# Clouds and the Earth's Radiant Energy System (CERES) EBAF-Surface Data Set Abstract

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## Data Set Description:

The EBAF-Surface product provides computed monthly mean surface radiative fluxes that are consistent with the CERES EBAF-TOA product. In the CERES EBAF-TOA product, the top-of-atmosphere (TOA) fluxes are constrained so that the global net TOA flux is consistent with our best estimate of heat storage in the Earth-atmosphere system (~0.58 Wm-2). CERES EBAF-Surface is primarily intended for studies that use Earth Radiation Budget (ERB) data to evaluate climate models, estimate the Earth's annual global mean energy budget, and infer meridional heat transports. The CERES EBAF-Surface dataset is a single file in netCDF format. It consists of monthly 1° regional, zonal, and global averages of surface upward/downward longwave (LW), upward/downward shortwave (SW), and net fluxes under clear and all-sky conditions as well as associated net cloud radiative effects. Computed fluxes are based on hourly computations using cloud properties derived from narrowband imagers onboard both EOS Terra and Aqua satellites as well as geostationary satellites to more fully model the diurnal cycle of clouds. The computations are also based on meteorological assimilation data from the Goddard Earth Observing System (GEOS) Versions 4 and 5 models. Unlike other CERES Level 3 clear-sky regional data sets that contain clear-sky data gaps, the clear-sky fluxes in the EBAF-Surface product are regionally complete. The EBAF-Surface product is the CERES project's best estimate of the fluxes based on all available satellite platforms and input data.

Additional information about the quality of the content of the EBAF-Surface product can be found in the Data Quality Summary (PDF).

## Summary of Changes:

The CERES Data Management Team and the Atmospheric Sciences Data Center (ASDC) at Langley use edition nomenclature to track major changes in versions of code. A summary of changes made to the CERES EBAF-Surface product is shown in the following table.

| Edition | Available at ASDC | Impact on EBAF-Surface Product |
|---|---|---|
| Edition2.8[4] | September 2014 | • Release of Edition 2.8.<br>• Uses EBAF-TOA Edition2.8 as the constraint on TOA fluxes.<br>• The AIRS product AIRX3STM.006 is used throughout the time record for the initial correction of upper tropospheric relative humidity and to determine uncertainties of GEOS temperature and humidity.<br>• Near surface temperature and humidity corrections to mitigate the GEOS-4 to GEOS-5 discontinuity are now applied globally. |
| Edition2.7[4] | October 2013 | • Release of Edition 2.7.<br>• Uses EBAF-TOA Edition2.7 as the constraint on TOA fluxes.<br>• The discontinuities in the computed fluxes caused |

| Edition | Available at ASDC | Impact on EBAF-Surface Product |
|---|---|---|
| | | by the change from GEOS-4 to GEOS-5 were mitigated.<br>• Corrected a 1° geolocation error.<br>• The computed clear-sky fluxes over snow and sea-ice have been revised. |
| Edition2.6r[4] | August 2012 | • Release of Edition 2.6r.<br>• New product. |
| Availability: (1) not available; (2) restricted to CERES analysts; (3) restricted to CERES Science Team and analysts; (4) public | | |

## References:


1. Kato, S., N. G. Loeb, F. G. Rose, D. R. Doelling, D. A. Rutan, T. E. Caldwell, L. Yu, and R. A. Weller, 2013: Surface irradiances consistent with CERES-derived top-of-atmosphere shortwave and longwave irradiances, *J. Climate*, **26**, 2719-2740, doi:10.1175/JCLI-D-12-00436.1.


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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 made considerable efforts 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.

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