

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

Data Management System

**CERES Inversion to Instantaneous TOA Fluxes
and Empirical Estimates of Surface Radiation Budget,
Subsystems 4.5 and 4.6 Test Plan**

**Release 5
Version 18**

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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
10/19/01	R3V5	302	<ul style="list-style-type: none"> • Changed input MOA file names to use \$CC12. • Updated format to comply with standards. 	Secs. 3.1.1.1 & 3.1.2 All
03/21/02	R3V6	322	<ul style="list-style-type: none"> • Added new PGEs CER4.5-6.1P2 and CER4.5-6.2P2. • Updated format to comply with standards. 	New sections: 3.2 & 3.4 All
04/26/02	R3V7	346	<ul style="list-style-type: none"> • SSFB-nadir and SSF-nadir products produced by PGE CER4.5-6.2P2. • Updated format to comply with standards. 	Secs. 3.4.2.2 & 3.4.2.3 All
06/21/02	R4V1	367	<ul style="list-style-type: none"> • Added new PGE CER4.5-6.1P3 for processing Aqua data. • Updated CER4.5-6.1P2 to use dynamic SCC produced by PGE CER2.4P1. • Updated format to comply with standards. 	Secs. 1.2, 2.2.1, & 3.3 Secs. 3.2.1.1 & 3.2.2 All
08/20/02	R4V2	381	<ul style="list-style-type: none"> • Updated CER4.5-6.2P2 to produce binary SSF/SSFA validation product. • Updated format to comply with standards. 	Secs. 1.2.2, 3.5, 3.5.2.1, 3.5.2.2, & 3.5.2.3 All
01/27/03	R4V3	416	<ul style="list-style-type: none"> • Modified command line for CER4.5-6.1P3 PCF generator. • Updated format to comply with standards. 	Sec. 3.3.1.1 All
04/24/03	R4V4	434	<ul style="list-style-type: none"> • Modified Instance definition line to use environment variables for CER4.5-6.1P1. • Updated format to comply with standards. 	Secs. 2.1, 3.1.1.1, 3.1.1.4, 3.1.2, & C.2 All
08/27/03	R4V5	461	<ul style="list-style-type: none"> • Added new PGE CER4.5-6.3P2. • Added new PGE CER4.5-6.4P1. • Updated format to comply with standards. 	Apps. B & C Secs. 2.2.4, 2.2.5, 3.7, & 3.8 All
10/29/03	R4V6	477	<ul style="list-style-type: none"> • Updated CER4.5-6.2P2 to produce new parameter ADMGEO. • Updated format to comply with standards. 	Sec. 3.5.1.1 All

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12/08/03	R4V7	488	<ul style="list-style-type: none"> Updated PGE CER4.5-6.3P2 to use Terra Edition2 ADMs. Added new PGE CER4.5-6.3P3. Updated format to comply with standards. 	Sec. 3.7.1.1 Secs. 2.2.5, 3.8, & App. C All
12/01/04	R4V8	570	<ul style="list-style-type: none"> Updated PGE CER4.5-6.3P3 to include Spectral Correction and new test data. There are now separate test cases for FM3 and FM4. Added new PGE CER4.5-6.6P2. Updated format to comply with standards. 	Secs. 1.2.5, 2.2.7, & 3.8 Sec. 3.10, Apps. B & C All
12/08/04	R4V9	572	<ul style="list-style-type: none"> Added new PGE CER4.5-6.6P3. Updated format to comply with standards. 	Secs. 1.2.6, 3.11, Apps. B & C All
03/07/05	R4V10	578	<ul style="list-style-type: none"> Modified PGE CER4.5-6.6P2. Changed output instance variable name for FM1 test case to INSTANCE_FM1. Added FM2 test case for CER4.5-6.6P2. Updated format to comply with standards. 	Secs. 3.10.1-4 Secs. 3.10.5-8 All
04/04/05	R4V11	581	<ul style="list-style-type: none"> Modified test case for CER4.5-6.6P2. Changed output instance variable name for FM1 test case to INSTANCE3_FM1. Added FM2 test case for CER4.5-6.3P2. Updated format to comply with standards. 	Secs. 3.7.1-4 Secs. 3.7.5-8 All
05/11/05	R4V12	587	<ul style="list-style-type: none"> Modified test case for CER4.5-6.2P2. Added tests for SCOOOL output. Added FM3 and FM4 test cases for CER4.5-6.2P2. Updated format to comply with standards. 	Secs. 3.5.2 & 3.5.5 Secs. 3.5.7-12 All
10/10/05	R4V13	596	<ul style="list-style-type: none"> Modified test case for CER4.5-6.1P3. Added separate FM3 and FM4 test cases for CER4.5-6.1P3. Modified input data for FM3 and FM4 test cases for CER4.5-6.3P3. Updated Description Tables for CER4.5.6-6P2 & CER4.5-6.6P3. Updated format to comply with standards. 	Sec. 3.3 Sec. 3.8 App. C All
10/04/06	R4V14	638	<ul style="list-style-type: none"> Changed SAIC and address to SSAI and new address. Changed SAIC to SSAI. 	Cover page Preface

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10/04/06 Continued	R4V14	638	<ul style="list-style-type: none"> • Removed Item #2 that references emailing the results because this no longer happens. • Removed SAIC and added SSAI to acronym list. 	Secs. 3.1.2.3, 3.2.2.3, 3.3.2.3, 3.3.5.3, 3.6.2.3, 3.7.3.2, 3.7.7.2, 3.8.3.2, & 3.8.7.2 App. A
06/29/07	R4V15	659	<ul style="list-style-type: none"> • Changed SCPOOL input filename and the 'copy to' location in PGE CER4.5-6.2P2. 	Secs. 3.5.1.1, 3.5.4.1, 3.5.7.1, & 3.5.10.1
02/21/08	R5V1	666	<ul style="list-style-type: none"> • Added PGEs CER4.5-6.1P4, CER4.5-6.1P5, CER4.5-6.2P3, and CER4.5-6.4P2. 	Secs. 1.2.1, 1.2.2, 2.2.2, 2.2.3, 2.2.5, 2.2.10, 3.4, 3.5, 3.8, 3.13, Apps. B, & C
12/08/08	R5V2	690	<ul style="list-style-type: none"> • Changed directory structure for PGEs CER4.5-6.1P2, CER4.5-6.1P3, CER4.5-6.2P2, CER4.5-6.3P2, CER4.5-6.3P3, CER4.5-6.4P1, CER4.5-6.6P2, and CER4.5-6.6P3. 	Secs. 2.1, 2.2.1, 2.2.4, 2.2.7, 2.2.8, 2.2.9, 2.2.11, 2.2.12, 3.2.1.1, 3.2.1.4, 3.2.2.1, 3.2.2.4, 3.2.3, 3.3.1.1, 3.3.1.2, 3.3.1.4, 3.3.2.1, 3.3.2.2, 3.3.2.4, 3.3.3, 3.3.4.1, 3.3.4.2, 3.3.4.4, 3.3.5.1, 3.3.5.2, 3.3.5.4, 3.3.6, 3.7.1.1, 3.7.1.2, 3.7.1.4, 3.7.2.1, 3.7.2.4, 3.7.3, 3.7.4.1, 3.7.4.2, 3.7.4.4, 3.7.5.1, 3.7.5.4, 3.7.6, 3.7.7.1, 3.7.7.2, 3.7.7.4, 3.7.8.1, 3.7.8.4, 3.7.9, 3.7.10.1, 3.7.10.2, 3.7.10.4, 3.7.11.1,

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12/08/08 (Continued)	R5V2	690	<ul style="list-style-type: none"> Changed directory structure for PGEs CER4.5-6.1P2, CER4.5-6.1P3, CER4.5-6.2P2, CER4.5-6.3P2, CER4.5-6.3P3, CER4.5-6.4P1, CER4.5-6.6P2, and CER4.5-6.6P3. 	Secs. 3.7.11.4, 3.7.12, 3.10.1.1, 3.10.1.2, 3.10.1.4, 3.10.3, 3.10.3.1, 3.10.3.3, 3.10.4, 3.10.5.1, 3.10.5.2, 3.10.5.4, 3.10.7, 3.10.7.1, 3.10.7.3, 3.10.8, 3.11.1.1, 3.11.1.2, 3.11.1.4, 3.11.3, 3.11.3.1, 3.11.3.3, 3.11.4, 3.11.5.1, 3.11.5.2, 3.11.5.4, 3.11.7, 3.11.7.1, 3.11.7.3, 3.11.8, 3.12.1.1, 3.12.1.2, 3.12.1.4, 3.12.2.1, 3.12.3, 3.14.1.1, 3.14.1.2, 3.14.1.4, 3.14.3, 3.14.5.1, 3.14.5.2, 3.14.5.4, 3.14.7, 3.14.7.1, 3.14.7.3, 3.14.8, 3.15.1.1, 3.15.1.2, 3.15.1.4, 3.15.3, 3.15.3.1, 3.15.3.3, 3.15.4, 3.15.5.1, 3.15.5.2, 3.15.5.4, 3.15.7, 3.15.7.1, 3.15.7.3, 3.15.8, App B

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12/08/08 (Continued)	R5V2	690	<ul style="list-style-type: none"> Changed directory name from "PCF" to "pcf." (04/02/09) 	All
03/04/09	R5V3	704	<ul style="list-style-type: none"> Updated test data and dates for PGEs CER4.5-6.1P4, CER4.5-6.1P5, CER4.5-6.2P3 and CER4.5-6.4P2. Updated evaluation procedures for PGEs CER4.5-6.1P4, CER4.5-6.1P5 and CER4.5-6.2P3. Removed PCFin files and corrected the PCF directory for PGEs CER4.5-6.1P4, CER4.5-6.1P5, CER4.5-6.2P3 and CER4.5-6.4P2. 	Secs. 3.4.1.1, 3.4.2, 3.4.2.4, 3.4.4.1, 3.4.5, 3.4.5.4, 3.5.1.1, 3.5.2, 3.5.2.4, 3.5.4.1, 3.5.5, 3.5.5.4, 3.8.1.1, 3.8.2, 3.8.2.4, 3.8.4.1, 3.8.5, 3.8.5.4, 3.8.7.1, 3.8, 3.8.8.4, 3.8.10.1, 3.8.11, 3.8.11.2, 3.8.11.4, 3.13.1.1, 3.13.2, 3.13.4.1, 3.13.5, 3.13.7.1, 3.13.8, 3.13.10.1, & 3.13.11
09/04/09	R5V4	722	<ul style="list-style-type: none"> Added PGEs CER4.5-6.5P2 and CER4.5-6.5P3. Corrections to directory paths (changed "PGE" to "CER." (05/14/10) 	Secs. 1.2.5, 2.2.11, 2.2.12, 3.13, 3.14, Fig. B-2, Tables C.1-14, C.1-15, C.1-16, C.1-17, C.2-14, C-2-15, C.2-16, C.2-17, C.4-6, C.4-7, C.4-22, C.4-23, C.4-24, C.4-25, & C.6-2 Secs. 2.2.1, 2.2.4, 2.2.7, 2.2.8, 2.2.9, 2.2.13, & 2.2.14

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05/28/2010	R5V5	786	<ul style="list-style-type: none"> Added PGEs CER4.5-6.5P4 and CER4.5-6.5P5. Changed references of Edition3 to Edition4. 	<p>Secs. 3-16, 3-17, 1.2.6, 2.2.13, 2.2.14, Fig. B-2, Tables C.1-16, C.1-17, C.2-16, C.2-17, C.4-6, C.4-7, C.4-24, C.4-25, & C.5-2</p> <p>Secs. 1.2.1, 1.2.2, 3.8, 3.13, Tables C.2-4, & C.2-5</p>
06/22/2010	R5V6	791	<ul style="list-style-type: none"> Added PGE CER4.5-6.2P4. 	<p>Secs. 1.2.2, 2.2.6, & 3.9, Fig. B-3, Tables C.1-9, C.2-9, C.4-4, & C.4-17</p>
11/04/2010	R5V7	814	<ul style="list-style-type: none"> Updated PGEs CER4.5-6.1P4, CER4.5-6.1P5, CER4.5-6.2P3, and CER4.5-6.4P2 to include testing for SGE. 	<p>Secs. 3.4, 3.5, 3.8, 3.14, Tables C.1-4, C.1-5, C.1-8, C.1-14, & C.5-2</p>
7/25/2012	R5V8	912	<ul style="list-style-type: none"> Updated PGEs CER4.5-6.2P4, CER4.5-6.4P1, CER4.5-6.5P4, and CER4.5-6.5P5 to include testing for SGE and for operation on <i>AMI-P6</i> and <i>x86</i> systems. Updated compilation information for PGEs CER4.5-6.2P4, CER4.5-6.4P1, CER4.5-6.5P4, and CER4.5-6.5P5. Updated Production Scripts and Executables Tables for PGEs CER4.5-6.2P4, CER4.5-6.4P1, CER4.5-6.5P4, and CER4.5-6.5P5. Added PGE CER4.5-6.1P6 for future use. 	<p>Secs. 3.10, 3.14, 3.18, & 3.19</p> <p>Secs. 2.2.6, 2.2.10, 2.2.14, & 2.2.15</p> <p>Tables C.1-9, C.1-13, C.1-17, C.1-18, C.2-9, C.2-13, C.2-17, & C.2-18</p> <p>Sec. 3.6</p>
7/25/2012	R5V9	913	<ul style="list-style-type: none"> Updated PGEs CER4.5-6.1P2, CER4.5-6.1P3, and CER4.5-6.2P2 to include testing for SGE and for operation on <i>AMI-P6</i> and <i>x86</i> systems. Updated compilation information for PGEs CER4.5-6.1P2, CER4.5-6.1P3, CER4.5-6.1P4, CER4.5-6.1P5, CER4.5-6.2P2, and CER4.5-6.2P3. 	<p>Secs. 3.2, 3.3, & 3.8</p> <p>Secs. 2.2.1, 2.2.2, 2.2.3, 2.2.4, & 2.2.5</p>

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7/25/2012 (Continued)	R5V9	913	<ul style="list-style-type: none"> Updated Production Scripts and Executables Tables for PGEs CER4.5-6.1P2, CER4.5-6.1P3, and CER4.5-6.2P2. 	Tables C.1-2, C.1-3, C.1-7, C.2-2, C.2-3, C.2-7, C.4-10, C.4-11, C.4-12, C.4-13, C.4-15, C.4-16, C.4-17, C.4-21, & C.4-22
11/26/2012	R5V10	939	<ul style="list-style-type: none"> Removed command line testing from PGEs CER4.5-6.2P4, CER4.5-6.4P1, CER4.5-6.5P4, and CER4.5-6.5P5. Formatting issues were fixed. (12/05/2012) 	Secs. 3.10.1.2, 3.10.4.2, 3.10.7.2, 3.10.10.2, 3.14.1.2, 3.14.4.2, 3.14.7.2, 3.14.10.2, 3.18.1.2, 3.18.5.2, 3.19.1.2, & 3.19.5.2 All
7/29/2013	R5V11	973	<ul style="list-style-type: none"> Added sibiMap input data and updated the MATCH input data. 	Secs. 3.6.1.1, 3.6.2, 3.6.4.1, 3.6.5, 3.6.7.1, 3.6.8, 3.6.10.1, 3.6.11, 3.6.13.1, 3.6.14, 3.6.16.1, 3.6.17, 3.6.19.1, 3.6.20, 3.6.22.1, 3.6.23, 3.6.25.1, 3.6.26, 3.6.28.1, 3.6.29, 3.6.31.1, 3.6.32, 3.6.34.1, & 3.6.35

Document Revision Record

SCCR Approval Date	Release/Version Number	SCCR Number	Description of Revision	Section(s) Affected
2/19/2014 (Continued)	R5V12	1001	<ul style="list-style-type: none"> Added fixes for PGE CER4.5-6.1P6. 	Secs. 1.2.2, 2.2.3, 2.2.5, Tables C.1-8, C.2-8, C.4-3, & C.4-16
4/16/2014	R5V13	1009	<ul style="list-style-type: none"> Modified compilation instructions. Removed SCOOL output files from PGEs CER4.5-6.2P2, CER4.5-6.2P3, and CER4.5-6.2P4. Added Stand Alone Test Procedures for FM5. 	Sec. 2.2.5 Secs. 3.9, 3.9.1.1, 3.9.2.2-3, 3.9.4.1, 3.9.5, 3.9.5.2-3, 3.9.7.1, 3.9.8, 3.9.8.2-3, 3.9.10.1, 3.9.11, 3.9.11.2-3, 3.10, 3.10.1.1, 3.10.2, 3.10.2.1-3, 3.10.4.1, 3.10.5, 3.10.5.1-3, 3.10.7.1, 3.10.8, 3.10.8.1-3, 3.10.10.1, 3.10.11, 3.10.11.1-3, 3.11, 3.11.1.1, 3.11.2, 3.11.2.2-3, 3.11.4.1, 3.11.5, 3.11.5.2-3, 3.11.7.1, 3.11.8, 3.11.8.2-3, 3.11.10.1, 3.11.11, 3.11.11.2-3, & Fig. B-2 Sec. 3.10.13
03/21/13	R5V14	959	<ul style="list-style-type: none"> Added and updated PGE CER4.5-6.1P7 for NPP. 	Secs. 1.2.2, 2.2.4, 3.8, Fig. B-3, Tables C.1-8, C.2-8, C.4-3, C.4-17, & C.5-2

