

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

## **Data Management System**

### **CERES Instantaneous SARB (Subsystem 5.0)**

#### **Release 5 Test Plan Version 7**

#### **Primary Authors**

*Tom Caldwell<sup>1</sup>*

<sup>1</sup>Science Systems and Applications, Inc. (SSAI)  
One Enterprise Parkway, Suite 200  
Hampton, VA 23666

NASA Langley Research Center  
Climate Science Branch  
Science Directorate  
21 Langley Boulevard  
Hampton, VA 23681-2199

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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"> <li>• Indicated in bold, red, italicized print which sections were to be skipped for SCCR #267 testing.</li> <li>• Reordered file name listings and diff statements so that all the files in a given directory can be listed or diffed before files in other directories are listed or diffed.</li> <li>• Redirected output from HDF comparison programs to separate files.</li> <li>• Updated format to comply with standards.</li> </ul>	Secs. 2.2.1, 2.2.2, 3.1, & 3.2  Sec. 3.3  Secs. 3.3.2.4.1, 3.3.2.4.2, & 3.3.2.6  All
12/07/01	R3V3	315	<ul style="list-style-type: none"> <li>• Removed red-lettered statements directing tester to skip indicated sections.</li> <li>• Updated timing information.</li> <li>• Added instructions to execute clean-up script prior to generating any files for a test case.</li> <li>• Added instructions for copying input files from other subsystems to the appropriate directories to instructions for testing the subset mode.</li> <li>• Updated format to comply with standards.</li> </ul>	Secs. 2.0 & 3.0  Sec. 3.3  Sec. 3.3  Sec. 3.3  All
12/20/02	R3V4	408	<ul style="list-style-type: none"> <li>• Removed sections pertaining to the PGE CER5.2P1.</li> <li>• Removed the separate test instructions for the Subset Mode and included evaluation steps for the CRSVB (subsetted CRS) product with those for evaluating the CRSB product. References to "Full-Hour MODE" and "Subset MODE" were also removed.</li> <li>• Added separate test instructions for the Terra satellite.</li> <li>• Updated format to comply with standards.</li> </ul>	Sec. 3.0  Sec. 3.0  Sec. 3.0  All

## Document Revision Record

SCCR Approval Date	Release/Version Number	SCCR Number	Description of Revision	Section(s) Affected
01/27/03	R3V5	419	<ul style="list-style-type: none"> <li>Added sections pertaining to the PGE CER5.3P1.</li> <li>Updated format to comply with standards.</li> </ul>	<p>Sec. 3.0</p> <p>All</p>
07/30/03	R3V6	458	<ul style="list-style-type: none"> <li>Changed PGE5.2 to 5.0P1.</li> <li>Updated run times.</li> <li>Modified filenames.</li> <li>Modified description of script.</li> <li>Updated format to comply with standards.</li> </ul>	<p>Sec. 3.1.2.4</p> <p>Secs. 3.2.1.4, 3.4.1.1.2, &amp; 3.6.1.1.2</p> <p>Secs. 3.2 &amp; 3.6</p> <p>Sec. 3.4.1.1</p> <p>All</p>
09/11/03	R3V7	468	<ul style="list-style-type: none"> <li>Added sections pertaining to new test cases for PGE CER5.0P1.</li> <li>Added sections pertaining to new PGE CER5.4P1.</li> <li>Updated run times.</li> <li>Updated format to comply with standards.</li> </ul>	<p>Secs. 3.2, 3.3, &amp; 3.4</p> <p>Sec. 3.9</p> <p>Secs. 3.2.1.4, 3.3.1.4, &amp; 3.4.1.4</p> <p>All</p>
09/30/03	R3V8	469	<ul style="list-style-type: none"> <li>Changed data date from 2001070500 to 2001071200.</li> <li>Updated format to comply with standards.</li> </ul>	<p>Secs. 3.8.1.1, 3.8.2.1, 3.8.2.2, 3.8.2.3, &amp; 3.8.3</p> <p>All</p>
01/16/04	R3V9	498	<ul style="list-style-type: none"> <li>Removed section for Version 3 MODIS testing of CER5.0P1.</li> <li>Changed testing strings to predefined variables.</li> <li>Updated format to comply with standards.</li> </ul>	<p>Sec. 3.2</p> <p>All</p> <p>All</p>
02/26/04	R3V10	505	<ul style="list-style-type: none"> <li>In the Log and Status File Results sections, the second LogReport in each filename was changed to LogStatus.</li> <li>The Total Run Time was changed.</li> <li>Updated format to comply with standards.</li> </ul>	<p>Secs. 3.1.2.1, 3.2.2.1, 3.3.2.1, 3.5.2.1, 3.7.2.1, &amp; 3.8.2.1</p> <p>Sec. 3.2.1.4</p> <p>All</p>
03/24/04	R3V11	515	<ul style="list-style-type: none"> <li>Modified description of PGE CER5.4P1.</li> <li>Updated SCCR number in tar filenames.</li> <li>Added filenames to list of outputs.</li> <li>Modified runtimes for PGE CER5.4P1.</li> <li>Added comparisons for new filenames.</li> <li>Updated App. B directory structure chart.</li> </ul>	<p>Sec. 1.2.4</p> <p>Sec. 2.1</p> <p>Sec. 3.8.1.1</p> <p>Sec. 3.8.1.1.2</p> <p>Sec. 3.8.2.2</p> <p>Appendix B</p>

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03/24/04 (Cont'd)	R3V11	515	<ul style="list-style-type: none"> <li>Updated format to comply with standards.</li> </ul>	All
06/28/04	R4V1	541	<ul style="list-style-type: none"> <li>Changed Release 3 to Release 4.</li> <li>Added MYD08 to aerosol filenames.</li> <li>Added tar file name to instructions.</li> <li>Corrected errors in instructions.</li> <li>Changed Date and Instance variables.</li> <li>Changed run time results.</li> <li>Added step for copying input files.</li> <li>Modified 5.0P1 comparison software script.</li> <li>Corrected step for copying input files used in PGE 5.1P1.</li> </ul>	Sec. 1.1 Sec. 1.2.1 Sec. 2.1 Sec. 2.2.2 Secs. 3.2.1.1, 3.3.1.1, 3.5.1.1, & 3.6.1.1 Secs. 3.2.1.4, 3.3.1.4, 3.5.1.1.2, & 3.6.1.1.2 Secs. 3.2.1.1 & 3.3.1.1 Secs. 3.2.2.3 & 3.3.2.3 Secs. 3.4.1.1, 3.5.1.1, 3.6.1.1
06/28/04 (Cont'd)	R4V1	541	<ul style="list-style-type: none"> <li>Correction: changed 5.0 to 5.1.</li> <li>Changed hcmp to HDF Post-Processor.</li> <li>Modified 5.1P1 comparison software script.</li> <li>Added Section 3.6 for PGE 5.1 Aqua test case.</li> <li>Added Section 3.10 for PGE 5.4 Aqua test case.</li> <li>Updated the way HTML code is developed.</li> <li>Updated format to comply with standards.</li> </ul>	Secs. 3.4.1.3, 3.4.1.5, 3.5.2.3, & 3.5.2.5 Secs. 3.4.1.6, 3.5.2.6, 3.7.1.4, & 3.8.2.4 Secs. 3.4.1.4, 3.5.2.4, 3.7.1.3, & 3.8.2.3 Sec. 3.6 Sec. 3.10 Secs. 3.9 & 3.10 All
03/11/05	R4V2	580	<ul style="list-style-type: none"> <li>Added FM1 and FM2 tests for Terra.</li> <li>Updated Test summary for Terra cases.</li> <li>Added FM3 and FM4 tests for Aqua.</li> <li>Updated Test summary for Aqua cases.</li> <li>Updated format to comply with standards.</li> </ul>	Sec. 3.9.1.1 Sec. 3.9.1.1.2 Sec. 3.10.1.1 Sec. 3.10.1.1.2 All

