

Introduction

The Clouds and the Earth's Radiant Energy System (CERES) is a key component of the Earth Observing System (EOS) program. The CERES instrument provides radiometric measurements of the Earth's atmosphere from three broadband channels: a shortwave channel (0.3 - 5 μm), a total channel (0.3 - 200 μm), and an infrared window channel (8 - 12 μm). The CERES instruments are improved models of the Earth Radiation Budget Experiment (ERBE) scanner instruments, which operated from 1984 through 1990 on the National Aeronautics and Space Administration's (NASA) Earth Radiation Budget Satellite (ERBS) and on the National Oceanic and Atmospheric Administration's (NOAA) operational weather satellites NOAA-9 and NOAA-10. The strategy of flying instruments on Sun-synchronous, polar orbiting satellites, such as NOAA-9 and NOAA-10, simultaneously with instruments on satellites that have precessing orbits in lower inclinations, such as ERBS, was successfully developed in ERBE to reduce time sampling errors. CERES continues that strategy by flying instruments on the polar orbiting EOS platforms simultaneously with an instrument on the Tropical Rainfall Measuring Mission (TRMM) spacecraft, which has an orbital inclination of 35 degrees. In addition, to reduce the uncertainty in data interpretation and to improve the consistency between the cloud parameters and the radiation fields, CERES includes cloud imager data and other atmospheric parameters. The TRMM satellite carries one CERES instrument while the EOS satellites carry two CERES instruments, one operating in a fixed azimuth plane scanning mode (FAPS) for continuous Earth sampling and the other operating in a rotating azimuth plane scan mode (RAPS) for improved angular sampling.

A high-level view of the CERES Data Management System (DMS) is illustrated by the CERES Top Level Data Flow Diagram shown in [Figure 1](#). Circles in the diagram represent algorithm processes called subsystems. Subsystems are a logical collection of algorithms which together convert input data products into output data products. Boxes represent primary (archival), internal, or ancillary data products. Boxes with arrows entering a circle are input data sources for the subsystem, while boxes with arrows exiting the circles are output data products.

The CERES DMS produces science data products for use by the CERES Science Team, the Data Management Team, and for archival at the Langley Distributed Active Archive Center (DAAC). This document describes the data products that are shown in [Figure 1](#). Various conditions control the production rate of each product. For example, some are produced for each instrument, some are produced for both instruments on a given satellite, and some are produced for the entire CERES mission. [Figure 1](#) lists each of these scenarios and assigns a one-letter key to identify them. The CERES products are written using one of three types of data structures: Hierarchical Data Format (HDF), binary format, or Hierarchical Data Format-Earth Observing System (HDF-EOS) format, which are described in [Figure 1](#) with corresponding one-letter keys. All data products distributed to external users are archived in HDF or HDF-EOS. The binary files are used within the CERES DMS and are not distributed.

