



ISCCP H-Series Production at NCEI

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ISCCP PI: William B. Rossow



ISCCP Production @ NCEI

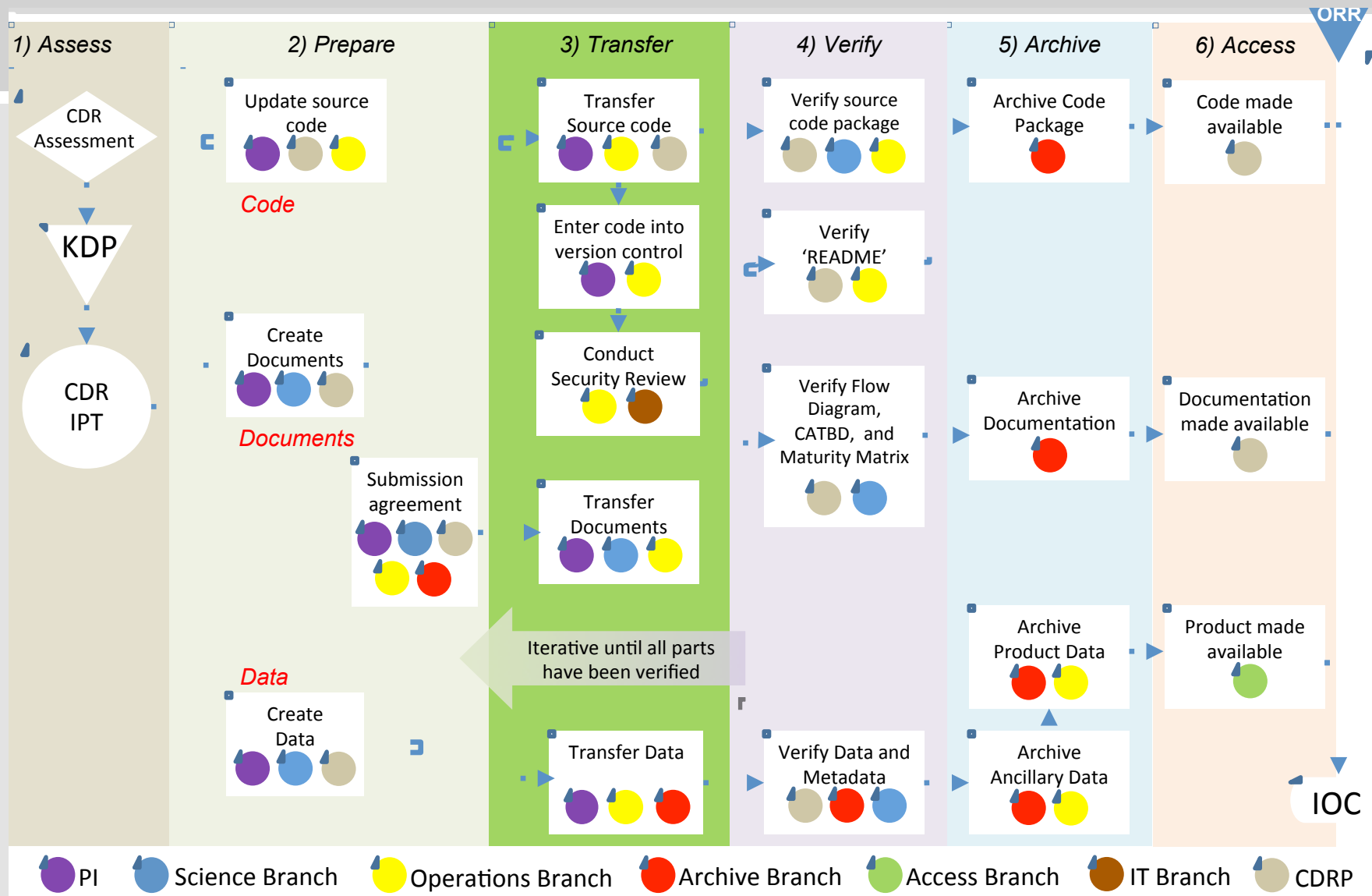
NCEI Goals:

- To develop the expertise and capabilities to produce, understand, and operationally maintain the International Satellite Cloud Climatology Project (ISCCP) H-Series Climate Data Record.