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03/21/13 (Cont'd)	R5V14	959	<ul style="list-style-type: none"> • Added MATCH-daily input files for PGEs CER4.5-6.1P6 and CER4.5-6.1P7 and added the SORCE TSI input file for PGE CER4.5-6.1P6. • Modified a minor formatting issue. (07/03/2014) 	Secs. 3.7.1.1, 3.7.2, 3.7.4.1, 3.7.5, 3.7.7.1, 3.7.8, 3.7.10.1, 3.7.11, 3.7.13.1, 3.7.14, 3.7.16.1, 3.7.17, 3.8.1.1, 3.8.2, 3.8.4.1, 3.8.5, 3.8.7.1 & 3.8.8 Sec. 3.1.19.1
04/02/15	R5V15	1064	<ul style="list-style-type: none"> • Added wording to clarify the HDF file comparison procedure for PGE CER4.5-6.1P7. 	Secs. 3.8.2.4, 3.8.5.4, & 3.8.8.4
06/25/2015	R5V16	1078	<ul style="list-style-type: none"> • Added P7 and x86-flex processors to the testing procedures. 	Secs. 3.8.1.2, 3.8.4.2, & 3.8.7.2
12/2/2015	R5V17	1100	<ul style="list-style-type: none"> • Added commands to move existing input files into temporary directories before CER4.5-6.0P6 tests, then restore them after tests complete. 	Secs. 3.1.1.1, 3.1.2, 3.1.5.1, 3.1.6, 3.1.9.1, 3.1.10, 3.1.13.1, 3.1.14, 3.1.17.1, & 3.1.18
02/01/2017	R5V18	1217	<ul style="list-style-type: none"> • Updated PGE CER4.5-6.1P6 to be x86 only. 	Secs. 2.2.3, 3.7.1.2, 3.7.4.2, 3.7.7.2, 3.7.10.2, 3.7.13.2, 3.7.16.2, 3.7.19.2, 3.7.22.2, 3.7.25.2, 3.7.28.2, 3.7.31.2, & 3.7.34.2
02/01/2017	R5V18	1218	<ul style="list-style-type: none"> • Updated PGE CER4.5-6.2P3 to be x86 only. 	Secs. 2.2.6, 3.11.1.2, 3.11.4.2, 3.11.7.2, 3.11.10.2, & 3.11.13.2

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02/01/2017	R5V18	1219	<ul style="list-style-type: none"> Updated PGE CER4.5-6.4P2 to be x86 only. Added FM5 testing and removed command line testing. 	Secs. 2.2.12, 3.17.1.2, 3.17.2, 3.17.4.2, 3.17.5, 3.17.7.2, 3.17.8, 3.17.10.2, 3.17.11, & 3.17.13-3.17.15
02/01/2017	R5V18	1220	<ul style="list-style-type: none"> Updated PGE CER4.5-6.0P6 to be x86 only. Added additional Terra test case. 	Secs. 2.2.1, 3.1.1.2, 3.1.5-3.1.8, 3.1.9.2, 3.1.13.2, 3.1.17.2, & 3.1.21.2
			<ul style="list-style-type: none"> Removed PGEs and any references to the following PGEs CER4.5-6.1P1, CER4.5-6.1P2, CER4.5-6.1P3, CER4.5-6.1P4, CER4.5-6.1P5, CER4.5-6.2P1, CER4.5-6.2P2, CER4.5-6.2P4, CER4.5-6.3P1, CER4.5-6.3P2, CER4.5-6.3P3, CER4.5-6.4P1, CER4.5-6.5P2, CER4.5-6.5P3, CER4.5-6.5P4, CER4.5-6.5P5, CER4.5-6.6P2, CER4.5-6.6P3. (03/26/2019) Removed Appendices B and C as they are no longer relevant. (03/26/2019) 	All Apps. B & C

Preface

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

The DMS consists of 12 subsystems; each subsystem contains one or more Product Generation Executables. Each subsystem executes when all of its required input data sets are available and produces one or more archival science products.

This Test Plan is written by the responsible CERES subsystem team for the CERES Configuration Management Team and the Langley ASDC to support subsystem testing. This document describes the software and supporting data files for this Subsystem and explains the procedures for installing, executing, and testing the software in the Science Software Integration and Testing environment. A section is also included on validating the software results.

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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 μm), a total channel (0.3 - 200 μm), and an infrared window channel (8 - 12 μm). The last data processed from the PFM instrument aboard TRMM was March 2000; no additional data are expected. Until June 2005, one instrument on each EOS platform operated in a fixed azimuth scanning mode and the other operated in a rotating azimuth scanning mode; now all are typically operating in the fixed azimuth scanning mode. The NPP platform carries the FM5 instrument, which operates in the fixed azimuth scanning mode though it has the capability to operate in a rotating azimuth scanning mode.

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

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

1.1 Document Overview

This document, [CERES Inversion to Instantaneous Top-of-Atmosphere \(TOA\) Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Release 4 Test Plan](#), is part of the CERES Subsystems 4.5 and 4.6 Release 4 delivery package provided to the Langley Atmospheric Science Data Center (ASDC). It provides a description of the CERES Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Release 4 software and explains the procedures for installing, executing, and testing the software. A section is also included on validating the software results. A description of acronyms and abbreviations is provided in [Appendix A](#).

This 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

1.2 Subsystem Overview

1.2.1 CER4.5-6.0P6 = CERES Sea Ice Brightness Index Inversion Subsystem 4.5 Pre Processor for Terra and Aqua Edition4 Processing and NPP Processing

The Terra and Aqua Edition4 and the NPP ADMs for fresh snow and sea ice scene types rely on the MODIS spectral information for scene classification. For clear-sky and partly cloudy sky scenes this information is computed using the clear-sky radiances. For overcast scenes where we can't see the surface, a monthly map of the relevant value is used to determine which ADM to use.

For sea ice scenes the Sea Ice Brightness Index (SIBI) is used to determine the ADM type. The SIBI is defined as $1.0 - (\text{ref_0469} - \text{ref_0858}) / (\text{ref_0469} + \text{ref_0858})$, where ref_0469 is the clear-sky reflectance in the 0.469 micron band and ref_0858 is the clear-sky reflectance in the 0.858 micron band.

The code reads in the cross-track SSF files for each month and outputs the mean SIBI in each grid box defined by the CERES nested-grid routine. For the SIBI, the conditions require that there be some sea ice present from at least one of sfc_type (ssf-25 & ssf-26) and/or snow_ice (ssf-69). The cloud fraction must be greater than or equal to 0% and less than 99%. The SIBI value is calculated in the main program. The FOV's are looped over and the respective values are summed for each grid box and the count is kept. Once the month has finished processing the mean value (sum/count) is output for each region that has a count greater than zero.

1.2.2 CERES Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Main Processors and HDF Post Processor

The Main Processor Product Generation Executives (PGE) CER4.5-6.1P6 and CER4.5-6.1P7 CERES Inversion to Instantaneous TOA Fluxes and the Empirical Estimates of Surface Radiation Budget, Subsystems 4.5 and 4.6, convert CERES filtered radiance measurements to instantaneous radiative flux estimates at the top of the Earth's atmosphere and produces radiative flux estimates at the Earth's surface for each CERES footprint. The output of the Subsystems 4.5 and 4.6 Main Processor PGE CER4.5-6.1P6, which is for Terra/Aqua Edition4 processing, consists of a binary Single Scanner Footprint TOA/Surface Fluxes and Clouds (SSF) product, a binary SSF Aerosol (SSFA) product containing MODIS aerosols, an ASCII Quality Control (QC) report, and a binary QC file. This PGE also has the option of using an alternate Instrument IES as input. The output of the Subsystems 4.5 and 4.6 Main Processor PGE CER4.5-6.1P7, which is for S-NPP processing, consists of a binary Single Scanner Footprint TOA/Surface Fluxes and Clouds (SSF) product, a binary SSF Aerosol (SSFA) product containing MODIS aerosols, an ASCII Quality Control (QC) report, and a binary QC file. This PGE also has the option of using an alternate Instrument IES as input.

The HDF Post Processor for CERES Inversion to Instantaneous TOA Fluxes and the Empirical Estimates of Surface Radiation Budget, Subsystems 4.5 and 4.6, reads the binary SSF (and the binary SSFA for Terra and Aqua processing) as input and generates an SSF product in Hierarchical Data Format (HDF).

1.2.3 CERES Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Subset Post Processors

The Subsetting Post Processor PGE CER4.5-6.2P3 (for Terra and Aqua Edition4 SSF subsetting) for CERES Inversion to Instantaneous TOA Fluxes and the Empirical Estimates of Surface Radiation Budget, Subsystems 4.5 and 4.6, reads up to 24 hourly binary SSF products as input and generates two SSF daily subset files, the first containing daytime data and the second containing nighttime data. CER4.5-6.2P3 also read in the hourly Terra or Aqua binary SSFA products as input and subsets the SSFA file into two daytime and nighttime aerosol binary files. The same footprints that were placed on the SSF subset files are selected for the SSF aerosol subset files. PGE CER4.5-6.2P3 also produce daily binary and HDF SSF Nadir products that contain nadir viewing footprints and a daily binary SSF validation product.

1.2.4 CERES Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Monthly Validation Site Post Processor

The Monthly Validation Site Post Processor combines all of the CERES validation site footprint records that were archived in the daily validation site SSF products for a single instrument during a data month and combines them into a single monthly binary SSF file.

1.2.5 CERES Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Alternate Main Processor and HDF Post Processor Using Instrument IES data

The Alternate Main Processor converts CERES unfiltered radiance measurements to instantaneous radiative flux estimates at the top of the Earth's atmosphere and produces radiative flux estimates at the Earth's surface for each CERES footprint. This processor uses an archived binary SSF and an archived binary IES as input and only the TOA and surface fluxes are replaced. The output of Subsystems 4.5 and 4.6 Alternate Main Processor consists of an Edition4 binary Single Scanner Footprint (SSF) product and an SSF product in Hierarchical Data Format (HDF).

1.2.6 CERES Inversion to Instantaneous TOA Fluxes and Empirical Estimates of Surface Radiation Budget Subsystems 4.5 and 4.6 Alternate Main Processor and HDF Post Processor Using Instrument IES data

The Alternate Main Processor converts CERES unfiltered radiance measurements to instantaneous radiative flux estimates at the top of the Earth's atmosphere and produces radiative flux estimates at the Earth's surface for each CERES footprint. This processor uses an archived binary SSF and an archived binary IES as input and only the TOA and surface fluxes are replaced. The output of Subsystems 4.5 and 4.6 Alternate Main Processor consists of an Edition3 binary Single Scanner Footprint (SSF) product and an SSF product in Hierarchical Data Format (HDF).

2.0 Software and Data File Installation Procedures

This section describes how to install the Subsystems 4.5 and 4.6 Inversion software in preparation for making the necessary test runs at the Langley ASDC. The installation procedures include instructions for uncompressing and untarring the delivered tar files, properly defining environmental variables, and compiling the Inversion programs.

2.1 Installation

Software/Data File Install Procedure:

1. The scripts, makefiles and Process Control Files in the Subsystems 4.5 and 4.6 delivery package expect the CERES environment variable, **\$CERESENV**, to point to a file which sets the following environment variables:

PGSDIR	-	Directory for Toolkit libraries
F90	-	Pointer to the SGI F90 64 bit compiler
CERESHOME	-	Top Directory for CERES Software
CERESLIB	-	Directory for CERESlib
PGSMMSG	-	Directory which contains Toolkit and CERES Status Message Files
PGSLIB	-	Directory which contains SGI 64-bit Toolkit library file
PGSINC	-	Pointer to the PGS include file directory
HDFDIR	-	Pointer to the HDF home directory
HDFINC	-	Pointer to the directory containing the HDF header files
HDFLIB	-	Pointer to the directory containing the HDF library

2. Change directory to the directory where you plan to install the Inversion Subsystems. (The following instructions assume that the directory will be **\$CERESHOME**.)
3. Uncompress and untar the tar files by replacing **XXX** with the appropriate SCCR number and typing the following commands:

```
uncompress inversion_src_R5-XXX.tar.Z
tar xf inversion_src_R5-XXX.tar
uncompress inversion_anc_R5-XXX.tar.Z
tar xf inversion_anc_R5-XXX.tar
uncompress inversion_data_R5-XXX.tar.Z
tar xf inversion_data_R5-XXX.tar
```

2.2 Compilation

2.2.1 Compiling PGE CER4.5-6.0P6

To create the Pre Processor executables on directory **\$CERESHOME/inversion/CER4.5-6.0P6/bin/** and to create the comparison software executables on **\$CERESHOME/inversion/test_suites/bin**, type the following commands:

```
source $CERESENV
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
```

For Terra, Aqua and NPP processing, execute the following command:

```
compile_4.5-6.0P6.pl
```

The following files will be created in **\$CERESHOME/inversion/CER4.5-6.0P6/bin**:

```
mapSpecModels_x86_64.exe for x86 processor
```

2.2.2 Compiling PGE CER4.5-6.1P6

To create the Main and Post Processor executables on directory **\$CERESHOME/inversion/CER4.5-6.1P6/bin/** and to create the comparison software executables on **\$CERESHOME/inversion/test_suites/bin**, type the following commands:

```
source $CERESENV  
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
```

For Terra and Aqua processing, execute the following command:

```
compile_4.5-6.1P6.pl
```

The following files will be created in **\$CERESHOME/inversion/CER4.5-6.1P6/bin**:

```
invsurf_1p6_x86_64.exe for x86 processor  
ssf2hdf_ed4_x86_64.exe for x86 processor
```

2.2.3 Compiling PGE CER4.5-6.1P7

To create the Main and Post Processor executables on directory **\$CERESHOME/inversion/CER4.5-6.1P7/bin/** and to create the comparison software executables on **\$CERESHOME/inversion/test_suites/bin**, type the following commands:

```
source $CERESENV  
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
```

For Terra and Aqua processing, execute the following command:

```
compile_4.5-6.1P7.pl
```

The following files will be created in **\$CERESHOME/inversion/CER4.5-6.1P7/bin**:

```
invsurf_1p7_ppc64.exe for P6 processor  
invsurf_1p7_x86_64.exe for x86 processor  
ssf2hdf_ed4_ppc64.exe for P6 processor  
ssf2hdf_ed4_x86_64.exe for x86 processor
```

2.2.4 Compiling PGE CER4.5-6.2P3

To create the SSF Subset Post Processor and HDF Post Processor for PGE CER4.5-6.2P3 on directory **\$CERESHOME/inversion/CER4.5-6.2P3/bin/** and to create the comparison software executable on **\$CERESHOME/inversion/test_suites/bin**, type the following commands:

```
source $CERESENV  
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
```

For Terra, Aqua, and NPP processing, execute the following command:

```
compile_4.5-6.2P3.csh
```

The following files will be created in **\$CERESHOME/inversion/CER4.5-6.2P3/bin**:

```
ssf2hdf_ed4_x86_64.exe for x86 processor  
subset_ssf_2p3_x86_64.exe for x86 processor
```

The following files will be created in **\$CERESHOME/inversion/test_suites/bin**:

```
comp_subsets_2p3_x86_64.exe for x86 processor  
comp_ssf2a_subsets_2p3_x86_64.exe for x86 processor  
compare_nadir_ssf_2p3_x86_64.exe for x86 processor  
compare_ssfa_2p3_x86_64.exe for x86 processor
```

2.2.5 Compiling PGE CER4.5-6.4P2

To create the Alternate Main and Post Processor executables on directory **\$CERESHOME/inversion/CER4.5-6.4P2/bin/** and to create the comparison software executables on **\$CERESHOME/inversion/test_suites/bin**, type the following commands:

```
source $CERESENV  
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf  
compile_4.5-6.4P2.csh
```

The following files will be created in **\$CERESHOME/inversion/CER4.5-6.4P2/bin**:

```
monthly_val_ssf_x86_64.exe for x86 processors
```

3.0 Test and Evaluation Procedures

This section provides general information on how to execute Subsystems 4.5 and 4.6 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 CER4_5-6.0P6 Pre Processor for Terra, Aqua and NPP Processing

3.1.1 Stand Alone Test Procedures for Terra, Environment variable REPROCESS='yes'

3.1.1.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
setenv YEAR 2004
setenv MONTH 07
setenv INSTANCE_0P6 Terra-MODIS_Edition4_000000.200407
source $CERESHOME/inversion/CER4.5-6.0P6/rcf/inversion-terra-env.csh
```

Copy any existing input files to a temporary directory:

```
mkdir $InputArchive/SSFb/Terra-FM1-MODIS_Beta2-
Ed4/2004/07/TEMP_MV_FOR_CM_TEST
mv $InputArchive/SSFb/Terra-FM1-MODIS_Beta2-Ed4/2004/07/CER*
$InputArchive/SSFb/Terra-FM1-MODIS_Beta2-
Ed4/2004/07/TEMP_MV_FOR_CM_TEST/
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.0P6/CER_SSFb_Terra-
FM1-MODIS_Beta2-Ed4_400401.200407*12 $InputArchive/SSFb/Terra-
FM1-MODIS_Beta2-Ed4/2004/07/
```

3.1.1.2 Execution

Execute the production script by typing the script name, **CER4.5-6.0P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
$CERESHOME/inversion/CER4.5-6.0P6/rcf/CER4.5-6.0P6-SGE_Driver.pl -date
200407 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/pcf/CER4.5-
6.0P6_PCF_$INSTANCE_0P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created `sgc_log` file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.0P6/CER4.5-6.0P6_$INSTANCE_0P6.o*
```

Output file generation test:

The script, **list_4.5-6.0P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/list_4.5-6.0P6.pl $INSTANCE_0P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.1.1.3 Exit Codes

All CER4.5-6.0P6 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the two executables.

3.1.1.4 Test Summary

Test Summary:

```
Total Run Time:      1:34 minutes
Memory:              300 K
Required Disk Space: 0.1 Megabytes
```

3.1.2 Evaluation Procedures

When running the production script, **run_4.5-6.0P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input files:

```
rm $InputArchive/SSFB/Terra-FM1-MODIS_Beta2-Ed4/2004/07/CER_SSFb_Terra-FM1-MODIS_Beta2-Ed4_400401.200407*12
```

Restore original contents of input file directory and remove temporary folder:

```
mv $InputArchive/SSFB/Terra-FM1-MODIS_Beta2-Ed4/2004/07/TEMP_MV_FOR_CM_TEST/* $InputArchive/SSFB/Terra-FM1-MODIS_Beta2-Ed4/2004/07/
rmdir $InputArchive/SSFB/Terra-FM1-MODIS_Beta2-Ed4/2004/07/TEMP_MV_FOR_CM_TEST/
```

3.1.3 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.0P6_LogReport_\${INSTANCE}_0P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.0P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.0P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6**, using the following **diff_4.5-6.0P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
$CERESHOME/inversion/CER4.5-6.0P6/rcf/diff_4.5-6.0P6.pl $INSTANCE_0P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.1.3.1 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Pre Processor will perform a single test. This test will compare the parameters of the sibiMap to the values in comparison files provided with the software delivery.

