



Clouds and the Earth's Radiant Energy System (CERES) Daily/Monthly Average Flux Stratified by ISCCP Cloud Types for Day. (FluxByCldTyp- Day/Month) Data Set Abstract



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Data Set Description:

The Daily and Monthly Flux By Cloud Type provides derived fluxes and cloud properties stratified by ISCCP Cloud Pressure and Optical Depth for Day and Month (FluxByCldTyp-Day/Month) archival data product contains daily averaged Top of Atmosphere (ToA) derived fluxes for each portion of the footprint using imager narrowband radiance then normalized to the observed flux and then stratified by seven cloud pressure layers and six optical depth bins along with clear from low earth orbit satellite imagers averaged over regions in a 1.0-degree equal angle grid for a day and month.

Input to the FluxByCldTyp Gridding Subsystem is the Single Scanner Footprint TOA/Surface Fluxes and Clouds (SSF) archival data product. Each FluxByCldTyp contains regional daily and monthly averages of daytime flux and cloud properties. The product is written in netCDF and contains metadata as well as gridded science data. The data is organized into daily and monthly netCDF 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 FluxByCldTyp product includes:

- Regional Data
- All and Clear-Sky TOA Fluxes
- Cloud optical depth and pressure histograms of TOA Fluxes
- Total Cloud Macro and Micro-Properties (Fraction, Temperature, Height, Pressure, Optical Depth, Radius, Path)
- Cloud optical depth and pressure histograms of Cloud Macro and Micro-Properties

Only footprints with solar zenith angle less than 82 degrees and imager coverage are included. Therefore, CERES footprints which fall outside of the imager swath do not appear on the FluxByCldTyp product. The maximum MODIS viewing zenith angle is $\sim 65^\circ$, and the maximum VIIRS viewing zenith angle is $\sim 70^\circ$.

Additional information about the format and content of the FluxByCldTyp 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 FluxByCldTyp product is shown in the following tables.

Modification History of the CERES NOAA20-VIIRS FluxByCldTyp Product

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on the NOAA20-VIIRS FluxByCldTyp Product
NOAA20-VIIRS_Edition1C ⁽⁴⁾	103103	Dec 2025	MATCH aerosols based on NOAA-20 aerosols in SSF.
NOAA20-VIIRS_Edition1C ⁽⁴⁾	102103	Dec 2025	Used Edition1-CV SSF as input instead of Edition1C intermediate SSF inputs,
NOAA20-VIIRS_Edition1C ⁽⁴⁾	101103	Dec 2025	The SSF snow and Ice map supplemental product switched from 16th mesh SNODEP to USAF Snow and Ice 0.9 degree.
NOAA20-VIIRS_Edition1C ⁽⁴⁾	100103	Dec 2025	- Fixed a bug where the snow/ice percent was not included for the ADM calculation. - Fixed a bug where shortwave flux calculation was missing cloud layer information in some cases/ - Edition1C SSF are used which are processed with MERRA-2 meteorology.
NOAA20-VIIRS_Edition1B ⁽⁴⁾	101102	Sep 2023	The SSF snow and Ice map supplemental product switched from 16th mesh SNODEP to USAF Snow and Ice 0.9 degree.
NOAA20-VIIRS_Edition1B ⁽⁴⁾	100102	Sep 2023	- PGEs were at the 408409 version of Terra-Aqua-MODIS - The NOAA-20 SSF is used as the input.
Availability: (1) not available; (2) restricted to CERES analysts; (3) restricted to CERES Science Team and analysts; (4) public			

Modification History of the CERES Terra-Aqua-MODIS FluxByCldTyp Product

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on the Terra-Aqua-MODIS FluxByCldTyp Product
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	407401	Jun 2023	Snow and Ice map supplemental product switched from 16th mesh SNODEP to USAF Snow and Ice 0.9 degree
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	406401	Mar 2022	Snow and Ice map supplemental product switched from 8th mesh CLASS to USAF SNODEP 16th mesh.
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	405401	Jan 2022	Instead of using a five-month average in calculating gains only a three-month average was used
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	404401	Jan 2022	Spectral Correction Coefficient produced on x86 for SSF.
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	403401	Jan 2022	- MODIS Collection 061 used as clouds inputs for SSF. - MATCH aerosols used MODIS Collection 061 inputs for SSF.
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	401401	Jan 2022	Input SSF data files were created from Edition1-CV inputs.
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	400401	Jan 2022	Fixed a bug with the daily albedo calculation and subsequently affects shortwave flux and albedo values in both daily and monthly
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	405400	Oct 2020	Instead of using a five-month average in calculating gains only a three-month average was used
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	404400	Jul 2020	Spectral Correction Coefficient produced on x86 for SSF.

Modification History of the CERES Terra-Aqua-MODIS FluxByCldTyp Product

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on the Terra-Aqua-MODIS FluxByCldTyp Product
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	403400	Jul 2020	- MODIS Collection 061 used as clouds inputs for SSF. - MATCH aerosols used MODIS Collection 061 inputs for SSF.
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	401400	Jul 2020	Input SSF data files were created from Edition1-CV inputs.
Terra-Aqua-MODIS_Edition4A ⁽⁴⁾	400400	Jun 2020	Initial code to produce FluxByCldTyp
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:

Sun, M., D. R. Doelling, N. G. Loeb, R. C. Scott, J. Wilkins, L. T. Nguyen, P. Mlynchak, 2022: Clouds and the Earth's Radiant Energy System (CERES) FluxByCldTyp Edition 4 Data Product. J. Atmos. Oceanic Technol., 39(3), 303-318. DOI: [10.1175/JTECH-D-21-0029.1](https://doi.org/10.1175/JTECH-D-21-0029.1)

Contact Information:

Investigator(s) Name and Title	Technical Contact(s)	Data Center
Norman G. Loeb CERES Interdisciplinary Principal Investigator E-mail: norman.g.loeb@nasa.gov Telephone: (757) 864-5688	David R. Doelling E-mail: david.r.doelling@nasa.gov Telephone: (757) 864-2155 Atmospheric Science Research Mail Stop 420 NASA Langley Research Center Hampton, Virginia 23681-2199 USA FAX: (757) 864-7996	User and Data Services Office Atmospheric Science Data Center NASA Langley Research Center Mail Stop 157D Hampton, Virginia 23681-2199 USA Telephone: (757) 864-8656 FAX: (757) 864-8807 E-mail: support-asdc@earthdata.nasa.gov URL: https://www.earthdata.nasa.gov/data/instruments/ceres-instruments

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.

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Author: User and Data Services, Langley ASDC

ASDC Help Desk: Phone (757) 864-8656; E-mail support-asdc@earthdata.nasa.gov