Additional Goals to sufficiently maintain the product and expand user base

- Understand end-user needs for ISCCP Cloud Products to shore up stakeholder involvement and feedback
- Engage SPC partners to acquire QC'd geostationary data
- Drive and support analysis of climate indicators using ISCCP data products

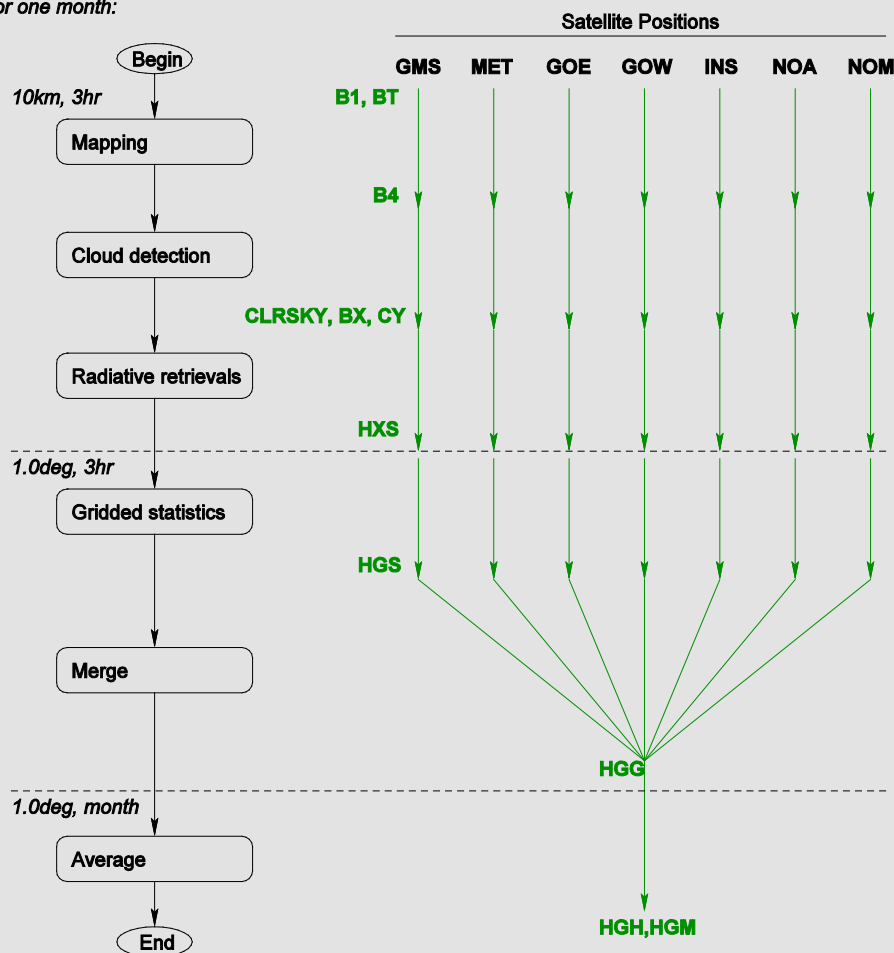
CDR R2O Process Diagram



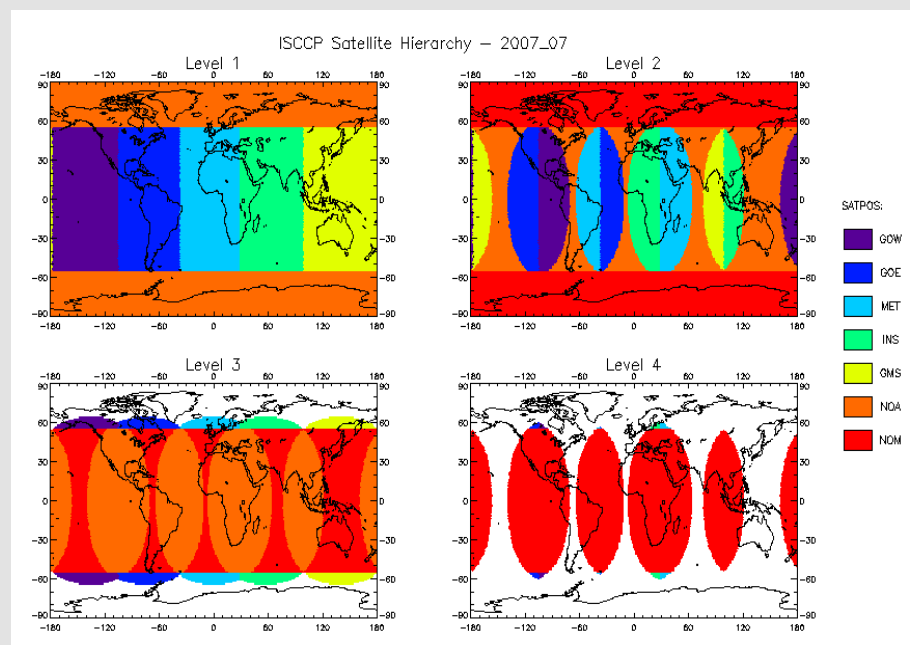
A Closer Look @ ISCCP H-Series Data Flow

