRODUCT FIELDS		GHRSSST PRODUCT FIELDS	
varName	long_name or description	varName	long_name or description
acspo_mask	ACSP0 clear-sky mask and other flags: bit1 (0=radiance valid; 1=invalid); bit2 (0=night; 1=day); bit3 (0=sea; 1=land); bit4 (0=good quality data; 1=degraded quality due to twilight); bit5 (0=no glint; 1=glint); bit6 (0=no snow/ice; 1=snow/ice); bits7-8 (00=clear; 01=probably clear; 10=cloudy; 11=undef)	dt_analysis	Deviation from SST reference (K)
		l2p_flags	L2P common flags in bits 1-6 and data provider flags (from ACSP0 mask) in bits 9-16
extra_byte_clear_sky_tests_results	Additional clear-sky test results	quality_level	quality level of SST pixel (0=invalid; 1,2=not_used; 3=cloudy; 4=probably_clear; 5=clear)
individual_clear_sky_tests_results	Individual clear-sky tests results	sea_surface_temperature	SST obtained by regression with buoy measurements (K)
sst_regression	Retrieved sea surface temperature from regression (K)	sses_bias	Sensor Specific Error Statistic (SSES) bias estimate (K)
sst_reynolds	Reference (first-guess) SST from daily Reynolds (K)	sses_standard_deviation	Sensor Specific Error Statistic (SSES) standard deviation (K)
tpw_acspo	Total precipitable water derived from relative humidity (g/cm^2)	CSPP_ACSP0 output files are in netCDF4 format: ACSP0 in filenames indicates legacy format; GHRSSST indicates GHRSSST Data Specification 2.0 format. Detailed information on the products and metadata contained in the NetCDF4 output files is provided in the <i>ACSP0-VIIRS External Users Manual</i> .	



ACSP0 retrieved sea surface temperature from regression (left) and total precipitable water from relative humidity (right) from example Aqua MODIS overpass. Imagery made with McIDAS-V, <http://www.ssec.wisc.edu/mcidas/software/v/>.