

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

Data Management System

Operator's Manual

Instantaneous Surface and Atmospheric Radiation Budget (SARB) Subsystem (Subsystem 5.0)

CER5.0P1

CER5.0P2

CER5.1P1

CER5.1P2

CER5.3P1

CER5.4P1

CER5.4P2

Release 5

Version 5

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Document Revision Record

The Document Revision Record contains information pertaining to approved document changes. The table lists the date the Software Configuration Change Request (SCCR) was approved, the Release and Version Number, the SCCR number, a short description of the revision, and the revised sections. The document authors are listed on the cover. The Head of the CERES Data Management Team approves or disapproves the requested changes based on recommendations of the Configuration Control Board.

Document Revision Record

SCCR Approval Date	Release/Version Number	SCCR Number	Description of Revision	Section(s) Affected
06/07/01	R3V2	267	<ul style="list-style-type: none"> • Corrected previously mistyped filenames for the remove and environment variable scripts. • Corrected mistyped filename for the monthly surface albedo history QC report file. • Corrected destination of the CRS output file. • Updated format to comply with standards. 	1.2.2, 1.4.5, 2.2.2, 2.4.5, 3.2.2, & 3.4.5 1.6 2.6 All
12/07/01	R3V3	315	<ul style="list-style-type: none"> • Updated Appendix B to include new error messages associated with file I/O on the Zhonghai Jin ocean surface albedo lookup tables ancillary input data file. • Updated Appendix C to include PCFin file lines for the Zhonghai Jin file for PGE CER5.1P1, for both the Full-Hour and the Subset modes. • Updated format to comply with standards. 	AppB AppC All
04/09/02	R3V4	337	<ul style="list-style-type: none"> • Updated the expected output tables to include the PCF, PCFin, and runlog filenames. • Updated format to comply with standards. 	Tables 1-6, 2-6, and 3-6 All
12/20/02	R3V5	408	<ul style="list-style-type: none"> • Removed sections pertaining to PGE CER5.2P1. • Removed sections pertaining to separate instructions for the "Subset Mode". • Added required information for various aerosol input data sets. • Added paragraph describing temporary files produced by PGE CER5.0P1. • Changed email address for responsible parties to a general SARB email alias. • Added new error messages to App. B. • Updated format to comply with standards. 	3.0 2.0 1.3 & 2.3 1.7 Tables 1-2 & 2-1 App.B All

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01/27/03	R3V6	419	<ul style="list-style-type: none"> Added sections pertaining to PGE CER5.3P1. Updated format to comply with standards. 	3.0 All
07/30/03	R3V7	458	<ul style="list-style-type: none"> Updated timing and memory requirements. Clarified mandatory/optional requirements regarding the daily MATCH aerosol input files. Updated format to comply with standards. 	1.2.4, 2.2.4, & 3.2.4 1.3.2.2 & 2.3.1.6 All
09/11/03	R3V8	468	<ul style="list-style-type: none"> Added Sections pertaining to new PGE, CER5.4P1. Updated sections that are also applicable to processing Aqua data. Updated format to comply with standards. 	4.0 1.0 & 2.0 All
01/16/04	R3V9	498	<ul style="list-style-type: none"> Modified references to Daily MATCH filenames to reflect new convention of including "_MODIS" in the name. Corrected name of PGE CER5.4P1 runscript name. Eliminated .met filename for the expected output file HMAVAIL listed in Table 4-6. Updated format to comply with standards. 	1.0, 2.0, Appendix C 4.4.3 4.6 All
03/24/04	R3V10	515	<ul style="list-style-type: none"> Updated run time information for PGE CER5.4P1. Added new filenames to Table 4.6. Updated ASCII file samples for PGE CER5.0P1 and CER5.4P1 in Appendix C. Updated format to comply with standards. 	4.2.4 4.6 C1, C4 All
06/28/04	R4V1	541	<ul style="list-style-type: none"> Updated ancillary data filenames. Added OR to description of data files. Corrected script names. Added 5.4P1 to Target PGEs. Added note to required files section. Updated format to comply with standards. 	Table 0-1 1.3.2.1 1.4, 1.4.3, 1.5.2, 4.4 2.1.4 (Table 2-3) 4.3.1.2 All
10/01/04	R4V2	563	<ul style="list-style-type: none"> Added new environment variable. Changed CC5 to CC5_4 for PCF filenames. 	4.2.2 4.4.1 - 4.4.3, & 4.4.5

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10/01/04 (Cont'd)	R4V2	563	<ul style="list-style-type: none"> Changed CC5 to CC5_4 for log filenames. Changed CC5 to CC5_4 for output files. Updated format to comply with standards. 	4.5.3 Tables 4-6 and 4-7 All
10/10/05	R4V3	597	<ul style="list-style-type: none"> Updated memory/runtime requirements. Added ./ to ASCII, PCF, and runscript commands. Added information for new PGEs 5.1P2 and 5.4P2. Added new section for PGE 5.1P2. Added new section for PGE 5.4P2. Updated format to comply with standards. 	1.2.4, 2.2.4, 4.2.4 1.4, 2.4, 4.4 Subsystem Overview 3.0 6.0 All
01/29/08	R4V4	668	<ul style="list-style-type: none"> Added environment variable to specify collection of MATCH data. 	1.2.2, 2.2.2, 3.2.2
11/12/08	R5V1	692	<ul style="list-style-type: none"> Updated contact information. Removed unused variables. Changed paths to reflect new directory structure. Removed .pl from script names. Removed QC section of post-processor 5.4P1. Updated Appendix C with new ASCII file listings for 5.1P1 and 5.4P1. 	Tables 1-1, 2-1, 3-1, 4-1, 5-1, 6-1 2.2.2, 5.2.2 2.4.1, 2.4.2, 2.4.3, 2.4.5, 2.5.3, Table 2-6, 5.4, 5.5.3, Table 5-6 2.4.1, 2.4.2, 2.4.5, 5.2.2, 5.4 5.3.1.2, Table 5-6 App. C.2 & C.4
01/22/09	R5V2	694	<ul style="list-style-type: none"> Changed paths to reflect new directory structure. Updated script name. Updated ASCII file listing. 	1.4.1, 1.4.2, 1.4.3, 1.4.5, 1.5.3, & Table 1-6 1.4.5 App C
07/28/09	R5V3	718	<ul style="list-style-type: none"> Added new PGE name. 	Title page, Document Overview

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07/28/09 (Cont'd)	R5V3	718	<ul style="list-style-type: none"> Added description of PGE 5.0P2. Added new test section for PGE 5.0P2. Changed the word "MODIS" to "MATCH." (08/05/2009) Changed "(#2)" to "(#1)." (08/05/2009) Corrected output file name. (09/01/2009) Removed Appendix C - Sample ASCII (PCFin) File Listing since PCFin files are no longer required. (09/16/2009) 	Subsystem Overview Sec. 2.0 Sec. 2.3.2 Sec. 2.3.2.1 Table 2-6 App. C
10/07/09	R5V4	728	<ul style="list-style-type: none"> Removal of QC processor information. Updated directory path to new structure. 	Subsystem Overview, 7.0, 7.3.1, 7.4, Table 7-6 7.4, 7.5.3, Table 7-6
10/27/09	R5V5	733	<ul style="list-style-type: none"> Updated script names. Updated directory paths to new structure. \$CERESHOME/sarb/data/ancillary/static/sarb/sahmaps was changed to \$CERESHOME/sarb/data/ancillary/dynamic/sarb. (10/29/2009) The target PGEs were removed from the CER_HQCR output files. (03/19/2010) A script name was modified. (03/19/2010) /QA was removed from the footnotes of the expected output file listing tables. (06/07/2010) Added "Available Through Ordering Tool" column and removed red "meta" from expected output tables. (09/15/2010) Modified a link and document title name. (04/10/2012) 	4.4, 4.4.2, 4.4.3, 4.4.5 4.4.1, 4.4.2, 4.4.3, 4.4.5, 4.5.3, Table 4-11 Sec. 2.7 Tables 3-6 & 4-6 Sec. 6.4 Tables 1-6, 2-6, 3-6, 4-6, 5-6, 6-6, & 7-6 All Expected Output Tables References

Preface

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

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

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

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

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Introduction

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

Document Overview

This document, CERES Instantaneous Surface and Atmospheric Radiation Budget (SARB) Subsystem 5.0 Release 3 Operator's Manual, is part of the CERES Subsystem 5.0 Release 3 delivery package provided to the Atmospheric Sciences Data Center (ASDC). It provides a description of the CERES Instantaneous SARB Subsystem Release 3 Product Generation Executives (PGE) and explains the procedures for executing the software. A description of acronyms and abbreviations is provided in [Appendix A](#), and a comprehensive lists of messages that can be generated during the execution of PGEs CER5.0P1, CER5.0P2, CER5.1P1, CER5.1P2, CER5.3P1, CER5.4P1, and CER5.4P2 are contained in [Appendix B](#).

This document is organized as follows:

[Introduction](#)

[Document Overview](#)

[Subsystem Overview](#)

1.0 PGENAME: CER5.0P1

2.0 PGENAME: CER5.0P2

3.0 PGENAME: CER5.1P1

4.0 PGENAME: CER5.1P2

5.0 PGENAME: CER5.3P1

6.0 PGENAME: CER5.4P1

7.0 PGENAME: CER5.4P2

References

[Appendix A](#) - Acronyms and Abbreviations

[Appendix B](#) - Error Messages for Subsystem 5.0

Subsystem Overview

The Instantaneous SARB Subsystem software computes longwave, shortwave, and window channel vertical flux profiles that span from the Earth's surface to the Top-of-Atmosphere. These profiles are archived on the Clouds and Radiative Swath (CRS) product. Each CRS contains data from one hour from one instrument, and directly corresponds to a Single Satellite CERES Footprint TOA and Surface Fluxes, Clouds (SSF) for the same hour.

~~Three PGEs are currently required for the Instantaneous SARB Subsystem. PGE CER5.1P1 is the Main-Processor, which is run on an hourly basis. Prior to processing CER 5.1P1, two pre-processors must be executed. PGE CER5.2P1 executes on a daily basis and is the first of two pre-processors to execute. After CER 5.2P1 has executed for each day of the month, PGE CER5.0P1 executes and processes the daily output from CER 5.2P1 for the month. After CER5.0P1 has processed, CER5.1P1 processes for each hour of available data for the month.~~

~~It is planned that in some future delivery of the subsystem, the functions performed by PGE CER5.2P1 will be combined with another existing PGE, leaving only PGEs CER 5.0P1 and CER 5.1P1. Because of this future plan, the numbering scheme of the Instantaneous SARB PGEs currently does not correspond to the order in which they are executed.~~

With the December 2002 delivery of the Instantaneous SARB Subsystem software, PGE CER5.2P1 is no longer necessary.

Four PGEs are currently required for the Instantaneous SARB Subsystem. PGE CER5.1P1 is the Main-Processor, which is run on an hourly basis. Prior to processing CER 5.1P1, the Instantaneous SARB Surface Albedo Monthly Pre-Processor and the Daily MODIS Aerosol Interpolation Monthly Pre-Processor must be executed using the hourly SSF Binary (SSFB) output produced for a whole month as input. After CER5.0P1 has processed, CER5.1P1 processes for each hour of available data for the month. PGE CER5.3P1 is the Instantaneous SARB Subsystem HDF-Only Post-Processor, which is only executed on a rare, as-need basis only. CER5.3P1 generates the HDF formatted CRS product from the CRSB, using the identical software executed by CER5.1P1 on a routine basis. A summary of the month's QC reports are generated by the Instantaneous SARB Subsystem Monthly Quality Control Summary Post-Processor, PGE CER5.4P1, along with verification that the CRSB and CRS files produced by CER5.1P1 contain the same information.

PGE 5.0P2 is executed once per month prior to running Synoptic SARB (PGE 7.2.1P1). This is to provide inputs necessary to Synoptic processing.

CER5.2P1: CERES Instantaneous SARB Subsystem Surface Albedo Daily Pre-Processor

~~PGE CER5.2P1, the Instantaneous SARB Subsystem Surface Albedo Daily Pre-Processor, subsets Field of View (FOV) data pertaining to surface albedo from the hourly SSF Binary (SSFB) files produced by PGE CER4.5-6P1 for a 24 hour period. These data are stored in a nonarchival daily file. Once all of the available SSFB files for the month have been subset, the resulting daily files are input to PGE CER5.0P1.~~

Beginning with the December 2002 delivery, PGE CER5.2P1 is no longer necessary.

CER5.0P1: CERES Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor and the Daily MODIS Aerosol Interpolation Monthly Pre-Processor

PGE CER5.0P1 consists of the Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor and the Daily MODIS Aerosol Interpolation Monthly Pre-Processor. The Surface Albedo Monthly Pre-Processor produces the Monthly Surface Albedo History (SAH) Map, and the Daily MODIS Aerosol Interpolation Monthly Pre-Processor produces the Interpolated Daily MODIS Aerosol (IMA) product.

The Surface Albedo Monthly Pre-Processor merges selected SSFB parameters produced by PGE CER4.5-6P1 into a single monthly file containing a 10-minute map of surface albedo observations from clear-sky over land FOVs. Two versions of this map are produced by PGE CER5.0P1. The first version contains only data derived from the input SSFB files, thus leaving some areas with no data. The second file fills in those areas for which no SSF data were available with data from a default data file. It is this second nonarchival file that is used as input by PGE CER5.1P1 for each hour of the month. An ASCII Quality Control (QC) report is also produced.

The Daily MODIS Aerosol Interpolation Monthly Pre-Processor reads all of the available daily MODIS MOD08 (or MYD08 for Aqua) files for the month and interpolates between days to fill in missing data. The resulting interpolated daily data are stored in one monthly file.

CER5.0P2: CERES Instantaneous and Synoptic SARB Subsystem Surface Albedo Monthly Pre-Processor

PGE CER5.0P2 consists of the Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor. The Surface Albedo Monthly Pre-Processor produces the Monthly Surface Albedo History (SAH) Map required by Synoptic SARB PGE 7.2.1P1.

The Surface Albedo Monthly Pre-Processor merges selected SSFB parameters produced by PGE CER4.5-6P1 into a single monthly file containing a 10-minute map of surface albedo observations. A surface albedo history map is then calculated using aerosol information obtained from multiple data sources. An ASCII Quality Control (QC) report is also produced.

CER5.1P1 - Instantaneous SARB Subsystem Main-Processor and HDF Post-Processor

PGE CER5.1P1 consists of a Main-Processor and an Hierarchical Data Format (HDF) Post-Processor. The primary outputs from the Main-Processor are the CRS Binary (CRSB) and the CRS Validation Binary (CRSVB), along with an ASCII QC report. The CRSB serves as input for CERES Subsystem 6.0, and as input to the Instantaneous SARB Subsystem HDF Post-Processor. The HDF Post-Processor reads the CRSB product and converts the data to an HDF format, thus generating the CRS archival product for distribution outside of NASA-Langley.

~~The Main Processor can process in two modes – Full Hour and Subset. The Full Hour Mode processes every FOV available from the SSF input product. The Subset Mode processes only those FOVs contained on the SSF that correspond to the CERES Validation Regions. The same software is used for both modes, hence there is only one PGE. The Production Strategy environment variable indicates in which mode the PGE will process. A Production Strategy environment variable definition beginning with “Subset” indicates that the PGE is to process in Subset Mode. If the Production Strategy environment variable definition begins with anything else, then the subsystem will process in Full Hour Mode.~~

CER5.1P2 - Instantaneous SARB Subsystem Main-Processor and HDF Post-Processor

This is a version of 5.1P1 intended for use in processing of Aqua data.

CER5.3P1 - Instantaneous SARB Subsystem HDF Post-Processor

PGE CER5.3P1 consists of the Hierarchical Data Format (HDF) Post-Processor. This processor will only be used in instances where reprocessing of the CRS files from existing CRSB files is necessary.

CER5.4P1 - Instantaneous SARB Subsystem Post-Processor

PGE CER5.4P1 consists of two executables. The Instantaneous SARB Subsystem HDF Verification Post-Processor compares up to five CRS files from the data month against the parent CRSB files to verify that the HDF conversion process maintained the integrity of the data.

In addition to the input files listed in the sections that follow, various static ancillary input data files are also required for the Instantaneous SARB PGEs to process. These files are listed in [Table 0-1](#).

CER5.4P2 - Instantaneous SARB Subsystem Post-Processor

This is a version of 5.4P1 which is intended for use in processing of Aqua data.