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10/10/05	R4V3	597	<ul style="list-style-type: none"> <li>Added use of run_make scripts.</li> <li>Changed testing dates; added ./ in front of ASCII, PCF, and runscripts. Updated runtime information.</li> <li>Updated format to comply with standards.</li> </ul>	Sec. 2.0 Secs. 3.3, 3.6, & 3.10 All
05/30/06	R4V4	626	<ul style="list-style-type: none"> <li>Updated filenames.</li> <li>Added note about testing platforms.</li> <li>Updated script names and test case information.</li> <li>Updated test summary table.</li> <li>Added statements pertaining to different test cases on each platform.</li> <li>Updated test case information.</li> <li>Updated script names and test case information.</li> <li>Updated test summary table.</li> <li>Added statements pertaining to different test cases on each platform.</li> <li>Updated format to comply with standards.</li> </ul>	Sec. 2.1 Sec. 2.1 Sec. 3.2.1.1 Sec. 3.2.1.4 Secs. 3.2.2.2 & 3.2.2.3 Sec. 3.2.3 Sec. 3.3.1.1 Sec. 3.3.1.4 Secs. 3.3.2.2, 3.3.2.3, & 3.3.3 All
01/09/07	R4V5	664	<ul style="list-style-type: none"> <li>Updated script names to match testing instructions.</li> <li>Document was converted from FrameMaker to Word.</li> </ul>	Secs. 3.2.1.1, 3.3.1.1, 3.6.1, 3.9.1, & 3.10.1 All
11/12/08	R5V1	692	<ul style="list-style-type: none"> <li>Removed QC section of post processor 5.4P1.</li> <li>Deleted removal script information.</li> <li>Added note about library compilation.</li> <li>Updated paths to reflect new directory structure.</li> <li>Changed perl script names to C shell.</li> <li>Updated test case information.</li> <li>Added unlimit command.</li> <li>New charts of sarb directory structure.</li> </ul>	Secs. 1.2.5 & 3.9.2.2 Sec. 2.1 Sec. 2.2 Secs. 2.2.2, 2.2.4, 3.5.1.1, 3.5.2, 3.5.3, & 3.9 Secs. 3.5.1.1, 3.5.3, 3.9, & App. C Sec. 3.5.1.1, Table 3-3, Sec. 3.9.1.1, Table 3-5, Secs. 3.9.3 3.5.1.1, & 3.9.1.1 App. B

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11/12/08 (Cont'd)	R5V1	692	<ul style="list-style-type: none"> <li>Updated output comparison procedure for PGE 5.1P1.</li> </ul>	Secs. 3.5.2.4 & 3.5.2.6
1/22/08	R5V2	694	<ul style="list-style-type: none"> <li>Updated paths to reflect new directory structure.</li> <li>Updated test case information.</li> <li>Added PROD environment variable and "unlimit" command. (02/05/2009)</li> </ul>	Secs. 2.2.1, 3.2, & 3.3 Secs. 3.2 & 3.3 Secs. 3.2 & 3.3
7/28/09	R5V3	718	<ul style="list-style-type: none"> <li>Added description of PGE CER5.0P2.</li> <li>Updated tar file information.</li> <li>Added 5.0P2 to list of PGEs.</li> <li>Added compilation of 5.0P2.</li> <li>Added test cases for Terra and Aqua for PGE 5.0P2.</li> </ul>	Subsystem Overview (1.2.3) Sec. 2.1 Sec. 2.2 Sec. 2.2.2 Secs. 3.4 & 3.5
10/07/09	R5V4	728	<ul style="list-style-type: none"> <li>Updated compilation instructions.</li> <li>Updated test case information.</li> <li>Updated directory structure.</li> </ul>	Secs. 2.2, 2.2.1, & 2.2.6 Sec. 3.12.1.1, Table 3-8, Sec. 3.12.3 Secs. 3.12.1 & 3.12.3
10/27/09	R5V5	733	<ul style="list-style-type: none"> <li>Updated tar file name.</li> <li>Updated directory structure.</li> <li>Updated test case information.</li> <li>Updated comparison code information.</li> <li>Updated script names.</li> </ul>	Sec. 2.1 Secs. 2.2.4, 3.8.1.1, 3.8.2, & 3.8.3 Sec. 3.8.1.1, Table 3-6, & Sec. 3.8.3 Secs. 2.2.4 & 3.8.2.6 Secs. 3.8.2.3 & 3.8.2.4
07/25/12	R5V6	917	<ul style="list-style-type: none"> <li>Updated compilation section for PGE CER5.0P2 delivery to <i>AMI</i>.</li> <li>Changed testing and evaluation procedures for CER5.0P2.</li> <li>Removed section for testing Aqua CER5.0P2. That information is now part of Section 3.4.</li> <li>Modified the "Introduction" paragraph. (12/03/2012)</li> </ul>	Sec. 2.2.2 Sec. 3.4 Sec. 3.5 Sec. 1.0

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<b>SCCR Approval Date</b>	<b>Release/Version Number</b>	<b>SCCR Number</b>	<b>Description of Revision</b>	<b>Section(s) Affected</b>
07/25/12 (Cont'd)	R5V6	917	<ul style="list-style-type: none"> <li>• Formatting issues were fixed. (12/03/2012)</li> <li>• Long hyphens in commands were changed to short hyphens. (12/05/2012)</li> </ul>	All  Secs. 2.2.3 & 2.2.6
07/10/14	R5V7	1028	<ul style="list-style-type: none"> <li>• Removal of obsolete sections for PGEs CER5.0P1, CER 5.1P1, CER5.1P2, CER5.3P1, CER5.4P1, and CER5.4P2.</li> <li>• Added testing instructions for new PGE CER5.0P3.</li> <li>• PGE names were modified to read PGE CER5.0P2 and PGE CER5.0P3. (03/23/2015)</li> </ul>	All  Secs. 1.2.3, 2.2.3, 3.2, App. B, and C. Sec. 1.2

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## 1.0 Introduction

CERES is a key component of EOS and NPP. The first CERES instrument (PFM) flew on TRMM, four instruments are currently operating on the EOS Terra (FM1 and FM2) and Aqua (FM3 and FM4) platforms, and NPP (FM5) platform. CERES measures radiances in three broadband channels: a shortwave channel (0.3 - 5  $\mu\text{m}$ ), a total channel (0.3 - 200  $\mu\text{m}$ ), and an infrared window channel (8 - 12  $\mu\text{m}$ ). The last data processed from the PFM instrument aboard TRMM was March 2000; no additional data are expected. Until June 2005, one instrument on each EOS platform operated in a fixed azimuth scanning mode and the other operated in a rotating azimuth scanning mode; now all are typically operating in the fixed azimuth scanning mode. The NPP platform carries the FM5 instrument, which operates in the fixed azimuth scanning mode though it has the capability to operate in a rotating azimuth scanning mode.

