Clouds and the Earth's Radiant Energy System (CERES)

Data Management System

Operator's Manual

Cloud Retrieval and Convolution
(Subsystems 4.1 through 4.4)

CER4.1-4.0P1, CER4.1-4.0P2, CER4.1-4.0P3,
CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3,
CER4.1-4.1P4, CER4.1-4.1P5, CER4.1-4.1P6, CER4.1-4.2P1, CER4.1-4.2P2,
CER4.1-4.2P3, CER4.1-4.2P4, CER4.1-4.2P5, CER4.1-4.3P1,
CER4.1-4.3P2, CER4.1-4.3P3, CER4.1-4.4P1

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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
05/24/01	R3V4	262	• Added instructions for Edition2 TRMM processing. • Updated CPU Time and Disk Storage in tables. • Updated the PCF sample code in Appendix C. • Added error tables to Appendix B for PGEs CER4.1-4.3P1 and CER4.1-4.4P1. Added a new error message to Table B-2. • Updated master pages to reflect the current version and date. • Changed the date and version on the cover page. • Updated format to comply with standards.	All
07/06/01	R3V5	273	• Added PGE CER4.1-4.1P2. • Changed error table in Appendix B to apply to both PGE CER4.1-4.1P1 and CER4.1-4.1P2. • Added sample PCFin file for CER4.1-4.1P2 in Appendix C. • Updated format to comply with standards.	All App. B App. C All
08/07/01	R3V6	284	• Changed number of subset files to 1-33 in PGEs 4.1-4.1P1 and 4.1-4.1P2. • Changed optional ("o") to mandatory ("m") for some output files for PGEs 4.1-4.1P1 and 4.1-4.1P2. • Added error code 99 to PGEs 4.1-4.1P1 and 4.1-4.1P2. • Added failed to stage .met file to error 14. • Updated format to comply with standards.	Secs. 2.6 & 3.6 Secs. 2.6 & 3.6 Secs. 2.5.1 & 3.5.1 App. B All
03/21/02	R3V7	330	• Updated Tables to include PCF files and Log Reports. • Added in Environment Script Requirements.	All All

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SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
03/21/02 (Cont'd)	R3V7	330	• Added in MODIS Aerosol data. • Updated format to comply with standards.	Sec. 3.3.1.2 All
06/03/02	R3V8	351	• Added PGE CER4.1-4.2P2. • Updated Appendix B to include new directory structure for PGE CER4.1-4.2P2. • Updated and formatted the file listing in Appendix C. • Added NESDIS Input Dataset for PGE CER4.1-4.0P1. • Included PCFin from 1P1 or 1P2 as input for 2P1. • Updated format to comply with standards.	Sec. 5.0 App. B App. C Sec. 1.3.2 Secs. 2.6, 3.6, & 4.3 All
12/04/02	R3V9	404	• Added PRODUCTION environmental variable. • Removed TRMM from 1P2 and 2P2 descriptions. • Updated error message. • Updated sampling strategy in PCFin examples. • Updated format to comply with standards.	Secs. 2.2.2 & 3.2.2 Secs. 2.2.2 & 3.2.2 App. B App. C All
1/29/03	R3V10	421	• Added PGE CER4.1-4.1P3. • Updated PGE CER4.1-4.2P2 for Aqua. • Added PGE CER4.1-4.1P3 to list of main processor errors. • Updated error message. • Updated format to comply with standards.	Sec. 6.0 & Preface Sec. 8.0 App. B App. C All
3/14/03	R3V11	425	• Added environmental variable CER4.1-4.2P1. • Added PCFin from CER4.1-4.1P3. • Added CER4.1-4.1P3 as source for CER4.1-4.2P1. • Updated format to comply with standards.	Sec. 5.0 All
9/05/03	R3V12	467	• Reduce run time and disk storage for CER4.1-4.1P2. • Added requirement for additional MOA files for CER4.1-4.1P2. • Added special requirements for clear sky map for CER4.1-4.1P1 and CER4.1-4.1P2.	Sec. 3.2.4 Sec. 3.3.2 Sec. 3.3.5

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9/05/03 (Cont'd)	R3V12	467	• Added command line inputs to PCF Generator scripts for MODIS version information.	Sec. 3.4
			• Added CRH file for 1.60 and change name for 0.63 micrometer files.	Sec. 3.6
			• Added CRH files for 1.60 micrometer to CER4.1-4.2P2 processing.	Sec. 6.3
			• Updated sample ASCII file listing for CER4.1-4.1P2.	App. C
			• Updated format to comply with standards.	All
12/22/03	R3V13	490	• Added VRG and VA to run time parameters for PGE4.1-4.1P2 and CER4.1-4.1P3.	Secs. 3.2.1 & 4.2.1
			• Reduce run time and disk storage for CER4.1-4.1P3.	Sec. 4.2.4
			• Added requirement for additional MOA files for CER4.1-4.1P3.	Sec. 4.3.2
			• Added special requirements for clear sky map for CER4.1-4.1P3.	Sec. 4.3.5
			• Added command line inputs to PCF Generator scripts for MODIS version information.	Sec. 4.4
			• Added additional explanation on MODIS file requirements.	Secs. 3.3.1 & 4.3.1
			• Removed 4.1-4.1P2 from Section 5.3.9.	Sec. 5.3.9
			• Added Section 7.3.3.	Sec. 7.3.3
			• Sample PCFin file for CER4.1-4.1P2 and CER4.1-4.1P3.	App. C
			• Updated format to comply with standards.	All
8/13/04	R3V14	549	• Increased the number of CldVis Subset files possible per hour to 56.	Sec. 4.6
			• Updated format to comply with standards.	All
11/16/04	R4V1	567	• Added the capability of turning on/off CloudVis output file. Added CV to Environment Variables for PGEs CER4.1-4.1P1, CER4.1-4.1P2, &CER4.1-4.1P3.	Secs. 2.2.2, 2.6, 3.2.2, 3.6, 4.2.2, 4.6, & App. D
			• Updated format to comply with standards.	All
5/16/07	R4V2	654	• Organization and Email updated.	Sec. 1.1.1
			• Additional target PGEs added for 0P1.	Secs. 1.1.4 & 1.8
			• Indicated target PGE for PCFin files.	Secs. 2.6, 3.6, & 4.6

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SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
5/16/07	R4V2	654	• Range for MODIS version changed.	Secs. 3.2 & 3.3
(Cont'd)			• Dynamic Clear Sky maps and update files that have not been implemented yet have been removed as input and output.	Secs. 3.3, 3.6, 4.3, 4.6, 5.3, 5.6, 6.3, & 6.6
			• Number of subset files increased and CloudVis file size updated.	Secs. 3.6 & 4.6
			• Added Four new PGEs.	Overview
			• Corrected source of environmental variables.	Sec. 4.2.2
			• Added Terra-MODIS Collection 005 Main Processor.	Secs. 1.1.4, 1.1.6, & 5.0
			• Added Aqua-MODIS Collection 005 Main Processor.	Secs. 1.1.4, 1.1.6, & 6.0
			• Added CER4.1-4.3P1 as target to 2P1.	Sec. 7.1
			• Added CER4.1-4.1P4 and 1P5 as parent and target to 2P2.	Secs. 8.1.3, 8.1.4, 8.3, & 8.6
			• Added Collection 005 Daily QC Processor.	Sec. 9.0
			• Added Collection 005 Monthly QC Processor.	Sec. 11.0
			• Associated Error Messages with new PGEs.	App. B
			• Added PCFin files for four new PGEs.	App. C
			• Added environmental variable for four new PGEs.	App. D
1/23/08	R4V3	658	• Added four new PGEs.	Overview
			• Added CER4.1-4.1P6 Edition3 Main Processor.	Secs. 1.1.4 & 7.0
			• Added Edition3 Daily QC Processor.	Sec. 11.0
			• Added Edition3 Clear Sky Update.	Sec. 12.0
			• Added Edition3 Monthly QC Processor.	Sec. 15.0
			• Associated Error Messages with new PGEs.	App. B
			• Added ASCII File Listing for new PGEs.	App. C
5/28/08	R4V4	673	• Added new environmental variable, MODIS_IGBP, for CER4.1-4.1P4 and CER4.1-4.1P5.	Secs. 5.2.2 & 6.2.2
1/22/09	R5V1	693	• Added new Snow and Ice PGE.	Overview
			• Added CER4.1-4.10P2 Snow and Ice PGE.	Sec. 2.0

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SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
1/22/09 (Cont'd)	R5V1	693	• Added IBM P4 runtimes and updated storage requirements.	Secs. 5.2.4, 6.2.4, 10.2.4, 11.2.4, & 15.2.4
			• Updated input file sizes.	Secs. 5.2.3, 6.2.3, 10.2.3, 11.2.3, & 15.2.3
			• Modified directory paths and changed to Perl scripts.	Secs. 5.4, 6.4, 10.4, 11.4, & 15.4
			• Updated output file sizes.	Tables 5-6, Secs. 6-6, 10-6, 11-6, & 15-6
			• Update directory paths in PCF.	C-2, C-5, C-6, C-10, C-11, & C-15
			• Added "Production" as an environmental variable. (03/11/2009)	Secs. 10.2.2, 11.2.2, & 15.2.2
			• Removed PGE 4.1-4.4P1 as a source for MODIS files. (03/11/2009)	Sec. 6.3.1.1
			• Modified and added alternate data set input filenames. (06/18/2009)	Secs. 10.3.1, 10.3.2, & 10.3.3
			• Changed configuration code from CC4_0P1 to CC4_0P2. (06/18/2009)	Secs. 6.2.2 & 7.2.2
			• Changed CC4_0P1 to CC4_0P2 in input files EICE and ESNOW. (06/22/2009)	Secs. 6.3.3, 6.3.4, 7.3.3, & 7.3.4
			• Added S'COOL files to input for CER4.1-4.2P3 (2/02/2011)	Sec. 11.3.4
7/28/09	R5V2	719	• Changed1P6 directory structure.	Secs. 8.4.1, 8.4.2, 8.4.3, 8.4.4, 8.5.3, 8.6, & 8.7
			• Changed 2P4 directory structure.	Secs. 12.4.1, 12.4.2, 12.4.3, 12.4.4, 12.5.3, 12.6, & 12.7

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SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
7/28/09 (Cont'd)	R5V2	719	• Changed 2P5 directory structure.	Secs. 13.4.1, 13.4.2, 13.4.3, 13.4.4, 13.5.3, 13.6, & 13.7
			• Changed 3P3 directory structure.	Secs. 16.4.1, 16.4.2, 16.4.3, 16.4.4, 16.5.3, & 16.6
			• Removed "PCFin" file from outputs of PGEs 1P6, 2P4, 2P5, and 3P3.	Secs. 8.4.1, 8.4.3, 12.4.1, 13.4.1, & 16.4.1
			• Removed Appendix C - Sample ASCII (PCFin) File Listing since PCFin files are no longer required.	App. C
			• Removed Satellite parameter from PCFGen command line. (10/28/2009)	Secs. 8.4.1, 8.4.3, 12.4.1, 13.4.1, 13.4.3, & 16.4.1
			• Removed Satellite parameter from Cleanup command line. (10/28/2009)	Secs. 8.4.4, 12.4.4, 13.4.4, & 16.4.4
			• Added ancillary files to input for CER4.1-4.1P6. (11/03/2009)	Sec. 8.3.9
			• Added S'COOL files to input for CER4.1-4.2P4. (11/03/2009)	Sec. 12.3.3
			• Removed /QA from expected output file listings destination column or footnotes. (06/25/2010)	Tables 1-6 through 16-6
			• Added "Available Through Ordering Tool" column and removed red "meta" from expected output tables. (09/14/2010)	All Expected Output Tables
10/13/10	R5V3	809	• Added directory name environment variables.	Secs. 8.0, 13.0, 14.0, & 17.0
			• Changed environment variable PS1 to PS1_1.	Sec. 8.0
			• Added SGE script running methods and SGE log files.	Secs. 8.0, 13.0, 14.0, & 17.0
			• Changed cleanup procedure to use environment rather than PCF file.	Secs. 8.4.4, 13.4.4, 14.4.4, & 17.4.4
			• Added SnowFree and SnowCovered ECS and CRHU files.	Secs. 8.0 & 14.0

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SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
10/13/10 (Cont'd)	R5V3	809	• Added new section for CER4.1-4.1P6/CER4.1-4.2P5 2-Day script procedures.	Sec. 9.0
			• Added ECS copy script.	Secs. 8.4.1 & 9.4.1
			• Modified arguments to CER4.1-4.1P6 Copy ECS script. (03/19/2012)	Secs. 8.4.1
			• Removed ECS .met files from CER4.1-4.1P6 input requirements. (03/19/2012)	Sec. 8.3
			• Updated Exit codes. (03/19/2012)	Sec. 8.5.1
			• Replaced cc$_1P6, CC4_2P4, CC4_2P5 with CC4_1, PS4_3 with PS4_1, SS4_3 with SS4_1. (03/19/2012)	Secs. 8.0, 13.0, 14.0, & 17.0
			• Corrected codes on ECS file names – were previously listed incorrectly. (03/19/2012)	Sec. 14.3
			• Added SGE driver arguments info and example command lines. (03/19/2012)	Secs. 8.4.3, 9.4, 13.4.2, 14.4.2, & 17.4.2
			• Modified a link and document title name. (04/10/2012)	References
			• Corrected SGE log file directory name. (06/25/2012)	Secs. 8.5.3.5, 13.5.3.5, 14.5.3.5, & 17.5.3.5
			• Corrected SGE log file directory name. (06/25/2012)	Tables 8-6, 13-6, 14-6, & 17-6
			• Added missing output file names. (07/06/2012)	Table 14-6
			• Added environment variable PROD. (07/06/2012)	Secs. 8.2.2, 13.2.2, 14.2.2, & 17.2.2
			• Removed environment variable InputArchive from 2P4 and 3P3. Inputs are now from InputArchiveSS. (07/09/2012)	Secs. 13.2.2, 13.3, 17.2.2, & 17.3
08/16/12	R5V4	924	• Reintroduced environment variable INST for PGE CER4.1-4.2P4 for Mail Summary purposes.	Sec. 13.2.2
			• Began updating PGE CER4.1-4.0P2 for running on *AMI*.	Sec. 2.0
			• Updated Error codes for PGEs CER4.1-4.2P4, CER4.1-4.2P5, and CER4.1-4.3P3.	Tables 13-5, 14-5, & 17-5
			• Added Manage_1P6_2P5.pl section.	Secs. 9.4 & 9.4.4

Document Revision Record

SCCR Approval Date	Release/ Version Number	SCCR Number	Description of Revision	Section(s) Affected
07/25/12	R5V5	918	• Removed "unavailable on *AMI-P*" notice for 4.1-4.0P2 execution.	Sec. 2.0
			• Added 4.1-4.0P2 CLASS 8th Mesh file type.	Secs. 2.2.2, 2.3
			• Changed Input file disposition after execution to "No action".	Secs. 2.3, 8.3, 13.3, 14.3, 17.3
			• Improved Output file listing.	Tables 2-8, 8-6, 13-6, 14-6, 17-6
			• Updated direction for running 2-Day 2-PGE processing.	Sec. 9.4
			• Added new section for final file removals.	Sec. 17.8
			• Added InputArchive and InputArchiveSS parameters. (11/15/2012)	Sec. 2.2.2
			• Modified "CLASS" directory filename. (11/29/2012)	Sec. 2.3.2
			• Corrected 4.1-4.0P2 input file directory information. (12/13/2012)	Sec. 2.3
			• Updated arguments for running 4.1-4.0P2. (12/13/2012)	Sec. 2.4
			• Corrected 4.1-4.0P2 Log file filenames. (12/13/2012)	Sec. 2.5.3
			• Updated 4.1-4.0P2 Subsytem Overview. (12/13/2012)	Subsystem Overview
01/02/13	R5V6	943	• Updated Snow and Ice Processor Subsystems Overview for PGEs CER4.1-4.0P2 and CER4.1-4.0P3.	Overview
			• Corrected small errors in PGE CER4.1-4.0P2.	Secs. 2.2.2, 2.4.1.1, & 2.6
			• Added section for new PGE CER4.1-4.0P3.	Sec. 3.0
			• Added parameter name. (01/10/2013)	Secs. 2.2.2, 3.2.2, 9.2.2, 14.2.2, 15.2.2, & 18.2.2
			• Modified file pathnames. (01/10/2013)	Secs. 3.3.1 & 3.3.2
			• Modified file pathnames for PCF and PCF log expected output files. (01/22/2013)	Table 3-8

Preface

The Clouds and the Earth's Radiant Energy System (CERES) Data Management System (DMS) 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 DMS consists of 12 subsystems; each subsystem contains one or more Product Generation Executables (PGEs). 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. This document describes all PGEs for this Subsystem and contains the Runtime Parameters, Production Request Parameters, the required inputs, the steps used to execute, and the expected outputs for each of these PGEs. 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, CERES Cloud Retrieval and Convolution Subsystems 4.1 through 4.4 Release 4 Operator's Manual is part of the CERES Subsystems 4.1 through 4.4 Release 4 delivery package provided to the Langley Atmospheric Science Data Center (ASDC). It provides a description of the CERES Cloud Retrieval and Convolution Release 4 software and explains the procedures for executing the software. A description of acronyms and abbreviations is provided in Appendix A, a comprehensive list of messages that can be generated during the execution of PGEs CER4.1-4.0P1, CER4.1-4.0P2, CER4.1-4.0P3, CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5, CER4.1-4.1P6, CER4.1-4.2P1, CER4.1-4.2P2, CER4.1-4.2P3, CER4.1-4.2P4, CER4.1-4.2P5, CER4.1-4.3P1, CER4.1-4.3P2, CER4.1-4.3P3 and CER4.1-4.4P1 are contained in Appendix B, and a sample environment script along with details on handling multiple instrument processing is provided in Appendix C.

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Appendix B - Error Messages for Subsystems 4.1-4.4
Appendix C - Subsystem Environment File

Subsystem Overview

CER4.1-4.0P1 - Snow and Ice Processor

The CERES "Determine Cloud Properties, TOA and Surface Fluxes" Subsystem (Subsystem 4) requires snow and ice information on a ten-minute grid. This information, received from the National Snow and Ice Data Center, is prepared on a 25-km equal area grid. The secondary source is the National Environmental Satellite, Data, and Information Service 8th mesh snow and ice map. This PGE re-projects the snow and ice data onto a 10 minute equal-angle grid.

CER4.1-4.0P2 - Snow and Ice Processor (8th or 16th Mesh)

The CERES "Determine Cloud Properties, TOA and Surface Fluxes" Subsystem (Subsystem 4) requires snow and ice information on a ten-minute grid. This information, received from the National Snow and Ice Data Center, is prepared on a 25-km equal area grid. The secondary source is the National Environmental Satellite, Data, and Information Service 8th mesh or 16th

mesh ice map or Comprehensive Large Array-Data Stewardship System's 16th mesh Snow and Ice Maps. This PGE re-projects the snow and ice data onto a 10 minute equal-angle grid.

CER4.1-4.0P3 - Snow and Ice Processor

The CERES "Determine Cloud Properties, TOA and Surface Fluxes" Subsystem (Subsystem 4) requires snow and ice information on a ten-minute grid. This information, received from the National Snow and Ice Data Center, is prepared on a 25-km equal area grid. The secondary source is the Air Force Weather Agency's 16th Mesh Snow and Ice Maps. This PGE re-projects the snow and ice data onto a 10 minute equal-angle grid.

CER4.1-4.1P1 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor

The CERES "Determine Cloud Properties, TOA and Surface Fluxes" Subsystem (Subsystem 4) has been divided into two separate subsystems. They are the "Determine Cloud Properties" Subsystem and the "Determine TOA and Surface Fluxes" Subsystem. The "Determine Cloud Properties" Subsystem has been further divided into two major components. Separate sets of executable code have been developed for each component, but they are contained within one PGE. The first major component (Cloud Retrieval) combines the functions described in Algorithm Theoretical Basis Documents (ATBDs) 4.1, 4.2, and 4.3, and provides the identification of clear-sky and clouds (cloud mask), cloud layer pressure determination, and cloud optical properties for the cloud imager data on a per-pixel basis. For convenience throughout the rest of this document, this component is referenced as "cloud retrieval." The second major component is Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function (PSF), corresponding to ATBD 4.4. For convenience throughout the rest of this document, this component is referenced as "convolution." Convolution accepts the pixel-level cloud data produced by the cloud retrieval component of the Determine Cloud Properties Subsystem and convolves it with the CERES footprint field-of-view (FOV) data obtained from the Instrument Earth Scans (IES) datasets to produce an intermediate Single Scanner Footprint (SSFI) output data product. The "Determine TOA and Surface Fluxes" Subsystem (ATBDs 4.5 and 4.6) completes Subsystem 4.0 and the SSF archive product by producing fluxes at the top of the atmosphere (TOA) and at the surface and is covered in another operations manual.

CER4.1-4.1P2 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Terra-MODIS Main Processor

This version of the PGE was designed to handle changes in cloud retrieval and convolution processing for the Moderate-Resolution Imaging Spectroradiometer on the Terra satellite without requiring the VIRS-TRMM processing to be modified.

CER4.1-4.1P3 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Aqua-MODIS Main Processor

This version of the PGE was designed to handle changes in cloud retrieval and convolution processing for the Moderate-Resolution Imaging Spectroradiometer on the Aqua satellite without requiring the VIRS-TRMM or Terra-MODIS processing to be modified.

CER4.1-4.1P4 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Terra-MODIS Collection 005 Main Processor

This version of the PGE was designed to handle changes in cloud retrieval and convolution processing for the Moderate-Resolution Imaging Spectroradiometer on the Terra satellite Collection 005 data products without requiring the Terra-MODIS Collection 004 processing to be modified.

CER4.1-4.1P5 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Aqua-MODIS Collection 005 Main Processor

This version of the PGE was designed to handle changes in cloud retrieval and convolution processing for the Moderate-Resolution Imaging Spectroradiometer on the Aqua satellite Collection 005 data products without requiring the Aqua-MODIS Collection 004 processing to be modified.

CER4.1-4.1P6 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Terra-/Aqua-MODIS Collection 005 Edition4 Main Processor

This version of the PGE was designed to handle changes in cloud retrieval and convolution processing for CERES Edition4 cloud algorithm and SSF structure using the Moderate-Resolution Imaging Spectroradiometer Collection 005 data products on both the Terra and Aqua platforms without requiring other processing to be modified.

CER4.1-4.2P1 - Imager Clear Sky Map Update and Daily QC Processor

The CERES "Determine Cloud Properties, TOA and Surface Fluxes" Subsystem (Subsystem 4) has the requirement to detect clouds from the imager radiances. One detection method compares the current pixel reflectance to a historical map of reflectance occurring under clear sky conditions. A similar procedure using clear sky brightness temperature is also used. A data product of imager albedo and brightness temperatures for clear pixels is produced for each

execution of CER4.1-4.1P1. At regularly scheduled intervals, the hourly information is compared to the historical file. Any daily value that are significantly different from the running average contained in the historical file are updated. To facilitate algorithm validation, daily QC products are produced. This PGE takes as input the hourly QC reports produced by CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, or CER4.1-4.1P5.

CER4.1-4.2P2 - Imager Clear Sky Map Update Processor

The CERES "Determine Cloud Properties, TOA and Surface Fluxes" Subsystem (Subsystem 4) has the requirement to detect clouds from the imager radiances. One detection method compares the current pixel reflectance to a historical map of reflectance occurring under clear sky conditions. A similar procedure using clear sky brightness temperature is also used. A data product of imager albedo and brightness temperatures for clear pixels is produced for each execution of CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, or CER4.1-4.1P5. At regularly scheduled intervals, the hourly information is compared to the historical file. Any daily value that are significantly different from the running average contained in the historical file are updated.

CER4.1-4.2P3 - Collection 005 Daily QC Processor

To facilitate algorithm validation, daily QC products are produced. This PGE takes as input the hourly QC reports produced by CER4.1-4.1P4 or CER4.1-4.1P5 (MODIS Collection 005 data).

CER4.1-4.2P4 – Edition4 Daily QC Processor

To facilitate algorithm validation, daily QC products are produced. This PGE takes as input the hourly QC reports produced by CER4.1-4.1P6 (CERES Edition4 data).

CER4.1-4.2P5 - Edition3 Imager Clear Sky Map Update Processor

The CERES "Determine Cloud Properties, TOA and Surface Fluxes" Subsystem (Subsystem 4) has the requirement to detect clouds from the imager radiances. One detection method compares the current pixel reflectance to a historical map of reflectance occurring under clear sky conditions. A similar procedure using clear sky brightness temperature is also used. A data product of imager albedo and brightness temperatures for clear pixels is produced for each execution of CER4.1-4.1P6. At regularly scheduled intervals, the hourly information is compared to the historical file. Any daily value that are significantly different from the running average contained in the historical file are updated.

CER4.1-4.3P1 - Monthly QC Processor

To facilitate algorithm validation, monthly QC products are produced. This PGE takes as input the daily QC reports produced by CER4.1-4.2P1.

CER4.1-4.3P2 - Collection 005 Monthly QC Processor

To facilitate algorithm validation, monthly QC products are produced. This PGE takes as input the daily QC reports produced by CER4.1-4.2P3 (MODIS Collection 005).

CER4.1-4.3P3 - Edition3 Monthly QC Processor

To facilitate algorithm validation, monthly QC products are produced. This PGE takes as input the daily QC reports produced by CER4.1-4.2P4 (CERES Edition4 clouds).

CER4.1-4.4P1 - Subset Imager Data

This PGE takes as input an imager data file and produces a file that contains only those scanlines which nadir pixel passes over a CERES Validation Region. The list of CERES Validation Regions is contained in CERESlib.

1.0 PGEName: CER4.1-4.0P1

CER4.1-4.0P1 - Snow and Ice Processor

1.1 PGE Details

1.1.1 Responsible Persons

Table 1-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Sunny Sun-Mack	Walter Miller
Organization	SSAI	SSAI
Address	1 Enterprise Parkway, Suite 200	1 Enterprise Parkway, Suite 200
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1687	951-1661
Fax	951-1900	951-1900
LaRC email	Szedung.Sun-Mack-1@nasa.gov	Walter.F.Miller@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 CER4.1-4.0P1

PGEName	Description
None	

1.1.4 Target PGE(s)

Table 1-3. Target PGEs after CER4.1-4.0P1

PGEName	Description
CER4.1-4.1P1	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for TRMM
CER4.1-4.1P2	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra
CER4.1-4.1P3	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua
CER4.1-4.1P4	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra Collection 005
CER4.1-4.1P5	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua Collection 005
CER4.1-4.1P6	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 for Terra-/Aqua-MODIS Collection 005 Edition4 Main Processor
CER5.1P1	Compute Surface and Atmospheric Radiative Fluxes
CER7.2.1P1	Synoptic SARB Subsystem Main Processor
CER11.1P6	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) GOES-West
CER11.1P7	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) Meteosat
CER11.1P8	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) GMS
CER11.1P10	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) McIDAS Data Flat Files

1.2 Operating Environment

1.2.1 Runtime Parameters

Table 1-4. Runtime Parameters for CER4.1-4.0P1

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01.. 12
DD	CERDataDateDay	I(2)	01.. 31

1.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC4_0P1 - Configuration Code for CER4.1-4.0P1, see CM Database
PS4_0 - Production Strategy for CER4.1-4.0P1, see Production Request
SS4_0 - Sampling Strategy for CER4.1-4.0P1, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

1.2.3 Execution Frequency

Daily (1/day) - This PGE is to be processed once per data-day, a maximum total of 31 days per month, when input is available.

1.2.4 Memory/Disk Space/Time Requirements

Table 1-5. Memory/Disk Space/Time Requirements for CER4.1-4.0P1

PGE Number	PGE Name	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.0P1	Snow and Ice Processor	0:00:05	76	5

1.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 1.3).

1.3 Processor Dependencies

1.3.1 Input Dataset Name (#1): SSMIF

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

$CERESHOME/clouds/data/input/SnowIce/NSIDC/
NISE_SSMIF13_YYYYMMDD.HDFEOS

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

   The DataDate must match the Runtime Parameters: YYYY, MM, DD

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

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

Ingest Source: National Snow and Ice Data Center (NSIDC)

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **2.13**

1.3.2 Input Dataset Name (#2): SNOW

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

$CERESHOME/clouds/data/input/SnowIce/NESDIS/
noaa_snow_fnn.ddddd.YYYYMMDDHH.YYYYMMDDHH
where ddddd is either north or south and nn is 14, 15, or 13 in priority order.

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

   The DataDate must be within the day specified for the run: YYYY, MM, DD

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

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

Ingest Source: National Environmental Satellite, data and Information Services (NESDIS)

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **10.00**

1.4 Operating Procedures

The PGE CER4.1-4.0P1 production script, **Run.CER4.1-4.0P1**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be

created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.0P1.PCFGen**.

1.4.1 How to Generate the PCF File

The PC file generator **CER4.1-4.0P1.PCFGen** requires three command-line arguments: 4-digit year (YYYY), 2-digit month (MM), 2-digit day (DD).

At the command-line (>) type:

> cd $CERESHOME/clouds/bin
> source $CERESHOME/clouds/bin/CER4.1-4.env
> $CERESHOME/clouds/bin/CER4.1-4.0P1.PCFGen YYYY MM DD

The following files will be generated in **$CERESHOME/clouds/rcf/**:

CER4.1-4.0P1_PCFin_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD and
CER4.1-4.0P1_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD.

1.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.0P1**, followed by the fully specified path name for the PCFile.

At the command-line (>) type:

>cd $CERESHOME/clouds/bin
>$CERESHOME/clouds/bin/Run.CER4.1-4.0P1 $CERESHOME/clouds/rcf/
CER4.1-4.0P1_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

1.4.3 Special Case Considerations

None.

1.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.
At the command-line (>) type:

>**cd $CERESHOME/clouds/bin**
>$CERESHOME/clouds/bin/Run.CER4.1-4.Cleanup $CERESHOME/clouds/rcf/
CER4.1-4.0P1_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

The cleanup script uses the generated PCFile to identify files to be removed. If no PCFile exists, one is generated.

1.5 Execution Evaluation

1.5.1 Exit Codes

The processor CER4.1-4.0P1 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 1-6. 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 1-1) for assistance.

Table 1-6. Exit Codes for CER4.1-4.0P1

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
Other	Failure	

1.5.2 Screen Messages

When running the production script, Run.CER4.1-4.0P1, one of three possible screen messages will appear, a system problem notwithstanding. They are shown in Table 1-7.

Table 1-7. Screen Messages for CER4.1-4.0P1

Message	Implication
Processing Complete	Successful completion of the PGE.
Problem executing Exe.CER4.1-4.0P1.SnowIce	A problem with the execution
Problem with NSIDC Data retrieval	A problem reading the NSIDC data set. Check for the existence of the input file. Stage it, if absent.

1.5.3 Log and Status Files Results

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

1.5.3.1 Report Log File: CER4.1-4.0P1_LogReport_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

1.5.3.2 Status Log File: CER4.1-4.0P1_LogStatus_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

1.5.3.3 User Log File: CER4.1-4.0P1_LogUser_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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.

1.5.3.4 ShmMem File: CER4.1-4.0P1_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.0P1.

1.5.4 Solutions to Possible Problems

As mentioned in Section 1.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

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. If one day fails, continue processing the next day.

b. Target PGE Termination

   If any of the files are missing from the expected output, this condition must terminate all further Target PGE processing for that day.

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 31 times, maximum, in a 31 day month.

Table 1-8. Expected Output File Listing for CER4.1-4.0P1

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_ESNOW_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD (.met) @($CERESHOME/clouds/data/out_comp/data/CER_ESAI)	m	2.3	1/day	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5, CER5.1P1, CER7.2.1P1, CER11.1P6, CER11.1P7, CER11.1P8, CER11.1P10	Archive	No
CER_EICE_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD (.met) @($CERESHOME/clouds/data/out_comp/data/CER_ESAI)	m	2.3	1/day	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5, CER5.1P1, CER7.2.1P1, CER11.1P6, CER11.1P7, CER11.1P8, CER11.1P10	Archive	No
CER4.1-4.0P1_PCF_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/rcf)	m	0.02	1/day	N/A	Archive, rm	No
CER4.1-4.0P1_PCFin_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/rcf)	m	0.004	1/day	N/A	Archive, rm	No
CER4.1-4.0P1_LogReport_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/data/runlogs)	m	0.001	1/day	N/A	Archive, rm	No
CER4.1-4.0P1_LogStatus_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/data/runlogs)	m	0.002	1/day	N/A	Archive, rm	No
CER4.1-4.0P1_LogUser_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/data/runlogs)	m	0.001	1/day	N/A	Archive, rm	No

a. See Section 1.2.2 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.
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/)
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.

The toolkit creates a temporary file.

Table 1-9. Temporary Files Listing for CER4.1-4.0P1

Directory	File Name
/CERES/clouds/data/runlogs	CER4.1-4.0P1_ShmMem

2.0 PGEName: CER4.1-4.0P2

CER4.1-4.0P2 - Snow and Ice Processor (8th or 16th Mesh)

2.1 PGE Details

2.1.1 Responsible Persons

Table 2-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Sunny Sun-Mack	Walter Miller
Organization	SSAI	SSAI
Address	1 Enterprise Parkway, Suite 200	1 Enterprise Parkway, Suite 200
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1687	951-1661
Fax	951-1900	951-1900
LaRC email	Szedung.Sun-Mack-1@nasa.gov	Walter.F.Miller@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 CER4.1-4.0P2

PGEName	Description
None	

2.1.4 Target PGE(s)

Table 2-3. Target PGEs after CER4.1-4.0P2

PGEName	Description
CER4.1-4.1P1	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for TRMM
CER4.1-4.1P4	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra Collection 005
CER4.1-4.1P5	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua Collection 005
CER4.1-4.1P6	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 for Terra-/Aqua-MODIS Collection 005 Edition4 Main Processor
CER5.1P1	Compute Surface and Atmospheric Radiative Fluxes
CER7.2.1P1	Synoptic SARB Subsystem Main Processor
CER11.1P6	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) GOES-West
CER11.1P7	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) Meteosat
CER11.1P8	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) GMS
CER11.1P10	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) McIDAS Data Flat Files

2.2 Operating Environment

2.2.1 Runtime Parameters

Table 2-4. Runtime Parameters for CER4.1-4.0P2

Parameter	Description	Data Type	Valid Values
M	Mesh Selection	I(2)	1,2
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01.. 12
DD	CERDataDateDay	I(2)	01.. 31

2.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.0P2.env**', is required and contains the following parameters:

InputArchive - Base directory of archived input files located in the ASDC
InputArchiveSS - Base directory of input/output files located in the Clouds subsystem data directory
CC4_0P1 - Configuration Code for Snow and Ice Map, see CM Database
PS4_0 - Production Strategy for Snow and Ice Map, see Production Request
SS4_0 - Sampling Strategy for Snow and Ice Map, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database
MESH - Selects which input files to use (1=8th, 2=16th) NESDIS files before 12-01-2012, CLASS after
PROD - Set to "YES" when run on a production computer
PGENAME - CER4.1-4.0P2

NOTE: If 8th mesh NESDIS or CLASS input maps are desired then set MESH to 1. Otherwise, set MESH to 2 for 16th mesh NESDIS (No 16th CLASS available). The environment variable PS4_0 must include "NESDIS", "CLASS", or "NESDIS-Mesh16th", as appropriate, to make output files identifiable.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

2.2.3 Execution Frequency

Daily (1/day) - This PGE is to be processed once per data-day, a maximum total of 31 days per month, when input is available.

2.2.4 Memory/Disk Space/Time Requirements

Table 2-5. Memory/Disk Space/Time Requirements for CER4.1-4.0P2

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.0P2	Snow and Ice Processor	IBM-P6	0:01:20	76	48

2.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 2.3).

2.3 Processor Dependencies

2.3.1 Input Dataset Name (#1): SSMIF

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

$InputArchive/NCEP/NSIDC/YYYY/NISE_SSMI*F??_YYYYMMDD.HDFEOS (Files with *="S" will be searched first. If not found *= " " will be searched. The greatest value of ?? available is used.)

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

   The DataDate must match the Runtime Parameters: YYYY, MM, DD
3. Waiting Period: **None. Process when all input data are available.**

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

Ingest Source: National Snow and Ice Data Center (NSIDC)

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **2.13**

2.3.2 Input Dataset Name (#2): SNOW 8th MESH

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

For NESDIS files:

$InputArchive/NCEP/NOAA_SNOW/YYYY/MM/noaa_snow_f??.ddddd.YYYYMMDD.*
(ddddd is either north or south. The greatest value of ?? available is located first. Then the first searched file with this ?? version number is chosen.)

For CLASS files:

$InputArchive/NCEP/CLASS_MESH8/YYYY/PRD.SPPROD.EDR15X.SYYDDD ??.E*
(X is either N or S, YY is 2-digit year, and DDD is Julian Day. Attempting to use file beginning at hour ??=06, 2nd searched file is chosen unless only one file available.)

1. Mandatory/Optional: **Both a North and South file is mandatory for 8th mesh processing.**
2. Time Related Dependency:

   The DataDate must be within the day specified for the run: YYYY, MM, DD
3. Waiting Period: **None. Process when all input data are available.**

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

Ingest Source: National Environmental Satellite, data and Information Services (NESDIS) or Comprehensive Large Array-Data Stewardship System (CLASS)

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **10.00**

2.3.3 Input Dataset Name (#3): SNOW 16th Mesh

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

$InputArchive/NCEP/NESDIS/YYYY/PRD.SPPROD.SNODEPH.XHMAMAP.DYYDDD.MESH16
(X is either N or S, YY is 2-digit year and DDD is Julian Day.)

1. Mandatory/Optional: **Both a North and South file is mandatory for 16th mesh processing.**
2. Time Related Dependency:

   The DataDate must be within the day specified for the run: YYYY, DDD
3. Waiting Period: **None. Process when all input data are available.**

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

Ingest Source: National Environmental Satellite, data and Information Services (NESDIS)

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **21.00**

2.3.4 Input Dataset Name (#4): Ancillary Files

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

   Appendix C.6-2 in the CERES Clouds Retrieval and Convolution Test Plan lists the ancillary data files and directory necessary to run this PGE.

   1. Mandatory/Optional: **This (these) file(s) is (are) optional**
   2. Time Related Dependency:

      The DataDate must match the Runtime Parameters: YYYY, MM, DD where appropriate.
   3. Waiting Period: **None.**

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

   Provided in subsystem delivery.

c. Alternate Data Set, if one exists (maximum waiting period): **None.**

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **Various**

2.4 Operating Procedures

The PGE CER4.1-4.0P2 can be run manually from the command line or it can be sent to the SGE via a job submission script. Both methods of operation require first sourcing the environment script, **CER4.1-4.0P2.env**. Running manually requires creating a Process Control File (PCF), which contains the correct file names and paths for the PGE, and passing the PCF on to the PGE production script. A PCF checking script may be called after creating the PCF to check for input files, issue a warning if previous output files already exist, and create a PCF log file. When running via the SGE submission script, the PGE is run for all days chosen. Each run creates a PCF and PCF log file, verifies inputs and checks for existing outputs, and submits a job to execute the PGE. A cleanup script can be run before either execution method to remove output files from a previous run.

2.4.1 Manual Execution

2.4.1.1 How to Generate the PCF File

The PCF generator, **CER4.1-4.PCFGen.pl**, requires four command-line arguments: 4-digit year (YYYY), 2-digit month (MM), and 2-digit day (DD).

