Clouds and the Earth's Radiant Energy System

(CERES)

Data Management System

Operator's Manual

TISA Averaging
(Subsystems 7.1, 8.0, & 10.0)

Release 5
Version 8

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Document Revision Record

The Document Revision Record contains information pertaining to approved document 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 document authors are listed on the cover. The Head of the CERES Data Management Team approves or disapproves the requested changes based on recommendations of the Configuration Control Board.

Document Revision Record

SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
06/28/01	R3V3	276	• Added the command to execute the clean up script.	Sec. 1.5.4
			• Corrected file name errors. Added plot file names for the cloud layer effective pressures and optical depths.	Table 1-5
			• Corrected the data file names. Added data file name for the cloud layer effective pressures and optical depths.	Table 1-6
			• Updated format to comply with standards.	All
04/01/02	R3V4	334	• Changed the alternate name, email and phone number.	Sec. 1.1.1
			• Added the PCF and log files and SRBAVG file.	Table 1-5
			• Took CAFR.{YYYY}{MM}_$INST and CSFR.{YYYY}{MM}_$INST out.	Table 1-6
			• Updated format to comply with standards.	All
01/22/03	R3V5	418	• Added PGE name for Subsystem 7.1 in Document Overview.	Document Overview
			• Added Subsystem 7.1 in Subsystem Overview.	Subsystem Overview
			• Deleted "EOS" to correct since SRBAVG is an HDF product.	All
			• Added PGE name CER7.1.1P1.	Sec. 1.0
			• Corrected Table number.	Sec. 2.1.2
			• Corrected Section number.	Sec. 2.2.5
			• Corrected Table number.	Sec. 2.4.1
			• Corrected Table number.	Sec. 2.4.5
			• Corrected Table number.	Sec. 2.5.1
			• Corrected Section number.	Sec. 2.5.4
			• Added Instrument code for AQUA.	Table 2-5
			• Updated format to comply with standards.	All

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SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
08/25/03	R3V6	462	• Added Subsystem 8 in the Document Overview.	Document Overview
			• Added Subsystem 8 in the Subsystem Overview.	Subsystem Overview
			• Added PGEName: CER8.1P1.	Sec. 2.0
			• Updated format to comply with standards.	All
03/25/04	R3V7	516	• Removed /QA from output files.	All
			• All files written to CERESHOME/tisa_avg/web/* were changed to "permanent."	All
			• Updated format to comply with standards.	All
04/20/05	R4V1	583	• Delete the two PGEs CER10.2P1 and CER10.3P1.	Document Overview
			• Added phase one to create the snow map, the monthly and monthly hourly means CERESclear-sky albedo and SW flux and clear-sky map.	Sec. 3.0
			• Added PGE CER10.1P2.	Sec. 4.0
			• Changed ENV10.1P1-env.csh to ENV10.1P2 and took out CC9_1.	Sec. 4.2.2
			• Changed ENV10.1P1-env.csh to ENV10.1P2.	Sec. 4.4
			• Updated format to comply with standards.	All
04/24/06	R4V2	624	• Added new PGE CER10.1P3.	Document Overview
			• Added the CER11.6P1 PGE for Parent PGE.	Sec. 1.1.3
			• Added GGEOW input dataset.	Sec. 1.3.3
			• Added PGE CER11.6P1.	Sec. 3.1.3
			• Corrected the Production Strategy and the Configuration code.	Sec. 3.2.2
			• Corrected the Production Strategy for input SFC.	Sec. 3.3.2
			• Added GGEOW input dataset.	Sec. 3.3.3
			• Corrected the Production Strategy and Configuration code for input dataset mhr-csalb.	Sec. 3.3.4
			• Corrected the Production Strategy and Configuration code for input dataset csalb0-intrp2s.	Sec. 3.3.5
			• Corrected the Production Strategy and Configuration code for input dataset SNOW-PCT.	Sec. 3.3.6

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SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
04/24/06 (Cont'd)	R4V2	624	• Changed CC10_1 to CC10. • Changed the PS and CC code for CER10.1P2. • Added information for PGE CER10.1P3. • Added CER11.6P1 PGE. • Added GGEOW input dataset. • Updated format to comply with standards.	Sec. 3.4 Sec. 4.2 Sec. 5 Sec. 5.1.3 Sec. 5.3.3 All
07/10/06	R4V3	631	• Changed file names and added inputs. • Corrected the directories for the input files. • Modified filename. • Updated format to comply with standards.	Sec. 1.0 Sec. 5.3 Sec. 1.3.3 All
10/04/06	R4V4	637	• Added a new PGE CER10.1P4 for Aqua processing. • Removed the input data for CER7.1.1P1. • Added a new PGE CER10.1P5 for Aqua phase one processing.	Sec. 6.0 Sec. 1.3.7 Sec. 7.0
11/15/06	R4V5	639	• Updated PGE CER8.1P1 for new processing. • Added a new PGE CER8.2P1 for creating SYN product Web plots. • Added a new cleanup script for all subsystems. • Added SSAI to Acronyms and Abbreviations. • Changed SAIC to SSAI in Contact Tables throughout the document. • Added 8.2P1 as a target pge in Table 2-3. • Added 8.2P1 as a target pge and removed "rm" from Table 2-5.	Sec. 2.0 Sec. 3.0 All App. A All Sec. 2.1.4 Sec. 2.6
02/08/08	R4V6	667	• Updated PGE CER8.1P1 to add the .gif files in the output data part. • Deleted PGE CER8.2P1 and merged this PGE with PGE CER8.1P1.	Sec. 2.0 Sec. 3.0
08/06/08	R5V1	677	• Updated PGE CER7.1.1P1 to include the new directory structure. • Added /pcf to PCF, and PCFIN, and changed 7.1P1 to 7.1.1P1 to PCF, PCFin, LogReport, LogStatus, and LogUser expected output filenames. (10/06/08)	Sec. 1.0 Table 1-6

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SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
11/12/08	R5V2	689	• Updated PGE CER8.1P1 to include the new directory structure.	Secs. 2.2, 2.4.1, 2.4.2, 2.4.3, 2.5.1, 2.5.2, 2.5.3, 2.5.4, & Table 2-5
			• Updated information in contact tables.	Tables 1-1, 2-1, 3-1, 4-1, 5-1, 6-1, & 7-1
			• Updated to change the scripts from bin to rcf directory. (11/17/2008)	Secs. 2.4, 2.5, 2.6
04/05/07	R5V3	650	• Disabled PGEs CER10.1P1, CER10.1P2, CER10.1P3, CER10.1P4, CER10.1P5.	Secs. 3.0, 4.0, 5.0, 6.0, & 7.0
			• Add PGEs CER10.0P1 and CER10.0P2.	Secs. 8.0 & 9.0
			• Input filenames were modified. (04/19/2010)	Secs. 9.3.4 & 9.3.5
			• Removed /QA from expected output file listings in the destination column. (06/04/2010)	Table 2-5
07/19/10	R5V4	796	• Added PGE CER7.3.1P1.	Sec. 2.0
			• Added PGE CER10.0P3.	Sec. 11.0
			• Added SS, PS and CC for GGEO input data. (09/21/2010)	Sec. 11.2.2
			• Added GGEO input descriptions. (09/21/2010)	Sec. 11.3.3
08/11/10	R5V5	801	• SNOW-PCT input file was added as it was deleted earlier and shouldn't have been.	Sec. 1.3.7
			• Updated PGE CER7.3.1P1 to be run on *AMI-P6* platform.	Sec. 2.0
			• Updated PGE CER10.0P3 to be run on *AMI-P6* platform.	Sec. 11.0
			• Added "Available Through Ordering Tool" column and removed red "meta" from expected output tables.	All Expected Output Tables
07/19/10	R5V6	795	• Updated the HDF output files to be Monthly, Monthly-3Hour, and kept Synoptic 3 hour the same.	Overview
			• Updated to run PGE CER8.1P1 on *P6* in support of Terra-Aqua and SGE.	Sec. 3.0
			• Added information referencing FM1 and FM2. (01/07/2011)	Sec. 3.0

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07/19/10 (Cont'd)	R5V6	795	• Corrected the file path for the LRGRP files. (02/14/2011)	Sec. 3.6
			• Added the PCF log file to Table 3.5 and made a note in Section 3.4.1. (07/01/11)	Sec. 3.4.1 & Table 3-5
08/11/10	R5V7	801	• Added satellite options for PGE CER7.3.1P1.	Sec. 2.0
			• Added satellite options for PGE CER10.0P3.	Sec. 11.0
			• Corrected the directory for TSI-xglb. (01/10/2012)	Table 11-6
			• Added the INST_ID for Terra instruments. (01/23/2012)	Sec. 3.2.2
			• Added INSTR_NAME and PLAT for the Environment Script Requirements. (02/01/2012)	Sec. 3.2.2
			• Updated the valid INSTR_NAME. (03/26/2012)	Sec. 3.2.2
			• Modified a link and document title name. (04/10/2012)	References
			• Updated table footnotes for PGE CER8.1P1. (04/11/2012)	Table 3-5
			• Added INSTR_NAME and PLAT for the Environment Script Requirements. (08/23/2012)	Secs. 2.2.2 & 11.2.2
10/05/12	R5V8	934	• Added PGE CER10.0P4 to produce SSF1deg data in GMT time.	Sec. 12.0
			• The parameter PLAT was changed to read "PLAT equals INSTR_Name". (05/02/2013)	Sec. 3.2.2
			• Added PCF, PCF log files, .met files, and deleted LogUser file. (05/09/2013)	Table 12-6
			• LogUser file was added back in. (05/09/2013)	Table 12-6
			• Updated the output data path. (05/14/2013)	Table 12-6
			• Removed PGEs CER7.1.1P1, CER10.1P1, CER10.1P2, CER10.1P3, CER10.1P4, CER10.1P5, CER10.0P1, and CER10.0P2. (09/05/2013)	Secs. 1.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, & 10.0
			• Updated Expected Output Tables. (09/05/2013)	Tables 1.6 & 3.6
			• Modified Target PGE for TSIB output file. (09/19/2013)	Table 1-6
			• Modified script requirements. (09/19/2013)	Sec. 2.2.2
			• Changed all the "Do not remove" in the "File Disposition after successful execution:" to "N/A and made a few other minor modifications. (09/19/2013)	Secs. 1.3.1-1.3.7, 2.3.1, 2.3.2, 3.3.1-3.3.3, & 4.3.1
			• Changed "M" to "m" in the "m/o" output table column to conform to standards. (10/04/2013)	Table 1-6

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SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
10/05/12 (Cont'd)	R5V8	934	• Minor table modifications (changed double lines to single lines). (10/04/2013)	Tables 2-4, 2-5, 3-2, 3-6, 4-2, & 4-6
			• Modified SSF1deg-Day(met) output filename. (10/08/2013)	Table 4-6
			• Fixed some cross reference link issues. (10/11/2013)	
			• Added the PCF.log file destination. (02/05/2014)	Tables 1.6 & 3.6
			• Removed "Archive" from PCF.log output file. (02/05/2014)	Table 4-6
			• Added DPO to destination column for output files that need to be placed not only into the Archive, but into the DPO, and also removed the "rm" destination for the same files. (06/04/2014)	Tables 1-6, 2-5, 3-6, & 4-6
			• Modified filename of PCF and PCF.log file. (06/04/2014)	Table 4-6

Preface

The Clouds and the Earth's Radiant Energy System (CERES) Data Management System supports the data processing needs of the CERES Science Team research to increase understanding of the Earth's climate and radiant environment. The CERES Data Management Team works with the CERES Science Team to develop the software necessary to support the science algorithms. This software, being developed to operate at the Langley Atmospheric Science Data Center (ASDC), produces an extensive set of science data products.