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

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

### 1.1 Document Overview

This document, the CERES Release 4 Delivery Test Plan for the CERES Instantaneous Surface and Atmospheric Radiation Budget (SARB) Subsystem (Subsystem 5.0), is part of the CERES Subsystem 5.0 Release 4 delivery package provided to the Langley Atmospheric Science Data Center (ASDC). It provides a description of the CERES Instantaneous SARB Subsystem Release 2 software, and explains the procedures for installing, executing, and testing the software. A section is also included on validating the results of executing the software. A description of acronyms and abbreviations is provided in [Appendix A](#), a directory structure diagram is contained in [Appendix B](#), and a description of the software and data files is contained in [Appendix C](#).

The document is organized as follows:

Section [1.0](#) - Introduction

Section [2.0](#) - Software and Data File Installation Procedures

Section [3.0](#) - Test and Evaluation Procedures

[Appendix A](#) - Acronyms and Abbreviations

[Appendix B](#) - Directory Structure Diagrams

[Appendix C](#) - File Description Tables

## **1.2 Subsystem Overview**

Two PGEs are currently required for the Instantaneous SARB Subsystem. PGE CER5.0P2 is the monthly processor for Edition2 data. PGE CER5.0P3 is the monthly processor for Edition4 data.

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

PGE CER5.0P2 executes the Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor.

The Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor produces a single monthly file containing surface albedo. This file is used as input by PGE CER7.2.1P1 for each month. An ASCII QC report is also produced.

### **1.2.2 CER5.0P3: Edition4 CERES Instantaneous and Synoptic SARB Subsystem Surface Albedo Pre-Processor**

PGE CER5.0P3 executes the Edition4 Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor.

The Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor produces a single monthly file containing surface albedo. This file is used as input by PGE CER7.2.1P2 for each month. An ASCII QC report is also produced.

## 2.0 Software and Data File Installation Procedures

This section describes how to install both the SARB library and the Subsystem 5.0 Instantaneous SARB software in preparation for making the necessary test runs at the Langley ASDC. The installation procedures include instructions for uncompressing and untarring the delivered files, properly defining environmental variables, and compiling the Instantaneous SARB programs.

### 2.1 Installation

Software/Data File Install Procedure:

1. The scripts, makefiles, and Process Control Files (PCF) in the Subsystem 5.0 delivery package expect the following environment variables, found in the `$CERESENV` script, to be defined:

<b>PGSDIR</b>	-	<b>Directory for Toolkit libraries</b>
<b>CERESHOME</b>	-	<b>Top Directory for CERES Software</b>
<b>CERESLIB</b>	-	<b>Directory for CERESlib</b>
<b>PGSINC</b>	-	<b>Pointer to the PGS Include file directory</b>
<b>PGSLIB</b>	-	<b>Directory which contains the Toolkit library file</b>
<b>PGSMMSG</b>	-	<b>Directory which contains Toolkit and CERES Status Message Files</b>
<b>HDFDIR</b>	-	<b>Pointer to the HDF home directory</b>

2. Change directory to the directory where you plan to install the SARB Subsystems. (The following instructions assume that the directory will be `$CERESHOME`.)
3. Untar the SARB library and Instantaneous SARB Subsystem files:

**Note: Please use the data tar files appropriate for the platform being tested.**

```
tar -xf InstSARB_data_R5-1028.tar
tar -xf InstSARB_anc_R5-1028.tar
tar -xf InstSARB_src_R5-1028.tar
```

### 2.2 Compilation

The status message files for all Instantaneous SARB PGEs are delivered in one directory. Software modules common to more than one PGE are contained in the SARB library. The instructions for compiling these portions of the subsystem follow. Instructions for generating the executable for PGE CER5.0P2 are in Section 2.2.1, and for PGE CER5.0P3 in Section 2.2.2.

1. The Status Message Files can be made by typing:

```
cd $CERESHOME/sarb/smf/sarb
./smfcompile_all.csh
```

#### 2.2.1 Compiling PGE 5.0P2

Depending where compilation occurs, the executable will contain the platform type in the name. In this document, the variable `$CPUTYPE` will be either `ppc64` or `x86_64`.

NOTE: For full subsystem deliveries, use the following commands to compile all the software:

```
cd $CERESHOME/sarb/CER5.0P2/rcf
./compile-CER5.0P2.pl all
```

1. The PGE 5.0P2 Main-Processor executable can be made on both the *P6* and *x86* platforms by typing:

```
cd $CERESHOME/sarb/CER5.0P2/rcf
./compile-CER5.0P2.pl lib
cd $CERESHOME/sarb/CER5.0P2/rcf
./compile-CER5.0P2.pl src
```

The resulting executable, **CER5.0P2\_\$CPUATYPE**, is stored in the directory **\$CERESHOME/sarb/CER5.0P2/bin**.

2. Execute the following on either platform to compile the comparison software for the Main-Processor output:

```
cd $CERESHOME/sarb/CER5.0P2/rcf
./compile-CER5.0P2.pl test
```

The resulting executable, **CER5.0P2Comp\_\$CPUATYPE.exe**, remains in the directory **\$CERESHOME/sarb/CER5.0P2/test\_suites**.

### 2.2.2 Compiling PGE 5.0P3

Depending where compilation occurs, the executable will contain the platform type in the name. In this document, the variable `$CPUATYPE` will be `ppc64`.

NOTE: For full subsystem deliveries, use the following commands to compile all the software:

```
cd $CERESHOME/sarb/CER5.0P3/rcf
./compile-CER5.0P3.pl all
```

1. The PGE 5.0P3 Main-Processor executable can be made on the *P6* platform by typing:

```
cd $CERESHOME/sarb/CER5.0P3/rcf
./compile-CER5.0P3.pl lib
cd $CERESHOME/sarb/CER5.0P3/rcf
./compile-CER5.0P3.pl src
```

The resulting executable, **CER5.0P3\_\$CPUATYPE**, is stored in the directory **\$CERESHOME/sarb/CER5.0P3/bin**.

2. Execute the following on either platform to compile the comparison software for the Main-Processor output:

```
cd $CERESHOME/sarb/CER5.0P3/rcf  
./compile-CER5.0P3.pl test
```

The resulting executable, **CER5.0P3Comp\_\${CPUTYPE}.exe**, remains in the directory **\$CERESHOME/sarb/CER5.0P3/test\_suites**.

