



Clouds and the Earth's Radiant Energy System (CERES) Hourly Cloud Properties Stratified by ISCCP Cloud Types for Day and Night. (CldTypHist) Data Set Abstract



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Data Set Description:

The Hourly Cloud Properties Stratified by ISCCP Cloud Types for Day and Night (CldTypHist) archival data product contains cloud parameters from low earth orbit and geostationary satellite imagers averaged over regions in a 1.0-degree equal angle grid for a month. They are divided between day and night, combined, and hourly averages.

Input to the CldTypHist Gridding Subsystem is the Single Scanner Footprint TOA/Surface Fluxes and Clouds (SSF) archival data product and gridded geostationary (GGEO) intermediate product. Each CldTypHist contains regional monthly averages of day, night, and combined day and night cloud properties. These cloud properties are also provided as hourly averages over the month. The product is written in HDF and contains metadata as well as gridded science data. The data is organized into monthly HDF files, each containing data on a 1.0-degree equal-angle grid. The science data are SDSs with multiple records. Each record contains spatially averaged data.

The CldTypHist product includes:

- Regional Data
- Surface Parameters (Elevation, Ocean Coverage, Snow and Ice Coverage, Surface Properties)
- Meteorological Parameters (Winds, Temperature, Pressure, Precipitable Water)
- Cloud Macro and Micro-Properties (Fraction, Temperature, Height, Pressure, Optical Depth, Radius, Path)
- Cloud optical depth and pressure histograms of cloud properties

Only footprints with imager coverage are included. Therefore, CERES footprints which fall outside of the imager swath do not appear on the CldTypHist product. The maximum MODIS viewing zenith angle is $\sim 65^\circ$, and the maximum VIIRS viewing zenith angle is $\sim 70^\circ$. Geostationary satellite imagery data are used within certain longitude boundaries for the five satellites.

Additional information about the format and content of the CldTypHist can be found in the [CERES Data Products Catalog](#).

Summary of Changes:

The CERES Data Management Team and the Atmospheric Science Data Center (ASDC) at Langley use a Sampling Strategy, a Production Strategy, and a Configuration Code (CCode) to track versions of CERES primary data products. In general, minor reprocessing changes are tracked by increasing the Configuration Code while major reprocessing changes result in a new Production Strategy. The Sampling Strategy identifies the satellite and instruments which acquired the data in the product.

A summary of changes made to the CERES CldTypHist product is shown in the following tables.

Modification History of the CERES GEO-MODIS-VIIRS CldTypHist Product

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on the NPP SSF1deg-Hour Product
GEO_MODIS-VIIRS_Edition4A ⁽⁴⁾	408409	Oct 2023	- PGEs were at the 408409 version of GEO-MODIS - The NOAA-20 SSF replaced Aqua as the afternoon LEO.
Availability: (1) not available; (2) restricted to CERES analysts; (3) restricted to CERES Science Team and analysts; (4) public			

Modification History of the GEO-MODIS CERES CldTypHist Product

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on the NPP SSF1deg-Hour Product
GEO_MODIS_Edition4A ⁽⁴⁾	408409	Aug 2023	Snow and Ice map supplemental product switched from 16th mesh SNODEP to USAF Snow and Ice 0.9 degree
GEO_MODIS_Edition4A ⁽⁴⁾	407409	Aug 2023	Snow and Ice map supplemental product switched from 8th mesh CLASS to USAF SNODEP 16th mesh.
GEO_MODIS_Edition4A ⁽⁴⁾	406409	Aug 2023	Instead of using a five-month average in calculating gains only a three-month average was used for inputs to the SSF. No impact on the MODIS clouds.
GEO_MODIS_Edition4A ⁽⁴⁾	405409	Sep 2023	Himawari 8 GEO rerun at 6 km instead of 8 km and switched to MATCH instead of climatological aerosol.
GEO_MODIS_Edition4A ⁽⁴⁾	404409	Aug 2023	- Updated software to run with NOAA-20 SSF netCDF files. - The Terra and Aqua SSF imager radiances is Collection 6.1
GEO_MODIS_Edition4A ⁽⁴⁾	407408	Oct 2020	Snow and Ice map supplemental product switched from 8th mesh CLASS to USAF SNODEP 16th mesh.
GEO_MODIS_Edition4A ⁽⁴⁾	406408	Oct 2020	Instead of using a five-month average for calculating gains only a three-month average was used for inputs to the SSF. No impact on the MODIS clouds.
GEO_MODIS_Edition4A ⁽⁴⁾	405408	May 2019	Himawari 8 GEO rerun at 6 km instead of 8 km and switched to MATCH instead of climatological aerosol.
GEO_MODIS_Edition4A ⁽⁴⁾	404408	Mar 2019	The Terra and Aqua SSF imager radiances switched to Collection 6.1.
GEO_MODIS_Edition4A ⁽⁴⁾	403408	Mar 2019	Himawari 8 GEO inputs reprocessed.
GEO_MODIS_Edition4A ⁽⁴⁾	402407	Sep 2017	- Updated software to better handle movement of satellites between domains (MET-8). 9/16 input
GEO_MODIS_Edition4A ⁽⁴⁾	401406	Apr 2017	- Added an ancillary lookup table to specify which GEO satellites should be used instead of having them hard coded. - Implemented changes to handle edge cases when inputs are missing
GEO_MODIS_Edition4A ⁽⁴⁾	401405	Feb 2017	Input SSF data files were created from Edition1-CV inputs.

Modification History of the GEO-MODIS CERES CldTypHist Product

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on the NPP SSF1deg-Hour Product
GEO_MODIS_Edition4A ⁽⁴⁾	400405	Jan 2017	- Implement limit on how many jobs can run at one time. - Transition to use same GEO boundary file as GGEO - Added additional GEO satellites that entered in 2016
GEO_MODIS_Edition4A ⁽⁴⁾	401404	Oct 2016	- Modified PGE not to delete intermediate files. - Input SSF data files were created from Edition1-CV inputs.
GEO_MODIS_Edition4A ⁽⁴⁾	400403	Oct 2016	Initial code to produce CldTypHist
Availability: (1) not available; (2) restricted to CERES analysts; (3) restricted to CERES Science Team and analysts; (4) public			

References:

An overview of the temporal interpolation and spatial averaging algorithms used for CERES can be found in the following reference:

Young, D. F., P. Minnis, D. R. Doelling, G. G. Gibson, and T. Wong, 1998: Temporal Interpolation Methods for the Clouds and Earth's Radiant Energy System (CERES) Experiment. *J. Appl. Meteorol.*, **37**, 572-590

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Acknowledgement:

The requested form of acknowledgment for any publication in which these data are used is:

"These data were obtained from the NASA Langley Research Center Atmospheric Science Data Center."

The Langley Data Center requests a reprint of any published papers or reports or a brief description of other uses (e.g., posters, oral presentations, etc.) of data that we have distributed. This will help the Data Center determine the use of data distributed, which is helpful in optimizing product development. It also helps us to keep our product-related references current.

Document Information:

Document Creation Date: April 1, 2026

Review Date:

Modification History: None

Last Date Modified: April 1, 2026

Document ID:

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