The Data Management System consists of 12 subsystems; each subsystem represents one or more stand-alone executable programs. Each subsystem executes when all of its required input data sets are available and produces one or more archival science products.

This Operator's Manual is written for the data processing operations staff at the Langley ASDC by the Data Management Team responsible for this Subsystem. Each volume describes all Product Generation Executables for a particular subsystem and contains the Runtime Parameters, Production Request Parameters, the required inputs, the steps used to execute, and the expected outputs for each executable included within this Subsystem. In addition, all subsystem error messages and subsequent actions required by the ASDC operations staff are included.

Acknowledgment is given to the CERES Documentation Team for their support in preparing this document.

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Introduction

CERES is a key component of EOS and NPP. The first CERES instrument (PFM) flew on TRMM, four instruments are currently operating on the EOS Terra (FM1 and FM2) and Aqua (FM3 and FM4) platforms, and NPP (FM5) platform. CERES measures radiances in 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 last data processed from the PFM instrument aboard TRMM was March 2000; no additional data are expected. Until June 2005, one instrument on each EOS platform operated in a fixed azimuth scanning mode and the other operated in a rotating azimuth scanning mode; now all are typically operating in the fixed azimuth scanning mode. The NPP platform carries the FM5 instrument, which operates in the fixed azimuth scanning mode though it has the capability to operate in a rotating azimuth scanning mode.

CERES climate data records involve an unprecedented level of data fusion: CERES measurements are combined with imager data (e.g., MODIS on Terra and Aqua, VIIRS on NPP), 4-D weather assimilation data, microwave sea-ice observations, and measurements from five geostationary satellites to produce climate-quality radiative fluxes at the top-of-atmosphere, within the atmosphere and at the surface, together with the associated cloud and aerosol properties.

The CERES project management and implementation responsibility is at NASA Langley. The CERES Science Team is responsible for the instrument design and the derivation and validation of the scientific algorithms used to produce the data products distributed to the atmospheric sciences community. The CERES DMT is responsible for the development and maintenance of the software that implements the science team's algorithms in the production environment to produce CERES data products. The Langley ASDC is responsible for the production environment, data ingest, and the processing, archival, and distribution of the CERES data products.

Document Overview

This document, the CERES Release 3 Operator's Manual for the Time Interpolation and Averaging Subsystem (TISA) 10.0, provides an overview of the operating environment, the operating procedure, and evaluation of the expected output files of the three Subsystems. This document is organized as follows:

Introduction
Document Overview
Subsystem Overview
PGEName: CER7.3.1P1
PGEName: CER8.1P1
PGEName: CER10.0P3
PGEName: CER10.0P4
References
Appendix A - Acronyms and Abbreviations
Appendix B - Error Messages for CER7.3.1P1, CER8.1P1, CER10.0P3, CER10.0P4

Subsystem Overview

Subsystem 7.1 - Time Interpolation for Single and Multiple Satellites

The time interpolation process (7.1), one of the two key parts of Subsystem 7.0, temporally interpolates CERES data and produces hourly of top-of-the-atmosphere (TOA) fluxes and cloud properties on a 1.0-degree equal-area grid. Another key part of Subsystem 7.0, the Synoptic Surface and Atmospheric Radiation Budget (SARB), Subsystem 7.2, produces the Intermediate Synoptic Radiative Fluxes and Clouds (SYNI), which contains the vertical structure of atmospheric and surface flux using the interpolated data as input and boundary conditions.

The main input to the time interpolation process is the Hourly Gridded Single Satellite Fluxes and Clouds (SFC) product, produced by Atmospheric Gridding and Spatial Averaging, Subsystem 9.0. The gridded shortwave (SW) and longwave (LW) TOA fluxes and cloud information are the key items to be interpolated. The radiative profile will be recalculated in the SARB part of Subsystem 7.0 using the interpolated fluxes as constraints. This process produces the internal product, Time Space Interpolate (TSI). These files contain nested grid region data which is the input to Subsystem 7.2.

The time interpolation process produces global maps of TOA total-sky LW and SW flux, TOA clear-sky LW and SW flux, TOA window radiances, and cloud properties at every hour Greenwich Mean Time (GMT) for every day of the month. The process of producing involves several steps:

1. Cloud properties from the CERES times of observation are interpolated.
2. The CERES TOA LW and SW fluxes are interpolated for every hour using geostationary data to assist in modeling meteorological variations between times of observations.

Subsystem 8.0 - Compute Regional, Zonal, and Global Averages

The Monthly Regional, Zonal, and Global Radiation Fluxes and Cloud Properties Subsystem produces regional, zonal and global monthly and monthly-3-hourly means. These means are calculated from one month of synoptic maps on a regional basis and then combined to produce zonal and global averages.

The main input to this Subsystem is the Surface and Atmospheric Radiation Budget (SARB) product, produced by Subsystem 7.2, SYNI. This product contains one month of 3-hourly synoptic maps of top-of-atmosphere (TOA) LW and SW fluxes, TOA window fluxes, upwelling and downwelling SW and LW fluxes at each standard CERES pressure level, and numerous cloud parameters for each region of the CERES global 1.0-degree equal-area grid. The flux parameters include both total-sky and clear-sky.

The three archival products output from this Subsystem are the Monthly Regional, Zonal and Global Radiative Fluxes and Clouds (Monthly) product (HDF format) which contains the regional, zonal and global monthly means of fluxes and cloud parameters, the Monthly-Hourly Regional, Zonal and Global Radiative Fluxes, Clouds (M3H) product (HDF format) which contains the regional, zonal and global monthly-3-hourly averages of the above parameters, and

the Synoptic Radiative Fluxes and Clouds (SYN) product (HDF format) which contains regional synoptic 3 hourly means of fluxes and cloud parameters.

The main steps involved in the averaging process are:

1. Read the synoptically ordered data.
2. Average the flux data to produce regional synoptic hourly, monthly and monthly-hourly means.
3. Average the cloud properties using the specified weighting schemes to produce regional synoptic hourly, monthly and monthly-hourly means.
4. Average the regional means to produce zonal means.
5. Average the zonal means to produce global means.

Subsystem 10.0 - Compute Monthly and Regional TOA and SRB Averages

The Monthly Regional TOA and SRB Averages Subsystem (10.0) computes averages of TOA longwave (LW) and shortwave (SW) fluxes, and cloud properties on regional, zonal, and global spatial scales. The main input to Subsystem 10.0 is the Hourly Gridded Single Satellite TOA and Clouds (SFC) product produced by Surface Gridding and Spatial Averaging Subsystem (9). SFC contains hourly single satellite flux and cloud properties averaged over 1.0-degree regions. Subsystem 10.0 produces the Monthly and Daily Regional TOA and SRB Averages (SSF1deg) product (HDF format).

The process of producing the means stored in SSF1deg-Month and SSF1deg-Daily involve:

1. The TOA clear-sky flux data and the cloud property data are linearly interpolated.
2. Monthly and daily means are calculated from the interpolated fluxes and cloud properties on regional, zonal, and global scales.

Subsystem 10.0 - Compute Monthly and Monthly Hourly CERES Albedo and SW Flux

The monthly and monthly hourly albedo and SW flux and the clear-sky albedo map are required for inputs into Subsystem 10.0. The main input to compute the average albedo and SW flux for each region are the Hourly Gridded TOA and Clouds (SFC) product from Subsystem 9.0

The process of producing the monthly and monthly hourly albedo and SW flux involved:

1. Timely interpolate the TOA albedo and SW flux for each region.
2. Spacial average the albedo and SW flux.
3. A clear-sky map of albedo is then produced for inputs to compute the GGEO fluxes.

1.0 PGEName: CER7.3.1P1

TO BE RUN ON *AMI-P6* PLATFORM

Time Interpolation for Only Terra or Only Aqua or Merged Terra and Aqua Satellites (Subsystem 7.1)

1.1 PGE Details

1.1.1 Responsible Persons

Table 1-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Cathy Nguyen	Dennis Keyes
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1666	951-1650
Fax	951-1900	951-1900
LaRC email	Le.T.Nguyen@nasa.gov	Dennis.F.Keyes@nasa.gov

1.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 1-1.