### 3.0 Test and Evaluation Procedures

This section provides general information on how to execute the Subsystem 5.0 PGEs and provides an overview of the test and evaluation procedures. It includes a description of what is being tested and the order in which the tests should be performed.

#### 3.1 PGE CER5.0P2--Monthly Pre-Processor for Terra

##### 3.1.1 Stand-alone Test Procedures for *P6* and *x86* platforms

###### 3.1.1.1 Execution

###### CER5.0P2: Terra-FM1

###### Command Line Instructions:

```
unlimit
setenv PROD no (read input locally)
cd $CERESHOME/sarb/CER5.0P2/rcf
source sarb-5.0P2-FM1-env.csh
cleanup-CER5.0P2.pl CER5.0P2_PCF_Terra-FM1-
  MODIS_Edition3_999999.200207
cd $CERESHOME/sarb/CER5.0P2/rcf
CER5.0P2_pcfgen.pl -date 200207
run-CER5.0P2.pl CER5.0P2_PCF_Terra-FM1-MODIS_Edition3_999999.200207
```

###### SGE Testing Instructions:

```
setenv PROD no (read input locally)
cd $CERESHOME/sarb/CER5.0P2/rcf
source sarb-5.0P2-FM1-env.csh
cleanup-CER5.0P2.pl CER5.0P2_PCF_Terra-FM1-
  MODIS_Edition3_999999.200207
cleanup-CER5.0P2.pl CER5.0P2_PCF_Terra-FM1-
  MODIS_Edition3_999999.200207
cd $CERESHOME/sarb/CER5.0P2/rcf
CER5.0P2-SGE_Driver.pl -date 200207
```

###### Exit Codes

```
0 - Normal Exit,
200 - Fatal Error.
```

**CER5.0P2: Terra-FM2****Command Line Instructions:**

```
unlimit
setenv PROD no (read input locally)
cd $CERESHOME/sarb/CER5.0P2/rcf
source sarb-5.0P2-FM2-env.csh
cleanup-CER5.0P2.pl CER5.0P2_PCF_Terra-FM2-
  MODIS_Edition3_999999.200207
cd $CERESHOME/sarb/CER5.0P2/rcf
CER5.0P2_pcfgen.pl -date 200207
run-CER5.0P2.pl CER5.0P2_PCF_Terra-FM2-MODIS_Edition3_999999.200207
```

**SGE Testing Instructions:**

```
setenv PROD no (read input locally)
cd $CERESHOME/sarb/CER5.0P2/rcf
source sarb-5.0P2-FM2-env.csh
cleanup-CER5.0P2.pl CER5.0P2_PCF_Terra-FM2-
  MODIS_Edition3_999999.200207
cd $CERESHOME/sarb/CER5.0P2/rcf
CER5.0P2-SGE_Driver.pl -date 200207
```

## Exit Codes

0 - Normal Exit,  
200 - Fatal Error.

**CER5.0P2: Aqua-FM3****Command Line Instructions:**

```
unlimit
setenv PROD no (read input locally)
cd $CERESHOME/sarb/CER5.0P2/rcf
source sarb-5.0P2-FM3-env.csh
cleanup-CER5.0P2.pl CER5.0P2_PCF_Aqua-FM3-
  MODIS_Edition3_999999.200207
cd $CERESHOME/sarb/CER5.0P2/rcf
CER5.0P2_pcfgen.pl -date 200207
run-CER5.0P2.pl CER5.0P2_PCF_Aqua-FM3-MODIS_Edition3_999999.200207
```

**SGE Testing Instructions:**

```
setenv PROD no (read input locally)
cd $CERESHOME/sarb/CER5.0P2/rcf
```

```
source sarb-5.0P2-FM3-env.csh
cleanup-CER5.0P2.pl CER5.0P2_PCF_Aqua-FM3-
  MODIS_Edition3_999999.200207
cd $CERESHOME/sarb/CER5.0P2/rcf
CER5.0P2-SGE_Driver.pl -date 200207
```

Exit Codes

0 - Normal Exit,  
200 - Fatal Error.

### **CER5.0P2: Aqua-FM4**

#### **Command Line Instructions:**

```
unlimit
setenv PROD no (read input locally)
cd $CERESHOME/sarb/CER5.0P2/rcf
source sarb-5.0P2-FM4-env.csh
cleanup-CER5.0P2.pl CER5.0P2_PCF_Aqua-FM4-
  MODIS_Edition3_999999.200207
cd $CERESHOME/sarb/CER5.0P2/rcf
CER5.0P2_pcfgen.pl -date 200207
run-CER5.0P2.pl CER5.0P2_PCF_Aqua-FM4-MODIS_Edition3_999999.200207
```

#### **SGE Testing Instructions:**

```
setenv PROD no (read input locally)
cd $CERESHOME/sarb/CER5.0P2/rcf
source sarb-5.0P2-FM4-env.csh
cleanup-CER5.0P2.pl CER5.0P2_PCF_Aqua-FM4-
  MODIS_Edition3_999999.200207
cd $CERESHOME/sarb/CER5.0P2/rcf
CER5.0P2-SGE_Driver.pl -date 200207
```

Exit Codes

0 - Normal Exit,  
200 - Fatal Error.

### **3.1.1.2 Test Summary**

#### **CER5.0P2: Edition2**

Total Run Time: 3 min

### 3.1.2 Evaluation Procedures

This section provides information on how to execute the comparison software for the SARB Subsystem PGE CER5.0P2.

#### **CER5.0P2: Terra-FM1**

To compare the created output data:

```
unlimit  
cd $CERESHOME/sarb/CER5.0P2/rcf  
source sarb-5.0P2-FM1-env.csh  
cd $CERESHOME/sarb/CER5.0P2/test_suites  
compare_CER5.0P2_files.pl
```

#### **CER5.0P2: Terra-FM2**

To compare the created output data:

```
unlimit  
cd $CERESHOME/sarb/CER5.0P2/rcf  
source sarb-5.0P2-FM2-env.csh  
cd $CERESHOME/sarb/CER5.0P2/test_suites  
compare_CER5.0P2_files.pl
```

#### **CER5.0P2: Aqua-FM3**

To compare the created output data:

```
unlimit  
cd $CERESHOME/sarb/CER5.0P2/rcf  
source sarb-5.0P2-FM3-env.csh  
cd $CERESHOME/sarb/CER5.0P2/test_suites  
compare_CER5.0P2_files.pl
```

#### **CER5.0P2: Aqua-FM4**

To compare the created output data:

```
unlimit  
cd $CERESHOME/sarb/CER5.0P2/rcf  
source sarb-5.0P2-FM4-env.csh  
cd $CERESHOME/sarb/CER5.0P2/test_suites  
compare_CER5.0P2_files.pl
```

### 3.1.2.1 Log and Status File Results

There are five Log files associated with this PGE. The first three listed below are required by the Toolkit. The Toolkit Log files contain all error and/or status messages produced by the PGE during processing.