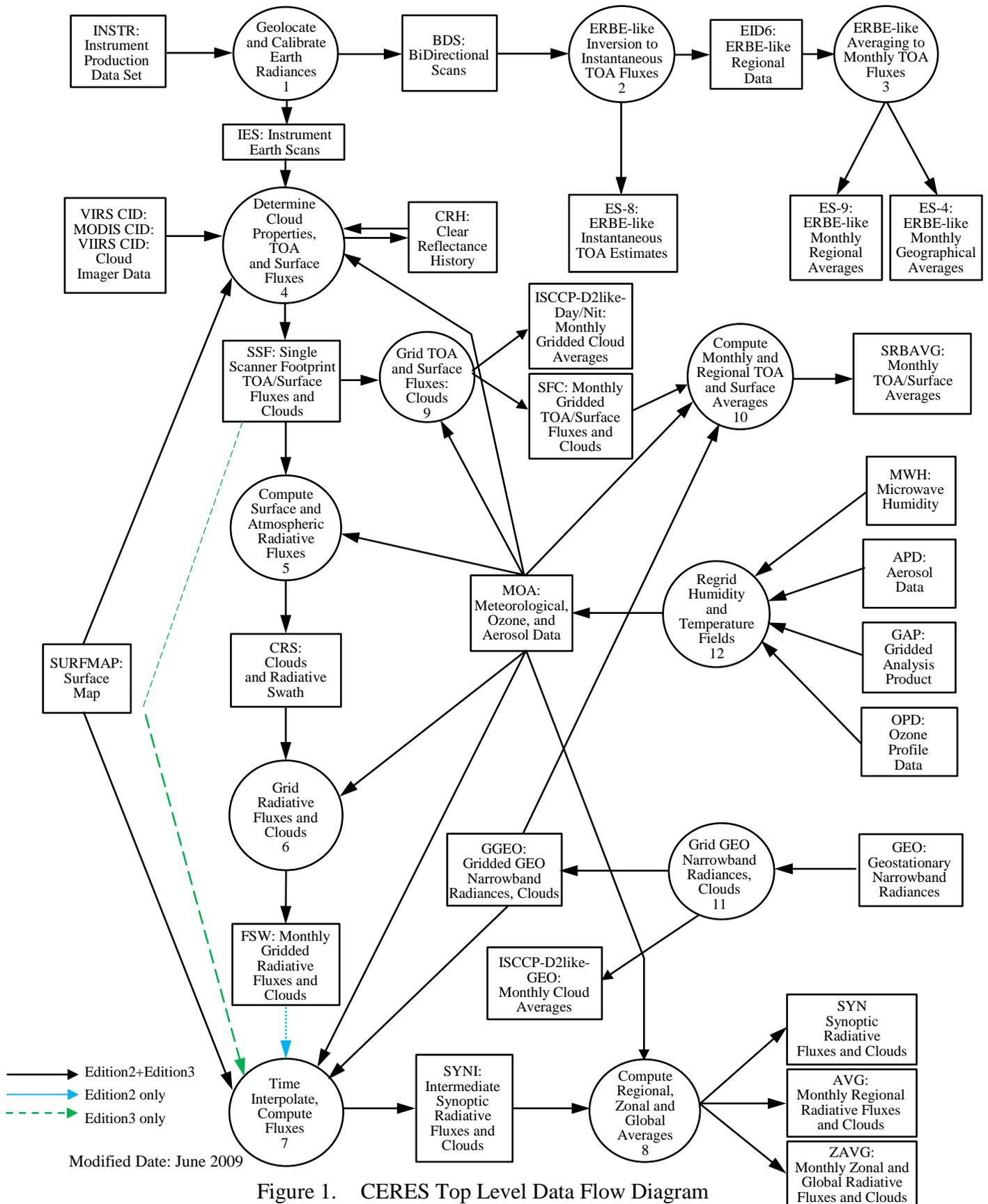


Figure 1. CERES Top Level Data Flow Diagram

Table 1. Scenario Key

Key	Scenario (Production Rate)
A	One per each instrument operating in fixed and/or rotating azimuth scan mode
B	One per each satellite (regardless of the number of instruments)
C	One per each instrument plus all instruments combined
D	One per mission (regardless of the number of instruments and satellites)
E	One per TRMM satellite (VIRS imager data)
F	One per EOS satellite (MODIS imager data)

Table 2. File Format Key

Format Key	Description
B	File written using binary file structure
E	File written using HDF-EOS structures
H	File written using HDF structures

There are three categories of products as listed in the summary [Table 3](#) through [Table 5](#).

Table 3: Primary Products: Output products which are permanently stored by the Langley TRMM and Terra Information System (LATIS) DAAC, are formatted in HDF or HDF-EOS format, and are available for distribution to the scientific community.

Table 4: Internal Products: CERES Level 0 input data and output products which are produced and used by the Data Management System, are stored by the LATIS DAAC, and are not available for distribution.

Table 5: Ancillary Products: Input products which contain non-CERES data needed to interpret the CERES measurements and are not available for distribution.

Each summary table lists the number of the subsystem which produces or uses the product, the CERES and EOSDIS product identification codes, a descriptive product name, the temporal production frequency, the size of one instance of the product, the total size of a full month of one instance of the product, a scenario key as described in [Table 1](#), and a format key as described in [Table 2](#). The total data volume for a given product can be derived from the monthly size and the scenario.

