

**National Climatic Data Center**

**DATA DOCUMENTATION**

**FOR**

**DATA SET 3641 (DSI-3641)**

**Hurricane Satellite (HURSAT-B1):  
ISCCP B1 observations of tropical cyclones  
worldwide**

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## 1. Abstract

The "Hurricane Satellite (HURSAT-B1): ISCCP B1 observations of tropical cyclones worldwide" data consist of raw satellite observations derived from the ISCCP B1 data centered on historical tropical cyclones (TC). The data derive from the global constellation of geostationary satellites (GOES, GMS and Meteosat series) spanning 1983 through the present. The data are available at 3-hour intervals and are gridded to roughly 8km resolution. The data include infrared window, visible and other channels available from the satellite instruments. Hurricane database (HURDAT) and "best track" information (from the JTWC) were temporally-interpolated to match the satellite data resolution. The satellite data were then gridded to 8km, with grid centers fixed on the tropical cyclone center of circulation. Data include hurricanes from the North Atlantic, Pacific and Indian Ocean Basins. Data are provided in a convenient NetCDF format which is self-documenting and follows standard storage and meta-data conventions. This data set will be updated on an as needed basis.

## 2. Element Names and Definitions

### 2.1 File Storage Format and Conventions

File storage format:  
NetCDF version 3

File storage URL:  
<http://www.unidata.ucar.edu/software/netcdf/>

File storage convention:  
COARDS (for TC-B1 data, version 1)

File storage convention URL:  
[http://ferret.wrc.noaa.gov/noaa\\_coop/coop\\_cdf\\_profile.html](http://ferret.wrc.noaa.gov/noaa_coop/coop_cdf_profile.html)

File metadata convention:  
<http://www.unidata.ucar.edu/software/netcdf-java/formats/DataDiscoveryAttConvention.html>

### 2.2 File naming convention:

*(Note: All times referenced in the naming convention are to the Universal Time Code, UTC)*

YyysBbNnn.Yyyn.Mm.Dd.Hhmm.Vv.Sat-Nn.Www.isccp-blu.ver.nc

Where:

Yyys = The year the tropical cyclone began (this may be different than YyyN if the cyclone began near the end of the year).

Bb = Basin ID:  
EP = Eastern Pacific  
IO = Indian Ocean  
NA = North Atlantic  
SH = Southern hemisphere  
WP = Western Pacific

Nnn = Storm ID. If a storm name is available, then this is the first 3 letters of the storm name. Otherwise, this is a zero-filled integer.

YyyN = Year of acquisition of the satellite image

Mm = Integer representing the month of the image acquisition 01=January, 02=February, ..., 12=December

Dd = Day of month of the image acquisition

Hhmm = Time of the satellite acquisition where Hhmm is Hh:mm UTC. The time represents the time the image acquisition began. Since images take at most 28 minutes to acquire, that represents the largest difference in time between the image and this subset of the image.

Vv = View zenith angle (degrees) from the satellite to the tropical cyclone center of circulation.

Sat-Nn = ISCCP Satellite ID where:  
GOE = GOES (U.S.A.)  
MET = Meteosat (Europe)  
GMS = GMS (Japanese)  
MTS = MTSAT (Japanese)

Www = Interpolated central wind speed. This is interpolated from the 6-hourly BEST track wind speed.

isccp-blutc = file suffix that identifies the data file and the file format

ver = file version. Initially, only version 1 (v01) exists, but future versions are forthcoming.

nc = file suffix identifying the file as a NetCDF file.

Example:

1992SH027.1993.01.01.0300.26.GMS-4.070.isccp-blutc.v01.nc

Means:

Year storm began	= 1992
Basin	= Southern Hemisphere (SH)
Storm ID	= 027
Image obtained - Year	= 1993
Image obtained - Month	= 01 (January)
Image obtained - Day of Month	= 01
Image obtained - Time	= 0300 = 03:00 UTC
Satellite view zenith angle	= 26 deg

Satellite	=	GMS-4
Tropical Cyclone Wind Speed	=	70 [UNITS??]
Dataset id	=	isccp-blutc
Version	=	1
File type	=	nc (NetCDF file)

### 2.3 Global Attributes:

*Note: Information on the Global Attributes can be obtained using the netCDF utility: ncdump*

The bulk of the global attributes derive from the "Unidata Dataset Discovery v1.0" which is described at:

<http://www.unidata.ucar.edu/software/netcdf-java/formats/DataDiscoveryAttConvention.html>

or the COARDS convention described at:

[http://ferret.wrc.noaa.gov/noaa\\_coop/coop\\_cdf\\_profile.html](http://ferret.wrc.noaa.gov/noaa_coop/coop_cdf_profile.html)

A description of the attributes not listed in these conventions follows:

Attribute:       **Cyclone\_ID**  
Description:      The tropical cyclone ID. See the description of the format above (in the file naming convention).

Attribute:       **Cyclone\_Name**  
Description:      The tropical cyclone name (if available) as provided in the interpolated best track/HURDAT data from Jim Kossin.

Attribute:       **base\_date**  
Description:      This is the year/month/day\_of\_month of the satellite image.

Attribute:       **Projection**  
Description:      Lists the projection "Mercator" of the gridded data.

Attribute:       **Satellite\_Name**  
Description:      The name of the satellite making the observation.

Attribute:       **Sensor\_Name**  
Description:      Name of the satellite instrument making the observation.

Attribute:       **B1\_file**  
Description:      File name of the ISCCP B1 file in the NCDC archive

from which this data was derived.

Attribute: **cvvs\_info\_b12blu**

Description: CVS information regarding the routine used to convert the ISCCP B1 file to a uniform format (ISCCP B1U).

Attribute: **cvvs\_info\_b1read**

Description: CVS information regarding the routine used to read the generic ISCCP B1 data.