1. Report Log File:

**\$CERESHOME/sarb/runlogs/CER5.0P2/CER5.0P2\_LogReport\_\$\$\$5\_\$PS5\_\$CC5.200207**

The Report Log File contain RegridMOA-related informational messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal).

2. Status Log File:

**\$CERESHOME/sarb/runlogs/CER5.0P2/CER5.0P2\_LogStatus\_\$\$\$5\_\$PS5\_\$CC5.200207**

The Status Log File contains all messages created by the Toolkit and RegridMOA-related messages that can lead to abnormal ending of the Preprocessor. If an abnormal exit is encountered by the PGE, this file should be examined for ' \_E\_ ', (error) or ' \_F\_ ' (fatal) message types.

3. User Log File:

**\$CERESHOME/sarb/runlogs/CER5.0P2/CER5.0P2\_LogUser\_\$\$\$5\_\$PS5\_\$CC5.200207**

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. PCF Log File:

**\$CERESHOME/sarb/CER5.0P2/rcf/pcf/CER5.0P2\_PCF\_\$\$\$5\_\$PS5\_\$CC5.200207.log**

This log file is created when the PCF is generated and contains a listing of all the environment variables set when the PCF was created along with a listing of all the files used to create this PCF. There is also a listing of any missing optional and mandatory files. The list of existing output data files will only be created if the PGE is run more than once without clean-up.

### 3.1.2.2 Metadata Evaluation

TBD

### 3.1.2.3 Evaluation of Comparison Software Output

All comparisons done in Section 3.1.1.1 by the test script should look like the following:

Comparing files:

```
CER_SAH_$$$5_Edition3A_300301.200207
CER_SAH_$$$5_$PS5_$CC5.200207
SUCCESSFUL
```

If an error in a file comparison is found the following message will be displayed:

Comparing files:

```
CER_SAH_$SS5_Edition3A_300301.200207
CER_SAH_$SS5_$PS5_$CC5.200207
ERROR: Check comparison file
```

The comparison file will be here:

```
{$CERESHOME}/sarb/CER5.0P2/test_suites
CER_SAH_$SS5_$PS5_$CC5.200207.compare
```

### 3.1.3 Solutions to Possible Problems

All SARB data should be deleted before rerunning any of the above tests. This can be done by using the following commands:

```
cd $CERESHOME/sarb/CER5.0P2/rcf
```

Then depending on which test case you want to delete:

```
source sarb-5.0P2-env.csh
cleanup-CER5.0P2.pl CER5.0P2_PCF_Terra-FM1-
MODIS_Edition3_999999.200207
```

## 3.2 PGE CER5.0P3—Edition4 Monthly Pre-Processor

### 3.2.1 Stand-alone Test Procedures for *P6* platform

#### 3.2.1.1 Execution

**CER5.0P3: Terra-FM1**

```
cd $CERESHOME/sarb/CER5.0P3/rcf
source sarb-5.0P3-FM1-env.csh
CER5.0P3-SGE_Driver.pl -date 201001 -clean
```

## Exit Codes

0 - Normal Exit,  
200 - Fatal Error.

**CER5.0P3: Terra-FM2**

```
cd $CERESHOME/sarb/CER5.0P3/rcf
source sarb-5.0P3-FM2-env.csh
CER5.0P3-SGE_Driver.pl -date 201001 -clean
```

## Exit Codes

0 - Normal Exit,  
200 - Fatal Error.

**CER5.0P3: Aqua-FM3**

```
cd $CERESHOME/sarb/CER5.0P3/rcf
source sarb-5.0P3-FM3-env.csh
CER5.0P3-SGE_Driver.pl -date 201001 -clean
```

## Exit Codes

0 - Normal Exit,  
200 - Fatal Error.

**CER5.0P3: Aqua-FM4**

```
cd $CERESHOME/sarb/CER5.0P3/rcf
source sarb-5.0P3-FM4-env.csh
CER5.0P3-SGE_Driver.pl -date 201001 -clean
```

## Exit Codes

0 - Normal Exit,  
200 - Fatal Error.

**3.2.1.2 Test Summary****CER5.0P3: Edition4**

Total Run Time: 3 min

**3.2.2 Evaluation Procedures**

This section provides information on how to execute the comparison software for the SARB Subsystem PGE CER5.0P3.

**CER5.0P3: Terra-FM1**

To compare the created output data:

```
unlimit  
cd $CERESHOME/sarb/CER5.0P3/rcf  
source sarb-5.0P3-FM1-env.csh  
cd $CERESHOME/sarb/CER5.0P3/test_suites  
compare_CER5.0P3_files.pl
```

#### **CER5.0P3: Terra-FM2**

To compare the created output data:

```
unlimit  
cd $CERESHOME/sarb/CER5.0P3/rcf  
source sarb-5.0P3-FM2-env.csh  
cd $CERESHOME/sarb/CER5.0P3/test_suites  
compare_CER5.0P3_files.pl
```

#### **CER5.0P3: Aqua-FM3**

To compare the created output data:

```
unlimit  
cd $CERESHOME/sarb/CER5.0P3/rcf  
source sarb-5.0P3-FM3-env.csh  
cd $CERESHOME/sarb/CER5.0P3/test_suites  
compare_CER5.0P3_files.pl
```

#### **CER5.0P3: Aqua-FM4**

To compare the created output data:

```
unlimit  
cd $CERESHOME/sarb/CER5.0P3/rcf  
source sarb-5.0P3-FM4-env.csh  
cd $CERESHOME/sarb/CER5.0P3/test_suites  
compare_CER5.0P3_files.pl
```

### **3.2.2.1 Log and Status File Results**

There are five Log files associated with this PGE. The first three listed below are required by the Toolkit. The Toolkit Log files contain all error and/or status messages produced by the PGE during processing.

1. Report Log File:  
**\$CERESHOME/sarb/runlogs/CER5.0P3/CER5.0P3\_LogReport\_\$\$\$5\_\$PS5\_\$CC5.201001**  
 The Report Log File contain RegridMOA-related informational messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal).
2. Status Log File:  
**\$CERESHOME/sarb/runlogs/CER5.0P3/CER5.0P3\_LogStatus\_\$\$\$5\_\$PS5\_\$CC5.201001**  
 The Status Log File contains all messages created by the Toolkit and RegridMOA-related messages that can lead to abnormal ending of the Preprocessor. If an abnormal exit is encountered by the PGE, this file should be examined for '\_E\_', (error) or '\_F\_' (fatal) message types.
3. User Log File:  
**\$CERESHOME/sarb/runlogs/CER5.0P3/CER5.0P3\_LogUser\_\$\$\$5\_\$PS5\_\$CC5.201001**  
 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. PCF Log File:  
**\$CERESHOME/sarb/CER5.0P3/rcf/pcf/CER5.0P3\_PCF\_\$\$\$5\_\$PS5\_\$CC5.201001.log**

This log file is created when the PCF is generated and contains a listing of all the environment variables set when the PCF was created along with a listing of all the files used to create this PCF. There is also a listing of any missing optional and mandatory files. The list of existing output data files will only be created if the PGE is run more than once without clean-up.