1.1.3 Parent PGE(s)

Table 1-2. Parent PGEs for CER7.3.1P1

PGEName	Description
CER9.1P1	Post-Processor for MOA Data, creates PMOA
CER9.3P1	Sort and Merge Gridded Single Satellite Fluxes and Clouds
CER11.6P1	Sort and Merge Gridded Geostationary Narrowband Radiance, GGEOW. This PGE should be used if GGEOW is available.
CER11.2P1	Sort and Merge Gridded Geostationary Narrowband Radiance, GGEO. This PGE is used only if GGEOW is not available.
CER10.0P3	Preprocessor for creating the clear-sky map, the monthly hourly CERES clear-sky albedo, Snow/Ice Data and SW normalization coefficients

1.1.4 Target PGE(s)

Table 1-3. Target PGEs after CER7.3.1P1

PGEName	Description
CER7.2.1P1	Synoptic SARB Subsystem Main-Processor

1.2 Operating Environment

1.2.1 Runtime Parameters

Table 1-4. Runtime Parameters for CER7.3.1P1

Parameter	Description	Data Type	Valid Values
MM	CERDataDateMonth	I(2)	01 .. 12
YYYY	CERDataDateYear	I(4)	>1996

1.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. It is named '**CER7_3_1P1_env.pm**' and contains the following parameters:

SS7_3 Output Sampling Strategy for Subsystem 7.3, see Production Request
SS9_T Input Sampling Strategy for Subsystem 9, see Production Request
SS9_A Input Sampling Strategy for Subsystem 9, see Production Request
SS10_3 Input Sampling Strategy for Subsystem 10, see Production Request
SS11 Input Sampling Strategy for Subsystem 11, see Production Request
SS12 Input Sampling Strategy for Subsystem 12, see Production Request
PS7_3 Output Production Strategy for Subsystem 7.3, see Production Request
PS9_T Input Production Strategy for Subsystem 9, see Production Request
PS9_A Input Production Strategy for Subsystem 9, see Production Request
PS10_3 Input Production Strategy for Subsystem 10, see Production Request
PS11 Input Production Strategy for Subsystem 11, see Production Request
PS12 Input Production Strategy for Subsystem 12, see Production Request
CC7_3 Output Configuration Code for Subsystems 7.3, see CM Database
CC9_T Input Configuration Code for Subsystems 9, see CM Database
CC9_A Input Configuration Code for Subsystems 9, see CM Database
CC9_1 Input Configuration Code for PMOA. see CM Database
CC10_3 Input Configuration Code for Subsystem 10, see CM Database

CC11 Input Configuration Code for Subsystem 11, see CM Database
CC11_6 Input Configuration Code for Subsystem 11, see CM Database
SW7_3 Output Software SCCR# for Subsystems 7.3, see CM Database
DATA7_3 Output Data SCCR# for Subsystems 7.3, see CM Database
INSTR_NAME Instrument Process for Subsystem 7.3.
For Terra only, INSTR_NAME is FM1 except for the following months,
Year 2000, months: 03, 04, 08, 09, 10
Year 2001, months: 02, 03, 04, 08, 09, 10
Year 2006, months: 01, 02
INSTR_NAME is FM2
For Aqua only, INSTR_NAME is FM3 except for the following months,
Year 2002, months: 07, 08, 09, 10
Year 2003, months: 02, 03, 04, 08, 09, 10, 11, 12
Year 2006, months: 01, 02
INSTR_NAME is FM4
For Merged Terra/Aqua, INSTR_NAME is FM1+FM2+FM3+FM4
PLAT Equals INSTR_NAME
InputArchive Directory from which to read the input data products, for all production processing this directory should be set to **/ASDC_archive/CERES**

1.2.3 Execution Frequency (daily, hourly, or monthly)

monthly (1/month) - This PGE is processed once per month, when input is available.

1.2.4 Memory/Disk Space/Time Requirements

Memory:	69792 K
Disk Space:	21.6 GB
Total Run Time:	2 hours 14 minutes

1.2.5 Restrictions Imposed in Processing Order

None. Process when input data are available (see Section 1.3).

1.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

1.3.1 Input Dataset Name (#1): PMOA

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/PMOA/$SS12_$PS12/YYYY/MM/
CER_PMOA_$SS12_$PS12_$CC9_1.{YYYY}{MM}F*, where * = 1 .. 4

1. Mandatory/Optional: **These files are Mandatory.**
2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

3. Waiting Period: **None, process when all input data are available.**

b. Source of Information (Source is PGE name or Ingest Source):

Source PGE: CER9.1P1

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **Total file size = 1441 MB (total 4 files = 5764 MB).**

1.3.2 Input Dataset Name (#2): SFCB Terra

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

$InputArchive/SFCB/_$SS9_T_$PS9_T/YYYY/MM/ CER_SFCB_$SS9_T_$PS9_T_$CC9_T.{YYYY}{MM}Z*, where * = 001 .. 180

$InputArchive/SFCB/_$SS9_T_$PS9_T/YYYY/MM/ CER_SFCB_$SS9_T_$PS9_T_$CC9_T.{YYYY}{MM}Z*.met, where * = 001 .. 180

1. Mandatory/Optional: **All 180 files are Mandatory.**
2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

3. Waiting Period: **None, process when all input data are available.**

b. Source of Information (Source PGE name or Ingest Source):

Source PGE: CER9.3P1

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **65 MB**

1.3.3 Input Dataset Name (#3): SFCB Aqua

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

$InputArchive/SFCB/_$SS9_A_$PS9_A/YYYY/MM/ CER_SFCB_$SS9_A_$PS9_A_$CC9_A.{YYYY}{MM}Z*, where * = 001 .. 180

$InputArchive/SFCB/_$SS9_A_$PS9_A/YYYY/MM/ CER_SFCB_$SS9_A_$PS9_A_$CC9_A.{YYYY}{MM}Z*.met, where * = 001 .. 180

1. Mandatory/Optional: **All 180 files are Mandatory.**

2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

3. Waiting Period: **None, process when all input data are available.**

b. Source of Information (Source PGE name or Ingest Source):

   Source PGE: CER9.3P1

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **65 MB**

1.3.4 Input Dataset Name (#4): GGEOW or GGEO

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

   $InputArchive/GGEO/$SS11_$PS11/YYYY/MM/
   CER_GGEO_$SS11_$PS11_$CC11.{YYYY}{MM}

or

   $InputArchive/GGEOW/$SS11_$PS11/YYYY/MM/
   CER_GGEOW_$SS11_$PS11_$CC11_6.{YYYY}{MM}

   GGEOW should be chosen before **GGEO,** and if it is not available, then **GGEO** is the alternate data set**.**

1. Mandatory/Optional: **This file is Optional, see item 3 below.**

2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

3. Waiting Period:

   Dependent on GGEOW or GGEO expected waiting period (consult CERES Data Management Office (DMO)).

b. Source of Information (Source PGE name or Ingest Source):

   Source PGE: CER11.6P1 or CER11.2P1

c. Alternate Data Set, if one exists (maximum waiting period): **GGEO**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **567 MB**

1.3.5 Input Dataset Name (#5): TSI-xglb

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

$InputArchive/TSI-xglb/$SS10_3_$PS10_3/YYYY/MM/ CER_TSI-xglb_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}

1. Mandatory/Optional: **This file is Mandatory.**
2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

3. Waiting Period: **None, process when all input data are available.**

b. Source of Information (Source PGE name or Ingest Source):

Source PGE: CER10.0P3

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **2.33 MB**

1.3.6 Input Dataset Name (#6): TSI-mhr-csalb

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

$InputArchive/TSI-mhr-csalb/$SS10_3_$PS10_3/YYYY/MM/ CER_TSI-mhr-csalb_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}

1. Mandatory/Optional: **This file is Mandatory.**
2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

3. Waiting Period: **None, process when all input data are available.**

b. Source of Information (Source PGE name or Ingest Source):

Source PGE: CER10.0P3

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **15.62 MB**

1.3.7 Input Dataset Name (#7): TSI-csalb0-intrp2s

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

$InputArchive/TSI-csalb0-intrp2s/$SS10_3_$PS10_3/YYYY/MM/CER_TSI-csalb0-intrp2s_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}

1. Mandatory/Optional: **This file is Mandatory.**
2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.
3. Waiting Period: **None, process when all input data are available.**

b. Source of Information (Source PGE name or Ingest Source):

   Source PGE: CER10.0P3

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **649800 B**

1.4 Operating Procedures (Procedure for each part of the processor's elements)

The Main Processor production script, **run_CER7.3.1P1.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. The PCF is created by executing the PCF generator, **CER7.3.1P1_pcf_gen.pl** after all of the necessary environment variables in Section 1.2.2 have been set. To run via SGE execute the production script by typing **CER7.3.1P1-SGE_Driver.pl** followed by the data date.

1.4.1 How to Generate the PCF for manual operations

The PCF file generator requires two (2) command line arguments:

(-d)	2-character static code to indicate that a date follows
(YYYY)	4-digit year
(MM)	2-digit month

At the command line (>) type:

> cd $CERESHOME/tisa_avg/CER7.3.1P1/rcf

For Terra Only:

> ./CER7.3.1P1_pcf_gen.pl -date {YYYY}{MM} -satellites terra ggeo

For Merged Terra Aqua:

> ./CER7.3.1P1_pcf_gen.pl -date {YYYY}{MM} -satellites terra aqua ggeo

The following file will be generated in **$CERESHOME/tisa_avg/CER7.3.1P1/rcf/pcf**:

CER7.3.1P1_PCF_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}
CER7.3.1P1_PCF_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}.log

1.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **run_CER7.3.1P1.pl**, followed by the PCF filename.

To run at the command line:

At the command line (>) type:

```
> cd $CERESHOME/tisa_avg/CER7.3.1P1/rcf
> ./run_CER7.3.1P1.pl
      CER7.3.1P1_PCF_$SS7_3_$PS7_3_$CC7_3.YYYYMM
```

To run using SGE:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission scripts.

For Terra only:

```
> ./CER7.3.1P1-SGE_Driver.pl -date YYYYMM -satellites terra ggeo
```

For Merged Terra Aqua:

```
> ./CER7.3.1P1-SGE_Driver.pl -date YYYYMM -satellites terra aqua ggeo
```

The **CER7.3.1P1-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested date and time given. If all input data files are available and previously created output for this data date does not exist it will submit the job to the cluster. However, if any mandatory data files are missing the script will not submit the job to the cluster.

If existing output data products are discovered they will be listed as output to the screen and the user must delete these files before rerunning the **CER7.3.1P1-SGE_Driver.pl** script.

1.4.3 Special Case Considerations

N/A at this time.

1.4.4 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then all TSI files created during the previous run must be deleted. A script to remove all files from the failed run is available. The script **CleanOutput.pl** takes as in input parameter the PCF filename for the failed run. The environment variable **$CERESHOME** must be set in order for this script to work.

```
> cd $CERESHOME/tisa_avg/CER7.3.1P1/rcf
> ./CleanOutput.pl $YYYY $MM
```

1.5 Execution Evaluation

1.5.1 Exit Codes

The processor CER7.3.1P1 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS), as seen in Table 1-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or Toolkit related error. In these cases, contact the responsible person(s) (see Table 1-1) for assistance.

Table 1-5. Exit Codes for CER7.3.1P1

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
202	Failure	Check the Log Files and take the appropriate action (see Appendix B).

1.5.2 Screen Messages (Use Table format for large number of messages)

When running the production script, **CER7.3.1P1**, the system message, "No match," may be written to the screen. This message occurs when the scripts try to remove an old output file that does not exist. This does not signify a problem.

1.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/tisa_avg/runlogs/CER7.3.1P1**.

1. **Report Log File: CER7.3.1P1_LogReport_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}**

The Report Log File contains TISA Averaging related messages. A comprehensive list of these messages that can be generated during execution of the PGE is contained in Appendix B.

