

README Document for
MODIS 8-day 1km Land Surface Temperature in Giovanni

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Summary:

The MODIS 8-day 1 km land surface temperature (LST) products in Giovanni covers Monsoon Asian Integrated Regional Study (MAIRS) region, which are processed from MODIS standard 8-day 1 km Land Surface Temperature & Emissivity products (MOD11A2.005 and MYD11A2.005). The original 10x10 degree tiled sinusoidal projected data are mosaic and re-projected onto equidistant cylindrical projection (or equirectangular projection) with nearest point sampling method. The data file covers entire Asian Monsoon region (0° – 60°N, 60°E – 150°E). This data set comprised daytime and nighttime LSTs averaged over clear-sky condition and quality flags.

Product Name:

Short Name: MOD11A2_MAIRS.005

Long Name: MODIS/Terra Land Surface Temperature and Emissivity 8-Day L3 1km MAIRS Region

Sensor/Platform: MODIS/Terra

Short Name: MYD11A2_MAIRS.005

Long Name: MODIS/Aqua Land Surface Temperature and Emissivity 8-Day L3 1km MAIRS Region

Sensor/Platform: MODIS/Aqua

Data Set Characteristics:

Temporal coverage	MOD11A2_MAIRS.005: 2000.03.05 - present MYD11A2_MAIRS.005: 2002.07.04 - present
Spatial coverage	0° – 60°N, 60°E – 150°E
Temporal resolution	8-day
Resolution	1 km at Equator (0.008992° x 0.008992°)
Projection	cylindrical equidistant (Equirectangular)
Data format	HDF-EOS

File Size	~ 98 MB compressed
Dimension	6672x 10008
First data point location	60°N, 60°E

File Name Convention:

MAIRS_<product>_L3_<version>_<YYYYMMDD>.hdf

Where:

<product> = MOD11A2 for data from MODIS/Terra

MYD11A2 for data from MODIS/Aqua

<version> = processing version, the current version is v005

<YYYYMMDD> = year, month, day

Parameters:

Each data file contains four scientific data sets (SDS) (i.e., parameters or HDF layers). They are:

Name	Unit	Data Type	Fill Value	Scaling (slope/offset)
LST_Day_1km: 8-day daytime 1km grid Land-surface Temperature	K	16-bit unsigned integer	0	0.02/0.
QC_Day: Quality control for daytime LST and emissivity		8-bit unsigned integer	0	
LST_Night_1km: 8-day nighttime 1km grid Land-surface Temperature	K	16-bit unsigned integer	0	0.02/0.
QC_Night: Quality control for nighttime LST and emissivity		8-bit unsigned integer	0	

The QC science data sets in this product (QC_Day, QC_Night) provide the user with information on algorithm results that can be viewed in a spatial context for each grid point. The following table lists the QC flags:

Bit No.	Name	Bit Comb.	V005 QC Flag
0-1	Mandatory QA Flags	00	LST produced, good quality, not necessary to examine more detailed QA

		01	LST produced, other quality, recommend examination of more detailed QA
		10	LST not produced due to cloud effects
		11	LST not produced primarily due to reasons other than cloud
2-3	Data Quality Flag	00	good data quality of L1B in 7 TIR bands
		01	Other quality data
		10	TBD
		11	TBD
4-5	Emis Error Flag	00	Average emissivity error ≤ 0.01
		01	Average emissivity error ≤ 0.02
		10	Average emissivity error ≤ 0.04
		11	Average emissivity error > 0.04
6-7	LST Error	00	Average LST error $\leq 1K$
		01	Average LST error $\leq 2K$
		10	Average LST error $\leq 3K$
		11	Average LST error $> 3K$

Data Access Methods:

Direct FTP:

ftp://neespi.gsfc.nasa.gov/data/s4pa/Land_Surface_Temperature/

Giovanni (online visualization and analysis):

http://gdata1.gsfc.nasa.gov/daac-bin/G3/gui.cgi?instance_id=mairs_8day

Processing Methods:

The data sets are processed by using MODIS Reprojection Tool (MRT) release 4.0 from the USGS and NASA land processes and distributed active archive center (LP DAAC). First, the original 8-day 1km Land Surface Temperature & Emissivity products (MOD11A2.005 and MYD11A2.005) were downloaded for all tiles over the Asian monsoon region. Then, programs **mrtmosaic** and **resample** were run under batch mode with the following setting:

```

SPATIAL_SUBSET_TYPE = INPUT_LAT_LONG
SPATIAL_SUBSET_UL_CORNER = ( 60.0 60.0 )
SPATIAL_SUBSET_LR_CORNER = ( 0.0 150.0 )
RESAMPLING_TYPE = NN (nearest point)

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OUTPUT_PROJECTION_TYPE = ER (equi-rectangular projection)
OUTPUT_PROJECTION_PARAMETERS = (6371007.181 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0 0.0)
DATUM = NoDatum
OUTPUT_PIXEL_SIZE = 1000

Data Quality:

The near point method is used for re-sampling. The data quality of each grid point is remained as the input data. The original input dataset MOD11A2.005 and MYD11A2.005 are composed by clear-sky pixels within the grid box (Wan, 2007).

In Giovanni, no quality filtering is performed. Therefore, all valid data points at all quality levels are participated in analysis.

For more information about validation and data quality of the input data, please read MODIS land validation page: <http://landval.gsfc.nasa.gov/ProductStatus.php?ProductID=MOD11>

Input data source:

The input data of this data set are MOD11A2.005 and MYD11A2.005, downloaded from USGS and NASA land processes and distributed active archive center <https://lpdaac.usgs.gov/>.

References:

LP DAAC MODIS products: https://lpdaac.usgs.gov/lpdaac/products/modis_products_table

MODIS Land validation: <http://landval.gsfc.nasa.gov/ProductStatus.php?ProductID=MOD11>

Wan, Zhengming: Collection-5 MODIS Land Surface Temperature Products Users' Guide, 2007
http://www.ices.ucsba.edu/modis/LstUsrGuide/MODIS_LST_products_Users_guide_C5.pdf