1. To compare the sibiMap files, type the following command:

```
diff $CERESHOME/inversion/data/sibiMap/Terra-
MODIS_Edition4/2004/07/CER_sibiMap_Terra-
MODIS_Edition4_000000.200407
$CERESHOME/inversion/data_exp/CER4.5-6.0P6/
```

3.1.4 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.0P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.0P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.0P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
$CERESHOME/inversion/CER4.5-6.0P6/rcf/cleanup_4.5-6.0P6.pl 200407
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.1.5 Stand Alone Test Procedures for Terra, Environment variable REPROCESS='no'

3.1.5.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
setenv YEAR 2016
setenv MONTH 06
setenv INSTANCE_0P6 Terra-MODIS_Edition1-CV_400400.201606
source $CERESHOME/inversion/CER4.5-6.0P6/rcf/inversion-terra-env1.csh
```

Copy any existing input files to a temporary directory:

```
mkdir $InputArchiveInt/SSF_Int/Terra-FM1-MODIS_Edition1-
CV/2016/06/TEMP_MV_FOR_CM_TEST
mv $InputArchiveInt/SSF_Int/Terra-FM1-MODIS_Edition1-CV/2016/06/CER*
$InputArchiveInt/SSF_Int/Terra-FM1-MODIS_Edition1-
CV/2016/06/TEMP_MV_FOR_CM_TEST/
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.0P6/CER_SSF1_Terra-FM1-
MODIS_Edition1-CV_400400.201606*12 $InputArchiveInt/SSF_Int/Terra-
FM1-MODIS_Edition1-CV/2016/06/
```

3.1.5.2 Execution

Execute the production script by typing the script name, **CER4.5-6.0P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
$CERESHOME/inversion/CER4.5-6.0P6/rcf/CER4.5-6.0P6-SGE_Driver.pl -date
201606 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/pcf/CER4.5-
6.0P6_PCF_$INSTANCE_0P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.0P6/CER4.5-
6.0P6_$INSTANCE_0P6.o*
```

Output file generation test:

The script, **list_4.5-6.0P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/list_4.5-6.0P6.pl $INSTANCE_0P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.1.5.3 Exit Codes

All CER4.5-6.0P6 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the two executables.

3.1.5.4 Test Summary

Test Summary:

Total Run Time:	1:34 minutes
Memory:	300 K
Required Disk Space:	0.1 Megabytes

3.1.6 Evaluation Procedures

When running the production script, **run_4.5-6.0P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input files:

```
rm $InputArchiveInt/SSF_Int/Terra-FM1-MODIS_Edition1-  
CV/2016/06/CER_SSF1_Terra-FM1-MODIS_Edition1-  
CV_400400.201606*12
```

Restore original contents of input file directory and remove temporary folder:

```
mv $InputArchiveInt/SSF_Int/Terra-FM1-MODIS_Edition1-  
CV/2016/06/TEMP_MV_FOR_CM_TEST/*  
$InputArchiveInt/SSF_Int/Terra-FM1-MODIS_Edition1-CV/2016/06/  
rmdir $InputArchiveInt/SSF_Int/Terra-FM1-MODIS_Edition1-  
CV/2016/06/TEMP_MV_FOR_CM_TEST/
```

3.1.7 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.0P6_LogReport \$INSTANCE_0P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.0P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.0P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6**, using the following **diff_4.5-6.0P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/diff_4.5-6.0P6.pl $INSTANCE_0P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.1.7.1 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Pre Processor will perform a single test. This test will compare the parameters of the sibiMap to the values in comparison files provided with the software delivery.

1. To compare the sibiMap files, type the following command:

```
diff $CERESHOME/inversion/data/sibiMap/Terra-MODIS_Edition1-  
CV/2016/06/CER_sibiMap_Terra-MODIS_Edition1-CV_400400.201606  
$CERESHOME/inversion/data_exp/CER4.5-6.0P6/
```

3.1.8 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.0P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.0P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.0P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/cleanup_4.5-6.0P6.pl 201606
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.1.9 Stand Alone Test Procedures for Aqua, Environment variable REPROCESS='yes'

3.1.9.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
setenv YEAR 2004
setenv MONTH 07
setenv INSTANCE_0P6 Aqua-MODIS_Edition4_000000.200407
source $CERESHOME/inversion/CER4.5-6.0P6/rcf/inversion-aqua-env1.csh
```

Copy any existing input files to a temporary directory:

```
mkdir $InputArchive/SSFB/Aqua-FM3-MODIS_Beta2-
Ed4/2004/07/TEMP_MV_FOR_CM_TEST
mv $InputArchive/SSFB/Aqua-FM3-MODIS_Beta2-Ed4/2004/07/CER*
$InputArchive/SSFB/Aqua-FM3-MODIS_Beta2-
Ed4/2004/07/TEMP_MV_FOR_CM_TEST/
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.0P6/CER_SSFB_Aqua-FM3-
MODIS_Beta2-Ed4_400401.200407*12 $InputArchive/SSFB/Aqua-FM3-
MODIS_Beta2-Ed4/2004/07/
```

3.1.9.2 Execution

Execute the production script by typing the script name, **CER4.5-6.0P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
$CERESHOME/inversion/CER4.5-6.0P6/rcf/CER4.5-6.0P6-SGE_Driver.pl -date
200407 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/pcf/CER4.5-
6.0P6_PCF_$INSTANCE_0P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.0P6/CER4.5-
6.0P6_$INSTANCE_0P6.o*
```

Output file generation test:

The script, **list_4.5-6.0P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/list_4.5-6.0P6.pl $INSTANCE_0P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.1.9.3 Exit Codes

All CER4.5-6.0P6 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the two executables.

3.1.9.4 Test Summary

Test Summary:

```
Total Run Time:      1:34 minutes
Memory:              300 K
Required Disk Space: 0.1 Megabytes
```

3.1.10 Evaluation Procedures

When running the production script, **run_4.5-6.0P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input files:

```
rm $InputArchive/SSFB/Aqua-FM3-MODIS_Beta2-
Ed4/2004/07/CER_SSFBAqua-FM3-MODIS_Beta2-Ed4_400401.200407*12
```

Restore original contents of input file directory and remove temporary folder:

```
mv $InputArchive/SSFB/Aqua-FM3-MODIS_Beta2-
Ed4/2004/07/TEMP_MV_FOR_CM_TEST/* $InputArchive/SSFB/Aqua-
FM3-MODIS_Beta2-Ed4/2004/07/
rmdir $InputArchive/SSFB/Aqua-FM3-MODIS_Beta2-
Ed4/2004/07/TEMP_MV_FOR_CM_TEST
```

3.1.11 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.0P6_LogReport_\$INSTANCE_0P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.0P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.0P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6**, using the following **diff_4.5-6.0P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/diff_4.5-6.0P6.pl $INSTANCE_0P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.1.11.1 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Pre Processor will perform a single test. This test will compare the parameters of the sibiMap to the values in comparison files provided with the software delivery.

1. To compare the sibiMap files, type the following command:

```
diff $CERESHOME/inversion/data/sibiMap/Aqua-  
MODIS_Edition4/2004/07/CER_sibiMap_Aqua-  
MODIS_Edition4_000000.200407  
$CERESHOME/inversion/data_exp/CER4.5-6.0P6/
```

3.1.12 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.0P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.0P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.0P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/cleanup_4.5-6.0P6.pl 200407
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.1.13 Stand Alone Test Procedures for Aqua, Environment variable REPROCESS='no'

3.1.13.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
setenv YEAR 2012
setenv MONTH 02
setenv INSTANCE_0P6 Aqua-MODIS_Edition4_000000.201202
source $CERESHOME/inversion/CER4.5-6.0P6/rcf/inversion-aqua-env2.csh
```

Copy any existing input files to a temporary directory:

```
mkdir $InputArchiveInt/SSF_Int/Aqua-FM3-
MODIS_Ed4Test/2012/02/TEMP_MV_FOR_CM_TEST
mv $InputArchiveInt/SSF_Int/Aqua-FM3-MODIS_Ed4Test/2012/02/CER*
$InputArchiveInt/SSF_Int/Aqua-FM3-
MODIS_Ed4Test/2012/02/TEMP_MV_FOR_CM_TEST/
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.0P6/CER_SSF_Aqua-FM3-
MODIS_Ed4Test_000000.201202*12 $InputArchiveInt/SSF_Int/Aqua-FM3-
MODIS_Ed4Test/2012/02/
```

3.1.13.2 Execution

Execute the production script by typing the script name, **CER4.5-6.0P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
$CERESHOME/inversion/CER4.5-6.0P6/rcf/CER4.5-6.0P6-SGE_Driver.pl -date
201202 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/pcf/CER4.5-
6.0P6_PCF_$INSTANCE_0P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.0P6/CER4.5-
6.0P6_$INSTANCE_0P6.o*
```

Output file generation test:

The script, **list_4.5-6.0P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/list_4.5-6.0P6.pl $INSTANCE_0P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.1.13.3 Exit Codes

All CER4.5-6.0P6 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the two executables.

3.1.13.4 Test Summary

Test Summary:

```
Total Run Time:      1:34 minutes
Memory:              300 K
Required Disk Space: 0.1 Megabytes
```

3.1.14 Evaluation Procedures

When running the production script, **run_4.5-6.0P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input files:

```
rm $InputArchiveInt/SSF_Int/Aqua-FM3-
MODIS_Ed4Test/2012/02/CER_SSF1_Aqua-FM3-
MODIS_Ed4Test_000000.201202*12
```

Restore original contents of input file directory and remove temporary folder:

```
mv $InputArchiveInt/SSF_Int/Aqua-FM3-
MODIS_Ed4Test/2012/02/TEMP_MV_FOR_CM_TEST/*
$InputArchiveInt/SSF_Int/Aqua-FM3-MODIS_Ed4Test/2012/02/
rmdir $InputArchiveInt/SSF_Int/Aqua-FM3-
MODIS_Ed4Test/2012/02/TEMP_MV_FOR_CM_TEST
```

3.1.15 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.0P6_LogReport \$INSTANCE_0P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.0P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.0P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6**, using the following **diff_4.5-6.0P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/diff_4.5-6.0P6.pl $INSTANCE_0P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.1.15.1 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Pre Processor will perform a single test. This test will compare the parameters of the sibiMap to the values in comparison files provided with the software delivery.

1. To compare the sibiMap files, type the following command:

```
diff $CERESHOME/inversion/data/sibiMap/Aqua-  
MODIS_Edition4/2012/02/CER_sibiMap_Aqua-  
MODIS_Edition4_000000.201202  
$CERESHOME/inversion/data_exp/CER4.5-6.0P6/
```

3.1.16 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.0P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.0P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.0P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/cleanup_4.5-6.0P6.pl 201202
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.1.17 Stand Alone Test Procedures for NPP, Environment variable REPROCESS='yes'

3.1.17.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
setenv YEAR 2012
setenv MONTH 02
setenv INSTANCE_0P6 NPP-VIIRS_Edition4_000000.201202
source $CERESHOME/inversion/CER4.5-6.0P6/rcf/inversion-npp-env1.csh
```

Copy any existing input files to a temporary directory:

```
mkdir $InputArchive/SSFBNPP-FM5-
VIIRS_SSIT/2012/02/TEMP_MV_FOR_CM_TEST
mv $InputArchive/SSFBNPP-FM5-VIIRS_SSIT/2012/02/CER*
$InputArchive/SSFBNPP-FM5-
VIIRS_SSIT/2012/02/TEMP_MV_FOR_CM_TEST/
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.0P6/CER_SSFBNPP-FM5-
VIIRS_SSIT_000000.201202*12 $InputArchive/SSFBNPP-FM5-
VIIRS_SSIT/2012/02/
```

3.1.17.2 Execution

Execute the production script by typing the script name, **CER4.5-6.0P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
$CERESHOME/inversion/CER4.5-6.0P6/rcf/CER4.5-6.0P6-SGE_Driver.pl -date
201202 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/pcf/CER4.5-
6.0P6_PCF_$INSTANCE_0P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.0P6/CER4.5-
6.0P6_$INSTANCE_0P6.o*
```

Output file generation test:

The script, **list_4.5-6.0P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/list_4.5-6.0P6.pl $INSTANCE_0P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.1.17.3 Exit Codes

All CER4.5-6.0P6 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the two executables.

3.1.17.4 Test Summary

Test Summary:

Total Run Time:	1:34 minutes
Memory:	300 K
Required Disk Space:	0.1 Megabytes

3.1.18 Evaluation Procedures

When running the production script, **run_4.5-6.0P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input files:

```
rm $InputArchive/SSFB/NPP-FM5-VIIRS_SSIT/2012/02/CER_SSFN_NPP-FM5-VIIRS_SSIT_000000.201202*12
```

Restore original contents of input file directory and remove temporary folder:

```
mv $InputArchive/SSFB/NPP-FM5-VIIRS_SSIT/2012/02/TEMP_MV_FOR_CM_TEST/* $InputArchive/SSFB/NPP-FM5-VIIRS_SSIT/2012/02/
rmdir $InputArchive/SSFB/NPP-FM5-VIIRS_SSIT/2012/02/TEMP_MV_FOR_CM_TEST
```

3.1.19 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.0P6_LogReport_\$INSTANCE_0P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.0P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.0P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6**, using the following **diff_4.5-6.0P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/diff_4.5-6.0P6.pl $INSTANCE_0P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.1.19.1 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Pre Processor will perform a single test. This test will compare the parameters of the sibiMap to the values in comparison files provided with the software delivery.

1. To compare the sibiMap files, type the following command:

```
diff $CERESHOME/inversion/data/sibiMap/NPP-  
VIIRS_Edition4/2012/02/CER_sibiMap_NPP-  
VIIRS_Edition4_000000.201202  
$CERESHOME/inversion/data_exp/CER4.5-6.0P6/
```

3.1.20 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.0P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.0P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.0P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/cleanup_4.5-6.0P6.pl 201202
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.1.21 Stand Alone Test Procedures for NPP, Environment variable REPROCESS='no'

3.1.21.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
setenv YEAR 2012
setenv MONTH 02
setenv INSTANCE_0P6 NPP-VIIRS_Edition4_999999.201202
source $CERESHOME/inversion/CER4.5-6.0P6/rcf/inversion-npp-env2.csh
```

Copy any existing input files to a temporary directory:

```
mkdir $InputArchiveInt/SSF_Int/NPP-FM5-
VIIRS_SSIT/2012/02/TEMP_MV_FOR_CM_TEST
mv $InputArchiveInt/SSF_Int/NPP-FM5-VIIRS_SSIT/2012/02/CER*
$InputArchiveInt/SSF_Int/NPP-FM5-
VIIRS_SSIT/2012/02/TEMP_MV_FOR_CM_TEST/
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.0P6/CER_SSF1_NPP-FM5-
VIIRS_SSIT_000000.201202*12 $InputArchiveInt/SSF_Int/NPP-FM5-
VIIRS_SSIT/2012/02/
```

3.1.21.2 Execution

Execute the production script by typing the script name, **CER4.5-6.0P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf
$CERESHOME/inversion/CER4.5-6.0P6/rcf/CER4.5-6.0P6-SGE_Driver.pl -date
201202 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/pcf/CER4.5-
6.0P6_PCF_$INSTANCE_0P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.0P6/CER4.5-
6.0P6_$INSTANCE_0P6.o*
```

Output file generation test:

The script, **list_4.5-6.0P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.0P6/rcf/list_4.5-6.0P6.pl $INSTANCE_0P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.1.21.3 Exit Codes

All CER4.5-6.0P6 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the two executables.

3.1.21.4 Test Summary

Test Summary:

Total Run Time:	1:34 minutes
Memory:	300 K
Required Disk Space:	0.1 Megabytes

3.1.22 Evaluation Procedures

When running the production script, **run_4.5-6.0P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input files:

```
rm $InputArchiveInt/SSF_Int/NPP-FM5-  
VIIRS_SSIT/2012/02/CER_SSFI_NPP-FM5-VIIRS_SSIT_000000.201202*12
```

Restore original contents of input file directory and remove temporary folder:

```
mv $InputArchiveInt/SSF_Int/NPP-FM5-  
VIIRS_SSIT/2012/02/TEMP_MV_FOR_CM_TEST/*  
$InputArchiveInt/SSF_Int/NPP-FM5-VIIRS_SSIT/2012/02/  
rmdir $InputArchiveInt/SSF_Int/NPP-FM5-  
VIIRS_SSIT/2012/02/TEMP_MV_FOR_CM_TEST
```

3.1.23 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.0P6_LogReport_\$INSTANCE_0P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.0P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.0P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.0P6**, using the following **diff_4.5-6.0P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/diff_4.5-6.0P6.pl $INSTANCE_0P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.1.23.1 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Pre Processor will perform a single test. This test will compare the parameters of the sibiMap to the values in comparison files provided with the software delivery.