### 3.2.2.2 Metadata Evaluation

TBD

### 3.2.2.3 Evaluation of Comparison Software Output

All comparisons done in Section 3.1.1.1 by the test script should look like the following:

Comparing files:

```
CER_SAH_$$$5_$PS5_$CC5.201001
CER_SAH_$$$5_$PS5_$CC5.201001
SUCCESSFUL
```

If an error in a file comparison is found the following message will be displayed:

Comparing files:

```
CER_SAH_$$$5_$PS5_$CC5.201001
CER_SAH_$$$5_$PS5_$CC5.201001
ERROR: Check comparison file
```

The comparison file will be here:

```
{$CERESHOME}/sarb/CER5.0P3/test_suites  
CER_SAH_$$$5_$PS5_$CC5.201001.compare
```

### **3.2.3 Solutions to Possible Problems**

All SARB data should be deleted before rerunning any of the above tests. This can be done by using the following commands:

```
cd $CERESHOME/sarb/CER5.0P3/rcf
```

Then depending on which test case you want to delete:

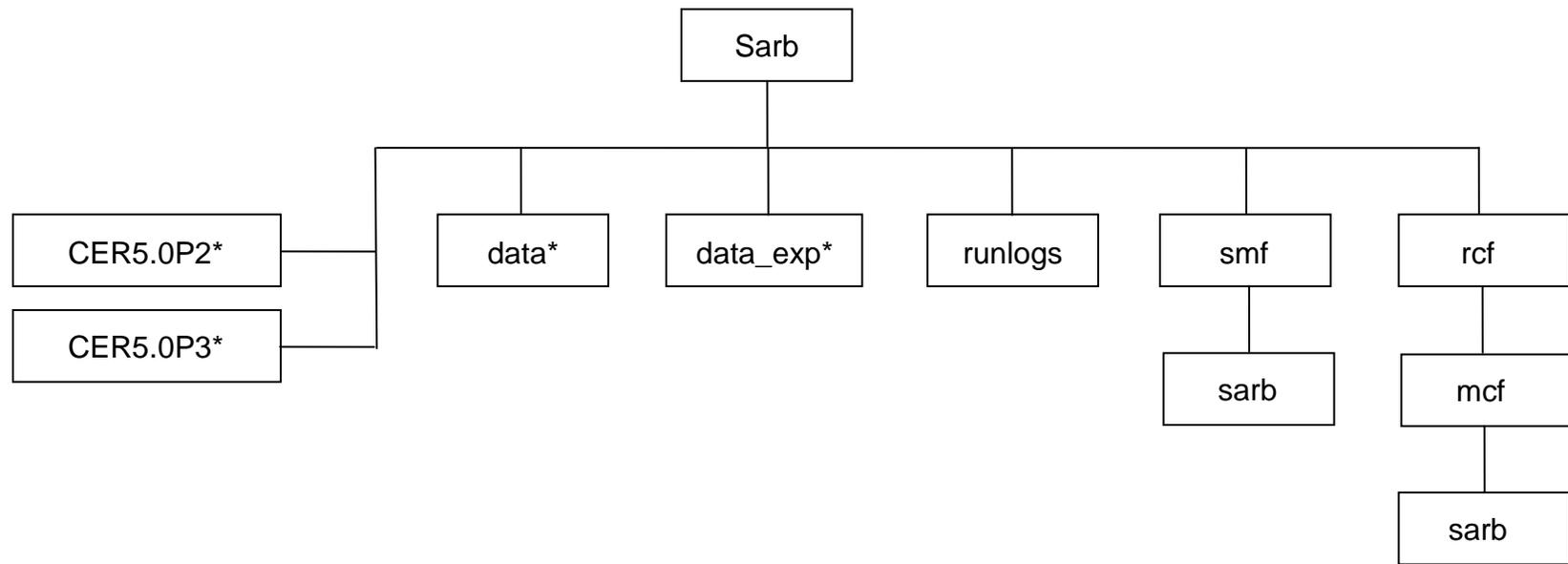
```
source sarb-5.0P3-FM1-env.csh  
cleanup-CER5.0P3.pl CER5.0P3_PCF_Terra-FM1-MODIS_Edition4-  
SSIT_999999.201001  
source sarb-5.0P3-FM2-env.csh  
cleanup-CER5.0P3.pl CER5.0P3_PCF_Terra-FM2-MODIS_Edition4-  
SSIT_999999.201001  
source sarb-5.0P3-FM3-env.csh  
cleanup-CER5.0P3.pl CER5.0P3_PCF_Aqua-FM3-MODIS_Edition4-  
SSIT_999999.201001  
source sarb-5.0P3-FM4-env.csh  
cleanup-CER5.0P3.pl CER5.0P3_PCF_Aqua-FM4-MODIS_Edition4-  
SSIT_999999.201001
```

## Appendix A Acronyms and Abbreviations

ASDC	Atmospheric Science Data Center
CERES	Clouds and the Earth's Radiant Energy System
CERESlib	CERES library
CRS	Clouds and Radiation Swath
CRSB	Clouds and Radiation Swath Binary
DAAC	Distributed Active Archive Center
DRIVTAB	Derivative Table
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
FOV	Field-of-View
GFDL	Geophysical Fluid Dynamics Laboratory
HDF	Hierarchical Data Format
LaTIS	Langley TRMM Information System
MCF	Metadata Control Files
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
PCF	Process Control File
PGE	Product Generation Executive
QC	Quality Control
SAH	Surface Albedo History
SARB	Surface and Atmospheric Radiation Budget
SCF	Science Computing Facility
SMF	Status Message Facility
TRMM	Tropical Rainfall Measuring Mission

Appendix B  
Directory Structure Diagrams

BREAKDOWN OF THE INSTANTANEOUS SARB DIRECTORY STRUCTURE

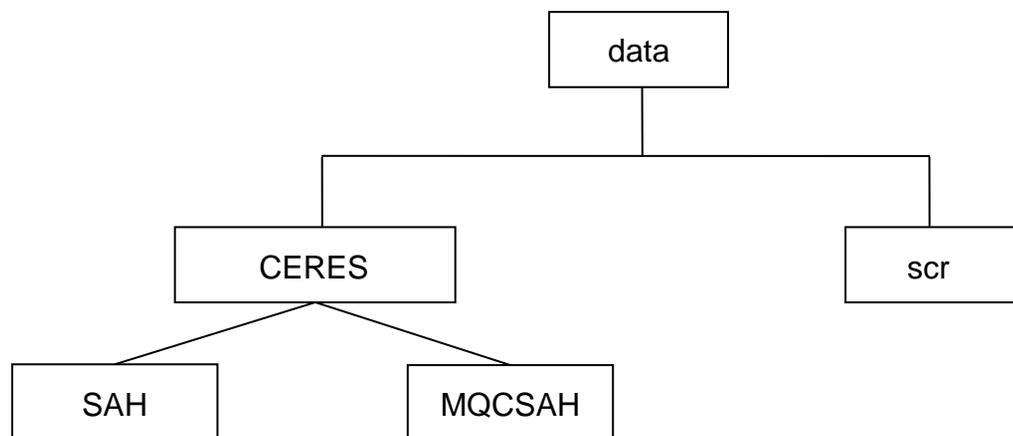


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\* Represents other tables to display subpaths.