Table 0-1. Instantaneous SARB Subsystem Static Ancillary Input Data Files

File Name	Description
SS5_DrivTab_19990315	Precomputed derivative table values
SigTab_Instantaneous_20040625	Precomputed sigma table values
IGBP_Ver3.0	Static, global vegetation/scene-type map index
CollinsAer_1998TRMM_Ver3.0 MATCH_TERRA_AOTS_MODIS.CurrDay MATCH_TERRA_AOTS_CLIM_MODIS.mm	<p>Aerosol climatology based on assimilated climatology provided by Bill Collins</p> <p><i>NOTE: The CollinsAer_1998TRMM_Ver3.0 is a single file containing data for the January-June 1998 time frame. The MATCH_TERRA_AOTS_MODIS files are daily files that are delivered to the ASDC by the SARB Working Group as they become available. For TRMM data sets for which MATCH data are not available, the ASCII filename generators for PGEs CER5.0P1 and CER5.1P1 intentionally generate a filename for a file that does not exist:</i></p> <p>CollAer_NonExistFile. The MATCH_TERRA_AOTS_MODIS daily files are used with both Terra and Aqua data sets. At this point in time, no distinction between Terra and Aqua is made in these filenames, i.e., all filenames contain the string "TERRA." For non-TRMM months for which daily MATCH files have not been delivered to Langley, the monthly MATCH-based climatological files, MATCH_TERRA_AOTS_CLIM_MODIS.yy, are provided.</p>
MATCH_TERRA_VERTICAL_MODIS.CurrDay	<p>Aerosol vertical profile climatology based on provided by Bill Collins</p> <p><i>NOTE: The MATCH_TERRA_VERTICAL_MODIS files are daily files that are delivered to the ASDC by the SARB Working Group as they become available. The MATCH_TERRA_VERTICAL_MODIS daily files are used with both Terra and Aqua data sets. At this point in time, no distinction between Terra and Aqua is made in these filenames, i.e., all filenames contain the string "TERRA."</i></p>
SS5_HuCoxMunk_OcnAlb	Coefficients for the Hu-Cox-Munk surface albedo over ocean technique
SS5_GFDLAerClim_200006	Geophysical Fluid Dynamics Laboratory (GFDL) Aerosol climatology for time frames not covered by the Collins assimilated aerosol climatology
flsa0404_lut.2s.coef	Surface albedo-related coefficients required by the Fu-Liou Radiative Transfer Model
flsa3_lut.4s.coef_19991215	Surface albedo-related coefficients required by the Fu-Liou Radiative Transfer Model
flsa4_lut.2s.coef_19991215	Surface albedo-related coefficients required by the Fu-Liou Radiative Transfer Model

Table 0-1. Instantaneous SARB Subsystem Static Ancillary Input Data Files

File Name	Description
SS5_ZJin_OcnAlb_20031101	Zhonghai Jin ocean spectral albedo lookup table
ControlFile_20070330	ASCII file of control parameters used by the SARB software
flsa200508c.fubin.tab	Surface albedo-related coefficients required by the Fu-Liou Radiative Transfer Model

1.0 PGENAME: CER5.0P1

CER5.0P1 - CERES Instantaneous Surface and Atmospheric Radiation Budget (SARB) Subsystem Surface Albedo Monthly Pre-Processor and Daily MODIS Aerosol Interpolation Monthly Pre-Processor

1.1 PGE Details

1.1.1 Responsible Persons

The Subsystem software analysts responsible for the development of PGE CER5.0P1 are listed in [Table 1-1](#).

Table 1-1. Subsystem Software Analysts Contacts

Item	Primary
Contact Name	Tom Caldwell
Organization	SSAI
Address	1 Enterprise Parkway
City	Hampton
State	VA 23666
Phone	(757) 951-1621
Fax	(757) 951-1900
LaRC e-mail	Thomas.E.Caldwell@nasa.gov

1.1.2 E-mail Distribution List

An E-mail distribution list can be obtained from the primary contact listed in [Table 1-1](#).

1.1.3 Parent PGE(s)

The PGEs listed in [Table 1-2](#) must successfully execute for the specified data set prior to executing PGE CER5.0P1.

Table 1-2. Parent PGEs for CER5.0P1

PGENAME	Description
CER4.5-6.1P1	Inversion to Instantaneous TOA Fluxes and Surface Fluxes
CER12.1P1	Regrid Meteorological, Ozone, and Aerosol (MOA) Subsystem

1.1.4 Target PGE(s)

[Table 1-3](#) lists the PGEs dependent on output from PGE CER5.0P1.

Table 1-3. Target PGEs after CER5.0P1

PGENAME	DESCRIPTION
CER5.1P1	Instantaneous SARB Main Processor

1.2 Operating Environment

1.2.1 Runtime Parameters (A List of all Dynamic Parameters needed at Runtime)

The runtime parameters listed in [Table 1-4](#) are required for the instructions given in the remainder of [Section 1.0](#) to process PGE CER5.0P1.

Table 1-4. Runtime Parameters for CER5.0P1

Parameter	Description	Data Type	Valid Values
DataMonth	Data Month--yyyymm, where yyyy = four-digit year mm = two-digit month	l(6), where year = (l4.4) month = (l2.2)	>1996 01 .. 12
PCFinfile	Name of input file to the PCF generator	ASCII	See Section 1.4
PCFname	Name of PCF file	ASCII	See Section 1.4

1.2.2 Environment Script Requirements

Refer to the CERES internal paper ([Reference 1](#)) for a detailed description of the CERES environment parameters required by the CERES PGEs.

PGE CER5.0P1 references the environment variable script, **ENV5.0P1-env.pl**, which contains the following parameters:

- SAT - Satellite: see Production Request
- INST - Instrument: see Production Request
- IMAG - Imager: see Production Request
- SS5 - Sampling Strategy for Instantaneous SARB: see Production Request
- SS5_MATCH - Flag to set MATCH data: C4 for collection 4, C5 for collection 5
- SS4_5 - Sampling Strategy for Inversion: see Production Request
- SS12 - Sampling Strategy for Regrid MOA: see Production Request
- PS5 - Production Strategy for Instantaneous SARB: see Production Request
- PS4_5 - Production Strategy for Inversion: see Production Request
- PS12 - Production Strategy for Regrid MOA: see Production Request
- CC5 - Configuration Code for Instantaneous SARB: see CM Database
- CC4_5 - Configuration Code for Inversion: see CM Database

CC12	- Configuration Code for Regrid MOA: see CM Database
SW5	- SCCR number for current version of Instantaneous SARB software: see CM Database
DATA5	- SCCR number for current version of Instantaneous SARB input data: see CM Database
InputCheck	- Variable to enable or disable PCF input checking: see CM database
PROD	- Yes if being run in production, no if being run in testing

1.2.3 Execution Frequency

CER5.0P1 executes once per data month, whenever all input data for all available days of that month are available. CER5.0P1 executes a maximum total of one time per month.

1.2.4 Memory/Disk Space/Time Requirements

Memory:	41112 K
Disk Space:	93.97 GB
Total Run Time:	4 hours 1 minute

1.2.5 Restrictions Imposed in Processing Order

A month may be processed at any time, providing that all the available SSFB files for that month have been produced. For Terra and Aqua data sets, all available daily MODIS MOD08 files for that month are necessary. Should there be multiple months that are ready for processing through PGE CER5.0P1, there are no restrictions imposed on the ordering of the months.

1.3 Processor Dependencies (Previous PGEs, Ingest Data,..)

This section describes the nonancillary input files that are required for PGE CER5.0P1 processing. See Section 1.2 for variable information contained in the listed filenames.

1.3.1 Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor

1.3.1.1 Input Dataset Name (#1): CER_SSFB - Hourly Binary SSF

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

`$CERESHOME/inversion/data/out_comp/data/CER_SSFB_$$$4_5_$PS4_5_$CC4_5.$DataMonth$dd$hh`

where \$dd= 01 .. 31

\$hh = 00 .. 23

1. Mandatory/optional: **These files are mandatory if available.**
 2. Time Related Dependency: **Input files must be for same month to be processed.**
 3. Waiting Period: **As soon as all SSFB files for the month are available.**
- b. Source of Information (Source is PGE name or Ingest Source):
- PGE CER4.5-6P1**
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**

- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **189.3 per hourly file**

1.3.1.2 Input Dataset Name (#2): CER_MOA - CERES Hourly Meteorological, Ozone, and Aerosol Ancillary Input Data Set

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

\$CERESHOME/sarb/data/out_comp/data/regridmoa

CER_MOA_\$\$\$12_\$\$S12_\$\$C12.\$DataMonth\$dd\$hh

where \$dd= 01 .. 31

\$hh = 00, 06, 12, 18

and

CER_MOA_\$\$\$12_\$\$S12_\$\$C12.\$NextDataMonth'0100'

where \$NextDataMonth is the data month immediately following \$DataMonth.

1. Mandatory/optional: **These files are mandatory.**
 2. Time Related Dependency: **Input files must be for same data month to be processed.**
 3. Waiting Period: **As soon as all MOA files for the month are available.**
- b. Source of Information (Source PGE name or Ingest Source):
PGE CER12.1P1
 - c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
 - d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
 - e. Typical file size (MB): **13.31**

1.3.2 Instantaneous SARB Subsystem Daily MODIS Aerosol Interpolation Monthly Pre-Processor

1.3.2.1 Input Dataset Name (#1): MODIS MOD08 (Terra) / MYD08 (Aqua)

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

\$CERESHOME/clouds/data/input/MODIS/yyyyddd/

MOD08_D3.platformyyyyddd.collectionnumber.productiondate.hdf (for Terra)

OR

\$CERESHOME/clouds/data/input/MODIS/yyyyddd/

MYD08_D3.platformyyyyddd.collectionnumber.productiondate.hdf (for Aqua)

where

yyyy = the four-digit data year

ddd = the three-digit Julian Day

platform = satellite, where "A" = Terra (AM1) and "P" = Aqua (PM1)

collectionnumber = version number

productiondate = processing date of granule

1. Mandatory/optional: **These files are mandatory if available for Terra and Aqua data sets. These files are not available for TRMM data sets.**
 2. Time Related Dependency: **Input files must be for same data month to be processed. If multiple versions of the data are received for a data month, the latest version should be used unless directed otherwise.**
 3. Waiting Period: **NONE. If there are missing days that are not expected to be obtained in a reasonable time frame (determined on a case-by-case basis), PGE CER5.0P1 can process successfully.**
- b. Source of Information (Source PGE name or Ingest Source):
Externally obtained from Goddard DAAC
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **452**

1.3.2.2 Input Dataset Name (#2): MATCH_TERRA_AOTS_MODIS - Daily MATCH Climatological Aerosol Files

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/sarb/data/ancillary/static/sarb/match_aot/match_aots_\$DataMonth/MATCH_TERRA_AOTS_MODIS.\$DataDay
1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets if available. IF NOT AVAILABLE, CONTACT THE RESPONSIBLE PERSONS LISTED IN [Table 1-1](#) BEFORE ATTEMPTING TO RUN WITHOUT THE FILES. The files may be available, just not delivered to the operational environment. This file is not available for TRMM data sets. At this point in time, no distinction between Terra and Aqua is made in these filenames, i.e., all filenames contain the string "TERRA."**
 2. Time Related Dependency: **Input file must be for same month to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
Provided by responsible persons listed in [Table 1-1](#), using the CM delivery process.

- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Retain.**
- e. Typical file size (MB): **0.38**

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

The Surface Albedo Monthly Pre-Processor production script, run_press5, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing an ASCII file generator, ascii_gen_5.0P1, and then executing the PCF generator, pcfgen_5.0P1.

1.4.1 How to Generate the ASCII File

The ASCII file name generator requires one command-line argument, \$DataMonth, as defined in [Table 1-4](#).

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.0P1/rcf
> ./ascii_gen_5.0P1.pl $DataMonth
```

The following file will be generated in \$CERESHOME/sarb/CER5.0P1/rcf/pcf/:

CER5.0P1_PCFin_\$\$S5_\$\$PS5_\$\$CC5.\$DataMonth

1.4.2 How to Generate the PCF File

The PCF generator, pcfgen_5.0P1, is executed using the newly created ASCII input file name as a command-line argument. See [Section 1.2](#) for variable information.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.0P1/rcf
> ./pcfgen_5.0P1.pl CER5.0P1_PCFin_$$S5_$$PS5_$$CC5.$DataMonth
```

The following PCF will be generated in \$CERESHOME/sarb/CER5.0P1/rcf/pcf/:

CER5.0P1_PCF_\$\$S5_\$\$PS5_\$\$CC5.\$DataMonth

1.4.3 How to Execute the Monthly Pre-Processor

Execute the production script by typing the script name, run_press5.pl, followed by a string which designates the name of the required PCF file. See [Section 1.2](#) for variable information.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.0P1/rcf
> ./run_press5.pl CER5.0P1_PCF_$$S5_$$PS5_$$CC5.$DataMonth
```

1.4.4 Special Case Considerations

N/A, at this time. Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

1.4.5 Special Reprocessing Instructions

All output files are opened with Status = NEW in CER5.0P1 software. These files must be removed before reprocessing.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.0P1/rcf
> ./rm_script_5.0P1.pl CER5.0P1_PCF_$$$5_$PS5_$CC5.$DataMonth
```

The script, rm_script_5.0P1.pl, removes all files generated by the ASCII file name and PCF generators, along with files generated during the execution of run_press5.

1.5 Execution Evaluation

1.5.1 Exit Codes

The PGE CER5.0P1 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in [Table 1-5](#). Other exit codes may appear from the program, which may be the result of a system, compiler, or Toolkit-related error. In these cases, contact the responsible person (see [Table 1-1](#)) for assistance.

Table 1-5. Exit Codes for CER5.0P1

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

1.5.2 Screen Messages

When running the production script, run_press5, the system message, "No match," may be written to the screen. This message occurs when the scripts try to remove an old output file that does not exist. This does not signify a problem.

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

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: \$CERESHOME/sarb/runlogs/. See [Section 1.2](#) for information on variable fields within the file names.

1. Report Log File: CER5.0P1_LogReport_\$\$\$5_\$PS5_\$CC5.\$DataMonth

The Report Log File contains the Instantaneous SARB-related messages. These messages may be strictly informative (Error Type = Notice or Warning) or may indicate a fatal condition that

results in premature PGE termination (Error Type = Error). A comprehensive list of these messages, that can be generated during the execution of the PGE, is given in [Table B-1](#).

2. Status Log File: CER5.0P1_LogStatus_\$\$\$5_\$PS5_\$CC5.\$DataMonth

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

3. User Log File: CER5.0P1_LogUser_\$\$\$5_\$PS5_\$CC5.\$DataMonth

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

1.5.4 Solutions to Possible Problems

As mentioned in Section [1.4.5](#), all output files are opened with Status = NEW in the PGE CER5.0P1 software. These files must be removed before reprocessing.

Should a review of the error message files discussed in Section [1.5.3](#) indicate that PGE CER5.0P1 failed reading a header for a specific day of the month, check that that day completed successfully. If that day did not complete successfully and the output files removed, sufficient header information was not written to the file, and CER5.0P1 will fail.

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

a. Subsystem Termination

If the Monthly Pre-Processor exit code indicates failure, halt processing of the Main-Processor for the month.

b. Target PGE Termination

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

1.6 Expected Output Dataset(s)

The expected output datasets for each instance of the PGE are listed in [Table 1-6](#). This PGE is expected to process 1 time, maximum, in a 31-day month.

Table 1-6. Expected Output File Listing for CER5.0P1

File Name ^a /Directory	m/o	File Size (MB)	Freq/PGE	Target PGE	Destination ^b	Available Through Ordering Tool
CER5.0P1_PCF_\$\$\$5_\$PS5_\$CC5.\$YYYYMM @(\$CERESHOME/sarb/CER5.0P1/rcf/pcf)	m	x	1/month	N/A	Archive, rm	No
CER5.0P1_PCFin_\$\$\$5_\$PS5_\$CC5.\$YYYYMM @(\$CERESHOME/sarb/CER5.0P1/rcf/pcf)	m	x	1/month	N/A	Archive, rm	No
CER5.0P1_LogReport_\$\$\$5_\$PS5_\$CC5.\$YYYYMM M @(\$CERESHOME/sarb/runlogs/)	m	x	1/month	N/A	Archive, rm	No
CER5.0P1_LogStatus_\$\$\$5_\$PS5_\$CC5.\$YYYYMM @(\$CERESHOME/sarb/runlogs/)	m	x	1/month	N/A	Archive, rm	No
CER5.0P1_LogUser_\$\$\$5_\$PS5_\$CC5.\$YYYYMM @(\$CERESHOME/sarb/runlogs/)	m	x	1/month	N/A	Archive, rm	No
CER_HMSAL_\$\$\$5_\$PS5_\$CC5.\$YYYYMM(.met) @(\$CERESHOME/sarb/data/ancillary/dynamic/sarb)	m	4.66	1/month	NONE	Archive, rm	No
CER_HMPSAL_\$\$\$5_\$PS5_\$CC5.\$YYYYMM(.met) @(\$CERESHOME/sarb/data/ancillary/dynamic/sarb)	m	4.66	1/month	CER5.1P1	Archive	No
CER_MQCSA_\$\$\$5_\$PS5_\$CC5.\$YYYYMM(.met) @(\$CERESHOME/sarb/data/out_comp/qa_reports/ sarb)	m	0.02	1/month	NONE	Archive, rm	No
CER_HMAER_\$\$\$5_\$PS5_\$CC5.\$YYYYMM(.met) @(\$CERESHOME/sarb/data/ancillary/dynamic/sarb)	m	61.30	1/month	CER5.1P1	Archive	No

- a. See Section 1.2 for information on variable data values
If “(.met)” is written next to an expected output filename, then the metadata file **must** exist with the identical filename and .met extension
- b. DB - File content is to be entered into the LaTIS Database
rm - remove
m - mandatory output
o - optional output
EOD - End of data month

1.7 Expected Temporary Files/Directories.

During execution, up to 31 temporary files are generated by PGE5.0P1. These files are named CER_HDSAL_\$\$\$5_\$PS5_\$CC5.\$DataDay, and are produced by the Surface Albedo Monthly Pre-Processor. During processing, these files are placed in the temporary directory \$CERESHOME/sarb/data/scr/CER5.0P1_\$\$\$5_\$PS5_\$CC5.\$YYYYMM. The run script run_press5_sfcalb removes the files and the directory at the end of processing.