1. To compare the sibiMap files, type the following command:

```
diff $CERESHOME/inversion/data/sibiMap/NPP-  
VIIRS_Edition4/2012/02/CER_sibiMap_NPP-VIIRS_Edition4_999999.201202  
$CERESHOME/inversion/data_exp/CER4.5-6.0P6/
```

3.1.24 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.0P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.0P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.0P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.0P6/rcf  
$CERESHOME/inversion/CER4.5-6.0P6/rcf/cleanup_4.5-6.0P6.pl 201202
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2 CER4_5-6.1P6 Main and Post Processors for Terra and Aqua Edition4 Processing

3.2.1 Stand Alone Test Procedures for FM1, Environment variables: REPROCESS = 'NO', READ_IES = 'NO' and PROD = 'no'

3.2.1.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2008
setenv MONTH 07
setenv DAY 15
setenv HOUR 15
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Terra-FM1-MODIS_Ed4Test_000000.$DATE_1P6
setenv SCC_1P6 Terra-FM1_Edition3_300300.20080715
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM1-test1-env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MOA_CERES_DAO-G5-CERES_020032.2008071512
  $InputArchive/MOA/CERES_DAO-G5-CERES/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MOA_CERES_DAO-G5-CERES_020032.2008071518
  $InputArchive/MOA/CERES_DAO-G5-CERES/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFI_Terra-FM1-
  MODIS_Ed4Test_000000.2008071515 $InputArchiveInt/SSF_Int/Terra-
  FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFAI_Terra-
  FM1-MODIS_Ed4Test_000000.2008071515
  $InputArchiveInt/SSF_Int/Terra-FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFAI_Terra-
  FM1-MODIS_Ed4Test_000000.2008071515.met
  $InputArchiveInt/SSF_Int/Terra-FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_FQCI_Terra-
  FM1-MODIS_Ed4Test_000000.2008071515 $InputArchiveInt/FQC/Terra-
  FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
  $InputArchive/SCCD/Terra-FM1_Edition3/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
  $InputArchive/SCCN/Terra-FM1_Edition3/2008/07/
```

```

cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20080715.nc
  $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Terra-
MODIS_Edition4_400400.200807
  $CERESHOME/inversion/data/sibiMap/Terra-MODIS_Edition4/2008/07/

```

3.2.1.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -
date 20080715 -hour 15 -clean

```

The following file will be generated:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_${INSTANCE}_1P6

```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```

ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_${INSTANCE}_1P6.o*

```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6

```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.1.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.1.4 Test Summary

Test Summary:

Total Run Time: 6:24 minutes
 Memory: 5.7 G
 Required Disk Space: 232 Megabytes

3.2.2 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchiveInt/SSF_Int/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_SSF1_$INSTANCE_1P6
rm $InputArchiveInt/SSF_Int/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_SSAI_$INSTANCE_1P6
rm $InputArchiveInt/SSF_Int/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_SSAI_$INSTANCE_1P6.met
rm $InputArchiveInt/FQC/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_FQCI_$INSTANCE_1P6
rm $InputArchive/SCCD/Terra-FM1_Edition3/2008/07/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Terra-FM1_Edition3/2008/07/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2008/07/CER_MOA_CERES_DAO-G5-CERES_020032.2008071512
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2008/07/CER_MOA_CERES_DAO-G5-CERES_020032.2008071518
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2008/07/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20080715.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $CERESHOME/inversion/data/sibiMap/Terra-
  MODIS_Edition4/2008/07/CER_sibiMap_Terra-
  MODIS_Edition4_400400.200807
```

3.2.2.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory

\$CERESHOME/inversion/data_exp/CER4.5-6.1P6, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.2.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.2.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.2.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Terra-FM1-  
MODIS_Ed4Test/2008/07/CER_SSF_$INSTANCE_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_$INSTANCE_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.3 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.4 Stand Alone, command line, Test Procedures for FM1, Environment Variables REPROCESS = 'YES', READ_IES = 'NO' and PROD = 'no'

3.2.4.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2008
setenv MONTH 07
setenv DAY 15
setenv HOUR 15
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Terra-FM1-MODIS_Ed4Test-
reproc_000000.$DATE_1P6
setenv SCC_1P6 Terra-FM1_Edition3_300300.20080715
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM1-test2-
env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_DAO-G5-CERES_020032.2008071512
$InputArchive/MOA/CERES_DAO-G5-CERES/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_DAO-G5-CERES_020032.2008071518
$InputArchive/MOA/CERES_DAO-G5-CERES/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFb_Terra-
FM1-MODIS_Ed4Test_000000.2008071515 $InputArchive/SSFB/Terra-
FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Terra-
FM1-MODIS_Ed4Test_000000.2008071515 $InputArchive/SSFA/Terra-
FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Terra-
FM1-MODIS_Ed4Test_000000.2008071515.met $InputArchive/SSFA/Terra-
FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_GQCI_Terra-
FM1-MODIS_Ed4Test_000000.2008071515 $InputArchive/GQCI/Terra-
FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Terra-FM1_Edition3/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Terra-FM1_Edition3/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20080715.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2008/07/
```

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Terra-
MODIS_Edition4_400400.200807
$CERESHOME/inversion/data/sibiMap/Terra-MODIS_Edition4/2008/07/

```

3.2.4.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -date
20080715 -hour 15 -clean

```

The following file will be generated:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_${INSTANCE}_1P6

```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```

ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_${INSTANCE}_1P6.o*

```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6

```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.4.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.4.4 Test Summary

Test Summary:

Total Run Time: 6:24 minutes
 Memory: 5.7 G
 Required Disk Space: 232 Megabytes

3.2.5 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchive/SSFB/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_SSFB_Terra-FM1-
  MODIS_Ed4Test_000000.2008071515
rm $InputArchive/SSFA/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_SSFA_Terra-FM1-
  MODIS_Ed4Test_000000.2008071515
rm $InputArchive/SSFA/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_SSFA_Terra-FM1-
  MODIS_Ed4Test_000000.2008071515.met
rm $InputArchive/GQCI/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_GQCI_Terra-FM1-
  MODIS_Ed4Test_000000.2008071515
rm $InputArchive/SCCD/Terra-FM1_Edition3/2008/07/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Terra-FM1_Edition3/2008/07/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2008/07/CER_MOA_CERES_DAO-G5-CERES_020032.2008071512
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2008/07/CER_MOA_CERES_DAO-G5-CERES_020032.2008071518
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2008/07/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20080715.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $CERESHOME/inversion/data/sibiMap/Terra-
  MODIS_Edition4/2008/07/CER_sibiMap_Terra-
  MODIS_Edition4_400400.200807
```

3.2.5.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.5.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.5.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.5.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Terra-FM1-MODIS_Ed4Test-  
reproc/2008/07/CER_SSF_${INSTANCE}_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_${INSTANCE}_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.6 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.7 Stand Alone, command line, Test Procedures for FM1, Environment Variables REPROCESS = 'YES' and READ_IES = 'YES'

3.2.7.1 Environment setup and file preparation

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2008
setenv MONTH 07
setenv DAY 15
setenv HOUR 15
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Terra-FM1-MODIS_Ed4Test-reproc-
ies_000000.$DATE_1P6
setenv SCC_1P6 Terra-FM1_Edition3_300300.20080715
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM1-test3-
env.csh

```

Copy the input files to appropriate locations:

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_DAO-G5-CERES_020032.2008071512
$InputArchive/MOA/CERES_DAO-G5-CERES/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_DAO-G5-CERES_020032.2008071518
$InputArchive/MOA/CERES_DAO-G5-CERES/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFb_Terra-
FM1-MODIS_Ed4Test_000000.2008071515 $InputArchive/SSFb/Terra-
FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Terra-
FM1-MODIS_Ed4Test_000000.2008071515 $InputArchive/SSFA/Terra-
FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Terra-
FM1-MODIS_Ed4Test_000000.2008071515.met $InputArchive/SSFA/Terra-
FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_GQCI_Terra-
FM1-MODIS_Ed4Test_000000.2008071515 $InputArchive/GQCI/Terra-
FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Terra-FM1_Edition3/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Terra-FM1_Edition3/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20080715.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2008/07/

```

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_IES_Terra-
FM1_Edition3_032040.2008071515 $InputArchive/IES/Terra-
FM1_Edition3/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Terra-
MODIS_Edition4_400400.200807
$CERESHOME/inversion/data/sibiMap/Terra-MODIS_Edition4/2008/07/

```

3.2.7.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -date
20080715 -hour 15 -clean

```

The following file will be generated:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_$INSTANCE_1P6

```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```

ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_$INSTANCE_1P6.o*

```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6

```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.7.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.7.4 Test Summary

Test Summary:

Total Run Time: 6:24 minutes
 Memory: 5.7 G
 Required Disk Space: 232 Megabytes

3.2.8 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchive/SSFB/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_SSFB_Terra-FM1-
  MODIS_Ed4Test_000000.2008071515
rm $InputArchive/SSFA/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_SSFA_Terra-FM1-
  MODIS_Ed4Test_000000.2008071515
rm $InputArchive/SSFA/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_SSFA_Terra-FM1-
  MODIS_Ed4Test_000000.2008071515.met
rm $InputArchive/GQCI/Terra-FM1-
  MODIS_Ed4Test/2008/07/CER_GQCI_Terra-FM1-
  MODIS_Ed4Test_000000.2008071515
rm $InputArchive/SCCD/Terra-FM1_Edition3/2008/07/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Terra-FM1_Edition3/2008/07/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2008/07/CER_MOA_CERES_DAO-G5-CERES_020032.2008071512
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2008/07/CER_MOA_CERES_DAO-G5-CERES_020032.2008071518
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2008/07/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20080715.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $InputArchive/IES/Terra-FM1_Edition3/2008/07/CER_IES_Terra-
  FM1_Edition3_032040.2008071515
rm $CERESHOME/inversion/data/sibiMap/Terra-
  MODIS_Edition4/2008/07/CER_sibiMap_Terra-
  MODIS_Edition4_400400.200807
```

3.2.8.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata

files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.8.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.8.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.8.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Terra-FM1-MODIS_Ed4Test-reproc-  
ies/2008/07/CER_SSF_$INSTANCE_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_$INSTANCE_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.9 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.10 Stand Alone Test Procedures for FM2, Environment variables: REPROCESS = 'NO', READ_IES = 'NO' and PROD = 'no'

3.2.10.1 Environment setup and file preparation

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2001
setenv MONTH 04
setenv DAY 15
setenv HOUR 15
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Terra-FM2-MODIS_SSIT2_000000.$DATE_1P6
setenv SCC_1P6 Terra-FM2_Edition3_300300.20010415
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM2-test1-env.csh

```

Copy the input files to appropriate locations:

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041512
$InputArchive/MOA/CERES_GMAO-G541-Ed4/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041518
$InputArchive/MOA/CERES_GMAO-G541-Ed4/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFI_Terra-FM2-
MODIS_SSIT2_000000.2001041515 $InputArchiveInt/SSF_Int/Terra-FM2-
MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFAI_Terra-
FM2-MODIS_SSIT2_000000.2001041515 $InputArchiveInt/SSF_Int/Terra-
FM2-MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFAI_Terra-
FM2-MODIS_SSIT2_000000.2001041515.met
$InputArchiveInt/SSF_Int/Terra-FM2-MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_FQCI_Terra-
FM2-MODIS_SSIT2_000000.2001041515 $InputArchiveInt/FQC/Terra-
FM2-MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Terra-FM2_Edition3/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Terra-FM2_Edition3/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20010415.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/

```

```
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Terra-  
MODIS_Edition4_400400.200104  
$CERESHOME/inversion/data/sibiMap/Terra-MODIS_Edition4/2001/04/
```

3.2.10.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -  
date 20010415 -hour 15 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-  
6.1P6_PCF_$INSTANCE_1P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created `sgc_log` file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-  
6.1P6_$INSTANCE_1P6.o*
```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.10.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.10.4 Test Summary

Test Summary:

Total Run Time:	6:19 minutes
Memory:	5.7 G
Required Disk Space:	232 Megabytes

3.2.11 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchiveInt/SSF_Int/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_SSF1_$INSTANCE_1P6
rm $InputArchiveInt/SSF_Int/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_SSAI_$INSTANCE_1P6
rm $InputArchiveInt/SSF_Int/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_SSAI_$INSTANCE_1P6.met
rm $InputArchiveInt/FQC/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_FQCI_$INSTANCE_1P6
rm $InputArchive/SCCD/Terra-FM2_Edition3/2001/04/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Terra-FM2_Edition3/2001/04/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_GMAO-G541-
  Ed4/2001/04/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041512
rm $InputArchive/MOA/CERES_GMAO-G541-
  Ed4/2001/04/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041518
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2001/04/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20010415.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $CERESHOME/inversion/data/sibiMap/Terra-
  MODIS_Edition4/2001/04/CER_sibiMap_Terra-
  MODIS_Edition4_400400.200104
```

3.2.11.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.11.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.11.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.11.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Terra-FM2-
MODIS_SSIT2/2001/04/CER_SSF_$INSTANCE_1P6
$CERESHOME/inversion/data_exp/CER4.5-
6.1P6/CER_SSF_$INSTANCE_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: "SSF_DATE" on the "SSF_Header" Vdata and "CERPRODUCTIONDATETIME" on the "CERES_metadata" Vdata. If CERESLIB has changed, the date may be different in the "LOCALVERSIONID" on the "CERES_metadata" Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.12 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.13 Stand Alone, command line, Test Procedures for FM2, Environment Variables REPROCESS = 'YES', READ_IES = 'NO' and PROD = 'no'

3.2.13.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2001
setenv MONTH 04
setenv DAY 15
setenv HOUR 15
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Terra-FM2-MODIS_Ed4Test-
reproc_000000.$DATE_1P6
setenv SCC_1P6 Terra-FM2_Edition3_300300.20010415
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM2-test2-
env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041512
$InputArchive/MOA/CERES_GMAO-G541-Ed4/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041518
$InputArchive/MOA/CERES_GMAO-G541-Ed4/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFb_Terra-
FM2-MODIS_SSIT2_000000.2001041515 $InputArchive/SSFB/Terra-FM2-
MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Terra-
FM2-MODIS_SSIT2_000000.2001041515 $InputArchive/SSFA/Terra-FM2-
MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Terra-
FM2-MODIS_SSIT2_000000.2001041515.met $InputArchive/SSFA/Terra-
FM2-MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_GQCI_Terra-
FM2-MODIS_SSIT2_000000.2001041515 $InputArchive/GQCI/Terra-FM2-
MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Terra-FM2_Edition3/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Terra-FM2_Edition3/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20010415.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2001/04/
```

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Terra-
MODIS_Edition4_400400.200104
$CERESHOME/inversion/data/sibiMap/Terra-MODIS_Edition4/2001/04/
```

3.2.13.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -
date 20010415 -hour 15 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_${INSTANCE}_1P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_${INSTANCE}_1P6.o*
```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.13.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.13.4 Test Summary

Test Summary:

Total Run Time: 6:42 minutes
 Memory: 5.7 G
 Required Disk Space: 232 Megabytes

3.2.14 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```

rm $InputArchive/SSFB/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_SSFB_Terra-FM2-
  MODIS_SSIT2_000000.2001041515
rm $InputArchive/SSFA/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_SSFA_Terra-FM2-
  MODIS_SSIT2_000000.2001041515
rm $InputArchive/SSFA/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_SSFA_Terra-FM2-
  MODIS_SSIT2_000000.2001041515.met
rm $InputArchive/GQCI/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_GQCI_Terra-FM2-
  MODIS_SSIT2_000000.2001041515
rm $InputArchive/SCCD/Terra-FM2_Edition3/2001/04/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Terra-FM2_Edition3/2001/04/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_GMAO-G541-
  Ed4/2001/04/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041512
rm $InputArchive/MOA/CERES_GMAO-G541-
  Ed4/2001/04/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041518
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2001/04/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20010415.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $CERESHOME/inversion/data/sibiMap/Terra-
  MODIS_Edition4/2001/04/CER_sibiMap_Terra-
  MODIS_Edition4_400400.200104

```

3.2.14.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.14.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.14.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.14.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Terra-FM2-MODIS_Ed4Test-  
reproc/2001/04/CER_SSF_${INSTANCE}_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_${INSTANCE}_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.15 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```
2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.16 Stand Alone, command line, Test Procedures for FM2, Environment Variables REPROCESS = 'YES' and READ_IES = 'YES'

3.2.16.1 Environment setup and file preparation

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2001
setenv MONTH 04
setenv DAY 15
setenv HOUR 15
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Terra-FM2-MODIS_Ed4Test-reproc-
ies_000000.$DATE_1P6
setenv SCC_1P6 Terra-FM2_Edition3_300300.20010415
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM2-test3-
env.csh

```

Copy the input files to appropriate locations:

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041512
$InputArchive/MOA/CERES_GMAO-G541-Ed4/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041518
$InputArchive/MOA/CERES_GMAO-G541-Ed4/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFb_Terra-
FM2-MODIS_SSIT2_000000.2001041515 $InputArchive/SSFB/Terra-FM2-
MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Terra-
FM2-MODIS_SSIT2_000000.2001041515 $InputArchive/SSFA/Terra-FM2-
MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Terra-
FM2-MODIS_SSIT2_000000.2001041515.met $InputArchive/SSFA/Terra-
FM2-MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_GQCI_Terra-
FM2-MODIS_SSIT2_000000.2001041515 $InputArchive/GQCI/Terra-FM2-
MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Terra-FM2_Edition3/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Terra-FM2_Edition3/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20010415.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2001/04/

```

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_IES_Terra-
FM2_Edition3_032040.2001041515 $InputArchive/IES/Terra-
FM2_Edition3/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Terra-
MODIS_Edition4_400400.200104
$CERESHOME/inversion/data/sibiMap/Terra-MODIS_Edition4/2001/04/

```

3.2.16.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -
date 20010415 -hour 15 -clean

```

The following file will be generated:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_$INSTANCE_1P6

```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```

ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_$INSTANCE_1P6.o*

```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6

```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.16.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.16.4 Test Summary

Test Summary:

Total Run Time: 6:42 minutes
 Memory: 5.7 G
 Required Disk Space: 232 Megabytes

3.2.17 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchive/SSFB/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_SSFB_Terra-FM2-
  MODIS_SSIT2_000000.2001041515
rm $InputArchive/SSFA/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_SSFA_Terra-FM2-
  MODIS_SSIT2_000000.2001041515
rm $InputArchive/SSFA/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_SSFA_Terra-FM2-
  MODIS_SSIT2_000000.2001041515.met
rm $InputArchive/GQCI/Terra-FM2-
  MODIS_SSIT2/2001/04/CER_GQCI_Terra-FM2-
  MODIS_SSIT2_000000.2001041515
rm $InputArchive/SCCD/Terra-FM2_Edition3/2001/04/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Terra-FM2_Edition3/2001/04/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_GMAO-G541-
  Ed4/2001/04/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041512
rm $InputArchive/MOA/CERES_GMAO-G541-
  Ed4/2001/04/CER_MOA_CERES_GMAO-G541-Ed4_400400.2001041518
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2001/04/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20010415.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $InputArchive/IES/Terra-FM2_Edition3/2001/04/CER_IES_Terra-
  FM2_Edition3_032040.2001041515
rm $CERESHOME/inversion/data/sibiMap/Terra-
  MODIS_Edition4/2001/04/CER_sibiMap_Terra-
  MODIS_Edition4_400400.200104
```

3.2.17.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata

files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.17.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.17.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.17.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Terra-FM2-MODIS_Ed4Test-reproc-  
ies/2001/04/CER_SSF_$INSTANCE_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_$INSTANCE_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.18 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.19 Stand Alone Test Procedures for FM3, Environment variables: REPROCESS = 'NO', READ_IES = 'NO' and PROD = 'no'

3.2.19.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DAY 15
setenv HOUR 07
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Aqua-FM3-MODIS_SSIT_000000.$DATE_1P6
setenv SCC_1P6 Aqua-FM3_Edition3_300300.20081015
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM3-test1-env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101506
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101512
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFI_Aqua-FM3-
MODIS_SSIT_000000.2008101507 $InputArchiveInt/SSF_Int/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFAI_Aqua-
FM3-MODIS_SSIT_000000.2008101507 $InputArchiveInt/SSF_Int/Aqua-
FM3-MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFAI_Aqua-
FM3-MODIS_SSIT_000000.2008101507.met
$InputArchiveInt/SSF_Int/Aqua-FM3-MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_FQCI_Aqua-FM3-
MODIS_SSIT_000000.2008101507 $InputArchiveInt/FQC/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Aqua-FM3_Edition3/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Aqua-FM3_Edition3/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20081015.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
```

```
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Aqua-  
MODIS_Edition4_400400.200810  
$CERESHOME/inversion/data/sibiMap/Aqua-MODIS_Edition4/2008/10/
```

