

**Description of IR cloud feature and tracks
V1.0**

Chuntao Liu

Department of Physical and Environmental Sciences
Texas A&M University –Corpus Christi

Chuntao.liu@tamucc.edu

<http://atmos.tamucc.edu/trmm/data/ircfs/>

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1. IR Cloud Features (IRCFs)

This database is created with merged IR product from 1998 to near current to identify clouds. Cloud features are identified by grouping contiguous 0.036°x0.036° grids with IR TB less or equal to 235 K. The output data are combined into monthly files and distributed online. The properties of each precipitation feature are summarized and listed below:

YEAR	LONG	Array[1147]	
MONTH	LONG	Array[1147]	
DAY	LONG	Array[1147]	
HOUR	LONG	Array[1147]	
LON	FLOAT	Array[1147]	geo-center longitude in degrees
LAT	FLOAT	Array[1147]	geo-center latitude in degrees
MINIR	FLOAT	Array[1147]	minimum IR brightness temperature in K
AREA	FLOAT	Array[1147]	area in km ²
NPIXELS	FLOAT	Array[1147]	number of grids
NPIX_235	FLOAT	Array[1147]	number of grids colder than 235 K
NPIX_220	FLOAT	Array[1147]	number of grids colder than 220 K
NPIX_210	FLOAT	Array[1147]	number of grids colder than 220 K
NPIX_200	FLOAT	Array[1147]	number of grids colder than 220 K
R_MAJOR	FLOAT	Array[1147]	Fit ellipse major axis in km
R_MINOR	FLOAT	Array[1147]	Fit ellipse minor axis in km
R_LON	FLOAT	Array[1147]	Fit ellipse longitude in degree
R_LAT	FLOAT	Array[1147]	Fit ellipse latitude in degree
R_ORIENTATION	FLOAT	Array[1147]	Fit ellipse orientation angle, 0 is east

The morphology of the feature can be represented by major, minor axes, orientation angle of fitted ellipse. Here R_XXX are the parameters fitted for whole feature

2. Collocation of WWLLN Lightning dataset

Using the ellipse parameters, the WWLLN lightning data between 2010 to 2019 are collocated to the IRCFs. The parameters include:

FLS15A	FLOAT	Number of lightning within 15 minutes after the IRCF
FLS15B	FLOAT	Number of lightning within 15 minutes after the IRCF
FLS30A	FLOAT	Number of lightning within 30 minutes after the IRCF
FLS30B	FLOAT	Number of lightning within 30 minutes after the IRCF

3. Tracking of IPFs

Tracking of IPFs is completed only for data between 2015-2019 for system with size greater than 1000 km². The parameters calculated for each track include:

T	FLOAT	Array[3055518]	Julday time of each feature
T_IND	FLOAT	Array[1488]	Unique Time index
TRACKS	LONG	Array[3055518]	Track index of each IPF
TRACK_ID	LONG	Array[840942]	Track Index
TRACK_START_TIME	FLOAT	Array[840942]	Track start time
TRACK_START_LON	FLOAT	Array[840942]	Track start longitude
TRACK_START_LAT	FLOAT	Array[840942]	Track start latitude
TRACK_END_TIME	FLOAT	Array[840942]	Track end time
TRACK_END_LON	FLOAT	Array[840942]	Track end longitude
TRACK_END_LAT	FLOAT	Array[840942]	Track end latitude
TRACK_NTIMES	LONG	Array[840942]	Number of time stamps
TRACK_MINIR	FLOAT	Array[840942]	Minimum IR TB in K
TRACK_MAXSIZE	FLOAT	Array[840942]	Max size (number of grids) of IRCF
TRACK_MAX210	FLOAT	Array[840942]	Max size (number of grids) with 210 K
TRACK_MAX235	FLOAT	Array[840942]	Max size (number of grids) with 235 K
TRACK_TOTFLASH	FLOAT	Array[840942]	Total lightning counts

All the calculated parameters for each one of PFs are saved in a Level-2 product file in “HDF format”. There is an IDL program “read_sds.pro” for accessing these level-2 files.

Read_sds.pro

This program reads all the science data from HDF-4 format file and save into a structure. This program can be used to access level-2 products with new definitions and all level-3 products.

Usage example:

```
IDL> read_sds,'example.HDF',f; f is a structure variable with all the parameters
```

Read_sds_one.pro

This program reads in one variable from HDF-4 format file Usage:

```
IDL> read_sds_one,'example.HDF','var1',var
```

All these IDL programs can be downloaded at:

<http://atmos.tamucc.edu/trmm/software/>