The environment script, **CER4.1-4.0P2.env**, requires arguments **X** (1-8th Mesh, 2-16th Mesh) and **F** (1-NESDIS input files, 2-AFWA input files)

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.0P2/rcf/CER4.1-4.0P2.env X F
> $CERESHOME/clouds/CER4.1-4.0P2/rcf/CER4.1-4.PCFGen.pl YYYY MM DD

The following file will be generated in **$CERESHOME/clouds/CER4.1-4.0P2/rcf/pcf/**:
CER4.1-4.0P2_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

The inputs and outputs listed in this PCF file can then be checked by typing:

> $CERESHOME/clouds/CER4.1-4.0P2/rcf/CER4.1-4.0P2.PCFcheck.pl $CERESHOME/clouds/CER4.1-4.0P2/rcf/pcf/CER4.1-4.0P2_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

The following file will be created in **$CERESHOME/clouds/CER4.1-4.0P2/rcf/pcf/:**
CER4.1-4.0P2_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD.log

2.4.1.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.0P2.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

>$CERESHOME/clouds/CER4.1-4.0P2/rcf/Run.CER4.1-4.0P2.pl $CERESHOME/clouds/CER4.1-4.0P2/rcf/pcf/CER4.1-4.0P2_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

2.4.2 Running with CER4.1-4.0P2 SGE script

The SGE script requires one date argument (YYYYMMDD) or two date range arguments (YYYSMSDS, YYYEMEDE).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.0P2/rcf/CER4.1-4.0P2.env X F

For a single date type:

> $CERESHOME/clouds/CER4.1-4.0P2/rcf/CER4.1-4.0P2-SGE_Driver.pl -date YYYYMMDD

For a range of dates type:

> $CERESHOME/clouds/CER4.1-4.0P2/rcf/CER4.1-4.0P2-SGE_Driver.pl -start YYYSMSDS -end YYYEMEDE

One job will be submitted for each day.

For each day the following files wil be created in

$CERESHOME/clouds/CER4.1-4.0P2/rcf/pcf/:
CER4.1-4.0P2_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD
CER4.1-4.0P2_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD.log

This log file contains the values of all environment variables, all input files being accessed, and the PCF generator output. If all mandatory input is present, the job will be submitted. Upon successful execution, all output files listed in Table 2-6 will be created for each day submitted.

Below are all available options for running **CER4.1-4.0P2-SGE_Driver.pl:**

[-clean]	Delete any existing outputs that are encountered.
[-platform CPU]	Run the PGE on the platform designated by CPU (i.e., *p6* or *x86*)
[-date YYYYMMDD]	Run the PGE on the data date specified by YYYYMMDD.
[-start YYYYMMDD]	Run the PGE starting on the data date specfied by YYYYMMDD.
[-end YYYYMMDD]	Run the PGE stopping on the data date specified by YYYYMMDD.

Example for running a single day:

> $CER4.1-4.0P2-SGE_Driver.pl -date 20070809

Example for running a range of days:

> $CER4.1-4.0P2-SGE_Driver.pl -start 20070801 –end 20070831

Example for a run given permission to delete any existing output from a previous run:

> $CER4.1-4.0P2-SGE_Driver.pl -date 20070809 -clean

Example for a run to be run on a specific platform:

> $CER4.1-4.0P2-SGE_Driver.pl -date 20070809 –platform p6

2.4.3 Special Case Considerations

None.

2.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience to delete outputs from a single date or a range of dates. It is to be run prior to reprocessing. The SGE scripts and the manual PCF checking alert the user when this is necessary.

At the command-line (>) type:

>cd $CERESHOME/clouds/CER4.1-4.0P2/rcf
> source CER4.1-4.0P2.env X F
>Run.CER4.1-4.Cleanup.pl YYYYMMDD [YYYYMEDE]

The current environment variable values are used to identify files to be removed.

2.5 Execution Evaluation

2.5.1 Exit Codes

The processor CER4.1-4.0P2 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 2-6. 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 2-6. Exit Codes for CER4.1-4.0P2

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
198	Failure	No PGE file. Generate PGE file.
200	Failure	PGE error. Check the Log Files and operations email and take the appropriate action (see Appendix B). This includes the case when problems occurred in generating output files.
Other	Failure	Call responsible persons

2.5.2 Screen Messages

When running the production script, **Run.CER4.1-4.0P2.pl**, one of three possible screen messages will appear, a system problem notwithstanding. They are shown in Table 2-7.

For SGE script runs, screen output will go to the SGE log file

$CERESHOME/clouds/sge_logs/CER4.1-4.0P2_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD.o*.

Table 2-7. Screen Messages for CER4.1-4.0P2

Message	Implication
Processing Complete	Successful completion of the PGE.
Problem executing Exe.CER4.1-4.0P2.SnowIce	A problem with the execution
Problem with NSIDC Data retrieval	A problem reading the NSIDC data set. Check for the existence of the input file. Stage it, if absent.

2.5.3 Log and Status Files Results

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

2.5.3.1 Report Log File: $CERESHOME/clouds/runlogs/CER4.1-4.0P2_LogReport_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

2.5.3.2 Status Log File: $CERESHOME/clouds/runlogs/CER4.1-4.0P2_LogStatus_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

2.5.3.3 User Log File: $CERESHOME/clouds/runlogs/CER4.1-4.0P2_LogUser_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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.

2.5.3.4 ShmMem File: CER4.1-4.0P2_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.0P2.

2.5.3.5 SGE Log File: $CERESHOME/clouds/sge_logs/CER4.1-4.0P2/CER4.1-4.0P2_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD.o*

The SGE CER4.1-4.0P2 Log File contains job submission information, environment values assigned, and all output that would have been screen output in a manual run. This file will be created for each job submitted on SGE.

2.5.4 Solutions to Possible Problems

As mentioned in Section 2.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script. The SGE script and the manual PCF checking routine should report if there is a need to do a Cleanup or stage a missing input.

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. If one day fails, continue processing the next day.

b. Target PGE Termination

If any of the files are missing from the expected output, this condition must terminate all further Target PGE processing for that day.

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 31 times, maximum, in a 31 day month.

Table 2-8. Expected Output File Listing for CER4.1-4.0P2

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Order Tool
CER_ESNOW_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD (.met) @($InputArchiveSS/CER_ESAI/$SS4_0_$PS4_0/YYYY/ MM)	m	2.3	1/day	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5, CER5.1P1, CER7.2.1P1, CER11.1P6, CER11.1P7, CER11.1P8, CER11.1P10	Archive	No
CER_EICE_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD (.met) @($InputArchiveSS/CER_ESAI/$SS4_0_$PS4_0/YYYY/ MM)	m	2.3	1/day	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5, CER5.1P1, CER7.2.1P1, CER11.1P6, CER11.1P7, CER11.1P8, CER11.1P10	Archive	No
CER4.1-4.0P2_PCF_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/ CER4.1-4.0P2/rcf/pcf)	m	0.02	1/day	N/A	Archive, rm	No
CER4.1-4.0P2_PCF_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD.log@($CERESHOME/clouds/ CER4.1-4.0P2/rcf/pcf)	m	0.02	1/day	N/A	Archive, rm	No
CER4.1-4.0P2_LogReport_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.001	1/day	N/A	Archive, rm	No
CER4.1-4.0P2_LogStatus_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.002	1/day	N/A	Archive, rm	No
CER4.1-4.0P2_LogUser_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.001	1/day	N/A	Archive, rm	No
CER4.1-4.0P2_$SS4_0_$PS4_0_$CC4_0P1. YYYYMMDD.o*@($CERESHOME/clouds/ sge_logs/CER4.1-4.0P2) SGE script run only	**m**	0.002	1/day	N/A	Archive, rm	No

a. See Section 2.2.2 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.
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/)
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}
DDD - 3 digit Julian day {valid values: 001 .. 366}
m - mandatory output
o - optional output
EOD - End of Data Month

2.7 Expected Temporary Files/Directories.

The toolkit creates a temporary file.

Table 2-9. Temporary Files Listing for CER4.1-4.0P2

Directory	File Name
$CERESHOME/clouds/runlogs	CER4.1-4.0P2_ShmMem

3.0 PGEName: CER4.1-4.0P3

CER4.1-4.0P3 - Snow and Ice Processor (16th Mesh AFWA)

3.1 PGE Details

3.1.1 Responsible Persons

Table 3-1. Subsystem Software Analysts Contacts

Item	Primary	Alternate
Contact Name	Sunny Sun-Mack	Walter Miller
Organization	SSAI	SSAI
Address	1 Enterprise Parkway, Suite 200	1 Enterprise Parkway, Suite 200
City	Hampton	Hampton
State	VA 23666	VA 23666
Phone	951-1687	951-1661
Fax	951-1900	951-1900
LaRC email	Szedung.Sun-Mack-1@nasa.gov	Walter.F.Miller@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 CER4.1-4.0P3

PGEName	Description
None	

3.1.4 Target PGE(s)

Table 3-3. Target PGEs after CER4.1-4.0P3

PGEName	Description
CER4.1-4.1P1	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for TRMM
CER4.1-4.1P2	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra
CER4.1-4.1P3	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua
CER4.1-4.1P4	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra Collection 005
CER4.1-4.1P5	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua Collection 005
CER4.1-4.1P6	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 for Terra-/Aqua-MODIS Collection 005 Edition4 Main Processor
CER5.1P1	Compute Surface and Atmospheric Radiative Fluxes
CER7.2.1P1	Synoptic SARB Subsystem Main Processor
CER11.1P6	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) GOES-West
CER11.1P7	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) Meteosat
CER11.1P8	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) GMS
CER11.1P10	Grid Geostationary Narrowband Radiances Main Processor (2nd pass) McIDAS Data Flat Files

3.2 Operating Environment

3.2.1 Runtime Parameters

Table 3-4. Runtime Parameters for CER4.1-4.0P3

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01.. 12
DD	CERDataDateDay	I(2)	01.. 31

3.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.0P3.env**', is required and contains the following parameters:

InputArchive - Base directory of archived input files located in the ASDC
InputArchiveSS - Base directory of input/output files located in the Clouds subsystem data directory
CC4_0P1 - Configuration Code for CER4.1-4.0P1, see CM Database
PS4_0 - Production Strategy for CER4.1-4.0P1, see Production Request
SS4_0 - Sampling Strategy for CER4.1-4.0P1, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database
PROD - Set to "YES" when run on a production computer
PGENAME - CER4.1-4.0P3

Note: The environment variable PS4_0 must include "AFWA-Mesh16th" to make output files identifiable.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

3.2.3 Execution Frequency

Daily (1/day) - This PGE is to be processed once per data-day, a maximum total of 31 days per month, when input is available.

3.2.4 Memory/Disk Space/Time Requirements

Table 3-5. Memory/Disk Space/Time Requirements for CER4.1-4.0P3

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.0P3	Snow and Ice Processor	IBM-P6	0:00:05	76	5

3.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 1.3).

3.3 Processor Dependencies

3.3.1 Input Dataset Name (#1): SSMIF

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

$InputArchive/NCEP/NSIDC/YYYY/
NISE_SSMI*Fnn_YYYYMMDD.HDFEOS
(Files with *="S" will be searched first. If not found *= " " will be searched. The greatest value of nn available is used.)

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

   The DataDate must match the Runtime Parameters: YYYY, MM, DD
3. Waiting Period: **None. Process when all input data are available.**

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

Ingest Source: National Snow and Ice Data Center (NSIDC)

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **2.13**

3.3.2 Input Dataset Name (#2): SNOW 16th Mesh

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

$InputArchive/AFWA-MESH16/YYYY/
PS.AFWA_SC.U_DI.A_GP.SNODEP_GR.P24KM_AR. X-HEM_PA.SNO-ICE_DD. YYYYMMDD_DT.12.GR1
(X is either N or S.)

This grib coded input file is converted to a binary file before being used as input. The new file will be

$InputArchiveSS/scr/
PS.AFWA_SC.U_DI.A_GP.SNODEP_GR.P24KM_AR. X-HEM_PA.SNO-ICE_DD. YYYYMMDD_DT.12

1. Mandatory/Optional: **Both a North and South file is mandatory for 16th mesh processing.**
2. Time Related Dependency:

   The DataDate must be within the day specified for the run: YYYY, MM, DD
3. Waiting Period: **None. Process when all input data are available.**

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

Ingest Source: Air Force Weather Agency (AFWA)

c. Alternate Data Set, if one exists (maximum waiting period): **None**

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **10.00**

3.4 Operating Procedures

The PGE CER4.1-4.0P3 can be run manually from the command line or it can be sent to the SGE via a job submission script. Both methods of operation require first sourcing the environment script, **CER4.1-4.0P3.env**. Running manually requires creating a Process Control File (PCF), which contains the correct file names and paths for the PGE, and passing the PCF on to the PGE production script. A PCF checking script may be called after creating the PCF to check for input files, issue a warning if previous output files already exist, and create a PCF log file. When running via the SGE submission script, the PGE is run for all days chosen. Each run creates a PCF and PCF log file, verifies inputs and checks for existing outputs, and submits a job to execute the PGE. A cleanup script can be run before either execution method to remove output files from a previous run..

3.4.1 Manual Execution

3.4.1.1 How to Generate the PCF File

The PC file generator **CER4.1-4.PCFGen.pl** requires three command-line arguments: 4-digit year (YYYY), 2-digit month (MM), 2-digit day (DD).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.0P3/rcf/CER4.1-4.0P3.env
> $CERESHOME/clouds/CER4.1-4.0P3/rcf/CER4.1-4.PCFGen.pl YYYY MM DD

The following file will be generated in **$CERESHOME/clouds/CER4.1-4.0P3/rcf/pcf/**:

CER4.1-4.0P3_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

3.4.1.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.0P3.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

>$CERESHOME/clouds/CER4.1-4.0P3/rcf/pcf/Run.CER4.1-4.0P3.pl $CERESHOME/clouds/CER4.1-4.0P3/rcf/pcf/ CER4.1-4.0P3_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

3.4.2 Running with CER4.1-4.0P3 SGE script

The SGE script requires one date argument (YYYYMMDD) or two date range arguments (YYYSMSDS, YYYEMEDE).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.0P3/rcf/CER4.1-4.0P3.env

For a single date type:

> $CERESHOME/clouds/CER4.1-4.0P3/rcf/CER4.1-4.0P3-SGE_Driver.pl -date YYYYMMDD

For a range of dates type:

> $CERESHOME/clouds/CER4.1-4.0P3/rcf/CER4.1-4.0P3-SGE_Driver.pl -start YYYSMSDS -end YYYEMEDE

One job will be submitted for each day.

For each day the following files wil be created in

$CERESHOME/clouds/CER4.1-4.0P3/rcf/pcf/:

CER4.1-4.0P3_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

CER4.1-4.0P3_PCF_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD.log

This log file contains the values of all environment variables, all input files being accessed, and the PCF generator output. If all mandatory input is present, the job will be submitted. Upon successful execution, all output files listed in Table 3-8 will be created for each day submitted.

Below are all available options for running **CER4.1-4.0P3-SGE_Driver.pl:**

[-clean]	Delete any existing outputs that are encountered.
[-platform CPU]	Run the PGE on the platform designated by CPU (i.e., *p6* or *x86*)

[-date YYYYMMDD] Run the PGE on the data date specified by YYYYMMDD.
[-start YYYYMMDD] Run the PGE starting on the data date specfied by YYYYMMDD.
[-end YYYYMMDD] Run the PGE stopping on the data date specified by YYYYMMDD.

Example for running a single day:

> $CER4.1-4.0P3-SGE_Driver.pl -date 20070809

Example for running a range of days:

> $CER4.1-4.0P3-SGE_Driver.pl -start 20070801 –end 20070831

Example for a run given permission to delete any existing output from a previous run:

> $CER4.1-4.0P3-SGE_Driver.pl -date 20070809 -clean

Example for a run to be run on a specific platform:

> $CER4.1-4.0P3-SGE_Driver.pl -date 20070809 –platform p6

3.4.3 Special Case Considerations

None.

3.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience to delete outputs from a single date or a range of dates. It is to be run prior to reprocessing. . The SGE scripts and the manual PCF checking alert the user when this is necessary.

At the command-line (>) type:

>cd $CERESHOME/clouds/CER4.1-4.0P3/rcf
> source CER4.1-4.0P3.env
>Run.CER4.1-4.Cleanup.pl YYYYMMDD [YYYYMEDE]

The current environment variable values are used to identify files to be removed.

3.5 Execution Evaluation

3.5.1 Exit Codes

The processor CER4.1-4.0P3 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 3-6. 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 3-1) for assistance.

Table 3-6. Exit Codes for CER4.1-4.0P3

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
198	Failure	No PGE file. Generate PGE file.
200	Failure	PGE error. Check the Log Files and operations email and take the appropriate action (see Appendix B). This includes the case when problems occurred in generating output files.
Other	Failure	Call responsible persons

3.5.2 Screen Messages

When running the production script, Run.CER4.1-4.0P3, one of three possible screen messages will appear, a system problem notwithstanding. They are shown in Table 1-7.

For SGE script runs, screen output will go to the SGE log file

$CERESHOME/clouds/sge_logs/CER4.1-4.0P3_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD.o*.

Table 3-7. Screen Messages for CER4.1-4.0P3

Message	Implication
Processing Complete	Successful completion of the PGE.
Problem executing Exe.CER4.1-4.0P3.SnowIce	A problem with the execution
Problem with NSIDC Data retrieval	A problem reading the NSIDC data set. Check for the existence of the input file. Stage it, if absent.

3.5.3 Log and Status Files Results

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

3.5.3.1 Report Log File: $CERESHOME/clouds/runlogs/CER4.1-4.0P3_LogReport_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

3.5.3.2 Status Log File: $CERESHOME/clouds/runlogs/CER4.1-4.0P3_LogStatus_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

The Status Log File contains all messages created by the Toolkit and fatal processing messages.

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.

3.5.3.3 User Log File: $CERESHOME/clouds/runlogs/CER4.1-4.0P3_LogUser_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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.

3.5.3.4 ShmMem File: CER4.1-4.0P3_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.0P3.

3.5.4 Solutions to Possible Problems

As mentioned in Section 1.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script. The SGE script and the manual PCF checking routine should report if there is a need to do a Cleanup or stage a missing input.

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. If one day fails, continue processing the next day.

b. Target PGE Termination

   If any of the files are missing from the expected output, this condition must terminate all further Target PGE processing for that day.

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 31 times, maximum, in a 31 day month.

Table 3-8. Expected Output File Listing for CER4.1-4.0P3

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_ESNOW_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD (.met) @($InputArchiveSS/CER_ESAI/$SS4_0_$PS4_0/YYYY/MM)	m	2.3	1/day	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5, CER5.1P1, CER7.2.1P1, CER11.1P6, CER11.1P7, CER11.1P8, CER11.1P10	Archive	No
CER_EICE_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD (.met) @($InputArchiveSS/CER_ESAI/$SS4_0_$PS4_0/YYYY/MM)	m	2.3	1/day	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5, CER5.1P1, CER7.2.1P1, CER11.1P6, CER11.1P7, CER11.1P8, CER11.1P10	Archive	No
CER4.1-4.0P3_PCF_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/CER4.1-4.0P3/rcf/pcf)	m	0.02	1/day	N/A	Archive, rm	No
CER4.1-4.0P3_PCF_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD.log@($CERESHOME/clouds/CER4.1-4.0P3/rcf/pcf)	m	0.004	1/day	N/A	Archive, rm	No
CER4.1-4.0P3_LogReport_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.001	1/day	N/A	Archive, rm	No
CER4.1-4.0P3_LogStatus_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.002	1/day	N/A	Archive, rm	No
CER4.1-4.0P3_LogUser_$SS4_0_$PS4_0_$CC4_ 0P1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.001	1/day	N/A	Archive, rm	No
CER4.1-4.0P3_$SS4_0_$PS4_0_$CC4_0P1. YYYYMMDD.o*@($CERESHOME/clouds/ sge_logs/CER4.1-4.0P3) SGE script run only	**m**	0.002	1/day	N/A	Archive, rm	No

a. See Section 3.2.2 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.
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/)
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.

The toolkit creates a temporary file. The grib coded input is converted to a temporary binary file for use as input. These 2 binary files are created by the PCF generator and will be deleted after the PCF is run.

Table 3-9. Temporary Files Listing for CER4.1-4.0P3

Directory	File Name
$CERESHOME/clouds/runlogs	CER4.1-4.0P3_ShmMem
$InputArchiveSS/scr	PS.AFWA_SC.U_DI.A_GP.SNODEP_GR.P24KM_AR.N-HEM_PA.SNO-ICE_DD. YYYYMMDD_DT.12
$InputArchiveSS/scr	PS.AFWA_SC.U_DI.A_GP.SNODEP_GR.P24KM_AR.S-HEM_PA.SNO-ICE_DD. YYYYMMDD_DT.12

4.0 PGEName: CER4.1-4.1P1

CER4.1-4.1P1 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for TRMM.

4.1 PGE Details

4.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

4.1.2 E-mail Distribution List

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

4.1.3 Parent PGE(s)

Table 4-1. Parent PGEs for CER4.1-4.1P1

PGEName	Description
CER1.1P1	CERES Geolocate and Calibrate Radiance - TRMM
CER4.1-4.0P1	Snow and Ice Processor
CER4.1-4.2P1	Imager Clear Sky Map Update Processor
CER4.1-4.4P1	Subset Imager Data by CERES Validation Region
CER12.1P1	Regrid Humidity and Temperature Fields Processor (MOA Product)

4.1.4 Target PGE(s)

Table 4-2. Target PGEs after CER4.1-4.1P1

PGEName	Description
CER4.5-6.1P1	Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Main Processor
CER4.1-4.2P1	Imager Clear Sky Map Update Processor

4.2 Operating Environment

4.2.1 Runtime Parameters

Table 4-3. Runtime Parameters for CER4.1-4.1P1

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31
HH	CERHrOfDay	I(2)	00 .. 23

4.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC1 - Configuration Code for IES, see CM Database
CC4_0P1 - Configuration Code for Snow and Ice Map, see CM Database
CC4_1P1 - Configuration Code for CER4.1-4.1P1, see CM Database
CC4_2 - Configuration Code for Clear Sky Map, see CM Database and Production Request
CC12 - Configuration Code for MOA, see CM Database
CV - Set to y when CloudVis Hourly File is produced, set to n otherwise
DATA4_1 - Data SCCR# for Clouds, see CM Database
IMAG - Imager Short Name (VIRS)
INST - CERES Instrument Short Name (PFM, SIM)
PRODUCTION - Set to "YES" when run on a production computer
PS1 - Production Strategy for IES, see Production Request
PS4_0 - Production Strategy for Snow and Ice Map, see Production Request
PS4_1 - Production Strategy for CER4.1-4.1P1, see Production Request
PS4_2 - Production Strategy for Clear Sky Map, see Production Request
PS12 - Production Strategy for MOA, see Production Request
SAT - Satellite Short Name (TRMM)
SS1 - Sampling Strategy for IES, see Production Request
SS4_0 - Sampling Strategy for Snow and Ice Map, see Production Request
SS4_1 - Sampling Strategy for CER4.1-4.1P1, see Production Request
SS4_2 - Sampling Strategy for Clear Sky Map, see Production Request
SS4_4 - Sampling Strategy for CER4.1-4.1P1, see Production Request
SS12 - Sampling Strategy for MOA, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

NOTE: In sequential processing, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change, CC4_2 would have the configuration code used on the previous day. The other variables would not change.

NOTE: If hourly CloudVis processing is required, then set variable to y (yes) otherwise set to n (no). CloudVis Subset processing will not be affected by changes to CV variable.

During nonsequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P1, PS4_1, and SS4_1.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

4.2.3 Execution Frequency

Hourly (1/hr/sat) - This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite.

4.2.4 Memory/Disk Space/Time Requirements

Table 4-4. Memory/Disk Space/Time Requirements for CER4.1-4.1P1

PGE Number	PGE Name	Platform	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.1P1	Cloud Property Retrieval and Convolution	TRMM	3:11:00	286	425
		Subset TRMM	0:30:00	280	60

4.2.5 Restrictions Imposed in Processing Order

Please process each given day in sequential order. For individual hours within a given day order is unimportant. That is, process all hours from January 1, 1998 before processing January 2, 1998. This allows for updating the Clear Reflectance History (CRH) (CER4.1-4.2P1) for a given day which is input into the next day's PGEs.

NOTE: For TRMM Edition2 processing, the requirement to process each day in sequence is removed from January 1, 1998 to August 31, 1998 and March, 2000.

4.3 Processor Dependencies (Previous PGEs, Ingest Data)

4.3.1 Input Dataset Name (#1): ECID

4.3.1.1 VIRS Data

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

   $CERESHOME/clouds/data/input/VIRS/
   1B01.YYMMDD.OOOO.CC_V.HDF, and if needed
   1B01.YYMMDD.OOOP.CC_V.HDF (see item f)

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

      The DataDate must match the Runtime Parameters: YYYY,MM,DD
      OOOO represents the orbit number of the first VIRS file, OOOP represents the next orbit of VIRS data, CC_V is the VIRS version number.

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

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

   INGEST Source: Goddard DAAC -or-
   PGE Source: CER4.1-4.4P1

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **91.9**

f. Special Requirements: **There is a preprocessor script that reads the start and end time of the file and assigns them a file link to the hours that are covered by the orbit. This information is used to place the correct VIRS file name in the PCF file. There are instances where the entire hour including overlap are included in a single orbit. In these cases, only one VIRS file will be included in the PCF. The renaming steps for Subsetted VIRS files are identical.**

To Rename the VIRS files, execute the following sequence of commands.

```
> source $CERESHOME/clouds/bin/CER4.1-4env
> $CERESHOME/clouds/bin/Run.CER4.1-4.0P1.RenameVIRS <filename>
```

where <filename> is the fully specified pathname of the VIRS file to be renamed. The links created by the rename program needs to be removed when transitioning from full VIRS files to subsets. Only the VIRS full or subset file being used should be in the directory.

4.3.2 Input Dataset Name (#2): MOA

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

$CERESHOME/sarb/data/out_comp/data/regridmoa/
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDHH, and if needed
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh
where hh = HH + 6 (see item f)

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

   The DataDate must bracket the Runtime Parameters: YYYY,MM,DD,HH

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

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

Source PGE: CER12.1P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s)

e. Typical file size (mb): **43.8**

f. Special Requirements: **MOA data are produced as six hour files named according to their start hour. To process an hour that is not hour 00, 06, 12, or 18, operators must stage the two bracketing MOA files, getting the file for hour 00 from 'tomorrow' if necessary.**

4.3.3 Input Dataset Name (#3): ESNOW

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/
CER_ESNOW_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

4.3.4 Input Dataset Name (#4): EICE

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/
CER_EICE_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

4.3.5 Input Dataset Name (#5): ECS-OA0063m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM.met

or for 19980101 to 19980901 and 20000301 to 20000401

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063m_015000.YYYYMMDD
CER_ECS-SOA0063m_015000.YYYYMMDD.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P1, PS4_1, and SS4_1.**

4.3.6 Input Dataset Name (#6): ECS-OA0160m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS
CER_ECS-SOA0160m_015000.XXXXMM
CER_ECS-SOA0160m_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

4.3.7 Input Dataset Name (#7): ECS-OA1663m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA1663m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA1663m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA1663m_015000.XXXXMM
CER_ECS-SOA1663m_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s)

e. Typical file size (mb): **18.6**

4.3.8 Input Dataset Name (#8): ECS-OA0063s

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0063s_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0063s_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063s_015000.XXXXMM
CER_ECS-SOA0063s_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **4.66**

4.3.9 Input Dataset Name (#9): ECS-OA0160s

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0160s_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0160s_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0160s_015000.XXXXMM
CER_ECS-SOA0160s_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **4.66**

4.3.10 Input Dataset Name (#10): ECS-OA1663s

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA1663s_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA1663s_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA1663s_015000.XXXXMM
CER_ECS-SOA1663s_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **4.66**

4.3.11 Input Dataset Name (#11): ECS-BT1080m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS/
CER_ECS-SBT1080m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-SBT1080m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SBT1080m_015000.XXXXMM
CER_ECS-SBT1080m_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **23.3**

4.3.12 Input Dataset Name (#12): ECS-BT1080s

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-SBT1080s_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-SBT1080s_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS
CER_ECS-SBT1080s_015000.XXXXMM
CER_ECS-SBT1080s_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **23.3**

4.3.13 Input Dataset Name (#13): Ephemeris Data

This Data set is needed only for TRMM processing.

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

TRMM_ED9D_OR_YYYY-MM-PVDT00-00-00Z_V01.nat
TRMM_ED9D_OR_YYYY-MM-DDT00-00-00Z_V01.nat

TRMM_ED9D_OR_YYYY-MM-NXDT00-00-00Z_V01.nat
$CERESHOME/instrument/data/ancillary/dynamic

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD
   PVD is previous day, NXD is next day.

3. Waiting Period: **TBD**

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

Ingest Source: Goddard DAAC

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

None.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **0.09**

4.3.14 Input Dataset Name (#14): Attitude Data

This Data set is needed only for TRMM processing.

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

TRMM_G500_LZ_YYYY-MM-PVDT00-00-00Z_V01.DAT1.nat
TRMM_G500_LZ_YYYY-MM-DDT00-00-00Z_V01.DAT1.nat
TRMM_G500_LZ_YYYY-MM-NXDT00-00-00Z_V01.DAT1.nat
$CERESHOME/instrument/data/ancillary/dynamic

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD
   PVD is previous day, NXD is next day.

3. Waiting Period: **TBD**

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

Ingest Source: Goddard DAAC

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

None.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **0.11**

4.3.15 Input Dataset Name (#15): IES

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

For TRMM:
$CERESHOME/instrument/data/int_prod/
CER_IES_$SS1_$PS1_$CC1.YYYYMMDDHH
CER_IES_$SS1_$PS1_$CC1.YYYYMMDDHH.met

1. Mandatory/Optional: **This (these) file(s) is (are) optional. See 2.4.3.**
2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY, MM, DD, HH
3. Waiting Period: Five days after DataDate.

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

Source PGE: CER1.1P1(TRMM)

c. Alternate Data Set, if one exists (maximum waiting period): **None.**

d. File Disposition after successful execution: **Remove**.

e. Typical file size (mb): **34.700**

4.4 Operating Procedures

The PGE CER4.1-4.1P1 production script, **Run.CER4.1-4.1P1**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.1P1.PCFGen**.

4.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, and 3-Terra. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-4.1P1.PCFGen**, requires four command-line arguments: 4-digit year (YYYY), 2-digit month (MM), 2-digit day (DD), and 2-digit hour-of-day (HH).

At the command-line (>) type:

> source $CERESHOME/clouds/bin/CER4.1-4.env X N
> $CERESHOME/clouds/bin/CER4.1-4.1P1.PCFGen YYYY MM DD HH

The following files will be generated in **$CERESHOME/clouds/rcf/**:

CER4.1-4.1P1_PCFin_$SS4_4_$PS4_1_$CC4_1P1.YYYYMMDDHH and
CER4.1-4.1P1_PCF_$SS4_4_$PS4_1_$CC4_1P1.YYYYMMDDHH

4.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.1P1**, followed by the PCF file name including directory.

At the command-line (>) type:

```
>cd $CERESHOME/clouds/bin
>$CERESHOME/clouds/bin/Run.CER4.1-4.1P1 $CERESHOME/clouds/rcf/
        CER4.1-4.1P1_PCF_$SS4_4_$PS4_1_$CC4_1P1.YYYYMMDDHH
```

4.4.3 Special Case Considerations

There is a need to process imager data even when CERES data (IES) is not available. The production request will indicate that CERES instrument be set to NONE. The SSFI, FQC, and FQCI files will not be produced for these cases. The exit code will be 202, because convolution would not have processed successfully.

Other special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

4.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.

At the command-line (>) type:

```
>cd $CERESHOME/clouds/bin
>$CERESHOME/clouds/bin/Run.CER4.1-4.Cleanup $CERESHOME/clouds/rcf/
        CER4.1-4.1P1_PCF_$SS4_4_$PS4_1_$CC4_1P1.YYYYMMDD
```

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

4.5 Execution Evaluation

4.5.1 Exit Codes

The processor CER4.1-4.1P1 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 (see Table 1-1) for assistance.

Table 4-5. Exit Codes for CER4.1-4.1P1

Exit Code	Definition	Action
0	Normal Exit	Proceed Normally
99	Failure	Check Imager input files for compression or corruption.
137	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).
200	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Check to ensure IES was staged and imager file was produced. This includes the case when no matching imager data was available for CERES footprints.
201	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). IES was not staged for convolution.
202	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Usually indicates a foreseeable input error.
203	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).

4.5.2 Screen Messages

Screen Messages are not normally encountered when running the production script Run.CER4.1-4.1P1. All messages of significance are reported to the appropriate log file. The scripts utilized in the production environment will indicate general success or failure of a specific run, but that is all.

4.5.3 Log and Status Files Results

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

4.5.3.1 Report Log File: CER4.1-4.1P1_LogReport_$SS4_4_$PS4_1_$CC4_1P1.YYYYMMDDHH

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

4.5.3.2 Status Log File: CER4.1-4.1P1_LogStatus_$SS4_4_$PS4_1_$CC4_1P1.YYYYMMDDHH

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

4.5.3.3 User Log File: CER4.1-4.1P1_LogUser_$SS4_4_$PS4_1_$CC4_1P1.YYYYMMDDHH

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.

4.5.3.4 ShmMem File: CER4.1-4.1P1_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.1P1.

4.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 4.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

4.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite. For satellites with multiple instruments, expect multiple outputs for the following datasets: CER_FQC, CER_FQCI, and CER_SSFI.

Table 4-6. Expected Output File Listing for CER4.1-4.1P1

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_CRHU_$SS4_1_$PS4_1_$CC4_1P1.YYYY MMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CRH_ Update)	o	.50	1/hr	CER4.1-4.2P1	Archive	No
CER_ECV_$SS4_1_$PS4_1_$CC4_1P1.YYYYMM DDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CloudVis)	o	380	1/hr	N/A	Archive, rm	No
CER_ECVS_$SS4_1_$PS4_1_$CC4_1P1.YYYY MMDDHHR(1..33) (.met) @(CERESHOME/clouds/data/out_comp/data/Subset)	o	13.3	0-33/hr	N/A	Archive, rm	No
CER_EQCHG_$SS4_1_$PS4_1_$CC4_1P1.YYYY MMDDHH (.met) (was CER_EQCB) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	17	1/hr	CER4.1-4.2P1	Archive	No
CER_EQCHB_$SS4_1_$PS4_1_$CC4_1P1.YYYY MMDDHH (.met) (was CER_EQCV) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	20.03	1/hr	CER4.1-4.2P1	Archive	No
CER_FQC_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P1.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.03	1/hr/inst	N/A	Archive, rm	No
CER_FQCI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P1.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.10	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER_SSFI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P1.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/SSF_Int)	o	202.65	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER4.1-4.1P1_PCF_$SS4_4_$PS4_1_$CC4_ 1P1.YYYYMMDDHH@($CERESHOME/clouds/rcf)	m	0.05	1/hr	N/A	Archive, rm	No
CER4.1-4.1P1_PCFin_$SS4_4_$PS4_1_$CC4_ 1P1.YYYYMMDDHH@($CERESHOME/clouds/rcf)	m	0.02	1/hr	CER4.4-4.2P1	Archive	No
CER4.1-4.1P1_LogReport_$SS4_4_$PS4_1_$CC4_ 1P1.YYYYMMDDHH@($CERESHOME/clouds/data/ runlogs)	m	0.5	1/hr	N/A	Archive, rm	No
CER4.1-4.1P1_LogStatus_$SS4_4_$PS4_1_$CC4_ 1P1.YYYYMMDDHH@($CERESHOME/clouds/data/ runlogs)	m	0.005	1/hr	N/A	Archive, rm	No
CER4.1-4.1P1_LogUser_$SS4_4_$PS4_1_$CC4_ 1P1.YYYYMMDDHH@($CERESHOME/clouds/data/ runlogs)	m	0.002	1/hr	N/A	Archive, rm	No

a. See Section 4.2.2 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.
- 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/)
- 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
- inst - Instrument (PFM, FM1, FM2, ...)

4.7 Expected Temporary Files/Directories.

There is two named temporary file created with this PGE. The toolkit also creates several temporary files for CloudVis (pc[n...n]).

Table 4-7. Temporary Files Listing for CER4.1-4.1P1

Directory	File Name
/CERES/clouds/data/int_prod/Cookie	CER_EIPD_$SS4_1_$PS4_1_$CC4_1P1.YYYYMMDDHH (.met)
/CERES/clouds/data/scr	pcnnnnnnnnnnnnnnnnnnnnnnnnnnnn
/CERES/clouds/data/runlogs	CER4.1-4.1P1_ShmMem

5.0 PGEName: CER4.1-4.1P2

CER4.1-4.1P2 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Terra-MODIS Main Processor for Terra.

5.1 PGE Details

5.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

5.1.2 E-mail Distribution List

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

5.1.3 Parent PGE(s)

Table 5-1. Parent PGEs for CER4.1-4.1P2

PGEName	Description
CER1.1P3	CERES Geolocate and Calibrate Radiance - Terra
CER1.1P5	CERES Geolocate and Calibrate Radiance - Aqua
CER4.1-4.0P1	Snow and Ice Processor
CER4.1-4.2P2	Imager Clear Sky Map Update Processor
CER12.1P1	Regrid Humidity and Temperature Fields Processor (MOA Product)

5.1.4 Target PGE(s)

Table 5-2. Target PGEs after CER4.1-4.1P2

PGEName	Description
CER4.5-6.1P2	Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Main Processor
CER4.1-4.2P1	Imager Clear Sky Map Update and Daily QC Processor
CER4.1-4.2P2	Imager Clear Sky Map Update Processor

5.2 Operating Environment

5.2.1 Runtime Parameters

Table 5-3. Runtime Parameters for CER4.1-4.1P2

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31
HH	CERHrOfDay	I(2)	00 .. 23
VRG	MODIS Radiance and Geolocation Version	I(1)	4 .. 5
VA	MODIS MOD04 Aerosol Version	I(1)	4 .. 5

5.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC1 - Configuration Code for IES, see CM Database
CC4_0P1 - Configuration Code for Snow and Ice Map, see CM Database
CC4_1P2 - Configuration Code for CER4.1-4.1P2, see CM Database
CC4_2 - Configuration Code for Clear Sky Map, see CM Database and Production Request
CC12 - Configuration Code for MOA, see CM Database
CV - Set to y when CloudVis Hourly File is produced, set to n otherwise
DATA4_1 - Data SCCR# for Clouds, see CM Database
IMAG - Imager Short Name (MODIS)
INST - CERES Instrument Short Name (FM1, FM2)
PRODUCTION - Set to "YES" when run on a production computer
PS1 - Production Strategy for IES, see Production Request
PS4_0 - Production Strategy for Snow and Ice Map, see Production Request
PS4_1 - Production Strategy for CER4.1-4.1P2, see Production Request
PS4_2 - Production Strategy for Clear Sky Map, see Production Request
PS12 - Production Strategy for MOA, see Production Request
SAT - Satellite Short Name (Terra)
SS1 - Sampling Strategy for IES, see Production Request
SS4_0 - Sampling Strategy for Snow and Ice Map, see Production Request
SS4_1 - Sampling Strategy for CER4.1-4.1P2, see Production Request
SS4_2 - Sampling Strategy for Clear Sky Map, see Production Request
SS4_4 - Sampling Strategy for CER4.1-4.1P2, see Production Request
SS12 - Sampling Strategy for MOA, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

NOTE: In sequential processing, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P2, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change, CC4_2 would have the configuration code used on the previous day. The other variables would not change.