ISCCP Data Flow Overview

For one month:



Note: Intermediate products will not be archived





D-Version to H-Version Changes

Radiance Calibrations: (1) Anchor for VIS calibration extended to combined results for NOAA-9 and NOAA-18, spanning most of the time record. (2) Overall IR calibration adjusted for small gain error in AVHRR calibrations compared to MODIS. (3) Geostationary normalization procedure changed to use all the radiance data rather than a small number of special samples

Cloud Detection Algorithm: (1) Added new radiance space contrast test inside regions with land-water mixtures (2) Updated surface type categories for algorithm tests to improve tests in rough topography (3) Revised daytime cloud detection over snow and ice by eliminating 3.7 μm tests. Improved polar cloud detection (4) summertime by reducing VIS detection thresholds over snow and ice and (5) wintertime by changing marginally cloudy to clear and marginally clear to cloudy

Gridded Product Contents: (1) Spatial sampling changed from 30 km to 10 km. (2) Revised the COUNTS-to-physical conversion tables to remove special values for underflow and overflow. (3) Increased uncertainty estimate information. (4) Filling of missing observations is performed in the global, 3-hr product instead of in the monthly product.

VIS and IR Radiance Models:(1) Replaced ocean VIS reflectance model with more accurate version with explicit glint treatment. (2) Calculated instrument-specific ozone absorption coefficients. (3) Added water vapor above 300 mb level in atmospheric ancillary data. (4) Added treatment of stratospheric and tropospheric aerosol scattering and absorption. (5) Improved surface temperature retrieval by accounting for variations of surface IR emissivity by surface type. (6) Introduced more explicit atmospheric and cloud vertical structures for retrievals



Description of ISCCP H-Series Products

Level 2:

- **HXS (DX)** –3 hr and ~10 km spatial and temporal resolutions
- **HXG** (global-DX) – Global merger of HXS data common to all satellites on a 0.10-degree equal-area grid (3hourly).

Level 3:

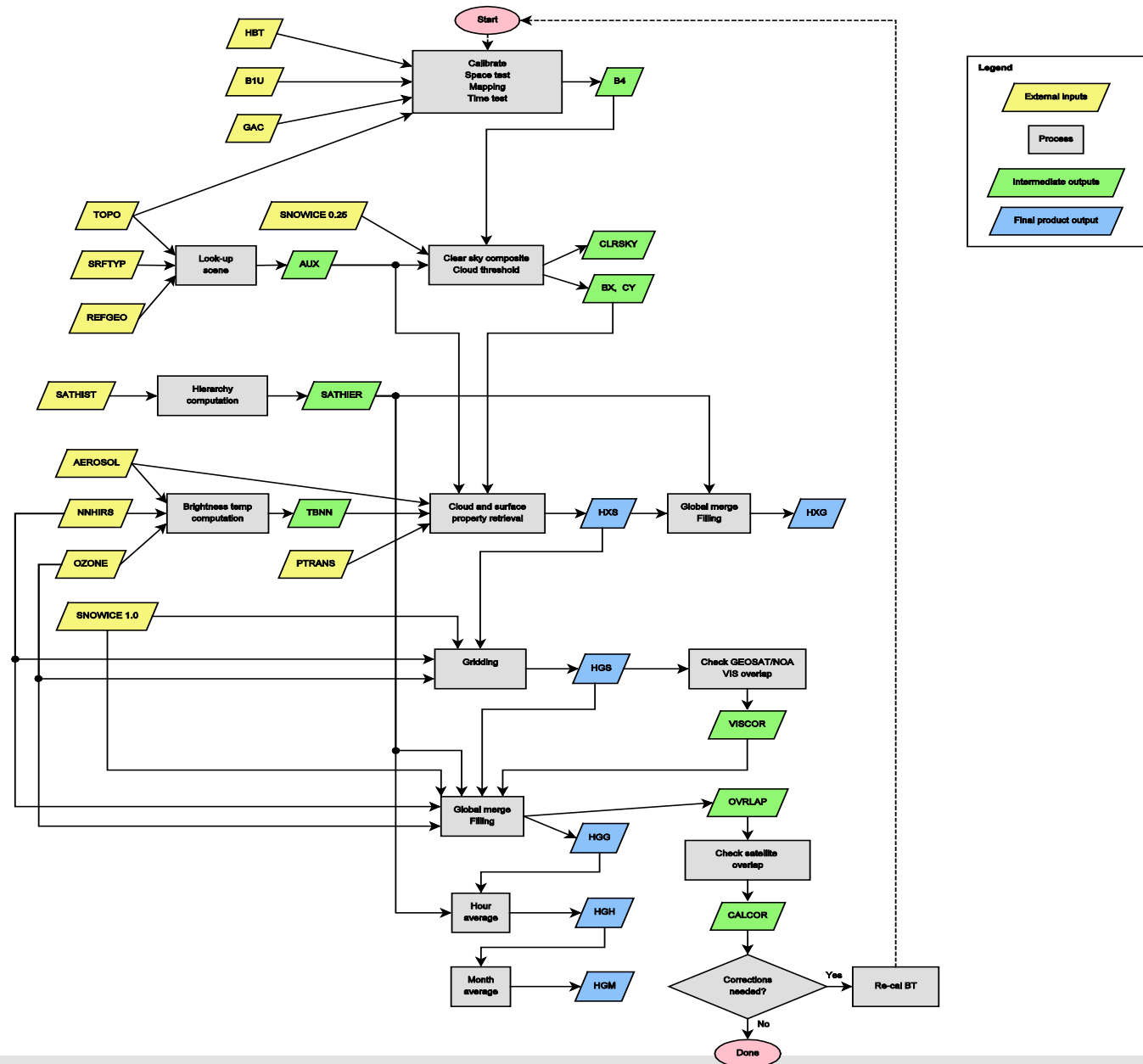
- **HGS** – reduces HXS product to a 1°-equivalent equal-area grid, determines additional statistical and cloud type information, and merges results with ancillary data products.
- **HGG (D1)** – global merger of the HGS Products from all available satellites available every 3 hours on 1°-equivalent equal-area grid
- **HGH/M (D2)** - monthly average of the HGG Product at each of eight times with HGM representing the monthly average at all 8 times.