3.2.19.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -  
date 20081015 -hour 07 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-  
6.1P6_PCF_${INSTANCE}_1P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created `sgc_log` file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-  
6.1P6_${INSTANCE}_1P6.o*
```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.19.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.19.4 Test Summary

Test Summary:

Total Run Time:	6:22 minutes
Memory:	5.7 G
Required Disk Space:	232 Megabytes

3.2.20 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```

rm $InputArchiveInt/SSF_Int/Aqua-FM3-
  MODIS_SSIT/2008/10/CER_SSF1_$INSTANCE_1P6
rm $InputArchiveInt/SSF_Int/Aqua-FM3-
  MODIS_SSIT/2008/10/CER_SSAI_$INSTANCE_1P6
rm $InputArchiveInt/SSF_Int/Aqua-FM3-
  MODIS_SSIT/2008/10/CER_SSAI_$INSTANCE_1P6.met
rm $InputArchiveInt/FQC/Aqua-FM3-
  MODIS_SSIT/2008/10/CER_FQCI_$INSTANCE_1P6
rm $InputArchive/SCCD/Aqua-FM3_Edition3/2008/10/CER_SCCD_$$CC_1P6
rm $InputArchive/SCCN/Aqua-FM3_Edition3/2008/10/CER_SCCN_$$CC_1P6
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101506
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101512
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2008/10/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20081015.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $CERESHOME/inversion/data/sibiMap/Aqua-
  MODIS_Edition4/2008/10/CER_sibiMap_Aqua-
  MODIS_Edition4_400400.200810

```

3.2.20.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6

```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.20.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.20.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.20.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Aqua-FM3-  
MODIS_SSIT/2008/10/CER_SSF_$INSTANCE_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_$INSTANCE_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: "SSF_DATE" on the "SSF_Header" Vdata and "CERPRODUCTIONDATETIME" on the "CERES_metadata" Vdata. If CERESLIB has changed, the date may be different in the

“LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.21 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.22 Stand Alone, command line, Test Procedures for FM3, Environment Variables REPROCESS = 'YES', READ_IES = 'NO' and PROD = 'no'

3.2.22.1 Environment setup and file preparation

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DAY 15
setenv HOUR 07
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Aqua-FM3-MODIS_Ed4Test-
reproc_000000.$DATE_1P6
setenv SCC_1P6 Aqua-FM3_Edition3_300300.20081015
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM3-test2-
env.csh

```

Copy the input files to appropriate locations:

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101506
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101512
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFB_Aqua-FM3-
MODIS_SSIT_000000.2008101507 $InputArchive/SSFB/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Aqua-FM3-
MODIS_SSIT_000000.2008101507 $InputArchive/SSFA/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Aqua-FM3-
MODIS_SSIT_000000.2008101507.met $InputArchive/SSFA/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_GQCI_Aqua-
FM3-MODIS_SSIT_000000.2008101507 $InputArchive/GQCI/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Aqua-FM3_Edition3/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Aqua-FM3_Edition3/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20081015.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2008/10/

```

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Aqua-
MODIS_Edition4_400400.200810
$CERESHOME/inversion/data/sibiMap/Aqua-MODIS_Edition4/2008/10/
```

3.2.22.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -
date 20081015 -hour 07 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_${INSTANCE}_1P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_${INSTANCE}_1P6.o*
```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.22.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.22.4 Test Summary

Test Summary:

Total Run Time: 6:22 minutes
 Memory: 5.7 G
 Required Disk Space: 232 Megabytes

3.2.23 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchive/SSFB/Aqua-FM3-MODIS_SSIT/2008/10/CER_SSFB_Aqua-
  FM3-MODIS_SSIT_000000.2008101507
rm $InputArchive/SSFA/Aqua-FM3-MODIS_SSIT/2008/10/CER_SSFA_Aqua-
  FM3-MODIS_SSIT_000000.2008101507
rm $InputArchive/SSFA/Aqua-FM3-MODIS_SSIT/2008/10/CER_SSFA_Aqua-
  FM3-MODIS_SSIT_000000.2008101507.met
rm $InputArchive/GQCI/Aqua-FM3-MODIS_SSIT/2008/10/CER_GQCI_Aqua-
  FM3-MODIS_SSIT_000000.2008101507
rm $InputArchive/SCCD/Aqua-FM3_Edition3/2008/10/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Aqua-FM3_Edition3/2008/10/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101506
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101512
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2008/10/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20081015.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $CERESHOME/inversion/data/sibiMap/Aqua-
  MODIS_Edition4/2008/10/CER_sibiMap_Aqua-
  MODIS_Edition4_400400.200810
```

3.2.23.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the

metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.23.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.23.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.23.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Aqua-FM3-MODIS_Ed4Test-  
reproc/2008/10/CER_SSF_${INSTANCE}_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_${INSTANCE}_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.24 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.25 Stand Alone, command line, Test Procedures for FM3, Environment Variables REPROCESS = 'YES' and READ_IES = 'YES'

3.2.25.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DAY 15
setenv HOUR 07
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Aqua-FM3-MODIS_Ed4Test-reproc-
ies_000000.$DATE_1P6
setenv SCC_1P6 Aqua-FM3_Edition3_300300.20081015
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM3-test3-
env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101506
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101512
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFB_Aqua-FM3-
MODIS_SSIT_000000.2008101507 $InputArchive/SSFB/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Aqua-FM3-
MODIS_SSIT_000000.2008101507 $InputArchive/SSFA/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Aqua-FM3-
MODIS_SSIT_000000.2008101507.met $InputArchive/SSFA/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_GQCI_Aqua-
FM3-MODIS_SSIT_000000.2008101507 $InputArchive/GQCI/Aqua-FM3-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Aqua-FM3_Edition3/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Aqua-FM3_Edition3/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20081015.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2008/10/
```

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_IES_Aqua-
FM3_Edition3_032040.2008101507 $InputArchive/IES/Aqua-
FM3_Edition3/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Aqua-
MODIS_Edition4_400400.200810
$CERESHOME/inversion/data/sibiMap/Aqua-MODIS_Edition4/2008/10/

```

3.2.25.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -date
20081015 -hour 07 -clean

```

The following file will be generated:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_${INSTANCE}_1P6

```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```

ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_${INSTANCE}_1P6.o*

```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6

```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.25.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.25.4 Test Summary

Test Summary:

Total Run Time: 7:25 minutes
 Memory: 5.7 G
 Required Disk Space: 232 Megabytes

3.2.26 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchive/SSFB/Aqua-FM3-MODIS_SSIT/2008/10/CER_SSFB_Aqua-
  FM3-MODIS_SSIT_000000.2008101507
rm $InputArchive/SSFA/Aqua-FM3-MODIS_SSIT/2008/10/CER_SSFA_Aqua-
  FM3-MODIS_SSIT_000000.2008101507
rm $InputArchive/SSFA/Aqua-FM3-MODIS_SSIT/2008/10/CER_SSFA_Aqua-
  FM3-MODIS_SSIT_000000.2008101507.met
rm $InputArchive/GQCI/Aqua-FM3-MODIS_SSIT/2008/10/CER_GQCI_Aqua-
  FM3-MODIS_SSIT_000000.2008101507
rm $InputArchive/SCCD/Aqua-FM3_Edition3/2008/10/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Aqua-FM3_Edition3/2008/10/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101506
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101512
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2008/10/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20081015.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $InputArchive/IES/Aqua-FM3_Edition3/2008/10/CER_IES_Aqua-
  FM3_Edition3_032040.2008101507
rm $CERESHOME/inversion/data/sibiMap/Aqua-
  MODIS_Edition4/2008/10/CER_sibiMap_Aqua-
  MODIS_Edition4_400400.200810
```

3.2.26.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.26.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.26.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.26.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Aqua-FM3-MODIS_Ed4Test-repro-  
cies/2008/10/CER_SSF_$INSTANCE_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_$INSTANCE_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.27 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.28 Stand Alone Test Procedures for FM4, Environment variables: REPROCESS = 'NO', READ_IES = 'NO' and PROD = 'no'

3.2.28.1 Environment setup and file preparation

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DAY 15
setenv HOUR 07
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Aqua-FM4-MODIS_SSIT-NoSW_000000.$DATE_1P6
setenv INSTANCE1_1P6 Aqua-FM4-MODIS_SSIT_000000.$DATE_1P6
setenv SCC_1P6 Aqua-FM4_Ed3-NoSW_300300.20081015
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM4-test1-env.csh

```

Copy the input files to appropriate locations:

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101506
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101512
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFI_Aqua-FM4-
MODIS_SSIT_000000.2008101507 $InputArchiveInt/SSF_Int/Aqua-FM4-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFAI_Aqua-
FM4-MODIS_SSIT_000000.2008101507 $InputArchiveInt/SSF_Int/Aqua-
FM4-MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFAI_Aqua-
FM4-MODIS_SSIT_000000.2008101507.met
$InputArchiveInt/SSF_Int/Aqua-FM4-MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_FQCI_Aqua-FM4-
MODIS_SSIT_000000.2008101507 $InputArchiveInt/FQC/Aqua-FM4-
MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Aqua-FM4_Ed3-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Aqua-FM4_Ed3-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20081015.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/

```

```
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Aqua-
MODIS_Edition4_400400.200810
$CERESHOME/inversion/data/sibiMap/Aqua-MODIS_Edition4/2008/10/
```

3.2.28.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -
date 20081015 -hour 07 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_${INSTANCE}_1P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created `sgc_log` file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_${INSTANCE}_1P6.o*
```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.28.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.28.4 Test Summary

Test Summary:

Total Run Time:	8:08 minutes
Memory:	5.7 G
Required Disk Space:	232 Megabytes

3.2.29 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```

rm $InputArchiveInt/SSF_Int/Aqua-FM4-
  MODIS_SSIT/2008/10/CER_SSF1_$INSTANCE1_1P6
rm $InputArchiveInt/SSF_Int/Aqua-FM4-
  MODIS_SSIT/2008/10/CER_SSF1_$INSTANCE1_1P6
rm $InputArchiveInt/SSF_Int/Aqua-FM4-
  MODIS_SSIT/2008/10/CER_SSF1_$INSTANCE1_1P6.met
rm $InputArchiveInt/FQC/Aqua-FM4-
  MODIS_SSIT/2008/10/CER_FQCI_$INSTANCE1_1P6
rm $InputArchive/SCCD/Aqua-FM4_Ed3-
  NoSW/2008/10/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Aqua-FM4_Ed3-
  NoSW/2008/10/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101506
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101512
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2008/10/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20081015.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $CERESHOME/inversion/data/sibiMap/Aqua-
  MODIS_Edition4/2008/10/CER_sibiMap_Aqua-
  MODIS_Edition4_400400.200810

```

3.2.29.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE1_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE1_1P6

```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.29.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.29.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.29.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Aqua-FM4-MODIS_SSI-  
NoSW/2008/10/CER_SSF_$INSTANCE_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_$INSTANCE_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: "SSF_DATE" on the "SSF_Header" Vdata and "CERPRODUCTIONDATETIME" on the "CERES_metadata" Vdata. If CERESLIB has changed, the date may be different in the

“LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.30 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.31 Stand Alone, command line, Test Procedures for FM4, Environment Variables REPROCESS = 'YES', READ_IES = 'NO' and PROD = 'no'

3.2.31.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DAY 15
setenv HOUR 07
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Aqua-FM4-MODIS_Ed4Test-NoSW-
reproc_000000.$DATE_1P6
setenv SCC_1P6 Aqua-FM4_Ed3-NoSW_300300.20081015
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM4-test2-
env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101506
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101512
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFB_Aqua-FM4-
MODIS_SSIT-NoSW_000000.2008101507 $InputArchive/SSFB/Aqua-FM4-
MODIS_SSIT-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Aqua-FM4-
MODIS_SSIT-NoSW_000000.2008101507 $InputArchive/SSFA/Aqua-FM4-
MODIS_SSIT-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Aqua-FM4-
MODIS_SSIT-NoSW_000000.2008101507.met $InputArchive/SSFA/Aqua-
FM4-MODIS_SSIT-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_GQCI_Aqua-
FM4-MODIS_SSIT-NoSW_000000.2008101507 $InputArchive/GQCI/Aqua-
FM4-MODIS_SSIT-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Aqua-FM4_Ed3-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Aqua-FM4_Ed3-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20081015.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2008/10/
```

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Aqua-
MODIS_Edition4_400400.200810
$CERESHOME/inversion/data/sibiMap/Aqua-MODIS_Edition4/2008/10/
```

3.2.31.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -
date 20081015 -hour 07 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_${INSTANCE}_1P6
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_${INSTANCE}_1P6.o*
```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.31.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.31.4 Test Summary

Test Summary:

Total Run Time: 6:27 minutes
 Memory: 5.7 G
 Required Disk Space: 232 Megabytes

3.2.32 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```

rm $InputArchive/SSFB/Aqua-FM4-MODIS_SSIT-
  NoSW/2008/10/CER_SSFB_Aqua-FM4-MODIS_SSIT-
  NoSW_000000.2008101507
rm $InputArchive/SSFA/Aqua-FM4-MODIS_SSIT-
  NoSW/2008/10/CER_SSFA_Aqua-FM4-MODIS_SSIT-
  NoSW_000000.2008101507
rm $InputArchive/SSFA/Aqua-FM4-MODIS_SSIT-
  NoSW/2008/10/CER_SSFA_Aqua-FM4-MODIS_SSIT-
  NoSW_000000.2008101507.met
rm $InputArchive/GQCI/Aqua-FM4-MODIS_SSIT-
  NoSW/2008/10/CER_GQCI_Aqua-FM4-MODIS_SSIT-
  NoSW_000000.2008101507
rm $InputArchive/SCCD/Aqua-FM4_Ed3-
  NoSW/2008/10/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Aqua-FM4_Ed3-
  NoSW/2008/10/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101506
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101512
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2008/10/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20081015.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $CERESHOME/inversion/data/sibiMap/Aqua-
  MODIS_Edition4/2008/10/CER_sibiMap_Aqua-
  MODIS_Edition4_400400.200810

```

3.2.32.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\$INSTANCE_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory

\$CERESHOME/inversion/data_exp/CER4.5-6.1P6, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.32.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

3.2.32.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P6
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.32.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Aqua-FM4-MODIS_Ed4Test-NoSW-  
reproc/2008/10/CER_SSF_$INSTANCE_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_$INSTANCE_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.33 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.2.34 Stand Alone, command line, Test Procedures for FM4, Environment Variables REPROCESS = 'YES' and READ_IES = 'YES'

3.2.34.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DAY 15
setenv HOUR 07
setenv DATE_1P6 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P6 Aqua-FM4-MODIS_Ed4Test-NoSW-reproc-
ies_000000.$DATE_1P6
setenv SCC_1P6 Aqua-FM4_Ed3-NoSW_300300.20081015
source $CERESHOME/inversion/CER4.5-6.1P6/rcf/inversion-FM4-test3-
env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101506
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/CER_MOA_CERES_GMAO-G5-Edition3-54_999999.2008101512
$InputArchive/MOA/CERES_GMAO-G5-Edition3-54/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFB_Aqua-FM4-
MODIS_SSIT-NoSW_000000.2008101507 $InputArchive/SSFB/Aqua-FM4-
MODIS_SSIT-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Aqua-FM4-
MODIS_SSIT-NoSW_000000.2008101507 $InputArchive/SSFA/Aqua-FM4-
MODIS_SSIT-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SSFA_Aqua-FM4-
MODIS_SSIT-NoSW_000000.2008101507.met $InputArchive/SSFA/Aqua-
FM4-MODIS_SSIT-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_GQCI_Aqua-
FM4-MODIS_SSIT-NoSW_000000.2008101507 $InputArchive/GQCI/Aqua-
FM4-MODIS_SSIT-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCD_$SCC_1P6
$InputArchive/SCCD/Aqua-FM4_Ed3-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_SCCN_$SCC_1P6
$InputArchive/SCCN/Aqua-FM4_Ed3-NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20081015.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2008/10/
```

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P6/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_IES_Aqua-
FM4_Ed3-NoSW_032040.2008101507 $InputArchive/IES/Aqua-FM4_Ed3-
NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P6/CER_sibiMap_Aqua-
MODIS_Edition4_400400.200810
$CERESHOME/inversion/data/sibiMap/Aqua-MODIS_Edition4/2008/10/

```

3.2.34.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P6-SGE_Driver.pl**, followed by the date and hour options and the cleanup option.

```

cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/CER4.5-6.1P6-SGE_Driver.pl -
date 20081015 -hour 07 -clean

```

The following file will be generated:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/pcf/CER4.5-
6.1P6_PCF_$INSTANCE_1P6

```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```

ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P6/CER4.5-
6.1P6_$INSTANCE_1P6.o*

```

Output file generation test:

The script, **list_4.5-6.1P6.pl**, will list the files that were created during execution of the PGE:

```

$CERESHOME/inversion/CER4.5-6.1P6/rcf/list_4.5-6.1P6.pl $INSTANCE_1P6

```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.2.34.3 Exit Codes

All CER4.5-6.1P6 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.2.34.4 Test Summary

Test Summary:

Total Run Time: 6:12 minutes
 Memory: 5.7 G
 Required Disk Space: 232 Megabytes

3.2.35 Evaluation Procedures

When running the production script, **run_4.5-6.1P6.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```

rm $InputArchive/SSFB/Aqua-FM4-MODIS_SSIT-
  NoSW/2008/10/CER_SSFB_Aqua-FM4-MODIS_SSIT-
  NoSW_000000.2008101507
rm $InputArchive/SSFA/Aqua-FM4-MODIS_SSIT-
  NoSW/2008/10/CER_SSFA_Aqua-FM4-MODIS_SSIT-
  NoSW_000000.2008101507
rm $InputArchive/SSFA/Aqua-FM4-MODIS_SSIT-
  NoSW/2008/10/CER_SSFA_Aqua-FM4-MODIS_SSIT-
  NoSW_000000.2008101507.met
rm $InputArchive/GQCI/Aqua-FM4-MODIS_SSIT-
  NoSW/2008/10/CER_GQCI_Aqua-FM4-MODIS_SSIT-
  NoSW_000000.2008101507
rm $InputArchive/SCCD/Aqua-FM4_Ed3-
  NoSW/2008/10/CER_SCCD_$SCC_1P6
rm $InputArchive/SCCN/Aqua-FM4_Ed3-
  NoSW/2008/10/CER_SCCN_$SCC_1P6
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101506
rm $InputArchive/MOA/CERES_GMAO-G5-Edition3-
  54/2008/10/CER_MOA_CERES_GMAO-G5-Edition3-
  54_999999.2008101512
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2008/10/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20081015.nc
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
rm $InputArchive/IES/Aqua-FM4_Ed3-NoSW/2008/10/CER_IES_Aqua-
  FM4_Ed3-NoSW_032040.2008101507
rm $CERESHOME/inversion/data/sibiMap/Aqua-
  MODIS_Edition4/2008/10/CER_sibiMap_Aqua-
  MODIS_Edition4_400400.200810

```

3.2.35.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P6_LogReport_\${INSTANCE}_1P6**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P6 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P6 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P6**, using the following **diff_4.5-6.1P6.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf
$CERESHOME/inversion/CER4.5-6.1P6/rcf/diff_4.5-6.1P6.pl $INSTANCE_1P6
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.2.35.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_compare_1p6 $INSTANCE_1P6
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_${DATE}_1P6
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_${DATE}_1P6
```

3.2.35.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P6 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_${DATE}_1P6
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_${DATE}_1P6
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.2.35.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/Aqua-FM4-MODIS_Ed4Test-NoSW-  
reproc-ies/2008/10/CER_SSF_$INSTANCE_1P6  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P6/CER_SSF_$INSTANCE_1P6
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata. Differences in the third to sixth decimal places for the data fields are acceptable.

