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

Data Management System

Operator's Manual

Regrid Meteorological, Ozone, and Aerosol (MOA) Subsystem (Subsystem 12.0)

CER12.1P1
CER12.1P2

Release 5
Version 7

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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

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			• Added GEOS4 information.	Sec. 3.0
			• Updated format to comply with standards.	All
06/30/03	R3V3	455	• Changed filenames GEOS401 to GEOS402.	Secs. 1.3.1.2 & 1.3.3
			• Updated format to comply with standards.	All
10/02/03	R3V4	473	• Changed GEOS4 in section titles to GEOS402.	Secs. 1.3.1.2 & 1.3.3
			• Added new section 1.3.1.3.	Sec. 1.3.1.3
			• Modified text to make GMAO data the primary meteorological data source.	Overview
			• Removed invalid PGE names from Table 1-2.	Secs. 1.1.4
			• Removed PS12 values for GEOS3.	Sec. 1.2.2
			• Removed GEOS3 information and replaced with GEOS4 data.	Sec. 1.2.4
			• Sections changed to reflect use of GMAO GEOS4 as primary data source with ECMWF as alternate.	Sec. 1.3.1
			• Moved SSMI data description.	Sec. 1.3.2
			• Move SMOBA data description.	Sec. 1.3.3.1
			• Changed title of EPToms section.	Sec. 1.3.3.2
			• Removed invalid PGE names from Table 1-5.	Sec. 1.6
			• Modified Appendix C.	App. C
			• Updated format to comply with standards.	All
02/24/05	R3V5	577	• Added new Production Strategy variable.	Sec. 1.2.2
			• Updated memory and time requirements.	Sec. 1.2.4
			• Updated filenames to use new Production Strategy variable.	Secs. 1.4.1 - 1.4.3, 1.5.3, & 1.6
			• Updated format to comply with standards.	All

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03/01/06	R4V1	615	• Replaced EPToms references with OMI.	Subsystem Overview, Secs. 1.2.4, 1.3.3.1, & 1.3.3.2
			• Removed ECMWF and EPToms references.	Overview, Secs. 1.2.2 & 1.3
			• Updated script names to new Perl names.	Secs. 1.2.2 & 1.4
			• Added new environment variables.	Sec. 1.2.2
			• Updated memory requirements.	Sec. 1.2.4
			• Added OMI to abbreviation list.	App. A
			• Updated ASCII file listing.	App. C
			• Updated format to comply with standards.	All
10/21/08	R5V1	686	• Updated contact information.	Table 1-1
			• Removed information and test case for backup ozone data source OMI; removed information for processing previous versions of MOA.	Subsystem Overview, Secs. 1.2.4 & 1.3.3.1
			• Removed GEOS4 test case and replaced with G5-CERES test case.	1.3.1
			• Changed pathnames to reflect new directory structure.	Secs. 1.4 & 1.5.3
			• Updated appendix with new ASCII file for G5-CERES.	App. C
			• Updated table to include PCFin, PCF, LogReport, LogStatus, and LogUser files.	Table 1-5
			• Added "G5Stream" to Environment Script Requirements. (11/6/2008)	Sec. 1.2.2
			• Added additional filename information. (11/6/2008)	Sec. 1.3.1(a)
03/04/09	R5V2	705	• Added new PGE CER12.1P2.	Sec. 2.0
			• Sample ASCII (PCFin) File Listing for CER12.1P2.	App. D
			• Removed Appendices C and D - Sample ASCII (PCFin) File Listings since PCFin files are no longer required. (09/16/2009)	Apps. C & D
10/27/09	R5V3	737	• Updated valid values of G5stream variable.	Secs. 1.2.2 & 2.2.2

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12/16/09	R5V4	753	• Updated environment variables.	Secs. 1.2.2 & 2.2.2
12/18/09	R5V5	749	• Removed references to outdated scripts.	Sec. 1.2.2, Table 1-3, Secs. 1.4, & 2.2.2, Table 2-3, & Sec. 2.4
			• Updated input and output directories.	Sec. 1.3, Table 1-5, Sec. 2.3, & Table 2-5
			• Added "Available Through Ordering Tool" column and removed red "meta" from expected output tables.	All Expected Output Tables
			• Updated script names and runlog paths	Secs. 1.4 & 1.5.3, Table 1-5, Secs. 2.4 & 2.5.3, & Table 2-5
			• Updated input file names and paths. (01/11/2011)	Secs. 1.3.1, 1.3.2, 2.3.1, & 2.3.2
			• Corrected dates of G5 dataset streams.	Secs. 1.3.1 & 2.3.1
			• Added instructions for SGE driver scripts. (03/01/2011)	Secs. 1.4.2 & 2.4.2
			• Added the following declarations that are mandatory for successful PGE execution: InputArchive, OutputArchive, and OZ12. (07/19/2011)	Sec. 2.2.2
			• Modified a link and document title name. (04/10/2012)	References
12/22/10	R5V6	821	• This version refers back to a delivery on *magneto*.	All
05/21/12	R5V7	899	• Modified input file names and sizes. • The SCCR Approval Date has been modified to reflect accurate approval date. (05/21/2012) • Modified disposition of PCF file for archival. (11/08/2012)	Sec. 1.3.1 Revision Record Tables 1-5 & 2-5