Other Data Collection Products: ISCCP H-Series Code Package, C-ATBD, Data Flow Diagram, Maturity Matrix, and ReadMe

**Note: H-Series products listed in blue italicized fonts were not publicly offered via ISCCP D-Series.*

ISCCP H-Series Processing Flow Diagram

- B1U rather than B3 data
- All Ancillary Products replaced with more up-to-date versions. The new atmospheric temperature-humidity profiles treat diurnal variations explicitly.
- Higher resolution output products with new formats.
- All final products, code, documentation, calibration tables, ancillary, and static data tables will be available to the public

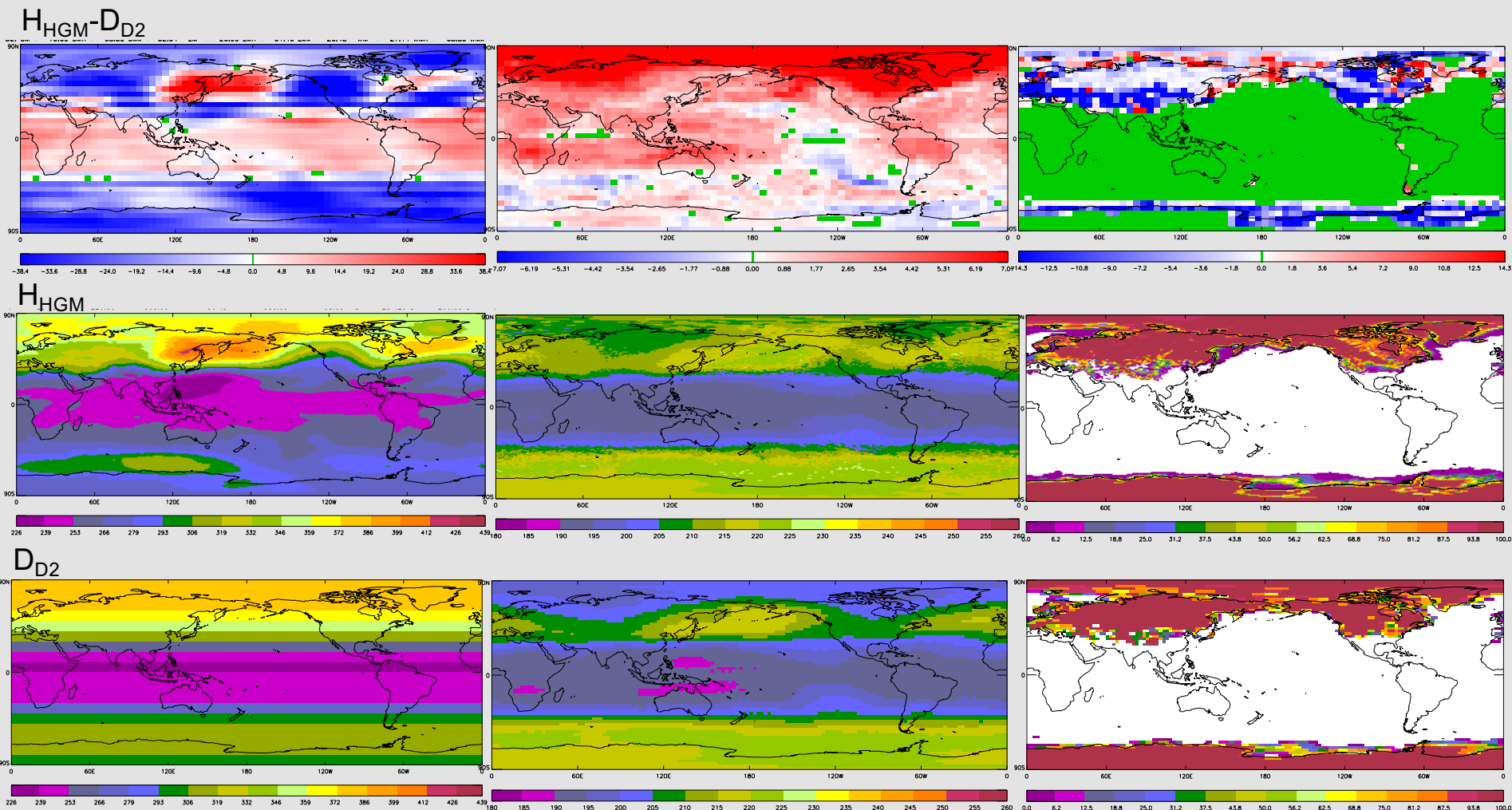


Changes to Ancillary Products

Ozone – Jan. 2009

NNHIRS TT – Jan. 2009

Snow and Ice – Jan. 2009



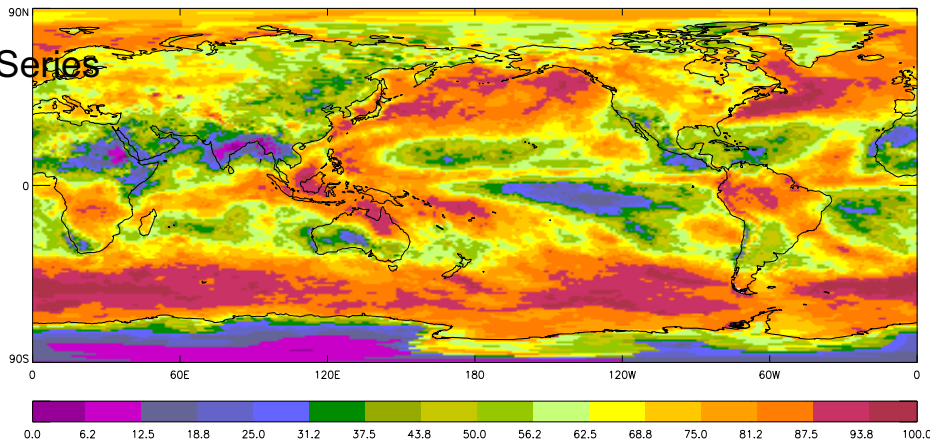
Comparison of ISCCP HGM and D2 Products

January 2009 HGM – D2 Comparison Plots Cloud Amount

H-D

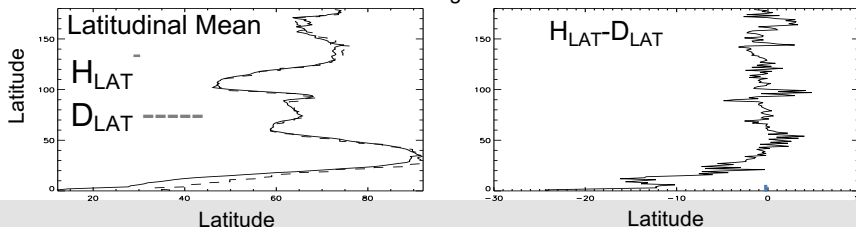
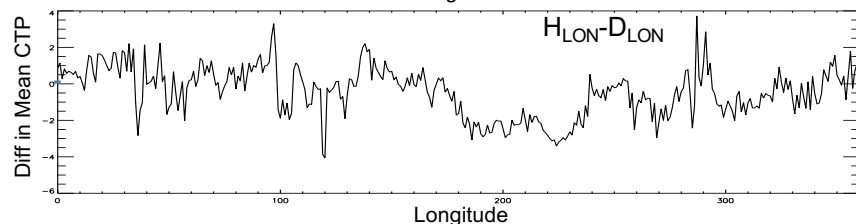
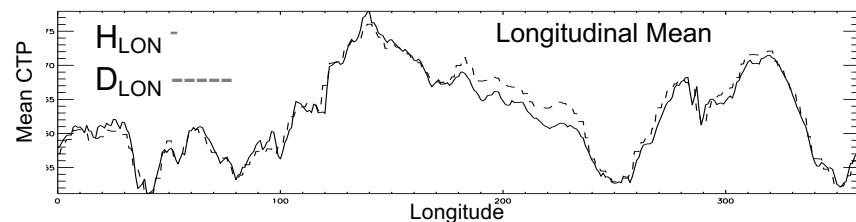