3.2.36 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P6 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P6.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P6/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P6/rcf  
$CERESHOME/inversion/CER4.5-6.1P6/rcf/cleanup_4.5-6.1P6.pl $DATE_1P6
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.3 CER4_5-6.1P7 Main and Post Processors for S-NPP Processing

3.3.1 Stand Alone Test Procedures for FM5, Environment variables: REPROCESS = 'NO', READ_IES = 'NO' and PROD = 'no'

3.3.1.1 Environment setup and file preparation

```

cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
setenv YEAR 2012
setenv MONTH 02
setenv DAY 08
setenv HOUR 15
setenv DATE_1P7 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P7 NPP-FM5-VIIRS_SSIT_000000.$DATE_1P7
source $CERESHOME/inversion/CER4.5-6.1P7/rcf/inversion-FM5-test1-env.csh

```

Copy the input files to appropriate locations. Since there are not Spectral Calibration files available for this test, there are not any copied and PS4_7=DefaultSCC is set in the environment script.:

```

cp $CERESHOME/inversion/data/input/CER4.5-
6.1P7/CER_MOA_CERES_DAO-G5-CERES_020033.2012020812
$InputArchive/MOA/CERES_DAO-G5-CERES/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P7/CER_MOA_CERES_DAO-G5-CERES_020033.2012020818
$InputArchive/MOA/CERES_DAO-G5-CERES/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_SSFI_NPP-FM5-
VIIRS_SSIT_000000.2012020815 $InputArchiveInt/SSF_Int/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_SSFAI_NPP-FM5-
VIIRS_SSIT_000000.2012020815 $InputArchiveInt/SSF_Int/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_SSFAI_NPP-FM5-
VIIRS_SSIT_000000.2012020815.met $InputArchiveInt/SSF_Int/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_FQCI_NPP-FM5-
VIIRS_SSIT_000000.2012020815 $InputArchiveInt/FQC/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20120208.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_sibiMap_NPP-
VIIRS_Edition4_400400.201202
$CERESHOME/inversion/data/sibiMap/NPP-VIIRS_Edition4/2012/02/

```

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P7/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
```

3.3.1.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P7-SGE_Driver.pl**, followed by the date and hour options, the cleanup option and the platform option selecting either P6, P7, x86, or x86-flex.

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
$CERESHOME/inversion/CER4.5-6.1P7/rcf/CER4.5-6.1P7-SGE_Driver.pl -
date 20120208 -hour 15 -clean -platform p6/p7/x86/x86-flex
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.1P7/rcf/pcf/CER4.5-
6.1P7_PCF_$INSTANCE_1P7
```

The submitted job can be monitored with the **qstat** command.

The most recently created `sgc_log` file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P7/CER4.5-
6.1P7_$INSTANCE_1P7.o*
```

Output file generation test:

The script, **list_4.5-6.1P7.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.1P7/rcf/list_4.5-6.1P7.pl $INSTANCE_1P7
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.3.1.3 Exit Codes

All CER4.5-6.1P7 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.3.1.4 Test Summary

Test Summary:

Total Run Time:	6:24 minutes
Memory:	5.7 G
Required Disk Space:	232 Megabytes

3.3.2 Evaluation Procedures

When running the production script, **run_4.5-6.1P7.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchiveInt/SSF_Int/NPP-FM5-
  VIIRS_SSIT/2012/02/CER_SSFI_${INSTANCE}_1P7
rm $InputArchiveInt/SSF_Int/NPP-FM5-
  VIIRS_SSIT/2012/02/CER_SSFAI_${INSTANCE}_1P7
rm $InputArchiveInt/SSF_Int/NPP-FM5-
  VIIRS_SSIT/2012/02/CER_SSFAI_${INSTANCE}_1P7.met
rm $InputArchiveInt/FQC/NPP-FM5-
  VIIRS_SSIT/2012/02/CER_FQCI_${INSTANCE}_1P7
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2012/02/CER_MOA_CERES_DAO-G5-CERES_020033.2012020812
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2012/02/CER_MOA_CERES_DAO-G5-CERES_020033.2012020818
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2012/02/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20120208.nc
rm $CERESHOME/inversion/data/sibiMap/NPP-
  VIIRS_Edition4/2012/02/CER_sibiMap_NPP-
  VIIRS_Edition4_400400.201202
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
```

3.3.2.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P7_LogReport_\${INSTANCE}_1P7**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P7 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P7 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P7** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P7**, using the following **diff_4.5-6.1P7.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
  $CERESHOME/inversion/CER4.5-6.1P7/rcf/diff_4.5-6.1P7.pl ${INSTANCE}_1P7
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.3.2.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p7 $INSTANCE_1P7
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P7  
$CERESHOME/inversion/test_suites/results/CmpReportarSSFA_$DATE_1P7
```

3.3.2.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P7 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P7  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P7
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.3.2.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/NPP-FM5-  
VIIRS_SSIT/2012/02/CER_SSF_$INSTANCE_1P7  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P7/CER_SSF_$INSTANCE_1P7
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The main purpose of the **hdiff** command is to verify that the HDF converter worked correctly. If the status from the "Evaluation of Comparison Software Output" section reports that it was successful, then the HDF file is not likely to have a major issue since it is created from the successfully compared data files. Watch the screen as any results scroll by. Presence of any major issues should be obvious as there would be many differences large enough to catch the eye. Differences in the third to sixth decimal places for the data fields are acceptable and

expected due to rounding differences between P6 and x86 resulting in different paths through the Inversion software.

The only other differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata.

3.3.3 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P7 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P7.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P7/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf  
$CERESHOME/inversion/CER4.5-6.1P7/rcf/cleanup_4.5-6.1P7.pl $DATE_1P7
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.3.4 Stand Alone, command line, Test Procedures for FM5, Environment Variables REPROCESS = 'YES', READ_IES = 'NO' and PROD = 'no'

3.3.4.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
setenv YEAR 2012
setenv MONTH 02
setenv DAY 08
setenv HOUR 15
setenv DATE_1P7 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P7 NPP-FM5-VIIRS_SSIT-reproc_000000.$DATE_1P7
source $CERESHOME/inversion/CER4.5-6.1P7/rcf/inversion-FM5-test2-
env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P7/CER_MOA_CERES_DAO-G5-CERES_020033.2012020812
$InputArchive/MOA/CERES_DAO-G5-CERES/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P7/CER_MOA_CERES_DAO-G5-CERES_020033.2012020818
$InputArchive/MOA/CERES_DAO-G5-CERES/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_SSFB_NPP-FM5-
VIIRS_SSIT_000000.2012020815 $InputArchive/SSFB/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_SSFA_NPP-FM5-
VIIRS_SSIT_000000.2012020815 $InputArchive/SSFA/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_SSFA_NPP-FM5-
VIIRS_SSIT_000000.2012020815.met $InputArchive/SSFA/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_GQCI_NPP-FM5-
VIIRS_SSIT_000000.2012020815 $InputArchive/GQCI/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20120208.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_sibiMap_NPP-
VIIRS_Edition4_400400.201202
$CERESHOME/inversion/data/sibiMap/NPP-VIIRS_Edition4/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P7/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
```

3.3.4.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P7-SGE_Driver.pl**, followed by the date and hour options, the cleanup option and the platform option selecting either P6, P7, x86, or x86-flex.

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
$CERESHOME/inversion/CER4.5-6.1P7/rcf/CER4.5-6.1P7-SGE_Driver.pl -date
20120208 -hour 15 -clean -platform p6/p7/x86/x86-flex
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.1P7/rcf/pcf/CER4.5-
6.1P7_PCF_$INSTANCE_1P7
```

The submitted job can be monitored with the **qstat** command.

The most recently created `sgc_log` file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P7/CER4.5-
6.1P7_$INSTANCE_1P7.o*
```

Output file generation test:

The script, **list_4.5-6.1P7.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.1P7/rcf/list_4.5-6.1P7.pl $INSTANCE_1P7
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.3.4.3 Exit Codes

All CER4.5-6.1P7 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.3.4.4 Test Summary

Test Summary:

Total Run Time:	6:24 minutes
Memory:	5.7 G
Required Disk Space:	232 Megabytes

3.3.5 Evaluation Procedures

When running the production script, **run_4.5-6.1P7.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchive/SSFB/NPP-FM5-VIIRS_SSIT/2012/02/CER_SSFB_NPP-
  FM5-VIIRS_SSIT_000000.2012020815
rm $InputArchive/SSFA/NPP-FM5-VIIRS_SSIT/2012/02/CER_SSFA_NPP-
  FM5-VIIRS_SSIT_000000.2012020815
rm $InputArchive/SSFA/NPP-FM5-VIIRS_SSIT/2012/02/CER_SSFA_NPP-
  FM5-VIIRS_SSIT_000000.2012020815.met
rm $InputArchive/GQCI/NPP-FM5-VIIRS_SSIT/2012/02/CER_GQCI_NPP-
  FM5-VIIRS_SSIT_000000.2012020815
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2012/02/CER_MOA_CERES_DAO-G5-CERES_020033.2012020812
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2012/02/CER_MOA_CERES_DAO-G5-CERES_020033.2012020818
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2012/02/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20120208.nc
rm $CERESHOME/inversion/data/sibiMap/NPP-
  VIIRS_Edition4/2012/02/CER_sibiMap_NPP-
  VIIRS_Edition4_400400.201202
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
```

3.3.5.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P7_LogReport_\${INSTANCE}_1P7**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P7 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P7 has been executed

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P7** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P7**, using the following **diff_4.5-6.1P7.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
  $CERESHOME/inversion/CER4.5-6.1P7/rcf/diff_4.5-6.1P7.pl $INSTANCE_1P7
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.3.5.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p7 $INSTANCE_1P7
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P7  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P7
```

3.3.5.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P7 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P7  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P7
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.3.5.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/NPP-FM5-VIIRS_SSIT-  
reproc/2012/02/CER_SSF_$INSTANCE_1P7  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P7/CER_SSF_$INSTANCE_1P7
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The main purpose of the **hdiff** command is to verify that the HDF converter worked correctly. If the status from the "Evaluation of Comparison Software Output" section reports that it was successful, then the HDF file is not likely to have a major issue since it is created from the successfully compared data files. Watch the screen as any results scroll by. Presence of any major issues should be obvious as there would be many differences large enough to catch the eye. Differences in the third to sixth decimal places for the data fields are acceptable and

expected due to rounding differences between P6 and x86 resulting in different paths through the Inversion software.

The only other differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata.

3.3.6 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P7 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P7.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P7/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf  
$CERESHOME/inversion/CER4.5-6.1P7/rcf/cleanup_4.5-6.1P7.pl $DATE_1P7
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.3.7 Stand Alone, command line, Test Procedures for FM5, Environment Variables REPROCESS = 'YES' and READ_IES = 'YES'

3.3.7.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
setenv YEAR 2012
setenv MONTH 02
setenv DAY 08
setenv HOUR 15
setenv DATE_1P7 $YEAR$MONTH$DAY$HOUR
setenv INSTANCE_1P7 NPP-FM5-VIIRS_SSIT-reproc-ies_000000.$DATE_1P7
source $CERESHOME/inversion/CER4.5-6.1P7/rcf/inversion-FM5-test3-
env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P7/CER_MOA_CERES_DAO-G5-CERES_020033.2012020812
$InputArchive/MOA/CERES_DAO-G5-CERES/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-
6.1P7/CER_MOA_CERES_DAO-G5-CERES_020033.2012020818
$InputArchive/MOA/CERES_DAO-G5-CERES/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_SSFB_NPP-FM5-
VIIRS_SSIT_000000.2012020815 $InputArchive/SSFB/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_SSFA_NPP-FM5-
VIIRS_SSIT_000000.2012020815 $InputArchive/SSFA/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_SSFA_NPP-FM5-
VIIRS_SSIT_000000.2012020815.met $InputArchive/SSFA/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_GQCI_NPP-FM5-
VIIRS_SSIT_000000.2012020815 $InputArchive/GQCI/NPP-FM5-
VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_MATCH-
daily_Terra-Aqua-MODIS_Edition4_400400.20120208.nc
$CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
MODIS_Edition4/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_IES_NPP-
FM5_AtLaunch_300301.2012020815 $InputArchive/IES/NPP-
FM5_AtLaunch/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/CER_sibiMap_NPP-
VIIRS_Edition4_400400.201202
$CERESHOME/inversion/data/sibiMap/NPP-VIIRS_Edition4/2012/02/
```

```
cp $CERESHOME/inversion/data/input/CER4.5-6.1P7/sorce_tsi_v15.txt.20140331 $CERESHOME/inversion/data/SORCE/
```

3.3.7.2 Execution

Execute the production script by typing the script name, **CER4.5-6.1P7-SGE_Driver.pl**, followed by the date and hour options, the cleanup option and the platform option selecting either P6, P7, x86, or x86-flex.

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
$CERESHOME/inversion/CER4.5-6.1P7/rcf/CER4.5-6.1P7-SGE_Driver.pl -date
20120208 -hour 15 -clean -platform p6/p7/x86/x86-flex
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.1P7/rcf/pcf/CER4.5-6.1P7_PCF_${INSTANCE_1P7}
```

The submitted job can be monitored with the **qstat** command.

The most recently created `sgc_log` file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.1P7/CER4.5-6.1P7_${INSTANCE_1P7}.o*
```

Output file generation test:

The script, **list_4.5-6.1P7.pl**, will list the files that were created during execution of the PGE:

```
$CERESHOME/inversion/CER4.5-6.1P7/rcf/list_4.5-6.1P7.pl $INSTANCE_1P7
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.3.7.3 Exit Codes

All CER4.5-6.1P7 software terminates using the CERES defined EXIT CODES. Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.3.7.4 Test Summary

Test Summary:

Total Run Time:	6:24 minutes
Memory:	5.7 G
Required Disk Space:	232 Megabytes

3.3.8 Evaluation Procedures

When running the production script, **run_4.5-6.1P7.pl**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Remove input data:

```
rm $InputArchive/SSFB/NPP-FM5-VIIRS_SSIT/2012/02/CER_SSFB_NPP-
  FM5-VIIRS_SSIT_000000.2012020815
rm $InputArchive/SSFA/NPP-FM5-VIIRS_SSIT/2012/02/CER_SSFA_NPP-
  FM5-VIIRS_SSIT_000000.2012020815
rm $InputArchive/SSFA/NPP-FM5-VIIRS_SSIT/2012/02/CER_SSFA_NPP-
  FM5-VIIRS_SSIT_000000.2012020815.met
rm $InputArchive/GQCI/NPP-FM5-VIIRS_SSIT/2012/02/CER_GQCI_NPP-
  FM5-VIIRS_SSIT_000000.2012020815
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2012/02/CER_MOA_CERES_DAO-G5-CERES_020033.2012020812
rm $InputArchive/MOA/CERES_DAO-G5-
  CERES/2012/02/CER_MOA_CERES_DAO-G5-CERES_020033.2012020818
rm $CERESHOME/inversion/data/MATCH-daily/Terra-Aqua-
  MODIS_Edition4/2012/02/CER_MATCH-daily_Terra-Aqua-
  MODIS_Edition4_400400.20120208.nc
rm $InputArchive/IES/NPP-FM5_AtLaunch/2012/02/CER_IES_NPP-
  FM5_AtLaunch_300301.2012020815
rm $CERESHOME/inversion/data/sibiMap/NPP-
  VIIRS_Edition4/2012/02/CER_sibiMap_NPP-
  VIIRS_Edition4_400400.201202
rm $CERESHOME/inversion/data/SORCE/sorce_tsi_v15.txt.20140331
```

3.3.8.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.1P7_LogReport_\$INSTANCE_1P7**, is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.1P7 has been executed. Metadata files, which end in extension '.met', are located in the same directories as their corresponding output files after CER4.5-6.1P7 has been executed.

Compare the information contained in the log file with the expected contents of the Log Report file found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P7** and compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.1P7**, using the following **diff_4.5-6.1P7.pl** script:

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf
$CERESHOME/inversion/CER4.5-6.1P7/rcf/diff_4.5-6.1P7.pl $INSTANCE_1P7
```

The only differences between the files should be the production times and differences in the directory paths where the tests were run.

3.3.8.2 Execution of Comparison Software for the Main Processor

The evaluation software for the Subsystem Main Processor will perform a single test. This test will compare all of the parameters on the binary SSF and the binary SSFA (if it exists) to the values in comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the binary SSF and binary SSFA, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin  
run_compare_1p7 $INSTANCE_1P7
```

Two files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P7  
$CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P7
```

3.3.8.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.1P7 comparison software.

Examine the comparison reports files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpReport_$DATE_1P7  
cat $CERESHOME/inversion/test_suites/results/CmpReportSSFA_$DATE_1P7
```

The final line of these files will report the status of the comparison between the generated data and the expected output.