2.0 PGENAME: CER5.0P2

CER5.0P2 - CERES Instantaneous and Synoptic Surface and Atmospheric Radiation Budget (SARB) Subsystem Surface Albedo Monthly Pre-Processor

2.1 PGE Details

2.1.1 Responsible Persons

The Subsystem software analysts responsible for the development of PGE CER5.0P2 are listed in [Table 2-1](#).

Table 2-1. Subsystem Software Analysts Contacts

Item	Primary
Contact Name	Tom Caldwell
Organization	SSAI
Address	1 Enterprise Parkway
City	Hampton
State	VA 23666
Phone	(757) 951-1621
Fax	(757) 951-1900
LaRC e-mail	Thomas.E.Caldwell@nasa.gov

2.1.2 E-mail Distribution List

An E-mail distribution list can be obtained from the primary contact listed in [Table 2-1](#).

2.1.3 Parent PGE(s)

The PGEs listed in [Table 2-2](#) must successfully execute for the specified data set prior to executing PGE CER5.0P2.

Table 2-2. Parent PGEs for CER5.0P2

PGENAME	Description
CER4.5-6.1P1	Inversion to Instantaneous TOA Fluxes and Surface Fluxes
CER12.1P1	Regrid Meteorological, Ozone, and Aerosol (MOA) Subsystem

2.1.4 Target PGE(s)

[Table 2-3](#) lists the PGEs dependent on output from PGE CER5.0P2.

Table 2-3. Target PGEs after CER5.0P2

PGENAME	Description
CER7.2.1P1	Instantaneous SARB Main Processor

2.2 Operating Environment

2.2.1 Runtime Parameters (A List of all Dynamic Parameters needed at Runtime)

The runtime parameters listed in [Table 2-4](#) are required for the instructions given in the remainder of [Section 2.0](#) to process PGE CER5.0P2.

Table 2-4. Runtime Parameters for CER5.0P2

Parameter	Description	Data Type	Valid Values
DataMonth	Data Month--yyyymm, where yyyy = four-digit year mm = two-digit month	l(6), where year = (l4.4) month = (l2.2)	>1996 01 .. 12
PCFinfile	Name of input file to the PCF generator	ASCII	See Section 2.4
PCFname	Name of PCF file	ASCII	See Section 2.4

2.2.2 Environment Script Requirements

Refer to the CERES internal paper ([Reference 1](#)) for a detailed description of the CERES environment parameters required by the CERES PGEs.

PGE CER5.0P2 references the environment variable script, **ENV5.0P2-env.pl**, which contains the following parameters:

- SAT - Satellite: see Production Request
- INST - Instrument: see Production Request
- IMAG - Imager: see Production Request
- SS5 - Sampling Strategy for Instantaneous SARB: see Production Request
- SS5_MATCH - Flag to set MATCH data: C4 for collection 4, C5 for collection 5
- SS4_5 - Sampling Strategy for Inversion: see Production Request
- SS12 - Sampling Strategy for Regrid MOA: see Production Request
- PS5 - Production Strategy for Instantaneous SARB: see Production Request
- PS4_5 - Production Strategy for Inversion: see Production Request
- PS12 - Production Strategy for Regrid MOA: see Production Request
- CC5 - Configuration Code for Instantaneous SARB: see CM Database
- CC4_5 - Configuration Code for Inversion: see CM Database
- CC12 - Configuration Code for Regrid MOA: see CM Database

SW5	- SCCR number for current version of Instantaneous SARB software: see CM Database
DATA5	- SCCR number for current version of Instantaneous SARB input data: see CM Database
InputCheck	- Variable to enable or disable PCF input checking: see CM database
PROD	- Yes if being run in production, no if being run in testing

2.2.3 Execution Frequency

CER5.0P2 executes once per data month, whenever all input data for all available days of that month are available. CER5.0P2 executes a maximum total of one time per month.

2.2.4 Memory/Disk Space/Time Requirements

Memory:	41112 K
Disk Space:	93.97 GB
Total Run Time:	4 hours 1 minute

2.2.5 Restrictions Imposed in Processing Order

A month may be processed at any time, providing that all the available SSFB files for that month have been produced. Should there be multiple months that are ready for processing through PGE CER5.0P2, there are no restrictions imposed on the ordering of the months.

2.3 Processor Dependencies (Previous PGEs, Ingest Data,..)

This section describes the nonancillary input files that are required for PGE CER5.0P2 processing. See Section 2.2 for variable information contained in the listed filenames.

2.3.1 Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor

2.3.1.1 Input Dataset Name (#1): CER_SSFB - Hourly Binary SSF

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

\$CERESHOME/inversion/data/out_comp/data/CER_SSFB_\$\$\$4_5_\$PS4_5_\$CC4_5.\$DataMonth\$dd\$hh

where \$dd= 01 .. 31

\$hh = 00 .. 23

1. Mandatory/optional: **These files are mandatory if available.**
 2. Time Related Dependency: **Input files must be for same month to be processed.**
 3. Waiting Period: **As soon as all SSFB files for the month are available.**
- b. Source of Information (Source is PGE name or Ingest Source):
- PGE CER4.5-6P1**
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
 - d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**

- e. Typical file size (MB): **189.3 per hourly file**

2.3.1.2 Input Dataset Name (#2): CER_MOA - CERES Hourly Meteorological, Ozone, and Aerosol Ancillary Input Data Set

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

\$CERESHOME/sarb/data/out_comp/data/regridmoa

CER_MOA_\$\$\$12_\$\$S12_\$\$C12.\$DataMonth\$dd\$hh

where \$dd= 01 .. 31

\$hh = 00, 06, 12, 18

and

CER_MOA_\$\$\$12_\$\$S12_\$\$C12.\$NextDataMonth"0100"

where \$NextDataMonth is the data month immediately following \$DataMonth.

1. Mandatory/optional: **These files are mandatory.**
 2. Time Related Dependency: **Input files must be for same data month to be processed.**
 3. Waiting Period: **As soon as all MOA files for the month are available.**
- b. Source of Information (Source PGE name or Ingest Source):
PGE CER12.1P1
 - c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
 - d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
 - e. Typical file size (MB): **40**

2.3.2 Instantaneous SARB Subsystem Daily MATCH Aerosol Interpolation Monthly Pre-Processor

2.3.2.1 Input Dataset Name (#1): MATCH_TERRA_AOTS_MODIS - Daily MATCH Climatological Aerosol Files

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

\$CERESHOME/sarb/data/ancillary/static/sarb/match_aot/match_aots_\$\$DataMonth/MATCH_TERRA_AOTS_MODIS.\$DataDay

1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets if available. IF NOT AVAILABLE, CONTACT THE RESPONSIBLE PERSONS LISTED IN [Table 2-1](#) BEFORE ATTEMPTING TO RUN WITHOUT THE FILES. The files may be available, just not delivered to the operational environment. This file is not available for TRMM data sets. At this point in time, no distinction between**

Terra and Aqua is made in these filenames, i.e., all filenames contain the string "TERRA."

2. Time Related Dependency: **Input file must be for same month to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
Provided by responsible persons listed in Table 2-1, using the CM delivery process.
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
 - d. File Disposition after successful execution: **Retain.**
 - e. Typical file size (MB): **0.38**

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

The Surface Albedo Monthly Pre-Processor production script, run_5.0P2.pl, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing an ASCII file generator, ascii_gen_5.0P2.pl, and then executing the PCF generator, pcfgen_5.0P2.pl.

2.4.1 How to Generate the ASCII File

The ASCII file name generator requires one command-line argument, \$DataMonth, as defined in Table 2-4.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.0P2/rcf
> ./ascii_gen_5.0P2.pl $DataMonth
```

The following file will be generated in \$CERESHOME/sarb/CER5.0P2/rcf/pcf/:

CER5.0P2_PCFin_\$\$\$5_\$\$PS5_\$\$CC5.\$DataMonth

2.4.2 How to Generate the PCF File

The PCF generator, pcfgen_5.0P2.pl, is executed using the newly created ASCII input file name as a command-line argument. See Section 2.2 for variable information.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.0P2/rcf
> ./pcfgen_5.0P2.pl CER5.0P2_PCFin_$$$5_$$PS5_$$CC5.$DataMonth
```

The following PCF will be generated in \$CERESHOME/sarb/CER5.0P2/rcf/pcf/:

CER5.0P2_PCF_\$\$\$5_\$\$PS5_\$\$CC5.\$DataMonth

2.4.3 How to Execute the Monthly Pre-Processor

Execute the production script by typing the script name, `run_5.0P2.pl`, followed by a string which designates the name of the required PCF file. See Section 2.2 for variable information.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.0P2/rcf
> ./run_5.0P2.pl CER5.0P2_PCF_$SS5_$PS5_$CC5.$DataMonth
```

2.4.4 Special Case Considerations

N/A, at this time. Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

2.4.5 Special Reprocessing Instructions

All output files are opened with Status = NEW in CER5.0P2 software. These files must be removed before reprocessing.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.0P2/rcf
> ./rm_script_5.0P2.pl CER5.0P2_PCF_$SS5_$PS5_$CC5.$DataMonth
```

The script, `rm_script_5.0P2.pl`, removes all files generated by the ASCII file name and PCF generators, along with files generated during the execution of `run_5.0P2.pl`.

2.5 Execution Evaluation

2.5.1 Exit Codes

The PGE CER5.0P2 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System (LaTIS) as seen in Table 2-5. 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 2-1) for assistance.

Table 2-5. Exit Codes for CER5.0P2

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

2.5.2 Screen Messages

When running the production script, `run_5.0P2.pl`, the system message, "No match," may be written to the screen. This message occurs when the scripts try to remove an old output file that does not exist. This does not signify a problem.

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

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: `$CERESHOME/sarb/runlogs/`. See Section 2.2 for information on variable fields within the file names.

1. Report Log File: `CER5.0P2_LogReport_$$$5_$PS5_$CC5.$DataMonth`

The Report Log File contains the Instantaneous SARB-related messages. These messages may be strictly informative (Error Type = Notice or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Error). A comprehensive list of these messages, that can be generated during the execution of the PGE, is given in Table B-1.

2. Status Log File: `CER5.0P2_LogStatus_$$$5_$PS5_$CC5.$DataMonth`

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

3. User Log File: `CER5.0P2_LogUser_$$$5_$PS5_$CC5.$DataMonth`

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

2.5.4 Solutions to Possible Problems

As mentioned in Section 2.4.5, all output files are opened with Status = NEW in the PGE CER5.0P2 software. These files must be removed before reprocessing.

Should a review of the error message files discussed in Section 2.5.3 indicate that PGE CER5.0P2 failed reading a header for a specific day of the month, check that that day completed successfully. If that day did not complete successfully and the output files removed, sufficient header information was not written to the file, and CER5.0P2 will fail.

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

a. Subsystem Termination

If the Monthly Pre-Processor exit code indicates failure, halt processing of the Main-Processor for the month.

b. Target PGE Termination

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

2.6 Expected Output Dataset(s)

The expected output datasets for each instance of the PGE are listed in Table 2-6. This PGE is expected to process 1 time, maximum, in a 31-day month.

Table 2-6. Expected Output File Listing for CER5.0P2

File Name ^a /Directory	m/o	File Size (MB)	Freq/PGE	Target PGE	Destination ^b	Available Through Ordering Tool
CER5.0P2_PCF_\$\$\$5_\$PS5_\$CC5.\$YYYYMM @(\$CERESHOME/sarb/CER5.0P2/rcf/pcf)	m	X	1/month	N/A	Archive, rm	No
CER5.0P2_PCFin_\$\$\$5_\$PS5_\$CC5.\$YYYYMM @(\$CERESHOME/sarb/CER5.0P2/rcf/pcf)	m	X	1/month	N/A	Archive, rm	No
CER5.0P2_LogReport_\$\$\$5_\$PS5_\$CC5.\$YYYYMM @(\$CERESHOME/sarb/runlogs/)	m	X	1/month	N/A	Archive, rm	No
CER5.0P2_LogStatus_\$\$\$5_\$PS5_\$CC5.\$YYYYMM @(\$CERESHOME/sarb/runlogs/)	m	X	1/month	N/A	Archive, rm	No
CER5.0P2_LogUser_\$\$\$5_\$PS5_\$CC5.\$YYYYMM @(\$CERESHOME/sarb/runlogs/)	m	X	1/month	N/A	Archive, rm	No
CER_SAH_\$\$\$5_\$PS5_\$CC5.\$YYYYMM (.met) @(\$CERESHOME/sarb/data/ancillary/dynamic/sarb)	m	14	1/month	NONE	Archive, rm	No
CER_MQCSAH_\$\$\$5_\$PS5_\$CC5.\$YYYYMM (.met) @(\$CERESHOME/sarb/data/out_comp/qa_reports/sarb)	m	0.002	1/month	NONE	Archive, rm	No

- a. See Section 2.2 for information on variable data values
If “(.met)” is written next to an expected output filename, then the metadata file **must** exist with the identical filename and .met extension
- b. DB - File content is to be entered into the LaTIS Database
rm - remove
m - mandatory output
o - optional output
EOD - End of data month

2.7 Expected Temporary Files/Directories.

During execution, a temporary file is generated by PGE5.0P2. This file is named CER_PRESAH_\$\$\$5_\$PS5_\$CC5.\$YYYY\$MM, and is produced by the Surface Albedo Monthly Pre-Processor. During processing, this file is placed in the directory \$CERESHOME/sarb/data/ancillary/dynamic/sarb. The run script run_5.0P2.pl removes the file at the end of processing.

3.0 PGENAME: CER5.1P1

CER5.1P1 - CERES Instantaneous Surface and Atmospheric Radiation Budget (SARB) Subsystem Main-Processor and HDF Post-Processor

3.1 PGE Details

3.1.1 Responsible Persons

The Subsystem software analysts responsible for the development of PGE CER5.1P1 are listed in [Table 3-1](#).

Table 3-1. Subsystem Software Analysts Contacts

Item	Primary
Contact Name	Tom Caldwell
Organization	SSAI
Address	1 Enterprise Parkway
City	Hampton
State	VA 23666
Phone	(757) 951-1621
Fax	(757) 951-1900
LaRC e-mail	Thomas.E.Caldwell@nasa.gov

3.1.2 E-mail Distribution List

An E-mail distribution list can be obtained from the primary contact listed in [Table 3-1](#).

3.1.3 Parent PGE(s)

The PGEs listed in [Table 3-2](#) must successfully execute for the specified data set prior to executing PGE CER5.1P1.

Table 3-2. Parent PGEs for CER5.1P1

PGENAME	Description
CER4.5-6.1P1	Inversion to Instantaneous TOA Fluxes and Surface Fluxes
CER5.0P1	Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor
CER12.1P1	Regrid Meteorological, Ozone, and Aerosol (MOA) Subsystem

3.1.4 Target PGE(s)

[Table 3-3](#) lists the PGEs dependent on output from PGE CER5.1P1.

Table 3-3. Target PGEs after CER5.1P1

PGEName	Description
CER5.3P1	Instantaneous SARB Subsystem HDF Post-Processor (on as-needed basis only)
CER5.4P1	Instantaneous SARB Subsystem Monthly QC Post-Processor
CER6.1P1	Grid Single Satellite Fluxes and Clouds and Compute Spatial Averages Processor

3.2 Operating Environment

3.2.1 Runtime Parameters (A List of all Dynamic Parameters needed at Runtime)

The runtime parameters listed in [Table 3-4](#) are required for the instructions given in the remainder of Section 3.0 to process PGE CER5.1P1.