NOTE: If hourly CloudVis processing is required, then set variable to y (yes) otherwise set to n (no). CloudVis Subset processing will not be affected by changes to CV variable.

During nonsequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P2, PS4_1, and SS4_1.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

5.2.3 Execution Frequency

Hourly (1/hr/sat) - This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite.

5.2.4 Memory/Disk Space/Time Requirements

Table 5-4. Memory/Disk Space/Time Requirements for CER4.1-4.1P2

PGE Number	PGE Name	Platform	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.1P2	Cloud Property Retrieval and Convolution	Terra	3:00:00	465	425
		Subset Terra	0:20:00	454	90

5.2.5 Restrictions Imposed in Processing Order

Please process each given day in sequential order. For individual hours within a given day order is unimportant. That is, process all hours from January 1, 1998 before processing January 2, 1998. This allows for updating the Clear Reflectance History (CRH) (CER4.1-4.2P2) for a given day which is input into the next day's PGEs.

5.3 Processor Dependencies (Previous PGEs, Ingest Data)

5.3.1 Input Dataset Name (#1): ECIA

5.3.1.1 MODIS Radiance Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD/
MOD02SS1.SYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

1. Mandatory/Optional: **One radiance and geolocation granule pair is mandatory. Other granules are optional.**
2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: CER4.1-4.4P1

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **50 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

5.3.1.2 MODIS Geolocation Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD/
MOD03.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

1. Mandatory/Optional: **One radiance and geolocation granule pair (same time) is mandatory. Other granules are optional.**
2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **61 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

5.3.1.3 MODIS Aerosol Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD
MOD04_L2.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

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

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**

hh **two digit processing hour**
mm **two digit processing minute**
ss **two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **12 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Aerosol data only exists for daylight hours. There is no fixed rules for how many granules should be present. However, any granule that matches the time of the sixteen granules of radiance and geolocation data should be used.**

5.3.2 Input Dataset Name (#2): MOA

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

$CERESHOME/sarb/data/out_comp/data/regridmoa/
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDHH,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh1,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh2,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh3, and
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh4

where hhn = where n represents other files within a 24 hour period (see item f)

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

   The DataDate must bracket the Runtime Parameters: YYYY,MM,DD,HH

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

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

Source PGE: CER12.1P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **43.8**

f. Special Requirements: **MOA data are produced as six hour files named according to their start hour. To process an hour the files for a 24 hour period are needed. If the hour is between 0 and 18, all four files for that data day are used with the two files bracketing the data hour (before and after) then the remainder in increasing time. If the hour is after 18, then hour 18 from that data day and hour 00 from the next data day followed by hours 06 and 12 from that data day in order.**

5.3.3 Input Dataset Name (#3): ESNOW

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/ CER_ESNOW_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

5.3.4 Input Dataset Name (#4): EICE

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/ CER_EICE_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

5.3.5 Input Dataset Name (#5): ECS-OA0063m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM.met

or for the period 19980101 to 19980901 and 20000301 to 20000401

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063m_015000.YYYYMMDD
CER_ECS-SOA0063m_015000.YYYYMMDD.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P2, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map**

available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P2, PS4_1, and SS4_1.

5.3.6 Input Dataset Name (#6): ECS-OA0160m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS
CER_ECS-SOA0160m_015000.XXXXMM
CER_ECS-SOA0160m_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

5.3.7 Input Dataset Name (#7): IES

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

For Terra:
$CERESHOME/instrument/data/int_prod/
CER_IES_$SAT-FM1_$PS1_$CC1.YYYYMMDDHH
CER_IES_$SAT-FM1_$PS1_$CC1.YYYYMMDDHH.met
CER_IES_$SAT-FM2_$PS1_$CC1.YYYYMMDDHH
CER_IES_$SAT-FM2_$PS1_$CC1.YYYYMMDDHH.met

1. Mandatory/Optional: **This (these) file(s) is (are) optional. See Section 5.4.3**
2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY, MM, DD, HH

3. Waiting Period: Five days after DataDate.

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

Source PGE: CER1.1P1(TRMM) -or- CER1.1P3 (Terra), CER1.1P5 (Aqua)

c. Alternate Data Set, if one exists (maximum waiting period): **None.**

d. File Disposition after successful execution: **Remove**.

e. Typical file size (mb): **34.700**

5.4 Operating Procedures

The PGE CER4.1-4.1P2 production script, **Run.CER4.1-4.1P2**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.1P2.PCFGen**.

5.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, and 3-Terra. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-4.1P2.PCFGen**, requires six command-line arguments: 4-digit year (YYYY), 2-digit month (MM), 2-digit day (DD), and 2-digit hour-of-day (HH), 1-digit MODIS radiance and geolocation version number (VRG), and 1-digit MODIS aerosol version number (VA).

At the command-line (>) type:

> source $CERESHOME/clouds/bin/CER4.1-4.env X N
> **$CERESHOME/clouds/bin/CER4.1-4.1P2.PCFGen YYYY MM DD HH VRG VA**

The following files will be generated in **$CERESHOME/clouds/rcf/**:

CER4.1-4.1P2_PCFin_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH and
CER4.1-4.1P2_PCF_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH

5.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.1P2**, followed by the PCF file name including directory.

At the command-line (>) type:

>**cd $CERESHOME/clouds/bin**
>$CERESHOME/clouds/bin/Run.CER4.1-4.1P2 $CERESHOME/clouds/rcf/
CER4.1-4.1P2_PCF_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH

5.4.3 Special Case Considerations

There is a need to process imager data even when CERES data (IES) is not available. The production request will indicate that CERES instrument be set to NONE. The SSFI, FQC, and

FQCI files will not be produced for these cases. The exit code will be 202, because convolution would not have processed successfully.

There are two CERES instruments on the Terra spacecraft, but only one imager. To efficiently process the data, two IES are input to convolution producing two SSFI files. This type of operation is indicated by a instrument environmental variable that includes both CERES instrument names separated by a "+". Each SSFI file name will only contain data from one instrument.

If the MODIS radiance and geolocation and MODIS aerosol version is not provided it will default to Version 004. The default cannot be used with the option described below.

There is an option while creating the PCF to only include up to four 5-minute MODIS granules in the PCF. This was designed to assist in over ARM processing so that MODIS files that are not needed can remain in the directory. The new format of how to generate the PCF is:
At the command-line (>) type:

> source $CERESHOME/clouds/bin/CER4.1-4.env X N
> $CERESHOME/clouds/bin/CER4.1-4.1P2.PCFGen YYYY MM DD HH VRG VA MM1 MM2 MM3 MM4

Where MM1, MM2, MM3, and MM4 are minute values of the MODIS granules. All are optional.

The following files will be generated in **$CERESHOME/clouds/rcf/**:

CER4.1-4.1P2_PCFin_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH and
CER4.1-4.1P2_PCF_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH

Other special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

5.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.
At the command-line (>) type:

>**cd $CERESHOME/clouds/bin**
>$CERESHOME/clouds/bin/Run.CER4.1-4.Cleanup $CERESHOME/clouds/rcf/ CER4.1-4.1P2_PCF_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDD

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

5.5 Execution Evaluation

5.5.1 Exit Codes

The processor CER4.1-4.1P2 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 5-5. 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 (see Table 1-1) for assistance.

Table 5-5. Exit Codes for CER4.1-4.1P2

Exit Code	Definition	Action
0	Normal Exit	Proceed Normally
99	Failure	Check Imager input files for compression or corruption.
137	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).
200	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Check to ensure IES was staged and imager file was produced. This includes the case when no matching imager data was available for CERES footprints.
201	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). IES was not staged for convolution.
202	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Usually indicates a foreseeable input error.
203	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).

5.5.2 Screen Messages

Screen Messages are not normally encountered when running the production script Run.CER4.1-4.1P2. All messages of significance are reported to the appropriate log file. The scripts utilized in the production environment will indicate general success or failure of a specific run, but that is all.

5.5.3 Log and Status Files Results

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

5.5.3.1 Report Log File: CER4.1-4.1P2_LogReport_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

5.5.3.2 Status Log File: CER4.1-4.1P2_LogStatus_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

5.5.3.3 User Log File: CER4.1-4.1P2_LogUser_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH

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.

5.5.3.4 ShmMem File: CER4.1-4.1P2_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.1P2.

5.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 5.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

5.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite. For satellites with multiple instruments, expect multiple outputs for the following datasets: CER_FQC, CER_FQCI, and CER_SSFI.

Table 5-6. Expected Output File Listing for CER4.1-4.1P2

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_CRHU-WL0063_$SS4_1_$PS4_1_$CC4_1P2. YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CRH_ Update)	o	.50	1/hr	CER4.1-4.2P1	Archive	No
CER_CRHU-WL0160_$SS4_1_$PS4_1_$CC4_1P2. YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CRH_ Update)	o	.50	1/hr	CER4.1-4.2P1	Archive	No
CER_ECV_$SS4_1_$PS4_1_$CC4_1P2.YYYYMM DDHH (.met) @(CERESHOME/clouds/data/out_comp/data/ CloudVis)	o	380	1/hr	N/A	Archive, rm	No
CER_ECVS_$SS4_1_$PS4_1_$CC4_1P2.YYYYMM DDHHR(1..68) (.met) @(CERESHOME/clouds/data/out_comp/data/Subset)	o	13.3	0-68/hr	N/A	Archive, rm	No
CER_EQCHG_$SS4_1_$PS4_1_$CC4_1P2.YYYY MMDDHH (.met) (was CER_EQCB) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	~17	1/hr	CER4.1-4.2P1	Archive	No
CER_EQCHB_$SS4_1_$PS4_1_$CC4_1P2.YYYY MMDDHH (.met) (was CER_EQCV) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	20.03	1/hr	CER4.1-4.2P1	Archive	No
CER_FQC_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P2.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.03	1/hr/inst	N/A	Archive, rm	No
CER_FQCI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P2.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.10	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER_SSFI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P2.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/SSF_Int)	o	202.65	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER_SSFAI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P2.YYYYMMDDHH(.met) @(CERESHOME/clouds/data/out_comp/data/SSF_Int)	0	24.7	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER4.1-4.1P2_PCFin_$SS4_4_$PS4_1_$CC4_ 1P2.YYYYMMDDHH@($CERESHOME/clouds/rcf)	m	0.05	1/hr	CER4.1-4.2P1	Archive	No
CER4.1-4.1P2_PCF_$SS4_4_$PS4_1_$CC4_ 1P2.YYYYMMDDHH@($CERESHOME/clouds/rcf)	m	0.02	1/hr	N/A	Archive, rm	No
CER4.1-4.1P2_LogReport_$SS4_4_$PS4_1_$CC4_ 1P2.YYYYMMDDHH@($CERESHOME/clouds/data/ runlogs)	m	0.7	1/hr	N/A	Archive, rm	No

Table 5-6. Expected Output File Listing for CER4.1-4.1P2

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER4.1-4.1P2_LogStatus_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH@($CERESHOME/clouds/data/runlogs)	m	0.005	1/hr	N/A	Archive, rm	No
CER4.1-4.1P2_LogUser_$SS4_4_$PS4_1_$CC4_1P2.YYYYMMDDHH@($CERESHOME/clouds/data/runlogs)	m	0.002	1/hr	N/A	Archive, rm	No

a. See Section 5.2.2 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.
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/)
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
inst - Instrument (PFM, FM1, FM2, ...)

5.7 Expected Temporary Files/Directories.

There is one named temporary file created with this PGE. The toolkit also creates several temporary files for CloudVis (pc[n...n]).

Table 5-7. Temporary Files Listing for CER4.1-4.1P2

Directory	File Name
/CERES/clouds/data/int_prod/Cookie	CER_EIPD_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met)
/CERES/clouds/data/scr	pcnnnnnnnnnnnnnnnnnnnnnnnnnnnnn
/CERES/clouds/data/runlogs	CER4.1-4.1P2_ShmMem

6.0 PGEName: CER4.1-4.1P3

CER4.1-4.1P3 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Aqua-MODIS Main Processor for Aqua.

6.1 PGE Details

6.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

6.1.2 E-mail Distribution List

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

6.1.3 Parent PGE(s)

Table 6-1. Parent PGEs for CER4.1-4.1P3

PGEName	Description
CER1.1P5	CERES Geolocate and Calibrate Radiance - Aqua
CER4.1-4.0P1	Snow and Ice Processor
CER4.1-4.2P2	Imager Clear Sky Map Update Processor
CER12.1P1	Regrid Humidity and Temperature Fields Processor (MOA Product)

6.1.4 Target PGE(s)

Table 6-2. Target PGEs after CER4.1-4.1P3

PGEName	Description
CER4.5-6.1P3	Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Main Processor
CER4.1-4.2P1	Imager Clear Sky Map Update and Daily QC Processor
CER4.1-4.2P2	Imager Clear Sky Map Update Processor

6.2 Operating Environment

6.2.1 Runtime Parameters

Table 6-3. Runtime Parameters for CER4.1-4.1P3

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31
HH	CERHrOfDay	I(2)	00 .. 23
VRG	MODIS Radiance and Geolocation Version	I(1)	3 .. 4
VA	MODIS MOD04 Aerosol Version	I(1)	3 .. 4

6.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC1 - Configuration Code for IES, see CM Database
CC4_0P1 - Configuration Code for Snow and Ice Map, see CM Database
CC4_1P3 - Configuration Code for CER4.1-4.1P3, see CM Database
CC4_2 - Configuration Code for Clear Sky Map, see CM Database and Production Request
CC12 - Configuration Code for MOA, see CM Database
CV - Set to y when CloudVis Hourly File is produced, set to n otherwise
DATA4_1 - Data SCCR# for Clouds, see CM Database
IMAG - Imager Short Name (MODIS)
INST - CERES Instrument Short Name (FM3, FM4)
PRODUCTION - Set to "YES" when run on a production computer
PS1 - Production Strategy for IES, see Production Request
PS4_0 - Production Strategy for Snow and Ice Map, see Production Request
PS4_1 - Production Strategy for CER4.1-4.1P3, see Production Request
PS4_2 - Production Strategy for Clear Sky Map, see Production Request
PS12 - Production Strategy for MOA, see Production Request
SAT - Satellite Short Name (Aqua)
SS1 - Sampling Strategy for IES, see Production Request
SS4_0 - Sampling Strategy for Snow and Ice Map, see Production Request
SS4_1 - Sampling Strategy for CER4.1-4.1P3, see Production Request
SS4_2 - Sampling Strategy for Clear Sky Map, see Production Request
SS4_4 - Sampling Strategy for CER4.1-4.1P3, see Production Request
SS12 - Sampling Strategy for MOA, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

NOTE: In sequential processing, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P3, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change, CC4_2 would have the configuration code used on the previous day. The other variables would not change.

NOTE: If hourly CloudVis processing is required, then set variable to y (yes) otherwise set to n (no). CloudVis Subset processing will not be affected by changes to CV variable.

During nonsequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P3, PS4_1, and SS4_1.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

6.2.3 Execution Frequency

Hourly (1/hr/sat) - This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite.

6.2.4 Memory/Disk Space/Time Requirements

Table 6-4. Memory/Disk Space/Time Requirements for CER4.1-4.1P3

PGE Number	PGE Name	Platform	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.1P3	Cloud Property Retrieval and Convolution	Aqua	3:00:00	465	425
		Subset Aqua	0:20:00	454	90

6.2.5 Restrictions Imposed in Processing Order

Please process each given day in sequential order. For individual hours within a given day order is unimportant. That is, process all hours from January 1, 1998 before processing January 2, 1998. This allows for updating the Clear Reflectance History (CRH) (CER4.1-4.2P3) for a given day which is input into the next day's PGEs.

6.3 Processor Dependencies (Previous PGEs, Ingest Data)

6.3.1 Input Dataset Name (#1): ECIA

6.3.1.1 MODIS Radiance Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD/
MYD02SS1.SYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

1. Mandatory/Optional: **One radiance and geolocation granule pair is mandatory. Other granules are optional.**
2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **66 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

6.3.1.2 MODIS Geolocation Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD/
MYD03.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

1. Mandatory/Optional: **One radiance and geolocation granule pair (same time) is mandatory. Other granules are optional.**
2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

3. Waiting Period: None. Process when all input data are available.

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **61 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

6.3.1.3 MODIS Aerosol Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD
MYD04_L2.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

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

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**

hh **two digit processing hour**
mm **two digit processing minute**
ss **two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **12 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Aerosol data only exists for daylight hours. There is no fixed rules for how many granules should be present. However, any granule that matches the time of the sixteen granules of radiance and geolocation data should be used.**

6.3.2 Input Dataset Name (#2): MOA

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

$CERESHOME/sarb/data/out_comp/data/regridmoa/
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDHH,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh1,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh2,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh3, and
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh4

where hhn = where n represents other files within a 24 hour period (see item f)

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

   The DataDate must bracket the Runtime Parameters: YYYY,MM,DD,HH

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

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

Source PGE: CER12.1P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **43.8**

f. Special Requirements: **MOA data are produced as six hour files named according to their start hour. To process an hour the files for a 24 hour period are needed. If the hour is between 0 and 18, all four files for that data day are used with the two files bracketing the data hour (before and after) then the remainder in increasing time. If the hour is after 18, then hour 18 from that data day and hour 00 from the next data day followed by hours 06 and 12 from that data day in order.**

6.3.3 Input Dataset Name (#3): ESNOW

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/ CER_ESNOW_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

6.3.4 Input Dataset Name (#4): EICE

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/ CER_EICE_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

6.3.5 Input Dataset Name (#5): ECS-OA0063m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P3, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P3, PS4_1, and SS4_1.**

6.3.6 Input Dataset Name (#6): ECS-OA0160m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS
CER_ECS-SOA0160m_015000.XXXXMM
CER_ECS-SOA0160m_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

6.3.7 Input Dataset Name (#7): ECS-OA0213m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0213m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0213m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS
CER_ECS-SOA0213m_$SS4_2_015000.XXXXMM
CER_ECS-SOA0213m_$SS4_2_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

6.3.8 Input Dataset Name (#8): IES

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

For Aqua:
$CERESHOME/instrument/data/int_prod/
CER_IES_$SAT-FM3_$PS1_$CC1.YYYYMMDDHH
CER_IES_$SAT-FM3_$PS1_$CC1.YYYYMMDDHH.met
CER_IES_$SAT-FM4_$PS1_$CC1.YYYYMMDDHH
CER_IES_$SAT-FM4_$PS1_$CC1.YYYYMMDDHH.met

1. Mandatory/Optional: **This (these) file(s) is (are) optional. See Section 6.4.3**.
2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY, MM, DD, HH

3. Waiting Period: Five days after DataDate.

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

Source PGE: CER1.1P5 (Aqua)

c. Alternate Data Set, if one exists (maximum waiting period): **None.**

d. File Disposition after successful execution: **Remove**.

e. Typical file size (mb): **34.700**

f. Special Requirements: **CERES FM4 experienced a shortwave detector anomaly on March 30, 2005. All FM4 IES created after that date has a different production strategy then the FM3 IES. The script will automatically handle it for Edition2 processing.**

6.4 Operating Procedures

The PGE CER4.1-4.1P3 production script, **Run.CER4.1-4.1P3**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.1P3.PCFGen**.

6.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-4.1P3.PCFGen**, requires six command-line arguments: 4-digit year (YYYY), 2-digit month (MM), 2-digit day (DD), and 2-digit hour-of-day (HH), 1-digit MODIS radiance and geolocation version number (VRG), and 1-digit MODIS aerosol version number (VA).

At the command-line (>) type:

> source $CERESHOME/clouds/bin/CER4.1-4.env X N
> $CERESHOME/clouds/bin/CER4.1-4.1P3.PCFGen YYYY MM DD HH VRG VA

The following files will be generated in **$CERESHOME/clouds/rcf/**:

CER4.1-4.1P3_PCFin_$SS4_4_$PS4_1_$CC4_1P3.YYYYMMDDHH and
CER4.1-4.1P3_PCF_$SS4_4_$PS4_1_$CC4_1P3.YYYYMMDDHH

6.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.1P3**, followed by the PCF file name including directory.

At the command-line (>) type:

>**cd $CERESHOME/clouds/bin**
>$CERESHOME/clouds/bin/Run.CER4.1-4.1P3 $CERESHOME/clouds/rcf/
CER4.1-4.1P3_PCF_$SS4_4_$PS4_1_$CC4_1P3.YYYYMMDDHH

6.4.3 Special Case Considerations

There is a need to process imager data even when CERES data (IES) is not available. The production request will indicate that CERES instrument be set to NONE. The SSFI, FQC, and FQCI files will not be produced for these cases. The exit code will be 202, because convolution would not have processed successfully.

There are two CERES instruments on the Terra spacecraft, but only one imager. To efficiently process the data, two IES are input to convolution producing two SSFI files. This type of operation is indicated by a instrument environmental variable that includes both CERES instrument names separated by a "+". Each SSFI file name will only contain data from one instrument.

There is an option while creating the PCF to only include up to four 5-minute MODIS granules in the PCF. This was designed to assist in over ARM processing so that MODIS files that are not needed can remain in the directory. The new format of how to generate the PCF is:
At the command-line (>) type:

> source $CERESHOME/clouds/bin/CER4.1-4.env X N
> $CERESHOME/clouds/bin/CER4.1-4.1P3.PCFGen YYYY MM DD HH VRG VA MM1 MM2 MM3 MM4

Where MM1, MM2, MM3, and MM4 are minute values of the MODIS granules. All are optional.

The following files will be generated in **$CERESHOME/clouds/rcf/**:

CER4.1-4.1P3_PCFin_$SS4_4_$PS4_1_$CC4_1P3.YYYYMMDDHH and
CER4.1-4.1P3_PCF_$SS4_4_$PS4_1_$CC4_1P3.YYYYMMDDHH

Other special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

6.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.

At the command-line (>) type:

>**cd $CERESHOME/clouds/bin**
>$CERESHOME/clouds/bin/Run.CER4.1-4.Cleanup $CERESHOME/clouds/rcf/ CER4.1-4.1P3_PCF_$SS4_4_$PS4_1_$CC4_1P3.YYYYMMDD

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

6.5 Execution Evaluation

6.5.1 Exit Codes

The processor CER4.1-4.1P3 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 6-5. 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 (see Table 1-1) for assistance.

Table 6-5. Exit Codes for CER4.1-4.1P3

Exit Code	Definition	Action
0	Normal Exit	Proceed Normally
99	Failure	Check Imager input files for compression or corruption.
137	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).
200	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Check to ensure IES was staged and imager file was produced. This includes the case when no matching imager data was available for CERES footprints.
201	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). IES was not staged for convolution.
202	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Usually indicates a foreseeable input error.
203	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).

6.5.2 Screen Messages

Screen Messages are not normally encountered when running the production script Run.CER4.1-4.1P3. All messages of significance are reported to the appropriate log file. The scripts utilized in the production environment will indicate general success or failure of a specific run, but that is all.

6.5.3 Log and Status Files Results

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

6.5.3.1 Report Log File: CER4.1-4.1P3_LogReport_$SS4_4_$PS4_1_$CC4_1P3.YYYYMMDDHH

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

6.5.3.2 Status Log File: CER4.1-4.1P3_LogStatus_$SS4_4_$PS4_1_$CC4_1P3.YYYYMMDDHH

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

6.5.3.3 User Log File: CER4.1-4.1P3_LogUser_$SS4_4_$PS4_1_$CC4_1P3.YYYYMMDDHH

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.

6.5.3.4 ShmMem File: CER4.1-4.1P3_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.1P3.

6.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 6.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

6.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite. For satellites with multiple instruments, expect multiple outputs for the following datasets: CER_FQC, CER_FQCI, and CER_SSFI.

Table 6-6. Expected Output File Listing for CER4.1-4.1P3

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_CRHU-WL0063_$SS4_1_$PS4_1_$CC4_1P3. YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CRH_ Update)	o	.50	1/hr	CER4.1-4.2P2	Archive	No
CER_CRHU-WL0213_$SS4_1_$PS4_1_$CC4_1P3. YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CRH_ Update)	o	.50	1/hr	CER4.1-4.2P2	Archive	No
CER_ECV_$SS4_1_$PS4_1_$CC4_1P3.YYYYMM DDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CloudVis)	o	380	1/hr	N/A	Archive, rm	No
CER_ECVS_$SS4_1_$PS4_1_$CC4_1P3.YYYYMM DDHHR(1..68) (.met) @(CERESHOME/clouds/data/out_comp/data/Subset)	o	13.3	0-68/hr	N/A	Archive, rm	No
CER_EQCHG_$SS4_1_$PS4_1_$CC4_1P3.YYYY MMDDHH (.met) (was CER_EQCB) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	~17	1/hr	CER4.1-4.2P1	Archive	No
CER_EQCHB_$SS4_1_$PS4_1_$CC4_1P3.YYYY MMDDHH (.met) (was CER_EQCV) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	20.03	1/hr	CER4.1-4.2P1	Archive	No
CER_FQC_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P3.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.03	1/hr/inst	N/A	Archive, rm	No
CER_FQCI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P3.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.10	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER_SSFI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P3.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/SSF_Int)	o	202.6 5	1/hr/inst	CER4.5-6.1P3	No Archive	No
CER_SSFAI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P3.YYYYMMDDHH(.met) @(CERESHOME/clouds/data/out_comp/data/SSF_Int)	0	24.7	1/hr/inst	CER4.5-6.1P3	No Archive	No
CER4.1-4.1P3_PCFin_$SS4_4_$PS4_1_$CC4_ 1P3.YYYYMMDDHH@($CERESHOME/clouds/rcf)	m	0.05	1/hr	CER4.1-4.2P1	Archive	No
CER4.1-4.1P3_PCF_$SS4_4_$PS4_1_$CC4_ 1P3.YYYYMMDDHH@($CERESHOME/clouds/rcf)	m	0.02	1/hr	N/A	Archive, rm	No
CER4.1-4.1P3_LogReport_$SS4_4_$PS4_1_$CC4_ 1P3.YYYYMMDDHH@($CERESHOME/clouds/data/ runlogs)	m	0.7	1/hr	N/A	Archive, rm	No

Table 6-6. Expected Output File Listing for CER4.1-4.1P3

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER4.1-4.1P3_LogStatus_$SS4_4_$PS4_1_$CC4_ 1P3.YYYYMMDDHH@($CERESHOME/clouds/data/ runlogs)	m	0.005	1/hr	N/A	Archive, rm	No
CER4.1-4.1P3_LogUser_$SS4_4_$PS4_1_$CC4_ 1P3.YYYYMMDDHH@($CERESHOME/clouds/data/ runlogs)	m	0.002	1/hr	N/A	Archive, rm	No

a. See Section 6.2.2 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.
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/)
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
inst - Instrument (PFM, FM1, FM2, ...)

6.7 Expected Temporary Files/Directories.

There is one named temporary file created with this PGE. The toolkit also creates several temporary files for CloudVis (pc[n...n]).

Table 6-7. Temporary Files Listing for CER4.1-4.1P3

Directory	File Name
/CERES/clouds/data/int_prod/Cookie	CER_EIPD_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met)
/CERES/clouds/data/scr	pcnnnnnnnnnnnnnnnnnnnnnnnnnnnnn
/CERES/clouds/data/runlogs	CER4.1-4.1P3_ShmMem

7.0 PGEName: CER4.1-4.1P4

CER4.1-4.1P4 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Terra-MODIS Main Processor for Terra Collection 005.

7.1 PGE Details

7.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

7.1.2 E-mail Distribution List

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

7.1.3 Parent PGE(s)

Table 7-1. Parent PGEs for CER4.1-4.1P4

PGEName	Description
CER1.1P3	CERES Geolocate and Calibrate Radiance - Terra
CER4.1-4.0P1	Snow and Ice Processor
CER4.1-4.2P2	Imager Clear Sky Map Update Processor
CER12.1P1	Regrid Humidity and Temperature Fields Processor (MOA Product)

7.1.4 Target PGE(s)

Table 7-2. Target PGEs after CER4.1-4.1P4

PGEName	Description
CER4.5-6.1P2	Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Main Processor
CER4.1-4.2P2	Imager Clear Sky Map Update Processor
CER4.1-4.2P3	Collection 005 Daily QC Processor

7.2 Operating Environment

7.2.1 Runtime Parameters

Table 7-3. Runtime Parameters for CER4.1-4.1P4

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31
HH	CERHrOfDay	I(2)	00 .. 23

7.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC1 - Configuration Code for IES, see CM Database
CC4_0P2 - Configuration Code for Snow and Ice Map, see CM Database
CC4_1P4 - Configuration Code for CER4.1-4.1P4, see CM Database
CC4_2 - Configuration Code for Clear Sky Map, see CM Database and Production Request
CC12 - Configuration Code for MOA, see CM Database
CV - Set to y when CloudVis Hourly File is produced, set to n otherwise
DATA4_1 - Data SCCR# for Clouds, see CM Database
IMAG - Imager Short Name (MODIS)
INST - CERES Instrument Short Name (FM1, FM2)
MODIS_IGBP - Set to y when MODIS derived IGBP map is to be used, set to n otherwise
PRODUCTION - Set to "YES" when run on a production computer
PS1 - Production Strategy for IES, see Production Request
PS4_0 - Production Strategy for Snow and Ice Map, see Production Request
PS4_1 - Production Strategy for CER4.1-4.1P4, see Production Request
PS4_2 - Production Strategy for Clear Sky Map, see Production Request
PS12 - Production Strategy for MOA, see Production Request
SAT - Satellite Short Name (Terra)
SS1 - Sampling Strategy for IES, see Production Request
SS4_0 - Sampling Strategy for Snow and Ice Map, see Production Request
SS4_1 - Sampling Strategy for CER4.1-4.1P4, see Production Request
SS4_2 - Sampling Strategy for Clear Sky Map, see Production Request
SS4_4 - Sampling Strategy for CER4.1-4.1P4, see Production Request
SS12 - Sampling Strategy for MOA, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

NOTE: In sequential processing, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P4, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change, CC4_2 would have the configuration code used on the previous day. The other variables would not change.

NOTE: If hourly CloudVis processing is required, then set variable to y (yes) otherwise set to n (no). CloudVis Subset processing will not be affected by changes to CV variable.

During nonsequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P4, PS4_1, and SS4_1.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

7.2.3 Execution Frequency

Hourly (1/hr/sat) - This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite.

7.2.4 Memory/Disk Space/Time Requirements

Table 7-4. Memory/Disk Space/Time Requirements for CER4.1-4.1P4

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.1P4	Cloud Property Retrieval and Convolution	IBM-P4	2:05:00	525	2276

7.2.5 Restrictions Imposed in Processing Order

Please process each given day in sequential order. For individual hours within a given day order is unimportant. That is, process all hours from January 1, 1998 before processing January 2, 1998. This allows for updating the Clear Reflectance History (CRH) (CER4.1-4.2P2) for a given day which is input into the next day's PGEs.

7.3 Processor Dependencies (Previous PGEs, Ingest Data)

7.3.1 Input Dataset Name (#1): ECIA

7.3.1.1 MODIS Radiance Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD/
MOD02SS1.SYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

1. Mandatory/Optional: **One radiance and geolocation granule pair is mandatory. Other granules are optional.**
2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **40 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

7.3.1.2 MODIS Geolocation Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD/
MOD03.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

1. Mandatory/Optional: **One radiance and geolocation granule pair (same time) is mandatory. Other granules are optional.**
2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

3. Waiting Period: None. Process when all input data are available.

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **30 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

7.3.1.3 MODIS Aerosol Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD
MOD04_L2.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

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

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**

hh **two digit processing hour**
mm **two digit processing minute**
ss **two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **20 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Aerosol data only exists for daylight hours. There is no fixed rules for how many granules should be present. However, any granule that matches the time of the sixteen granules of radiance and geolocation data should be used.**

7.3.2 Input Dataset Name (#2): MOA

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

$CERESHOME/sarb/data/out_comp/data/regridmoa/
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDHH,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh1,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh2,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh3, and
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh4

where hhn = where n represents other files within a 24 hour period (see item f)

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

   The DataDate must bracket the Runtime Parameters: YYYY,MM,DD,HH

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

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

Source PGE: CER12.1P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **43.8**

f. Special Requirements: **MOA data are produced as six hour files named according to their start hour. To process an hour the files for a 24 hour period are needed. If the hour is between 0 and 18, all four files for that data day are used with the two files bracketing the data hour (before and after) then the remainder in increasing time. If the hour is after 18, then hour 18 from that data day and hour 00 from the next data day followed by hours 06 and 12 from that data day in order.**

7.3.3 Input Dataset Name (#3): ESNOW

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/ CER_ESNOW_$SS4_0_$PS4_0_$CC4_0P2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

7.3.4 Input Dataset Name (#4): EICE

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/ CER_EICE_$SS4_0_$PS4_0_$CC4_0P2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

7.3.5 Input Dataset Name (#5): ECS-OA0063m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM.met

or for the period 19980101 to 19980901 and 20000301 to 20000401

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063m_015000.YYYYMMDD
CER_ECS-SOA0063m_015000.YYYYMMDD.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P4, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map**

available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P4, PS4_1, and SS4_1.

7.3.6 Input Dataset Name (#6): ECS-OA0160m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS
CER_ECS-SOA0160m_015000.XXXXMM
CER_ECS-SOA0160m_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

7.3.7 Input Dataset Name (#7): IES

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

For Terra:
$CERESHOME/instrument/data/int_prod/
CER_IES_$SAT-FM1_$PS1_$CC1.YYYYMMDDHH
CER_IES_$SAT-FM1_$PS1_$CC1.YYYYMMDDHH.met
CER_IES_$SAT-FM2_$PS1_$CC1.YYYYMMDDHH
CER_IES_$SAT-FM2_$PS1_$CC1.YYYYMMDDHH.met

1. Mandatory/Optional: **This (these) file(s) is (are) optional. See Section 7.4.3.**
2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY, MM, DD, HH

3. Waiting Period: Five days after DataDate.

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

   Source PGE: CER1.1P3 (Terra)

c. Alternate Data Set, if one exists (maximum waiting period): **None.**

d. File Disposition after successful execution: **Remove**.

e. Typical file size (mb): **34.700**

7.4 Operating Procedures

The PGE CER4.1-4.1P4 production script, **Run.CER4.1-4.1P4.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.1P4.PCFGen.pl**.

7.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, and 3-Terra. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-4.1P4.PCFGen.pl**, requires six command-line arguments: 4-digit year (YYYY), 2-digit month (MM), 2-digit day (DD), and 2-digit hour-of-day (HH).

At the command-line (>) type:

```
> source $CERESHOME/clouds/CER4.1-4.1P4/rcf/CER4.1-4.env X N
> $CERESHOME/clouds/CER4.1-4.1P4/rcf/CER4.1-4.1P4.PCFGen.pl YYYY MM
      DD HH
```

The following files will be generated in **$CERESHOME/clouds/CER4.1-4.1P4/rcf/pcf/**:

CER4.1-4.1P4_PCFin_$SS4_4_$PS4_1_$CC4_1P4.YYYYMMDDHH and
CER4.1-4.1P4_PCF_$SS4_4_$PS4_1_$CC4_1P4.YYYYMMDDHH

7.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.1P4.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

```
>unlimit
>cd $CERESHOME/clouds/CER4.1-4.1P4/rcf
>$CERESHOME/clouds/CER4.1-4.1P4/rcf/Run.CER4.1-4.1P4.pl
      $CERESHOME/clouds/CER4.1-4.1P4/rcf/pcf/
      CER4.1-4.1P4_PCF_$SS4_4_$PS4_1_$CC4_1P4.YYYYMMDDHH
```

7.4.3 Special Case Considerations

There is a need to process imager data even when CERES data (IES) is not available. The production request will indicate that CERES instrument be set to NONE. The SSFI, FQC, and FQCI files will not be produced for these cases. The exit code will be 202, because convolution would not have processed successfully.

There are two CERES instruments on the Terra spacecraft, but only one imager. To efficiently process the data, two IES are input to convolution producing two SSFI files. This type of operation is indicated by a instrument environmental variable that includes both CERES instrument names separated by a "+". Each SSFI file name will only contain data from one instrument.

If the MODIS radiance and geolocation and MODIS aerosol version is not provided it will default to Version 005. The default cannot be used with the option described below.

There is an option while creating the PCF to only include up to four 5-minute MODIS granules in the PCF. This was designed to assist in over ARM processing so that MODIS files that are not needed can remain in the directory. The new format of how to generate the PCF is:
At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.1P4/rcf/CER4.1-4.env X N
> $CERESHOME/clouds/CER4.1-4.1P4/rcf/CER4.1-4.1P4.PCFGen.pl YYYY MM DD HH MM1 MM2 MM3 MM4

Where MM1, MM2, MM3, and MM4 are minute values of the MODIS granules. All are optional.

The following files will be generated in **$CERESHOME/clouds/CER4.1-4.1P4/rcf/pcf/**:
CER4.1-4.1P4_PCFin_$SS4_4_$PS4_1_$CC4_1P4.YYYYMMDDHH and
CER4.1-4.1P4_PCF_$SS4_4_$PS4_1_$CC4_1P4.YYYYMMDDHH

Other special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

7.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.
At the command-line (>) type:

>cd $CERESHOME/clouds/CER4.1-4.1P4/rcf
>$CERESHOME/clouds/CER4.1-4.1P4/rcf/Run.CER4.1-4.Cleanup.pl $CERESHOME/clouds/CER4.1-4.1P4/rcf/pcf/ CER4.1-4.1P4_PCF_$SS4_4_$PS4_1_$CC4_1P4.YYYYMMDD

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

7.5 Execution Evaluation

7.5.1 Exit Codes

The processor CER4.1-4.1P4 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 7-5. 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 (see Table 1-1) for assistance.

Table 7-5. Exit Codes for CER4.1-4.1P4

Exit Code	Definition	Action
0	Normal Exit	Proceed Normally
99	Failure	Check Imager input files for compression or corruption.
137	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).
200	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Check to ensure IES was staged and imager file was produced. This includes the case when no matching imager data was available for CERES footprints.
201	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). IES was not staged for convolution.
202	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Usually indicates a foreseeable input error.
203	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).

7.5.2 Screen Messages

Screen Messages are not normally encountered when running the production script Run.CER4.1-4.1P4.pl. All messages of significance are reported to the appropriate log file. The scripts utilized in the production environment will indicate general success or failure of a specific run, but that is all.

7.5.3 Log and Status Files Results

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

7.5.3.1 Report Log File: CER4.1-4.1P4_LogReport_$SS4_4_$PS4_1_$CC4_1P4.YYYYMMDDHH

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

7.5.3.2 Status Log File: CER4.1-4.1P4_LogStatus_$SS4_4_$PS4_1_$CC4_1P4.YYYYMMDDHH

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

7.5.3.3 User Log File: CER4.1-4.1P4_LogUser_$SS4_4_$PS4_1_$CC4_1P4.YYYYMMDDHH

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.

7.5.3.4 ShmMem File: CER4.1-4.1P4_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.1P4.

7.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 7.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

7.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite. For satellites with multiple instruments, expect multiple outputs for the following datasets: CER_FQC, CER_FQCI, and CER_SSFI.