3.3.8.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF/NPP-FM5-VIIRS_SSIT-reproc-  
ies/2012/02/CER_SSF_$INSTANCE_1P7  
$CERESHOME/inversion/data_exp/CER4.5-  
6.1P7/CER_SSF_$INSTANCE_1P7
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The main purpose of the **hdiff** command is to verify that the HDF converter worked correctly. If the status from the "Evaluation of Comparison Software Output" section reports that it was successful, then the HDF file is not likely to have a major issue since it is created from the successfully compared data files. Watch the screen as any results scroll by. Presence of any major issues should be obvious as there would be many differences large enough to catch the eye. Differences in the third to sixth decimal places for the data fields are acceptable and

expected due to rounding differences between P6 and x86 resulting in different paths through the Inversion software.

The only other differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata.

3.3.9 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.1P7 software. These files must be removed before rerunning these test procedures. A script which removes PGE created files, **cleanup_4.5-6.1P7.pl**, is located in directory **\$CERESHOME/inversion/CER4.5-6.1P7/rcf**. To use the clean-up script:

```
cd $CERESHOME/inversion/CER4.5-6.1P7/rcf  
$CERESHOME/inversion/CER4.5-6.1P7/rcf/cleanup_4.5-6.1P7.pl $DATE_1P7
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.4 CER4_5-6.2P3 Terra and Aqua Edition4 and NPP Edition1 SSF Subsetting Post Processor Producing Daily SSF and SSFA Subset Files, and Nadir SSF, Validation SSF, and Validation SSFA Subset Products

3.4.1 Stand Alone Test Procedures for FM1

3.4.1.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
setenv YEAR 2008
setenv MONTH 07
setenv DAY 15
setenv DATE_2P3 $YEAR$MONTH$DAY
setenv INSTANCE2_2P3 Terra-FM1-MODIS_Ed4Test_000000.$DATE_2P3
source $CERESHOME/inversion/CER4.5-6.2P3/rcf/inversion-terra-test-FM1-
subset-env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSFA_Terra-
FM1-MODIS_Ed4Test_000000.2008071515
$CERESHOME/inversion/data/SSFA/Terra-FM1-MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSF_B_Terra-
FM1-MODIS_Ed4Test_000000.2008071515
$CERESHOME/inversion/data/SSFB/Terra-FM1-MODIS_Ed4Test/2008/07/
```

3.4.1.2 Execution

Execute the production script by typing the script name, **CER4.5-6.2P3-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/CER4.5-6.2P3-SGE_Driver.pl -
date $DATE_2P3 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/pcf/CER4.5-
6.2P3_PCF_$INSTANCE2_2P3
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.2P3/CER4.5-
6.2P3_$INSTANCE2_2P3.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.2P3, will be executed and will create the files printed out by the **list_4.5-6.2P3csh** script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/list_4.5-6.2P3.csh
$INSTANCE2_2P3
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.4.1.3 Exit Codes

All CER4.5-6.2P3 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.4.1.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:10 minutes
Memory:              5422 K
Required Disk Space: 60.5 Megabytes
```

3.4.2 Evaluation Procedures

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA/Terra-FM1-
MODIS_Ed4Test/2008/07/CER_SSFA_Terra-FM1-
MODIS_Ed4Test_000000.2008071515
rm $CERESHOME/inversion/data/SSFB/Terra-FM1-
MODIS_Ed4Test/2008/07/CER_SSFB_Terra-FM1-
MODIS_Ed4Test_000000.2008071515
```

3.4.2.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.2P3_LogReport_\$INSTANCE2_2P3** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.2P3 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.2P3 has been executed.

Compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.2P3**, using the following **diff_4.5-6.2P3.csh** script:

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/diff_4.5-6.2P3.csh $INSTANCE2_2P3
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.4.2.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Subset Post Processor will perform a single test. This test will compare the data on the two newly created SSF subset files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.2P3, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_subset_compare $INSTANCE2_2P3
run_subset_aerosol_compare $INSTANCE2_2P3
run_nadir_compare $INSTANCE2_2P3
run_validation_compare $INSTANCE2_2P3
run_validation_aero_compare $INSTANCE2_2P3
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

3.4.2.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.2P3 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.4.2.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF-nadir/Terra-FM1-  
MODIS_Ed4Test/2008/07/CER_SSF-nadir_${INSTANCE2}_2P3  
$CERESHOME/inversion/data_exp/CER4.5-6.2P3/CER_SSF-  
nadir_${INSTANCE2}_2P3
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata.

3.4.3 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.2P3 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.2P3.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.2P3/rcf**. To use the clean-up script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/cleanup_4.5-6.2P3.csh  
$INSTANCE2_2P3
```
2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.4.4 Stand Alone Test Procedures for FM2

3.4.4.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
setenv YEAR 2001
setenv MONTH 04
setenv DAY 15
setenv DATE_2P3 $YEAR$MONTH$DAY
setenv INSTANCE2_2P3 Terra-FM2-MODIS_SSIT2_000000.$DATE_2P3
source $CERESHOME/inversion/CER4.5-6.2P3/rcf/inversion-terra-test-FM2-
subset-env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSFA_Terra-
FM2-MODIS_SSIT2_000000.2001041515
  $CERESHOME/inversion/data/SSFA/Terra-FM2-MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSFb_Terra-
FM2-MODIS_SSIT2_000000.2001041515
  $CERESHOME/inversion/data/SSFb/Terra-FM2-MODIS_SSIT2/2001/04/
```

3.4.4.2 Execution

Execute the production script by typing the script name, **CER4.5-6.2P3-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/CER4.5-6.2P3-SGE_Driver.pl -
date $DATE_2P3 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/pcf/CER4.5-
6.2P3_PCF_$INSTANCE2_2P3
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.2P3/CER4.5-
6.2P3_$INSTANCE2_2P3.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.2P3, will be executed and will create the files printed out by the **list_4.5-6.2P3csh** script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/list_4.5-6.2P3.csh
$INSTANCE2_2P3
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.4.4.3 Exit Codes

All CER4.5-6.2P3 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.4.4.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:10 minutes
Memory:              5422 K
Required Disk Space: 60.5 Megabytes
```

3.4.5 Evaluation Procedures

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA/Terra-FM2-
MODIS_SSIT2/2001/04/CER_SSFA_Terra-FM2-
MODIS_SSIT2_000000.2001041515
rm $CERESHOME/inversion/data/SSFB/Terra-FM2-
MODIS_SSIT2/2001/04/CER_SSFB_Terra-FM2-
MODIS_SSIT2_000000.2001041515
```

3.4.5.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.2P3_LogReport_\$INSTANCE2_2P3** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.2P3 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.2P3 has been executed.

Compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.2P3**, using the following **diff_4.5-6.2P3.csh** script:

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/diff_4.5-6.2P3.csh $INSTANCE2_2P3
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.4.5.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Subset Post Processor will perform a single test. This test will compare the data on the two newly created SSF subset files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.2P3, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_subset_compare $INSTANCE2_2P3
run_subset_aerosol_compare $INSTANCE2_2P3
run_nadir_compare $INSTANCE2_2P3
run_validation_compare $INSTANCE2_2P3
run_validation_aero_compare $INSTANCE2_2P3
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

3.4.5.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.2P3 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.4.5.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF-nadir/Terra-FM2-  
MODIS_SSIT2/2001/04/CER_SSF-nadir_${INSTANCE2}_2P3  
$CERESHOME/inversion/data_exp/CER4.5-6.2P3/CER_SSF-  
nadir_${INSTANCE2}_2P3
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata.

3.4.6 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.2P3 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.2P3.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.2P3/rcf**. To use the clean-up script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/cleanup_4.5-6.2P3.csh  
$INSTANCE2_2P3
```
2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.4.7 Stand Alone Test Procedures for FM3

3.4.7.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DAY 15
setenv DATE_2P3 $YEAR$MONTH$DAY
setenv INSTANCE2_2P3 Aqua-FM3-MODIS_SSIT_000000.$DATE_2P3
source $CERESHOME/inversion/CER4.5-6.2P3/rcf/inversion-aqua-test-FM3-
subset-env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSFA_Aqua-FM3-
MODIS_SSIT_000000.2008101507
$CERESHOME/inversion/data/SSFA/Aqua-FM3-MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSFBAqua-FM3-
MODIS_SSIT_000000.2008101507
$CERESHOME/inversion/data/SSFB/Aqua-FM3-MODIS_SSIT/2008/10/
```

3.4.7.2 Execution

Execute the production script by typing the script name, **CER4.5-6.2P3-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/CER4.5-6.2P3-SGE_Driver.pl -
date $DATE_2P3 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/pcf/CER4.5-
6.2P3_PCF_$INSTANCE2_2P3
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgelog** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgelog/CER4.5-6.2P3/CER4.5-
6.2P3_$INSTANCE2_2P3.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.2P3, will be executed and will create the files printed out by the **list_4.5-6.2P3csh** script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/list_4.5-6.2P3.csh
$INSTANCE2_2P3
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.4.7.3 Exit Codes

All CER4.5-6.2P3 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.4.7.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:10 minutes
Memory:              5422 K
Required Disk Space: 60.5 Megabytes
```

3.4.8 Evaluation Procedures

When running the production script, **run_4.5-6.2P3.csh**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA/Aqua-FM3-
MODIS_SSIT/2008/10/CER_SSFA_Aqua-FM3-
MODIS_SSIT_000000.2008101507
rm $CERESHOME/inversion/data/SSFB/Aqua-FM3-
MODIS_SSIT/2008/10/CER_SSFB_Aqua-FM3-
MODIS_SSIT_000000.2008101507
```

3.4.8.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.2P3_LogReport_\$INSTANCE2_2P3** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.2P3 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.2P3 has been executed.

Compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.2P3**, using the following **diff_4.5-6.2P3.csh** script:

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/diff_4.5-6.2P3.csh $INSTANCE2_2P3
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.4.8.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Subset Post Processor will perform a single test. This test will compare the data on the two newly created SSF subset files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.2P3, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_subset_compare $INSTANCE2_2P3
run_subset_aerosol_compare $INSTANCE2_2P3
run_nadir_compare $INSTANCE2_2P3
run_validation_compare $INSTANCE2_2P3
run_validation_aero_compare $INSTANCE2_2P3
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

3.4.8.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.2P3 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.4.8.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF-nadir/Aqua-FM3-  
MODIS_SSIT/2008/10/CER_SSF-nadir_${INSTANCE2}_2P3  
$CERESHOME/inversion/data_exp/CER4.5-6.2P3/CER_SSF-  
nadir_${INSTANCE2}_2P3
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata.

3.4.9 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.2P3 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.2P3.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.2P3/rcf**. To use the clean-up script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/cleanup_4.5-6.2P3.csh  
$INSTANCE2_2P3
```
2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.4.10 Stand Alone Test Procedures for FM4

3.4.10.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DAY 15
setenv DATE_2P3 $YEAR$MONTH$DAY
setenv INSTANCE2_2P3 Aqua-FM4-MODIS_SSIT-NoSW_000000.$DATE_2P3
source $CERESHOME/inversion/CER4.5-6.2P3/rcf/inversion-aqua-test-FM4-
subset-env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSFA_Aqua-FM4-
MODIS_SSIT-NoSW_000000.2008101507
$CERESHOME/inversion/data/SSFA/Aqua-FM4-MODIS_SSIT-
NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSFb_Aqua-FM4-
MODIS_SSIT-NoSW_000000.2008101507
$CERESHOME/inversion/data/SSFb/Aqua-FM4-MODIS_SSIT-
NoSW/2008/10/
```

3.4.10.2 Execution

Execute the production script by typing the script name, **CER4.5-6.2P3-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/CER4.5-6.2P3-SGE_Driver.pl -
date $DATE_2P3 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/pcf/CER4.5-
6.2P3_PCF_$INSTANCE2_2P3
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.2P3/CER4.5-
6.2P3_$INSTANCE2_2P3.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.2P3, will be executed and will create the files printed out by the **list_4.5-6.2P3csh** script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/list_4.5-6.2P3.csh
$INSTANCE2_2P3
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found. THERE ARE NOT ANY SSFB-nadir OR SSF-nadir PRODUCTS WITH THIS TEST. THESE FILES WILL SHOW AS MISSING.

3.4.10.3 Exit Codes

All CER4.5-6.2P3 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.4.10.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:10 minutes
Memory:              5422 K
Required Disk Space: 60.5 Megabytes
```

3.4.11 Evaluation Procedures

When running the production script, **run_4.5-6.2P3.csh**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA/Aqua-FM4-MODIS_SSIT-
NoSW/2008/10/CER_SSFA_Aqua-FM4-MODIS_SSIT-
NoSW_000000.2008101507
rm $CERESHOME/inversion/data/SSFB/Aqua-FM4-MODIS_SSIT-
NoSW/2008/10/CER_SSFB_Aqua-FM4-MODIS_SSIT-
NoSW_000000.2008101507
```

3.4.11.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.2P3_LogReport_\$INSTANCE2_2P3** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.2P3 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.2P3 has been executed.

Compare the metadata files with the expected contents of the files with the same names found in directory `$CERESHOME/inversion/data_exp/CER4.5-6.2P3`, using the following `diff_4.5-6.2P3.csh` script:

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/diff_4.5-6.2P3.csh $INSTANCE2_2P3
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.4.11.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Subset Post Processor will perform a single test. This test will compare the data on the two newly created SSF subset files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.2P3, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_subset_compare $INSTANCE2_2P3
run_subset_aerosol_compare $INSTANCE2_2P3
run_nadir_compare $INSTANCE2_2P3
run_validation_compare $INSTANCE2_2P3
run_validation_aero_compare $INSTANCE2_2P3
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

3.4.11.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.2P3 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.4.11.4 Evaluation of SSF HDF Product – THERE IS NO HDF PRODUCT WITH THIS TEST DATA.

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF-nadir/Aqua-FM4-MODIS_SSI-  
NoSW/2008/10/CER_SSF-nadir_${INSTANCE2}_2P3  
$CERESHOME/inversion/data_exp/CER4.5-6.2P3/CER_SSF-  
nadir_${INSTANCE2}_2P3
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata.

3.4.12 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.2P3 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.2P3.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.2P3/rcf**. To use the clean-up script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/cleanup_4.5-6.2P3.csh  
$INSTANCE2_2P3
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.4.13 Stand Alone Test Procedures for FM5

3.4.13.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
setenv YEAR 2012
setenv MONTH 02
setenv DAY 15
setenv DATE_2P3 $YEAR$MONTH$DAY
setenv INSTANCE2_2P3 NPP-FM5-VIIRS_SSIT_000000.$DATE_2P3
source $CERESHOME/inversion/CER4.5-6.2P3/rcf/inversion-npp-test-FM5-
subset-env.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSFA_NPP-FM5-
VIIRS_SSIT_000000.2012021507
  $CERESHOME/inversion/data/SSFA/NPP-FM5-VIIRS_SSIT/2012/02/
cp $CERESHOME/inversion/data/input/CER4.5-6.2P3/CER_SSFN_NPP-FM5-
VIIRS_SSIT_000000.2012021507
  $CERESHOME/inversion/data/SSFN/NPP-FM5-VIIRS_SSIT/2012/02/
```

3.4.13.2 Execution

Execute the production script by typing the script name, **CER4.5-6.2P3-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/CER4.5-6.2P3-SGE_Driver.pl -
date $DATE_2P3 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/pcf/CER4.5-
6.2P3_PCF_${INSTANCE2_2P3}
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.2P3/CER4.5-
6.2P3_${INSTANCE2_2P3}.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.2P3, will be executed and will create the files printed out by the **list_4.5-6.2P3csh** script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/list_4.5-6.2P3.csh
$INSTANCE2_2P3
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.4.13.3 Exit Codes

All CER4.5-6.2P3 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.4.13.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:10 minutes
Memory:              5422 K
Required Disk Space: 60.5 Megabytes
```

3.4.14 Evaluation Procedures

When running the production script, **run_4.5-6.2P3.csh**, the system message, 'No match', may be written to the screen. This message occurs when the script tries to remove an old output file that does not exist. This does not signify a problem.

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA/NPP-FM5-
VIIRS_SIT/2012/02/CER_SSFA_NPP-FM5-
VIIRS_SIT_000000.2012021507
rm $CERESHOME/inversion/data/SSFB/NPP-FM5-
VIIRS_SIT/2012/02/CER_SSFB_NPP-FM5-
VIIRS_SIT_000000.2012021507
```

3.4.14.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.2P3_LogReport_\$INSTANCE2_2P3** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.2P3 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.2P3 has been executed.

Compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.2P3**, using the following **diff_4.5-6.2P3.csh** script:

```
cd $CERESHOME/inversion/CER4.5-6.2P3/rcf
$CERESHOME/inversion/CER4.5-6.2P3/rcf/diff_4.5-6.2P3.csh $INSTANCE2_2P3
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.4.14.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Subset Post Processor will perform a single test. This test will compare the data on the two newly created SSF subset files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.2P3, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_subset_compare $INSTANCE2_2P3
run_subset_aerosol_compare $INSTANCE2_2P3
run_nadir_compare $INSTANCE2_2P3
run_validation_compare $INSTANCE2_2P3
run_validation_aero_compare $INSTANCE2_2P3
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

3.4.14.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.2P3 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubset_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSF2A_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFNadir_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFVal_$DATE_2P3
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFAVal_$DATE_2P3
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.4.14.4 Evaluation of SSF HDF Product

This section provides the procedure for evaluating the output from the SSF HDF product produced by the test software. The comparison software was compiled when all software was compiled in a previous step. Execute the program by typing the following lines:

```
hdiff $CERESHOME/inversion/data/SSF-nadir/NPP-FM5-  
VIIRS_SSIT/2012/02/CER_SSF-nadir_$INSTANCE2_2P3  
$CERESHOME/inversion/data_exp/CER4.5-6.2P3/CER_SSF-  
nadir_$INSTANCE2_2P3
```

The executable, **hdiff**, compares each Vdata and each SDS on the SSF HDF output file.

The only differences between the two HDF output files should be the dates on Vfields: “SSF_DATE” on the “SSF_Header” Vdata and “CERPRODUCTIONDATETIME” on the “CERES_metadata” Vdata. If CERESLIB has changed, the date may be different in the “LOCALVERSIONID” on the “CERES_metadata” Vdata.