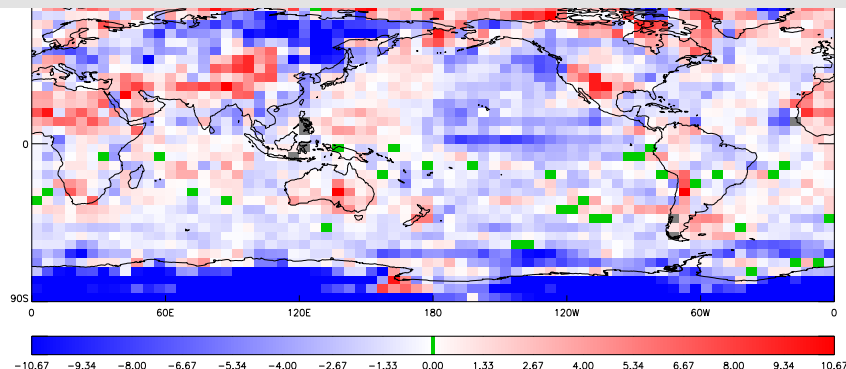
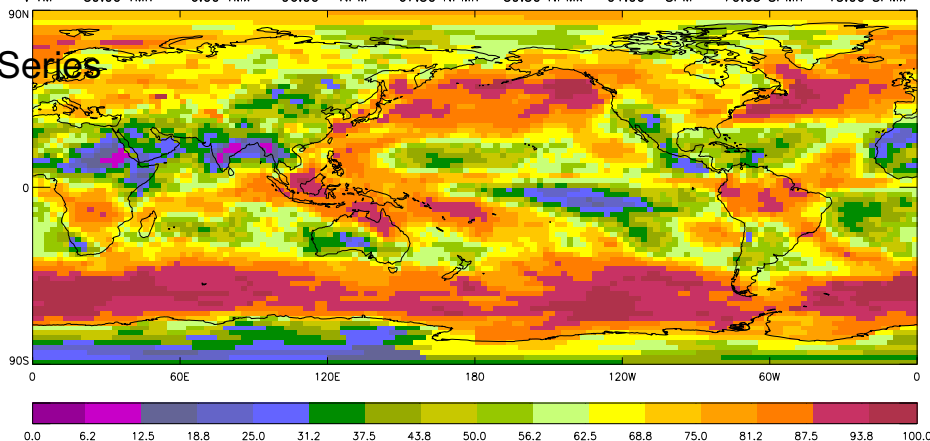
HGM : GM = 65.46 GMn = 1.90 GMx = 99.50 LM = 56.31 LMn = 1.90 LMx = 96.30 WM = 69.28 WMn = 11.00 WMx = 99.50
HGM : TM = 58.53 TMn = 1.90 TMx = 96.90 NPM = 67.10 NPMn = 32.90 NPMx = 94.90 SPM = 64.88 SPMn = 5.90 SPMx = 98.00

H-Series



D2 : GM = 66.29 GMn = 6.00 GMx = 99.50 LM = 57.60 LMn = 6.00 LMx = 94.00 WM = 70.19 WMn = 18.00 WMx = 99.50
D2 : TM = 59.00 TMn = 6.00 TMx = 96.00 NPM = 67.50 NPMn = 39.50 NPMx = 91.00 SPM = 70.63 SPMn = 15.00 SPMx = 98.00