Table 7-6. Expected Output File Listing for CER4.1-4.1P4

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_CRHU-WL0063_$SS4_1_$PS4_1_$CC4_1P4. YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CRH_ Update)	o	.50	1/hr	CER4.1-4.2P2	Archive	No
CER_CRHU-WL0160_$SS4_1_$PS4_1_$CC4_1P4. YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CRH_ Update)	o	.50	1/hr	CER4.1-4.2P2	Archive	No
CER_ECV_$SS4_1_$PS4_1_$CC4_1P4.YYYYMM DDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CloudVis)	o	376	1/hr	N/A	Archive, rm	No
CER_ECVS_$SS4_1_$PS4_1_$CC4_1P4.YYYYMM DDHHR(1..68) (.met) @(CERESHOME/clouds/data/out_comp/data/Subset)	o	13.3	0-68/hr	N/A	Archive, rm	No
CER_EQCHG_$SS4_1_$PS4_1_$CC4_1P4.YYYY MMDDHH (.met) (was CER_EQCB) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	~35	1/hr	CER4.1-4.2P3	Archive	No
CER_EQCHB_$SS4_1_$PS4_1_$CC4_1P4.YYYY MMDDHH (.met) (was CER_EQCV) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	32	1/hr	CER4.1-4.2P3	Archive	No
CER_FQC_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P4.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.03	1/hr/inst	N/A	Archive, rm	No
CER_FQCI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P4.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.10	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER_SSFI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P4.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/SSF_Int)	o	202.65	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER_SSFAI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P4.YYYYMMDDHH(.met) @(CERESHOME/clouds/data/out_comp/data/SSF_Int)	0	24.7	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER4.1-4.1P4_PCFin_$SS4_4_$PS4_1_$CC4_ 1P4.YYYYMMDDHH@($CERESHOME/clouds/ CER4.1-4.1P4/rcf/pcf)	m	0.05	1/hr	CER4.1-4.2P3	Archive	No
CER4.1-4.1P4_PCF_$SS4_4_$PS4_1_$CC4_ 1P4.YYYYMMDDHH@($CERESHOME/clouds/ CER4.1-4.1P4/rcf/pcf)	m	0.02	1/hr	N/A	Archive, rm	No
CER4.1-4.1P4_LogReport_$SS4_4_$PS4_1_$CC4_ 1P4.YYYYMMDDHH@($CERESHOME/clouds/runlogs)	m	0.7	1/hr	N/A	Archive, rm	No

Table 7-6. Expected Output File Listing for CER4.1-4.1P4

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER4.1-4.1P4_LogStatus_$SS4_4_$PS4_1_$CC4_ 1P4.YYYYMMDDHH@($CERESHOME/clouds/runlogs)	m	0.005	1/hr	N/A	Archive, rm	No
CER4.1-4.1P4_LogUser_$SS4_4_$PS4_1_$CC4_ 1P4.YYYYMMDDHH@($CERESHOME/clouds/runlogs)	m	0.002	1/hr	N/A	Archive, rm	No

a. See Section 7.2.2 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. 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/)
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
inst - Instrument (PFM, FM1, FM2, ...)

7.7 Expected Temporary Files/Directories.

There is one named temporary file created with this PGE. The toolkit also creates several temporary files for CloudVis (pc[n...n]).

Table 7-7. Temporary Files Listing for CER4.1-4.1P4

Directory	File Name
/CERES/clouds/data/int_prod/Cookie	CER_EIPD_$SS4_1_$PS4_1_$CC4_1P4.YYYYMMDDHH (.met)
/CERES/clouds/data/scr	pcnnnnnnnnnnnnnnnnnnnnnnnnnnnn
/CERES/clouds/runlogs	CER4.1-4.1P4_ShmMem

8.0 PGEName: CER4.1-4.1P5

CER4.1-4.1P5 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Aqua-MODIS Main Processor for Aqua Collection 005.

8.1 PGE Details

8.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

8.1.2 E-mail Distribution List

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

8.1.3 Parent PGE(s)

Table 8-1. Parent PGEs for CER4.1-4.1P5

PGEName	Description
CER1.1P5	CERES Geolocate and Calibrate Radiance - Aqua
CER4.1-4.0P1	Snow and Ice Processor
CER4.1-4.2P2	Imager Clear Sky Map Update Processor
CER12.1P1	Regrid Humidity and Temperature Fields Processor (MOA Product)

8.1.4 Target PGE(s)

Table 8-2. Target PGEs after CER4.1-4.1P5

PGEName	Description
CER4.5-6.1P3	Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Main Processor
CER4.1-4.2P2	Imager Clear Sky Map Update Processor
CER4.1-4.2P3	Collection 005 Daily QC Processor

8.2 Operating Environment

8.2.1 Runtime Parameters

Table 8-3. Runtime Parameters for CER4.1-4.1P5

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31
HH	CERHrOfDay	I(2)	00 .. 23

8.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC1 - Configuration Code for IES, see CM Database
CC4_0P2 - Configuration Code for Snow and Ice Map, see CM Database
CC4_1P5 - Configuration Code for CER4.1-4.1P5, see CM Database
CC4_2 - Configuration Code for Clear Sky Map, see CM Database and Production Request
CC12 - Configuration Code for MOA, see CM Database
CV - Set to y when CloudVis Hourly File is produced, set to n otherwise
DATA4_1 - Data SCCR# for Clouds, see CM Database
IMAG - Imager Short Name (MODIS)
INST - CERES Instrument Short Name (FM3, FM4)
MODIS_IGBP - Set to y when MODIS derived IGBP map is to be used, set to n otherwise
PRODUCTION - Set to "YES" when run on a production computer
PS1 - Production Strategy for IES, see Production Request
PS4_0 - Production Strategy for Snow and Ice Map, see Production Request
PS4_1 - Production Strategy for CER4.1-4.1P5, see Production Request
PS4_2 - Production Strategy for Clear Sky Map, see Production Request
PS12 - Production Strategy for MOA, see Production Request
SAT - Satellite Short Name (Aqua)
SS1 - Sampling Strategy for IES, see Production Request
SS4_0 - Sampling Strategy for Snow and Ice Map, see Production Request
SS4_1 - Sampling Strategy for CER4.1-4.1P5, see Production Request
SS4_2 - Sampling Strategy for Clear Sky Map, see Production Request
SS4_4 - Sampling Strategy for CER4.1-4.1P5, see Production Request
SS12 - Sampling Strategy for MOA, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

NOTE: In sequential processing, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P5, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change, CC4_2 would have the configuration code used on the previous day. The other variables would not change.

NOTE: If hourly CloudVis processing is required, then set variable to y (yes) otherwise set to n (no). CloudVis Subset processing will not be affected by changes to CV variable.

During nonsequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P5, PS4_1, and SS4_1.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

8.2.3 Execution Frequency

Hourly (1/hr/sat) - This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite.

8.2.4 Memory/Disk Space/Time Requirements

Table 8-4. Memory/Disk Space/Time Requirements for CER4.1-4.1P5

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.1P5	Cloud Property Retrieval and Convolution	IBM-P4	1:25:00	525	2277

8.2.5 Restrictions Imposed in Processing Order

Please process each given day in sequential order. For individual hours within a given day order is unimportant. That is, process all hours from January 1, 1998 before processing January 2, 1998. This allows for updating the Clear Reflectance History (CRH) (CER4.1-4.2P5) for a given day which is input into the next day's PGEs.

8.3 Processor Dependencies (Previous PGEs, Ingest Data)

8.3.1 Input Dataset Name (#1): ECIA

8.3.1.1 MODIS Radiance Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD/
MYD02SS1.SYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

1. Mandatory/Optional: **One radiance and geolocation granule pair is mandatory. Other granules are optional.**
2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **40 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

8.3.1.2 MODIS Geolocation Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD/
MYD03.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

1. Mandatory/Optional: **One radiance and geolocation granule pair (same time) is mandatory. Other granules are optional.**
2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **30 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

8.3.1.3 MODIS Aerosol Data

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

$CERESHOME/clouds/data/input/MODIS/YYYYDDD
MYD04_L2.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

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

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**

hh **two digit processing hour**
mm **two digit processing minute**
ss **two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **20 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Aerosol data only exists for daylight hours. There is no fixed rules for how many granules should be present. However, any granule that matches the time of the sixteen granules of radiance and geolocation data should be used.**

8.3.2 Input Dataset Name (#2): MOA

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

$CERESHOME/sarb/data/out_comp/data/regridmoa/
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDHH,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh1,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh2,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh3, and
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh4

where hhn = where n represents other files within a 24 hour period (see item f)

1. Mandatory/Optional: **This file is mandatory.**

2. Time Related Dependency:

The DataDate must bracket the Runtime Parameters: YYYY,MM,DD,HH

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

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

Source PGE: CER12.1P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **43.8**

f. Special Requirements: **MOA data are produced as six hour files named according to their start hour. To process an hour the files for a 24 hour period are needed. If the hour is between 0 and 18, all four files for that data day are used with the two files bracketing the data hour (before and after) then the remainder in increasing time. If the hour is after 18, then hour 18 from that data day and hour 00 from the next data day followed by hours 06 and 12 from that data day in order.**

8.3.3 Input Dataset Name (#3): ESNOW

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/ CER_ESNOW_$SS4_0_$PS4_0_$CC4_0P2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

8.3.4 Input Dataset Name (#4): EICE

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

$CERESHOME/clouds/data/out_comp/data/CER_ESAI/ CER_EICE_$SS4_0_$PS4_0_$CC4_0P2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **2.333**

8.3.5 Input Dataset Name (#5): ECS-OA0063m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM
CER_ECS-SOA0063m_$SS4_2_StartUp_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1P5, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1P5, PS4_1, and SS4_1.**

8.3.6 Input Dataset Name (#6): ECS-OA0160m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS
CER_ECS-SOA0160m_015000.XXXXMM
CER_ECS-SOA0160m_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

8.3.7 Input Dataset Name (#7): ECS-OA0213m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0213m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0213m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS
CER_ECS-SOA0213m_$SS4_2_015000.XXXXMM
CER_ECS-SOA0213m_$SS4_2_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

8.3.8 Input Dataset Name (#8): IES

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

For Aqua:
$CERESHOME/instrument/data/int_prod/
CER_IES_$SAT-FM3_$PS1_$CC1.YYYYMMDDHH
CER_IES_$SAT-FM3_$PS1_$CC1.YYYYMMDDHH.met
CER_IES_$SAT-FM4_$PS1_$CC1.YYYYMMDDHH
CER_IES_$SAT-FM4_$PS1_$CC1.YYYYMMDDHH.met

1. Mandatory/Optional: **This (these) file(s) is (are) optional. See Section 8.4.3**.
2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY, MM, DD, HH

3. Waiting Period: Five days after DataDate.

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

Source PGE: CER1.1P5 (Aqua)

c. Alternate Data Set, if one exists (maximum waiting period): **None.**

d. File Disposition after successful execution: **Remove**.

e. Typical file size (mb): **34.700**

f. Special Requirements: **CERES FM4 experienced a shortwave detector anomaly on March 30, 2005. All FM4 IES created after that date has a different production strategy then the FM3 IES. The script will automatically handle it for Edition2 processing.**

8.4 Operating Procedures

The PGE CER4.1-4.1P5 production script, **Run.CER4.1-4.1P5.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.1P5.PCFGen.pl**.

8.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-4.1P5.PCFGen.pl**, requires six command-line arguments: 4-digit year (YYYY), 2-digit month (MM), 2-digit day (DD), and 2-digit hour-of-day (HH).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.1P5/rcf/CER4.1-4.env X N
> $CERESHOME/clouds/CER4.1-4.1P5/rcf/CER4.1-4.1P5.PCFGen.pl YYYY MM DD HH

The following files will be generated in **$CERESHOME/clouds/CER4.1-4.1P5/rcf/pcf/**:

CER4.1-4.1P5_PCFin_$SS4_4_$PS4_1_$CC4_1P5.YYYYMMDDHH and
CER4.1-4.1P5_PCF_$SS4_4_$PS4_1_$CC4_1P5.YYYYMMDDHH

8.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.1P5.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

>unlimit
>cd $CERESHOME/clouds/CER4.1-4.1P5/rcf
>$CERESHOME/clouds/CER4.1-4.1P5/rcf/Run.CER4.1-4.1P5.pl $CERESHOME/clouds/CER4.1-4.1P5/rcf/pcf/ CER4.1-4.1P5_PCF_$SS4_4_$PS4_1_$CC4_1P5.YYYYMMDDHH

8.4.3 Special Case Considerations

There is a need to process imager data even when CERES data (IES) is not available. The production request will indicate that CERES instrument be set to NONE. The SSFI, FQC, and FQCI files will not be produced for these cases. The exit code will be 202, because convolution would not have processed successfully.

There are two CERES instruments on the Terra spacecraft, but only one imager. To efficiently process the data, two IES are input to convolution producing two SSFI files. This type of operation is indicated by a instrument environmental variable that includes both CERES instrument names separated by a "+". Each SSFI file name will only contain data from one instrument.

There is an option while creating the PCF to only include up to four 5-minute MODIS granules in the PCF. This was designed to assist in over ARM processing so that MODIS files that are not needed can remain in the directory. The new format of how to generate the PCF is:

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.1P5/rcf/CER4.1-4.env X N
> $CERESHOME/clouds/CER4.1-4.1P5/rcf/CER4.1-4.1P5.PCFGen.pl YYYY MM DD HH MM1 MM2 MM3 MM4

Where MM1, MM2, MM3, and MM4 are minute values of the MODIS granules. All are optional.

The following files will be generated in **$CERESHOME/clouds/CER4.1-4.1P5/rcf/pcf/**:

CER4.1-4.1P5_PCFin_$SS4_4_$PS4_1_$CC4_1P5.YYYYMMDDHH and
CER4.1-4.1P5_PCF_$SS4_4_$PS4_1_$CC4_1P5.YYYYMMDDHH

Other special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

8.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.

At the command-line (>) type:

>cd $CERESHOME/clouds/CER4.1-4.1P5/rcf
>$CERESHOME/clouds/CER4.1-4.1P5/rcf/Run.CER4.1-4.Cleanup.pl $CERESHOME/clouds/CER4.1-4.1P5/rcf/pcf/ CER4.1-4.1P5_PCF_$SS4_4_$PS4_1_$CC4_1P5.YYYYMMDD

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

8.5 Execution Evaluation

8.5.1 Exit Codes

The processor CER4.1-4.1P5 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 8-5. 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 (see Table 1-1) for assistance.

Table 8-5. Exit Codes for CER4.1-4.1P5

Exit Code	Definition	Action
0	Normal Exit	Proceed Normally
99	Failure	Check Imager input files for compression or corruption.
137	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).
200	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Check to ensure IES was staged and imager file was produced. This includes the case when no matching imager data was available for CERES footprints.
201	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). IES was not staged for convolution.
202	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Usually indicates a foreseeable input error.
203	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B).

8.5.2 Screen Messages

Screen Messages are not normally encountered when running the production script Run.CER4.1-4.1P5. All messages of significance are reported to the appropriate log file. The scripts utilized in the production environment will indicate general success or failure of a specific run, but that is all.

8.5.3 Log and Status Files Results

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

8.5.3.1 Report Log File: CER4.1-4.1P5_LogReport_$SS4_4_$PS4_1_$CC4_1P5.YYYYMMDDHH

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

8.5.3.2 Status Log File: CER4.1-4.1P5_LogStatus_$SS4_4_$PS4_1_$CC4_1P5.YYYYMMDDHH

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

8.5.3.3 User Log File: CER4.1-4.1P5_LogUser_$SS4_4_$PS4_1_$CC4_1P5.YYYYMMDDHH

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.

8.5.3.4 ShmMem File: CER4.1-4.1P5_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.1P5.

8.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 8.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

8.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite. For satellites with multiple instruments, expect multiple outputs for the following datasets: CER_FQC, CER_FQCI, and CER_SSFI.

Table 8-6. Expected Output File Listing for CER4.1-4.1P5

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_CRHU-WL0063_$SS4_1_$PS4_1_$CC4_1P5. YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CRH_Update)	o	.50	1/hr	CER4.1-4.2P2	Archive	No
CER_CRHU-WL0213_$SS4_1_$PS4_1_$CC4_1P5. YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CRH_Update)	o	.50	1/hr	CER4.1-4.2P2	Archive	No
CER_ECV_$SS4_1_$PS4_1_$CC4_1P5.YYYYMM DDHH (.met) @(CERESHOME/clouds/data/out_comp/data/CloudVis)	o	410	1/hr	N/A	Archive, rm	No
CER_ECVS_$SS4_1_$PS4_1_$CC4_1P5.YYYYMM DDHHR(1..68) (.met) @(CERESHOME/clouds/data/out_comp/data/Subset)	o	13.3	0-56/hr	N/A	Archive, rm	No
CER_EQCHG_$SS4_1_$PS4_1_$CC4_1P5.YYYY MMDDHH (.met) (was CER_EQCB) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	~37	1/hr	CER4.1-4.2P3	Archive	No
CER_EQCHB_$SS4_1_$PS4_1_$CC4_1P5.YYYY MMDDHH (.met) (was CER_EQCV) @(CERESHOME/clouds/data/out_comp/QA_Reports)	m	32	1/hr	CER4.1-4.2P3	Archive	No
CER_FQC_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P5.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.03	1/hr/inst	N/A	Archive, rm	No
CER_FQCI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P5.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/QA_Reports)	o	.10	1/hr/inst	CER4.5-6.1P1	No Archive	No
CER_SSFI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P5.YYYYMMDDHH (.met) @(CERESHOME/clouds/data/out_comp/data/SSF_Int)	o	202.65	1/hr/inst	CER4.5-6.1P3	No Archive	No
CER_SSFAI_$SAT-$INST-$IMAG_$PS4_1_$CC4_ 1P5.YYYYMMDDHH(.met) @(CERESHOME/clouds/data/out_comp/data/SSF_Int)	0	24.7	1/hr/inst	CER4.5-6.1P3	No Archive	No
CER4.1-4.1P5_PCFin_$SS4_4_$PS4_1_$CC4_ 1P5.YYYYMMDDHH@($CERESHOME/clouds/ CER4.1-4.1P5/rcf/pcf)	m	0.05	1/hr	CER4.1-4.2P3	Archive	No
CER4.1-4.1P5_PCF_$SS4_4_$PS4_1_$CC4_ 1P5.YYYYMMDDHH@($CERESHOME/clouds/ CER4.1-4.1P5/rcf/pcf)	m	0.02	1/hr	N/A	Archive, rm	No
CER4.1-4.1P5_LogReport_$SS4_4_$PS4_1_$CC4_ 1P5.YYYYMMDDHH@($CERESHOME/clouds/runlogs)	m	0.7	1/hr	N/A	Archive, rm	No
CER4.1-4.1P5_LogStatus_$SS4_4_$PS4_1_$CC4_ 1P5.YYYYMMDDHH@($CERESHOME/clouds/runlogs)	m	0.005	1/hr	N/A	Archive, rm	No
CER4.1-4.1P5_LogUser_$SS4_4_$PS4_1_$CC4_ 1P5.YYYYMMDDHH@($CERESHOME/clouds/runlogs)	m	0.002	1/hr	N/A	Archive, rm	No

a. See Section 8.2.2 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.

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/)
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
inst	- Instrument (PFM, FM1, FM2, ...)

8.7 Expected Temporary Files/Directories.

There is one named temporary file created with this PGE. The toolkit also creates several temporary files for CloudVis (pc[n...n]).

Table 8-7. Temporary Files Listing for CER4.1-4.1P5

Directory	File Name
/CERES/clouds/data/int_prod/Cookie	CER_EIPD_$SS4_1_$PS4_1_$CC4_1P5.YYYYMMDDHH (.met)
/CERES/clouds/data/scr	pcnnnnnnnnnnnnnnnnnnnnnnnnnnnn
/CERES/clouds/runlogs	CER4.1-4.1P5_ShmMem

9.0 PGEName: CER4.1-4.1P6

CER4.1-4.1P6 - Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical Property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Terra-/Aqua-MODIS Collection 005 Edition4 Main Processor.

9.1 PGE Details

9.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

9.1.2 E-mail Distribution List

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

9.1.3 Parent PGE(s)

Table 9-1. Parent PGEs for CER4.1-4.1P6

PGEName	Description
CER1.1P8	CERES Geolocate and Calibrate Radiance RMM, Terra, Aqua, and NPP (Edition1-CV)
CER1.3P3	CERES Geolocate and Calibrate Radiance, BDS Reprocessing
CER4.1-4.0P1	Snow and Ice Processor
CER4.1-4.2P5	Edition4 Imager Clear Sky Map Update Processor
CER12.1P1	Regrid Humidity and Temperature Fields Processor (MOA Product)

9.1.4 Target PGE(s)

Table 9-2. Target PGEs after CER4.1-4.1P6

PGEName	Description
CER4.5-6.1P4	Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Main Processor (Terra)
CER4.5-6.1P5	Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Main Processor (Aqua)
CER4.1-4.2P5	Edition4 Imager Clear Sky Map Update Processor
CER4.1-4.2P4	Edition4 Daily QC Processor

9.2 Operating Environment

9.2.1 Runtime Parameters

Table 9-3. Runtime Parameters for CER4.1-4.1P6

Parameter	Description	Data Type	Valid Values
X	Satellite Index	I(1)	3, 6
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31
HH	CERHrOfDay	I(2)	00 .. 23

9.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC1_5 - Configuration Code for IES, see CM Database
CC4_0P1 - Configuration Code for Snow and Ice Map, see CM Database
CC4_1 - Current Configuration Code, see CM Database
CC4_2 - Configuration Code for Clear Sky Map, see CM Database and Production Request
CC12 - Configuration Code for MOA, see CM Database
CV - Set to y when CloudVis Hourly File is produced, set to n otherwise
DATA4_1 - Data SCCR# for Clouds, see CM Database
CPUTYPE - Host Machine type (ppc64 or x86_64)
IMAG - Imager Short Name (MODIS)
InputArchive - Base directory of archived input files located in the ASDC
InputArchiveSS - Base directory of input/output files located in the Clouds subsystem data directory
INST - CERES Instrument Short Name (FM1, FM2, FM3, FM4)
M04_VERSION - MODIS Aerosol version number 5 or 51
MOA_Dir - Base directory of input MOA files
PROD - Set to "YES" when run on a production computer
PS1_1 - Production Strategy for IES, see Production Request
PS4_0 - Production Strategy for Snow and Ice Map, see Production Request
PS4_1 - Current Production Strategy, see Production Request
PS4_2 - Production Strategy for Clear Sky Map, see Production Request
PS12 - Production Strategy for MOA, see Production Request
SAT - Satellite Short Name (Aqua, Terra)
SS1 - Sampling Strategy for IES, see Production Request
SS4_0 - Sampling Strategy for Snow and Ice Map, see Production Request
SS4_1 - Current Sampling Strategy, see Production Request

SS4_2 - Sampling Strategy for Clear Sky Map, see Production Request
SS4_4 - Sampling Strategy for CER4.1-4.1P6, see Production Request
SS12 - Sampling Strategy for MOA, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database
PGENAME - CER4.1-4.1P6

NOTE: In sequential processing, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change, CC4_2 would have the configuration code used on the previous day. The other variables would not change.

NOTE: If hourly CloudVis processing is required, then set variable to y (yes) otherwise set to n (no). CloudVis Subset processing will not be affected by changes to CV variable.

During nonsequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1, PS4_1, and SS4_1.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

9.2.3 Execution Frequency

Hourly (1/hr/sat) - This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite.

9.2.4 Memory/Disk Space/Time Requirements

Table 9-4. Memory/Disk Space/Time Requirements for CER4.1-4.1P6

PGE Number	PGE Name	Platform	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.1P6	Cloud Property Retrieval and Convolution	Aqua	IBM-P6	1:00:00/hr	525	2277
		Terra	IBM-P6	1:00:00/hr	525	

9.2.5 Restrictions Imposed in Processing Order

It is necessary to process days in sequential order. For individual hours within a given day order is unimportant. That is, process all hours from January 1, 1998 before processing January 2,

1998. This allows for updating the Clear Reflectance History (CRH) (CER4.1-4.2P5) for a given day which is input into the next day's PGEs. Running via the 4.1-4.1P6/4.1-4.2P5 2-day SGE production script, in Section 10.0, will safeguard this processing order requirement.

9.3 Processor Dependencies (Previous PGEs, Ingest Data)

9.3.1 Input Dataset Name (#1): ECIA

9.3.1.1 MODIS Radiance Data

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

$InputArchive/MODIS/Aqua/C5/YYYY/DDD/
MYD02SS1.SYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf (Aqua) or
$InputArchive/MODIS/Terra/C5/YYYY/DDD/
MOD02SS1.SYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf (Terra)

1. Mandatory/Optional: **One radiance and geolocation granule pair is mandatory. Other granules are optional.**
2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (Mb): **66 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

9.3.1.2 MODIS Geolocation Data

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

$InputArchive/MODIS/Aqua/C5/YYYY/DDD/
MYD03.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf (Aqua) or
$InputArchive/MODIS/Terra/C5/YYYY/DDD/
MOD03.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf (Terra)

1. Mandatory/Optional: **One radiance and geolocation granule pair (same time) is mandatory. Other granules are optional.**

2. Time Related Dependency:

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (Mb): **61 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Processing normally requires sixteen granules. The two five minute granule immediately preceding the hour (50 and 55), twelve granules within the hour, and two five minute granules immediately following the hour (00 and 05). The granules before or after the data hour can cross into different data day, month, and year.**

9.3.1.3 MODIS Aerosol Data

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

$InputArchive/MODIS/Aqua/C5/YYYY/DDD
MYD04_L2.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf (Aqua) or
$InputArchive/MODIS/Terra/C5/YYYY/DDD/
MOD04_L2.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf (Terra)

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

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC -or-
PGE Source: None

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (Mb): **12 per 5 minute granule**

f. Special Requirements: **Lots of disk space. Aerosol data only exists for daylight hours. There are no fixed rules for how many granules should be present. However, any granule that matches the time of the sixteen granules of radiance and geolocation data should be used.**

9.3.2 Input Dataset Name (#2): MOA

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

$MOA_Dir/$SS12_$PS12/YYYY/MM/
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDHH,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh1,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh2,
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh3, and
CER_MOA_$SS12_$PS12_$CC12.YYYYMMDDhh4

where hhn = where n represents other files within a 24 hour period (see item f)

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

   The DataDate must bracket the Runtime Parameters: YYYY,MM,DD,HH
3. Waiting Period: **None. Process when all input data are available.**

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

Source PGE: CER12.1P1

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **43.8**

f. Special Requirements: **MOA data are produced as six hour files named according to their start hour. To process an hour the files for a 24 hour period are needed. If the hour is between 0 and 18, all four files for that data day are used with the two files bracketing the data hour (before and after) then the remainder in increasing time. If the hour is after 18, then hour 18 from that data day and hour 00 from the next data day followed by hours 06 and 12 from that data day in order.**

9.3.3 Input Dataset Name (#3): ESNOW

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

$InputArchive/CERES/ESNOW/$SS4_0_$PS4_0/YYYY/MM/
CER_ESNOW_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD
3. Waiting Period: **None. Process when all input data are available.**

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **2.333**

9.3.4 Input Dataset Name (#4): EICE

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

$InputArchive/CERES/EICE/$SS4_0_$PS4_0/YYYY/MM/
CER_EICE_$SS4_0_$PS4_0_$CC4_0P1.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

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

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

Source PGE: CER4.1-4.0P1

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **2.333**

9.3.5 Input Dataset Name (#5): ECS-OA0063SFm

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

$InputArchiveSS/ECS-OA0063SFm/$SS4_2_$PS4_2/YYYY/MM/
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P5

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

$CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/
CER_ECS-SOA0063SFm_$SS4_2_StartUp_015000.XXXXMM

Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1, PS4_1, and SS4_1.**

9.3.6 Input Dataset Name (#6): ECS-OA0063SFSCm

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

$InputArchiveSS/ECS-OA0063SFSCm/$SS4_2_$PS4_2/YYYY/MM/ CER_ECS-OA0063SFSCm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P5

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

$CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/ CER_ECS-SOA0063SFSCm_$SS4_2_StartUp_015000.XXXXMM

Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or**

obtained from the responsible person in Table 1-1. These would be different from CC4_1, PS4_1, and SS4_1.

9.3.7 Input Dataset Name (#7): ECS-OA0160SFm

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

$InputArchiveSS/ECS-OA0160SFm/$SS4_2_$PS4_2/YYYY/MM/ CER_ECS-OA0160SFm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

1. Mandatory/Optional: **This file is optional. It will only be generated during Terra processing.**
2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY,MM,DD
3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P5

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

$CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/ CER_ECS-SOA0160SFm_$SS4_2_StartUp_015000.XXXXMM

Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1, PS4_1, and SS4_1.**

9.3.8 Input Dataset Name (#8): ECS-OA0213SFm

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

$InputArchiveSS/ECS-OA0213SFm/$SS4_2_$PS4_2/YYYY/MM/ CER_ECS-OA0213SFm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P5

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

$CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/ CER_ECS-SOA0213SFm_$SS4_2_StartUp_015000.XXXXMM

Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1, PS4_1, and SS4_1.**

9.3.9 Input Dataset Name (#9): ECS-OA0124SCm

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

$InputArchiveSS/ECS-OA0124SCm/$SS4_2_$PS4_2/YYYY/MM/ CER_ECS-OA0124SCm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

1. Mandatory/Optional: **This file is optional.**

2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

   Source PGE: CER4.1-4.2P5

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

   $CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/CER_ECS-SOA0124SCm_$SS4_2_StartUp_015000.XXXXMM

   Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1, PS4_1, and SS4_1.**

9.3.10 Input Dataset Name (#10): ECS-OA0124SFm

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

   $InputArchiveSS/ECS-OA0124SFm/$SS4_2_$PS4_2/YYYY/MM/CER_ECS-OA0124SFm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

1. Mandatory/Optional: **This file is optional.**

2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

   Source PGE: CER4.1-4.2P5

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

$CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/CER_ECS-SOA0124SFm_$SS4_2_StartUp_015000.XXXXMM

Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

f. Special Requirements: **In sequential processing (when the previous day has been run using the same configuration code, production strategy and sampling strategy, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change during the same production and sampling strategy, CC4_2 would have the configuration code used on the previous data day. The other variables would not change. During nonsequential processing and the first data day of sequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1, PS4_1, and SS4_1.**

9.3.11 Input Dataset Name (#11): IES

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

For Aqua:

$InputArchive/CERES/IES/$SAT-FM3_$PS1_1/YYYY/MM/
CER_IES_$SAT-FM3_$PS1_1_$CC1_5.YYYYMMDDHH
CER_IES_$SAT-FM3_$PS1_1_$CC1_5.YYYYMMDDHH.met
$InputArchive/CERES/IES/$SAT-FM4_$PS1_1/YYYY/MM/
CER_IES_$SAT-FM4_$PS1_1_$CC1_5.YYYYMMDDHH
CER_IES_$SAT-FM4_$PS1_1_$CC1_5.YYYYMMDDHH.met

For Terra:

$InputArchive/CERES/IES/$SAT-FM1_$PS1_1/YYYY/MM/
CER_IES_$SAT-FM1_$PS1_1_$CC1_5.YYYYMMDDHH
CER_IES_$SAT-FM1_$PS1_1_$CC1_5.YYYYMMDDHH.met
$InputArchive/CERES/IES/$SAT-FM2_$PS1_1/YYYY/MM/
CER_IES_$SAT-FM2_$PS1_1_$CC1_5.YYYYMMDDHH
CER_IES_$SAT-FM2_$PS1_1_$CC1_5.YYYYMMDDHH.met

Note: If $PS1_1=Editionx and the hour is after 2005032923, then Edx-NoSW is used instead, where x=edition number.

1. Mandatory/Optional: **This (these) file(s) is (are) optional. See Section 9.4.4**.

2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY, MM, DD, HH

3. Waiting Period: **Five days after DataDate.**

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

   Source PGE: CER1.3P3 or CER1.1P8

c. Alternate Data Set, if one exists (maximum waiting period): **None.**

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **34.700**

f. Special Requirements: **CERES FM4 experienced a shortwave detector anomaly on March 30, 2005. All FM4 IES created after that date has a different production strategy then the FM3 IES. The script will automatically handle it for Edition2 processing.**

9.3.12 Input Dataset Name (#12): Ancillary Files

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

   Appendix C.6-1 in the CERES Clouds Retrieval and Convolution Test Plan lists the ancillary data files and directory necessary to run this PGE.

1. Mandatory/Optional: **This (these) file(s) is (are) optional. See Section 9.4.3.**

   NOTE : The Terra calibration file, CALIB/Terra/CER_CALIB-0375_Terra-MODIS_015000.YYYYMM, is mandatory for Terra runs. It is not available for dates after 12/31/2010. If such a date is being processed, contact a Responsible Person (8.1.1) for a work around.

2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY, MM where appropriate.

3. Waiting Period: **None.**

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

   Provided in subsystem delivery.

c. Alternate Data Set, if one exists (maximum waiting period): **None.**

d. File Disposition after successful execution: **Retain**.

e. Typical file size (mb): **Various**

f. Special Requirements: **CERES FM4 experienced a shortwave detector anomaly on March 30, 2005. All FM4 IES files created after that date have a different production strategy than the FM3 IES files. The script will automatically handle it for Edition2 processing.**

9.4 Operating Procedures

***** IMPORTANT ***** : The below operating procedures give instructions on running the CER4.1-4.1P6 PGE one hour at a time as it has always been done in the past. It is strongly recommended that these procedures **NOT** be used anymore. Instead, use the 4.1-4.1P6/ 4.1-4.2P5 2-day Operating Procedures in Section 10.4. This will ensure that the "Restrictions Imposed on Processing Order" (Section 9.2.5) are handled properly. It will also save much time over running each 4.1-4.1P6 hour and 4.1-4.2P5 day individually. For weekend processing, there is a monthly method of operation.

The PGE CER4.1-4.1P6 can be run manually from the command line or it can be sent to the SGE via a job submission script. Both methods of operation require first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env**, which requires the command-line argument digit satellite (X). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. Running manually requires creating a Process Control File (PCF), which contains the correct file names and paths for the PGE, and passing the PCF on to the PGE production script. A PCF checking script may be called after creating the PCF to check for input files, issue a warning if previous output files already exist, and create a PCF log file. When running via the SGE submission script, the PGE is run for all hours chosen. Each run creates a PCF and PCF log file, verifies inputs and checks for existing outputs, and submits a job to execute the PGE. A cleanup script can be run before either execution method to remove output files from a previous run.

9.4.1 ECS input files

If ECS Input Data Files **$InputArchiveSS/ECS-OA*m/$SS4_2_$PS4_2/YYYY/MM/ CER_ECS-OA*m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD** are not available, an alternate set of data files must be copied into their place. This can be done with the following commands:

```
> source $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.env X
> $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.1P6.CopyECS.pl FromDir
      FromSamplingStrategy FromProductionStrategy FromCCCode
      FromDateString ToDir ToSamplingStrategy ToProductionStrategy
      ToCCCode ToDateString
```

Where

ToDir = $InputArchiveSS
ToSamplingStrategy = $SS4_2
ToProductionStrategy = $PS4_2
ToCCCode = $CC4_2
ToDateString = YYYYMMDD

If choosing to use Start Up Clear Sky Maps :

FromDir = $CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT
FromSamplingStrategy = $SS4_2
FromProductionStrategy = StartUp
FromCCCode = 015000
FromeDateString = XXXXMM, MM is the desired month

The arguments on this command line can be omitted and the user will be prompted for them. A description of the arguments can be viewed by typing:

> **$CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.1P6.CopyECS.pl -help**

9.4.2 Manual Execution

9.4.2.1 How to Generate the PCF File

The PCF generator, **CER_4.1-4.1P6.PCFGen.pl**, requires four command-line arguments: 4-digit year (YYYY), 2-digit month (MM), 2-digit day (DD), and 2-digit hour-of-day (HH).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.env X
> $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.1P6.PCFGen.pl YYYY MM DD HH

The following file will be generated in **$CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/**:
CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH

The inputs and outputs listed in this PCF file can then be checked by typing:

> $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.1P6.PCFcheck.pl $CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH

The following file will be created in **$CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/:**
CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH.log

9.4.2.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.1P6.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

>$CERESHOME/clouds/CER4.1-4.1P6/rcf/Run.CER4.1-4.1P6.pl $CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH

9.4.3 Running with CER4.1-4.1P6 SGE script

The SGE script requires one date argument (YYYYMMDD) or two date range arguments (YYYSMSDS, YYYEMEDE). An optional hour argument (HH) may be added if all 24 hours are not desired.

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.env X

For a single date type:

> $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.1P6-SGE_Driver.pl -date YYYYMMDD [-hour HH]

For a range of dates type:

> $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.1P6-SGE_Driver.pl -start YYYSMSDS -end YYYEMEDE [-hour HH]

One job will be submitted for each hour. No more than 48 hourly jobs may be run at the same time.

For each hour the following files wil be created in **$CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/:**

CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH
CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH.log

This log file contains the values of all environment variables, all input files being accessed, and the PCF generator output. If all mandatory input is present, the job will be submitted. Upon successful execution, all output files listed in Table 9-6 will be created for each hour submitted.

Below are all available options for running **CER4.1-4.1P6-SGE_Driver.pl :**

[-clean]	Delete any existing outputs that are encountered.
[-platform CPU]	Run the PGE on the platform designated by CPU (i.e., *p6* or *x86*)
[-date YYYYMMDD]	Run the PGE on the data date specified by YYYYMMDD.
[-start YYYYMMDD]	Run the PGE starting on the data date specfied by YYYYMMDD.
[-end YYYYMMDD]	Run the PGE stopping on the data date specified by YYYYMMDD.
[-hour HH]	Run the PGE for the data hour specified by HH.
[-start_hour HH]	Run the PGE for the data hours starting with HH.
[-end_hour HH]	Run the PGE for the data hours ending with HH.
[-help]	Display help message with all options.

Example for running a single hour :

> CER4.1-4.1P6-SGE_Driver.pl -date 20070809 -hour 15

Example for running a range of hours in one day:

> CER4.1-4.1P6-SGE_Driver.pl -date 20070809 –start_hour 15 -end_hour 25

Example for running all hours of one day:

> CER4.1-4.1P6-SGE_Driver.pl -date 20070809

Example for running all hours of a range of days:

> CER4.1-4.1P6-SGE_Driver.pl -start 20070801 –end 20070831

Example for a run given permission to delete any existing output from a previous run:

> CER4.1-4.1P6-SGE_Driver.pl -date 20070809 -clean

Example for a run to be run on a specific platform:

> CER4.1-4.1P6-SGE_Driver.pl -date 20070809 –platform p6

9.4.4 Special Case Considerations

9.4.4.1 Processing with no IES

There is a need to process imager data even when CERES data (IES) is not available. The production request will indicate that CERES instrument be set to NONE. None or not all SSFI, FQC, and FQCI files will be produced for these cases. The exit code will be 1, because convolution would not have processed successfully.

9.4.4.2 Terra two instrument/one imager consideration

There are two CERES instruments on the Terra spacecraft, but only one imager. To efficiently process the data, two IES are input to convolution producing two SSFI files. This type of operation is indicated by an instrument environmental variable that includes both CERES instrument names separated by a "+". Each SSFI file name will only contain data from one instrument.

9.4.4.3 Operating with only up to four 5-minute MODIS granules

There is an option to only include up to four 5-minute MODIS granules, MM1 MM2 MM3 MM4, all of which are optional. This was designed to assist in over ARM processing so that MODIS files that are not needed can remain in the directory.

For manual execution the new format of how to generate the PCF is:

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.env X
> $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.1P6.PCFGen.pl YYYY MM DD HH MM1 MM2 MM3 MM4

The following file will be generated in **$CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/**:

CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH

And can be checked and executed as described above in manual execution section.