Table 3-4. Runtime Parameters for CER5.1P1

Parameter	Description	Data Type	Valid Values
DataDate	Data Date--yyyymmddhh, where yyyy = four-digit year mm = two-digit month dd = two-digit day hh = two-digit hour	l(10), where year = (l4.4) month = (l2.2) day = (l2.2) hour = (l2.2)	>1996 01 .. 12 01 .. 31 00 .. 23
DataDay	Data Day--yyyymmdd, where yyyy = four-digit year mm = two-digit month dd = two-digit day	l(8), where year = (l4.4) month = (l2.2) day = (l2.2)	>1996 01 .. 12 01 .. 31
DataMonth	Data Month--yyyymm, where yyyy = four-digit year mm = two-digit month	l(6), where year = (l4.4) month = (l2.2)	>1996 01 .. 12
PCFinfile	Name of input file to the PCF generator	ASCII	See Section 3.4
PCFname	Name of PCF file	ASCII	See Section 3.4

3.2.2 Environment Script Requirements

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

PGE CER5.1P1 references the environment variable script, **ENV5.1P1-env.csh**, which contains the following parameters:

SAT	- Satellite: see Production Request
INST	- Instrument: see Production Request
IMAG	- Imager: see Production Request
SS5	- Sampling Strategy for Instantaneous SARB: see Production Request
SS5_MATCH	- Flag to set MATCH data: C4 for collection 4, C5 for collection 5
SS4_5	- Sampling Strategy for Inversion: see Production Request
SS12	- Sampling Strategy for Regrid MOA: see Production Request
PS5	- Production Strategy for Instantaneous SARB: see Production Request
PS4_5	- Production Strategy for Inversion: see Production Request
PS12	- Production Strategy for Regrid MOA: see Production Request
CC5	- Configuration Code for Instantaneous SARB: see CM Database
CC4_5	- Configuration Code for Inversion: see CM Database
CC12	- Configuration Code for Regrid MOA: see CM Database
SW5	- SCCR number for current version of Instantaneous SARB software: see CM Database
DATA5	- SCCR number for current version of Instantaneous SARB input data: see CM Database

3.2.3 Execution Frequency

CER5.1P1 executes once per data hour, whenever all input data for an hour are available.

CER5.1P1 executes a maximum total of 744 times per month.

3.2.4 Memory/Disk Space/Time Requirements

Since the number of FOVs actually processed will vary, the time each run takes will vary. Other factors will cause a variation in timing results between runs also. While reasonably representative of the execution times of PGE CER5.1P1, the numbers listed below are based on one data hour only.

	Subset Mode	Full-Hour Mode
Memory:	61088 K	115296 K
Disk Space:	4540 MB	1364 MB
Total Run Time	5:30 minutes	2:43:11 hr

3.2.5 Restrictions Imposed in Processing Order

The Instantaneous SARB Surface Albedo Monthly Pre-Processor, PGE CER5.0P1, must be processed for the month before any executions of PGE CER5.1P1 can be processed. There are no restrictions in processing order within the month for PGE CER5.1P1.

3.3 Processor Dependencies (Previous PGEs, Ingest Data,..)

This section describes the nonancillary input files that are required for PGE CER5.1P1 processing. See Section 3.2 for variable information contained in the listed filenames.

3.3.1 Instantaneous SARB Subsystem Main-Processor

3.3.1.1 Input Dataset Name (#1): CER_SSFb - Hourly Binary SSF

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/inversion/data/out_comp/data/CER_SSFb_\$\$\$4_5_\$PS4_5_\$CC4_5.\$DataDate
 1. Mandatory/optional: **This file(s) is mandatory for all CERES instruments.**
 2. Time Related Dependency: **Input file must be for same hour to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
PGE CER4.5-6P1
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **189.3**

3.3.1.2 Input Dataset Name (#2): CER_MOA - CERES Hourly Meteorological, Ozone, and Aerosol Ancillary Input Data Set

- a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)
**\$CERESHOME/sarb/data/out_comp/data/regridmoa/
CER_MOA_\$\$\$12_\$PS12_\$CC12.YYYYMMDDHH,**

Where YYYYMMDDHH = \$DataDate when HH = 00, 06, 12, or 18

or

**CER_MOA_\$\$\$12_\$PS12_\$CC12.H1
CER_MOA_\$\$\$12_\$PS12_\$CC12.H2**

Where **H1** and **H2** are the ECMWF or DAS data dates (YYYYMMDDhh, where hh=00, 06, 12, 18) that are the closest to DataDate **YYYYMMDDHH**. **H1** must be 0-6 hours earlier than **YYYYMMDDHH**, and **H2** must be 0-6 hours later than **YYYYMMDDHH**. For values of YYYYMMDDHH where HH is greater than 18, the value of H2 will be for hour 00 of the next day.

1. Mandatory/optional: **This file(s) is mandatory for all CERES instruments.**
 2. Time Related Dependency: **Input file must correspond to the same hour to be processed--see Part (a) above.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source PGE name or Ingest Source):
PGE CER12.1P1

- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **13.31**

3.3.1.3 Input Dataset Name (#3): Monthly Surface Albedo History File

- a. Directory Location/Inputs Expected
\$CERESHOME/sarb/data/ancillary/dynamic/sarb/CER_HMPSAL_\$\$\$5_\$PS5_\$CC5.\$DataMonth
 1. Mandatory/optional: **This file(s) is mandatory for all CERES instruments.**
 2. Time Related Dependency: **Input file must be for the same month as data being processed.**
 3. Waiting Period: **N/A - As soon as available.**
- b. Source of Information (Source PGE name or Ingest Source):
PGE CER 5.0P1
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Needed for all hours within the same month.**
- e. Typical file size (MB): **4.66 MB**

3.3.1.4 Input Dataset Name (#4): CER_HMAER - Interpolated Daily MODIS Aerosol (IMA)

- a. Directory Location/Inputs Expected
\$CERESHOME/sarb/data/ancillary/dynamic/sarb/CER_HMAER_\$\$\$5_\$PS5_\$C5.\$DataMonth
 1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets. This file is not available for TRMM data sets.**
 2. Time Related Dependency: **Input file must be for the same month and instrument as data being processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source PGE name or Ingest Source):
PGE CER 5.0P1
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Needed for all hours within the same month.**
- e. Typical file size (MB): **61.30**

3.3.1.5 Input Dataset Name (#5): CER_SSFA - Hourly Binary SSF Supplemental Aerosol Files

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/inversion/data/out_comp/data/CER_SSFA_\$\$\$4_5_\$PS4_5_\$CC4_5.\$DataDate
 1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets. This file is not available for TRMM data sets.**
 2. Time Related Dependency: **Input file must be for same hour to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
PGE CER4.5-6P1
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **24.83**

3.3.1.6 Input Dataset Name (#6): MATCH_TERRA_AOTS_MODIS - Daily MATCH Climatological Aerosol Files

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/sarb/data/ancillary/static/sarb/match_aot/match_aots_ \$DataMonth/MATCH_TERRA_AOTS_MODIS.\$DataDay
 1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets if available. IF NOT AVAILABLE, CONTACT THE RESPONSIBLE PERSONS LISTED IN [Table 3-1](#) BEFORE ATTEMPTING TO RUN WITHOUT THE FILES. The files may be available, just not delivered to the operational environment. This file is not available for TRMM data sets. At this point in time, no distinction between Terra and Aqua is made in these filenames, i.e., all filenames contain the string "TERRA."**
 2. Time Related Dependency: **Input file must be for same day to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
Provided by responsible persons listed in [Table 3-1](#), using the CM delivery process.
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Retain.**
- e. Typical file size (MB): **0.38**

3.3.1.7 Input Dataset Name (#7): MATCH_TERRA_VERTICAL_MODIS - Daily MATCH Climatological Vertical Aerosol Files

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/sarb/data/ancillary/static/sarb/match_vert/match_verts_ \$DataMonth/MATCH_TERRA_VERTICAL_MODIS.\$DataDay
 1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets if available. IF NOT AVAILABLE, CONTACT THE RESPONSIBLE PERSONS LISTED IN Table 3-1 BEFORE ATTEMPTING TO RUN WITHOUT THE FILES. The files may be available, just not delivered to the operational environment. This file is not available for TRMM data sets. At this point in time, no distinction between Terra and Aqua is made in these filenames, i.e., all filenames contain the string "TERRA."**
 2. Time Related Dependency: **Input file must be for same day to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
Provided by responsible persons listed in Table 3-1, using the CM delivery process.
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Retain.**
- e. Typical file size (MB): **4.9**

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

The Main-Processor production script, runsarb, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing an ASCII file generator, ascii_gen_5.1P1, and then executing the PCF generator, pcfgen_5.1P1.

3.4.1 How to Generate the ASCII File

The ASCII file name generator requires one command-line argument, \$DataDate, as defined in Table 3-4.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.1P1/rcf
> ./ascii_gen_5.1P1 $DataDate
```

The following file will be generated in \$CERESHOME/sarb/CER5.1P1/rcf/pcf/:

CER5.1P1_PCFin_ \$SS5_ \$PS5_ \$CC5.\$DataDate

3.4.2 How to Generate the PCF File

The PCF generator, `pcfgen_5.1P1`, is executed using the newly created ASCII input file name as a command-line argument. See Section 3.2 for variable information.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/CER5.1P1/rcf/
> ./pcfgen_5.1P1 CER5.1P1_PCFin_$$$5_$PS5_$CC5.$DataDate
```

The following PCF will be generated in `$CERESHOME/sarb/CER5.1P1/rcf/pcf/`:

```
CER5.1P1_PCF_$$$5_$PS5_$CC5.$DataDate
```

3.4.3 How to Execute the Main-Processor

Execute the production script by typing the script name, `runsarb`, followed by a string which designates the name of the required PCF file. See Section 3.2 for variable information.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/CER5.1P1/rcf
> ./runsarb.pl CER5.1P1_PCF_$$$5_$PS5_$CC5.$DataDate
```

3.4.4 Special Case Considerations

N/A, at this time. Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

3.4.5 Special Reprocessing Instructions

All output files are opened with Status = NEW in CER5.1P1 software. These files must be removed before reprocessing. The script in the following instructions removes all files generated by the ascii file generator, the PCF generator, and the execution of the Subsystem software.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/CER5.1P1/rcf
> ./rm_script_5.1P1 CER5.1P1_PCF_$$$5_$PS5_$CC5.$DataDate
```

The script, `rm_script_5.1P1`, removes all files generated by the ASCII file name and PCF generators, along with files generated during the execution of `runsarb`.

3.5 Execution Evaluation

3.5.1 Exit Codes

The PGE CER5.1P1 terminates using the CERES-defined EXIT CODES for LaTIS as seen in Table 3-5. Other exit codes may appear from the program, which may be the result of a system, compiler, or Toolkit-related error. In these cases, contact the responsible person (see Table 3-1) for assistance.

Table 3-5. Exit Codes for CER5.1P1

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

3.5.2 Screen Messages

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

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

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: `$CERESHOME/sarb/runlogs/`. See Section 3.2 for information on variable fields within the file names.

1. Report Log File: CER5.1P1_LogReport_\$\$\$5_\$PS5_\$CC5.\$DataDate

The Report Log File contains the Instantaneous SARB-related messages. These messages may be strictly informative (Error Type = Notice or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Error). A comprehensive list of these messages, that can be generated during the execution of the PGE, is given in [Table B-1](#).

2. Status Log File: CER5.1P1_LogStatus_\$\$\$5_\$PS5_\$CC5.\$DataDate

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

3. User Log File: CER5.1P1_LogUser_\$\$\$5_\$PS5_\$CC5.\$DataDate

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

3.5.4 Solutions to Possible Problems

As mentioned in Section 3.4.5, all output files are opened with Status = NEW in the Instantaneous SARB Subsystem Main-Processor software. These files must be removed before reprocessing.

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

a. Subsystem Termination

If one hour fails, continue processing the next hour.

b. Target PGE Termination

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

3.6 Expected Output Dataset(s)

The expected output datasets for each instance of the PGE are listed in [Table 3-6](#). This PGE is expected to process 744 times, maximum, in a 31-day month.

Table 3-6. Expected Output File Listing for CER5.1P1

File Name ^a /Directory	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination ^b	Available Through Ordering Tool
CER5.1P1_PCF_\$\$\$5_\$PS5_\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/CER5.1P1/rcf/pcf)	m	x	1/hr	N/A	Archive, rm	No
CER5.1P1_PCFin_\$\$\$5_\$PS5_\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/CER5.1P1/rcf/pcf)	m	x	1/hr	N/A	Archive, rm	No
CER5.1P1_LogReport_\$\$\$5_\$PS5_\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/runlogs/)	m	x	1/hr	N/A	Archive, rm	No
CER5.1P1_LogStatus_\$\$\$5_\$PS5_\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/runlogs/)	m	x	1/hr	N/A	Archive, rm	No
CER5.1P1_LogUser_\$\$\$5_\$PS5_\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/runlogs/)	m	x	1/hr	N/A	Archive, rm	No
CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$YYYYMMDDHH(.met) @(\$CERESHOME/sarb/data/out_comp/data/sarb)	m	225.0	1/hr	CER6.1P1, CER5.4P1, CER5.3P1	Archive	No
CER_CRSVB_\$\$\$5_\$PS5_\$CC5.\$YYYYMMDDHH(.met) @(\$CERESHOME/sarb/data/out_comp/data/sarb)	m	1.64	1/hr	NONE	Archive, rm	No
CER_HQCR_\$\$\$5_\$PS5_\$CC5.\$YYYYMMDDHH(.met) @(\$CERESHOME/sarb/data/out_comp/qa_reports/sarb)	m	.09	1/hr		Archive, do not remove	No
CER_CRS_\$\$\$5_\$PS5_\$CC5.\$YYYYMMDDHH(.met) @(\$CERESHOME/sarb/data/out_comp/data/sarb)	m	225.0	1/hr	CER5.4P1	Archive, do not remove	No

a. See Section 3.2 for information on variable data values

If “(.met)” is written next to an expected output filename, then the metadata file **must** exist with the identical filename and .met extension

b. VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)

DB - File content is to be entered into the LaTIS Database

rm - remove

m - mandatory output

o - optional output

EOD - End of data month

3.7 Expected Temporary Files/Directories.

There are no temporary files or directories generated by PGE5.1P1.

4.0 PGENAME: CER5.1P2

CER5.1P2 - CERES Instantaneous Surface and Atmospheric Radiation Budget (SARB) Subsystem Main-Processor and HDF Post-Processor

4.1 PGE Details

4.1.1 Responsible Persons

The Subsystem software analysts responsible for the development of PGE CER5.1P2 are listed in [Table 4-1](#).

Table 4-1. Subsystem Software Analysts Contacts

Item	Primary
Contact Name	Tom Caldwell
Organization	SSAI
Address	1 Enterprise Parkway
City	Hampton
State	VA 23666
Phone	(757) 951-1621
Fax	(757) 951-1900
LaRC e-mail	Thomas.E.Caldwell@nasa.gov

4.1.2 E-mail Distribution List

An E-mail distribution list can be obtained from the primary contact listed in [Table 4-1](#).

4.1.3 Parent PGE(s)

The PGEs listed in [Table 4-2](#) must successfully execute for the specified data set prior to executing PGE CER5.1P2.

Table 4-2. Parent PGEs for CER5.1P2

PGENAME	Description
CER4.5-6.1P1	Inversion to Instantaneous TOA Fluxes and Surface Fluxes
CER5.0P1	Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor
CER12.1P1	Regrid Meteorological, Ozone, and Aerosol (MOA) Subsystem

4.1.4 Target PGE(s)

[Table 4-3](#) lists the PGEs dependent on output from PGE CER5.1P2.

Table 4-3. Target PGEs after CER5.1P2

PGEName	Description
CER5.3P1	Instantaneous SARB Subsystem HDF Post-Processor (on as-needed basis only)
CER5.4P2	Instantaneous SARB Subsystem Monthly QC Post-Processor
CER6.1P1	Grid Single Satellite Fluxes and Clouds and Compute Spatial Averages Processor

4.2 Operating Environment

4.2.1 Runtime Parameters (A List of all Dynamic Parameters needed at Runtime)

The runtime parameters listed in [Table 4-4](#) are required for the instructions given in the remainder of Section 4.0 to process PGE CER5.1P2.

Table 4-4. Runtime Parameters for CER5.1P2

Parameter	Description	Data Type	Valid Values
DataDate	Data Date--yyyymmddhh, where yyyy = four-digit year mm = two-digit month dd = two-digit day hh = two-digit hour	l(10), where year = (I4.4) month = (I2.2) day = (I2.2) hour = (I2.2)	>1996 01 .. 12 01 .. 31 00 .. 23
DataDay	Data Day--yyyymmdd, where yyyy = four-digit year mm = two-digit month dd = two-digit day	l(8), where year = (I4.4) month = (I2.2) day = (I2.2)	>1996 01 .. 12 01 .. 31
DataMonth	Data Month--yyyymm, where yyyy = four-digit year mm = two-digit month	l(6), where year = (I4.4) month = (I2.2)	>1996 01 .. 12
PCFinfile	Name of input file to the PCF generator	ASCII	See Section 4.4
PCFname	Name of PCF file	ASCII	See Section 4.4

4.2.2 Environment Script Requirements

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

PGE CER5.1P2 references the environment variable script, **ENV5.1P2-env.pl**, which contains the following parameters:

SAT	- Satellite: see Production Request
INST	- Instrument: see Production Request
IMAG	- Imager: see Production Request
SS5	- Sampling Strategy for Instantaneous SARB: see Production Request
SS5_MATCH	- Flag to set MATCH data: C4 for collection 4, C5 for collection 5
SS4_5	- Sampling Strategy for Inversion: see Production Request
SS12	- Sampling Strategy for Regrid MOA: see Production Request
PS5	- Production Strategy for Instantaneous SARB: see Production Request
PS4_5	- Production Strategy for Inversion: see Production Request
PS12	- Production Strategy for Regrid MOA: see Production Request
CC5	- Configuration Code for Instantaneous SARB: see CM Database
CC4_5	- Configuration Code for Inversion: see CM Database
CC12	- Configuration Code for Regrid MOA: see CM Database
SW5	- SCCR number for current version of Instantaneous SARB software: see CM Database
DATA5	- SCCR number for current version of Instantaneous SARB input data: see CM Database
InputCheck	- Variable to enable or disable PCF input checking: see CM database
PROD	- Yes if being run in production, no if being run in testing

4.2.3 Execution Frequency

CER5.1P2 executes once per data hour, whenever all input data for an hour are available.