2. **Status Log File: CER7.3.1P1_LogStatus_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}**

The Status Log File contains all messages created by the Toolkit. If an abnormal exit is encountered by the PGE, this file should be examined for '_F_', fatal message type. The responsible person should be advised.

3. **User Log File: CER7.3.1P1_LogUser_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}**

The User Log File is not used at this time, but exists to satisfy the Toolkit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

1.5.4 Solutions to Possible Problems

As mentioned in Appendix B all output files are opened with Status = NEW. The PGE script has been designed to check for these files and to delete them prior to execution, but in the case of a change in the file permission status, the ASDC must take appropriate action. These files must be removed before reprocessing. A script, which removes PGE created files, **CleanOutput.pl**, is located in directory **$CERESHOME/tisa_avg/CER7.3.1P1/rcf**. To use the clean-up files for **CER7.3.1P1**:

> **$CERESHOME/tisa_avg/CER7.3.1P1/rcf/CleanOutput.pl $YYYY $MM**

1.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

There are no foreseeable subsystem terminating conditions at this time.

b. Target PGE Termination

N/A

1.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process once per month**.**

Table 1-6. Expected Output File Listing for CER7.3.1P1

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER7.3.1P1_PCF_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}@($CERESHOME/tisa_avg/CER7.3.1P1/rcf/pcf)	m	1	1/mo	N/A	Archive, rm	No
CER7.3.1P1_PCF_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}.log@($CERESHOME/tisa_avg/CER7.3.1P1/rcf/pcf)	m	1	1/mo	N/A	rm	No
CER7.3.1P1_LogReport_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}@($CERESHOME/tisa_avg/runlogs/CER7.3.1P1)	m	1	1/mo	N/A	Archive, rm	No
CER7.3.1P1_LogStatus_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}@($CERESHOME/tisa_avg/runlogs/CER7.3.1P1)	m	1	1/mo	N/A	Archive, rm	No
CER7.3.1P1_LogUser_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}@($CERESHOME/tisa_avg/runlogs/CER7.3.1P1)	m	1	1/mo	N/A	Archive, rm	No
CER_TSIB_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}Z*, where * = 001...180 (.met) @($CERESHOME/tisa_avg/data/TSIB/$SS7_3_$PS7_3/YYYY/MM)	m	298	180/mo	7.2.1P1 & 8.1P1	DPO, Archive	No

a. See Section 1.2 for information on variable data values
If "(.met)" is written next to an expected Output Filename, then the metadata file must exist with the identical filename and .met extension

b. VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
Permanent - Files will not be removed from the production disk
DB - File content is to be entered into the LaTIS Database
rm - remove
YYYY - 4 digit year
MM - 2 digit month {valid values: 01 .. 12}
DD - 2 digit day {valid values: 01 .. 31
HH - 2 digit hour of the day {valid values: 00 .. 23)
m - mandatory output

o - optional output
EOD - End of Data Month

1.7 Expected Temporary Files/Directories

N/A

2.0 PGEName: CER8.1P1

To Be Run on *AMI-P6* PLATFORM
Compute Regional, Zonal, and Global Averages (Subsystem 8.0)

2.1 PGE Details

2.1.1 Responsible Persons

Table 2-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Cathy Nguyen	Dennis Keyes
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1666	951-1650
Fax	951-1900	951-1900
LaRC email	Le.T.Nguyen@nasa.gov	Dennis.F.Keyes@nasa.gov

2.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 2-1.

2.1.3 Parent PGE(s)

Table 2-2. Parent PGEs for CER8.1P1

PGEName	Description	Instruments
CER7.3.1P1	Time Space Interpolation for Single and Multiple Satellites	Terra (FM1, FM2)
CER7.2.P1	Synoptic SARB Subsystem Main-Processor	Terra (FM1, FM2), Terra-Aqua
CER7.3.1P1	Time Interpolation for Merged Terra-Aqua Main-Processor	Terra-Aqua (Merged)

2.1.4 Target PGE(s)

CER8.1P1 has no target PGE(s).

2.2 Operating Environment

2.2.1 Runtime Parameters

Table 2-3. Runtime Parameters for CER8.1P1

Parameter	Description	Data Type	Valid Values
MM	CERDataDateMonth	I(2)	01 .. 12
YYYY	CERDataDateYear	I(4)	>1996

2.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters. The URL for this document is http://ceres.larc.nasa.gov/Internal/intern_docs.php

One Environment Script is required. It is named '**CER8_1P1_env.pm**' and contains the following parameters:

SS8	Output Sampling Strategy for Subsystem 8, see Production Request
SS7_2	Input Sampling Strategy for Subsystems 7.2 and 8.1, see Production Request
SS7_3	Output Sampling Strategy for Subsystem 7.3, and input for Subsystem 8, see Production Request
PS8	Output Production Strategy for Subsystem 8, see Production Request
PS7_2	Input Production Strategy for Subsystems 7.2 and 8.1, see Production Request
PS7_3	Output Production Strategy for Subsystem 7.3, and input for Subsystem 8, see Production Request
CC8	Output Configuration Code for Subsystem 8, see CM Database
CC7_2	Input Configuration Code for Subsystems 7.2 and 8.1, see CM Database
CC7_3	Output Configuration Code for Subsystems 7.3, see CM Database
SW8	Output Software SCCR# for Subsystem 8, see CM Database
DATA8	Output Data SCCR# for Subsystem 8, see CM Database
INST_ID	Instrument Process (6 for Merged Terra-Aqua) for Subsystem 8, see Production Request For Terra only, INST_ID is 2 except for the following months, INST_ID is 3 Year 2000, months: 03, 04, 08, 09, 10 Year 2001, months: 02, 03, 04, 08, 09, 10
INSTR_NAME	If INST_ID equals 2 or 3 then INSTR_NAME is FM1+FM2 If INST_ID equals 6 then INSTR_NAME is FM1+FM2+FM3+FM4

PLAT	Equals INSTR_NAME
InputArchive	Directory from which to read the input data products, for all production processing this directory should be set to **/ASDC_archive/CERES**

2.2.3 Execution Frequency (daily, hourly, or monthly)

monthly (1/month) - This PGE is processed once per month, when input is available.

2.2.4 Memory/Disk Space/Time Requirements

Memory:	171472 K
Disk Space:	20 GB
Total Run Time:	5 hours 30 minutes (includes plots)

2.2.5 Restrictions Imposed in Processing Order

Process when input data are available (see Section 2.3).

2.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

2.3.1 Input Dataset Name (#1): TSIB

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

   $InputArchive/TSIB/$SS7_3_$PS7_3/YYYY/MM/ CER_TSIB_$SS7_3_$PS7_3_$CC7_3.{YYYY}{MM}Z{zone number}, where zone number = 01 .. 180

   1. Mandatory/Optional: **At least one of the 180 files is Mandatory.**
   2. Time Related Dependency:

      The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

   3. Waiting Period:

      Wait until CER7.3.1P1 (Merge) has completed for the DataMonth.

b. Source of Information (Source PGE name or Ingest Source):

   Source PGE: CER7.3.1P1 (Merge)

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **220 MB**

2.3.2 Input Dataset Name (#2): SYNI

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

   $InputArchive/SYNI/$SS7_2_$PS7_2/YYYY/MM/ CER_SYNI_$SS7_2_$PS7_2_$CC7_2.{YYYY}{MM}{Zone}, where Zone = 01 .. 180

   1. Mandatory/Optional: **At least one of the 180 files is Mandatory.**
   2. Time Related Dependency:

      The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.
   3. Waiting Period:

      Wait until CER7.2.1P1 has completed for the DataMonth.

b. Source of Information (Source PGE name or Ingest Source):

   Source PGE: CER7.2P1

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **252 MB**

2.4 Operating Procedures

The main processor production script, **run_CER8.1P1.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing the PCF generator, **CER8.1P1_pcfgen.pl** after all of the necessary environment variables in Section 2.2.2 have been set. To run via SGE execute the production script by typing **CER8.1P1-PGE_Driver.pl** followed by the data date (YYYYMM).

2.4.1 How to Generate the PCF File

The PCF generator, **CER8.1P1_pcfgen.pl**, requires one command line argument:

(-date)	5-character static code to indicate that a date follows
(YYYYMM)	4-digit year and 2-digit month as 1 word

At the command line (>) type:

> **cd $CERESHOME/tisa_avg/CER8.1P1/rcf/**
> **./CER8.1P1_pcfgen.pl -date YYYYMM**

The following PCF will be generated in **$CERESHOME/tisa_avg/CER8.1P1/rcf/pcf/**:

CER8.1P1_PCF_$SS8_$PS8_$CC8.{YYYY}{MM}
CER8.1P1_PCF_$SS8_$PS8_$CC8.{YYYY}{MM}.log

The log file will identify any required files that are missing along with those that will be used based on the pcf file.

2.4.2 How to Execute the Main Processor

The production script is executed by typing the script name, **run_CER8.1P1.pl**, followed by the PCF file name, see Table 2-3.

At the command line (>) type:

> **cd $CERESHOME/tisa_avg/CER8.1P1/rcf**
> **./run_CER8.1P1.pl CER8.1P1_PCF_$SS8_$PS8_$CC8.{YYYY}{MM}**

To run using SGE:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission scripts.

> ./CER8.1P1-SGE_Driver.pl -date YYYYMM

The **CER8.1P1-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested date and time given. If all input data files are available and previously created output for this data date does not exist, it will submit the job to the cluster. However, if any mandatory data files are missing the script will not submit the job to the cluster.

If existing output data products are discovered they will be listed as output to the screen and the user **must** delete these files before rerunning the **CER8.1P1-SGE_Driver.pl** script

See Section 2.4.4 if reprocessing is required.

2.4.3 Special Case Considerations

N/A at this time.

2.4.4 Special Reprocessing Instructions

All output files are opened with STATUS=NEW in Subsystem 8.0. The PGE script has been designed to check for these files and delete them prior to execution, but in the case of a change in the file permission status, the ASDC must take appropriate action. These files must be removed before processing.

The **CleanOutput.pl** with the year and month will cleanup ALL previous output under **tisa_avg/CER8.1P1/rcf/pcf and tisa_avg/data** with the following command:

> perl CleanOutput.pl YYYY MM

2.5 Execution Evaluation

2.5.1 Exit Codes

The processor **run_CER8.1P1.pl** (called by **CER8.1P1-SGE_Driver.pl**)_terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 2-4. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or Toolkit related error. In these cases, contact the responsible person (see Table 2-1) for assistance.