For SGE execution the new format to generate PCF and execute is:

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.env X
> $CERESHOME/clouds/CER4.1-4.1P6/rcf/CER4.1-4.1P6-SGE_Driver.pl -date YYYYMMDD -hour HH -- MM1 MM2 MM3 MM4

The following files will be generated in **$CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/**:
CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH
CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH.log

And will be submitted for execution by the script.

9.4.4.4 Other considerations

Other special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

9.4.5 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing. The SGE scripts and the manual PCF checking alert the user when this is necessary.

At the command-line (>) type:

> cd $CERESHOME/clouds/CER4.1-4.1P6/rcf
> source CER4.1-4.env X

For a single hour type:

> Run.CER4.1-4.Cleanup.pl YYYYMMDDHH

For a range of hours, specify a begin and end date to cleanup all hours in between. Type:

> Run.CER4.1-4.Cleanup.pl YYYS[MSDSHS] YYYE[MEDEHE]

The current environment variable values are used to identify files to be removed.

9.5 Execution Evaluation

9.5.1 Exit Codes

The processor CER4.1-4.1P6 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 9-5. 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 (see Table 1-1) for assistance.

Table 9-5. Exit Codes for CER4.1-4.1P6

Exit Code	Definition	Action
0	Normal Exit	Proceed Normally
1	Success with qualifications	Convolution was not able to process all IES requested either due to them being missing, being marked failed, or no matching imager data for the footprints was available. The clouds QC and CloudVis were produced correctly.
10	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). Check to ensure IES was staged and imager file was produced. This includes the case when no matching imager data was available for CERES footprints.
198	Failure	No PGE file. Generate PGE file.
200	Failure	PGE error. Check the Log Files and operations email and take the appropriate action (see Appendix B). This includes the case when problems occurred in generating output files.
201	Failure	Check the Log Files and operations email and take the appropriate action (see Appendix B). IES was not staged for convolution or other problem reading inputs.

9.5.2 Screen Messages

Screen Messages are not normally encountered when running the production script **Run.CER4.1-4.1P6.pl**. All messages of significance are reported to the appropriate log file. The scripts utilized in the production environment will indicate general success or failure of a specific run, but that is all. For SGE script runs, screen output will go to the SGE log file **$CERESHOME/clouds/sge_logs/CER4.1-4.1P6_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH.o***.

9.5.3 Log and Status Files Results

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

9.5.3.1 Report Log File: $CERESHOME/clouds/runlogs/CER4.1-4.1P6_LogReport_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

9.5.3.2 Status Log File: $CERESHOME/clouds/runlogs/CER4.1-4.1P6_LogStatus_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

9.5.3.3 User Log File: $CERESHOME/clouds/runlogs/CER4.1-4.1P6_LogUser_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH

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.

9.5.3.4 ShmMem File: $CERESHOME/clouds/runlogs/CER4.1-4.1P6_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.1P6.

9.5.3.5 SGE Log File: $CERESHOME/clouds/sge_logs/CER4.1-4.1P6/CER4.1-4.1P6_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH.o*

The SGE CER4.1-4.1P6 Log File contains job submission info, environment values assigned, and all output that would have been screen output in a manual run. This file will be created for each hourly job submitted on SGE.

9.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 9.4.5, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script as instructed in Section 9.4.5. The SGE scripts and the manual PCF checking routine should report if there is a need to do a Cleanup or stage a missing input.

9.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is to be processed once per data-hour, for a maximum total of 744 hours per month per satellite. For satellites with multiple instruments, expect multiple outputs for the following datasets: CER_FQC, CER_FQCI, and CER_SSFI.

Table 9-6. Expected Output File Listing for CER4.1-4.1P6

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_CRHU-WL0063SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/)	O	.05	1/hr	CER4.1-4.2P5	Archive	No
CER_CRHU-WL0063SFSC_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/)	O	.1	1/hr	CER4.1-4.2P5	Archive	No
CER_CRHU-WL0160SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/) (Terra only)	O	.05	1/hr	CER4.1-4.2P5	Archive	No
CER_CRHU-WL0213SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/)	O	.05	1/hr	CER4.1-4.2P5	Archive	No
CER_CRHU-WL0124SC_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/)	o	.005	1/hr	CER4.1-4.2P5	Archive	No
CER_CRHU-WL0124SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/)	o	.05	1/hr	CER4.1-4.2P5	Archive	No
CER_ECV_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/ECV/$SS4_1_$PS4_1/YYYY/MM/)	o	1063	1/hr	N/A	Archive, rm	No
CER_ECVS_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHHR(1..68) (.met) @($InputArchiveSS/ECVS/$SS4_1_$PS4_1/YYYY/MM/)	o	13.3	0-56/hr	N/A	Archive, rm	No
CER_EQCHG_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) (was CER_EQCB) @($InputArchiveSS/EQCHG/$SS4_1_$PS4_1/YYYY/MM/)	m	74	1/hr	CER4.1-4.2P4	Archive	No
CER_EQCHB_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) (was CER_EQCV) @($InputArchiveSS/EQCHB/$SS4_1_$PS4_1/YYYY/MM/)	m	68	1/hr	CER4.1-4.2P4	Archive	No

Table 9-6. Expected Output File Listing for CER4.1-4.1P6

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_FQC_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH (.met) @($InputArchiveSS/FQC/$SS4_4_$PS4_1/YYYY/MM/)	o	.08	1/hr/inst	N/A	Archive, rm	No
CER_FQCI_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH (.met) @($InputArchiveSS/FQC/$SS4_4_$PS4_1/YYYY/MM/)	o	.70	1/hr/inst	CER4.5-6.1P4 (Terra) or CER4.5-6.1P5 (Aqua)	No Archive	No
CER_SSFI_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH (.met) @($InputArchiveSS/SSF_Int/$SS4_4_$PS4_1/ YYYY/MM/)	o	139	1/hr/inst	CER4.5-6.1P4 (Terra) or CER4.5-6.1P5 (Aqua)	No Archive	No
CER_SSFAI_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH (.met) @($InputArchiveSS/SSF_Int/$SS4_4_$PS4_1/ YYYY/MM/)	0	21	1/hr/inst	CER4.5-6.1P4 (Terra) or CER4.5-6.1P5 (Aqua)	No Archive	No
CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH @($CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf)	m	0.07	1/hr	N/A	Archive	No
CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH.log @($CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf)	m	0.07	1/hr	N/A	Archive	No
CER4.1-4.1P6_LogReport_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH @($CERESHOME/clouds/runlogs)	m	0.8	1/hr	N/A	Archive, rm	No
CER4.1-4.1P6_LogStatus_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH @($CERESHOME/clouds/runlogs)	m	0.009	1/hr	N/A	Archive, rm	No
CER4.1-4.1P6_LogUser_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH @($CERESHOME/clouds/runlogs)	m	0.004	1/hr	N/A	Archive, rm	No
CER4.1-4.1P6_$SS4_4_$PS4_1_$CC4_1. YYYYMMDDHH.o* @($CERESHOME/clouds/sge_logs/CER4.1-4.1P6) SGE script run only	m	0.16	1/hr	N/A	Archive, rm	No

a. See Section 9.2.2 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. 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/)
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
inst - Instrument (PFM, FM1, FM2, ...)

9.7 Expected Temporary Files/Directories.

There is one named temporary file created with this PGE. The toolkit also creates several temporary files for CloudVis (pc[n...n]).

Table 9-7. Temporary Files Listing for CER4.1-4.1P6

Directory	File Name
$CERESHOME/clouds/data/Cookie/$SS4_1_$PS4_1/YYYY/MM/	CER_EIPD_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met)
$CERESHOME/clouds/data/scr	Pcnnnnnnnnnnnnnnnnnnnnnnnnnnn
$CERESHOME/clouds/runlogs	CER4.1-4.1P6_ShmMem

10.0 2-Day SGE execution of PGEs CER4.1-4.1P6 and CER4.1-4.2P5

The PGEs CER4.1-4.1P6 (Section 9.0) and CER4.1-4.2P5 (Section 15.0) should be run such that 2 full days of CER4.1-4.1P6 are complete before CER4.1-4.2P5 incorporates the 2 days of CRH Updates into ECS files for the next 2 days. See Sections 9.0 and 15.0 for information pertaining specifically to CER4.1-4.1P6 and CER4.1-4.2P5, respectively.

10.1 PGE Details

See Sections 9.1 and 15.1.

10.2 Operating Environment

See Sections 9.2 and 15.2.

10.3 Processor Dependencies (Previous PGEs, Ingest Data)

See Sections 9.3 and 15.3.

10.4 Operating Procedures

The **Submit_1P6_2P5.pl** 2-day SGE script should be run for 2 days or for an entire month. For each pair of days, one job is submitted to run 4.1-4.1P6 for each of the 48 hours. Once these have completed, 4.1-4.2P5 is run. Then the process repeats for the next 2 days, and so on. First, the cloud retrieval-specific environment script, **CER4.1-4.env**, must be run which requires the command-line argument digit satellite (X). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The SGE script requires two date range arguments, YYYYMMD1 and YYYYMMD2, or one month argument, YYYYMM.

Below are all available options for running **Submit_1P6_2P5.pl:**

[-start_date YYYYMMDD]	Run all hours starting with date specfied by YYYYMMDD.
[-end_date YYYYMMDD]	Last day run is date specified by YYYYMMDD.
[-run_month YYYYMM]	Run all days in month specified by YYYYMM.
[-help]	Display help message with all options.

Example for running 2 days :

> **Submit_1P6_2P5.pl –start_date 20070809 –end_date 20070810**

Example for running a whole month:

> **Submit_1P6_2P5.pl –run_month 200708**

10.4.1 ECS Input Files

If the ECS Input Data Files are not available for the first two days being run, then they must be copied from another location for BOTH days using the procedure described in Section 9.4.1.

10.4.2 Running 2 days with 4.1-4.1P6/4.1-4.2P5 SGE script

The run script requires start and end dates. For a 2 day run, these dates must be within the same month and the days must be consecutive, D1 is the day before D2.

At the command-line (>) type:

> cd $CERESHOME/clouds/CER4.1-4.1P6/rcf/
> source CER4.1-4.env X
> Submit_1P6_2P5.pl -start YYYYMMD1 -end YYYYMMD2

For each pair of days, one 4.1-4.1P6 job will be submitted for each hour (up to 48 jobs). Once completed, one 4.1-4.2P5 job will be submitted. For each 4.1-4.1P6 job, all expected outputs listed in Table 9-6 will be produced. For the 4.1-4.2P5 job, all expected outputs listed in Table 15-6 will be produced. For each 1P6/2P5 pair of days run, a summary file **$CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/summary/CER4.1-4.1P6_$SS4_4_$PS4_1_$CC4_1.YYYYMMD100-YYYYMMD223.summary** will be created with sge job submission statuses and paths to job progress files. An additional runlog file, **$CERESHOME/clouds/data/runlogs/CER4.1-1P6_2P5/CER4.1-1P6_2P5_YYYYMMD1-YYYYMMD2.log,** will be created with success reports for all jobs run. A completion email will be sent to all users listed in the **$CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/Submit_1P6_2P5.email** file (one email per line). The path to the runlog file is provided in the email.

Example of a 2 Day run:

> Submit_1P6_2P5.pl -start 20070810 -end 20070811

10.4.3 Running one month with 4.1-4.1P6/4.1-4.2P5 SGE script

The run script requires the month being run.

At the command-line (>) type:

> cd $CERESHOME/clouds/CER4.1-4.1P6/rcf/
> source CER4.1-4.env X
> Submit_1P6_2P5.pl -run_month YYYYMM

For each pair of days, one 4.1-4.1P6 job will be submitted for each of the 48 hours in. Once done, one 4.1-4.2P5 job will be submitted that pair of days. This process will repeat until all days have been run. For months with an odd number of days, the last day will run alone. For each 4.1-4.1P6 job, all expected outputs listed in Table 9-6 will be produced. For each 4.1-4.2P5 job, all expected outputs listed in Table 15-6 will be produced. For each 1P6/2P5 pair of days run, a summary file **$CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/summary/CER4.1-4.1P6_$SS4_4_$PS4_1_$CC4_1.YYYYMMD100-YYYYMMD223.summary** will be created with sge job submission statuses and paths to job progress files. An additional runlog file, **$CERESHOME/clouds/data/runlogs/CER4.1-1P6_2P5/CER4.1-**

1P6_2P5_YYYYMM01-YYYYMMDL.log, will be created with success reports for all of the jobs run. (DL is the last day of month MM). A completion email will be sent to all users listed in the **$CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf/Submit_1P6_2P5.email** file (one email per line). The path to the runlog file is provided in the email.

Example of a one month run:

> Submit_1P6_2P5.pl -run_month 200708

10.4.4 Managing Jobs

Once submitted, the execution session can be managed with **Manage_1P6_2P5.pl**. This script must be run from within the "**$CERESHOME/clouds/CER4.1-4.1P6/rcf**" directory. Following the on-screen menus, an operator will be able to perform the following actions:

- See the sessions that are currently active as well as their status: "running", "shutting_down", "immediate_shutdown".
- Cleanly shut down the session. Clean, meaning not killing running SGE jobs and allow processing to run through the clear sky updater for the current day or pair of days.
- Forcibly kill the session (immediate_shutdown). Forcibly shutdown by killing any queued/running SGE jobs submitted for that date or pair of days.

A normal/abnormal completion of manage action notification will be included in the **Submit_1P6_2P5.pl** completion email. Three different types of Manage notifications could be sent:

- The script completed normally.
- The script was instructed by an operator to cleanly shut down.
- The script was instructed by an operator to immediately shut down.

10.4.5 Special Case Considerations

See Sections 9.4.4 and 15.4.3.

10.4.6 Special Reprocessing Instructions

Should the script end before completing all jobs, it can be restarted by cleaning up the last run pair of days and then rerunning the remaining range of dates. The reason for the failure should first be examined and corrected. Then the run that failed during the pair of days YYYYMMD1 and YYYYMMD2 can be restarted with the following commands:

> cd $CERESHOME/clouds/CER4.1-4.1P6/rcf/
> source CER4.1-4.env X
> Run.CER4.1-4.Cleanup.pl YYYYMMD1 YYYYMMD2
> source $CERESHOME/clouds/CER4.1-4.2P5/rcf/CER4.1-4.env X
> $CERESHOME/clouds/CER4.1-4.2P5/rcf/Run.CER4.1-4.Cleanup.pl YYYYMMD2

> source CER4.1-4.env X
> Submit_1P6_2P5.pl -start YYYYMMD1 -end YYYYMMDE

where DE is the ending day of the original run or the last day of the month being run.

10.5 Execution Evaluation

See Sections 9.5 and 15.5.

An additional log file will be created which contains success/failure statistics for all jobs submitted by the **Submit_1P6_2P5.pl** script:

$CERESHOME/clouds/runlogs/CER4.1-1P6_2P5/CER4.1-1P6_2P5_YYYYMMD1-YYYYMMDE

10.6 Expected Output Dataset(s)

See Sections 9.6 and 15.6.

10.7 Expected Temporary Files/Directories.

See Sections 9.7 and 15.7.

11.0 PGEName: CER4.1-4.2P1

CER4.1-4.2P1 - Imager Clear Sky Map Update and Daily QC Processor

11.1 PGE Details

11.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

11.1.2 E-mail Distribution List

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

11.1.3 Parent PGE(s)

Table 11-1. Parent PGEs for CER4.1-4.2P1

PGEName	Description
CER4.1-4.1P1	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for TRMM
CER4.1-4.1P2	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra
CER4.1-4.1P3	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua

11.1.4 Target PGE(s)

Table 11-2. Target PGEs after CER4.1-4.2P1

PGEName	Description
CER4.1-4.1P1	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for TRMM
CER4.1-4.1P2	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra
CER4.1-4.1P3	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua
CER4.1-4.3P1	Monthly QC Processor

11.2 Operating Environment

11.2.1 Runtime Parameters

Table 11-3. Runtime Parameters for CER4.1-4.2P1

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31

11.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC4_2P1 - Configuration Code for CER4.1-4.2P1, see CM Database
CC4_2 - Configuration Code for Clear Sky Map, see CM Database and Production Request
DATA4_1 - Data SCCR# for Clouds, see CM Database
IMAG - Imager Short Name (VIRS, MODIS)

INST - CERES Instrument Short Name as defined for the hourly PGE (PFM, SIM, FM1, FM2, FM1+FM2, FM3, FM4, FM3+FM4)
PS4_1 - Production Strategy for CER4.1-4.2P1, see Production Request
PS4_2 - Production Strategy for Clear Sky Map, see Production Request
SAT - Satellite Short Name (TRMM, Terra)
SS4_1 - Sampling Strategy for CER4.1-4.2P1, see Production Request
SS4_2 - Sampling Strategy for Clear Sky Map, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

NOTE: In sequential processing, CC4_2, PS4_2, and SS4_2 would be the same as CC4_2P1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change, CC4_2 would have the configuration code used on the previous day. The other variables would not change.

During nonsequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available to use as an input. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_2P1, PS4_1, and SS4_1.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

11.2.3 Execution Frequency

Daily (1/day/sat) - This PGE is to be processed once per data-day per satellite, a maximum total of 31 days per satellite month, when input is available.

11.2.4 Memory/Disk Space/Time Requirements

Table 11-4. Memory/Disk Space/Time Requirements for CER4.1-4.2P1

PGE Number	PGE Name	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.2P1	Imager Clear Sky Update and Daily QC Processor	0:02:50	186	248

11.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 11.3).

11.3 Processor Dependencies (Previous PGEs, Ingest Data)

11.3.1 Input Dataset Name (#1): ECS-OA0063m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS/
CER_ECS-SOA0063m_$SS4_2_Startup_015000.XXXXMM
CER_ECS-SOA0063m_$SS4_2_Startup_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

11.3.2 Input Dataset Name (#2): ECS-OA0160m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P1

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

$CERESHOME/clouds/data/ancillary/static/CER_ECS
CER_ECS-SOA0160m_015000.XXXXMM
CER_ECS-SOA0160m_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

11.3.3 Input Dataset Name (#3): CRHU

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

$CERESHOME/clouds/data/out_comp/data/CRH_Update/
CER_CRHU_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD(00-23)
CER_CRHU_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P1 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P1, or decision made not to process missing hours.**

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

PGE4.1-4.1P1

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

d. File Disposition after successful execution: **/QA**

e. Typical file size (mb): **0.05**

f. Special Requirements: **The CER_CRHU file is needed for TRMM processing. For Terra and Aqua processing the Clear Sky History portion is done in CER4.1-4.2P2, and these files or CER_CRHU-WL0063 are not used. The script was not modified to remove these files from the PCF to maintain TRMM production.**

11.3.4 Input Dataset Name (#4): EQCHG (was CER_EQCB)

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

$CERESHOME/clouds/data/out_comp/QA_Reports/
CER_EQCHG_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD(00-23)

1. Mandatory/Optional: **This file is optional.**

2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P1 or PGE4.1-4.1P2 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P1 or PGE4.1-4.1P2, or decision made not to process missing hours.**

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

PGE4.1-4.1P1 or PGE4.1-4.1P2

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **~5**

11.3.5 Input Dataset Name (#5): EQCHB (was CER_EQCV)

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

$CERESHOME/clouds/data/out_comp/QA_Reports/ CER_EQCHB_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD(00-23)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P1 or PGE4.1-4.1P2 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P1 or PGE4.1-4.1P2, or decision made not to process missing hours.**

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

PGE4.1-4.1P1 or PGE4.1-4.1P2

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): 18.76

11.3.6 Input Dataset Name (#6): PCFin

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

$CERESHOME/clouds/rcf/
CER4.1-4.1P1_PCFin_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD(00-23)
or
CER4.1-4.1P2_PCFin_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD(00-23)
or
CER4.1-4.1P3_PCFin_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD(00-23)

This is determined by the hourly processing leading to running this PGE.

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P1, CER4.1-4.1P2, or CER4.1-4.1P3 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, or decision made not to process missing hours.**

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

PGE4.1-4.1P1, PGE4.1-4.1P2, or PGE4.1-4.1P3

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **0.019**

11.4 Operating Procedures

The PGE CER4.1-4.2P1 production script, **Run.CER4.1-4.2P1**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.2P1.PCFGen**.

11.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-4.2P1.PCFGen**, requires three command-line arguments: 4-digit year (YYYY), 2-digit month (MM), and 2-digit day (DD)

At the command-line (>) type:

> source $CERESHOME/clouds/bin/CER4.1-4.env X N
> $CERESHOME/clouds/bin/CER4.1-4.2P1.PCFGen YYYY MM DD

The following files will be generated in **$CERESHOME/clouds/rcf/**:

CER4.1-4.2P1_PCFin_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD
CER4.1-4.2P1_PCF_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD

11.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.2P1**, followed by the PCF file name including directory.

At the command-line (>) type:

```
>cd $CERESHOME/clouds/bin
>$CERESHOME/clouds/bin/Run.CER4.1-4.2P1
        $CERESHOME/clouds/rcf/CER4.1-
        4.2P1_PCF_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD
```

11.4.3 Special Case Considerations

Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request. When processing two days before Clear Sky Update, only the Daily QC files will be produced.

11.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.

At the command-line (>) type:

```
>cd $CERESHOME/clouds/bin
>$CERESHOME/clouds/bin/Run.CER4.1-4.Cleanup
        $CERESHOME/clouds/rcf/CER4.1-
        4.2P1_PCF_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD
```

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

11.5 Execution Evaluation

11.5.1 Exit Codes

The processor CER4.1-4.2P1 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 11-5. 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 (see Table 1-1) for assistance.

Table 11-5. Exit Codes for CER4.1-4.2P1

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
Other	Failure	Call responsible persons

11.5.2 Screen Messages

When running the production script, **Run.CER4.1-4.2P1**, 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.

11.5.3 Log and Status Files Results

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

11.5.3.1 Report Log File: CER4.1-4.2P1_LogReport_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

11.5.3.2 Status Log File: CER4.1-4.2P1_LogStatus_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

11.5.3.3 User Log File: CER4.1-4.2P1_LogUser_$SS4_1_$PS4_1_$CC4_2P1.YYYYMMDD

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.

11.5.3.4 ShmMem File: CER4.1-4.2P1_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.2P1.

11.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 11.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

11.5.5 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. If one day fails, continue processing the next day.

b. Target PGE Termination

There are no foreseeable Subsystem terminating conditions at this time. If the day fails, continue processing.

11.6 Expected Output Datasets

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process 31 times, maximum, in a 31 day month per satellite.

Table 11-6. Expected Output File Listing for CER4.1-4.2P1

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_ECS-OA0063m_$SS4_1_$PS4_1_$CC4_ 2P1.yyyymmNXD (.met) @($CERESHOME/clouds/data/out_comp/data/ CER_ECS)	o	18.66	1/day	CER4.1-4.1P1	Archive	No
CER_ECS-OA0160m_$SS4_1_$PS4_1_$CC4_ 2P1.yyyymmNXD (.met) @($CERESHOME/clouds/data/out_comp/data/ CER_ECS)	o	18.66	1/day	CER4.1-4.1P1	Archive	No
CER_EQCDG_$SS4_1_$PS4_1_$CC4_2P1. YYYYMMD(.met) (was CER_EQCD) @($CERESHOME/clouds/data/out_comp/QA_Reports)	m	63.9	1/day	CER4.1-4.3P1	Archive	No
CER_EQCDB_$SS4_1_$PS4_1_$CC4_2P1. YYYYMMDD (.met) (was CER_EQCDV) @($CERESHOME/clouds/data/out_comp/QA_Reports)	m	18.76	1/day	CER4.1-4.3P1	Archive	No
CER_EQCDS_$SS4_1_$PS4_1_$CC4_2P1.YYYYMM DD (.met) (was CER_EQCS) @($CERESHOME/clouds/data/out_comp/QA_Reports)	o	0.10	1/day	N/A	Archive, rm	No
CER4.1-4.2P1_PCF_$SS4_1_$PS4_1_$CC4_2P1. YYYYMMDD@($CERESHOME/clouds/rcf)	m	0.04	1/day	N/A	Archive, rm	No
CER4.1-4.2P1_PCFin_$SS4_1_$PS4_1_$CC4_2P1. YYYYMMDD@($CERESHOME/clouds/rcf)	m	0.006	1/day	N/A	Archive, rm	No
CER4.1-4.2P1_LogReport_$SS4_1_$PS4_1_$CC4_ 2P1.YYYYMMDD @($CERESHOME/clouds/data/runlogs)	m	0.01	1/day	N/A	Archive, rm	No
CER4.1-4.2P1_LogStatus_$SS4_1_$PS4_1_$CC4_ 2P1.YYYYMMDD @($CERESHOME/clouds/data/runlogs)	m	0.002	1/day	N/A	Archive, rm	No
CER4.1-4.2P1_LogUser_$SS4_1_$PS4_1_$CC4_ 2P1.YYYYMMDD @($CERESHOME/clouds/data/runlogs)	m	0.001	1/day	N/A	Archive, rm	No

a. See Section 11.2.2 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.
SD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
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
NXD - The next Data Day

The CER_ECS series of files will not be produced during Terra processing.

11.7 Expected Temporary Files/Directories.

The toolkit creates a temporary file.

Table 11-7. Temporary Files Listing for CER4.1-4.2P1

Directory	File Name
/CERES/clouds/data/runlogs	CER4.1-4.2P1_ShmMem

12.0 PGEName: CER4.1-4.2P2

CER4.1-4.2P2 - Imager Clear Sky Map Update Processor

12.1 PGE Details

12.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

12.1.2 E-mail Distribution List

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

12.1.3 Parent PGE(s)

Table 12-1. Parent PGEs for CER4.1-4.2P2

PGEName	Description
CER4.1-4.1P1	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for TRMM
CER4.1-4.1P2	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra
CER4.1-4.1P3	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua
CER4.1-4.1P4	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra Collection 005
CER4.1-4.1P5	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua Collection 005

12.1.4 Target PGE(s)

Table 12-2. Target PGEs after CER4.1-4.2P2

PGEName	Description
CER4.1-4.1P1	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for TRMM
CER4.1-4.1P2	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra
CER4.1-4.1P3	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua
CER4.1-4.1P4	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra Collection 005
CER4.1-4.1P5	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua Collection 005

12.2 Operating Environment

12.2.1 Runtime Parameters

Table 12-3. Runtime Parameters for CER4.1-4.2P2

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31
PYYY	Prior CERDataDateYear (Optional)	I(4)	>1996
PM	Prior CERDataDateMonth (Optional)	I(2)	01 .. 12
PD	Prior CERDataDateDay (Optional)	I(2)	01 .. 31

12.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC4_2P2	-	Configuration Code for CER4.1-4.2P2, see CM Database
CC4_2	-	Configuration Code for Clear Sky Map, see CM Database and Production Request
DATA4_1	-	Data SCCR# for Clouds, see CM Database
IMAG	-	Imager Short Name (MODIS)
PRODUCTION	-	Set to "YES" when run on a production computer
PS4_1	-	Production Strategy for CER4.1-4.2P2, see Production Request
PS4_2	-	Production Strategy for Clear Sky Map, see Production Request
SAT	-	Satellite Short Name (Terra)
SS4_1	-	Sampling Strategy for CER4.1-4.2P2, see Production Request
SS4_2	-	Sampling Strategy for Clear Sky Map, see Production Request
SW4_1	-	Software SSCR # for Clouds, see CM Database

NOTE: In sequential processing, CC4_2, PS4_2, and SS4_2 would be the same as CC4_2P2, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change, CC4_2 would have the configuration code used on the previous day. The other variables would not change.

During nonsequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available to use as an input. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_2P2, PS4_1, and SS4_1.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

12.2.3 Execution Frequency

Daily (1/2days/sat) - This PGE is to be processed on even days plus the 31st of the month per satellite, a maximum total of 16 times per satellite month, when input is available.

12.2.4 Memory/Disk Space/Time Requirements

Table 12-4. Memory/Disk Space/Time Requirements for CER4.1-4.2P2

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.2P2	Imager Clear Sky Update Processor	IBM-P4	0:02:50	186	123

12.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 12.3).

12.3 Processor Dependencies (Previous PGEs, Ingest Data)

12.3.1 Input Dataset Name (#1): ECS-OA0063m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0063m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

For Terra processing
$CERESHOME/clouds/ancillary/CER4.1-4.1P4/static/CER_ECS/
CER_ECS-SOA0063m_Terra-MODIS_StartUp_015000.XXXXMM
CER_ECS-SOA0063m_Terra-MODIS_StartUp_015000.XXXXMM.met

When processing Aqua the alternate file is
$CERESHOME/clouds/ancillary/CER4.1-4.1P5/static/CER_ECS/
CER_ECS-SOA0063m_Aqua-MODIS_StartUp_015000.XXXXMM
CER_ECS-SOA0063m_Aqua-MODIS_StartUp_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

12.3.2 Input Dataset Name (#2): ECS-OA0160m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0160m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P2

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

For Terra processing
$CERESHOME/clouds/ancillary/CER4.1-4.1P4/static/CER_ECS/
CER_ECS-OA0160m_Terra-MODIS_StartUp_015000.XXXXMM
CER_ECS-OA0160m_Terra-MODIS_StartUp_015000.XXXXMM.met

When processing Aqua the alternate file is
$CERESHOME/clouds/ancillary/CER4.1-4.1P5/static/CER_ECS/
CER_ECS-OA0160m_Aqua-MODIS_StartUp_015000.XXXXMM
CER_ECS-OA0160m_Aqua-MODIS_StartUp_015000.XXXXMM.met

Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

12.3.3 Input Dataset Name (#3): ECS-OA0213m

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

$CERESHOME/clouds/data/out_comp/data/CER_ECS
CER_ECS-OA0213m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD
CER_ECS-OA0213m_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD.met

1. Mandatory/Optional: **This file is optional.**

2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

   Source PGE: CER4.1-4.2P2

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

   For Terra processing
   $CERESHOME/clouds/ancillary/CER4.1-4.1P4/static/CER_ECS/
   CER_ECS-SOA0213m_Terra-MODIS_StartUp_015000.XXXXMM
   CER_ECS-SOA0213m_Terra-MODIS_StartUp_015000.XXXXMM.met

   When processing Aqua the alternate file is
   $CERESHOME/clouds/ancillary/CER4.1-4.1P5/static/CER_ECS/
   CER_ECS-SOA0213m_Aqua-MODIS_StartUp_015000.XXXXMM
   CER_ECS-SOA0213m_Aqua-MODIS_StartUp_015000.XXXXMM.met

   Immediate if no near-term plans to process the previous day.

d. File Disposition after successful execution:

   Do not remove, will be needed for other PGE(s).

e. Typical file size (mb): **18.6**

12.3.4 Input Dataset Name (#4): CRHU

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

   $CERESHOME/clouds/data/out_comp/data/CRH_Update/
   CER_CRHU_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMDD(00-23)
   CER_CRHU_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMDD(00-23).met

   1. Mandatory/Optional: **This file is optional.**
   2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through CER4.1-4.1P1 if the imager data are available.**
   3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P1 or decision made not to process missing hours.**

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

   PGE4.1-4.1P1

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

d. File Disposition after successful execution: **/QA**

e. Typical file size (mb): **0.12**

12.3.5 Input Dataset Name (#5): CRHU

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

$CERESHOME/clouds/data/out_comp/data/CRH_Update/
CER_CRHU_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMPD(00-23)
CER_CRHU_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through CER4.1-4.1P1 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P1 or decision made not to process missing hours.**

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

PGE4.1-4.1P1

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

d. File Disposition after successful execution: **/QA**

e. Typical file size (mb): **0.12**

12.3.6 Input Dataset Name (#6): CRHU-WL0063

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

$CERESHOME/clouds/data/out_comp/data/CRH_Update/
CER_CRHU-WL0063_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD(00-23)
CER_CRHU-WL0063_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P2, CER4.1-4.1P3, PGE4.1-4.1P4, or PGE4.1-4.1P5 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P2, CER4.1-4.1P3, PGE4.1-4.1P4, or PGE4.1-4.1P5 or decision made not to process missing hours.**

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

CER4.1-4.1P2, PGE4.1-4.1P3, PGE4.1-4.1P4, or PGE4.1-4.1P5

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

d. File Disposition after successful execution: **/QA**

e. Typical file size (mb): **0.12**

12.3.7 Input Dataset Name (#7): CRHU-WL0063

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

$CERESHOME/clouds/data/out_comp/data/CRH_Update/
CER_CRHU-WL0063_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMPD(00-23)
CER_CRHU-WL0063_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through CER4.1-4.1P2, CER4.1-4.1P3, PGE4.1-4.1P4, or PGE4.1-4.1P5 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P2, CER4.1-4.1P3, PGE4.1-4.1P4, or PGE4.1-4.1P5 or decision made not to process missing hours.**

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

CER4.1-4.1P2, PGE4.1-4.1P3, PGE4.1-4.1P4, or PGE4.1-4.1P5

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

d. File Disposition after successful execution: **/QA**

e. Typical file size (mb): **0.12**

12.3.8 Input Dataset Name (#8): CRHU-WL0160

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

$CERESHOME/clouds/data/out_comp/data/CRH_Update/
CER_CRHU-WL0160_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD(00-23)
CER_CRHU-WL0160_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P2 or CER4.1-4.1P4 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P2 or CER4.1-4.1P4 or decision made not to process missing hours.**

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

CER4.1-4.1P2 or CER4.1-4.1P4

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

d. File Disposition after successful execution: **/QA**

e. Typical file size (mb): **0.12**

12.3.9 Input Dataset Name (#9): CRHU-WL0160

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

$CERESHOME/clouds/data/out_comp/data/CRH_Update/
CER_CRHU-WL0160_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMPD(00-23)
CER_CRHU-WL0160_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through CER4.1-4.1P2 or CER4.1-4.1P4 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P2 or CER4.1-4.1P4 or decision made not to process missing hours.**

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

CER4.1-4.1P2 or CER4.1-4.1P4

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

d. File Disposition after successful execution: **/QA**

e. Typical file size (mb): **0.12**

12.3.10 Input Dataset Name (#10): CRHU-WL0213

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

$CERESHOME/clouds/data/out_comp/data/CRH_Update/
CER_CRHU-WL0213_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD(00-23)
CER_CRHU-WL0213_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P3 or CER4.1-4.1P5 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P3 or CER4.1-4.1P5 or decision made not to process missing hours.**

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

PGE4.1-4.1P3 or CER4.1-4.1P5

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

d. File Disposition after successful execution: **/QA**

e. Typical file size (mb): **0.12**

12.3.11 Input Dataset Name (#11): CRHU-WL0213

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

$CERESHOME/clouds/data/out_comp/data/CRH_Update/
CER_CRHU-WL0213_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMPD(00-23)
CER_CRHU-WL0213_$SS4_1_$PS4_1_$CC4_2P2.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through CER4.1-4.1P3 or CER4.1-4.1P5 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P3 or CER4.1-4.1P5 or decision made not to process missing hours.**

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

PGE4.1-4.1P3 or CER4.1-4.1P5

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

d. File Disposition after successful execution: **/QA**

e. Typical file size (mb): **0.12**

12.4 Operating Procedures

The PGE CER4.1-4.2P2 production script, **Run.CER4.1-4.2P2.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.2P2.PCFGen.pl**.

12.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-4.2P2.PCFGen.pl**, requires three command-line arguments: 4-digit year (YYYY), 2-digit month (MM), and 2-digit day (DD)

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.2P2/rcf/CER4.1-4.env X N
> $CERESHOME/clouds/CER4.1-4.2P2/rcf/CER4.1-4.2P2.PCFGen.pl YYYY MM DD

The following files will be generated in **$CERESHOME/clouds/CER4.1-4.2P2/rcf/pcf/**:

CER4.1-4.2P2_PCFin_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD
CER4.1-4.2P2_PCF_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD

12.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.2P2.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

```
>unlimit
>cd $CERESHOME/clouds/CER4.1-4.2P2/rcf
>$CERESHOME/clouds/CER4.1-4.2P2/rcf/Run.CER4.1-4.2P2.pl
        $CERESHOME/clouds/CER4.1-4.2P2/rcf/pcf/
        CER4.1-4.2P2_PCF_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD
```

12.4.3 Special Case Considerations

When processing requires running two days simultaneously, the optional runtime parameter for the prior day can be used. This will use both days of clear sky update files(CRHU) to build the new maps. It should not be run across data month boundaries in this manner. Format for the PCF file generator is:

```
>$CERESHOME/clouds/CER4.1-4.2P2/rcf/CER4.1-4.2P2.PCFGen.pl YYYY MM
        DD PYYY PM PD
```

12.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.
At the command-line (>) type:

```
>cd $CERESHOME/clouds/CER4.1-4.2P2/rcf
>$CERESHOME/clouds/CER4.1-4.2P2/rcf/Run.CER4.1-4.Cleanup.pl
        $CERESHOME/clouds/CER4.1-4.2P2/rcf/pcf/
        CER4.1-4.2P2_PCF_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD
```

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

12.5 Execution Evaluation

12.5.1 Exit Codes

The processor CER4.1-4.2P2 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 12-5. 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 (see Table 1-1) for assistance.

Table 12-5. Exit Codes for CER4.1-4.2P2

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
Other	Failure	Call responsible persons

12.5.2 Screen Messages

When running the production script, **Run.CER4.1-4.2P2**, 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.

12.5.3 Log and Status Files Results

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

12.5.3.1 Report Log File: CER4.1-4.2P2_LogReport_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

12.5.3.2 Status Log File: CER4.1-4.2P2_LogStatus_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

12.5.3.3 User Log File: CER4.1-4.2P2_LogUser_$SS4_1_$PS4_1_$CC4_2P2.YYYYMMDD

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.

12.5.3.4 ShmMem File: CER4.1-4.2P2_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.2P2.

12.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 12.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

12.5.5 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. If one day fails, continue processing the next day.

b. Target PGE Termination

There are no foreseeable Subsystem terminating conditions at this time. If the day fails, continue processing.

12.6 Expected Output Datasets

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process 31 times, maximum, in a 31 day month per satellite.