CER5.1P2 executes a maximum total of 744 times per month.

4.2.4 Memory/Disk Space/Time Requirements

Since the number of FOVs actually processed will vary, the time each run takes will vary. Other factors will cause a variation in timing results between runs also. While reasonably representative of the execution times of PGE CER5.1P2, the numbers listed below are based on one data hour only.

	Subset Mode	Full-Hour Mode
Memory:	61088 K	115296 K
Disk Space:	4540 MB	1364 MB
Total Run Time	5:30 minutes	2:43:11 hr

4.2.5 Restrictions Imposed in Processing Order

The Instantaneous SARB Surface Albedo Monthly Pre-Processor, PGE CER5.0P1, must be processed for the month before any executions of PGE CER5.1P2 can be processed. There are no restrictions in processing order within the month for PGE CER5.1P2.

4.3 Processor Dependencies (Previous PGEs, Ingest Data,..)

This section describes the nonancillary input files that are required for PGE CER5.1P2 processing. See Section 4.2 for variable information contained in the listed filenames.

4.3.1 Instantaneous SARB Subsystem Main-Processor

4.3.1.1 Input Dataset Name (#1): CER_SSFb - Hourly Binary SSF

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/inversion/data/out_comp/data/CER_SSFb_\$\$\$4_5_\$PS4_5_\$CC4_5.\$DataDate
 1. Mandatory/optional: **This file(s) is mandatory for all CERES instruments.**
 2. Time Related Dependency: **Input file must be for same hour to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
PGE CER4.5-6P1
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **189.3**

4.3.1.2 Input Dataset Name (#2): CER_MOA - CERES Hourly Meteorological, Ozone, and Aerosol Ancillary Input Data Set

- a. Directory Location/Inputs Expected (Including .met files, Header files, etc.)
**\$CERESHOME/sarb/data/out_comp/data/regridmoa/
CER_MOA_\$\$\$12_\$PS12_\$CC12.YYYYMMDDHH,**

Where YYYYMMDDHH = \$DataDate when HH = 00, 06, 12, or 18

or

**CER_MOA_\$\$\$12_\$PS12_\$CC12.H1
CER_MOA_\$\$\$12_\$PS12_\$CC12.H2**

Where **H1** and **H2** are the ECMWF or DAS data dates (YYYYMMDDhh, where hh=00, 06, 12, 18) that are the closest to DataDate **YYYYMMDDHH**. **H1** must be 0-6 hours earlier than **YYYYMMDDHH**, and **H2** must be 0-6 hours later than **YYYYMMDDHH**. For values of YYYYMMDDHH where HH is greater than 18, the value of H2 will be for hour 00 of the next day.

1. Mandatory/optional: **This file(s) is mandatory for all CERES instruments.**
 2. Time Related Dependency: **Input file must correspond to the same hour to be processed--see Part (a) above.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source PGE name or Ingest Source):
PGE CER12.1P1

- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: Remove if all other dependent PGEs have processed.
- e. Typical file size (MB): **13.31**

4.3.1.3 Input Dataset Name (#3): Monthly Surface Albedo History File

- a. Directory Location/Inputs Expected
\$CERESHOME/sarb/data/ancillary/dynamic/sarb/CER_HMPSAL_\$\$\$5_\$PS5_\$CC5.\$DataMonth
 1. Mandatory/optional: **This file(s) is mandatory for all CERES instruments.**
 2. Time Related Dependency: **Input file must be for the same month as data being processed.**
 3. Waiting Period: **N/A - As soon as available.**
- b. Source of Information (Source PGE name or Ingest Source):
PGE CER 5.0P1
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Needed for all hours within the same month.**
- e. Typical file size (MB): **4.66 MB**

4.3.1.4 Input Dataset Name (#4): CER_HMAER - Interpolated Daily MODIS Aerosol (IMA)

- a. Directory Location/Inputs Expected
\$CERESHOME/sarb/data/ancillary/dynamic/sarb/CER_HMAER_\$\$\$5_\$PS5_\$C5.\$DataMonth
 1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets. This file is not available for TRMM data sets.**
 2. Time Related Dependency: **Input file must be for the same month and instrument as data being processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source PGE name or Ingest Source):
PGE CER 5.0P1
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Needed for all hours within the same month.**
- e. Typical file size (MB): **61.30**

4.3.1.5 Input Dataset Name (#5): CER_SSFA - Hourly Binary SSF Supplemental Aerosol Files

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/inversion/data/out_comp/data/CER_SSFA_\$\$\$4_5_\$PS4_5_\$CC4_5.\$DataDate
 1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets. This file is not available for TRMM data sets.**
 2. Time Related Dependency: **Input file must be for same hour to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
PGE CER4.5-6P1
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **24.83**

4.3.1.6 Input Dataset Name (#6): MATCH_TERRA_AOTS_MODIS - Daily MATCH Climatological Aerosol Files

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/sarb/data/ancillary/static/sarb/match_aot/match_aots_ \$DataMonth/MATCH_TERRA_AOTS_MODIS.\$DataDay
 1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets if available. IF NOT AVAILABLE, CONTACT THE RESPONSIBLE PERSONS LISTED IN [Table 4-1](#) BEFORE ATTEMPTING TO RUN WITHOUT THE FILES. The files may be available, just not delivered to the operational environment. This file is not available for TRMM data sets. At this point in time, no distinction between Terra and Aqua is made in these filenames, i.e., all filenames contain the string "TERRA."**
 2. Time Related Dependency: **Input file must be for same day to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
Provided by responsible persons listed in [Table 4-1](#), using the CM delivery process.
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Retain.**
- e. Typical file size (MB): **0.38**

4.3.1.7 Input Dataset Name (#7): MATCH_TERRA_VERTICAL_MODIS - Daily MATCH Climatological Vertical Aerosol Files

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/sarb/data/ancillary/static/sarb/match_vert/match_verts_ \$DataMonth/MATCH_TERRA_VERTICAL_MODIS.\$DataDay
 1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets if available. IF NOT AVAILABLE, CONTACT THE RESPONSIBLE PERSONS LISTED IN Table 4-1 BEFORE ATTEMPTING TO RUN WITHOUT THE FILES. The files may be available, just not delivered to the operational environment. This file is not available for TRMM data sets. At this point in time, no distinction between Terra and Aqua is made in these filenames, i.e., all filenames contain the string "TERRA."**
 2. Time Related Dependency: **Input file must be for same day to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
Provided by responsible persons listed in Table 4-1, using the CM delivery process.
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Retain.**
- e. Typical file size (MB): **4.9**

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

The Main-Processor production script, runsarb, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing an ASCII file generator, ascii_gen_5.1P2.pl, and then executing the PCF generator, pcfgen_5.1P2.pl.

4.4.1 How to Generate the ASCII File

The ASCII file name generator requires one command-line argument, \$DataDate, as defined in Table 4-4.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.1P2/rcf
> ./ascii_gen_5.1P2.pl $DataDate
```

The following file will be generated in \$CERESHOME/sarb/CER5.1P2/rcf/pcf/:

CER5.1P2_PCFin_ \$SS5_ \$PS5_ \$CC5.\$DataDate

4.4.2 How to Generate the PCF File

The PCF generator, `pcfgen_5.1P2.pl`, is executed using the newly created ASCII input file name as a command-line argument. See Section 4.2 for variable information.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/CER5.1P2/rcf/  
> ./pcfgen_5.1P2.pl CER5.1P2_PCFin_$$$5_$PS5_$CC5.$DataDate
```

The following PCF will be generated in `$CERESHOME/sarb/CER5.1P2/rcf/pcf/`:

```
CER5.1P2_PCF_$$$5_$PS5_$CC5.$DataDate
```

4.4.3 How to Execute the Main-Processor

Execute the production script by typing the script name, `runsarb.pl`, followed by a string which designates the name of the required PCF file. See Section 4.2 for variable information.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/CER5.1P2/rcf  
> ./runsarb.pl CER5.1P2_PCF_$$$5_$PS5_$CC5.$DataDate
```

4.4.4 Special Case Considerations

N/A, at this time. Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

4.4.5 Special Reprocessing Instructions

All output files are opened with Status = NEW in CER5.1P2 software. These files must be removed before reprocessing. The script in the following instructions removes all files generated by the ascii file generator, the PCF generator, and the execution of the Subsystem software.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/CER5.1P2/rcf  
> ./rm_script_5.1P2.pl CER5.1P2_PCF_$$$5_$PS5_$CC5.$DataDate
```

The script, `rm_script_5.1P2.pl`, removes all files generated by the ASCII file name and PCF generators, along with files generated during the execution of `runsarb`.

4.5 Execution Evaluation

4.5.1 Exit Codes

The PGE CER5.1P2 terminates using the CERES-defined EXIT CODES for 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 4-1) for assistance.

Table 4-5. Exit Codes for CER5.1P2

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

4.5.2 Screen Messages

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

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

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: `$CERESHOME/sarb/runlogs`. See Section 4.2 for information on variable fields within the file names.

1. Report Log File: CER5.1P2_LogReport_\$\$\$5_\$PS5_\$CC5.\$DataDate

The Report Log File contains the Instantaneous SARB-related messages. These messages may be strictly informative (Error Type = Notice or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Error). A comprehensive list of these messages, that can be generated during the execution of the PGE, is given in [Table B-1](#).

2. Status Log File: CER5.1P2_LogStatus_\$\$\$5_\$PS5_\$CC5.\$DataDate

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

3. User Log File: CER5.1P2_LogUser_\$\$\$5_\$PS5_\$CC5.\$DataDate

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

4.5.4 Solutions to Possible Problems

As mentioned in Section 4.4.5, all output files are opened with Status = NEW in the Instantaneous SARB Subsystem Main-Processor software. These files must be removed before reprocessing.

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

a. Subsystem Termination

If one hour fails, continue processing the next hour.

b. Target PGE Termination

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

4.6 Expected Output Dataset(s)

The expected output datasets for each instance of the PGE are listed in [Table 4-6](#). This PGE is expected to process 744 times, maximum, in a 31-day month.

Table 4-6. Expected Output File Listing for CER5.1P2

File Name ^a /Directory	m/o	File Size (MB)	Freq/PGE	Target PGE	Destination ^b	Available Through Ordering Tool
CER5.1P2_PCF_\$\$S5_\$\$PS5_\$\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/CER5.1P2/rcf/pcf)	m	x	1/hr	N/A	Archive, rm	No
CER5.1P2_PCFin_\$\$S5_\$\$PS5_\$\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/CER5.1P2/rcf/pcf)	m	x	1/hr	N/A	Archive, rm	No
CER5.1P2_LogReport_\$\$S5_\$\$PS5_\$\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/runlogs)	m	x	1/hr	N/A	Archive, rm	No
CER5.1P2_LogStatus_\$\$S5_\$\$PS5_\$\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/runlogs/)	m	x	1/hr	N/A	Archive, rm	No
CER5.1P2_LogUser_\$\$S5_\$\$PS5_\$\$CC5.\$YYYYMMDDHH @(\$CERESHOME/sarb/runlogs)	m	x	1/hr	N/A	Archive, rm	No
CER_CRSB_\$\$S5_\$\$PS5_\$\$CC5.\$YYYYMMDDHH(.met) @(\$CERESHOME/sarb/data/out_comp/data/sarb)	m	225.0	1/hr	CER6.1P1, CER5.4P2, CER5.3P1	Archive	No
CER_CRSVB_\$\$S5_\$\$PS5_\$\$CC5.\$YYYYMMDDHH(.met) @(\$CERESHOME/sarb/data/out_comp/data/sarb)	m	1.64	1/hr	NONE	Archive, rm	No
CER_HQCR_\$\$S5_\$\$PS5_\$\$CC5.\$YYYYMMDDHH(.met) @(\$CERESHOME/sarb/data/out_comp/qa_reports/sarb)	m	.09	1/hr		Archive, do not remove	No
CER_CRS_\$\$S5_\$\$PS5_\$\$CC5.\$YYYYMMDDHH(.met) @(\$CERESHOME/sarb/data/out_comp/data/sarb)	m	225.0	1/hr	CER5.4P2	Archive, do not remove	Yes

- a. See Section 4.2 for information on variable data values
If “(.met)” is written next to an expected output filename, then the metadata file **must** exist with the identical filename and .met extension
- b. VD - Validation Days in 1998 (Jan./5, 12, 19, 26/, Apr./6, 13, 20, 27/, July/6, 13, 20, 27/, Oct./5, 12, 19, 26/)
DB - File content is to be entered into the LaTIS Database
rm - remove
m - mandatory output
o - optional output
EOD - End of data month

4.7 Expected Temporary Files/Directories.

There are no temporary files or directories generated by PGE5.1P2.

5.0 PGEName: CER5.3P1

CER5.3P1 - CERES Instantaneous Surface and Atmospheric Radiation Budget (SARB) Subsystem HDF Post-Processor

5.1 PGE Details

5.1.1 Responsible Persons

The Subsystem software analysts responsible for the development of PGE CER5.3P1 are listed in [Table 5-1](#).

Table 5-1. Subsystem Software Analysts Contacts

Item	Primary
Contact Name	Tom Caldwell
Organization	SSAI
Address	1 Enterprise Parkway
City	Hampton
State	VA 23666
Phone	(757) 951-1621
Fax	(757) 951-1900
LaRC e-mail	Thomas.E.Caldwell@nasa.gov

5.1.2 E-mail Distribution List

An E-mail distribution list can be obtained from the primary contact listed in [Table 5-1](#).

5.1.3 Parent PGE(s)

The PGEs listed in [Table 5-2](#) must successfully execute for the specified data set prior to executing PGE CER5.3P1.

Table 5-2. Parent PGEs for CER5.3P1

PGEName	Description
CER4.5-6.1P1	Inversion to Instantaneous TOA Fluxes and Surface Fluxes
CER5.1P1	Instantaneous SARB Subsystem Main Processor

5.1.4 Target PGE(s)

[Table 5-3](#) lists the PGEs dependent on output from PGE CER5.3P1.

Table 5-3. Target PGEs after CER5.3P1

PGENAME	Description
N/A	No CERES PGE uses the CRS as input

5.2 Operating Environment

5.2.1 Runtime Parameters (A List of all Dynamic Parameters needed at Runtime)

The runtime parameters listed in [Table 5-4](#) are required for the instructions given in the remainder of [Section 5.0](#) to process PGE CER5.3P1.

Table 5-4. Runtime Parameters for CER5.3P1

Parameter	Description	Data Type	Valid Values
DataDate	Data Date--yyyymmddhh, where yyyy = four-digit year mm = two-digit month dd = two-digit day hh = two-digit hour	I(10), where year = (I4.4) month = (I2.2) day = (I2.2) hour = (I2.2)	>1996 01 .. 12 01 .. 31 00 .. 23
PCFinfile	Name of input file to the PCF generator	ASCII	See Section 5.4
PCFname	Name of PCF file	ASCII	See Section 5.4

5.2.2 Environment Script Requirements

Refer to the CERES internal paper ([Reference 1](#)) for a detailed description of the CERES environment parameters required by the CERES PGEs.

PGE CER5.1P1 references the environment variable script, **ENV5.3P1-env.csh**, which contains the following parameters:

- SS5 - Sampling Strategy for Instantaneous SARB (CRSB): see Production Request
- SS5_3 - Sampling Strategy for Instantaneous SARB (CRS): see Production Request
- SS4_5 - Sampling Strategy for Inversion (SSFA): see Production Request
- PS5 - Production Strategy for Instantaneous SARB (CRSB): see Production Request
- PS5_3 - Production Strategy for Instantaneous SARB (CRS): see Production Request
- PS4_5 - Production Strategy for Inversion (SSFA): see Production Request
- CC5 - Configuration Code for Instantaneous SARB (CRSB): see CM Database
- CC5_3 - Configuration Code for Instantaneous SARB (CRS): see CM Database

- CC4_5 - Configuration Code for Inversion (SSFA): see CM Database
- SW5_3 - SCCR number for current version of Instantaneous SARB software: see CM Database
- DATA5_3 - SCCR number for current version of Instantaneous SARB input data: see CM Database

5.2.3 Execution Frequency

CER5.3P1 executes once per data hour, whenever all input data for an hour are available. CER5.3P1 executes a maximum total of 744 times per month. CER5.3P1 is not routinely processed. A production request from the cognizant CERES personnel will indicate when to process CER5.3P1.