Figure B-1. Instantaneous SARB Directory Structure.

### BREAKDOWN OF THE INSTANTANEOUS SARB DIRECTORY STRUCTURE



B-2

Figure B-1. Instantaneous SARB Directory Structure.

## BREAKDOWN OF THE INSTANTANEOUS SARB DIRECTORY STRUCTURE

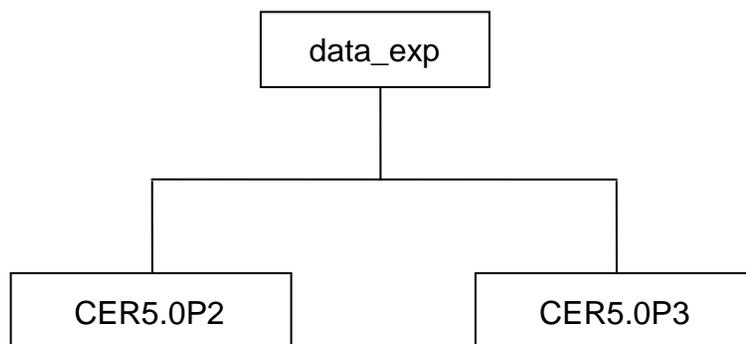
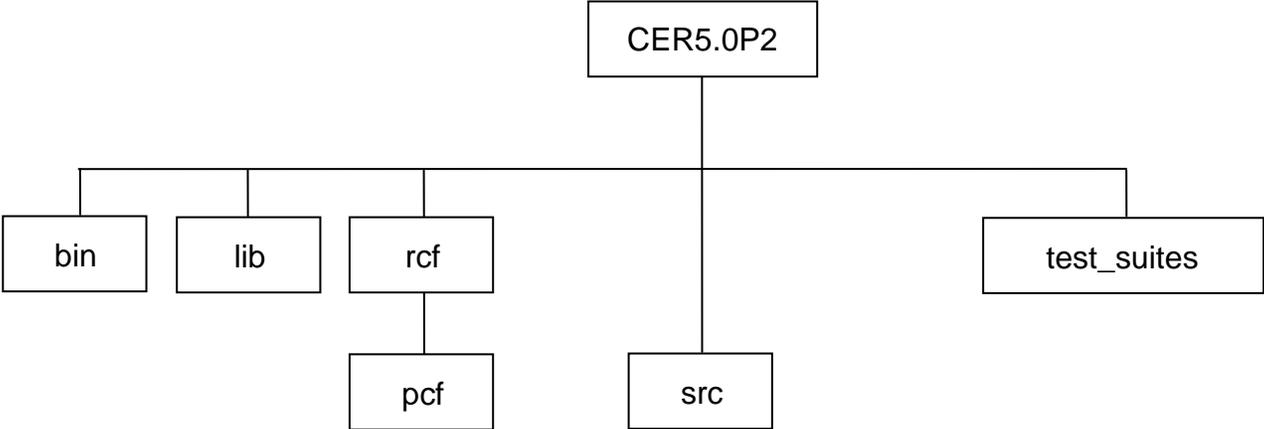


Figure B-1. Instantaneous SARB Directory Structure.

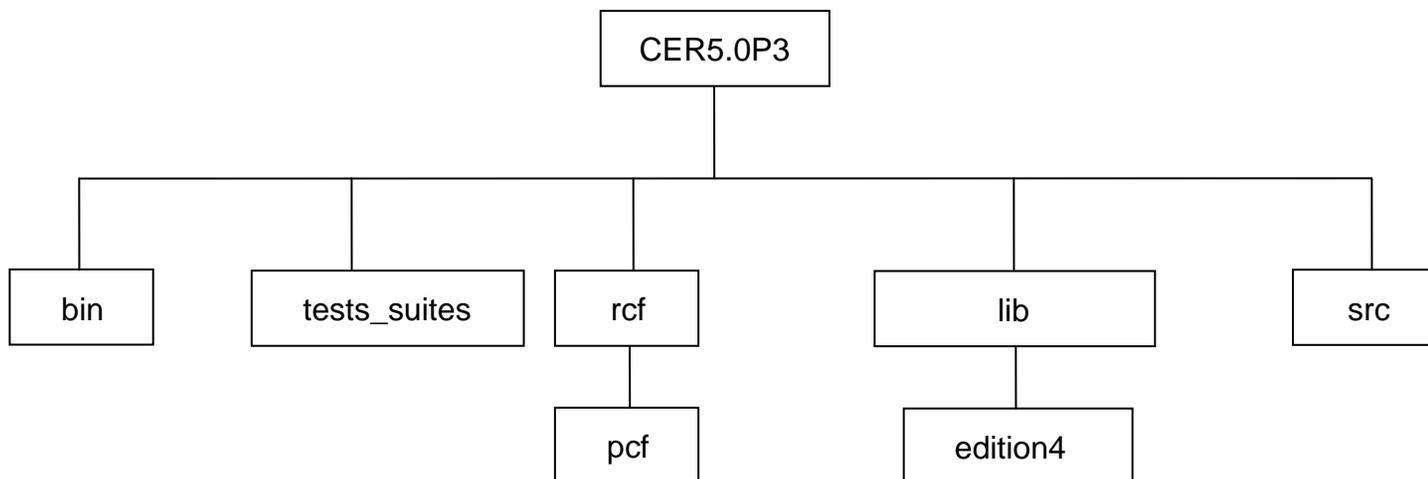
### BREAKDOWN OF THE INSTANTANEOUS SARB DIRECTORY STRUCTURE



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Figure B-1. Instantaneous SARB Directory Structure.

### BREAKDOWN OF THE INSTANTANEOUS SARB DIRECTORY STRUCTURE



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Figure B-1. Instantaneous SARB Directory Structure.

