

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

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Data Set Description:

The EBAF-TOA product provides monthly mean top-of-atmosphere (TOA) radiative fluxes constrained such that the global net TOA flux is consistent with our best estimate of heat storage in the Earth-atmosphere system ($\sim 0.58 \text{ Wm}^{-2}$). CERES EBAF-TOA 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-TOA dataset is a single file in netCDF format. It consists of monthly 1° regional, zonal, and global averages of TOA longwave (LW), shortwave (SW), and net fluxes under clear and all-sky conditions as well as associated cloud radiative effects. Unlike other CERES Level 3 clear-sky regional data sets that contain clear-sky data gaps, the clear-sky fluxes in the EBAF-TOA product are regionally complete. The EBAF-TOA 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-TOA 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-TOA product is shown in the following table.

Edition	Available at ASDC	Impact on EBAF-TOA Product
Edition2.8 ⁽⁴⁾	March 2014	<ul style="list-style-type: none"> • Release of Edition 2.8. • Incoming solar irradiances are from SORCE TIM TSI V-15 for March 2000-June 2013, followed by RMIB from July 2013 onwards.
Edition2.7 ⁽⁴⁾	October 2013	<ul style="list-style-type: none"> • Release of Edition 2.7. • Improves clear-sky SW and LW TOA fluxes over snow and sea-ice. • Corrects small error from all-sky regions falling in adjacent time zones due to a coding bug.
Edition2.6r ⁽⁴⁾	August 2012	<ul style="list-style-type: none"> • Release of Edition 2.6r. • Reflects the new ocean heat storage term of 0.58 Wm^{-2}. • The global mean uses geodetically weighted zonal means, unlike Edition 1A. • Satellites are combined for this product. From March 2000 through June 2002, only Terra data was used. After June 2002, the Edition2.6r has combined the Terra and Aqua CERES fluxes.

Edition	Available at ASDC	Impact on EBAF-TOA Product
Terra_Edition1A ⁽⁴⁾	June 2008	<ul style="list-style-type: none"> • Release of Edition1A. • Reflects ocean heat storage term of 0.9 Wm⁻². • This product is based on the Terra satellite.
Availability: (1) not available; (2) restricted to CERES analysts; (3) restricted to CERES Science Team and analysts; (4) public		

References:

1. A summary of the constraint of net flux to the ocean heat storage term based on uncertainty analysis of the CERES instrument and algorithms can be found in the following reference:
Loeb, N. G., B. A. Wielicki, D. R. Doelling, G. L. Smith, D. F. Keyes, S. Kato, N. Manalo-Smith, and T. Wong, 2009: Toward optimal closure of the Earth's top-of-atmosphere radiation budget, *J. Climate*, **22**, 748-756, doi: 10.1175/2008JCLI2637.1
2. 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 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.

Document Information:

- Document Creation Date: August 20, 2012
 - Last Date Modified: March 19, 2014
 - Review Date: March 19, 2014
 - Document ID:
 - Author: User and Data Services, Langley ASDC
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