The following sections of the catalog describe products from each of the three categories listed above. Each product description consists of a summary narrative followed by a listing of the parameters in the product. [Appendix A](#) provides a list of Acronyms and Unit Definitions; [Appendix B](#) describes the metadata that are written to all CERES products.

Table 3. Primary Archival Products Summary

Sub Sys	Product Codes		Name	Frequency	Size, MB	Monthly Size, MB	Key	
	CERES	EOSDIS					Scenario	Format
1	BDS	CER01	Bidirectional Scans	1/Day	844.7	26186	A	H
2	ES-8	CER02	ERBE-like Instantaneous TOA Estimates	1/Day	480.2	14886	A	E
3	ES-9	CER03	ERBE-like Monthly Regional Averages	1/Month	1099.1	1099	C	H
3	ES-4	CER13	ERBE-like Monthly Geographical Averages	1/Month	27.1	27	C	H
4	SSF	CER11	Single Scanner Footprint TOA/Surface Fluxes and Clouds	1/Hour	257.6	191677	A	H
5	CRS	CER04	Clouds and Radiative Swath	1/Hour	353.9	263308	A	H
6	FSW	CER05	Monthly Gridded Radiative Fluxes and Clouds	1/Month	20349.4	20349	C	H
7	SYN	CER07	Synoptic Radiative Fluxes and Clouds	1/Day	1920.2	59526	C	E
8	AVG	CER08	Monthly Regional Radiative Fluxes and Clouds	1/Month	1188.5	1189	C	E
8	ZAVG	CER15	Monthly Zonal and Global Radiative Fluxes and Clouds	1/Month	3.3	3	C	E
9	SFC	CER12	Monthly Gridded TOA/Surface Fluxes and Clouds	1/Month	11068.7	11069	C	H
10	SRBAVG	CER06	Monthly TOA/Surface Averages	1/Month	4722.2	4722	C	E

Table 4. Internal Products Summary

Sub Sys	Product Code		Name	Frequency	Size, MB	Monthly Size, MB	Key	
	CERES	EOSDIS					Scenario	Format
1	INSTR	CERX00	Instrument Production Data Set	1/Day	89.0	2759	A	B
1	IES	CER09	Instrument Earth Scans	1/Hour	33.8	25148	A	H
2	EID-6	CERX02	ERBE-like Regional Data	1/Day	17.2	533	A	B
4	CRH	CER16	Clear Reflectance History	1/Day	17.8	552	B	B
11	GGEO	CERX14	Gridded GEO Narrowband Radiances	1/Month	472.8	479	D	B
12	MOA	CERX06	Meteorological, Ozone, and Aerosol Data	1/Hour	43.8	5431.2	D	B

Table 5. Ancillary Products Summary

Sub Sys	Product Code		Name	Frequency	Size, MB	Monthly Size, MB	Key	
	CERES	EOSDIS					Scenario	Format
4	CID_VIRS	CERX05	VIRS Cloud Imager Data	1/Hour	57.4	42706	E	H
4	CID_MODIS	CERX04	MODIS Cloud Imager Data	1/5mins	338.1	3018378	F	H
4	SURFMAP	CERX07	Surface Map	Variable	28.8	162	D	B
1	GEO	CERX09	Geostationary Narrowband Radiances	8/Day/ Satellite	7.7	7600	D	B
2	APD	CERX10	Aerosol Data	1/Month	.4	.4	D	B
2	GAP	CERX12	Gridded Analysis Product	4-8/Day	103.6	128495	D	B
2	MWH	CERX13	Microwave Humidity	1/Day	2.1	65	D	B
2	OPD	CERX11	Ozone Profile Data	1/Day	2.4	74	D	B

Introduction Revision Record

The product Revision Record contains information pertaining to approved section changes. The table lists the date the Software Configuration Change Request (SCCR) was approved, the Release and Version Number, the SCCR number, a short description of the revision, and the revised sections. The authors are listed on the document cover.

Introduction Revision Record

SCCR Approval Date	Release/Version Number	SCCR Number	Description of Revision	Section(s) Affected
N/A	R3V1	N/A	<ul style="list-style-type: none">• Updated format to comply with standards.• Deleted section numbers and modified some links. (06/18/2014)• Removed R3V1 from header. (06/19/2014)	All Sec. 1.0, All All