## Appendix C File Description Tables

### C.1 Production Scripts and Executables

Table C.1-1. Production Scripts

File Name	Format	Description
CER5.0P2_pcfgen.pl	ASCII	Perl script which creates the PCF for the Edition2 surface albedo processor
run-CER5.0P2.pl	ASCII	Perl script which executes PGE 5.0P2
CER5_0P2_Env.pm	ASCII	Perl module for passing env variables
CER5_0P2_FileUtils.pm	ASCII	Perl module containing needed subroutines
CER5.0P2-Launch.pl	ASCII	Perl script to send jobs to SGE
CER5.0P2-SGE_Driver.pl	ASCII	Perl script to process commands and run SGE
compile-CER5.0P2.pl	ASCII	Perl script to compile libraries and executables
CER5.0P3_pcfgen.pl	ASCII	Perl script which creates the PCF for the Edition4 surface albedo processor
run-CER5.0P3.pl	ASCII	Perl script which executes PGE 5.0P3
CER5_0P3_Env.pm	ASCII	Perl module for passing env variables
CER5_0P3_FileUtils.pm	ASCII	Perl module containing needed subroutines
CER5.0P3-Launch.pl	ASCII	Perl script to send jobs to SGE
CER5.0P3-SGE_Driver.pl	ASCII	Perl script to process commands and run SGE
compile-CER5.0P3.pl	ASCII	Perl script to compile libraries and executables

Table C.1-2. Executables

File Name	Format	Description
CER5.0P2_ppc64.exe <sup>1</sup>	Binary	Edition2 Pre-Processor executable
CER5.0P3_ppc64.exe <sup>1</sup>	Binary	Edition4 Pre-Processor executable

<sup>1</sup>These files will be generated on execution of Subsystem software and are not included in the tar file.

### C.2 Processing Control Files (PCF), Metadata Control Files (MCF) and Status Message Files (SMF)

The Process Control Files are not included in the Software Delivery Package. They will be created by the PCF generator scripts.

Table C.2-1. Metadata Control Files

File Name	Format	Description
mcf_sarbgc	ODL	MCF for Binary QC Report for Main-Processor
mcf_sarbhdf	ODL	MCF for CRS's HDF file for HDF Post-Processor
mcf_sarb	ODL	MCF for Binary CRS file for Main-Processor
mcf_monthly_aer	ODL	MCF for MODIS Aerosol file for MODIS Pre-Processor
mcf_daily_sah	ODL	MCF for Daily Surface Albedo files for Surface Albedo Pre-Processor
mcf_monthly_sahprod	ODL	MCF for Monthly Surface Albedo files for Surface Albedo Monthly Pre-Processor--production use
mcf_monthly_sahcurr	ODL	MCF for Monthly Surface Albedo files for Surface Albedo Monthly Pre-Processor--SSF data only
mcf_monthly_sahqc	ODL	MCF for Monthly Surface Albedo files for Surface Albedo Monthly Pre-Processor Quality Control Report

Table C.2-2. Process Control Files

File Name	Format	Description
CER5.0P2_PCF_Terra-FM1-MODIS_SSIT-Monthly_999999.201001	ASCII	Process Control File template for Surface Albedo Monthly Pre-Processor
CER5.0P3_PCF_Terra-FM1-MODIS_SSIT-Monthly_999999.201001	ASCII	Process Control File template for Edition4 Surface Albedo Monthly Pre-Processor

<sup>1</sup>These files will be generated on execution of Subsystem software and are not included in the tar file.

Table C.2-3. Status Message Files (SMF)

File Name	Format	Directory	Description
ANCINIT_25725.t	ASCII	smf/sarb	Toolkit Message File
PGS_25725 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
FLSALUT_25724.t	ASCII	smf/sarb	Toolkit Message File
PGS_25724 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
GADSAER_25715.t	ASCII	smf/sarb	Toolkit Message File
PGS_25715 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File

Table C.2-3. Status Message Files (SMF)

File Name	Format	Directory	Description
GFDLAER_25716.t	ASCII	smf/sarb	Toolkit Message File
PGS_25716 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
HCMOCNALB_225723.t	ASCII	smf/sarb	Toolkit Message File
PGS_225723 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
IGBPUTIL_25721.t	ASCII	smf/sarb	Toolkit Message File
PGS_25721 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
INITSARB_25701.t	ASCII	smf/sarb	Toolkit Message File
PGS_25701 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
MSFCALBIO_25722.t	ASCII	smf/sarb	Toolkit Message File
PGS_25722 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
PGS_INGEST_25702.t	ASCII	smf/sarb	Toolkit Message File
PGS_25702 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
PGS_SIGMALOAD_25703.t	ASCII	smf/sarb	Toolkit Message File
PGS_25703 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
PGS_TUNEDRV_25704.t	ASCII	smf/sarb	Toolkit Message File
PGS_25704 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
PGS_FLXRANGE_25705.t	ASCII	smf/sarb	Toolkit Message File
PGS_25705 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
PGS_FLMODEL_25706.t	ASCII	smf/sarb	Toolkit Message File
PGS_25706 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
SARBMETA_25726.t	ASCII	smf/sarb	Toolkit Message File
PGS_25726 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
PGS_MODISAERRD_25751.t		smf/sarb	Toolkit Message File
PGS_25751		PGS_message/sarb	Toolkit Message File
SARBIOUTIL_25750.t		smf/sarb	Toolkit Message File
PGS_25750		PGS_message/sarb	Toolkit Message File

Table C.2-3. Status Message Files (SMF)

File Name	Format	Directory	Description
SSFAAOT_25727.t		smf/sarb	Toolkit Message File
PGS_25727		PGS_message/sarb	Toolkit Message File
PGS_SFCALBCALC_25707.t	ASCII	smf/sarb	Toolkit Message File
PGS_25707 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
PGS_SFCALBINGEST_25708.t	ASCII	smf/sarb	Toolkit Message File
PGS_25708 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
PGS_DERIVLOAD_25709.t	ASCII	smf/sarb	Toolkit Message File
PGS_25709 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
PGS_WRAPSARB_25710.t	ASCII	smf/sarb	Toolkit Message File
PGS_25710 <sup>1</sup>	ASCII	PGS_message/sarb	Toolkit Message File
postproc_mod_26513.t	ASCII	smf/sarb	Toolkit Message File
PGS_26513	ASCII	PGS_message/sarb	Toolkit Message File

<sup>1</sup>These files will be generated on execution of Subsystem software and are not included in the tar file.

### C.3 Ancillary Input Data

Table C.3-1. Ancillary Input Data

File Name	Format	Description	Static/Dynamic
IGBP_Ver3.0	Binary	IGBP map	Static
flsa0404_lut.2s.coef	Binary	Surface Albedo look up table for Fu-Liou model	Static
flsa200508c.fubin.tab	Binary	Binary Look-Up-Table file of broadband surface albedos including dependencies for sun angle, cloud fraction and properties	Static
flsa4_lut.2s.coef_19991215	Binary	Surface Albedo look up table for Fu-Liou model	Static

Table C.3-1. Ancillary Input Data

File Name	Format	Description	Static/Dynamic
sah.ed3.YYYYMM.clim	Binary	Match aerosol data for Edition3 processing	Static
MATCH_TERRA_AOTS_CLIM_MODIS.mm (in match_aot)	Binary	Match climatology aerosol data for Terra processing	Static
SAH.v5.YYYYMM	Binary	Match aerosol data for Edition2 processing	Static

#### C.4 Output Temporary Data Files (Production Results)

Table C.4-1. Output Temporary Data Files

File Name	Format	Description
CER_PRESAH_Terra-FM1-MODIS_Edition4-SSIT_999999.201001	ASCII	Temporary data file used in processing of surface albedo history map (SAH).

<sup>1</sup>These files will be generated on execution of Subsystem software and are not included in the tar file.