Attribute: **cvvs\_info\_SpcSat**

Description: CVS information regarding the specific routine used to read the data (which is specific by processing center and satellite).

Attribute: **cvvs\_info\_b12nc**

Description: CVS information regarding the routine used to extract the tropical cyclone grids from the ISCCP B1 data

Attribute: **cvvs\_info\_nc2v01**

Description: CVS information regarding the routine used to modify the NetCDF data to include the required attributes. This attribute will not appear in version 2 data as it will be part of the b12nc algorithm.

## 2.4 Variables:

*Note: Information on the variables can be obtained using the netCDF utility: ncdump*

Again, COARDS conventions define the `add_offset`, `scale_factor`, `long_name` and `units` attributes. We only describe that which can not be obtained from `ncdump` and an understanding of the COARDS convention.

Element Name: lat

Definition: Latitude dimension vector of the corresponding satellite observation grids.

Element Name: lon

Definition: Longitude dimension vector of the corresponding satellite observation grids.

Element Name: VZA

Definition: Satellite view zenith angle.

Element Name: IRWIN

Definition: Infrared window channel brightness temperature observation. The data is provided in scaled temperature. The original B1 data were calibrated using the ISCCP absolute calibration (version was that as of May 2006). The data were further calibrated using coincident HIRS observations and provided corrections to the ISCCP calibration. The application of the correction is described below.

#### Attributes

Calibration\_Correction\_Equation: *This is the equation on how the calibration correction should be applied.*

Calibration\_Correction\_Scale: *The scale used in the calibration correction.*

Calibration\_Correction\_Offset: *The offset used in the calibration correction.*

Calibration\_Correction\_AppendDate: *The date the calibration correction was appended to the file.*

Calibration\_Correction\_TableVersion: *The filename and version of the calibration correction from which the correction derives.*

#### ***Depending on the availability of channels the following channels are optional for all data sets.***

Element Name: VSCHN (*optional*)

Definition: Visible channel observations.

Element Name: IRWVP (*optional*)

Definition: Infrared window channel observations.

Element Name: IRSPL (*optional*)

Definition: Split window channel observations.

Element Name: IRNIR (*optional*)

Definition: Near-infrared channel observations.

#### ***The following variables will likely be moved to global attributes in future releases of the data.***

Element Name: NomDate

Definition: Nominal starting date (UTC) of the satellite image. This is generally of the form YYJJJ where YY is the last two digits of the year and JJJ is the day of the year. Note: It may also be of a format which includes a 4-digit year. That is,

YYYYJJJ.

Element Name: NomTime  
Definition: The nominal starting time (UTC) of the satellite image, of the format HHMMSS

Element Name: sss  
Definition: Sensor ID. The missing value is -9999. A table of the McIDAS sensor IDs is available at:  
[http://www.ssec.wisc.edu/mcidas/doc/misc\\_doc/area2.html](http://www.ssec.wisc.edu/mcidas/doc/misc_doc/area2.html) (sensor source numbers)

Element Name: nchan  
Definition: Dimension describing the number of available channels from the instrument.

Element Name: SubSatLat  
Definition: The satellite nadir point latitude at the time of the image observation.

Element Name: SubSatLon  
Definition: The satellite nadir point longitude at the time of the image observation.

### **3. Start Date**

19830701 (but may change)

### **4. Stop Date**

Ongoing.

### **5. Coverage**

- a. Southernmost Latitude: 90S
- b. Northernmost Latitude: 90N
- c. Westernmost Longitude: 180W
- d. Easternmost Longitude: 180E

### **6. How to Order Data**

Ask NCDC's Climate Services about costs of obtaining this dataset.

Phone 828-271-4800  
Fax 828-271-4876  
e-mail [NCDC.Orders@noaa.gov](mailto:NCDC.Orders@noaa.gov)

## 7. Archiving Data Center

a. Name: National Climatic Data Center/NCDC  
Address: Federal Building  
151 Patton Ave.  
Asheville, NC 28801-5001  
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## 8. Technical Contact

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Fax: 828-  
Email: [Ken.Knapp@noaa.gov](mailto:Ken.Knapp@noaa.gov)

b. Name: RSAD Chief  
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151 Patton Ave.  
Asheville, NC 2801-5001  
Voice: 828-271-4339  
Fax: 828-  
Email:

## 9. Known Uncorrected Problems

The version 1 data are not fully CF compliant. However, the data are COARDS compliant and are thus usable with grads-dods and other data processing routines which make use of the COARDS convention. Future versions of the data will be fully CF compliant.

## **10. Quality Statement**

Disclaimer: While every effort has been made to ensure that these data are accurate and reliable within the limits of the current state of the art, NOAA cannot assume liability for any damages caused by any errors or omissions in the data, nor as a result of the failure of the data to function on a particular system. NOAA makes no warranty, expressed or implied, nor does the fact of distribution constitute such a warranty.

This dataset has undergone extensive quality checks on all parameters, including range checks and elimination of reporting sites with extensive missing data.

## **11. Essential Companion Datasets**

None.

## **12. References**

Knapp, K. R. (2007), Calibration of long-term geostationary infrared observations using HIRS, *Journal of Atmospheric and Oceanic Technology*, Submitted.

Knapp, K. R., and J. P. Kossin (2007), Global tropical cyclone data set from ISCCP B1 geostationary satellite data, *Journal of Applied Remote Sensing*, Submitted.

Kossin, J. P., K. R. Knapp, D. J. Vimont, and R. J. Murnane (2007), A Reanalysis of Global Hurricane Trends, *Geophysical Research Letters*, Submitted.

## **13. Revision Information**

20061231 - Changed title of data set to reflect the new direction (future HURSAT-AVHRR)