Table 2-4. Exit Codes for CER8.1P1

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
215	Failure	PCF file is required on input
300	Failure	PCF file supplied does not exist
202	Failure	Check the Log Files and take the appropriate action or the first plot step failed. (see Appendix B).
203	Failure	Failed to create the web plot *.gif files.

2.5.2 Screen Messages (Use Table format for large number of messages)

When running the production script, **run_CER8.1P1.csh** (called by **CER8.1P1-SGE_Driver.pl**), the system message, "No match," may be written to the screen. This message occurs when the scripts try to remove an old output file that does not exist. This does not signify a problem.

2.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE.

If running using the batch script SGE **CER8.1P1-SGE_Driver.pl** program, information (statements, errors and warnings) is output to the **$CERESHOME/tisa_avg/sge_logs/CER8.1P1_$INSTANCE.oNNNNNN**.

* NNNNNN is the job number.

The PGE log files are located in directory: **$CERESHOME/tisa_avg /runlogs/CER8.1P1**.

1. **Report Log File: CER8.1P1_LogReport_$SS8_$PS8_$CC8.{YYYY}{MM}**

The Report Log File contains TISA Averaging related messages. A comprehensive list of these messages that can be generated during execution of the PGE is contained in Appendix B.

2. **Status Log File: CER8.1P1_LogStatus_$SS8_$PS8_$CC8.{YYYY}{MM}**

The Status Log File contains all messages created by the Toolkit. If an abnormal exit is encountered by the PGE, this file should be examined for '_F_', fatal message type. The responsible person should be advised.

3. **User Log File: CER8.1P1_LogUser_$SS8_$PS8_$CC8.{YYYY}{MM}**

The User Log File is not used at this time, but exists to satisfy the Toolkit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

2.5.4 Solutions to Possible Problems

As mentioned in Section 2.4.4, all output files are opened with Status = NEW. The PGE script has been designed to check for these files and to delete them prior to execution, but in the case of a change in the file permission status, the ASDC must take appropriate action. These files must be removed before reprocessing. A script, which removes PGE created files, **CleanOutput.pl**, is located in directory **$CERESHOME/tisa_avg/CER8.1P1/rcf**. To use the clean-up files for **CER8.1P1**:

> **$CERESHOME/tisa_avg/CER8.1P1/rcf/CleanOutput.pl YYYY MM**

2.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

There are no foreseeable subsystem terminating conditions at this time.

b. Target PGE Termination

N/A

2.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process once per month.

Table 2-5. Expected Output File Listing for CER8.1P1

File Name[a]/Directory[c]	m/o[d]	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER8.1P1_PCF_$SS8_$PS8_$CC8.{YYYY}{MM} @($CERESHOME/tisa_avg/CER8.1P1/rcf/pcf)	m	.2	1/mo	N/A	Archive, rm	No
CER8.1P1_PCF_$SS8_$PS8_$CC8.{YYYY}{MM}.log @($CERESHOME/tisa_avg/CER8.1P1/rcf/pcf)	m	.1	1/mo	N/A	Archive, rm	No
CER8.1P1_LogReport_$SS8_$PS8_$CC8.{YYYY}{MM} @($CERESHOME/tisa_avg/runlogs/CER8.1P1)	m	2.6	1/mo	N/A	Archive, rm	No
CER8.1P1_LogStatus_$SS8_$PS8_$CC8.{YYYY}{MM} @($CERESHOME/tisa_avg /runlogs/CER8.1P1)	m	1	1/mo	N/A	Archive, rm	No
CER8.1P1_LogUser_$SS8_$PS8_$CC8.{YYYY}{MM} @($CERESHOME/tisa_avg/ runlogs/CER8.1P1)	m	1	1/mo	N/A	Archive, rm	No
CER8.1P1_$SS8_$PS8_$CC8.oNNNNNN @($CERESHOME/tisa_avg/sge_logs)	o	.2	1/mo	N/A	Archive, rm	No
CER_SYN1deg-Month_$SS8_$PS8_$CC8.{YYYY}{MM} (.met)@($CERESHOME/tisa_avg/data/SYN1deg-Month/$SS8_$PS8/YYYY/MM)	m	1585	1/mo	N/A	DPO, Archive	Yes
CER_SYN1deg-M3Hour_$SS8_$PS8_$CC8.{YYYY} {MM}(.met)@($CERESHOME/tisa_avg/data/SYN1deg-M3Hour/$SS8_$PS8/YYYY/MM)	m	36	1/mo	N/A	DPO, Archive	Yes
CER_SYN1deg-3Hour_$SS8_$PS8_$CC8.{YYYY}{MM} {DD}(.met)@($CERESHOME/tisa_avg/data/SYN1deg-3Hour/$SS8_$PS8/YYYY/MM)	m	564	28..31/ mo	N/A	DPO, Archive	Yes
CER_LRGRP_$SS8_$PS8_$CC8.{YYYY}{MM}(.met) @($CERESHOME/tisa_avg/data/LRGRP/$SS8_$PS8/ YYYY/MM)	m	1	1/mo	N/A	Archive, rm	No
AER_OPT_01.gif ... AER_OPT_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}. {yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
ALB_SFC_CLR_01.gif ... ALB_SFC_CLR_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}. {yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
CLD_EMISS_01.gif ... CLD_EMISS_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}. {yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
CLD_FRAC_01.gif ... CLD_FRAC_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyy y}{mm})	m	.43	1/mo	N/A	Permanent	No
CLD_ICE_DIAM_01.gif ... CLD_ICE_DIAM_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}. {yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No

Table 2-5. Expected Output File Listing for CER8.1P1

File Name[a]/Directory[c]	m/o[d]	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CLD_LIQ_RAD_01.gif ... CLD_LIQ_RAD_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
CLD_OPT_01.gif ... CLD_OPT_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
CLD_PBOT_01.gif ... CLD_PBOT_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
CLD_PHASE_01.gif ... CLD_PHASE_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
CLD_PTOP_01.gif ... CLD_PTOP_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
CLD_TEMP_01.gif ... CLD_TEMP_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
LW_DOWN_SFC_01.gif ... LW_DOWN_SFC_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
LW_NET_SFC_01.gif ... LW_NET_SFC_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
LW_TOA_CLDFORC_01.gif ... LW_TOA_CLDFORC_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
LW_TOA_OBS_01.gif ... LW_TOA_OBS_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
LW_TOA_TUN_01.gif ... LW_TOA_TUN_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
LW_TOA_UNT-OBS_01.gif ... LW_TOA_UNT-OBS_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
NET_TOA_OBS_01.gif ... NET_TOA_OBS_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No

Table 2-5. Expected Output File Listing for CER8.1P1

File Name[a]/Directory[c]	m/o[d]	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
SFC_UV_INDEX_01.gif ... SFC_UV_INDEX_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
SW_DOWN_SFC_01.gif ... SW_DOWN_SFC_ 248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
SW_NET_SFC_01.gif ... SW_NET_SFC_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
SW_SFC_AERFORC_01.gif ... SW_SFC_AERFORC_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
SW_TOA_AERFORC_01.gif ... SW_TOA_AERFORC_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
SW_TOA_CLDFORC_01.gif ... SW_TOA_CLDFORC_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
SW_TOA_OBS_01.gif ... SW_TOA_OBS_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
SW_TOA_TUN_01.gif ... SW_TOA_TUN_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No
SW_TOA_UNT-OBS_01.gif ... SW_TOA_UNT-OBS_248.gif @($CERESHOME/tisa_avg/web/plot/gif/SYN_{INST}.{yyyy}{mm})	m	.43	1/mo	N/A	Permanent	No

a. See Section 2.2 for information on variable data values
If "(**.met**)" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension

b. Permanent - Files will not be removed from the production disk
DB - File content is to be entered into the LaTIS Database
rm - remove

c. YYYY - 4 digit year
MM - 2 digit month {valid values: 01 .. 12}
DD - 2 digit day {valid values: 01 .. 31}
INST - INST – Instrument ID are date dependent (Mon, Year) especially for Terra (see Section 2.2). Values: 2:FM1, 3:FM2, 4:FM5, 5:FM4, 6:Merge

d. m - mandatory output
o - optional output

2.7 Expected Temporary Files/Directories

N/A

3.0 PGEName: CER10.0P3

TO BE RUN ON *AMI-P6* PLATFORM

CERES Only Terra or Only Aqua or Merged Terra and Aqua Monthly and Monthly Hourly Albedo and SW Flux (Subsystem 10.0)

3.1 PGE Details

3.1.1 Responsible Persons

Table 3-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Cathy Nguyen	Dennis Keyes
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1666	951-1650
Fax	951-1900	951-1900
LaRC email	Le.T.Nguyen@nasa.gov	Dennis.F.Keyes@nasa.gov

3.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 3-1.

3.1.3 Parent PGE(s)

Table 3-2. Parent PGEs for CER10.0P3

PGEName	Description
CER9.3P1	Terra Sort and Merge Gridded TOA and Surface Fluxes
CER9.3P1	Aqua Sort and Merge Gridded TOA and Surface Fluxes

3.1.4 Target PGE(s)

Table 3-3. Target PGEs after CER10.0P3

PGEName	Description
CER7.3.1P1	Time Interpolation of Merged Terra and Aqua Satellites

3.2 Operating Environment

3.2.1 Runtime Parameters

Table 3-4. Runtime Parameters for CER10.0P3

Parameter	Description	Data Type	Valid Values
MM	CERDataDateMonth	I(2)	01 .. 12
YYYY	CERDataDateYear	I(4)	>1996

3.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. It is named '**CER10_0P3_env.pm'** and contains the following parameters:

SS10_3 Output Sampling Strategy for Subsystem 10, see Production Request
SS9_T Input Sampling Strategy for Subsystem 9, see Production Request
SS9_A Input Sampling Strategy for Subsystem 9, see Production Request
SS11 Input Sampling Strategy for Subsystem 11, see Production Request
PS10_3 Output Production Strategy for Subsystem 10, see Production Request
PS9_T Input Production Strategy for Subsystem 9, see Production Request
PS9_A Input Production Strategy for Subsystem 9, see Production Request
PS11 Input Production Strategy for Subsystem 11, see Production Request
CC10_3 Output Configuration Code for Subsystem 10, see CM Database
CC9_T Input Configuration Code for Subsystem 9, see CM Database
CC9_A Input Configuration Code for Subsystem 9, see CM Database
CC11 Input Configuration Code for Subsystem 11, see CM Database
CC11_6 Input Configuration Code for Subsystem 11, see CM Database
SW10 Output Software SCCR# for Subsystem 10, see CM Database
DATA10 Output Data SCCR# for Subsystem 10, see CM Database

INSTR_NAME Instrument Process for Subsystem 10.
For Terra only, INSTR_NAME is FM1 except for the following months,
Year 2000, months: 03, 04, 08, 09, 10
Year 2001, months: 02, 03, 04, 08, 09, 10
Year 2006, months: 01, 02
INSTR_NAME is FM2
For Aqua only, INSTR_NAME is FM3 except for the following months,
Year 2002, months: 07, 08, 09, 10
Year 2003, months: 02, 03, 04, 08, 09, 10, 11, 12
Year 2006, months: 01, 02
INSTR_NAME is FM4
For Merged Terra/Aqua, INSTR_NAME is FM1+FM2+FM3+FM4

PLAT Equals INSTR_NAME

InputArchive Directory from which to read the input data products, for all production processing this directory should be set to **/ASDC_archive/CERES**

3.2.3 Execution Frequency (daily, hourly, or monthly)

monthly (1/month) - This PGE is processed once per month, when input is available.