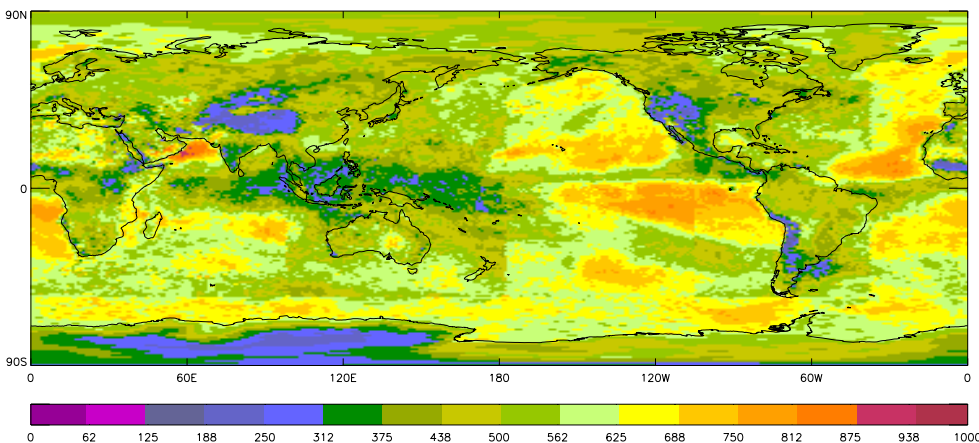
D-Series



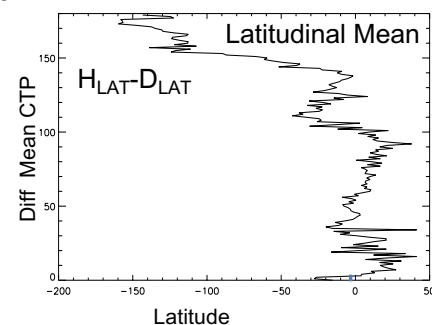
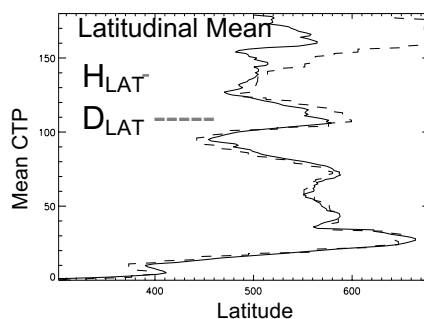
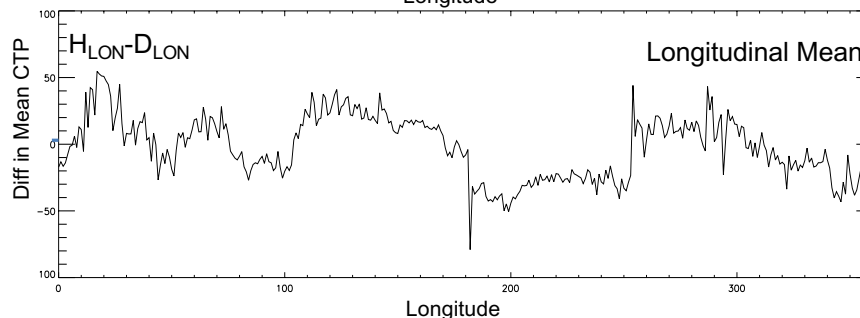
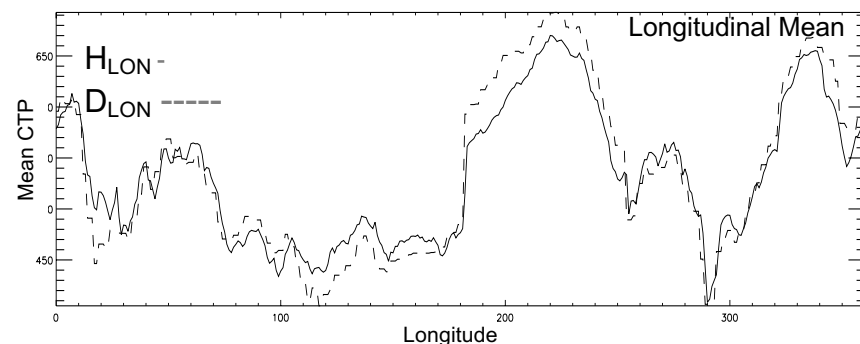
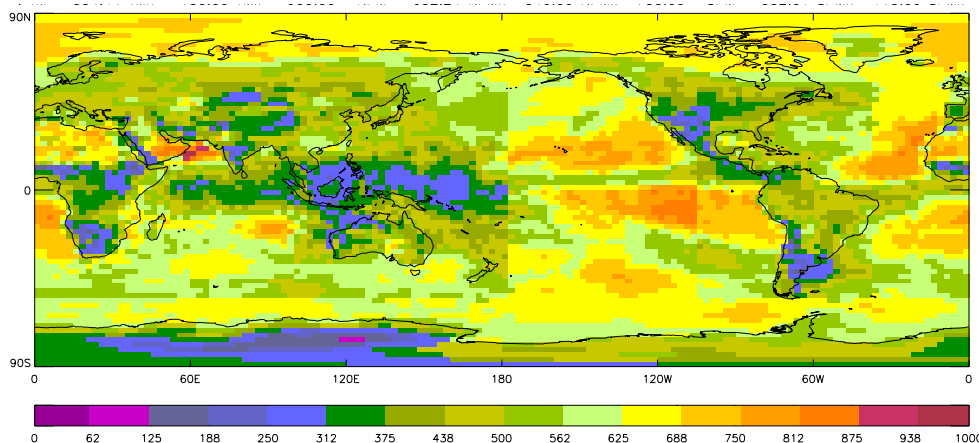
Comparison of ISCCP HGM and D2 Products