Table 12-6. Expected Output File Listing for CER4.1-4.2P2

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_ECS-OA0063m_$SS4_1_$PS4_1_$CC4_2P2. yyyymmNXD (.met) @($CERESHOME/clouds/data/out_comp/data/ CER_ECS)	m	18.66	Once every 2 days	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5, CER7.2.1P1	Archive	No
CER_ECS-OA0160m_$SS4_1_$PS4_1_$CC4_2P2. yyyymmNXD (.met) @($CERESHOME/clouds/data/out_comp/data/ CER_ECS)	o	18.66	Once every 2 days	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P4	Archive	No
CER_ECS-OA0213m_$SS4_1_$PS4_1_$CC4_2P2. yyyymmNXD (.met) @($CERESHOME/clouds/data/out_comp/data/ CER_ECS)	o	18.66	Once every 2 days	CER4.1-4.1P3, CER4.1-4.1P5	Archive	No
CER_ECS-OA0063m_$SS4_1_$PS4_1_$CC4_2P2. yyyymmNNXD (.met) @($CERESHOME/clouds/data/out_comp/data/ CER_ECS)	o	18.66	Once every 2 days	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5	Archive	No
CER_ECS-OA0160m_$SS4_1_$PS4_1_$CC4_2P2. yyyymmNNXD (.met) @($CERESHOME/clouds/data/out_comp/data/ CER_ECS)	o	18.66	Once every 2 days	CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P4	Archive	No
CER_ECS-OA0213m_$SS4_1_$PS4_1_$CC4_2P2. yyyymmNNXD (.met) @($CERESHOME/clouds/data/out_comp/data/ CER_ECS)	o	18.66	Once every 2 days	CER4.1-4.1P3, CER4.1-4.1P5	Archive	No
CER4.1-4.2P2_PCF_$SS4_1_$PS4_1_$CC4_2P2. YYYYMMDD@($CERESHOME/clouds/ CER4.1-4.2P2/rcf/pcf)	m	0.04	Once every 2 days	N/A	Archive, rm	No
CER4.1-4.2P2_PCFin_$SS4_1_$PS4_1_$CC4_2P2. YYYYMMDD@($CERESHOME/clouds/ CER4.1-4.2P2/rcf/pcf)	m	0.006	Once every 2 days	N/A	Archive, rm	No
CER4.1-4.2P2_LogReport_$SS4_1_$PS4_1_$CC4_ 2P2.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.01	Once every 2 days	N/A	Archive, rm	No
CER4.1-4.2P2_LogStatus_$SS4_1_$PS4_1_$CC4_ 2P2.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.002	Once every 2 days	N/A	Archive, rm	No

Table 12-6. Expected Output File Listing for CER4.1-4.2P2

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER4.1-4.2P2_LogUser_$SS4_1_$PS4_1_$CC4_ 2P2.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.001	Once every 2 days	N/A	Archive, rm	No

a. See Section 12.2.2 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. 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/)
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
NXD - The next Data Day
NNXD - The Next Next Data Day

12.7 Expected Temporary Files/Directories.

The toolkit creates a temporary file.

Table 12-7. Temporary Files Listing for CER4.1-4.2P2

Directory	File Name
/CERES/clouds/runlogs	CER4.1-4.2P2_ShmMem

13.0 PGEName: CER4.1-4.2P3

CER4.1-4.2P3 - Collection 005 Daily QC Processor

13.1 PGE Details

13.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

13.1.2 E-mail Distribution List

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

13.1.3 Parent PGE(s)

Table 13-1. Parent PGEs for CER4.1-4.2P3

PGEName	Description
CER4.1-4.1P4	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra Collection 005
CER4.1-4.1P5	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Aqua Collection 005

13.1.4 Target PGE(s)

Table 13-2. Target PGEs after CER4.1-4.2P3

PGEName	Description
CER4.1-4.3P2	Collection 005 Monthly QC Processor

13.2 Operating Environment

13.2.1 Runtime Parameters

Table 13-3. Runtime Parameters for CER4.1-4.2P3

Parameter	Description	Data Type	Valid Values
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31

13.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC4_1 - Configuration Code for hourly QC files, see CM Database and Production Request
CC4_2P3 - Configuration Code for CER4.1-4.2P3, see CM Database
DATA4_1 - Data SCCR# for Clouds, see CM Database
IMAG - Imager Short Name (VIRS, MODIS)
INST - CERES Instrument Short Name as defined for the hourly PGE (FM1, FM2, FM1+FM2, FM3, FM4, FM3+FM4)
PRODUCTION - Set to "YES" when run on a production computer
PS4_1 - Production Strategy for hourly QC files, see Production Request
PS4_3 - Production Strategy for CER4.1-4.2P3, see Production Request
SAT - Satellite Short Name (TRMM, Terra)
SS4_1 - Sampling Strategy for hourly QC files, see Production Request
SS4_3 - Sampling Strategy for CER4.1-4.2P3, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

NOTE: In sequential processing, CC4_1, PS4_1, and SS4_1 would be the same as CC4_2P3, PS4_3, and SS4_3 respectively.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

13.2.3 Execution Frequency

Daily (1/day/sat) - This PGE is to be processed once per data-day per satellite, a maximum total of 31 days per satellite month, when input is available.

13.2.4 Memory/Disk Space/Time Requirements

Table 13-4. Memory/Disk Space/Time Requirements for CER4.1-4.2P3

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.2P3	Collection 005 Daily QC Processor	IBM-P4	0:00:24	186	2518

13.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 13.3).

13.3 Processor Dependencies (Previous PGEs, Ingest Data)

13.3.1 Input Dataset Name (#1): EQCHG

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

$CERESHOME/clouds/data/out_comp/QA_Reports/ CER_EQCHG_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P4 or PGE4.1-4.1P5 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P4 or PGE4.1-4.1P5, or decision made not to process missing hours.**

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

PGE4.1-4.1P4 or PGE4.1-4.1P5

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **~37**

13.3.2 Input Dataset Name (#2): EQCHB

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

$CERESHOME/clouds/data/out_comp/QA_Reports/ CER_EQCHB_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P4 or PGE4.1-4.1P5 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P4 or PGE4.1-4.1P5, or decision made not to process missing hours.**

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

PGE4.1-4.1P4 or PGE4.1-4.1P5

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): 32

13.3.3 Input Dataset Name (#3): PCFin

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

$CERESHOME/clouds/CER4.1-4.1P4/rcf/pcf/
CER4.1-4.1P4_PCFin_$SS4_1_$PS4_1_$CC4_1P4.YYYYMMDD(00-23)
or
$CERESHOME/clouds/CER4.1-4.1P5/rcf/pcf/
CER4.1-4.1P5_PCFin_$SS4_1_$PS4_1_$CC4_1P5.YYYYMMDD(00-23)

This is determined by the hourly processing leading to running this PGE.

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P4 or CER4.1-4.1P5 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P4 or CER4.1-4.1P5, or decision made not to process missing hours.**

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

PGE4.1-4.1P4, or PGE4.1-4.1P5

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **0.019**

13.3.4 Input Dataset Name (#4): ESCF

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

$CERESHOME/clouds/ancillary/static/SCOOL/
CER_ESCF_SCOOLRegions_011000.YYYYMM

This is determined by the hourly processing leading to running this PGE.

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P4 or CER4.1-4.1P5 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P4 or CER4.1-4.1P5, or decision made not to process missing hours.**

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

CERES Students' Clouds Observations On-Line (S'COOL)

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

d. File Disposition after successful execution: **Retain**

e. Typical file size (mb): **0.003**

13.4 Operating Procedures

The PGE CER4.1-4.2P3 production script, **Run.CER4.1-4.2P3.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.2P3.PCFGen.pl**.

13.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-4.2P3.PCFGen.pl**, requires three command-line arguments: 4-digit year (YYYY), 2-digit month (MM), and 2-digit day (DD)

At the command-line (>) type:

```
> source $CERESHOME/clouds/CER4.1-4.2P3/rcf/CER4.1-4.env X N
> $CERESHOME/clouds/CER4.1-4.2P3/rcf/CER4.1-4.2P3.PCFGen.pl YYYY MM
    DD
```

The following files will be generated in **$CERESHOME/clouds/CER4.1-4.2P3/rcf/pcf/**:

CER4.1-4.2P3_PCFin_$SS4_3_$PS4_3_$CC4_2P3.YYYYMMDD
CER4.1-4.2P3_PCF_$SS4_3_$PS4_3_$CC4_2P3.YYYYMMDD

13.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.2P3.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

```
>unlimit
>cd $CERESHOME/clouds/CER4.1-4.2P3/rcf
>$CERESHOME/clouds/ CER4.1-4.2P3/rcf/Run.CER4.1-4.2P3.pl
        $CERESHOME/clouds/CER4.1-4.2P3/rcf/pcf/
        CER4.1-4.2P3_PCF_$SS4_3_$PS4_3_$CC4_2P3.YYYYMMDD
```

13.4.3 Special Case Considerations

Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

13.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.

At the command-line (>) type:

```
>cd $CERESHOME/clouds/CER4.1-4.2P3/rcf
>$CERESHOME/clouds/CER4.1-4.2P3/rcf/Run.CER4.1-4.Cleanup.pl
        $CERESHOME/clouds/CER4.1-4.2P3/rcf/pcf/
        CER4.1-4.2P3_PCF_$SS4_3_$PS4_3_$CC4_2P3.YYYYMMDD
```

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

13.5 Execution Evaluation

13.5.1 Exit Codes

The processor CER4.1-4.2P3 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 13-5. 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 (see Table 1-1) for assistance.

Table 13-5. Exit Codes for CER4.1-4.2P3

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
Other	Failure	Call responsible persons

13.5.2 Screen Messages

When running the production script, **Run.CER4.1-4.2P3.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.

13.5.3 Log and Status Files Results

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

13.5.3.1 Report Log File: CER4.1-4.2P3_LogReport_$SS4_3_$PS4_3_$CC4_2P3.YYYYMMDD

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

13.5.3.2 Status Log File: CER4.1-4.2P3_LogStatus_$SS4_3_$PS4_3_$CC4_2P3.YYYYMMDD

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

13.5.3.3 User Log File: CER4.1-4.2P3_LogUser_$SS4_3_$PS4_3_$CC4_2P3.YYYYMMDD

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.

13.5.3.4 ShmMem File: CER4.1-4.2P3_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.2P3.

13.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 13.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

13.5.5 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. If one day fails, continue processing the next day.

b. Target PGE Termination

There are no foreseeable Subsystem terminating conditions at this time. If the day fails, continue processing.

13.6 Expected Output Datasets

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process 31 times, maximum, in a 31 day month per satellite.

Table 13-6. Expected Output File Listing for CER4.1-4.2P3

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_EQCDG_$SS4_3_$PS4_3_$CC4_2P3. YYYYMMD(.met) (was CER_EQCD) @($CERESHOME/clouds/data/out_comp/QA_Reports)	m	830	1/day	CER4.1-4.3P2	Archive	No
CER_EQCDB_$SS4_3_$PS4_3_$CC4_2P3. YYYYMMDD (.met) (was CER_EQCDV) @($CERESHOME/clouds/data/out_comp/QA_Reports)	m	32	1/day	CER4.1-4.3P2	Archive	No
CER_EQCDS_$SS4_3_$PS4_3_$CC4_2P3.YYYYMM DD (.met) (was CER_EQCS) @($CERESHOME/clouds/data/out_comp/QA_Reports)	o	0.10	1/day	N/A	Archive, rm	No
CER4.1-4.2P3_PCF_$SS4_3_$PS4_3_$CC4_2P3. YYYYMMDD @($CERESHOME/clouds/CER4.1-4.2P3/rcf/pcf)	m	0.04	1/day	N/A	Archive, rm	No
CER4.1-4.2P3_PCFin_$SS4_3_$PS4_3_$CC4_2P3. YYYYMMDD @($CERESHOME/clouds/CER4.1-4.2P3/rcf/pcf)	m	0.006	1/day	N/A	Archive, rm	No
CER4.1-4.2P3_LogReport_$SS4_3_$PS4_3_$CC4_ 2P3.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.01	1/day	N/A	Archive, rm	No
CER4.1-4.2P3_LogStatus_$SS4_3_$PS4_3_$CC4_ 2P3.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.002	1/day	N/A	Archive, rm	No
CER4.1-4.2P3_LogUser_$SS4_3_$PS4_3_$CC4_ 2P3.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.001	1/day	N/A	Archive, rm	No

a. See Section 13.2.2 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.
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/)
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
NXD - The next Data Day

13.7 Expected Temporary Files/Directories.

The toolkit creates a temporary file.

Table 13-7. Temporary Files Listing for CER4.1-4.2P3

Directory	File Name
/CERES/clouds/runlogs	CER4.1-4.2P3_ShmMem

14.0 PGEName: CER4.1-4.2P4

CER4.1-4.2P4 – Edition4 Daily QC Processor

14.1 PGE Details

14.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

14.1.2 E-mail Distribution List

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

14.1.3 Parent PGE(s)

Table 14-1. Parent PGEs for CER4.1-4.2P4

PGEName	Description
CER4.1-4.1P6	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra/Aqua-MODIS Collection 005 Edition4

14.1.4 Target PGE(s)

Table 14-2. Target PGEs after CER4.1-4.2P4

PGEName	Description
CER4.1-4.3P3	Edition4 Monthly QC Processor

14.2 Operating Environment

14.2.1 Runtime Parameters

Table 14-3. Runtime Parameters for CER4.1-4.2P4

Parameter	Description	Data Type	Valid Values
X	Satellite Index	I(1)	3, 6
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31

14.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC4_1 - Current Configuration Code, see CM Database and Production Request
DATA4_1 - Data SCCR# for Clouds, see CM Database
CPUTYPE - Host Machine type (ppc64 or x86_64)
IMAG - Imager Short Name (VIRS, MODIS)
INST - CERES Instrument Short Name (Aqua, Terra) (used by Mail Summary only)
InputArchiveSS - Base directory of archived input/output files located in the Clouds subsystem data directory
PROD - Set to "YES" when run on a production computer
PS4_1 - Current Production Strategy, see Production Request
SAT - Satellite Short Name (TRMM, Terra)
SS4_1 - Current Sampling Strategy, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database
PGENAME - CER4.1-4.2P4

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

14.2.3 Execution Frequency

Daily (1/day/sat) - This PGE is to be processed once per data-day per satellite, a maximum total of 31 days per satellite month, when input is available.

14.2.4 Memory/Disk Space/Time Requirements

Table 14-4. Memory/Disk Space/Time Requirements for CER4.1-4.2P4

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.2P4	Edition4 Daily QC Processor	IBM-P6	0:02:50	186	123

14.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 14.3).

14.3 Processor Dependencies (Previous PGEs, Ingest Data)

14.3.1 Input Dataset Name (#1): EQCHG

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

$InputArchiveSS/CERES/EQCHG/$SS4_1_$PS4_1/YYYY/MM/ CER_EQCHG_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P6 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6, or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **~39**

14.3.2 Input Dataset Name (#2): EQCHB

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

$InputArchiveSS/CERES/EQCHB/$SS4_1_$PS4_1/YYYY/MM/ CER_EQCHB_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P6 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6, or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): 36.5

14.4 Operating Procedures

The PGE CER4.1-4.2P4 can be run manually from the command line or it can be sent to the SGE via a job submission script. Both methods of operation require first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env**. Running manually requires creating a Process Control File (PCF), which contains the correct file names and paths for the PGE, and passing the PCF on to the PGE production script. A PCF checking script may be called after creating the PCF to check for input files, issue a warning if previous output files already exist, and create a PCF log file. When running via the SGE submission script, the PGE is run for the dates chosen. Each run creates a PCF and PCF log file, verifies inputs and checks for existing outputs, and submits a job to execute the PGE. A cleanup script can be run before either execution method to remove output files from a previous run.

14.4.1 Manual Execution

14.4.1.1 How to Generate the PCF File

The environment script requires one optional command-line argument: 1-digit satellite (X). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The PCF generator, **CER_4.1-4.2P4.PCFGen.pl**, requires three command-line arguments: 4-digit year (YYYY), 2-digit month (MM), and 2-digit day (DD)

At the command-line (>) type:

```
> source $CERESHOME/clouds/CER4.1-4.2P4/rcf/CER4.1-4.env X
> $CERESHOME/clouds/CER4.1-4.2P4/rcf/CER4.1-4.2P4.PCFGen.pl YYYY MM
    DD
```

The following file will be generated in **$CERESHOME/clouds/CER4.1-4.2P4/rcf/pcf/**:

CER4.1-4.2P4_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

The inputs and outputs listed in this PCF file can then be checked by typing:

> $CERESHOME/clouds/CER4.1-4.2P4/rcf/CER4.1-4.2P4.PCFcheck.pl $CERESHOME/clouds/CER4.1-4.2P4/rcf/pcf/CER4.1-4.2P4_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

The following file will be generated in **$CERESHOME/clouds/CER4.1-4.2P4/rcf/pcf/**:
CER4.1-4.2P4_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD.log

14.4.1.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.2P4.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

>$CERESHOME/clouds/CER4.1-4.2P4/rcf/Run.CER4.1-4.2P4.pl $CERESHOME/clouds/CER4.1-4.2P4/rcf/pcf/CER4.1-4.2P4_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

14.4.2 Running with SGE script

The environment script requires the command-line argument digit satellite (X). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The SGE script requires one date argument (YYYYMMDD) or two date range arguments (YYYSMSDS, YYYEMEDE).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.2P4/rcf/CER4.1-4.env X

For a single date type:

> $CERESHOME/clouds/CER4.1-4.2P4/rcf/CER4.1-4.2P4-SGE_Driver.pl -date YYYYMMDD

For a range of dates type:

> $CERESHOME/clouds/CER4.1-4.2P4/rcf/CER4.1-4.2P4-SGE_Driver.pl -start YYYSMSDS -end YYYEMEDE

Before a day is submitted, the PCF generator produces the following files in **$CERESHOME/clouds/CER4.1-4.2P4/rcf/pcf/:**
CER4.1-4.2P4_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD
CER4.1-4.2P4_PCF_$SS4_1_$PS4_2_$CC4_1.YYYYMMDD.log

This log file contains the values of all environment variables, all input files being accessed, and the PCF generator output. If all mandatory input is present, the job will be submitted. Upon successful execution, all output files listed in Table 14-6 will be created for each day submitted.

Below are all available options for running **CER4.1-4.2P4-SGE_Driver.pl:**

[-clean]	Delete any existing outputs that are encountered.
[-platform CPU]	Run the PGE on the platform designated by CPU (i.e., *p6* or *x86*)
[-date YYYYMMDD]	Run the PGe on the data date specified by YYYYMMDD.
[-start YYYYMMDD]	Run the PGE starting on the data date specified by YYYYMMDD.
[-end YYYYMMDD]	Run the PGE stopping on the data date specified by YYYYMMDD.

Example for running a single day:

> CER4.1-4.2P4-SGE_Driver.pl –date 20070809

Example for running a range of days:

> CER4.1-4.2P4-SGE_Driver.pl -start 20070801 -end 20070810

Example for a run given permission to delete any existing output from a previous run:

> CER4.1-4.2P4-SGE_Driver.pl -date 20070809 -clean

Example for a run to be run on a specific platform:

> CER4.1-4.2P4-SGE_Driver.pl -date 20070809 –platform p6

14.4.3 Special Case Considerations

Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

14.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing. The SGE scripts and the manual PCF checking alert the user when this is necessary.

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.2P4/rcf/CER4.1-4.env X
>$CERESHOME/clouds/CER4.1-4.2P4/rcf/Run.CER4.1-4.Cleanup.pl
YYYYMMDD

The cleanup script uses the current environment variable values to identify files to be removed.

14.5 Execution Evaluation

14.5.1 Exit Codes

The processor CER4.1-4.2P4 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 14-5. 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 (see Table 1-1) for assistance.

Table 14-5. Exit Codes for CER4.1-4.2P4

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
198	Failure	No PGE file. Generate PGE file.
200	Failure	PGE error. Check the Log Files and operations email and take the appropriate action (see Appendix B). This includes the case when problems occurred in generating output files.
Other	Failure	Call responsible persons

14.5.2 Screen Messages

When running the production script, **Run.CER4.1-4.2P4.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. For SGE script runs, screen output will go to the SGE log file **$CERESHOME/clouds/sge_logs/CER4.1-4.2P4_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD.o***.

14.5.3 Log and Status Files Results

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

14.5.3.1 Report Log File: $CERESHOME/clouds/runlogs/CER4.1-4.2P4_LogReport_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

14.5.3.2 Status Log File: $CERESHOME/clouds/runlogs/CER4.1-4.2P4_LogStatus_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

14.5.3.3 User Log File: $CERESHOME/clouds/runlogs/CER4.1-4.2P4_LogUser_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

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.

14.5.3.4 ShmMem File: $CERESHOME/clouds/runlogs/CER4.1-4.2P4_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.2P4.

14.5.3.5 SGE 2P4 Log File: $CERESHOME/clouds/sge_logs/CER4.1-4.2P4/CER4.1-4.2P4_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH.o*

The SGE 2P4 Log File contains job submission info, environment values assigned, and all ouput that would have been screen output in a manual run. This file will be created for each daily job submitted on SGE.

14.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 14.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script. The SGE scripts and the manual PCF checking routine should report if there is a need to do a Cleanup or stage a missing input.

14.5.5 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. If one day fails, continue processing the next day.

b. Target PGE Termination

   There are no foreseeable Subsystem terminating conditions at this time. If the day fails, continue processing.

14.6 Expected Output Datasets

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process 31 times, maximum, in a 31 day month per satellite.

Table 14-6. Expected Output File Listing for CER4.1-4.2P4

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_EQCDG_$SS4_1_$PS4_1_$CC4_1. YYYYMMD(.met) (was CER_EQCD) @($InputArchiveSS/EQCDG/$SS4_1_$PS4_1/YYYY/ MM/)	m	936	1/day	CER4.1-4.3P3	Archive	No
CER_EQCDB_$SS4_1_$PS4_1_$CC4_1. YYYYMMDD (.met) (was CER_EQCDV) @($InputArchiveSS/EQCDB/$SS4_1_$PS4_1/YYYY/ MM/)	m	36.5	1/day	CER4.1-4.3P3	Archive	No
CER4.1-4.2P4_PCF_$SS4_1_$PS4_1_$CC4_1. YYYYMMDD @($CERESHOME/clouds/CER4.1-4.2P4/rcf/pcf)	m	0.04	1/day	N/A	Archive, rm	No
CER4.1-4.2P4_PCF_$SS4_1_$PS4_1_$CC4_1. YYYYMMDD.log @($CERESHOME/clouds/CER4.1-4.2P4/rcf/pcf)	m	0.04	1/day	N/A	Archive, rm	No
CER4.1-4.2P4_LogReport_$SS4_1_$PS4_1_$CC4_ 1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.01	1/day	N/A	Archive, rm	No
CER4.1-4.2P4_LogStatus_$SS4_1_$PS4_1_$CC4_ 1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.002	1/day	N/A	Archive, rm	No
CER4.1-4.2P4_LogUser_$SS4_1_$PS4_1_$CC4_1. YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.001	1/day	N/A	Archive, rm	No
CER4.1-4.2P4_$SS4_1_$PS4_1_$CC4_1. YYYYMMDD.o*@($CERESHOME/clouds/ sge_logs/CER4.1-4.2P4) SGE script run only	m	0.002	1/day	N/A	Archive, rm	No

a. See Section 14.2.2 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.
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/)
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
NXD - The next Data Day

14.7 Expected Temporary Files/Directories.

The toolkit creates a temporary file.

Table 14-7. Temporary Files Listing for CER4.1-4.2P4

Directory	File Name
$CERESHOME/clouds/runlogs	CER4.1-4.2P4_ShmMem

15.0 PGEName: CER4.1-4.2P5

CER4.1-4.2P2 – Edition4 Imager Clear Sky Map Update Processor

15.1 PGE Details

15.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

15.1.2 E-mail Distribution List

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

15.1.3 Parent PGE(s)

Table 15-1. Parent PGEs for CER4.1-4.2P5

PGEName	Description
CER4.1-4.1P6	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra-/Aqua-MODIS Collection 005 Edition4

15.1.4 Target PGE(s)

Table 15-2. Target PGEs after CER4.1-4.2P5

PGEName	Description
CER4.1-4.1P6	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor for Terra-/Aqua- Collection 005 Edition4

15.2 Operating Environment

15.2.1 Runtime Parameters

Table 15-3. Runtime Parameters for CER4.1-4.2P5

Parameter	Description	Data Type	Valid Values
X	Satellite Index	I(1)	3, 6
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12
DD	CERDataDateDay	I(2)	01 .. 31
PYYY	Prior CERDataDateYear (Optional	I(4)	>1996
PM	Prior CERDataDateMonth (Optional)	I(2)	01 .. 12
PD	Prior CERDataDateDay (Optional)	I(2)	01 .. 31

15.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC4_1 - Current Configuration Code, see CM Database
CC4_2 - Configuration Code for Clear Sky Map, see CM Database and Production Request
DATA4_1 - Data SCCR# for Clouds, see CM Database
CPUTYPE - Host Machine type (ppc64 or x86_64)
IMAG - Imager Short Name (MODIS)
InputArchiveSS - Base directory of archived input/output files located in the Clouds subsystem data directory
PROD - Set to "YES" when run on a production computer
PS4_1 - Current Production Strategy, see Production Request
PS4_2 - Production Strategy for Clear Sky Map, see Production Request
SAT - Satellite Short Name (Terra)
SS4_1 - Current Sampling Strategy, see Production Request
SS4_2 - Sampling Strategy for Clear Sky Map, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database
PGENAME - CER4.1-4.2P5

NOTE: In sequential processing, CC4_2, PS4_2, and SS4_2 would be the same as CC4_1, PS4_1, and SS4_1 respectively. On the first data day following a configuration code change, CC4_2 would have the configuration code used on the previous day. The other variables would not change.

During nonsequential processing, CC4_2, PS4_2, and SS4_2 will contain the values for the best Clear Sky Map available to use as an input. This information may be supplied through the Production Request or obtained from the responsible person in Table 1-1. These would be different from CC4_1, PS4_1, and SS4_1.

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

15.2.3 Execution Frequency

Daily (1/2days/sat) - This PGE is to be processed on even days plus the 31st of the month per satellite, a maximum total of 16 times per satellite month, when input is available.

15.2.4 Memory/Disk Space/Time Requirements

Table 15-4. Memory/Disk Space/Time Requirements for CER4.1-4.2P5

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.2P5	Imager Clear Sky Update Processor	IBM-P6	0:00:24	186	2518

15.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 15.3).

15.3 Processor Dependencies (Previous PGEs, Ingest Data)

15.3.1 Input Dataset Name (#1): ECS-OA0063SFm

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

$InputArchiveSS/ECS-OA0063SFm/$SS4_2_$PS4_2/YYYY/MM/
CER_ECS-OA0063SFm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD
3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P5

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

$CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/CER_ECS-SOA0063SFm_$SS4_2_StartUp_015000.XXXXMM

Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

15.3.2 Input Dataset Name (#2): ECS-OA0063SFSCm

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

$InputArchiveSS/ECS-OA0063SFSCm/$SS4_2_$PS4_2/YYYY/MM/CER_ECS-OA0063SFSCm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P5

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

$CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/CER_ECS-SOA0063SFSCm_$SS4_2_StartUp_015000.XXXXMM

Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

15.3.3 Input Dataset Name (#3): ECS-OA0160SFm

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

$InputArchiveSS/ECS-OA0160SFm/$SS4_2_$PS4_2/YYYY/MM/CER_ECS-OA0160SFm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

1. Mandatory/Optional: **This file is optional. It will be produced only when Terra is processed.**
2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P5

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

$CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/CER_ECS-SOA0160SFm_$SS4_2_StartUp_015000.XXXXMM

Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

15.3.4 Input Dataset Name (#4): ECS-OA0213SFm

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

$InputArchiveSS/ECS-OA0213SFm/$SS4_2_$PS4_2/YYYY/MM/CER_ECS-OA0213SFm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

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

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

Source PGE: CER4.1-4.2P5

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

$CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/CER_ECS-SOA0213SFm_$SS4_2_StartUp_015000.XXXXMM

Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

15.3.5 Input Dataset Name (#5): ECS-OA0124SCm

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

$InputArchiveSS/ECS-OA0124SCm/$SS4_2_$PS4_2/YYYY/MM/CER_ECS-OA0213SCm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

1. Mandatory/Optional: **This file is optional.**

2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

   Source PGE: CER4.1-4.2P5

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

   $CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/CER_ECS-SOA0124SCm_$SS4_2_StartUp_015000.XXXXMM

   Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

15.3.6 Input Dataset Name (#6): ECS-OA0124SFm

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

   $InputArchiveSS/ECS-OA0124SFm/$SS4_2_$PS4_2/YYYY/MM/CER_ECS-OA0213SFm_$SS4_2_$PS4_2_$CC4_2.YYYYMMDD

1. Mandatory/Optional: **This file is optional.**

2. Time Related Dependency:

   The DataDate must match the Runtime Parameters: YYYY,MM,DD

3. Waiting Period: **TBD**

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

   Source PGE: CER4.1-4.2P5

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

   $CERESHOME/clouds/ancillary/CER4.1-4.1P6/static/CER_ECS/StartUp/$SAT/CER_ECS-SOA0124SFm_$SS4_2_StartUp_015000.XXXXMM

   Immediate if no near-term plans to process the previous day. Use CER4.1-4.1P6.CopyECS.pl explained in Section 9.4.1 to copy ECS files.

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **18.6**

15.3.7 Input Dataset Name (#7): CRHU-WL0063SF

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0063SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)
CER_CRHU-WL0063SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through PGE4.1-4.1P6 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through PGE4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **0.05**

15.3.8 Input Dataset Name (#8): CRHU-WL0063SF

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0063SF_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23)
CER_CRHU-WL0063SF_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through PGE4.1-4.1P6 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **0.05**

15.3.9 Input Dataset Name (#9): CRHU-WL0063SFSC

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0063SFSC_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)
CER_CRHU-WL0063SFSC_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through PGE4.1-4.1P6 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through PGE4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **0.05**

15.3.10 Input Dataset Name (#10): CRHU-WL0063SFSC

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0063SFSC_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23)
CER_CRHU-WL0063SFSC_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through PGE4.1-4.1P6 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb**): 0.05**

15.3.11 Input Dataset Name (#11): CRHU-WL0160SF

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

$InputArchiveSS/CRH_Update/SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0160SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)
CER_CRHU-WL0160SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional. They will only be available when Terra is processed.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P6 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

CER4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb**): 0.05**

15.3.12 Input Dataset Name (#12): CRHU-WL0160SF

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0160SF_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23)
CER_CRHU-WL0160SF_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional. They will only be available when Terra is processed.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through CER4.1-4.1P6 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

CER4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb**): 0.05**

15.3.13 Input Dataset Name (#13): CRHU-WL0213SF

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0213SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)
CER_CRHU-WL0213SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P6 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb**): 0.05**

15.3.14 Input Dataset Name (#14): CRHU-WL0213SF

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0213SF_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23)
CER_CRHU-WL0213SF_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through CER4.1-4.1P6 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **0.05**

15.3.15 Input Dataset Name (#15): CRHU-WL0124SC

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0124SC_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)
CER_CRHU-WL0124SC_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P6 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **0.05**

15.3.16 Input Dataset Name (#16): CRHU-WL0124SC

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0124SC_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23)
CER_CRHU-WL0124SC_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through CER4.1-4.1P6 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **0.05**

15.3.17 Input Dataset Name (#17): CRHU-WL0124SF

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0124SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23)
CER_CRHU-WL0124SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the day must be processed through CER4.1-4.1P6 if the imager data are available.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb**): 0.05**

15.3.18 Input Dataset Name (#18): CRHU-WL0124SF

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

$InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/
CER_CRHU-WL0124SF_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23)
CER_CRHU-WL0124SF_$SS4_1_$PS4_1_$CC4_1.PYYYPMPD(00-23).met

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **Twenty-four hours of the previous day must be processed through CER4.1-4.1P6 if the imager data are available and two days of processing are being done simultaneously.**
3. Waiting Period: **Should hold until entire day has been processed through CER4.1-4.1P6 or decision made not to process missing hours.**

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

PGE4.1-4.1P6

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **0.05**

15.4 Operating Procedures

The PGE CER4.1-4.2P5 is run via the SGE submission script, **CER4.1-4.2P5-SGE_Driver.pl**, which creates a Process Control File (PCF) and PCF log file, verifies inputs and checks for

existing outputs, and submits a job for each chosen day. The PGE can also be run manually by creating a PCF with the PCF generator **CER4.1-4.2P5.PCFGen.pl**, checking I/O with **CER4.1-4.2P5.PCFcheck.pl**, and then executing the production script, **Run.CER4.1-4.2P5.pl**, which references the PCF. Both methods of operation require first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env.** Note that the 4.1-4.2P5 PGE can be run by the 4.1-4.1P6/4.1-4.2P5 2-Day SGE script described in Section 11.4.

15.4.1 Manual Execution

15.4.1.1 How to Generate the PCF File

The environment script requires the command-line arguments 1-digit satellite (X). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The PCF generator, **CER_4.1-4.2P5.PCFGen.pl**, requires three command-line arguments: 4-digit year (YYYY), 2-digit month (MM), and 2-digit day (DD). It also allows optional (but recommended) arguments: 4-digit previous day year (PYYY), 2-digit previous day month (PM), and 2-digit previous day (PD).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.2P5/rcf/CER4.1-4.env X
> $CERESHOME/clouds/CER4.1-4.2P5/rcf/CER4.1-4.2P5.PCFGen.pl YYYY MM DD [PYYY PM PD]

The following file will be generated in **$CERESHOME/clouds/CER4.1-4.2P5/rcf/pcf/**:
CER4.1-4.2P5_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

The inputs and outputs listed in this PCF file can then be checked by typing:

> $CERESHOME/clouds/CER4.1-4.2P5/rcf/CER4.1-4.2P5.PCFcheck.pl $CERESHOME/clouds/CER4.1-4.2P5/rcf/pcf/CER4.1-4.2P5_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

The following file will be created in **$CERESHOME/clouds/**CER4.1-4.2P5/**rcf/pcf/**:
CER4.1-4.2P5_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD.log

15.4.1.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.2P5.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

>$CERESHOME/clouds/CER4.1-4.2P5/rcf/Run.CER4.1-4.2P5.pl $CERESHOME/clouds/CER4.1-4.2P5/rcf/pcf/CER4.1-4.2P5_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

15.4.2 Running with SGE script

The environment script requires the command-line argument digit satellite (X). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The SGE script requires one date argument (YYYYMMDD) or two date range arguments (PYYYPMPD, YYYYMMDD). The range must be 2 consecutive days.

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.2P5/rcf/CER4.1-4.env X

For a single date type:

> $CERESHOME/clouds/CER4.1-4.2P5/rcf/CER4.1-4.2P5-SGE_Driver.pl
-current_date YYYYMMDD

For 2 consecutive dates type:

> $CERESHOME/clouds/CER4.1-4.2P5/rcf/CER4.1-4.2P5-SGE_Driver.pl
-current_date YYYYMMDM -previous_date PYYYPMPD

Before the job is submitted, the PCF generator produces the following files in **$CERESHOME/clouds/CER4.1-4.2P5/rcf/pcf/:**

> CER4.1-4.2P5_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD
> CER4.1-4.2P5_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD.log

This log file contains the values of all environment variables, all input files being accessed, and the PCF generator output. If all mandatory input is present, the job will be submitted. Upon successful execution, all output files listed in Table 14-15-6 will be created.

Below are all available options for running **CER4.1-4.2P5-SGE_Driver.pl:**

[-clean] Delete any existing outputs that are encountered.
[-platform CPU] Run the PGE on the platform designated by CPU (i.e., *p6* or *x86*)
[-current_date YYYYMMDD] Run the PGE for the data date specified by YYYYMMDD.
[-previous_date PYYYPMPD] Run the PGE also using data date specified by PYYYPMPD.

Example for running with a single day of data:

> CER4.1-4.2P5-SGE_Driver.pl –current_date 20070809

Example for running with 2 days of data:

> CER4.1-4.2P5-SGE_Driver.pl –current_date 20070810 –previous_date 20070809

Example for a run given permission to delete any existing output from a previous run:

> CER4.1-4.2P5-SGE_Driver.pl –current_date 20070809 -clean

Example for a run to be run on a specific platform:

> CER4.1-4.2P5-SGE_Driver.pl –current_date 20070809 –platform p6

15.4.3 Special Case Considerations

When processing requires running two days simultaneously, the optional runtime parameter for the prior day can be used. This will use both days of clear sky update files(CRHU) to build the new maps. It should not be run across data month boundaries in this manner. Format for the PCF file generator is:

> source $CERESHOME/clouds/CER4.1-4.2P5/rcf/CER4.1-4.env X
>$CERESHOME/clouds/ CER4.1-4.2P5/rcf/CER4.1-4.2P5.PCFGen.pl YYYY MM DD PYYY PM PD

15.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. The SGE scripts and the manual PCF checking alert the user when this is necessary. It is to be run prior to reprocessing.

At the command-line (>) type:

>$CERESHOME/clouds/CER4.1-4.2P5/rcf/Run.CER4.1-4.Cleanup.pl YYYYMMDD

The cleanup script uses the current environment variable values to identify files to be removed.

15.5 Execution Evaluation

15.5.1 Exit Codes

The processor CER4.1-4.2P5 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in

Table 15-5. 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 (see Table 1-1) for assistance.

Table 15-5. Exit Codes for CER4.1-4.2P5

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
198	Failure	No PGE file. Generate PGE file.
200	Failure	PGE error. Check the Log Files and operations email and take the appropriate action (see Appendix B). This includes the case when problems occurred in generating output files.
Other	Failure	Call responsible persons

15.5.2 Screen Messages

When running the production script, Run.CER4.1-4.2P5.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. For SGE script runs, screen output will go to the SGE log file **$CERESHOME/clouds/sge_logs/CER4.1-4.2P5 _$SS4_1_$PS4_1_$CC4_1.YYYYMMDD.o***.

15.5.3 Log and Status Files Results

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

15.5.3.1 Report Log File: CER4.1-4.2P5_LogReport_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

15.5.3.2 Status Log File: CER4.1-4.2P5_LogStatus_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

15.5.3.3 User Log File: CER4.1-4.2P5_LogUser_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD

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.

15.5.3.4 ShmMem File: CER4.1-4.2P5_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.2P5.

15.5.3.5 SGE Log File: $CERESHOME/clouds/sge_logs/CER4.1-4.2P5/CER4.1-4.2P5_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD.o*

The SGE 2P5 Log File contains job submission info, environment values assigned, and all ouput that would have been screen output in a manual run. This file will be created for each daily job submitted on SGE.

15.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 15.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. The SGE scripts and the manual PCF checking routine should report if there is a need to do a Cleanup or stage missing input. Prior to any reprocessing, please run the Cleanup script.

15.5.5 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. If one day fails, continue processing the next day.

b. Target PGE Termination

   There are no foreseeable Subsystem terminating conditions at this time. If the day fails, continue processing.

15.6 Expected Output Datasets

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process 31 times, maximum, in a 31 day month per satellite.