3.2.4 Memory/Disk Space/Time Requirements

Memory:	54624 K
Disk Space:	21.6 GB
Total Run Time:	48 minutes

3.2.5 Restrictions Imposed in Processing Order

None. Process when input data are available (see Section 3.3).

3.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

3.3.1 Input Dataset Name (#1): SFCB Terra

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/SFCB/
CER_SFCB_${SS9_T_}_${PS9_T_}_${CC9_T}.{YYYY}{MM}Z*, where* = 001 .. 180

$InputArchive/SFCB/
CER_SFCB_${SS9_T_}_${PS9_T_}_${CC9_T}.{YYYY}{MM}Z*.met, where* = 001 .. 180

1. Mandatory/Optional: **180 files are Mandatory.**
2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

3. Waiting Period: **None, process when all input data are available.**

b. Source of Information (Source PGE name or Ingest Source):

Source PGE: CER9.3P1

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **33 MB**

3.3.2 Input Dataset Name (#2): SFCB Aqua

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

$InputArchive/SFCB/
CER_SFCB_${SS9_A_}_${PS9_A_}_${CC9_A}.{YYYY}{MM}Z*, where* = 001 .. 180

$InputArchive/SFCB/
CER_SFCB_${SS9_A_}_${PS9_A_}_${CC9_A}.{YYYY}{MM}Z*.met, where* = 001 .. 180

1. Mandatory/Optional: **180 files are Mandatory.**
2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

3. Waiting Period: **None, process when all input data are available.**

b. Source of Information (Source PGE name or Ingest Source):

Source PGE: CER9.3P1

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **33 MB**

3.3.3 Input Dataset Name (#3): GGEOW or GGEO

a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)

$InputArchive/GGEO/
CER_GGEO_$SS11_$PS11_$CC11.{YYYY}{MM}

or

$InputArchive/GGEOW/
CER_GGEOW_$SS11_$PS11_$CC11_6.{YYYY}{MM}

GGEOW should be chosen before **GGEO,** and if it is not available, then **GGEO** is the alternate data set**.**

1. Mandatory/Optional: **This file is Optional, see item 3 below.**

2. Time Related Dependency:

   The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

3. Waiting Period:

   Dependent on GGEOW or GGEO expected waiting period (consult CERES Data Management Office (DMO)).

b. Source of Information (Source PGE name or Ingest Source):

   Source PGE: CER11.6P1 or CER11.2P1

c. Alternate Data Set, if one exists (maximum waiting period): **GGEO**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **567 MB**

3.4 Operating Procedures (Procedure for each part of the processor's elements)

The main processor production script, **run_CER10.0P3.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing the generator, **CER10.0P3_pcf_gen.pl** after all of the necessary environment variables in Section 3.2.2 have been set**.** To run via SGE execute the production script by typing **CER10.0P3-SGE_Driver.pl** followed by the data date

3.4.1 How to Generate the PCF File for manual operations

The PCF file generator requires two (2) command line arguments:

(-d)	2-character static code to indicate that a date follows
(YYYY)	4-digit year
(MM)	2-digit month

At the command line (>) type:

> cd $CERESHOME/tisa_avg/CER10.0P3/rcf

For Terra only:

> ./CER10.0P3_pcf_gen.pl -date {YYYY}{MM} -satellites terra ggeo

For Merged Terra Aqua:

> ./CER10.0P3_pcf_gen.pl -date {YYYY}{MM} -satellites terra aqua ggeo

The following file will be generated in **$CERESHOME/tisa_avg/CER10.0P3/rcf/pcf**:
CER10.0P3_PCF_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}
CER10.0P3_PCF_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}.log

3.4.2 How to Execute the Main Processor

The production script is executed by typing the script name, **run_CER10.0P3.pl**, followed by the PCF file name.

To run at the command line:

```
> cd $CERESHOME/tisa_avg/CER10.0P3/rcf
> ./run_CER10.0P3.pl {YYYY} {MM}
    CER10.0P3_PCF_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}
```

To run using SGE:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission scripts.

For Terra only:

```
> CER10.0P3-SGE_Driver.pl -date YYYYMM -satellites terra ggeo
```

For Merged Aqua Terra:

```
> CER10.0P3-SGE_Driver.pl -date YYYYMM -satellites terra aqua ggeo
```

The **CER10.0P3-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested date and time given. If all input data files are available and previously created output for this data date does not exist it will submit the job to the cluster. However, if any mandatory data files are missing the script will not submit the job to the cluster.

If existing output data products are discovered they will be listed as output to the screen and the user must delete these files before rerunning the **CER10.0P3-SGE_Driver.pl** script.

3.4.3 Special Case Considerations

N/A at this time.

3.4.4 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then all TSI files created during the previous run must be deleted. A script to remove all files from the failed run is available. The script **CleanOutput.pl** takes as in input parameter the PCF filename for the failed run. The environment variable $CERESHOME must be set in order for this script to work.

```
> cd $CERESHOME/tisa_avg/CER10.0P3/rcf/
> ./CleanOutput.pl $YYYY $MM
```

3.5 Execution Evaluation

3.5.1 Exit Codes

The processor CER10.0P3 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS), as seen in Table 3-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or Toolkit related error. In these cases, contact the responsible person(s) (see Table 3-1) for assistance.

Table 3-5. Exit Codes for CER10.0P3

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
202	Failure	Check the Log Files and take the appropriate action (see Appendix B).

3.5.2 Screen Messages (Use Table format for large number of messages)

When running the production script, **CER10.0P3**, the system message, "No match," may be written to the screen. This message occurs when the scripts try to remove an old output file that does not exist. This does not signify a problem.

3.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/tisa_avg/runlogs/CER10.0P3**.

1. **Report Log File: CER10.0P3_LogReport_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}**

The Report Log File contains TISA Averaging related messages. A comprehensive list of these messages that can be generated during execution of the PGE is contained in Appendix B.

2. **Status Log File: CER10.0P3_LogStatus_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}**

The Status Log File contains all messages created by the Toolkit. If an abnormal exit is encountered by the PGE, this file should be examined for '_F_', fatal message type. The responsible person should be advised.

3. **User Log File: CER10.0P3_LogUser_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}**

The User Log File is not used at this time, but exists to satisfy the Toolkit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

3.5.4 Solutions to Possible Problems

As mentioned in Appendix B all output files are opened with Status = NEW. The PGE script has been designed to check for these files and to delete them prior to execution, but in the case of a change in the file permission status, the ASDC must take appropriate action. These files must be removed before reprocessing. A script, which removes PGE created files, **CleanOutput.pl**, is located in directory **$CERESHOME/tisa_avg/CER10.0P3/rcf**. To use the clean-up files for **CER10.0P3**:

> **$CERESHOME/tisa_avg/CER10.0P3/rcf/CleanOutput.pl $YYYY $MM**

3.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

There are no foreseeable subsystem terminating conditions at this time.

b. Target PGE Termination

N/A

3.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process once per month**.**

Table 3-6. Expected Output File Listing for CER10.0P3

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER10.0P3_PCF_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}@($CERESHOME/tisa_avg/CER10.0P3/rcf/pcf)	m	1	1/mo	N/A	Archive, rm	No
CER10.0P3_PCF_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}.log@($CERESHOME/tisa_avg/CER10.0P3/rcf/pcf)	m	1	1/mo	N/A	rm	No
CER_TSI-mhr-csalb_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}(.met)@($CERESHOME/tisa_avg/data/TSI-mhr-csalb/$SS10_3_$PS10_3/YYYY/MM)	m	12	1/mo	CER7.3.1P1	DPO, Archive	No
CER_TSI-csalb0-intrp2s_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}(.met) @($CERESHOME/tisa_avg/data/TSI-csalb0-intrp2s/ $SS10_3_$PS10_3/YYYY/MM)	m	1	1/mo	CER7.3.1P1	DPO, Archive	No
CER_TSI-SNOW-PCT_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}(.met) @($CERESHOME/tisa_avg/data/TSI-SNOW-PCT/ $SS10_3_$PS10/YYYY/MM)	m	4	1/mo	CER7.3.1P1	DPO, Archive	No
CER_TSI-xglb_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM}(.met) @($CERESHOME/tisa_avg/data/TSI-xglb/ $SS10_3_$PS10/YYYY/MM)	m	3	1/mo	CER7.3.1P1	DPO, Archive	No
CER10.0P3_LogStatus_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM} @($CERESHOME/tisa_avg/runlogs/CER10.0P3)	m	0.005	1/mo	N/A	Archive, rm	No

Table 3-6. Expected Output File Listing for CER10.0P3

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER10.0P3_LogReport_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM} @($CERESHOME/tisa_avg/runlogs/CER10.0P3)	m	0.001	1/mo	N/A	Archive, rm	No
CER10.0P3_LogUser_$SS10_3_$PS10_3_$CC10_3.{YYYY}{MM} @($CERESHOME/tisa_avg/runlogs/CER10.0P3)	m	0.001	1/mo	N/A	Archive, rm	No

a. See Section 3.2 for information on variable data values
If "(**.met**)" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension

b.
VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
Permanent - Files will not be removed from the production disk
DB - File content is to be entered into the LaTIS Database
rm - remove
YYYY - 4 digit year
MM - 2 digit month {valid values: 01 .. 12}
DD - 2 digit day {valid values: 01 .. 31
HH - 2 digit hour of the day {valid values: 00 .. 23)
m - mandatory output
o - optional output
EOD - End of Data Month

3.7 Expected Temporary Files/Directories

Table 3-7. Temporary Files Listing

Directory	File Name
$CERESHOME/tisa_avg/data/int_prod	CER_TSI-clrsky-albsw_$SS10_3_ $PS10_3_$CC10_3.{YYYY}{MM}
$CERESHOME/tisa_avg/data/int_prod	CER_match-bin_$SS10_3_ $PS10_3_$CC10_3.{YYYY}{MM}
$CERESHOME/tisa_avg/data/int_prod	CER_match-lat_$SS10_3_ $PS10_3_$CC10_3.{YYYY}{MM}
$CERESHOME/tisa_avg/data/int_prod	CER_match-tot_$SS10_3_ $PS10_3_$CC10_3.{YYYY}{MM}
$CERESHOME/tisa_avg/data/int_prod	CER_tot-match_$SS10_3_ $PS10_3_$CC10_3.{YYYY}{MM}

4.0 PGEName: CER10.0P4

CERES Only Terra or Only Aqua Monthly and Daily Averaged TOA fluxes and Cloud Properties (Subsystem 10.0)

TO BE RUN ON *AMI-P6* or *x86* PLATFORM

4.1 PGE Details

4.1.1 Responsible Persons

Table 4-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Cathy Nguyen	Dennis Keyes
Organization	SSAI	SSAI
Address	1 Enterprise Parkway	1 Enterprise Parkway
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1666	951-1650
Fax	951-1900	951-1900
LaRC email	Le.T.Nguyen@nasa.gov	Dennis.F.Keyes@nasa.gov

4.1.2 E-mail Distribution List

E-mail distribution list can be obtained from the primary contact listed in Table 4-1.