5.2.4 Memory/Disk Space/Time Requirements

Since the number of FOVs actually processed will vary, the time each run takes will vary. Other factors will cause a variation in timing results between runs also. While reasonably representative of the execution times of PGE CER5.3P1, the numbers listed below are based on one data hour only.

Memory:	157928 K
Disk Space:	458 MB
Total Run Time	2:19 minutes

5.2.5 Restrictions Imposed in Processing Order

There are no restrictions in processing order within the month for PGE CER5.3P1.

5.3 Processor Dependencies (Previous PGEs, Ingest Data,..)

This section describes the nonancillary input files that are required for PGE CER5.3P1 processing. See Section 5.2 for variable information contained in the listed filenames.

5.3.1 Instantaneous SARB Subsystem Post-Processor

5.3.1.1 Input Dataset Name (#1): CER_CRSB - Hourly Binary CRS Files

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

\$CERESHOME/sarb/data/out_comp/data/sarb/CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataDate

1. Mandatory/optional: **This file(s) is mandatory for all CERES instruments.**
 2. Time Related Dependency: **Input file must be for same hour to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
PGE CER5.1P1
 - c. Alternate Data Set, if one exists (maximum waiting period): **NONE**

- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **225**

5.3.1.2 Input Dataset Name (#2): CER_SSFA - Hourly Binary SSF Supplemental Aerosol Files

- a. Directory Location/Inputs Expected (Including .met files, header files, etc.):
\$CERESHOME/inversion/data/out_comp/data/CER_SSFA_\$\$\$4_5_\$PS4_5_\$CC4_5.\$DataDate
 1. Mandatory/optional: **This file is mandatory for Terra and Aqua data sets. This file is not available for TRMM data sets.**
 2. Time Related Dependency: **Input file must be for same hour to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
PGE CER4.5-6P1
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **24.83**

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

The Post-Processor production script, runsarb_post, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing an ASCII file generator, ascii_gen_5.3P1, and then executing the PCF generator, pcfgen_5.3P1.

5.4.1 How to Generate the ASCII File

The ASCII file name generator requires one command-line argument, \$DataDate, as defined in [Table 5-4](#).

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/bin/sarb
> ascii_gen_5.3P1 $DataDate
```

The following file will be generated in \$CERESHOME/sarb/rcf/PCFgen/sarb/:

CER5.3P1_PCFin_\$\$\$5_3_\$PS5_3_\$CC5_3.\$DataDate

5.4.2 How to Generate the PCF File

The PCF generator, `pcfgen_5.3P1`, is executed using the newly created ASCII input file name as a command-line argument. See Section 5.2 for variable information.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/bin/sarb/
> pcfgen_5.3P1 CER5.3P1_PCFin_$$$5_3_$PS5_3_$CC5_3.$DataDate
```

The following PCF will be generated in `$CERESHOME/sarb/rcf/pcf/sarb/`:

```
CER5.3P1_PCF_$$$5_3_$PS5_3_$CC5_3.$DataDate
```

5.4.3 How to Execute the Post-Processor

Execute the production script by typing the script name, `runsarb_post`, followed by a string which designates the name of the required PCF file. See Section 5.2 for variable information.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/bin/sarb
> runsarb_post CER5.3P1_PCF_$$$5_3_$PS5_3_$CC5_3.$DataDate
```

5.4.4 Special Case Considerations

N/A, at this time. Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

5.4.5 Special Reprocessing Instructions

All output files are opened with Status = NEW in CER5.3P1 software. These files must be removed before reprocessing. The script in the following instructions removes all files generated by the ascii file generator, the PCF generator, and the execution of the Subsystem software.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/bin/sarb
> rm_script_5.3P1 CER5.3P1_PCF_$$$5_3_$PS5_3_$CC5_3.$DataDate
```

The script, `rm_script_5.3P1`, removes all files generated by the ASCII file name and PCF generators, along with files generated during the execution of `runsarb_post`.

5.5 Execution Evaluation

5.5.1 Exit Codes

The PGE CER5.3P1 terminates using the CERES-defined EXIT CODES for 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 5-1](#)) for assistance.

Table 5-5. Exit Codes for CER5.3P1

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

5.5.2 Screen Messages

When running the production script, runsarb, 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.

5.5.3 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/sarb/data/runlogs/sarb`. See Section 5.2 for information on variable fields within the file names.

1. Report Log File: CER5.3P1_LogReport_\$\$\$5_3_\$PS5_3_\$CC5_3.\$DataDate

The Report Log File contains the Instantaneous SARB-related messages. These messages may be strictly informative (Error Type = Notice or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Error). A comprehensive list of these messages, that can be generated during the execution of the PGE, is given in [Table B-1](#).

2. Status Log File: CER5.3P1_LogStatus_\$\$\$5_3_\$PS5_3_\$CC5_3.\$DataDate

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

3. User Log File: CER5.3P1_LogUser_\$\$\$5_3_\$PS5_3_\$CC5_3.\$DataDate

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.

5.5.4 Solutions to Possible Problems

As mentioned in Section 5.4.5, all output files are opened with Status = NEW in the Instantaneous SARB Subsystem Main-Processor software. These files must be removed before reprocessing.

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

a. Subsystem Termination

If one hour fails, continue processing the next hour.

b. Target PGE Termination

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

5.6 Expected Output Dataset(s)

The expected output datasets for each instance of the PGE are listed in [Table 5-6](#). This PGE is expected to process 744 times, maximum, in a 31-day month.

Table 5-6. Expected Output File Listing for CER5.3P1

File Name ^a /Directory	m/o	File Size (MB)	Freq/PGE	Target PGE	Destination ^b	Available Through Ordering Tool
CER5.3P1_PCF_\$\$S5_3_\$PS5_3_\$CC5_3.\$YYYYMMDD HH@(\$CERESHOME/sarb/rcf/pcf/sarb)	m	x	1/hr	N/A	Archive, rm	No
CER5.3P1_PCFin_\$\$S5_3_\$PS5_3_\$CC5_3.\$YYYYMMDD HH@(\$CERESHOME/sarb/rcf/PCFgen/sarb)	m	x	1/hr	N/A	Archive, rm	No
CER5.3P1_LogReport_\$\$S5_3_\$PS5_3_\$CC5_3.\$YYYYMM DDHH@(\$CERESHOME/sarb/data/runlogs/sarb)	m	x	1/hr	N/A	Archive, rm	No
CER5.3P1_LogStatus_\$\$S5_3_\$PS5_3_\$CC5_3.\$YYYYMM DDHH@(\$CERESHOME/sarb/data/runlogs/sarb)	m	x	1/hr	N/A	Archive, rm	No
CER5.3P1_LogUser_\$\$S5_3_\$PS5_3_\$CC5_3.\$YYYYMM DDHH@(\$CERESHOME/sarb/data/runlogs/sarb)	m	x	1/hr	N/A	Archive, rm	No
CER_CRS_\$\$S5_3_\$PS5_3_\$CC5_3.\$YYYYMMDDHH (.met)@(\$CERESHOME/sarb/data/out_comp/data/sarb)	m	225.0	1/hr	NONE	Archive, rm	No

- a. See Section 5.2 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
m - mandatory output
o - optional output
EOD - End of data month

5.7 Expected Temporary Files/Directories.

There are no temporary files or directories generated by PGE5.3P1.

6.0 PGENAME: CER5.4P1

CER5.4P1 - CERES Instantaneous Surface and Atmospheric Radiation Budget (SARB) Subsystem Monthly Quality Control (QC) Summary Post-Processor

6.1 PGE Details

6.1.1 Responsible Persons

The Subsystem software analysts responsible for the development of PGE CER5.4P1 are listed in [Table 6-1](#).

Table 6-1. Subsystem Software Analysts Contacts

Item	Primary
Contact Name	Tom Caldwell
Organization	SSAI
Address	1 Enterprise Parkway
City	Hampton
State	VA 23666
Phone	(757) 951-1621
Fax	(757) 951-1900
LaRC e-mail	Thomas.E.Caldwell@nasa.gov

6.1.2 E-mail Distribution List

An E-mail distribution list can be obtained from the primary contact listed in [Table 6-1](#).

6.1.3 Parent PGE(s)

The PGEs listed in [Table 6-2](#) must successfully execute for the specified data set prior to executing PGE CER5.4P1.

Table 6-2. Parent PGEs for CER5.4P1

PGENAME	Description
CER5.1P1	Instantaneous SARB Subsystem Main-Processor

6.1.4 Target PGE(s)

[Table 6-3](#) lists the PGEs dependent on output from PGE CER5.4P1.

Table 6-3. Target PGEs after CER5.4P1

PGEName	Description
N/A	No CERES PGE uses output from CER5.4P1 as input

6.2 Operating Environment

6.2.1 Runtime Parameters (A List of all Dynamic Parameters needed at Runtime)

The runtime parameters listed in [Table 6-4](#) are required for the instructions given in the remainder of [Section 6.0](#) to process PGE CER5.4P1.

Table 6-4. Runtime Parameters for CER5.4P1

Parameter	Description	Data Type	Valid Values
DataMonth	Data Month--yyyymm, where yyyy = four-digit year mm = two-digit month	l(6), where year = (l4.4) month = (l2.2)	>1996 01 .. 12
PCFinfile	Name of input file to the PCF generator	ASCII	See Section 6.4
PCFname	Name of PCF file	ASCII	See Section 6.4

6.2.2 Environment Script Requirements

Refer to the CERES internal paper ([Reference 1](#)) for a detailed description of the CERES environment parameters required by the CERES PGEs.

PGE CER5.4P1 references the environment variable script, **ENV5.4P1-env.csh**, which contains the following parameters:

- SAT - Satellite: see Production Request
- INST - Instrument: see Production Request
- IMAG - Imager: see Production Request
- SS5 - Sampling Strategy for Instantaneous SARB (CRSB): see Production Request
- PS5 - Production Strategy for Instantaneous SARB (CRSB): see Production Request
- CC5_4 - Configuration Code for Instantaneous SARB Post Processor: see CM Database
- CC 5 - Configuration Code for Instantaneous SARB (CRSB): see CM Database
- SW5 - SCCR number for current version of Instantaneous SARB software: see CM Database
- DATA5 - SCCR number for current version of Instantaneous SARB input data: see CM Database

6.2.3 Execution Frequency

CER5.4P1 executes once per data month, whenever all hourly input data for the month are available.

6.2.4 Memory/Disk Space/Time Requirements

Since the number of hours actually processed per month will vary, the time each run takes will vary. Other factors will cause a variation in timing results between runs also. While reasonably representative of the execution times of PGE CER5.4P1, the numbers listed below are based on one data month only.

Memory:	22392 K
Disk Space:	1353 MB
Total Run Time	7:48 minutes

6.2.5 Restrictions Imposed in Processing Order

There are no restrictions in processing order within the month for PGE CER5.4P1.

6.3 Processor Dependencies (Previous PGEs, Ingest Data,..)

This section describes the nonancillary input files that are required for PGE CER5.4P1 processing. See Section 6.2 for variable information contained in the listed filenames.

6.3.1 Instantaneous SARB Subsystem Post-Processor

6.3.1.1 Input Dataset Name (#1): Pair: CER_CRSB - Hourly Binary CRS and CER_CRSB - Hourly CRS

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

\$CERESHOME/sarb/data/out_comp/data/sarb/

Pair1:

CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"0106"

CER_CRB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"0106"

Pair2:

CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"0809"

CER_CRB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"0809"

Pair3:

CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"1415"

CER_CRB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"1415"

Pair4:

CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"2118"

CER_CRB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"2118"

Pair5:**CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"3023"****CER_CRS_\$\$\$5_\$PS5_\$CC5.\$DataMonth"3023"**

1. Mandatory/optional: **The availability of at least one complete pair of files is mandatory. A set of routine hours throughout a data month were chosen at the time of delivery so that a decision regarding which hours to verify is not required each month. Multiple hours were chosen because for any month any hour could not be available, and with five routine hours the odds of having at least one pair available are greatly increased.**
 2. Time Related Dependency: **Input files must be for same month to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
- PGE CER5.1P1**
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
- d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
- e. Typical file size (MB): **CRSB - 225, CRS - 105**

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

The QC Summary Post-Processor production script, run_postss5.pl, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing an ASCII file generator, ascii_gen_5.4P1, and then executing the PCF generator, pcfgen_5.4P1.

6.4.1 How to Generate the ASCII File

The ASCII file name generator requires one command-line argument, \$DataMonth, as defined in [Table 6-4](#).

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.4P1/rcf
> ./ascii_gen_5.4P1 $DataMonth
```

The following file will be generated in \$CERESHOME/sarb/CER5.4P1/rcf/pcf/:

CER5.4P1_PCFin_\$\$\$5_\$PS5_\$CC5_4.\$DataMonth

6.4.2 How to Generate the PCF File

The PCF generator, pcfgen_5.4P1, is executed using the newly created ASCII input file name as a command-line argument. See Section [6.2](#) for variable information.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.4P1/rcf/
> ./pcfgen_5.4P1 CER5.4P1_PCFin_$$$5_$PS5_$CC5_4.$DataMonth
```

The following PCF will be generated in `$CERESHOME/sarb/CER5.4P1/rcf/pcf/`:

```
CER5.4P1_PCF_$$$5_$PS5_$CC5_4.$DataMonth
```

6.4.3 How to Execute the Monthly QC Post-Processor

Execute the production script by typing the script name, `run_postss5`, followed by a string which designates the name of the required PCF file. See Section 6.2 for variable information.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/CER5.4P1/rcf
> ./run_postss5 CER5.4P1_PCF_$$$5_$PS5_$CC5_4.$DataMonth
```

6.4.4 Special Case Considerations

N/A, at this time. Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

6.4.5 Special Reprocessing Instructions

All output files are opened with Status = NEW in CER5.4P1 software. These files must be removed before reprocessing. The script in the following instructions removes all files generated by the ascii file generator, the PCF generator, and the execution of the Subsystem software.

At the command-line (denoted by “>”) type:

```
> cd $CERESHOME/sarb/CER5.4P1/rcf
> ./rm_script_5.4P1 CER5.4P1_PCF_$$$5_$PS5_$CC5_4.$DataMonth
```

The script, `rm_script_5.4P1`, removes all files generated by the ASCII file name and PCF generators, along with files generated during the execution of `run_postss5`.

6.5 Execution Evaluation

6.5.1 Exit Codes

The PGE CER5.4P1 terminates using the CERES-defined EXIT CODES for 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 6-1) for assistance.

Table 6-5. Exit Codes for CER5.4P1

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

6.5.2 Screen Messages

When running the production script, runsarb, 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.

6.5.3 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/sarb/runlogs/`. See Section 6.2 for information on variable fields within the file names.

1. Report Log File: CER5.4P1_LogReport_\$\$\$5_\$PS5_\$CC5_4.\$DataMonth

The Report Log File contains the Instantaneous SARB-related messages. These messages may be strictly informative (Error Type = Notice or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Error). A comprehensive list of these messages, that can be generated during the execution of the PGE, is given in [Table B-1](#).

2. Status Log File: CER5.4P1_LogStatus_\$\$\$5_\$PS5_\$CC5_4.\$DataMonth

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

3. User Log File: CER5.4P1_LogUser_\$\$\$5_\$PS5_\$CC5_4.\$DataMonth

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.

6.5.4 Solutions to Possible Problems

As mentioned in Section 6.4.5, all output files are opened with Status = NEW in the Instantaneous SARB Subsystem Main-Processor software. These files must be removed before reprocessing.

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

a. Subsystem Termination

If one month fails, continue processing the next month.

b. Target PGE Termination

N/A

6.6 Expected Output Dataset(s)

The expected output datasets for each instance of the PGE are listed in [Table 6-6](#). This PGE is expected to process once per data month.

Table 6-6. Expected Output File Listing for CER5.4P1

File Name ^a /Directory	m/o	File Size (KB)	Freq/PGE	Target PGE	Destination ^b	Available Through Ordering Tool
CER5.4P1_PCF_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM @(\$CERESHOMe/sarb/CER5.4P1/rcf/pcf)	M	x	1/mn	N/A	Archive, rm	No
CER5.4P1_PCFin_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM @(\$CERESHOMe/sarb/CER5.4P1/rcf/pcf)	M	x	1/mn	N/A	Archive, rm	No
CER5.4P1_LogReport_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM @(\$CERESHOMe/sarb/runlogs)	M	x	1/mn	N/A	Archive, rm	No
CER5.4P1_LogStatus_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM @(\$CERESHOMe/sarb/runlogs)	M	x	1/mn	N/A	Archive, rm	No
CER5.4P1_LogUser_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM @(\$CERESHOMe/sarb/runlogs)	M	x	1/mn	N/A	Archive, rm	No

a. See Section 6.2 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

m - mandatory output

o - optional output

EOD - End of data month

6.7 Expected Temporary Files/Directories.

The expected temporary files for each instance of the PGE are listed in [Table 6-7](#). This PGE is expected to process once per data month.

Table 6-7. Expected Temporary File Listing for CER5.4P1

Day:Hour	Temporary CRSB files @(\$CERESHOMe/sarb/data/scr)	Temporary HCOMP files @(\$CERESHOMe/sarb/data/scr)
01:06	CER_CRSB_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"0106"	CER_HCOMP_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"0106"
08:09	CER_CRSB_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"0809"	CER_HCOMP_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"0809"
14:15	CER_CRSB_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"1415"	CER_HCOMP_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"1415"
21:18	CER_CRSB_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"2118"	CER_HCOMP_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"2118"
30:23	CER_CRSB_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"3023"	CER_HCOMP_\$\$S5_\$\$PS5_\$\$CC5_4.\$YYYYMM"3023"

7.0 PGEName: CER5.4P2

CER5.4P2 - CERES Instantaneous Surface and Atmospheric Radiation Budget (SARB) Subsystem Monthly Summary Post-Processor

7.1 PGE Details

7.1.1 Responsible Persons

The Subsystem software analysts responsible for the development of PGE CER5.4P2 are listed in [Table 7-1](#).

Table 7-1. Subsystem Software Analysts Contacts

Item	Primary
Contact Name	Tom Caldwell
Organization	SSAI
Address	1 Enterprise Parkway
City	Hampton
State	VA 23666
Phone	(757) 951-1621
Fax	(757) 951-1900
LaRC e-mail	Thomas.E.Caldwell@nasa.gov

7.1.2 E-mail Distribution List

An E-mail distribution list can be obtained from the primary contact listed in [Table 7-1](#).

7.1.3 Parent PGE(s)

The PGEs listed in [Table 7-2](#) must successfully execute for the specified data set prior to executing PGE CER5.4P2.

Table 7-2. Parent PGEs for CER5.4P2

PGEName	Description
CER5.1P2	Instantaneous SARB Subsystem Main-Processor

7.1.4 Target PGE(s)

[Table 7-3](#) lists the PGEs dependent on output from PGE CER5.4P2.

Table 7-3. Target PGEs after CER5.4P2

PGEName	Description
N/A	No CERES PGE uses output from CER5.4P2 as input

7.2 Operating Environment

7.2.1 Runtime Parameters (A List of all Dynamic Parameters needed at Runtime)

The runtime parameters listed in [Table 7-4](#) are required for the instructions given in the remainder of [Section 7.0](#) to process PGE CER5.4P2.

Table 7-4. Runtime Parameters for CER5.4P2

Parameter	Description	Data Type	Valid Values
DataMonth	Data Month--yyyymm, where yyyy = four-digit year mm = two-digit month	l(6), where year = (l4.4) month = (l2.2)	>1996 01 .. 12
PCFinfile	Name of input file to the PCF generator	ASCII	See Section 7.4
PCFname	Name of PCF file	ASCII	See Section 7.4

7.2.2 Environment Script Requirements

Refer to the CERES internal paper ([Reference 1](#)) for a detailed description of the CERES environment parameters required by the CERES PGEs.

PGE CER5.4P2 references the environment variable script, **ENV5.4P2-env.pl**, which contains the following parameters:

- SAT - Satellite: see Production Request
- INST - Instrument: see Production Request
- IMAG - Imager: see Production Request
- SS5 - Sampling Strategy for Instantaneous SARB (CRSB): see Production Request
- PS5 - Production Strategy for Instantaneous SARB (CRSB): see Production Request
- CC5_4 - Configuration Code for Instantaneous SARB Post Processor: see CM Database
- CC 5 - Configuration Code for Instantaneous SARB (CRSB): see CM Database
- SW5 - SCCR number for current version of Instantaneous SARB software: see CM Database
- DATA5 - SCCR number for current version of Instantaneous SARB input data: see CM Database

InputCheck - Variable to enable or disable PCF input checking: see CM database
 PROD - Yes if being run in production, no if being run in testing

7.2.3 Execution Frequency

CER5.4P2 executes once per data month, whenever all hourly input data for the month are available.

7.2.4 Memory/Disk Space/Time Requirements

Since the number of hours actually processed per month will vary, the time each run takes will vary. Other factors will cause a variation in timing results between runs also. While reasonably representative of the execution times of PGE CER5.4P2, the numbers listed below are based on one data month only.

Memory:	22392 K
Disk Space:	1353 MB
Total Run Time	7:48 minutes

7.2.5 Restrictions Imposed in Processing Order

There are no restrictions in processing order within the month for PGE CER5.4P2.

7.3 Processor Dependencies (Previous PGEs, Ingest Data,..)

This section describes the nonancillary input files that are required for PGE CER5.4P2 processing. See Section 7.2 for variable information contained in the listed filenames.

7.3.1 Instantaneous SARB Subsystem Post-Processor

7.3.1.1 Input Dataset Name (#1): Pair: CER_CRSB - Hourly Binary CRS and CER_CRSB - Hourly CRS

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

\$CERESHOME/sarb/data/out_comp/data/sarb/

Pair1:

CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"0106"

CER_CRB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"0106"

Pair2:

CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"0809"

CER_CRB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"0809"

Pair3:

CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"1415"

CER_CRB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"1415"

Pair4:

CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"2118"

CER_CRB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"2118"

Pair5:**CER_CRSB_\$\$\$5_\$PS5_\$CC5.\$DataMonth"3023"****CER_CRS_\$\$\$5_\$PS5_\$CC5.\$DataMonth"3023"**

1. Mandatory/optional: **The availability of at least one complete pair of files is mandatory. A set of routine hours throughout a data month were chosen at the time of delivery so that a decision regarding which hours to verify is not required each month. Multiple hours were chosen because for any month any hour could not be available, and with five routine hours the odds of having at least one pair available are greatly increased.**
 2. Time Related Dependency: **Input files must be for same month to be processed.**
 3. Waiting Period: **As soon as available.**
- b. Source of Information (Source is PGE name or Ingest Source):
- PGE CER5.1P2**
- c. Alternate Data Set, if one exists (maximum waiting period): **NONE**
 - d. File Disposition after successful execution: **Remove if all other dependent PGEs have processed.**
 - e. Typical file size (MB): **CRSB - 225, CRS - 105**

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

The Post-Processor production script, run_postss5.pl, references a Process Control File (PCF) which contains the correct file names and paths for the PGE. This PCF is created by first executing an ASCII file generator, ascii_gen_5.4P2.pl, and then executing the PCF generator, pcfgen_5.4P2.pl.

7.4.1 How to Generate the ASCII File

The ASCII file name generator requires one command-line argument, \$DataMonth, as defined in [Table 7-4](#).

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.4P2/rcf
> ./ascii_gen_5.4P2.pl $DataMonth
```

The following file will be generated in \$CERESHOME/sarb/CER5.4P2/rcf/pcf/:

CER5.4P2_PCFin_\$\$\$5_\$PS5_\$CC5_4.\$DataMonth

7.4.2 How to Generate the PCF File

The PCF generator, pcfgen_5.4P2, is executed using the newly created ASCII input file name as a command-line argument. See [Section 7.2](#) for variable information.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.4P2/rcf/
> ./pcfgen_5.4P2.pl CER5.4P2_PCFin_$$S5_$$PS5_$$CC5_4.$DataMonth
```

The following PCF will be generated in `$CERESHOME/sarb/CER5.4P2/rcf/pcf/`:

```
CER5.4P2_PCF_$$S5_$$PS5_$$CC5_4.$DataMonth
```

7.4.3 How to Execute the Monthly Post-Processor

Execute the production script by typing the script name, `run_postss5.pl`, followed by a string which designates the name of the required PCF file. See Section 7.2 for variable information. At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.4P2/rcf
> ./run_postss5.pl CER5.4P2_PCF_$$S5_$$PS5_$$CC5_4.$DataMonth
```

7.4.4 Special Case Considerations

N/A, at this time. Special case considerations will be handled on a case-by-case basis, where special instructions will accompany each special request.

7.4.5 Special Reprocessing Instructions

All output files are opened with Status = NEW in CER5.4P2 software. These files must be removed before reprocessing. The script in the following instructions removes all files generated by the ascii file generator, the PCF generator, and the execution of the Subsystem software.

At the command-line (denoted by ">") type:

```
> cd $CERESHOME/sarb/CER5.4P2/rcf
> ./rm_script_5.4P2.pl CER5.4P2_PCF_$$S5_$$PS5_$$CC5_4.$DataMonth
```

The script, `rm_script_5.4P2.pl`, removes all files generated by the ASCII file name and PCF generators, along with files generated during the execution of `runsarb_post`.

7.5 Execution Evaluation

7.5.1 Exit Codes

The PGE CER5.4P2 terminates using the CERES-defined EXIT CODES for 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 7-1) for assistance.

Table 7-5. Exit Codes for CER5.4P2

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

7.5.2 Screen Messages

When running the production script, runsarb, 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.

7.5.3 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/sarb/runlogs`. See Section 7.2 for information on variable fields within the file names.

1. Report Log File: CER5.4P2_LogReport_\$\$\$5_\$PS5_\$CC5_4.\$DataMonth

The Report Log File contains the Instantaneous SARB-related messages. These messages may be strictly informative (Error Type = Notice or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Error). A comprehensive list of these messages, that can be generated during the execution of the PGE, is given in [Table B-1](#).

2. Status Log File: CER5.4P2_LogStatus_\$\$\$5_\$PS5_\$CC5_4.\$DataMonth

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

3. User Log File: CER5.4P2_LogUser_\$\$\$5_\$PS5_\$CC5_4.\$DataMonth

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.

7.5.4 Solutions to Possible Problems

As mentioned in Section 7.4.5, all output files are opened with Status = NEW in the Instantaneous SARB Subsystem Main-Processor software. These files must be removed before reprocessing.

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

a. Subsystem Termination

If one month fails, continue processing the next month.

b. Target PGE Termination

N/A

7.6 Expected Output Dataset(s)

The expected output datasets for each instance of the PGE are listed in [Table 7-6](#). This PGE is expected to process once per data month.

Table 7-6. Expected Output File Listing for CER5.4P2

File Name ^a /Directory	m/o	File Size (KB)	Freq/PGE	Target PGE	Destination ^b	Available Through Ordering Tool
CER5.4P2_PCF_\$\$\$5_\$PS5_\$\$C5_4.\$YYYYMM @(\$CERESHOMe/sarb/CER5.4P2/rcf/pcf)	m	x	1/mn	N/A	Archive, rm	No
CER5.4P2_PCFin_\$\$\$5_\$PS5_\$\$C5_4.\$YYYYMM @(\$CERESHOMe/sarb/CER5.4P2/rcf/pcf)	m	x	1/mn	N/A	Archive, rm	No
CER5.4P2_LogReport_\$\$\$5_\$PS5_\$\$C5_4.\$YYYYMM @(\$CERESHOMe/sarb/runlogs)	m	x	1/mn	N/A	Archive, rm	No
CER5.4P2_LogStatus_\$\$\$5_\$PS5_\$\$C5_4.\$YYYYMM @(\$CERESHOMe/sarb/runlogs)	m	x	1/mn	N/A	Archive, rm	No
CER5.4P2_LogUser_\$\$\$5_\$PS5_\$\$C5_4.\$YYYYMM @(\$CERESHOMe/sarb/runlogs)	m	x	1/mn	N/A	Archive, rm	No

a. See Section 7.2 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

m - mandatory output

o - optional output

EOD - End of data month

7.7 Expected Temporary Files/Directories.

The expected temporary files for each instance of the PGE are listed in [Table 7-7](#). This PGE is expected to process once per data month.

Table 7-7. Expected Temporary File Listing for CER5.4P2

Day:Hour	Temporary CRSB files @(\$CERESHOME/sarb/data/scr)	Temporary HCOMP files @(\$CERESHOME/sarb/data/scr)
01:06	CER_CRSB_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"0106"	CER_HCOMP_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"0106"
08:09	CER_CRSB_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"0809"	CER_HCOMP_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"0809"
14:15	CER_CRSB_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"1415"	CER_HCOMP_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"1415"
21:18	CER_CRSB_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"2118"	CER_HCOMP_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"2118"
30:23	CER_CRSB_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"3023"	CER_HCOMP_\$\$S5_\$PS5_\$CC5_4.\$YYYYMM"3023"

References

1. CERES Internal Paper, "Sampling Strategy, Production Strategy, and Configuration Code Implementation at the Langley TRMM and Terra Information System (LATIS)." [URL: http://ceres.larc.nasa.gov/Internal/intern_docs.php](http://ceres.larc.nasa.gov/Internal/intern_docs.php)

Appendix A Acronyms and Abbreviations

ASDC	Atmospheric Sciences Data Center
CERES	Clouds and the Earth's Radiant Energy System
CRS	Cloud Radiative Swath
CRSB	Cloud Radiative Swath Binary
DAAC	Distributed Active Archive Center
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
GFDL	Geophysical Fluid Dynamics Laboratory
GSFC	Goddard Space Flight Center
HDF	Hierarchical Data Format
IMA	Interpolated Daily MODIS Aerosol
LaTIS	Langlely TRMM Information System
MB	Megabytes
met	metadata file
µm	microns
MOA	Meteorological, Ozone, and Aerosol
MODIS	Moderate Resolution Imaging Spectrometer
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
PCF	Process Control File
PGE	Product Generation Executives
QC	Quality Control
SAH	Surface Albedo History
SAIC	Science Applications International Corporation
SARB	Surface and Atmospheric Radiation Budget
SMF	Status Message File
SSAI	Science Systems and Applications, Inc.
SSF	Single Satellite CERES Footprint TOA and Surface Fluxes, Clouds
SSFA	Single Satellite CERES Footprint TOA and Surface Fluxes, Clouds, Aerosols
SSFB	Single Satellite CERES Footprint TOA and Surface Fluxes, Clouds Binary
TOA	Top-of-Atmosphere

TRMM Tropical Rainfall Measuring Mission
VD Validation Days

Appendix B Error Messages for Subsystem 5.0

Appendix B contains a comprehensive list of messages that can be generated during the execution of PGEs CER5.0P1, and CER5.1P1. 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 = Notice or Warning), or may indicate a fatal condition that results in premature PGE termination (Error Type = Error). 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 diagnostic messages for PGEs CER5.0P1, and CER5.1P1 (Main-Processor only). [Table B-2](#) contains a list of the PGE CER5.1P1 HDF Post-Processor diagnostic messages. Each table entry includes the message mnemonic, a brief description of the error, and the recommended action that should be taken when the message is encountered. The message mnemonic indicates the error type.

NOTE: Some messages may be generated from any one of multiple origins within the software. Instead of repeating the messages for each possible origin, these messages are simply preceded with “_____(),” and are located last in the table.

Operator Instructions:

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

1. Look at the last few records on the LogStatus file.
2. Find the error message in the following Error Message listing(s), and follow the appropriate ACTION

ACTION CODE	= 1 ; Verify that file exists
	= 2 ; Verify that the file size is correct
	= 3 ; Check the ASCII input file and PCF file for correctness
	= 4 ; No Action, call the Responsible Person in Table 1-1 for PGE CER5.0P1, or Table 3-1 for PGE CER5.1P1
	= 5 ; No Action, the PGE's QC report notifies the responsible person
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 (see ACTION CODE 4).
5. If the appropriate ACTION failed, then call the responsible person (see ACTION CODE 4).
6. In all cases, log all steps that were taken after the PGE failure, and send a copy to the responsible person (see ACTION CODE 4).