Table 15-6. Expected Output File Listing for CER4.1-4.2P5

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_ECS-OA0063SFm_$SS4_1_$PS4_1_$CC4_1. yyyymmNXD (.met) @($InputArchiveSS/ECS-OA0063SFm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0063SFm_$SS4_1_$PS4_1_$CC4_1. yyyymmNNXD (.met) @($InputArchiveSS/ECS-OA0063SFm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0160SFm_$SS4_1_$PS4_1_$CC4_1. yyyymmNXD (.met) @($InputArchiveSS/ECS-OA0160SFm/ $SS4_1_$PS4_1/YYYY/MM/) Terra only	o	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0160SFm_$SS4_1_$PS4_1_$CC4_1. yyyymmNNXD (.met) @($InputArchiveSS/ECS-OA0160SFm/ $SS4_1_$PS4_1/YYYY/MM/) Terra only	o	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0213SFm_$SS4_1_$PS4_1_$CC4_1. yyyymmNXD (.met) @($InputArchiveSS/ECS-OA0213SFm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0213SFm_$SS4_1_$PS4_1_$CC4_1. yyyymmNNXD (.met) @($InputArchiveSS/ECS-OA0213SFm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0063SFSCm_$SS4_1_$PS4_1_ CC4_1.yyyymmNXD (.met) @($InputArchiveSS/ECS-OA0063SFSCm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0063SFSCm_$SS4_1_$PS4_1_ CC4_1.yyyymmNNXD (.met) @($InputArchiveSS/ECS-OA0063SFSCm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0124SFm_$SS4_1_$PS4_1_$CC4_1. yyyymmNXD (.met) @($InputArchiveSS/ECS-OA0124SFm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0124SFm_$SS4_1_$PS4_1_$CC4_1. yyyymmNNXD (.met) @($InputArchiveSS/ECS-OA0124SFm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No

Table 15-6. Expected Output File Listing for CER4.1-4.2P5

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_ECS-OA0124SCm_$SS4_1_$PS4_1_$CC4_1. yyyymmNXD (.met) @($InputArchiveSS/ECS-OA0124SCm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER_ECS-OA0124SCm_$SS4_1_$PS4_1_$CC4_1. yyyymmNNXD (.met) @($InputArchiveSS/ECS-OA0124SCm/ $SS4_1_$PS4_1/YYYY/MM/)	m	18.66	Once every 2 days	CER4.1-4.1P6, CER7.2.1P1	Archive	No
CER4.1-4.2P5_PCF_$SS4_1_$PS4_1_$CC4_1. YYYYMMDD@($CERESHOME/clouds/ CER4.1-4.2P5/rcf/pcf)	m	0.04	Once every 2 days	N/A	Archive, rm	No
CER4.1-4.2P5_PCF_$SS4_1_$PS4_1_$CC4_1. YYYYMMDD.log@($CERESHOME/clouds/ CER4.1-4.2P5/rcf/pcf)	m	0.04	Once every 2 days	N/A	Archive, rm	No
CER4.1-4.2P5_LogReport_$SS4_1_$PS4_1_$CC4_ 1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.01	Once every 2 days	N/A	Archive, rm	No
CER4.1-4.2P5_LogStatus_$SS4_1_$PS4_1_$CC4_ 1.YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.002	Once every 2 days	N/A	Archive, rm	No
CER4.1-4.1P6_LogUser_$SS4_1_$PS4_1_$CC4_1. YYYYMMDD@($CERESHOME/clouds/runlogs)	m	0.001	Once every 2 days	N/A	Archive, rm	No
CER4.1-4.2P5_$SS4_1_$PS4_1_$CC4_1. YYYYMMDD.o*@($CERESHOME/clouds/ sge_logs/CER4.1-4.2P5) SGE script run only	m	0.04	Once every 2 days	N/A	Archive, rm	No

a. See Section 15.2.2 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.
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/)
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
NXD - The next Data Day
NNXD - The Next Next Data Day

15.7 Expected Temporary Files/Directories.

The toolkit creates a temporary file.

Table 15-7. Temporary Files Listing for CER4.1-4.2P5

Directory	File Name
$CERESHOME/clouds/runlogs	CER4.1-4.2P5_ShmMem

16.0 PGEName: CER4.1-4.3P1

CER4.1-4.3P1 - Monthly QC Generator

16.1 PGE Details

16.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

16.1.2 E-mail Distribution List

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

16.1.3 Parent PGE(s)

Table 16-1. Parent PGEs for CER4.1-4.3P1

PGEName	Description
CER4.1-4.2P1	Imager Clear Sky Map Update Processor

16.1.4 Target PGE(s)

Table 16-2. Target PGEs after CER4.1-4.3P1

PGEName	Description
None	N/A

16.2 Operating Environment

16.2.1 Runtime Parameters

Table 16-3. Runtime Parameters for CER4.1-4.3P1

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

16.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC4_3P1 - Configuration Code for CER4.1-4.3P1, see CM Database
DATA4_1 - Data SCCR# for Clouds, see CM Database
IMAG - Imager Short Name (VIRS, MODIS)
PS4_1 - Production Strategy for CER4.1-4.2P1, see Production Request
SAT - Satellite Short Name (TRMM, Terra)
SS4_1 - Sampling Strategy for CER4.1-4.2P1, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

16.2.3 Execution Frequency

Monthly (1/month) - This PGE is to be processed once per data-month when input is available.

16.2.4 Memory/Disk Space/Time Requirements

Table 16-4. Memory/Disk Space/Time Requirements for CER4.1-4.3P1

PGE Number	PGE Name	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.3P1	Monthly QC Processor	0:05:00	186	335

16.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 16.3).

16.3 Processor Dependencies

16.3.1 Input Dataset Name (#1): EQCDG (was CER_EQCD)

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

$CERESHOME/clouds/data/out_comp/QA_Reports/ CER_EQCDG_$SS4_1_$PS4_1_$CC4_3P1.YYYYMM(01-31)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **All days of the month must be processed through CER4.1-4.2P1 if the imager data are available.**
3. Waiting Period: **Hold until entire month has been processed through CER4.1-4.2P1 or decision made not to process missing data.**

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

PGE4.1-4.2P1

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **~115**

16.3.2 Input Dataset Name (#2): EQCDB (was CER_EQCDV)

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

$CERESHOME/clouds/data/out_comp/QA_Reports/ CER_EQCDB_$SS4_1_$PS4_1_$CC4_3P1.YYYYMM(01-31)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **All days of the month must be processed through CER4.1-4.2P1 if the imager data are available.**
3. Waiting Period: **Hold until entire month has been processed through CER4.1-4.2P1 or decision made not to process missing hours.**

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

PGE4.1-4.2P1

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **18.76**

16.3.3 Input Dataset Name (#2): EQCDGLT(xx)

These files are listed in the PCF file for offline purposes. Please ignore.

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

The PGE CER4.1-4.3P1 production script, **Run.CER4.1-4.3P1**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.3P1.PCFGen**.

16.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-4.3P1.PCFGen**, requires two command-line arguments: 4-digit year (YYYY), 2-digit month (MM).

At the command-line (>) type:

> source $CERESHOME/clouds/bin/CER4.1-4.env X N
> $CERESHOME/clouds/bin/CER4.1-4.3P1.PCFGen YYYY MM

The following files will be generated in **$CERESHOME/clouds/rcf/**:
CER4.1-4.3P1_PCFin_$SS4_1_$PS4_1_$CC4_3P1.YYYYMM
CER4.1-4.3P1_PCF_$SS4_1_$PS4_1_$CC4_3P1.YYYYMM

16.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.3P1**, followed by the PCF file name including directory.

At the command-line (>) type:

>cd $CERESHOME/clouds/bin
>$CERESHOME/clouds/bin/Run.CER4.1-4.3P1
$CERESHOME/clouds/rcf/CER4.1-
4.3P1_PCF_$SS4_1_$PS4_1_$CC4_3P1.YYYYMM

16.4.3 Special Case Considerations

Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

16.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.

At the command-line (>) type:

>cd $CERESHOME/clouds/bin
>$CERESHOME/clouds/bin/Run.CER4.1-4.Cleanup
$CERESHOME/clouds/rcf/CER4.1-
4.3P1_PCF_$SS4_1_$PS4_1_$CC4_3P1.YYYYMM

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

16.5 Execution Evaluation

16.5.1 Exit Codes

The processor CER4.1-4.3P1 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 16-5. 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 (see Table 1-1) for assistance.

Table 16-5. Exit Codes for CER4.1-4.3P1

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
Other	Failure	Call responsible persons

16.5.2 Screen Messages

When running the production script, Run.CER4.1-4.3P1, 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.

16.5.3 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/clouds/data/runlogs**.

16.5.3.1 Report Log File: CER4.1-4.3P1_LogReport_$SS4_1_$PS4_1_$CC4_3P1.YYYYMM

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

16.5.3.2 Status Log File: CER4.1-4.3P1_LogStatus_$SS4_1_$PS4_1_$CC4_3P1.YYYYMM

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

16.5.3.3 User Log File: CER4.1-4.3P1_LogUser_$SS4_1_$PS4_1_$CC4_3P1.YYYYMM

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.

16.5.3.4 ShmMem File: CER4.1-4.3P1_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.3P1.

16.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 16.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

16.5.5 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

There are no target PGEs to this PGE.

16.6 Expected Output Datasets

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

Table 16-6. Expected Output File Listing for CER4.1-4.3P1

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_EQCMG_$SS4_1_$PS4_1_$CC4_3P1. YYYYMM(.met) @($CERESHOME/clouds/data/out_comp/QA_Reports)	m	315.7	1/mon/sat	N/A	Archive, rm	No
CER_EQCMB_$SS4_1_$PS4_1_$CC4_3P1. YYYYMM (.met) @($CERESHOME/clouds/data/out_comp/QA_Reports)	m	18.76	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P1_PCF_$SS4_1_$PS4_1_$CC4_3P1. YYYYMM@($CERESHOME/clouds/rcf)	m	0.03	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P1_PCFin_$SS4_1_$PS4_1_$CC4_3P1. YYYYMM@($CERESHOME/clouds/rcf)	m	0.004	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P1_LogReport_$SS4_1_$PS4_1_$CC4_3P1. YYYYMM@($CERESHOME/clouds/data/runlogs)	m	0.002	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P1_LogStatus_$SS4_1_$PS4_1_$CC4_3P1. YYYYMM@($CERESHOME/clouds/data/runlogs)	m	0.003	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P1_LogUser_$SS4_1_$PS4_1_$CC4_3P1. YYYYMM@($CERESHOME/clouds/data/runlogs)	m	0.002	1/mon/sat	N/A	Archive, rm	No

a. See Section 16.2.2 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.
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/)
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
NXD - The next Data Day

16.7 Expected Temporary Files/Directories.

There are no temporary files with this PGE.

17.0 PGEName: CER4.1-4.3P2

CER4.1-4.3P2 - Collection 005 Monthly QC Generator

17.1 PGE Details

17.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

17.1.2 E-mail Distribution List

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

17.1.3 Parent PGE(s)

Table 17-1. Parent PGEs for CER4.1-4.3P2

PGEName	Description
CER4.1-4.2P3	Collection 005 Daily QC Processor

17.1.4 Target PGE(s)

Table 17-2. Target PGEs after CER4.1-4.3P2

PGEName	Description
None	N/A

17.2 Operating Environment

17.2.1 Runtime Parameters

Table 17-3. Runtime Parameters for CER4.1-4.3P2

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

17.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC4_2P3 - Configuration Code for CER4.1-4.2P3, see CM Database
CC4_3P2 - Configuration Code for CER4.1-4.3P2, see CM Database
DATA4_1 - Data SCCR# for Clouds, see CM Database
IMAG - Imager Short Name (VIRS, MODIS)
PRODUCTION - Set to "YES" when run on a production computer
PS4_1 - Production Strategy for CER4.1-4.2P3, see Production Request
PS4_3 - Production Strategy for CER4.1-4.3P2, see Production Request
SAT - Satellite Short Name (TRMM, Terra)
SS4_1 - Sampling Strategy for CER4.1-4.2P3, see Production Request
SS4_3 - Sampling Strategy for CER4.1-4.3P2, see Production Request
SW4_1 - Software SSCR # for Clouds, see CM Database

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

17.2.3 Execution Frequency

Monthly (1/month) - This PGE is to be processed once per data-month when input is available.

17.2.4 Memory/Disk Space/Time Requirements

Table 17-4. Memory/Disk Space/Time Requirements for CER4.1-4.3P2

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.3P2	Collection 005 Monthly QC Processor	IBM-P4	0:05:00	186	27139

17.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 17.3).

17.3 Processor Dependencies

17.3.1 Input Dataset Name (#1): EQCDG

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

$CERESHOME/clouds/data/out_comp/QA_Reports/ CER_EQCDG_$SS4_1_$PS4_1_$CC4_2P3.YYYYMM(01-31)

1. Mandatory/Optional: **This file is optional.**

2. Time Related Dependency: **All days of the month must be processed through CER4.1-4.2P3 if the imager data are available.**
3. Waiting Period: **Hold until entire month has been processed through CER4.1-4.2P3 or decision made not to process missing data.**

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

PGE4.1-4.2P3

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **~830**

17.3.2 Input Dataset Name (#2): EQCDB (was CER_EQCDV)

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

$CERESHOME/clouds/data/out_comp/QA_Reports/ CER_EQCDB_$SS4_1_$PS4_1_$CC4_2P3.YYYYMM(01-31)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **All days of the month must be processed through CER4.1-4.2P3 if the imager data are available.**
3. Waiting Period: **Hold until entire month has been processed through CER4.1-4.2P3 or decision made not to process missing hours.**

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

PGE4.1-4.2P3

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (mb): **32**

17.3.3 Input Dataset Name (#2): EQCDGLT(xx)

These files are listed in the PCF file for offline purposes. Please ignore.

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

The PGE CER4.1-4.3P2 production script, **Run.CER4.1-4.3P2.pl**, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF can be created by first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env** then executing the PCF generator **CER4.1-4.3P2.PCFGen.pl**.

17.4.1 How to Generate the PCF File

The environment script requires two optional command-line arguments: 1-digit satellite (X) and character string prefix to production strategy (N). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The prefix is usually Subset that generates special processing where only data in CERES validation regions is used. The PCF generator, **CER_4.1-**

4.3P2.PCFGen.pl, requires two command-line arguments: 4-digit year (YYYY), 2-digit month (MM).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.3P2/rcf/CER4.1-4.env X N
> $CERESHOME/clouds/CER4.1-4.3P2/rcf/CER4.1-4.3P2.PCFGen.pl YYYY MM

The following files will be generated in **$CERESHOME/clouds/CER4.1-4.3P2/rcf/pcf/**:
CER4.1-4.3P2_PCFin_$SS4_3_$PS4_3_$CC4_3P2.YYYYMM
CER4.1-4.3P2_PCF_$SS4_3_$PS4_3_$CC4_3P2.YYYYMM

17.4.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.3P2.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

unlimit
>cd $CERESHOME/clouds/CER4.1-4.3P2/rcf
>$CERESHOME/clouds/CER4.1-4.3P2/rcf/Run.CER4.1-4.3P2.pl
$CERESHOME/clouds/CER4.1-4.3P2/rcf/pcf/CER4.1-4.3P2_PCF_$SS4_3_$PS4_3_$CC4_3P2.YYYYMM

17.4.3 Special Case Considerations

Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

17.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. It is to be run prior to reprocessing.

At the command-line (>) type:

>cd $CERESHOME/clouds/CER4.1-4.3P2/rcf
>$CERESHOME/clouds/CER4.1-4.3P2/rcf/Run.CER4.1-4.Cleanup.pl
$CERESHOME/clouds/CER4.1-4.3P2/rcf/pcf/CER4.1-4.3P2_PCF_$SS4_3_$PS4_3_$CC4_3P2.YYYYMM

The cleanup script uses the PCFile from the PCFile Generator to identify files to be removed.

17.5 Execution Evaluation

17.5.1 Exit Codes

The processor CER4.1-4.3P2 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 17-5. 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 (see Table 1-1) for assistance.

Table 17-5. Exit Codes for CER4.1-4.3P2

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
Other	Failure	Call responsible persons

17.5.2 Screen Messages

When running the production script, **Run.CER4.1-4.3P2.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.

17.5.3 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/clouds/runlogs**.

17.5.3.1 Report Log File: CER4.1-4.3P2_LogReport_$SS4_3_$PS4_3_$CC4_3P2.YYYYMM

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

17.5.3.2 Status Log File: CER4.1-4.3P2_LogStatus_$SS4_3_$PS4_3_$CC4_3P2.YYYYMM

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

17.5.3.3 User Log File: CER4.1-4.3P2_LogUser_$SS4_3_$PS4_3_$CC4_3P2.YYYYMM

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.

17.5.3.4 ShmMem File: CER4.1-4.3P2_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.3P2.

17.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 17.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. Prior to any reprocessing, please run the Cleanup script.

17.5.5 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

   There are no target PGEs to this PGE.

17.6 Expected Output Datasets

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

Table 17-6. Expected Output File Listing for CER4.1-4.3P2

File Name[a]/Directory	m/o	File Size (mb)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_EQCMG_$SS4_3_$PS4_3_$CC4_3P2. YYYYMM(.met) @($CERESHOME/clouds/data/out_comp/ QA_Reports)	m	385	1/mon/sat	N/A	Archive, rm	No
CER_EQCMB_$SS4_3_$PS4_3_$CC4_3P2. YYYYMM (.met) @($CERESHOME/clouds/data/out_comp/ QA_Reports)	m	32	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P2_PCF_$SS4_3_$PS4_3_$CC4_3P2. YYYYMM @($CERESHOME/clouds/CER4.1-4.3P2/rcf/pcf)	m	0.03	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P2_PCFin_$SS4_3_$PS4_3_$CC4_3P2. YYYYMM @($CERESHOME/clouds/CER4.1-4.3P2/rcf/pcf)	m	0.004	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P2_LogReport_$SS4_3_$PS4_3_ $CC4_3P2.YYYYMM @($CERESHOME/clouds/runlogs)	m	0.002	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P2_LogStatus_$SS4_3_$PS4_3_ $CC4_3P2.YYYYMM @($CERESHOME/clouds/runlogs)	m	0.003	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P2_LogUser_$SS4_3_$PS4_3_ $CC4_3P2.YYYYMM @($CERESHOME/clouds/runlogs)	m	0.002	1/mon/sat	N/A	Archive, rm	No

a. See Section 17.2.2 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.
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/)
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
NXD - The next Data Day

17.7 Expected Temporary Files/Directories.

There are no temporary files with this PGE.

18.0 PGEName: CER4.1-4.3P3

CER4.1-4.3P3 – Edition4 Monthly QC Generator

18.1 PGE Details

18.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

18.1.2 E-mail Distribution List

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

18.1.3 Parent PGE(s)

Table 18-1. Parent PGEs for CER4.1-4.3P3

PGEName	Description
CER4.1-4.2P4	Edition4 Daily QC Processor

18.1.4 Target PGE(s)

Table 18-2. Target PGEs after CER4.1-4.3P3

PGEName	Description
None	N/A

18.2 Operating Environment

18.2.1 Runtime Parameters

Table 18-3. Runtime Parameters for CER4.1-4.3P3

Parameter	Description	Data Type	Valid Values
X	Satellite Index	I(1)	3, 6
YYYY	CERDataDateYear	I(4)	>1996
MM	CERDataDateMonth	I(2)	01 .. 12

18.2.2 Environment Script Requirements

One environment script, named '**CER4.1-4.env**', is required and contains the following parameters:

CC4_1	-	Current Configuration Code, see CM Database
DATA4_1	-	Data SCCR# for Clouds, see CM Database
CPUTYPE	-	Host Machine type (ppc64 or x86_64)
IMAG	-	Imager Short Name (VIRS, MODIS)
InputArchiveSS	-	Base directory of archived input/output files located in the Clouds subsystem data directory
PROD	-	Set to "YES" when run on a production computer
PS4_1	-	Current Production Strategy, see Production Request
SAT	-	Satellite Short Name (TRMM, Terra)
SS4_1	-	Current Sampling Strategy, see Production Request
SW4_1	-	Software SSCR # for Clouds, see CM Database
PGENAME	-	CER4.1-4.3P3

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

18.2.3 Execution Frequency

Monthly (1/month) - This PGE is to be processed once per data-month when input is available.

18.2.4 Memory/Disk Space/Time Requirements

Table 18-4. Memory/Disk Space/Time Requirements for CER4.1-4.3P3

PGE Number	PGE Name	Hardware	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.3P3	Edition4 Monthly QC Processor	IBM-P6	0:05:00	186	27139

18.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 18.3).

18.3 Processor Dependencies

18.3.1 Input Dataset Name (#1): EQCDG

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

$InputArchiveSS/CERES/EQCDG/$SS4_1_$PS4_1/YYYY/MM/ CER_EQCDG_$SS4_1_$PS4_1_$CC4_1.YYYYMM(01-31)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **All days of the month must be processed through CER4.1-4.2P4 if the imager data are available.**
3. Waiting Period: **Hold until entire month has been processed through CER4.1-4.2P4 or decision made not to process missing data.**

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

PGE4.1-4.2P4

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **~935**

18.3.2 Input Dataset Name (#2): EQCDB (was CER_EQCDV)

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

$InputArchiveSS/CERES/EQCDB/$SS4_1_$PS4_1/YYYY/MM/ CER_EQCDB_$SS4_1_$PS4_1_$CC4_1.YYYYMM(01-31)

1. Mandatory/Optional: **This file is optional.**
2. Time Related Dependency: **All days of the month must be processed through CER4.1-4.2P4 if the imager data are available.**
3. Waiting Period: **Hold until entire month has been processed through CER4.1-4.2P4 or decision made not to process missing hours.**

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

PGE4.1-4.2P4

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

d. File Disposition after successful execution: **Do not remove**

e. Typical file size (mb): **36.5**

18.3.3 Input Dataset Name (#2): EQCDGLT(xx)

These files are listed in the PCF file for offline purposes. Please ignore.

18.4 Operating Procedures

The PGE CER4.1-4.3P3 is best run via the SGE submission script , **CER4.1-4.3P3-SGE_Driver.pl**, which creates a Process Control File (PCF) and PCF log file, verifies inputs and checks for existing outputs, and submits a job for each chosen day. The PGE can also be run manually by creating a PCF with the PCF generator **CER4.1-4.3P3.PCFGen.pl**, checking I/O with **CER4.1-4.3P3.PCFcheck.pl**, and then executing the production script, **Run.CER4.1-4.3P3.pl**, which references the PCF. Both methods of operation require first sourcing the cloud retrieval-specific environment script, **CER4.1-4.env**.

18.4.1 Manual Execution

18.4.1.1 How to Generate the PCF File

The environment script requires the command-line arguments 1-digit satellite (X). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The PCF generator, **CER_4.1-4.3P3.PCFGen.pl**, requires two command-line arguments: 4-digit year (YYYY), 2-digit month (MM).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.3P3/rcf/CER4.1-4.env X
> $CERESHOME/clouds/CER4.1-4.3P3/rcf/CER4.1-4.3P3.PCFGen.pl YYYY MM

The following file will be generated in **$CERESHOME/clouds/rcf/**:
CER4.1-4.3P3_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMM

The inputs and outputs listed in this PCF file can then be checked by typing:

> $CERESHOME/clouds/CER4.1-4.3P3/rcf/CER4.1-4.3P3.PCFcheck.pl
$CERESHOME/clouds/CER4.1-4.3P3/rcf/pcf/CER4.1-4.3P3_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMM

The following file will be created in **$CERESHOME/clouds/CER4.1-4.3P3/rcf/pcf/**:
CER4.1-4.3P3_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMM.log

18.4.1.2 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.3P3.pl**, followed by the PCF file name including directory.

At the command-line (>) type:

>$CERESHOME/clouds/CER4.1-4.3P3/rcf/Run.CER4.1-4.3P3.pl
$CERESHOME/clouds/CER4.1-4.3P3/rcf/pcf/CER4.1-4.3P3_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMM

18.4.2 Running with SGE script

The environment script requires the command-line argument digit satellite (X). The default satellite is TRMM, 1-NOAA09, 2-TRMM, 3-Terra, and 6-Aqua. The SGE script requires one date argument (YYYYMM) or two date range arguments (YYYSMS, YYYEME).

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.3P3/rcf/CER4.1-4.env X

For a single date type:

> $CERESHOME/clouds/CER4.1-4.3P3/rcf/CER4.1-4.3P3-SGE_Driver.pl -date YYYYMM

For a range of dates type:

> $CERESHOME/clouds/CER4.1-4.3P3/rcf/CER4.1-4.3P3-SGE_Driver.pl -start YYYSMS -end YYYEME

Before the job is submitted, the PCF generator produces the following files in **$CERESHOME/clouds/CER4.1-4.13P3/rcf/pcf/:**

CER4.1-4.3P3_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMM
CER4.1-4.3P3_PCF_$SS4_1_$PS4_1_$CC4_1.YYYYMM.log

This log file contains the values of all environment variables, all input files being accessed, and the PCF generator output. If all mandatory input is present, the job will be submitted. Upon successful execution, all output files listed in Table 18-6 will be created for each hour submitted.

Below are all available options for running **CER4.1-4.3P3-SGE_Driver.pl:**

[-clean]	Delete any existing outputs that are encountered.
[-platform CPU]	Run the PGE on the platform designated by CPU (i.e., *p6* or *x86*)
[-date YYYYMM]	Run the PGE on the data month specified by YYYYMM.
[-start YYYYMM]	Run the PGE starting on the data month specfied by YYYYMM.
[-end YYYYMM]	Run the PGE stopping on the data month specified by YYYYMM.

Example for running a single month:

> CER4.1-4.3P3-SGE_Driver.pl –date 200708

Example for running a range of months:

> CER4.1-4.3P3-SGE_Driver.pl -start 200701 -end 200712

Example for a run given permission to delete any existing output from a previous run:

> CER4.1-4.3P3-SGE_Driver.pl -date 200708 -clean

Example for a run to be run on a specific platform:

> CER4.1-4.3P3-SGE_Driver.pl -date 200708 –platform p6

18.4.3 Special Case Considerations

Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

18.4.4 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 4.1 through 4.4 software. The output from previous runs must be removed before reprocessing. A cleanup script has been provided as a convenience. The SGE scripts and the manual PCF checking alert the user when this is necessary. It is to be run prior to reprocessing.

At the command-line (>) type:

> source $CERESHOME/clouds/CER4.1-4.3P3/rcf/CER4.1-4.env X
>$CERESHOME/clouds/CER4.1-4.3P3/rcf/Run.CER4.1-4.Cleanup.pl YYYYMM

The cleanup script uses the current environment variable values to identify files to be removed.

18.5 Execution Evaluation

18.5.1 Exit Codes

The processor CER4.1-4.3P3 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 18-5. 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 (see Table 1-1) for assistance.

Table 18-5. Exit Codes for CER4.1-4.3P3

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
198	Failure	No PGE file. Generate PGE file.
200	Failure	PGE error. Check the Log Files and operations email and take the appropriate action (see Appendix B). This includes the case when problems occurred in generating output files.
Other	Failure	Call responsible persons

18.5.2 Screen Messages

When running the production script, Run.CER4.1-4.3P3.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. For SGE script runs, screen output will go to the SGE log file **$CERESHOME/clouds/sge_logs/CER4.1-4.3P3_$SS4_1_$PS4_1_$CC4_1.YYYYMM.o***.

18.5.3 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/clouds/runlogs**.

18.5.3.1 Report Log File: CER4.1-4.3P3_LogReport_$SS4_1_$PS4_1_$CC4_1.YYYYMM

The log report file contains informational messages for the PGE. They indicate progression through critical steps of the code or use of contingency code that will handle data problems. They point to algorithms that were executing when program problems occur. A comprehensive list of these messages, that can be generated during the execution of the PGE, is contained in Appendix B.

18.5.3.2 Status Log File: CER4.1-4.3P3_LogStatus_$SS4_1_$PS4_1_$CC4_1.YYYYMM

The Status Log File contains all messages created by the Toolkit and fatal processing messages. 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.

18.5.3.3 User Log File: CER4.1-4.3P3_LogUser_$SS4_1_$PS4_1_$CC4_1.YYYYMM

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.

18.5.3.4 ShmMem File: CER4.1-4.3P3_ShmMem

The ShmMem File exists to satisfy the Toolkit requirements and is not actively used by CER4.1-4.3P3.

18.5.3.5 SGE Log File:$CERESHOME/clouds/sge_logs/CER4.1-4.3P3/CER4.1-4.3P3_$SS4_1_$PS4_1_$CC4_1.YYYYMM.o*

The SGE 3P3 Log File contains job submission info, environment values assigned, and all ouput that would have been screen output in a manual run.

18.5.4 Solutions to Possible Problems

The most likely problems encountered are missing input or ancillary data files, or existing output files. These should be identified in the Status Log File. These errors could also be linked to missing .met files or other problems related to a temporary file needed to process metadata. As mentioned in Section 18.4.4, all output files are opened with Status = NEW in Subsystem 4.1 software. The SGE scripts and the manual PCF checking routine should report if there is a need to do a Cleanup or stage missing input. Prior to any reprocessing, please run the Cleanup script.

18.5.5 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

There are no target PGEs to this PGE.

18.6 Expected Output Datasets

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

Table 18-6. Expected Output File Listing for CER4.1-4.3P3

File Name[a]/Directory	m/o	File Size (mb)	Freq/PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_EQCMG_$SS4_1_$PS4_1_$CC4_1. YYYYMM(.met) @($InputArchiveSS/EQCMG/$SS4_1_$PS4_1/YYYY/ MM/)	m	440	1/mon/sat	N/A	Archive, rm	No
CER_EQCMB_$SS4_1_$PS4_1_$CC4_1. YYYYMM (.met) @($InputArchiveSS/EQCMB/$SS4_1_$PS4_1/YYYY/ MM/)	m	36.5	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P3_PCF_$SS4_1_$PS4_1_$CC4_1. YYYYMM @($CERESHOME/clouds/ CER4.1-4.3P3/rcf/pcf)	m	0.03	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P3_PCF_$SS4_1_$PS4_1_$CC4_1. YYYYMM.log @($CERESHOME/clouds/ CER4.1-4.3P3/rcf/pcf)	m	0.03	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P3_LogReport_$SS4_1_$PS4_1_$CC4_1. YYYYMM @($CERESHOME/clouds/runlogs)	m	0.002	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P3_LogStatus_$SS4_1_$PS4_1_$CC4_1. YYYYMM @($CERESHOME/clouds/runlogs)	m	0.003	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P3_LogUser_$SS4_1_$PS4_1_$CC4_1. YYYYMM@($CERESHOME/clouds/runlogs)	m	0.002	1/mon/sat	N/A	Archive, rm	No
CER4.1-4.3P3_$SS4_1_$PS4_1_$CC4_1. YYYYMM.o* @($CERESHOME/clouds/sge_logs/CER4.1-4.3P3) SGE script only	m	0.03	1/mon/sat	N/A	Archive, rm	No

a. See Section 18.2.2 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.
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/)
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
NXD - The next Data Day

18.7 Expected Temporary Files/Directories.

There are no temporary files with this PGE.

18.8 Additional Files for Removal

Once CER4.1-4.3P3 has completed creating Monthly QC files, all remaining output files from the Clouds subsystem can be removed. The hourly QC from CER4.1-4.1P6 and daily QC from CER4.1-4.2P4 can be removed. CRHU files output from CER4.1-4.1P6 and ECS files output from CER4.1-4.2P5 can be removed. Any remaining PCF files can be removed. Scratch files may also be removed only if there are no Aqua or Terra jobs currently processing.

Table 18-7. Additional Files for Removal

Files to remove from previous PGEs	Creating PGE	Destination
CER_EQCHG_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/EQCHG/$SS4_1_$PS4_1/YYYY/MM/) For all DDHH of YYYYMM	CER4.1-4.1P6	rm
CER_EQCHB_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/EQCHB/$SS4_1_$PS4_1/YYYY/MM/) For all DDHH of YYYYMM	CER4.1-4.1P6	rm
CER4.1-4.1P6_PCF_$SS4_4_$PS4_1_$CC4_1.YYYYMMDDHH (.log) @($CERESHOME/clouds/CER4.1-4.1P6/rcf/pcf) For all DDHH of YYYYMM	CER4.1-4.1P6	rm
Pc[n…n] @ $CERESHOME/clouds/data/scr (Do not remove if any CER4.1-4.1P6 process is actively running in $CERESHOME/clouds)	CER4.1-4.1P6	rm
CER_EQCDG_$SS4_1_$PS4_1_$CC4_1.YYYYMMD(.met) (was CER_EQCD) @($InputArchiveSS/EQCDG/$SS4_1_$PS4_1/YYYY/MM/) For all DD of YYYYMM	CER4.1-4.2P4	rm
CER_EQCDB_$SS4_1_$PS4_1_$CC4_1.YYYYMMDD (.met) (was CER_EQCDV) @($InputArchiveSS/EQCDB/$SS4_1_$PS4_1/YYYY/MM/) For all DD of YYYYMM	CER4.1-4.2P4	rm
CER_CRHU-WL0063SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/) For all DDHH of YYYMM	CER4.1-4.1P6	rm
CER_CRHU-WL0063SFSC_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/) For all DDHH of YYYMM	CER4.1-4.1P6	rm
CER_CRHU-WL0160SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/) (Terra only) For all DDHH of YYYMM	CER4.1-4.1P6	rm
CER_CRHU-WL0213SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/) For all DDHH of YYYMM	CER4.1-4.1P6	rm
CER_CRHU-WL0124SC_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/) For all DDHH of YYYMM	CER4.1-4.1P6	rm

Table 18-7. Additional Files for Removal

Files to remove from previous PGEs	Creating PGE	Destination
CER_CRHU-WL0124SF_$SS4_1_$PS4_1_$CC4_1.YYYYMMDDHH (.met) @($InputArchiveSS/CRH_Update/$SS4_1_$PS4_1/YYYY/MM/) For all DDHH of YYYMM	CER4.1-4.1P6	rm
CER_ECS-OA0063SFm_$SS4_1_$PS4_1_$CC4_1.YYYMMDD (.met) @($InputArchiveSS/ECS-OA0063SFm/$SS4_1_$PS4_1/YYYY/MM/) For all DD of YYYMM (including next 2 days)	CER4.1-4.2P5	rm
CER_ECS-OA0063SFSCm_$SS4_1_$PS4_1_CC4_1.YYYMMDD (.met) @($InputArchiveSS/ECS-OA0063SFSCm/$SS4_1_$PS4_1/YYYY/MM/) For all DD of YYYMM (including next 2 days)	CER4.1-4.2P5	rm
CER_ECS-OA0160SFm_$SS4_1_$PS4_1_$CC4_1.YYYMMDD (.met) @($InputArchiveSS/ECS-OA0160SFm/$SS4_1_$PS4_1/YYYY/MM/) Terra only For all DD of YYYMM (including next 2 days)	CER4.1-4.2P5	rm
CER_ECS-OA0213SFm_$SS4_1_$PS4_1_$CC4_1.YYYMMDD (.met) @($InputArchiveSS/ECS-OA0213SFm/$SS4_1_$PS4_1/YYYY/MM/) For all DD of YYYMM (including next 2 days)	CER4.1-4.2P5	rm
CER_ECS-OA0124SCm_$SS4_1_$PS4_1_CC4_1.YYYMMDD (.met) @($InputArchiveSS/ECS-OA0214SCm/$SS4_1_$PS4_1/YYYY/MM/) For all DD of YYYMM (including next 2 days)	CER4.1-4.2P5	rm
CER_ECS-OA0124SFm_$SS4_1_$PS4_1_CC4_1.YYYMMDD (.met) @($InputArchiveSS/ECS-OA0214SFm/$SS4_1_$PS4_1/YYYY/MM/) For all DD of YYYMM (including next 2 days)	CER4.1-4.2P5	rm

19.0 PGEName: CER4.1-4.4P1

CER4.1-4.4P1 - Subset Imager Data

19.1 PGE Details

19.1.1 Responsible Persons

Responsible persons can be obtained from the primary contact listed in Table 1-1.

19.1.2 E-mail Distribution List

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

19.1.3 Parent PGE(s)

N/A

19.1.4 Target PGE(s)

Table 19-1. Target PGEs after CER4.1-4.4P1

PGEName	Description
CER4.1-4.1P1	Imager Clear-Sky Determination and Cloud Detection, Cloud Pressure Retrieval, Cloud Optical property Retrieval, and Convolution of Imager Cloud Properties with CERES Footprint Point Spread Function Subsystem 4.1 through 4.4 Main Processor

19.2 Operating Environment

19.2.1 Runtime Parameters

Table 19-2. Runtime Parameters for CER4.1-4.4P1

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

19.2.2 Environment Script Requirements

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

Also see Appendix C of this document for a detailed description of the Subsystem specific environment.

19.2.3 Execution Frequency

Monthly (1/month) - This PGE is to be processed once per data-month when input is available.

19.2.4 Memory/Disk Space/Time Requirements

Table 19-3. Memory/Disk Space/Time Requirements for CER4.1-4.4P1

PGE Number	PGE Name	Total Run Time (HR:MN:SEC)	Memory (MB)	Disk Storage (MB)
CER4.1-4.4P1	Subset Imager Data	0:05:20	97	15

19.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available (see Section 19.3).

19.3 Processor Dependencies

19.3.1 Input Dataset Name (#1): ECID

19.3.1.1 VIRS Data

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

   $CERESHOME/clouds/data/input/VIRS/
   1B01.YYMMDD.OOOO.CC_V.HDF, and maybe
   1B01.YYMMDD.OOOP.CC_V.HDF

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

      The DataDate must match the Runtime Parameters: YYYY,MM,DD
      OOOO represents the orbit number of the first VIRS file, OOOP represents the next orbit of VIRS data, CC_V is the VIRS version number.

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

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

   INGEST Source: Goddard DAAC

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **91.9**

19.3.1.2 MODIS Radiance Data

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

$CERESHOME/clouds/data/input/MODIS/
MOD02SS1.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

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

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**
mm	**two digit processing minute**
ss	**two digit processing second**

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

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

INGEST Source: Goddard DAAC

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **291 per 5 minute granule**

f. Special Requirements: Lots of disk space

19.3.1.3 MODIS Geolocation Data

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

$CERESHOME/clouds/data/input/MODIS/
MOD03.AYYYYDDD.HHMM.CC_M.yyyydddhhmmss.hdf

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

YYYY	**four digit data year**
DDD	**three digit data Julian day**
HH	**two digit data start hour**
MM	**two digit data start minute**
CC_M	**MODIS version number**
yyyy	**four digit processing year**
ddd	**three digit processing Julian day**
hh	**two digit processing hour**

mm **two digit processing minute**
ss **two digit processing second**

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

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

INGEST Source: Goddard DAAC

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

d. File Disposition after successful execution: **Remove**

e. Typical file size (Mb): **61 per 5 minute granule**

f. Special Requirements: Lots of disk space

19.4 Operating Procedures

The PGE CER4.1-4.4P1 production script, **Run.CER4.1-4.4P1** takes up to 4 command-line parameters.

Parameter 1	=	YYYY (four digit year)
Parameter 2	=	MM (two digit month)
Parameter 3	=	<Data Pathname> (full path name to where data is located) Usually $CERESHOME/clouds/data/input/<$IMAG>.
Parameter 4	=	DD (two digit day). Restart capability. Can re-start processing at a given day. Optional, if not present, processing starts at day 01.

19.4.1 How to Execute the Main Processor

Execute the production script by typing the script name, **Run.CER4.1-4.4P1**, followed by the desired parameters.

At the command-line (>) type:

>cd $CERESHOME/clouds/bin
>$CERESHOME/clouds/bin/Run.CER4.1-4.4P1 YYYY MM <pathname> <start day>

19.4.2 Special Case Considerations

Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

19.4.3 Special Reprocessing Instructions

Prior to re-processing, the output from previous runs needs to be deleted from the archive. Currently there is no vehicle to capture version information in the filenames for the Subsetted imager data.

19.5 Execution Evaluation

19.5.1 Exit Codes

The processor CER4.1-4.4P1 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 19-4. 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 1-1) for assistance.

Table 19-4. Exit Codes for CER4.1-4.4P1

Exit Code	Definition	Action
0	Normal Exit	Proceed normally
Other	Failure	Call responsible persons

19.5.2 Screen Messages

When running the production script, Run.CER4.1-4.4P1, 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. It may also indicate that there is no imager data staged.

19.5.3 Log and Status Files Results

At this time, there are no log files produced by this PGE.

19.5.4 Solutions to Possible Problems

At this time there are no possible errors for which solutions can be guessed.

19.5.5 Conditions for PGE and/or Target PGE(s) Terminal Failure

a. PGE Termination

   Since PGE processes a month of Imager data at a time, a restart capability was added to account for situations that cause problems. If a particular granule of Imager data causes problems, remove the granule from disk and restart the processing on the data day of failure and notify Subsystem analysts of problem.

b. Target PGE Termination

   If the PGE fails, a subset Imager data set will not be produced for that granule. If none is produced for the granule, target PGEs cannot be processed using that granule.

19.6 Expected Output Datasets

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process once per month per satellite. At this time, this PGE cannot produce the Subset Imager data for MODIS.