4.1.3 Parent PGE(s)

Table 4-2. Parent PGEs for CER10.0P4

PGEName	Description
CER9.3P1	Terra Sort and Merge Gridded TOA and Surface Fluxes
CER9.3P1	Aqua Sort and Merge Gridded TOA and Surface Fluxes

4.1.4 Target PGE(s)

Table 4-3. Target PGEs after CER10.0P4

PGEName	Description
None	Final Product – SSF1deg-Month and SSF1deg-Day

4.2 Operating Environment

4.2.1 Runtime Parameters

Table 4-4. Runtime Parameters for CER10.0P4

Parameter	Description	Data Type	Valid Values
MM	CERDataDateMonth	I(2)	01 .. 12
YYYY	CERDataDateYear	I(4)	>1996

4.2.2 Environment Script Requirements

Refer to the CERES internal paper (Reference 1) for a detailed description of the CERES environment parameters.

One Environment Script is required. It is named '**CER10_0P3_env.pm'** and contains the following parameters:

SS10_4	Output Sampling Strategy for Subsystem 10, see Production Request
SS9	Input Sampling Strategy for Subsystem 9, see Production Request
PS10_4	Output Production Strategy for Subsystem 10, see Production Request
PS9	Input Production Strategy for Subsystem 9, see Production Request
CC10_4	Output Configuration Code for Subsystem 10, see CM Database
CC9	Input Configuration Code for Subsystem 9, see CM Database
SW10	Output Software SCCR# for Subsystem 10, see CM Database
DATA10	Output Data SCCR# for Subsystem 10, see CM Database
INSTR_NAME	Terra or Aqua Instrument Process for Subsystem 10.
PLAT	Equals INSTR_NAME
InputArchive	Directory from which to read the input data products, for all production processing this directory should be set to **/ASDC_archive/CERES**

4.2.3 Execution Frequency (daily, hourly, or monthly)

monthly (1/month) - This PGE is processed once per month, when input is available.

4.2.4 Memory/Disk Space/Time Requirements

Memory:	54624 K
Disk Space:	21.6 GB
Total Run Time:	25 minutes

4.2.5 Restrictions Imposed in Processing Order

None. Process when input data are available (see Section 4.3).

4.3 Processor Dependencies (Previous PGEs, Ingest Data)

Note: Include required .met files, header files, .. all required inputs

4.3.1 Input Dataset Name (#1): SFCB Terra

a. Directory Location/Inputs Expected (Including .met files, header files, etc.):

   $InputArchive/SFCB/
   CER_SFCB_${SS9_}_${PS9_}_${CC9}.{YYYY}{MM}Z*, where* = 001 .. 180

   $InputArchive/SFCB/
   CER_SFCB_${SS9_}_${PS9_}_${CC9}.{YYYY}{MM}Z*.met, where* = 001 .. 180

   1. Mandatory/Optional: **180 files are Mandatory.**
   2. Time Related Dependency:

      The DataDate {YYYY}{MM} must match the Runtime Parameters YYYY and MM.

   3. Waiting Period: **None, process when all input data are available.**

b. Source of Information (Source PGE name or Ingest Source):

   Source PGE: CER9.3P1

c. Alternate Data Set, if one exists (maximum waiting period): **N/A**

d. File Disposition after successful execution: **N/A**

e. Typical file size (MB): **33 MB**

4.4 Operating Procedures (Procedure for each part of the processor's elements)

The main processor production script, **run_CER10.0P4.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing the generator, **CER10.0P4_pcf_gen.pl** after all of the necessary environment variables in Section 4.2.2 have been set**.** To run via SGE execute the production script by typing **CER10.0P4-SGE_Driver.pl** followed by the data date.

4.4.1 How to Generate the PCF File for manual operations

The PCF file generator requires two (2) command line arguments:

(-d)	2-character static code to indicate that a date follows
(YYYY)	4-digit year
(MM)	2-digit month

At the command line (>) type:

> cd $CERESHOME/tisa_avg/CER10.0P4/rcf

For Terra:

> ./CER10.0P4_pcf_gen.pl -date {YYYY}{MM} -satellites terra

For Aqua:

> ./CER10.0P4_pcf_gen.pl -date {YYYY}{MM} -satellites aqua

The following file will be generated in **$CERESHOME/tisa_avg/CER10.0P4/rcf/pcf**:
CER10.0P4_PCF_$SS10_4_$PS10_4_$CC10_4.{YYYY}{MM}
CER10.0P4_PCF_$SS10_4_$PS10_4_$CC10_4.{YYYY}{MM}.log

4.4.2 How to Execute the Main Processor

The production script is executed by typing the script name, **run_CER10.0P4.pl**, followed by the PCF file name.

To run at the command line:

> cd $CERESHOME/tisa_avg/CER10.0P4/rcf
> ./run_CER10.0P4.pl {YYYY} {MM}
CER10.0P3_PCF_$SS10_4_$PS10_4_$CC10_4.{YYYY}{MM}

To run using SGE for a single date:

Note: It is not necessary to manually create the PCF as described above when submitting a job using the SGE submission scripts.

For Terra:

> CER10.0P4-SGE_Driver.pl -date YYYYMM -satellites terra

For Aqua:

> CER10.0P4-SGE_Driver.pl -date YYYYMM -satellites aqua

To run using SGE for a for a range of months:

For Terra:

> CER10.0P4-SGE_Driver.pl -start YYYYMM -end YYYYMM -satellites terra

For Aqua:

> CER10.0P4-SGE_Driver.pl -start YYYYMM -end YYYYMM -satellites aqua

There are several options for running jobs for multiple months. Specific platforms can also be designated.

Here are optional arguments for **CER10.0P4-SGE_Driver.pl**:

[-clean]	Delete any existing outputs that are encountered
[-satellite SAT]	Run the PGE for the designated satellite SAT (i.e., terra or aqua)
[-date YYYYMM]	Run the PGE on the data month specified by YYYYMM
[-start YYYYMM]	Run the PGE starting on the data month specified by YYYYMM
[-end YYYYMM]	Run the PGE stopping on the data month specified by YYYYMM
[-platform CPU]	Run the PGE on the platform designated by CPU (i.e., *P6* or *x86*)

Below are some examples of executing the driver script with these arguments.

To run a single month:

> CER10.0P4-SGE_Driver.pl -date 200801 -satellites terra

To run a range of months:

> CER10.0P4-SGE_Driver.pl -start 200801 -end 200812 -satellites aqua

For any of the examples above, you can add the platform option to specify either the *P6* or *x86* platform.

For example:

> CER10.0P4-SGE_Driver.pl -date 200801 -satellites terra -platform p6

or

> CER10.0P4-SGE_Driver.pl -date 200801 -satellites terra –platform x86

The **CER10.0P4-SGE_Driver.pl** script will search for the required input data files and any existing data product files for the requested date and time given. If all input data files are available and previously created output for this data date does not exist it will submit the job to the cluster. However, if any mandatory data files are missing the script will not submit the job to the cluster.

If existing output data products are discovered they will be listed as output to the screen and the user must delete these files before rerunning the **CER10.0P4-SGE_Driver.pl** script.

4.4.3 Special Case Considerations

N/A at this time.

4.4.4 Special Reprocessing Instructions

If reprocessing is done to correct an error during production, then SSF1deg and SSF1def-Day files created during the previous run must be deleted. A script to remove all files from the failed run is available. The script **CleanOutput.pl** takes as in input parameter the PCF filename for the failed run. The environment variable **$CERESHOME** must be set in order for this script to work.

```
> cd $CERESHOME/tisa_avg/CER10.0P4/rcf/
> ./CleanOutput.pl $YYYY $MM
```

4.5 Execution Evaluation

4.5.1 Exit Codes

The processor CER10.0P4 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS), as seen in Table 4-5. Other Exit Codes may appear from the program, which may be the result of a system, compiler, or Toolkit related error. In these cases, contact the responsible person(s) (see Table 4-1) for assistance.

Table 4-5. Exit Codes for CER10.0P4

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
202	Failure	Check the Log Files and take the appropriate action (see Appendix B).

4.5.2 Screen Messages (Use Table format for large number of messages)

When running the production script, **CER10.0P4**, the system message, "No match," may be written to the screen. This message occurs when the scripts try to remove an old output file that does not exist. This does not signify a problem.

4.5.3 Log and Status Files Results (Include ALL Log Files)

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/tisa_avg/runlogs/CER10.0P4**.

1. **Report Log File: CER10.0P4_LogReport_$SS10_4_$PS10_4_$CC10_4.{YYYY}{MM}**

The Report Log File contains TISA Averaging related messages. A comprehensive list of these messages that can be generated during execution of the PGE is contained in Appendix B.

2. **Status Log File: CER10.0P4_LogStatus_$SS10_4_$PS10_4_$CC10_4.{YYYY}{MM}**

The Status Log File contains all messages created by the Toolkit. If an abnormal exit is encountered by the PGE, this file should be examined for '_F_', fatal message type. The responsible person should be advised.