May 2009 HGM – D2 Comparison Plots Mean Cloud Top Pressure

H-Series



D-Series





Dealing with Data Gaps and QC Issues

NCEI ISCCP Team identified temporal gaps in time series and attempted to recover/backfill data. Recovery Efforts led to interactions with:

- SSEC – GOES (-5 through -7)
- EUMETSAT – Meteosat Data

All data not included in initial v01r00 product release has been documented to identify QC issues associated with all unused geostationary and PO data.

Data recovery efforts still left large gaps in data for the following time periods:

- May, June Sept, Oct, Nov, 1988 GOE-7 (GOE)
- MET-3 1992 May through mid Sept. (GOE)
- MET-5 1995 Jan - April (MET)

The v01r00 product will be initially released without these data but plans are to continue data recovery for 2017 reprocessing for specific months. Backfilling requires continued collaboration with ISCCP data partners.

ISCCP Production @ NCEI

NCEI ISCCP H-Series Phase Schedule:

- **Phase I** – Reproduce ISCCP D-Series record for July 1983-Dec. 2009 (aka Base Period)
 - Ported code to run at NCEI (Code package includes B1U and GAC QC code, Production Code, Calibration Code, and Ancillary Data Production Code)
 - QC'd base period GAC and B1U data
 - Wrapping up CDR documentation package
 - Currently producing and archiving data (~1 decade approved and completed)Expected Completion: **Mid-Late Jan. 2017**
- **Phase II** – Extend the time series to include data from January 1982 through June 2015 (i.e., thru Himawari-7)Expected Completion: **Mid-Late June 2017**
- **Phase III** – Introduce Himawari-8 and GOES-R data into ISCCP H-Series processing stream for build up into operational production. Current update frequency is planned to be completed on a quarterly basis.
Expected Completion: **Mid-Late Dec. 2017**

*Note: Original release is v01r00

Transparent Access to ISCCP

- Archived in CLASS with HDSS-Archive System (HAS) access 1983/07 and 2009/12 by 1/31/17 and extended period by 6/30/17.

NOAA's Comprehensive Large Array-Data Stewardship System (CLASS)

NOAA COMPREHENSIVE LARGE ARRAY-DATA STEWARDSHIP SYSTEM (CLASS)

NOAA HOME WEATHER OCEANS FISHERIES CHARTING SATELLITES CLIMATE RESEARCH COASTS CAREERS

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 - October 27, 2016
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 - NOAA

Image source: Suomi NPP VIIRS

NEWS

Celebrating 5 Year Anniversary for Suomi NPP (10/28/16):
Suomi National Polar-orbiting Partnership (S-NPP) is celebrating its 5 year anniversary from launch on 10/28/2011. We'd like to congratulate the Joint Polar Satellite System (JPSS) program for a successful satellite launch and the continued orbit and data transmission back to earth. We would also like to congratulate the NOAA JPSS ground system for tracking, receiving and transmitting the data to CLASS for archival and access. To date, the CLASS has archived 5.64 Petabytes of S-NPP data with more than 18 Petabytes of data delivered to its user community. Congratulations to all!

Suomi NPP data access status (updated 02/25/16):
The majority of S-NPP products are available for ordering through CLASS. For those datasets available for public access the begin dates are indicated next to the product names under the many JPSS search pages. A complete table of SNPP products showing product maturity level date ranges has recently been added to the CLASS FAQ under the NPP FAQ section. Also, links to the Readme files have been moved from the CLASS front page to this table located at the following URL: http://www.nsof.class.noaa.gov/release/data_available/npp/npp_public_data_table.htm

For further assistance please check out the [STAB Science Documents](#) website for JPSS Algorithm Theoretical

SEARCH FOR DATA

- Environmental Data from Polar-orbiting Satellites
- Environmental Data from Geostationary Satellites
- Defense Meteorological Satellite Program (DMSP)
- Suomi National Polar-orbiting Partnership (NPP)
- Sea Surface Temperature data (SST)
- RADARSAT
- Altimetry / Sea Surface Height Data (JASON)
- Global Navigation Satellite Systems (GNSS)
- Other - Miscellaneous products in CLASS

SEARCH COLLECTION METADATA

GO