Table 19-5. Expected Output File Listing for CER4.1-4.4P1

File Name[a]/Directory	m/o	File Size (mb)	Freq/PGE	Target PGE	Destination[b]	Available Through Ordering Tool
1B01.YYMMDD.X..X.VER.HDF.Subset @($CERESHOME/clouds/data/input/VIRS)	m	15	1/granule, approx 500/month/sat	CER4.1-4.1P1	Archive, rm EOD	No

a. See Section 19.2.2 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.
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/)
DB - File content is to be entered into the LaTIS Database
rm - remove
YYYY - 4 digit year
YY - 2 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
NXD - The next Data Day
X..X - VIRS orbit number, varying number of digits
VER - VIRS processing Version number.

19.7 Expected Temporary Files/Directories.

There are no temporary files with this PGE.

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
2. Reference "DMT to DAAC Production Request." URL: http://ceres.larc.nasa.gov/dmt2daac.php

Appendix A
Acronyms and Abbreviations

ASDC	Atmospheric Science Data Center
AVHRR	Advanced Very High Resolution Radiometer
CERES	Clouds and the Earth's Radiant Energy System
CM	Configuration Management
CRH	Clear Radiance History
DAAC	Distributed Active Archive Center
DAO	Data Assimilation Office
DB	Data Base
EOS	Earth Observing System
EOS-AM	EOS Morning Crossing Mission
EOS-PM	EOS Afternoon Crossing Mission
ERBE	Earth Radiation Budget Experiment
ERBS	Earth Radiation Budget Satellite
HDF	Hierarchical Data Format
IES	Instrument Earth Scans
LaRC	Langley Research Center
LaTIS	Langley TRMM Information System
LW	Longwave
MB	megabytes
met	metadata file
μm	microns
MOA	Meteorological, Ozone, and Aerosol
MODIS	Moderate-Resolution Imaging Spectroradiometer
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
NSIDC	Source for Snow and Ice Data Set
PCF	Processing Control File
PGE	Program Generation Executive
PSF	Point Spread Function
PRE_SSF	Preliminary Single Satellite CERES Footprint TOA and Surface Fluxes
QC	Quality Control
SGE	Sun Grid Engine
SMF	Status Message File
SSAI	Science Systems and Applications, Inc.

SSF	Single Scanner Footprint TOA and Surface Fluxes, Clouds
SURFMAP	SURFace MAP
Terra	alias for EOS-AM1
TRMM	Tropical Rainfall Measuring Mission
VIRS	Visible and Infrared System

Appendix B
Error Messages for Subsystems 4.1-4.4

Appendix B contains a comprehensive list of messages that can be generated during the execution of PGEs CER4.1-4.0P1, CER4.1-4.0P2, CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5, CER4.1-4.1P6, CER4.1-4.2P1, CER4.1-4.2P2, CER4.1-4.2P3, CER4.1-4.2P4, CER4.1-4.2P5, CER4.1-4.3P1, CER4.1-4.3P2, CER4.1-4.3P3 and CER4.1-4.4P1. 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 PGE CER4.1-4.0P1 and CER4.1-4.0P2 diagnostic messages. Each table entry includes the mnemonic associated with the error, error message, module producing the error, and action number that refers to list below table.

Table B-2 contains a list of the PGE CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6 diagnostic messages. Each table entry includes the mnemonic associated with the error, error message, module producing the error, and action number that refers to list below table.

Table B-3 contains a list of the PGE CER4.1-4.2P1, CER4.1-4.2P2, CER4.1-4.2P3, CER4.1-4.2P4 and CER4.1-4.2P5 diagnostic messages. Each table entry includes the mnemonic associated with the error, error message, module producing the error, and action number that refers to list below table.

Table B-4 contains a list of the PGE CER4.1-4.3P1, CER4.1-4.3P2 and CER4.1-4.3P3 diagnostic messages. Each table entry includes the mnemonic associated with the error, error message, module producing the error, and action number that refers to list below table.

Table B-5 contains a list of the PGE CER4.1-4.4P1 diagnostic messages. Each table entry includes the mnemonic associated with the error, error message, module producing the error, and action number that refers to list below table.

Operator Instructions:

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

1. Look at the last few records in 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 no information is derived, then call the responsible person in Table 1-1.

5. If the appropriate ACTION failed, then call the responsible person in Table 1-1.
6. In all cases, log all steps that were taken after the PGE failure, and send a copy to the responsible person listed in Table 1-1.

Table B-1. Toolkit (SMF) Utility Message Table for CER4.1-4.0P1 and CER4.1-4.0P2

Message/Error Type		Module Name	Action Key
SURFIO_E_FAILED_GET_FNAME	Error ... Unable to get NSIDC HDF file name.	read_NSIDC_hdf	1
SURFIO_E_FAILED_INDEX_READ	Error ... Unable to Read Polar index arrays.	read_NSIDC_hdf	2
SURFIO_E_FAILED_NSIDC_READ	Error ... Unable to Read NSIDC Snow File.	read_NSIDC_hdf	3

Action Keys for Table B-1: (Note if an ACTION does not work, call the Responsible Person in Table 1-1.)

1. Problem Reading PCF File
   Ensure that PCF file for this run was properly created.
   If evidence of corruption, recreate PCF file and start job again.
   If still not successful, call the Responsible Person in Table 1-1.
2. Problem reading surfmapIO index file
   Check file for existence from logical ID 200 of PCF.
   If evidence of corruption, reload file.
   If still not successful, call the Responsible Person in Table 1-1.
3. Problem reading NSIDC HDF file
   Check file for correct date in the specified directory from 1.3.1.
   If evidence of corruption, reload NISE_SSMIF13_YYYMMDD.HDFEOS.
   If still not successful, call the Responsible Person in Table 1-1.

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for BiDirectModel(:,:)	ReadBiDirModel()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for DirectModel(:,:)	ReadDirModel()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for ElevationChunk(:,:)	ReadElevationChunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for ElevationChunk1(:,:)	GetElevationChunk1()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for IceChunk(:,:)	ReadIceChunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for IceChunk1(:,:)	GetIceChunk1()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for TerrainChunk(:,:)	ReadTerrainChunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for TerrainChunk1(:,:)	GetTerrainChunk1()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for SceneIDChunk(:,:)	ReadSceneIDChunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for SceneIDChunk1(:,:)	GetSceneIDChunk1()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for SnowChunk(:,:)	ReadSnowChunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for SnowChunk1(:,:)	GetSnowChunk1()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for EmitWindowChunk(:,:)	ReadEmitWindowChunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for EmitWindowChunk1(:,:)	GetEmitWindowChunk1()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for Emit0375Chunk(:,:)	ReadEmit0375Chunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for Emit0375Chunk1(:,:)	GetEmit0375Chunk1()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for Emit1190Chunk(:,:)	ReadEmit1190Chunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for Emit1190Chunk1(:,:)	GetEmit1190Chunk1()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for WaterContentChunk(:,:)	ReadWaterContentChunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for WaterContentChunk1(:,:)	GetWaterContentChunk1()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for GlobalChunk(:,:)	ReadGlobalChunk()	1
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for GlobalChunk1(:,:)	GetGlobalChunk1()	1

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_ALLOCATEANCCHUNK_UNABLE	ERROR...unable to allocate memory for ErbeBiDM(:,:,:,:)	ReadBiDirModel()	1
CERES_E_ALLOCATEVINTTILE_UNABLEe	ERROR...unable to allocate memory for VINT: PixelSAT(:,:,:)	ExecuteVINT()	1
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. Map chunk not found.	ChunkRegion()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Failure in chi calculation	bderb5	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. ElevationMap chunk not found.	ReadElevationChunk()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadElevationChunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadIceChunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. TerrainMap chunk not found.	ReadTerrainChunk()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadTerrainChunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. SceneIDMap chunk not found.	ReadSceneIDChunk()	2

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadSceneIDChunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. SnowMap chunk not found.	ReadSnowChunk()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadSnowChunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. EmitWindowMap chunk not found.	ReadEmitWindowChunk()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadEmitWindowChunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. Emit0375Map chunk not found.	ReadEmit0375Chunk()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadEmit0375Chunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. Emit1190Map chunk not found.	ReadEmit1190Chunk()	2

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadEmit1190Chunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. WaterContentMap chunk not found.	ReadWaterContentChunk()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadWaterContentChunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Input lat1, lon1, lat2, lon2, do not fall into any one of (1)PolarRegion (2)NoCrossingRegion (3)DatelineCrossing (4)GreenwichCrossing. GlobalMap chunk not found.	ReadGlobalChunk()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...This subroutine should be called only when GreenwichCrossing occurs. But for some reason, this subroutine is called when no GreenwichCrossing occurs!	ReadGlobalChunk1()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Failure in chi calculation: chi < 0.0	GetErbeBiDirModel()	2
CERES_E_CHUNKBOUNDARY_ERROR	ERROR...Failure in chi calculation	bderb5()	2
CERES_E_GETFILENAME_ERROR	ERROR...in getting file name: Number of errors of finding input/output files from PCfile= ", IVar1	InitPCFile()	3
CERES_E_GETNUMOFFILE_UNKNOWN	ERROR ...in GetNumofFile check logic ID Wrong # of input files!!	InitCID_AVHRR	3
CERES_E_GetRunTimeParam_Error	ERROR ..Number of errors of finding run-time parameters =	PC1P1	4
CERES_E_GetRunTimeParam_Error	ERROR ..Number of errors of finding run-time parameters =	PC2P1	4
CERES_E_INQUIREFILE_ERROR	ERROR...file not exist: Number of non-exist input files =	InitPCFile()	4
CERES_E_INVALID_UTCB_INPUTS	ERROR...Cannot convert given input to UTC_B Invalid inputs for UTC_B generation %s	Build_UTC	5

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: ElevationMap, fail to open the map	OpenElevationMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: CloudVis, fail to open the file	InitCloudVisType()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: CloudVis, fail to open the file for read subset	Subset_ReformatCloudVis()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: tempSubsetCloudVis, fail to open the file	Subset_ReformatCloudVis()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: SceneIDMap, fail to open the map	OpenSceneIDMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: WaterContentMap, fail to open the map	OpenWaterContentMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: WaterContentMap_CRH, fail to open the map	OpenWaterContentMap_CRHupdate()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: SnowMap, fail to open the map	OpenSnowMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: IceMap, fail to open the map	OpenIceMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: EmitWindowMap, fail to open the map	OpenEmitWindowMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: Emit0375Map, fail to open the map	OpenEmit0375Map()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: Emit1190Map, fail to open the map	OpenEmit1190Map()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: WaterFlagMap, fail to open the map	OpenWaterFlagMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: MOASceneMap, fail to open the map	OpenMOASceneMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: GlobalMap, fail to open the map	OpenGlobalMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: TerrainMap, fail to open the map	OpenTerrainMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: RegionLimits, fail to open the file	OpenRegionLimits()	6
CERES_E_OPENFILE_UNABLE	SceneIDMap_CRH, fail to open the map	OpenSceneIDMap_CRH()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: CRHOverheadBTemp, fail to open the file	OpenCRHOverheadBTemp( )	6

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: CRHOverheadAlbedo, fail to open the file	OpenCRHOverheadAlbedo( )	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: CRHOverheadAlbedoSTD, fail to open the file	OpenCRHOverheadAlbedo STD()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: CRHOverheadBTempSTD, fail to open the file	OpenCRHOverheadBTemp STD()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: VINTraybref, fail to open the file	OpenVINTraybref()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: bdnnref, fail to open the file	Openbdnnref()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: VINTmodelsnew, fail to open the file	OpenVINTmodelsnew()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: VINTmodelsnew37, fail to open the file	OpenVINTmodelsnew37()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: VINTerbedir, fail to open the file	OpenVINTerbedir()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: VINTchannel2, fail to open the file	OpenVINTchannel2()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: VINTchannel3, fail to open the file	OpenVINTchannel3()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: VINTchannel4, fail to open the file	OpenVINTchannel4()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: VINTchannel5, fail to open the file	OpenVINTchannel5()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: StoweLut0063, fail to open the file	OpenStoweLut0063	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: StoweLut0160, fail to open the file	OpenStoweLut0160	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: BiDirModelMap, fail to open the map	OpenBiDirModelMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: DirModelMap, fail to open the map	OpenDirModelMap()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: DirModel, fail to open the map	OpenDirModel()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: ErbeBiDirModel, fail to open the map	OpenErbeBiDirModel()	6

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: CookieOutput, fail to open the file	OpenCookieOutput()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: VintOutput, fail to open the file	OpenVintOutput()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: CloudVisTemp, fail to open the file	OpenCloudVisTemp()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: SubsetCloudVisTemp, fail to open the file	OpenSubsetCloudVisTemp( )	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: NadirCRHUpdate, fail to open the file	OpenNadirCRHUpdate()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: CRHUpdateCERESInput, fail to open the file	OpenCRHUpdateCERESUpdate()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: GeoOffline, fail to open the file	OpenGeoOffline()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: AOTOffline, fail to open the file	OpenAOTOffline()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: BinnedQCReport not found	WriteBinnedQC()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: QCReport not found	WriteQC()	6
CERES_E_OPENFILE_UNABLE	ERROR...in opening file: %s no found	InitCID_AVHRR ()	6
CERES_E_OPENFILE_UNABLE,	ERROR...in opening file: RadianceQCReport not found	WriteRadianceQC()	6
CERES_E_OPENFILE_UNABLE,	ERROR...in opening file: fileNames[i]	InitCID_VIRS	6
CERES_E_OPENFILE_UNABLE,	ERROR...in opening file: Logical ID %d",inID	ReformatCloudVisFile	6
CERES_E_READFILE_ERROR	ERROR...error in reading RegionLimits header. Process shutdown	InitSubset()	7
CERES_E_READFILE_ERROR	ERROR...error in reading subset CloudVis header. Process shutdown	Subset_ReformatCloudVis()	7
CERES_E_READFILE_ERROR	ERROR...FileName(1:FileNameLen)//" reading: error occurs	GetMap_1ByteInt()	7
CERES_E_READFILE_ERROR	ERROR...FileName(1:FileNameLen)//" file ended before lower bound of chunk reached!	GetMap_1ByteInt()	7
CERES_E_READFILE_ERROR	ERROR...FileName(1:FileNameLen)//"file ended before lower bound of chunk reached!	GetMap_2ByteInt()	7
CERES_E_READFILE_ERROR	ERROR...FileName(1:FileNameLen)//"reading: error occurs!	GetMap_4ByteInt()	7

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_READFILE_ERROR	ERROR...FileName(1:FileNameLen)//"file ended before lower bound of chunk reached!	GetMap_4ByteInt()	7
CERES_E_READFILE_ERROR	ERROR...FileName(1:FileNameLen)//" reading: error occurs!	GetMap_4ByteReal()	7
CERES_E_READFILE_ERROR	ERROR...FileName(1:FileNameLen)//" file ended before lower bound of chunk reached!	GetMap_4ByteReal()	7
CERES_E_READFILE_ERROR	ERROR...FileName(1:FileNameLen)//" reading: error occurs!	GetMap_8ByteReal()	7
CERES_E_READFILE_ERROR	ERROR...FileName(1:FileNameLen)//" file ended before lower bound of chunk reached!	GetMap_8ByteReal()	7
CERES_E_READFILE_ERROR	ERROR...%d VIRS time records	InitCID_VIRS	7
CERES_E_READFILE_ERROR	ERROR...Error reading # bytes in CloudVis file	ReformatCloudVisFile	7
CERES_E_READFILE_ERROR	ERROR...reading CloudVis header	ReformatCloudVisFile	7
CERES_E_READFILE_NOTOPEN	ERROR... FileName(1:FileNameLen)//" file is not opened before reading!	GetMap_1ByteInt()	2
CERES_E_READFILE_NOTOPEN	ERROR... FileName(1:FileNameLen)//" file is not opened before reading!	GetMap_2ByteInt()	2
CERES_E_READFILE_NOTOPEN	ERROR... FileName(1:FileNameLen)//" file is not opened before reading!	GetMap_4ByteInt()	2
CERES_E_READFILE_NOTOPEN	ERROR... FileName(1:FileNameLen)//" file is not opened before reading!	GetMap_4ByteReal()	2
CERES_E_READFILE_NOTOPEN	ERROR... FileName(1:FileNameLen)//" file is not opened before reading!	GetMap_8ByteReal()	2
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for regionIndex (%i5)	InitQC ()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for qcData (%i4)	InitQC ()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CloudChunk(1: %i3, 1:%i3)	RetrieveChunk()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory unable to allocate memory for latROI(1: %i3)	InitSubset()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for lonROI(1: %i3)	InitSubset()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for indexROI(1: %i3)	InitSubset()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for hitROI(1: %i3)	InitSubset()	1

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CloudVisData(1: %i3)	InitCloduVis()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CookieDough(1: %i3)	InitCookieChunk()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for MOA Index Storage	InitMOA()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for MOA Data Storage	InitMOA()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CorrKPixelsPerTile_X(:)	ICSBTempInterface ()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CorrKPixelsPerTile_Y(:)	ICSBTempInterface ( )	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for MOA Data Storage	InitMOA()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CorrKPixelsPerTile_X(:)	SkinTempInterface ()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CorrKPixelsPerTile_Y(:)	SkinTempInterface ()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for GeoOffline(1: %i5)	InitGeoOffline()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for AOTOffline(1: %i5)	InitAOTOffline()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for qcData (%i4)	InitQC ()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for arrayDOY	InitCID_VIRS ()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for arrayYear	InitCID_VIRS ()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for VIRS scan line	ReadCIDVIRSScanLine ()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory %d VIRS records	InitCID_VIRS()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CloudVis header	ReformatCloudVisFile	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CloudVis data	ReformatCloudVisFile	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CloudVis buffer	ReformatCloudVisFile	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for PixelsPerTile_X(:)	InitCorrKChunk()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for PixelsPerTile_Y(:)	InitCorrKChunk()	1
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CorrK_Data(:)	InitCorrKChunk()	1

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
CERES_E_WRITEFILE_ERROR	ERROR...error in writing CloudVis header. Process shutdown	Subset_ReformatCloudVis()	8
CERES_E_WRITEFILE_ERROR	ERROR...error in writing CloudVis header. Process shutdown	Subset_ReformatCloudVis()	8
CERES_E_WRITEFILE_ERROR	ERROR...error in writing CloudVis header on shutdown. Process shutdown	ShutdownCloduVis()	8
CERES_E_WRITEFILE_ERROR	ERROR...error in writing CloudVis header. Process shutdown	InitCloduVis()	8
CERES_E_WRITEFILE_ERROR	ERROR...Error in write CookieDough header	OutputCookieHeader()	8
CERES_E_WRITEFILE_ERROR	ERROR...Error in write CookieDough at the scanline number = %i5	WriteCookieChunk()	8
CERES_E_WRITEFILE_ERROR	ERROR...Error in write GeoOffline Header	OutputGeoOfflineHeader()	8
CERES_E_WRITEFILE_ERROR	ERROR...Error in write GeoOffline at the scanline number = %i5	OutputGeoOffline()	8
CERES_E_WRITEFILE_ERROR	ERROR...Error in write AOTOffline Header	OutputAOTOfflineHeader()	8
CERES_E_WRITEFILE_ERROR	ERROR...Error in write AOTOffline at the scanline number = %i5	OutputAOTOffline()	8
CERES_E_WRITEFILE_ERROR	ERROR...Error in writing VintData at the tile number = %i3	WriteVintInputCERESData()	8
CERES_E_WRITEFILE_ERROR	ERROR...writing # bytes	ReformatCloudVisFile	8
CERES_E_WRITEFILE_ERROR	ERROR...writing CloudVis header	ReformatCloudVisFile	8
CERES_E_WRITEFILE_ERROR	ERROR...writing CloudVis reformatted data	ReformatCloudVisFile	8
FOOTPRINT_E_CLOSEFILE_UNABLE	ERROR...in closing file: Problem in closing SSF Intermediate output file.	Fin_SSF_Int	9
FOOTPRINT_E_DATATIME_DIFFERENT	ERROR...in date or time between data files: IES HDF file is for the wrong data day.	Read_HDF_IES_Header	10
FOOTPRINT_E_DATATIME_DIFFERENT	ERROR...in date or time between data files: IES HDF file is for the wrong data hour	Read_HDF_IES_Header	10
FOOTPRINT_E_DATATIME_DIFFERENT	ERROR...in date or time between data files: IES HDF file is for the wrong data month.	Read_HDF_IES_Header	10
FOOTPRINT_E_DATATIME_DIFFERENT	ERROR...in date or time between data files: IES HDF file is for the wrong data year.	Read_HDF_IES_Header	10

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
FOOTPRINT_E_DATATIME_DIFFERENT	ERROR...in date or time between data files: Imager data file was for the wrong day.	Check_Imager_File	10
FOOTPRINT_E_DATATIME_DIFFERENT	ERROR...in date or time between data files: Imager data file was for the wrong hour.	Check_Imager_File	10
FOOTPRINT_E_DATATIME_DIFFERENT	ERROR...in date or time between data files: Imager data file was for the wrong month.	Check_Imager_File	10
FOOTPRINT_E_DATATIME_DIFFERENT	ERROR...in date or time between data files: Imager data file was for the wrong year.	Check_Imager_File	10
FOOTPRINT_E_GETFILNM_UNKNOWN	ERROR...in getting file name: Check LogReport for %i file(s) not found	PCParam	3
FOOTPRINT_E_GETPARAM_ERROR	ERROR...in getting run-time parameter: Check LogReport for %i paramter(s) not found	PCParam	3
FOOTPRINT_E_GETPARAM_ERROR	ERROR...in getting run-time parameter: Check LogReport for %i paramter(s) and %i file(s) not found	PCParam	3
FOOTPRINT_E_INQUIREFL_NOEXIST	ERROR...file does not exist: Source_FileName(1:190)	Initialize_Granule_Data.f90	4
FOOTPRINT_E_INQUIREFL_NOEXIST	ERROR...file does not exist: Imager_FileName(1:190)	Initialize_Granule_Data.f90	4
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: Intermediate SSF already exists.	Init_SSF_Int	11
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: status = Output_FileName(1:175)	Init_SSF_Int	6
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: QC_FileName(1:175) already exists.	Initialize_Granule_Data	6
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: QCBin_FileName(1:175) already exists.	Initialize_Granule_Data	6
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: Param_FileName(1:190)	Initialize_Granule_Data	6
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: PSF file	Initialize_Granule_Data	6
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: Imager file.	Check_Imager_File	6
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: QC_FileName	Init_QC_Stats	6
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: IES HDF file.	Read_HDF_IES_Header	6
FOOTPRINT_E_OPENFILE_UNABLE	ERROR...in opening file: Binary QC file.	Write_Binary_QC	6
FOOTPRINT_E_PLATFORM_DIFFERENT	ERROR...in platform between data files: Imager data file was for the wrong platform.	Check_Imager_File	12

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
FOOTPRINT_E_PLATFORM_DIFFERENT	ERROR...in platform between data files: IES HDF file is for the wrong satellite.	Read_HDF_IES_Header	12
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: Imager file header.	Check_Imager_File	7
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: Imager scan line.	Check_Imager_File	7
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: Imager data file quality assurance flag was FAIL or bad	Check_Imager_File	7
FOOTPRINT_E_READ_ERROR	ERROR...There are no scan lines in imager file.	Check_Imager_File	13
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: Param file	Initialize_PGE_Data	7
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: Normal PSF data	Initialize_Granule_Data	7
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: Nadir PSF data	Initialize_Granule_Data	7
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: PSF array size.	Initialize_Granule_Data	7
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: PSF file	Initialize_Granule_Data	7
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: HDF Flag is specified incorrectly.	Initialize_Granule_Data	7
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: IES HDF file	Read_HDF_IES_Header	7
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: IES data file quality assurance flag was FAIL.	Read_HDF_IES_Header	14
FOOTPRINT_E_READ_ERROR	ERROR...in reading from file: IES data file quality assurance flag was bad.	Read_HDF_IES_Header	7
FOOTPRINT_E_TIME_ERROR	ERROR...in converting time: Julian to ASCII	JulDay_to_ASCII	5
FOOTPRINT_E_TIME_ERROR	ERROR...in converting time: Julian to ASCII in HDF IES.	Read_HDF_IES_Header	5
FOOTPRINT_E_WRITE_ERROR	ERROR...in writing to file: Binary QC file.	Write_Binary_QC	8
MOAIO_E_FAILED_COLAT_INVALID	occurred at Latitude :	LatLong_Reg()	2
MOAIO_E_FAILED_GRIDIDX_INVALID	occurred with Grid_Index :%i3 grid(1) for DAO 2x2.5, grid(2) for DAO 1x1, grid(3) for NCEP -All others are Unavailable"	LatLong_Reg()	2
MOAIO_E_FAILED_GRIDIDX_INVALID	occurred with Grid_Index :%i3 grid(1) for DAO 2x2.5, grid(2) for DAO 1x1, grid(3) for NCEP -All others are Unavailable	Region_LatLon()	2
MOAIO_E_FAILED_LONG_INVALID	occurred at Longitude :	LatLong_Reg()	2

Table B-2. TK (SMF) Utility Message Table for CER4.1-4.1P1, CER4.1-4.1P2, CER4.1-4.1P3, CER4.1-4.1P4, CER4.1-4.1P5 and CER4.1-4.1P6

Message/Error Type		Module Name	Action Key
MOAIO_E_FAILED_REGNUM_INVALID	occurred with Region Number :%i8 -Max Region Number for Grid(%i1) is %i5	LatLong_Reg()	2
MOAIO_E_FAILED_REGNUM_INVALID	occurred with Region Number :%i8 -Max Region Number for Grid(%i1) is %i5	Region_LatLon()	2
PGSCSC_E_LOOK_PT_ALTIT_RANGE	look point altitude unreasonably low or high	PGSCSCZenithAzimuth_Below()	2
PGSCSC_E_INVALID_VECTAG	invalid tag for vector whose zenith and azimuth are sought	PGSCSCZenithAzimuth_Below(	2
PGSCSC_E_ZERO_INPUT_VECTOR	input vector with zero length when direction is required	PGSCSCZenithAzimuth_Below(	2
SURFIO_E_FAILED_TABLE_CLOSE	Error ... Unable to Close Table File.	Read_Tables()	9
SURFIO_E_FAILED_TABLE_OPEN	Error ... Unable to Open tabular data file.	Read_Tables(	6
SURFIO_E_FAILED_TABLE_READ	Error ... Unable to Read tabular data file. occurred with spectral integration weights	Read_Tables()	7
SURFIO_E_FAILED_TABLE_READ	Error ... Unable to Read tabular data file. occurred with spectral albedos	Read_Tables()	7
SURFIO_E_FAILED_TABLE_READ	Error ... Unable to Read tabular data file. occurred with emissivities and broadband albedos	Read_Tables()	7
SURFIO_E_FAILED_TABLE_READ	Error ... Unable to Read tabular data file. occurred with dummy characters	Read4	7
SURFIO_E_FAIL_TABNUM_INVALID	Error ... InValid Table Number.	Read_Tables()	2

Action Keys for Table B-2: (Note if an ACTION does not work, call the Responsible Person in Table 1-1.)

1. Problem allocating memory
   Monitor system memory usage.
   Restart job when it is reduced.
   If still not successful, call the Responsible Person in Table 1-1.
2. Problem Internal to Software
   Call the Responsible Person in Table 1-1.
3. Problem Reading PCF
   Ensure that PCF file for this run was properly created.
   Check the appropriate LogReport file for the number of bad parameters or files.
   If evidence of corruption, recreate PCF file and start job again.
   If still not successful, call the Responsible Person in Table 1-1.

4. Missing Files that are Specified in PCF
   Check the appropriate LogReport file for the name of missing files or Section 4.3.
   (If reported by Logical ID check file type in the PCF from a successful case.)
   Load files that are missing.
   If still not successful, call the Responsible Person in Table 1-1.
5. Problem Converting Date
   Check ephemeris file for correct date.
   Check runtime date to be valid.
   If evidence of corruption or missing, reload ephemeris file.
   If still not successful, call the Responsible Person in Table 1-1.
6. Problem Opening Specified File
   Check file for correct name in the specified directory from Section 4.3.
   If evidence of corruption or missing, reload file.
   If still not successful, call the Responsible Person in Table 1-1.
7. Problem Reading Specified File
   If evidence of corruption or missing, reload file.
   If still not successful, call the Responsible Person in Table 1-1.
8. Problem Writing Specified File
   If disk is full, remove files and restart.
   Check for corrupted file.
   If still not successful, call the Responsible Person in Table 1-1.
9. Problem Closing Specified File
   Check for file existence. Proceed as normal.
   Call the Responsible Person in Table 1-1.
10. Problem with Different Input Data Dates
    Check the PCF dates to agree with request.
    Check input file metadata load file that instance agrees with data date.
    Call the Responsible Person in Table 1-1.
11. Problem with Existing Output File
    Check the run date requested with PCF.
    Delete existing SSFI file.
    Call the Responsible Person in Table 1-1.
12. Problem with Different Input Platforms
    Check the PCF dates to agree with request.
    Check input file metadata load file that satellite agrees with sampling strategy.
    Call the Responsible Person in Table 1-1.
13. There was no imager scan lines in file.
    If subset processing was occurring, no action required do not start inversion.
    Check for known problems with imager that would have prevented data from being sent.
    Call the Responsible Person in Table 1-1.
14. The input file has been marked failed, .met not staged, or file corrupted.
    The job cannot be processed, proceed to next data hour.

Table B-3. TK (SMF) Utility Message Table for CER4.1-4.2P1, CER4.1-4.2P2, CER4.1-4.2P3, CER4.1-4.2P4 and CER4.1-4.2P5

Message/Error Type		Module Name	Action Key
CERES_E_GetFileName_Error	ERROR...in getting file name: Updated NadirCRH for version: %3, not found from PCfile	CheckUpdatedNadirCRHExist()	1
CERES_E_GetRunTimeParam_Error	ERROR...in getting run-time parameter:	InitPC	2
CERES_E_OpenFile_unable	ERROR...in opening file: SaveNadirCRHOutput, fail to open the file	OpenSaveNadirCRHOutput	3
CERES_E_OpenFile_unable	ERROR...in opening file: SaveCRHAlbedoOutput, fail to open the file	OpenSaveCRHAlbedoOutput	3
CERES_E_OpenFile_unable	ERROR...in opening file: Updated CRH for the version: %3, failed to open IVar1 = CRHVersion	OpenUpdatedNadirCRH()	3
CERES_E_OpenFile_unable	ERROR...in opening file: CRHOverheadAlbedo, fail to open the file	OpenCRHOverheadAlbedo()	3
CERES_E_OpenFile_unable	ERROR...in opening file: CRHOverheadAlbedoSTD, fail to open the file	OpenCRHOverheadAlbedoSTD()	3
CERES_E_OpenFile_unable	ERROR...in opening file: CRHOverheadBTemp, fail to open the file	OpenCRHOverheadBTemp()	3
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CRHSave	OverheadCRHUpdateTest	4
CERES_E_UNABLE_ALLOCATEMEMORY	ERROR...Unable to allocate memory for CRH or CRHID	OverheadCRHUpdateTest	4

Action Keys for Table B-3: (Note if an ACTION does not work, call the Responsible Person in Table 1-1.)

1. Problem Reading PCF File
   Ensure that PCF file for this run was properly created.
   If evidence of corruption, recreate PCF file and start job again.
   If still not successful, call the Responsible Person in Table 1-1.
2. Problem Reading PCF File
   Ensure that PCF file for this run was properly created.
   Check the appropriate LogReport file for the number of bad parameters or files.
   If evidence of corruption, recreate PCF file and start job again.
   If still not successful, call the Responsible Person in Table 1-1.
3. Problem reading specified file
   Check file for correct date in the specified directory from 4.3.1
   If evidence of corruption or missing, reload file.
   If still not successful, call the Responsible Person in Table 1-1.

4. Problem allocating memory
   Monitor system memory usage.
   Restart job when it is reduced.
   If still not successful, call the Responsible Person in Table 1-1.

Table B-4. TK (SMF) Utility Message Table for CER4.1-4.3P1, CER4.1-4.3P2 and CER4.1-4.3P3

Message/Error Type		Module Name	Action Key
None	None	None	1

Action Keys for Table B-3: (Note if an ACTION does not work, call the Responsible Person in Table 1-1.)

1. Call the Responsible Person in Table 1-1.

Table B-5. TK (SMF) Utility Message Table for CER4.1-4.4P1

Message/Error Type		Module Name	Action Key
None	None	None	1

Action Keys for Table B-3: (Note if an ACTION does not work, call the Responsible Person in Table 1-1.)

1. Call the Responsible Person in Table 1-1.

Appendix C
Subsystem Environment File

One sample Environment Script is provided. It is located in **$CERESHOME/clouds/$PGENAME/rcf**, is named '**CER4.1-4.env**' and contains the following environment variables:

SAT	- Platform
INST	- Instrument
IMAG	- Imager

SS1	SS12	SS4_0	SS4_1	SS4_2	SS4_3	SS4_4
PS1_1	PS12	PS4_0	PS4_1	PS4_2	PS4_3	
CC1	CC12	CC4_0P1	CC4_0P2	CC4_1P1	CC4_1P2	
CC4_1P3	CC4_2P1					
CC4_2P2	CC4_3P1					

The SS variables refer to a Subsystem specific Sampling Strategy, the PS variables, its Production Strategy, and the CC variables, its Configuration Code. These variables take on different values depending on the SAT/INST/IMAG combination. For instance, processing of TRMM data requires Edition2 IES's whereas processing Terra data requires Alpha IES's. The values for the variables in the env file are set to values indicated for SSI&T. For Production processing, **the values for these variables must be set according to the values specified in the Production Request**, see Reference 2. The Sampling Strategy variables for SS4 are set according to the values for SAT, INST, and IMAG. The variable INST can, depending upon the satellite and processing request, take on the value of (NONE, FM1+FM2, FM3+FM4, FM1, FM2, FM3, FM4 or PFM). Each value for INST will cause different things to occur:

NONE	Cloud Retrieval Only Processing (no Convolution)
Multi INST (FM1+FM2, FM3+FM4)	Produce individual instrument version of 4.4 products CER_FQC, CER_FQCI, and CER_SSFI
Single INST (FM1,FM2,FM3,FM4,PFM)	Produce only those instrument specific products CER_FQC, CER_FQCI, and CER_SSFI

In order to facilitate processing of multiple satellites in various configurations, several parameters can be added to the command to source the env file. The first optional parameter dictates which Satellite to process and is implemented as follows:

> source $CERESHOME/clouds/$PGENAME/rcf/CER4.1-4.env <data_type>

where, for processing Clouds data, <data_type> can take on the values (**1, 2, 3, or 6**) where:

1 = NOAA9
2 = TRMM
3 = Terra
6 = Aqua

If no parameter is given, the env script defaults to the TRMM case (2).

If Subset processing by CERES Validation Region is desired, a second, optional parameter is passed when sourcing the env file. (Subset imager data must already be staged and, in the case of VIRS data, renamed appropriately using the Rename script).

> source $CERESHOME/clouds/$PGENAME/rcf/CER4.1-4.env <data_type> Subset

This will trigger Subset processing by CERES Validation Region in convolution. If processing in Subset mode, the <data_type> parameter **must** be specified.

```
#!/bin/csh -f

setenv  DATA_TYPE       $1

if ( $DATA_TYPE == "" ) then
      setenv  DATA_TYPE 2
endif

setenv PREFIX ""
if ( $2 != "" ) then
      setenv PREFIX $2
endif

if ( $DATA_TYPE == 1 ) then     # CERES NOAA-09 Variables
      setenv  SAT     NOAA9
      setenv  INST    ERBE
      setenv  IMAG    AVHRR

      setenv  PS1     Edition1
      setenv  CC1     011004
      setenv  PS12    ECMWF-GEOS2
endif

if ( $DATA_TYPE == 2 ) then     # CERES TRMM Variables
      setenv  SAT     TRMM
      setenv  INST    PFM
      setenv  IMAG    VIRS

      setenv  PS1     Edition1
      setenv  CC1     000031
      setenv  PS12    ECMWF-GEOS2
endif

if ( $DATA_TYPE == 3 ) then     # CERES Terra Variables
      setenv  SAT     Terra
      setenv  INST    FM1+FM2
      setenv  IMAG    MODIS

      setenv  PS1     Edition1
      setenv  CC1     017012
      setenv  PS12    ECMWF-GEOS3
endif

if ( $DATA_TYPE == 4 ) then     # CERES Terra Variables with MOD06 cloud product
      setenv  SAT     Terra
      setenv  INST    FM1+FM2
      setenv  IMAG    MODIS

      setenv  PS1     Edition1
      setenv  CC1     018013
      setenv  PS12    ECMWF-GEOS3
endif
```

```
if ( $DATA_TYPE == 6 ) then     # CERES Aqua MODIS Variables
      setenv  SAT     Aqua
      setenv  INST    FM3+FM4
      setenv  IMAG    MODIS

      setenv  PS1     Beta1
      setenv  CC1     024021
      setenv  PS12    ECMWF-GEOS3
endif

setenv  SS1           $SAT-$INST

setenv  CURR_CC_0P1     020018
setenv  CURR_CC_1P1     000000
setenv  CURR_CC_1P2     000000
setenv  CURR_CC_1P3     000000
setenv  CURR_CC_1P4     000000
setenv  CURR_CC_1P5     000000
setenv  CURR_CC_2P1     000000
setenv  CURR_CC_2P2     000000
setenv  CURR_CC_2P3     000000
setenv  CURR_CC_3P1     020019
setenv  CURR_CC_3P2     020019

setenv  CURR_DA         00262
setenv  CURR_SW         00262
setenv  DATA4_1         $CURR_DA
setenv  SW4_1           $CURR_SW

setenv  SS12            CERES
setenv  CC12            016020

setenv  SS4_0           CERES
setenv  PS4_0           NSIDC-NESDIS

setenv  SS4_1           $SAT-$IMAG
setenv  CC4_0P1         $CURR_CC_0P1
setenv  CC4_1P1         $CURR_CC_1P1
setenv  CC4_1P2         $CURR_CC_1P2
setenv  CC4_1P3         $CURR_CC_1P3
setenv  CC4_1P4         $CURR_CC_1P4
setenv  CC4_1P5         $CURR_CC_1P5

setenv  CC4_2P1         $CURR_CC_2P1
setenv  CC4_2P2         $CURR_CC_2P2
setenv  CC4_2P2         $CURR_CC_2P3

setenv  CC4_3P1         $CURR_CC_3P1
setenv  CC4_3P1         $CURR_CC_3P2

setenv  PS4_1           $PREFIX\SSIT

# for clear sky map
setenv  SS4_2           $SS4_1
setenv  PS4_2           $PS4_1
setenv  CC4_2           $CC4_1P2
```

```
setenv  CV      notDefined
#       setenv  CV      y      # CloudVis is turned on
#       setenv  CV      n      # CloudVis is turned off

if ( $DATA_TYPE == 2 ) then     # CERES TRMM Variables
   setenv  CC4_2          $CC4_1P1
endif

if ( $DATA_TYPE == 6 ) then     # CERES Aqua Variables
   setenv  CC4_2          $CC4_1P3
endif

# Collection 005 QC output vs. input if same as main processor
setenv SS4_3  $SS4_1
setenv PS4_3  $PS4_1
setenv CC4_3  000000

setenv CC4_1  000000


setenv  SS4_4          $SAT-$INST-$IMAG
if ( $INST == "NONE" ) setenv  SS4_4           $SAT-$IMAG
```