



Clouds and the Earth's Radiant Energy System (CERES) SYN/AVG/ZAVG Data Set Abstract



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Data Set Description:

The Synoptic Radiative Fluxes and Clouds (SYN) product contains a day of space and time averaged Clouds and the Earth's Radiant Energy System (CERES) data for a single scanner instrument. The 1-degree regional fluxes are averaged at 3-hour GMT based intervals.

The monthly Regional Radiative Fluxes and Clouds (AVG) product contains monthly and monthly hourly (3-hour) averages of the Synoptic Radiative Fluxes and Clouds (SYN) product.

The Monthly Zonal and Global Radiative Fluxes and Clouds (ZAVG) product are the zonal and global averages of the monthly and monthly hourly (3-hour) averages of the Synoptic Radiative and Clouds (SYN) product.

SYN, AVG and ZAVG are archival products produced by Subsystem 8. There is one set produced for the CERES-instrument in cross-track (FAPS) mode for each spacecraft. This product is written in HDF and contains metadata as well as gridded science data. The science data are SDSs with multiple records. Each record contains spatially averaged data for an individual region, zone or globe.

The SYN, AVG and ZAVG products include:

- Regional data (SYN, AVG)
- Zonal and global data (ZAVG)
- Cloud category properties for four (low, lower middle, upper middle and high) cloud layers
- Observed CERES TOA clear-sky and all-sky fluxes
- MODIS based spectral aerosol optical depths
- Constrained (tuned) vertical flux profiles for both clear-sky and total-sky conditions evaluated at the TOA, 70mb, 200mb, 500mb, and surface
- The constrained (tuned) and initial (untuned) profiles for the pristine (clear sky no-aerosol), clear-sky, total-sky-no-aerosol, and total-sky conditions
- The adjusted radiative transfer model input parameters
- The direct and diffuse SW surface fluxes for total-sky, clear-sky, pristine and actinic conditions
- The surface UVA and UVB downwelling and direct diffuse ratios for total-sky, clear-sky, pristine and total-sky-no-aerosol conditions

Additional information about the format and content of the SYN/AVG/ZAVG can be found in the [CERES Data Products Catalog](#). A detailed description of the SYN/AVG/ZAVG can be found in the SYN/AVG/ZAVG Collection Guides.

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 SYN/AVG/ZAVG product is shown in the following tables.

Modification History of the CERES SYN/AVG/ZAVG Terra Products

Sampling Strategy and Production Strategy	CCode	Available at ASDC	Impact on Terra SYN, AVG and ZAVG Products
Terra-FM1-MODIS_Beta3 ⁽⁴⁾ Terra-FM2-MODIS_Beta3 ⁽⁴⁾	005003	April 2007	<ul style="list-style-type: none"> • The 3-hourly and the monthly 3-hourly average code are updated and modified. Cloud properties are averaged with cloud fractions for weighting. • MODIS aerosol optical depths are included. • TOA flux errors are included. • TSI inputs with "NaN" or "Inf" are replaced with defaults. • Linear interpolation is added for hours with missing data in SYNI. • Untuned fluxes are computed from tuned and adjusted fluxes. • Direct and diffuse fluxes are computed from the total fluxes and the direct diffuse ratios. The direct and the diffuse fluxes are computed the surface fluxes and the direct diffuse ratios. • Number of hourboxes for observed, untuned and tuned SW and LW fluxes are added • Number of observations in AVG/ZAVG are removed. • SYN/AVG/ZAVG structures are re-organized for clearness. • The HDF file compression is included to reduce the file size.

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.

Reference:

The CERES Team has gone to considerable trouble to remove major errors and to verify the quality and accuracy of these data. Please provide a reference to the following paper when you publish scientific results with the CERES data:

Wielicki, B. A., B. R. Barkstrom, E. F. Harrison, R. B. Lee III, G. L. Smith, and J. E. Cooper, "Clouds and the Earth's Radiant Energy System (CERES): An Earth Observing System Experiment," *Bull. Amer. Meteor. Soc.*, **77**, 853-868, 1996.

Document Information:

Document Creation Date: April 4, 2007

Last Date Modified:

Review Date:

Document ID:

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