3.4.15 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.2P3 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.2P3.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.2P3/rcf**. To use the clean-up script:

```
$CERESHOME/inversion/CER4.5-6.2P3/rcf/cleanup_4.5-6.2P3.csh  
$INSTANCE2_2P3
```
2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.5 CER4_5-6.4P2 Terra and Aqua Edition4 SSF Post Processor Producing Monthly SSF and SSFA Validation subset files

3.5.1 Stand Alone Test Procedures for FM1

3.5.1.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
setenv YEAR 2008
setenv MONTH 07
setenv DATE_4P2 $YEAR$MONTH
setenv INSTANCE2_4P2 Terra-FM1-MODIS_Ed4Test_000000.$DATE_4P2
source $CERESHOME/inversion/CER4.5-6.4P2/rcf/inversion-FM1-valmm-
subset.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFA-val_Terra-
FM1-MODIS_Ed4Test_000000.20080715
$CERESHOME/inversion/data/SSFA-val/Terra-FM1-
MODIS_Ed4Test/2008/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFb-val_Terra-
FM1-MODIS_Ed4Test_000000.20080715
$CERESHOME/inversion/data/SSFB-val/Terra-FM1-
MODIS_Ed4Test/2008/07/
```

3.5.1.2 Execution

Execute the production script by typing the script name, **CER4.5-6.4P2-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/CER4.5-6.4P2-SGE_Driver.pl -
date $DATE_4P2 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/pcf/CER4.5-
6.4P2_PCF_$INSTANCE2_4P2
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.4P2/CER4.5-
6.4P2_$INSTANCE2_4P2.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.4P2, will be executed and will create the files printed out by the **list_4.5-6.4P2.csh** script:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/list_4.5-6.4P2.csh
$INSTANCE2_4P2
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.5.1.3 Exit Codes

All CER4.5-6.4P2 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.5.1.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:02 minutes
Memory:              4631 K
Required Disk Space: 2.0 Megabytes
```

3.5.2 Evaluation Procedures

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA-val/Terra-FM1-
MODIS_Ed4Test/2008/07/CER_SSFA-val_Terra-FM1-
MODIS_Ed4Test_000000.20080715
rm $CERESHOME/inversion/data/SSFB-val/Terra-FM1-
MODIS_Ed4Test/2008/07/CER_SSFB-val_Terra-FM1-
MODIS_Ed4Test_000000.20080715
```

3.5.2.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.4P2_LogReport_\$INSTANCE2_4P2** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.4P2 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.4P2 has been executed.

Metadata files:

```
CER_SSFB-valmm_$INSTANCE_4P2.met
CER_SSFA-valmm_$INSTANCE_4P2.met
```

Compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.4P2**, using the following **diff_4.5-6.4P2.csh** script:

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/diff_4.5-6.4P2.csh $INSTANCE2_4P2
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.5.2.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Post Processor will perform a single test. This test will compare the data on the two newly created monthly validation site SSF files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.4P2, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_valmm_compare $INSTANCE2_4P2
run_valmm_a_compare $INSTANCE2_4P2
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_$DATE_4
P2
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFAValmm_$DATE_
4P2
```

3.5.2.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.4P2 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_$DATE_4P2
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFAValmm_$DATE_4P2
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.5.3 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.4P2 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.4P2.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.4P2/rcf**. To use the clean-up script:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/cleanup_4.5-6.4P2.csh
$INSTANCE2_4P2
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.5.4 Stand Alone Test Procedures for FM2

3.5.4.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
setenv YEAR 2001
setenv MONTH 04
setenv DATE_4P2 $YEAR$MONTH
setenv INSTANCE2_4P2 Terra-FM2-MODIS_SSIT2_000000.$DATE_4P2
source $CERESHOME/inversion/CER4.5-6.4P2/rcf/inversion-FM2-valmm-
subset.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFA-val_Terra-
FM2-MODIS_SSIT2_000000.20010415
  $CERESHOME/inversion/data/SSFA-val/Terra-FM2-
MODIS_SSIT2/2001/04/
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFb-val_Terra-
FM2-MODIS_SSIT2_000000.20010415
  $CERESHOME/inversion/data/SSFb-val/Terra-FM2-
MODIS_SSIT2/2001/04/
```

3.5.4.2 Execution

Execute the production script by typing the script name, **CER4.5-6.4P2-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/CER4.5-6.4P2-SGE_Driver.pl -
date $DATE_4P2 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/pcf/CER4.5-
6.4P2_PCF_$INSTANCE2_4P2
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.4P2/CER4.5-
6.4P2_$INSTANCE2_4P2.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.4P2, will be executed and will create the files printed out by the **list_4.5-6.4P2.csh** script:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/list_4.5-6.4P2.csh
$INSTANCE2_4P2
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.5.4.3 Exit Codes

All CER4.5-6.4P2 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.5.4.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:02 minutes
Memory:              4631 K
Required Disk Space: 2.0 Megabytes
```

3.5.5 Evaluation Procedures

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA-val/Terra-FM2-
MODIS_SSIT2/2001/04/CER_SSFA-val_Terra-FM2-
MODIS_SSIT2_000000.20010415
rm $CERESHOME/inversion/data/SSFB-val/Terra-FM2-
MODIS_SSIT2/2001/04/CER_SSFB-val_Terra-FM2-
MODIS_SSIT2_000000.20010415
```

3.5.5.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.4P2_LogReport_\$INSTANCE2_4P2** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.4P2 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.4P2 has been executed.

Metadata files:

```
CER_SSFB-valmm_$INSTANCE_4P2.met
CER_SSFA-valmm_$INSTANCE_4P2.met
```

Compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.4P2**, using the following **diff_4.5-6.4P2.csh** script:

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/diff_4.5-6.4P2.csh $INSTANCE2_4P2
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.5.5.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Post Processor will perform a single test. This test will compare the data on the two newly created monthly validation site SSF files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.4P2, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_valmm_compare $INSTANCE2_4P2
run_valmm_a_compare $INSTANCE2_4P2
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_$DATE_4
P2
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFAValmm_$DATE_
4P2
```

3.5.5.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.4P2 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_$DATE_4P2
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFAValmm_$DATE_4P2
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.5.6 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.4P2 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.4P2.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.4P2/rcf**. To use the clean-up script:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/cleanup_4.5-6.4P2.csh
$INSTANCE2_4P2
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.5.7 Stand Alone Test Procedures for FM3

3.5.7.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DATE_4P2 $YEAR$MONTH
setenv INSTANCE2_4P2 Aqua-FM3-MODIS_SSIT_000000.$DATE_4P2
source $CERESHOME/inversion/CER4.5-6.4P2/rcf/inversion-FM3-valmm-
subset.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFA-val_Aqua-
FM3-MODIS_SSIT_000000.20081015 $CERESHOME/inversion/data/SSFA-
val/Aqua-FM3-MODIS_SSIT/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFb-val_Aqua-
FM3-MODIS_SSIT_000000.20081015 $CERESHOME/inversion/data/SSFB-
val/Aqua-FM3-MODIS_SSIT/2008/10/
```

3.5.7.2 Execution

Execute the production script by typing the script name, **CER4.5-6.4P2-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/CER4.5-6.4P2-SGE_Driver.pl -
date $DATE_4P2 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/pcf/CER4.5-
6.4P2_PCF_$INSTANCE2_4P2
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.4P2/CER4.5-
6.4P2_$INSTANCE2_4P2.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.4P2, will be executed and will create the files printed out by the **list_4.5-6.4P2csh** script:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/list_4.5-6.4P2.csh
$INSTANCE2_4P2
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.5.7.3 Exit Codes

All CER4.5-6.4P2 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.5.7.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:02 minutes
Memory:              4631 K
Required Disk Space: 2.0 Megabytes
```

3.5.8 Evaluation Procedures

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA-val/Aqua-FM3-
MODIS_SSIT/2008/10/CER_SSFA-val_Aqua-FM3-
MODIS_SSIT_000000.20081015
rm $CERESHOME/inversion/data/SSFB-val/Aqua-FM3-
MODIS_SSIT/2008/10/CER_SSFB-val_Aqua-FM3-
MODIS_SSIT_000000.20081015
```

3.5.8.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.4P2_LogReport_\$INSTANCE2_4P2** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.4P2 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.4P2 has been executed.

Metadata files:

```
CER_SSFB-valmm_$INSTANCE_4P2.met
CER_SSFA-valmm_$INSTANCE_4P2.met
```

Compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.4P2**, using the following **diff_4.5-6.4P2.csh** script:

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/diff_4.5-6.4P2.csh $INSTANCE2_4P2
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.5.8.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Post Processor will perform a single test. This test will compare the data on the two newly created monthly validation site SSF files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.4P2, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_valmm_compare $INSTANCE2_4P2
run_valmm_a_compare $INSTANCE2_4P2
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_${DATE}_4P2
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_${DATE}_4P2
```

3.5.8.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.4P2 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_${DATE}_4P2
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_${DATE}_4P2
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.5.9 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.4P2 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.4P2.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.4P2/rcf**. To use the clean-up script:


```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/cleanup_4.5-6.4P2.csh
$INSTANCE2_4P2
```
2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.5.10 Stand Alone Test Procedures for FM4

3.5.10.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
setenv YEAR 2008
setenv MONTH 10
setenv DATE_4P2 $YEAR$MONTH
setenv INSTANCE2_4P2 Aqua-FM4-MODIS_SSIT-NoSW_000000.$DATE_4P2
source $CERESHOME/inversion/CER4.5-6.4P2/rcf/inversion-FM4-valmm-
subset.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFA-val_Aqua-
FM4-MODIS_SSIT-NoSW_000000.20081015
$CERESHOME/inversion/data/SSFA-val/Aqua-FM4-MODIS_SSIT-
NoSW/2008/10/
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFb-val_Aqua-
FM4-MODIS_SSIT-NoSW_000000.20081015
$CERESHOME/inversion/data/SSFb-val/Aqua-FM4-MODIS_SSIT-
NoSW/2008/10/
```

3.5.10.2 Execution

Execute the production script by typing the script name, **CER4.5-6.4P2-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/CER4.5-6.4P2-SGE_Driver.pl -
date $DATE_4P2 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/pcf/CER4.5-
6.4P2_PCF_$INSTANCE2_4P2
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.4P2/CER4.5-
6.4P2_$INSTANCE2_4P2.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.4P2, will be executed and will create the files printed out by the **list_4.5-6.4P2.csh** script:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/list_4.5-6.4P2.csh
$INSTANCE2_4P2
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.5.10.3 Exit Codes

All CER4.5-6.4P2 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.5.10.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:02 minutes
Memory:              4631 K
Required Disk Space: 2.0 Megabytes
```

3.5.11 Evaluation Procedures

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA-val/Aqua-FM4-MODIS_SSIT-
NoSW/2008/10/CER_SSFA-val_Aqua-FM4-MODIS_SSIT-
NoSW_000000.20081015
rm $CERESHOME/inversion/data/SSFB-val/Aqua-FM4-MODIS_SSIT-
NoSW/2008/10/CER_SSFB-val_Aqua-FM4-MODIS_SSIT-
NoSW_000000.20081015
```

3.5.11.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.4P2_LogReport_\$INSTANCE2_4P2** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.4P2 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.4P2 has been executed.

Metadata files:

```
CER_SSFB-valmm_$INSTANCE_4P2.met
CER_SSFA-valmm_$INSTANCE_4P2.met
```

Compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.4P2**, using the following **diff_4.5-6.4P2.csh** script:

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/diff_4.5-6.4P2.csh $INSTANCE2_4P2
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.5.11.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Post Processor will perform a single test. This test will compare the data on the two newly created monthly validation site SSF files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.4P2, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_valmm_compare $INSTANCE2_4P2
run_valmm_a_compare $INSTANCE2_4P2
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_$DATE_4
P2
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFAValmm_$DATE_
4P2
```

3.5.11.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.4P2 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_$DATE_4P2
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFAValmm_$DATE_4P2
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.5.12 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.4P2 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.4P2.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.4P2/rcf**. To use the clean-up script:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/cleanup_4.5-6.4P2.csh
$INSTANCE2_4P2
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

3.5.13 Stand Alone Test Procedures for FM5

3.5.13.1 Environment setup and file preparation

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
setenv YEAR 2014
setenv MONTH 07
setenv DATE_4P2 $YEAR$MONTH
setenv INSTANCE2_4P2 NPP-FM5-VIIRS_Edition1A_100101.$DATE_4P2
source $CERESHOME/inversion/CER4.5-6.4P2/rcf/inversion-FM5-valmm-
subset.csh
```

Copy the input files to appropriate locations:

```
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFA-val_NPP-
FM5-VIIRS_Edition1A_100101.20140715
$CERESHOME/inversion/data/SSFA-val/NPP-FM5-
VIIRS_Edition1A/2014/07/
cp $CERESHOME/inversion/data/input/CER4.5-6.4P2/CER_SSFb-val_NPP-
FM5-VIIRS_Edition1A_100101.20140715
$CERESHOME/inversion/data/SSFb-val/NPP-FM5-
VIIRS_Edition1A/2014/07/
```

3.5.13.2 Execution

Execute the production script by typing the script name, **CER4.5-6.4P2-SGE_Driver.pl**, followed by the date option and the cleanup option.

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/CER4.5-6.4P2-SGE_Driver.pl -
date $DATE_4P2 -clean
```

The following file will be generated:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/pcf/CER4.5-
6.4P2_PCF_$INSTANCE2_4P2
```

The submitted job can be monitored with the **qstat** command.

The most recently created **sgc_log** file can be viewed to monitor progress of this job. This will be the last file listed by the command:

```
ls -arlt $CERESHOME/inversion/sgc_logs/CER4.5-6.4P2/CER4.5-
6.4P2_$INSTANCE2_4P2.o*
```

Output file generation test:

The SSF subset Processor Product Generation Executive (PGE), CER4.5-6.4P2, will be executed and will create the files printed out by the **list_4.5-6.4P2.csh** script:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/list_4.5-6.4P2.csh
$INSTANCE2_4P2
```

Note: If any file that should have been created is missing, then a message is written to the screen naming which file could not be found.

3.5.13.3 Exit Codes

All CER4.5-6.4P2 software terminates using the CERES defined EXIT CODES for the Langley TRMM Information System (LaTIS). Successful completion is indicated by an exit code of 0. This test should complete with an exit code of 0 for each of the executables.

3.5.13.4 Test Summary

SSF Subset Postprocessor Test Summary:

```
Total Run Time:      0:02 minutes
Memory:              4631 K
Required Disk Space: 2.0 Megabytes
```

3.5.14 Evaluation Procedures

Clean up the input directories:

```
rm $CERESHOME/inversion/data/SSFA-val/NPP-FM5-
VIIRS_Edition1A/2014/07/CER_SSFA-val_NPP-FM5-
VIIRS_Edition1A_100101.20140715
rm $CERESHOME/inversion/data/SSFB-val/NPP-FM5-
VIIRS_Edition1A/2014/07/CER_SSFB-val_NPP-FM5-
VIIRS_Edition1A_100101.20140715
```

3.5.14.1 Log and Status File Results and Metadata Evaluation

The Error and Status Log File, **CER4.5-6.4P2_LogReport_\$INSTANCE2_4P2** is located in directory **\$CERESHOME/inversion/runlogs** after CER4.5-6.4P2 has been executed. Metadata files which end in extension, '.met', are located in the same directories as their corresponding output files after CER4.5-6.4P2 has been executed.

Metadata files:

```
CER_SSFB-valmm_$INSTANCE_4P2.met
CER_SSFA-valmm_$INSTANCE_4P2.met
```

Compare the metadata files with the expected contents of the files with the same names found in directory **\$CERESHOME/inversion/data_exp/CER4.5-6.4P2**, using the following **diff_4.5-6.4P2.csh** script:

```
cd $CERESHOME/inversion/CER4.5-6.4P2/rcf
$CERESHOME/inversion/CER4.5-6.4P2/rcf/diff_4.5-6.4P2.csh $INSTANCE2_4P2
```

The only differences between the *.met files should be the production times and differences in the directory paths where the tests were run.

3.5.14.2 Execution of Comparison Software for the SSF Subset Post Processor

The evaluation software for this SSF Post Processor will perform a single test. This test will compare the data on the two newly created monthly validation site SSF files to the comparison files provided with the software delivery.

1. The executable for the comparison software is not provided in the tar file. It was created when all the software's code was compiled.
2. To execute the comparison software for the CER4.5-6.4P2, type the following commands:

```
cd $CERESHOME/inversion/test_suites/bin
run_valmm_compare $INSTANCE2_4P2
run_valmm_a_compare $INSTANCE2_4P2
```

The following comparison output files will be created:

```
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_$DATE_4
P2
$CERESHOME/inversion/test_suites/results/CmpSubsetSSFAValmm_$DATE_
4P2
```

3.5.14.3 Evaluation of Comparison Software Output

This section provides the procedure for evaluating the output from the CER4.5-6.4P2 comparison software.

Examine the comparison report files by typing:

```
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFValmm_$DATE_4P2
cat $CERESHOME/inversion/test_suites/results/CmpSubsetSSFAValmm_$DATE_4P2
```

The final line of this file will report the status of the comparison between the generated data and the expected output.

3.5.15 Solutions to Possible Problems

1. All output files are opened with Status = NEW in the CER4.5-6.4P2 software. These files must be removed before running these test procedures. A script, which removes PGE created files, **cleanup_4.5-6.4P2.csh**, is located in directory **\$CERESHOME/inversion/CER4.5-6.4P2/rcf**. To use the clean-up script:

```
$CERESHOME/inversion/CER4.5-6.4P2/rcf/cleanup_4.5-6.4P2.csh
$INSTANCE2_4P2
```

2. Use the latest version of CERESlib.
3. Ignore the warnings received during compilation.

Appendix A Acronyms and Abbreviations

ASCII	American Standard Code Information Interchange
ASDC	Atmospheric Science Data Center
CERES	Clouds and the Earth's Radiant Energy System
CERESlib	CERES library
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
F90	Fortran 90
HDF	Hierarchical Data Format
LaTIS	Langley TRMM Information System
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
PCF	Process Control File
PGE	Product Generation Executives
QC	Quality Control
SSAI	Science Systems Applications, Inc.
SSF	Single Scanner Footprint TOA/Surface Fluxes and Clouds
SSF	Single Scanner Footprint TOA/Surface Fluxes and Clouds
SSFA	Single Scanner Footprint TOA/Surface Fluxes and Clouds Aerosols
TOA	Top-of-Atmosphere
TRMM	Tropical Rainfall Measuring Mission