3. **User Log File: CER10.0P4_LogUser_$SS10_4_$PS10_4_$CC10_4.{YYYY}{MM}**

The User Log File is not used at this time, but exists to satisfy the Toolkit requirements. Typically the _U_ and _N_ (User information and Notice) will be written to User Log File and Status Log File.

4.5.4 Solutions to Possible Problems

As mentioned in Appendix B all output files are opened with Status = NEW. The PGE script has been designed to check for these files and to delete them prior to execution, but in the case of a change in the file permission status, the ASDC must take appropriate action. These files must be removed before reprocessing. A script, which removes PGE created files, **CleanOutput.pl**, is located in directory **$CERESHOME/tisa_avg/CER10.0P4/rcf**. To use the clean-up files for **CER10.0P4**:

> **$CERESHOME/tisa_avg/CER10.0P4/rcf/CleanOutput.pl $YYYY $MM**

4.5.5 Conditions for Subsystem and/or Target PGE(s) Terminal Failure (Halt all further processing)

a. Subsystem Termination

There are no foreseeable subsystem terminating conditions at this time.

b. Target PGE Termination

N/A

4.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process once per month**.**

Table 4-6. Expected Output File Listing for CER10.0P4

File Name[a]/Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_SSF1deg-Month_$SS10_4_ $PS10_4_$CC10_4.{YYYYMM}@ ($CERESHOME/tisa_avg/data/SSF1deg-Month/$SS10_4_$PS10_4/$year/$month)	m	1	1/mo	N/A	DPO, Archive	Yes
CER_SSF1deg-Day_$SS10_4_ $PS10_4_$CC10_4.{YYYYMM}@ ($CERESHOME/tisa_avg/data/SSF1deg-Day/$SS10_4_$PS10_4/$year/$month)	m	1	1/mo	N/A	DPO, Archive	Yes
CER_SSF1deg-Month_$SS10_4_ $PS10_4_$CC10_4.{YYYYMM}.met@ ($CERESHOME/tisa_avg/data/SSF1deg-Month/$SS10_4_$PS10_4/$year/$month)	m	0.01	1/mo	N/A	DPO, Archive	Yes
CER_SSF1deg-Day_$SS10_4_ $PS10_4_$CC10_4.{YYYYMM}.met@ ($CERESHOME/tisa_avg/data/SSF1deg-Day/$SS10_4_$PS10_4/$year/$month)	m	0.01	1/mo	N/A	DPO, Archive	Yes
CER10.0P4_LogStatus_$SS10_4_$PS10_4 _$CC10_4.{YYYY}{MM} @($CERESHOME/tisa_avg/runlogs/ CER10.0P4)	m	0.005	1/mo	N/A	Archive, rm	No
CER10.0P4_LogReport_$SS10_4_$PS10_ 4_$CC10_4.{YYYY}{MM} @($CERESHOME/tisa_avg/runlogs/ CER10.0P4)	m	0.001	1/mo	N/A	Archive, rm	No
CER10.0P4_LogUser_$SS10_4_$PS10_4_ $CC10_4.{YYYY}{MM} @($CERESHOME/tisa_avg/runlogs/ CER10.0P4)	m	0.001	1/mo	N/A	Archive, rm	No
CER10.0P4_PCF_$SS10_4_$PS10_4_$CC 10_4.{YYYY}{MM}.log @($CERESHOME/tisa_avg/CER10.0P4/ rcf/pcf)	m	0.07	1/mo	N/A	rm	No
CER10.0P4_PCF_$SS10_4_$PS10_4_$CC 10_4.{YYYY}{MM} @($CERESHOME/tisa_avg/CER10.0P4/ rcf/pcf)	m	0.06	1/mo	N/A	Archive, rm	No

a. See Section 4.2 for information on variable data values
If "(**.met**)" is written next to an expected Output Filename, then the metadata file **must** exist with the identical filename and .met extension

b.
VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
Permanent - Files will not be removed from the production disk
DB - File content is to be entered into the LaTIS Database
rm - remove
YYYY - 4 digit year
MM - 2 digit month {valid values: 01 .. 12}
DD - 2 digit day {valid values: 01 .. 31
HH - 2 digit hour of the day {valid values: 00 .. 23)
m - mandatory output

o	-	optional output
EOD	-	End of Data Month

4.7 Expected Temporary Files/Directories

N/A

References

1. Reference "Sampling Strategy, Production Strategy, and Configuration Code Implementation at the Langley TRMM and Terra Information System (LATIS)" internal paper for detail description of the CERES environment parameters. URL: http://ceres.larc.nasa.gov/Internal/intern_docs.php

Appendix A
Acronyms and Abbreviations

ADM	Angular Distribution Models
ASCII	American Standard Code Information Interchange
ASDC	Atmospheric Science Data Center
AVG	Monthly Regional, Average Radiative Fluxes and Clouds
CERES	Clouds and the Earth's Radiant Energy System
CERESLib	CERES Library
DAAC	Distributed Active Archive Center
DMT	Data Management Team
EOS	Earth Observing System
EOSDIS	EOS Data Information System
EOS-AM	EOS Morning Crossing Mission
EOS-PM	EOS Afternoon Crossing Mission
ERBE	Earth Radiation Budget Experiment
ERBS	Earth Radiation Budget Satellite
F90	Fortran 90
FOV	Field-of-View
FSW	Hourly Gridded Single Satellite Fluxes and Clouds
GB	Gigabytes
GGEO	Geostationary data
HDF	Hierarchical Data Format
HDF-EOS	Hierarchical Data Format - Earth Observing System
KB	Kilobytes
LaRC	Langley Research Center
LaTIS	Langley TRMM Information System
LW	Longwave
MB	Megabytes
MCF	Metadata Control File
μm	micrometer, micron
met	metadata file
μm	microns
MM	Two-digit Month
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
PCF	Process Control File

PMOA	Post Meteorological, Ozone, and Aerosol
QC	Quality Control
SARB	Surface and Atmospheric Radiation Budget
SFC	Hourly Gridded Single Satellite TOA and Surface Fluxes and Clouds
SGE	Sun Grid Engine
SMF	Status Message File
SRBAVG	Monthly TOA and SRB Averages
SSAI	Science Systems and Applications, Inc.
SW	Shortwave
SYN	Synoptic Radiative Fluxes and Clouds
TISA	Time Interpolation and Spatial Averaging
TOA	Top-Of-the-Atmosphere
TRMM	Tropical Rainfall Measuring Mission
TSI	Time Space Interpolation of clouds and TOA fluxes
UT	Universal Time
YYYY	Four-digit Year
ZAVG	Monthly Zonal and Global Average Radiative Fluxes and Clouds

Appendix B
Error Messages for CER7.3.1P1, CER8.1P1, CER10.0P3, and CER10.0P4

Appendix B contains a comprehensive list of messages that can be generated during the execution of a PGE. These messages are used to inform the operator or analyst of specific circumstances encountered during data processing. These messages may be strictly informative (Error Type = Status or Warning), or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal). All messages are written to the LogReport File and/or the LogStatus File of the processing instance.

Table B-1 contains a list of the PGEs CER7.3.1P1, CER8.1P1, CER10.0P3, and CER10.0P4 diagnostic messages. Each table entry includes a message pneumonic, the message content, the source module and the recommended action that should be taken when the message is encountered.

Operator Instructions:

If a PGE prematurely terminates, then take the following steps:

1. Look at the last few records on the LogStatus File.
2. Find the error message in the following Error Message listing(s), and follow the appropriate ACTION.
3. If an error message is not in the LogStatus File, then repeat steps 1 and 2 using the LogReport File.
4. If the appropriate ACTION failed, then call the responsible persons in Section 1.1.1.
5. In all cases, log all steps that were taken after the PGE failure, and send a copy to the responsible persons.

Action Key Definitions:

Key	Action
1	Go to the appropriate directory to check for the file availability and file permission.
2	Check file existence in directory. $CERESHOME/tisa_avg/data/ancillary/static.
3	Check for permission on $CERESHOME/tisa_avg/data/data_8/out_comp.
4	Check directory $CERESHOME/tisa_avg/data/ for input files.
5	Error in closing file. Check for permission then call the responsible persons.
6	Check for input file permission.
7	Check for write permission and then call the responsible persons.
8	Warning message. Call the responsible persons.
9	Warning message. Code check for analyst.
10	Code errors. Call the responsible persons.
11	Check the hrs.h@($CERESHOME/tisa_avg/src/include7_10) file in the source code/include directory.

B.1 Error Messages for CER7.3.1P1, CER8.1P1, CER10.0P3, and CER10.0P4.

Table B-1. TK Message Table for CER7.3.1P1, CER8.1P1, CER10.0P3, and CER10.0P4

Message/Error Type		Module Name	Action Key
TISAVG_E_OPEN_ERROR	ERROR...Opening GEORC file	georc	1
TISAVG_E_OPEN_ERROR	ERROR...Opening SRBAVG files	hdf_file	1
TISAVG_E_OPEN_ERROR	ERROR...Opening grid for a opened HDF file	hdf_file	1
TISAVG_M_CLOSE_ERROR	MESSAGE...Error detaching grid	hdf_file	8
TISAVG_M_CLOSE_ERROR	MESSAGE...Error closing hdf file	hdf_file	2
TISAVG_E_SRBAVG_WRT_ERR	ERROR...Error writing data onto HDF file	hdf_file	7
TISAVG_E_SUBSYS_HR	ERROR...Error hours in day for the processing subsystem	init_subsys	11
TISAVG_E_BAD_PARAM_INT	ERROR...Error if there is a measurement for the hour and the data is default value	interp_algrthms	8
TISAVG_E_OPEN_ERROR	ERROR...Opening HDF file for write	io_data_mod	1
TISAVG_E_OPEN_ERROR	ERROR...Open_interp_file	output_interp_data	1
TISAVG_E_OPEN_ERROR	ERROR...Opening qc report file	qc_avg	1
TISAVG_F_SOLDEC_ERR	FATAL...Calculating solar declination angles, distance corrected solar constants	sol_stats	10
TISAVG_E_ACCESS_RTN	ERROR...Routine call need at least one input parameter	sol_stats	6
TISAVG_F_CDM_OPEN_ERR	FATAL...Unable to fill sw directional model table	sw_dirmod_rtns	10
TISAVG_W_GET_PCF_PARAM_UNKNOWN	WARNING...Run time param read is not successful	sys_param	8
TISAVG_E_OPEN_ERROR	ERROR...Reading valid region data	valid_regions	6
TISAVG_E_POLAR_FLAG_ERROR	ERROR...Getting the polar flag for a given zone	weights_flags	6