B.1 Error Messages for PGEs CER5.0P1, and CER5.1P1

Table B-1. TK (SMF) Utility Message Table for PGEs CER5.0P1, and CER5.1P1

Error Message/Description	Action Code
AerClim_OpenDrive (): Error ... Could not read MATCH data Error retrieving Collins aerosol climatology static ancillary input data filename from PCF	1,3
AerClim_OpenDrive (): Error ... Could not retrieve filename Error retrieving Collins aerosol climatology static ancillary input data filename from PCF	3
AerClim_OpenDrive (): Error ... Determining existence of Aer file Error determining the existence of the Collins aerosol climatology static ancillary input data file	3
DailySA_Close (): Error ... Cannot close daily SA file Error closing daily surface albedo history file	2,3
DailySA_Open (): Error ... Cannot open daily SA file Error opening a daily surface albedo history input file.	1,3
DailySA_Open (): Error ... Cannot read daily SA header Error reading a header record on a daily surface albedo history file	4
DailySA_Open (): Error ... Determining existence of file Error determining the existence of an input file	4
DailySA_Open (): Error ... Retrieving name of SA file Error retrieving daily surface albedo history input filename from PCF	3
DailySA_Process (): Error ... Cannot read daily SA file Error reading a daily surface albedo history input file	2,3
DataDate_Retrieve (): Error ... Retrieval of Day from PCF Error retrieving the data day from the PCF	3
DataDate_Retrieve (): Error ... Retrieval of Month from PCF Error retrieving the data month from the PCF	3
DataDate_Retrieve (): Error ... Retrieval of Year from PCF Error retrieving the data year from the PCF	3
Deriv_Init(): Error ... Unable to open DrivTab file Error opening derivative table input file; PCF logic ID # 1	1
dt_load(): Error ... bt read error Error reading the derivative tables from the static ancillary file; PCF logic ID # 1	2,3
dt_load(): Error ... ntbl is greater than maxsubtab Error reading the number of derivative tables from static ancillary file; PCF logic ID # 1	2,3
dt_load(): Error ... ntbl read error Error reading the derivative tables from the static ancillary file; PCF logic ID # 1	2,3
dt_load(): Error ... nword read error Error reading the sizes of the derivative tables from static ancillary file; PCF logic ID # 1	2,3
dt_tune_mem(): Warning ... Error in cloud fractional area adjustment Error encountered in constraint algorithm for indicated FOV. Store values from initial pass on output. Processing for current hour continues with next FOV.	5

Error Message/Description	Action Code
Finish_DailyPre5 (): Error ... Cannot close daily SA file Error closing daily surface albedo history file	2,3
Finish5(): Error ... SSF close failed Error closing primary input file; PCF Logic ID # 112	4
FLSA_LUT_Ingest (): Error ... Cannot close FLSALUT file Cannot close Fu-Liou Surface Albedo Lookup table input file	2,3
FLSA_LUT_Ingest (): Error ... Cannot open FLSALUT file Cannot open Fu-Liou Surface Albedo Lookup table input file	1,3
FLSA_LUT_Ingest (): Error ... Cannot read FLSALUT file Cannot read Fu-Liou Surface Albedo Lookup table input file	2,3
FluxRange_Check(): Warning ... Constr Dir/Diff Invalid Invalid direct/diffuse ratio value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Constr Dn LW Clr Invalid Invalid LW downwards clear sky flux profile value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Constr Dn LW Tot Invalid Invalid LW downwards total sky flux profile value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Constr Dn SW Clr Invalid Invalid SW downwards clear sky flux profile value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Constr Dn SW Tot Invalid Invalid SW downwards total sky flux profile value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Constr Up LW Clr Invalid Invalid LW upwards clear sky flux profile value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Constr Up LW Tot Invalid Invalid LW upwards total sky flux profile value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Constr Up SW Clr Invalid Invalid SW upwards clear sky flux profile value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Constr Up SW Tot Invalid Invalid SW upwards total sky flux profile value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Constr Up SW Tot Invalid Invalid SW upwards total sky flux profile value from constrained pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Init Dir/Diff Invalid Invalid direct/diffuse ratio value from initial pass for indicated FOV. Processing for current hour continues with next FOV.	5

Error Message/Description	Action Code
FluxRange_Check(): Warning ... Initial Dn LW Clr Invalid Invalid LW downwards clear sky flux profile value from initial pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Initial Dn LW Tot Invalid Invalid LW downwards total sky flux profile value from initial pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Initial Dn SW Clr Invalid Invalid SW downwards clear sky flux profile value from initial pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Initial Dn SW Tot Invalid Invalid SW downwards total sky flux profile value from initial pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Initial Up LW Clr Invalid Invalid LW upwards clear sky flux profile value from initial pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Initial Up LW Tot Invalid Invalid LW upwards total sky flux profile value from initial pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Initial Up SW Clr Invalid Invalid SW upwards clear sky flux profile value from initial pass for indicated FOV. Processing for current hour continues with next FOV.	5
FluxRange_Check(): Warning ... Initial Up SW Tot Invalid Invalid SW upwards total sky flux profile value from initial pass for indicated FOV. Processing for current hour continues with next FOV.	5
FOV_Process () Error ... Cannot read SSF input file Error reading SSF input file	2,3
FOV_Process () Error ... Writing record to output Error writing a record to the daily surface albedo history output file	4
GADSAer_Ingest (): Error ... Sbr. GADSAer_Ingest -- File OPEN Error opening GADS aerosol climatology ancillary input data file	1,3
GADSAer_Ingest (): Error ... Sbr. GADSAer_Ingest -- File READ Error reading GADS aerosol climatology ancillary input data file	2,3
HCM_OcnAlb_Ingest (): Error ... Cannot close H-C-M OcnAlb file Error closing Hu-Cox-Munk Surface Albedo over Ocean ancillary input data file	2,3
HCM_OcnAlb_Ingest (): Error ... Cannot open H-C-M OcnAlb file Error opening Hu-Cox-Munk Surface Albedo over Ocean ancillary input data file	1,3
HCM_OcnAlb_Ingest (): Error ... Cannot read H-C-M OcnAlb file Error reading Hu-Cox-Munk Surface Albedo over Ocean ancillary input data file	2,3
HCM_OcnAlb_Ingest (): Error ... Cannot write H-C-M OcnAlb file Error writing to Hu-Cox-Munk Surface Albedo over Ocean ancillary input data file	1,3
Header_WrapUp () Error ... Cannot write header data Error writing header to daily surface albedo history output file	4

Error Message/Description	Action Code
IGBP_Ingest (): Error ... Cannot close IGBP file Error closing IGBP ancillary input data file	2,3
IGBP_Ingest (): Error ... Cannot open IGBP file Error opening IGBP ancillary input data file	1,3
IGBP_Ingest (): Error ... Cannot read IGBP file Error reading IGBP ancillary input data file	2,3
Ingest_Input(): Error ... Unable to open SSF Error opening primary input file; PCF Logic ID # 112	1,3
Ingest_Input(): Error ... Unable to read SSF file Error reading primary input file; PCF Logic ID # 112	2,3
Input_Close () Error ... Cannot close SSF file Error closing SSF input file	4
Input_Open () Error ... Cannot open SSF file Error opening SSF input file	1,3
Input_Open () Error ... Retrieving SSF Name from PCF Error retrieving the name of the SSFB input file contained in the PCF	3
Input_Open () Error ... Determining existence of SSF Error determining whether or not a specified SSFB input file exists	3
InstSARB_Meta_Drv (): Error ... Write fail on CRSB metadata Error writing meta data file for the CRSB product	3
InstSARB_Meta_Drv (): Error ... Write fail on Main-Proc QC metadata Error writing meta data file for the Instantaneous SARB Main-Processor QC Report file	3
LUDCOMP(): Warning ... Matrix is singular Error encountered in constraint algorithm for indicated FOV. Store values from initial pass on output. Processing for current hour continues with next FOV.	5
MonQC_WrapUp () Error ... Cannot close monthly QC file Error closing Monthly Surface Albedo History QC Report output file	2,3
MonQC_WrapUp () Error ... Cannot open monthly QC file Error opening Monthly Surface Albedo History QC Report output file	3
MonQC_WrapUp () Error ... Cannot write monthly QC file Error writing to Monthly Surface Albedo History QC Report output file	4
MonSA_Ingest (): Error ... Cannot close monthly SA file Error closing Monthly Surface Albedo History ancillary input data file	2,3
MonSA_Ingest (): Error ... Cannot open monthly SA file Error opening Monthly Surface Albedo History ancillary input data file	1,3
MonSA_Ingest (): Error ... Cannot read monthly SA file Error reading Monthly Surface Albedo History ancillary input data file	2,3
MonSA_Output (): Error ... Cannot close monthly SA file Error closing Monthly Surface Albedo History output data file	2,3
MonSA_Output (): Error ... Cannot open monthly SA file Error opening Monthly Surface Albedo History output data file	1,3

Error Message/Description	Action Code
MonSA_Output (): Error ... Cannot write monthly SA file Error writing Monthly Surface Albedo History output data file	2,3
PreSS5_Daily_MetaDrv (): Error ... Write fail on Daily SAH metadata Error writing meta data file for the Daily SAH file	3
PreSS5_DayMerge_MetaDrv (): Error ... Write fail on Monthly QC metadata Error writing meta data file for the Monthly SAH QC Report file	3
PreSS5_DayMerge_MetaDrv (): Error ... Write fail on Non-Prod SAH metadata Error writing meta data file for the Monthly non-production SAH file	3
PreSS5_DayMerge_MetaDrv (): Error ... Write fail on Prod SAH metadata Error writing meta data file for the Monthly SAH file to be used in production processing	3
Output_Open () Error ... Unable to open output file Error opening daily surface albedo output file	3
QC5_Close(): Error ... QC report close failed Error closing Instantaneous SARB QC Report output file; PCF Logic ID # 57	4
QC5_Open(): Error ... QC report open failed Error opening Instantaneous SARB QC Report output file; PCF Logic ID # 57	3
SfcAlb_Drv(): Warning ... Sbr. SfcAlb_Drv -- Invalid CERES scene id Invalid CERES scene type value for indicated FOV. Processing for current hour continues with next FOV.	5
SfcAlb_Drv(): Warning ... Sbr. SfcAlb_Drv -- Invalid ERBE scene id Invalid ERBE scene type value for indicated FOV. Processing for current hour continues with next FOV.	5
SSFA_Reclngest(): ERROR ... No latitude for validation No latitudinal coordinate provided for validation.	4
SSFA_Reclngest(): ERROR ... No longitude for validation Latitudinal coordinate provided for validation, but no longitudinal coordinate.	4
SSFA_Reclngest(): ERROR ... SSFA record read error Error reading supplemental SSFA aerosol data record.	2,3
SSFA_Reclngest(): ERROR ... Supp Aer latitude mismatch SSF and SSFA latitude mismatch.	3
SSFA_Reclngest(): ERROR ... Supp Aer longitude mismatch SSF and SSFA longitude mismatch.	3
st_get_nl(): Warning ... Sbr. st_get_nl -- Sigma table maxtune Unable to retrieve correct sigma table value. Value for iav (1,ia) exceeds value for maxtune parameter for indicated FOV. Processing for current hour continues with next FOV.	5
st_get_nl(): Warning ... Sbr. st_get_nl -- Sigma table mcldc Unable to retrieve correct sigma table value. Value for iav (2,ia) exceeds value for mcldc parameter for indicated FOV. Processing for current hour continues with next FOV.	5
st_get_nl(): Warning ... Sbr. st_get_nl -- Sigma table nsid Unable to retrieve correct sigma table value. Value for iav (3,ia) exceeds value for nsid parameter for indicated FOV. Processing for current hour continues with next FOV.	5

Error Message/Description	Action Code
st_load(): Error ... NCASE is greater than MCASE Invalid value of either NCASE or MCASE parameters in the static ancillary input data file; PCF logic ID # 2	2,3
st_load(): Error ... NSID is greater than MSID Invalid value of either NSID or MSID parameters in the static ancillary input data file; PCF logic ID # 2	2,3
st_load(): Error ... Sigma LUT pointer out of range Error encountered in constraint algorithm for indicated FOV. Store values from initial pass on output. Processing for current hour continues with next FOV.	5
st_load(): Error ... Unable to read namelist ST_CASE Unable to read namelist ST_CASE from the static ancillary input data file; PCF logic ID # 2	2,3
st_load(): Error ... Unable to read namelist ST_SIGF Unable to read namelist ST_SIGF from the static ancillary input data file; PCF logic ID # 2	2,3
st_load(): Error ... Unable to read namelist ST_SIGV Unable to read namelist ST_SIGV from the static ancillary input data file; PCF logic ID # 2	2,3
st_load(): Error ... Unable to read sigma table parameters Error reading sigma table-static ancillary input data file; PCF logic ID # 2	2,3
st_load(): Error ... Unable to read namelist ST_VERS Error reading sigma table-static ancillary input data file version number; PCF logic ID # 2	2,3
tridag(): Warning ... Sbr. tridag, Constr -- Pause 1 Invalid value encountered for indicated FOV in radiative transfer model at first Fu-Liou PAUSE during the constrained pass. Processing for current hour continues with next FOV.	5
tridag(): Warning ... Sbr. tridag, Constr -- Pause 2 Invalid value encountered for indicated FOV in radiative transfer model at second Fu-Liou PAUSE during the constrained pass. Processing for current hour continues with next FOV.	5
tridag(): Warning ... Sbr. tridag, Initial -- Pause 1 Invalid value encountered for indicated FOV in radiative transfer model at first Fu-Liou PAUSE during the initial pass. Processing for current hour continues with next FOV.	5
tridag(): Warning ... Sbr. tridag, Initial -- Pause 2 Invalid value encountered for indicated FOV in radiative transfer model at second Fu-Liou PAUSE during the initial pass. Processing for current hour continues with next FOV.	5
Tune_Drv(): Warning ... Aerosol Optical Depth Out Of Range Adjusted aerosol optical depth value out-of-range for indicated FOV. Store values from initial pass on output. Processing for current hour continues with next FOV.	5
tune_xxx(): Warning ... Adjusted cloud fractional area out of range Error encountered in constraint algorithm for indicated FOV. Store values from initial pass on output. Processing for current hour continues with next FOV.	5
tune_xxx(): Warning ... Tunexxx is in error Error encountered in constraint algorithm for indicated FOV. Store values from initial pass on output. Processing for current hour continues with next FOV.	5

Error Message/Description	Action Code
____(): ERROR ... Determining if file exists Error encountered determining whether or not a file exists	3
____(): ERROR ... Determining valid HDF file Error encountered reading a daily MODIS MOD08 aerosol.data value	1,2,3
____(): ERROR ... Failure closing file Error encountered closing a file	4
____(): ERROR ... Failure closing HDF file Error encountered reading a daily MODIS MOD08 aerosol.data value	4
____(): ERROR ... Failure opening file Error encountered opening a file	3
____(): ERROR ... Failure opening HDF file Error encountered reading a daily MODIS MOD08 aerosol.data value	1,2,3
____(): ERROR ... Missing Day run-time LID Retrieval of day run-time parameter requested, but no LID provided	4
____(): ERROR ... Missing Hour run-time LID Retrieval of hour run-time parameter requested, but no LID provided	4
____(): ERROR ... Missing Month run-time LID Retrieval of month run-time parameter requested, but no LID provided	4
____(): ERROR ... Missing Year run-time LID Retrieval of year run-time parameter requested, but no LID provided	4
____(): ERROR ... No DA file record length No record length provided for opening a direct access file	4
____(): ERROR ... Read of Angstrom Exp 1 Ocean_Mean Error encountered reading a daily MODIS MOD08 aerosol.data value	1,4
____(): ERROR ... Read of Angstrom Exp 2 Ocean_Mean Error encountered reading a daily MODIS MOD08 aerosol.data value	1,4
____(): ERROR ... Read of Continental Optical Depth Mean Error encountered reading a daily MODIS MOD08 aerosol.data value	1,4
____(): ERROR ... Read of Effective Optical Depth Ocean Mean Error encountered reading a daily MODIS MOD08 aerosol.data value	1,4
____(): ERROR ... Read of Mean Reflectance Land All QA66 Mean Error encountered reading a daily MODIS MOD08 aerosol.data value	1,4
____(): ERROR ... Read of Optical Depth Dust Mean Error encountered reading a daily MODIS MOD08 aerosol.data value	1,4
____(): ERROR ... Read of Optical Depth Land Ocean Mean Error encountered reading a daily MODIS MOD08 aerosol.data value	1,4
____(): ERROR ... Read of Optical Depth Smoke Mean Error encountered reading a daily MODIS MOD08 aerosol.data value	1,4

Error Message/Description	Action Code
____(): ERROR ... Read of Optical Depth Sulfate Mean Error encountered reading a daily MODIS MOD08 aerosol.data value	1,4
____(): ERROR ... Retrieving Day PCF run-time Error encountered retrieving day from PCF	3
____(): ERROR ... Retrieving file name Error encountered retrieving filename from PCF	3
____(): ERROR ... Retrieving Hour PCF run-time Error encountered retrieving hour from PCF	3
____(): ERROR ... Retrieving Month PCF run-time Error encountered retrieving month from PCF	3
____(): ERROR ... Retrieving Year PCF run-time Error encountered retrieving year from PCF	3

B.1.1 Error Messages for PGE CER5.1P1 HDF Post-Processor

Table B-2. PGE CER5.1P1 HDF Post-Processor Error Messages

Message	Module Name	Error Type	Action
200: CRS QA Flag set to QA_FAIL. HDF file will not be created.	crs2hdf	Fatal	This hour should not be run while CRSB QA flag is set to FAIL
201: subroutine crs_open could not open CRS file	crs2hdf	Fatal	Check PCF file for request name and location of CRSB file. Verify file exists in that location. PCF logic ID #7
202: problem closing the CRS file	crs2hdf	Fatal	Check for system problem
203: Could not open HDF file, XXX	crs2hdf	Fatal	Check PCF file for request name and location of CRS file. PCF logic ID #102
204: error initializing HDF file	crs2hdf	Fatal	Check for system problem
205: Unable to write header to HDF file XXX	crs2hdf	Fatal	Check for system problem
206: Could not close, XXX	crs2hdf	Fatal	Check for system problem
207: error closing the HDF file	crs2hdf	Fatal	Check for system problem
208: Unable to write XXX SDS for YYY for record number ZZ	crs2hdf	Fatal	Check for system problem
209: Unable to read XXX SDS for YYY for record number ZZ	crs2hdf	Fatal	Contact Analyst listed in Table 3-1
210: Invalid SDS number. Correct numbers are 1 through 185.	crs2hdf	Fatal	Contact Analyst listed in Table 3-1