Preface

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

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

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

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

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Introduction

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

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

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

Document Overview

This document, Regrid Meteorological, Ozone, & Aerosol (MOA) Release 3 Operator's Manual, is part of the CERES Subsystem 12.0 Release 3 delivery package provided to the Langley Atmospheric Science Data Center (ASDC). It provides a description of the CERES Regrid MOA Release 3 software that comprises the Product Generation Executive (PGE) CER12.1P1 and instructions for executing the software. Appendix A contains a description of acronyms and abbreviations, and Appendix B contains a comprehensive list of messages that can be generated during the execution of PGEs CER12.1P1 and CER12.1P2.

This document is organized as follows:

Introduction
Document Overview
Subsystem Overview
1.0 PGEName: CER12.1P1
2.0 PGEName: CER12.1P2

Appendix A - Acronyms and Abbreviations
Appendix B - Error Messages

Subsystem Overview

CER12.1.P1 - Regrid MOA Subsystem

The CERES Regrid MOA Subsystem (12.0) ingests meteorological, ozone, and aerosol data from multiple sources and combines these data into the MOA product. The primary data on the MOA are meteorological data obtained from the Global Modeling and Assimilation Office (GMAO) at Goddard Space Flight Center (GSFC). These data include vertical profiles of temperature, humidity, and wind speeds, along with surface pressure, temperature, humidity, and wind speed at 10 meters. The profile data are provided at six-hour intervals and the surface data at three-hour intervals.

The ozone profile and total column values are daily values obtained from the National Centers for Environmental Prediction (NCEP) Stratospheric Monitoring Group Ozone Blended Analysis (SMOBA) data. The aerosol optical depth data are monthly climatological data based on results from studies conducted by Dr. Larry Stowe (NOAA) and Dr. Rachel Pinker (University of Maryland). As the horizontal resolutions of the ozone and aerosol data are different from that of the meteorological data, the ozone and aerosol data are horizontally interpolated using an area-weighted averaging technique to conform with the meteorological data. There is no temporal interpolation of either the ozone or the aerosol data.

Each MOA record contains the meteorological, ozone, and aerosol data for a single region. The horizontal resolution of the input meteorological data may change with time and source, and thus the number of MOA records may change. Each horizontal grid used for storing the MOA data throughout the lifetime of the CERES project is assigned a grid index number. This value is stored in the first record of each MOA file for reference by the users.

If available, Special Sensor Microwave/Imager (SSM/I) column precipitable water data are also included on the MOA files. These data are obtained from the Global Hydrology Resource Center (GHRC) and stored on the MOA file in their native grid. Skin temperature data obtained from the GMAO files are also stored in the MOA file. Because the horizontal resolution of the SSM/I data is different from that of the GMAO resolution, these data are stored at the end of the MOA files. The SSM/I data are temporally interpolated to the hour using data from multiple satellites carrying the SSM/I imager.

CER12.1.P2 - Regrid MOA Subsystem

The CERES Regrid MOA Subsystem PGE CER12.1P2 is an update of PGE 12.1P1 for Edition3 processing. This PGE uses meteorological data from GMAO on an hourly basis. GMAO data is also used for ozone data and SMOBA is no longer required.

1.0 PGEName: CER12.1P1

CER12.1P1 - CERES Regrid Meteorological, Ozone, and Aerosol (MOA) Subsystem.

1.1 PGE Details

1.1.1 Responsible Persons

Table 1-1. Subsystem Software Analysts Contacts

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

1.1.2 E-mail Distribution List

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

1.1.3 Parent PGE(s)

The Regrid MOA Subsystem is only dependent on outside data sources and has no Parent PGEs within the CERES processing system.

1.1.4 Target PGE(s)

Table 1-2. Target PGEs after CER12.1P1

PGEName	Description
CER4.1-4.1P1	Cloud Property Retrieval and Convolution of Imager Cloud properties with CERES Footprint Point spread function
CER4.5-6.1P1	Inversion to Instantaneous TOA Fluxes and Surface Fluxes
CER9.1P1	Post-Processor for MOA Data, create PMOA
CER5.0P1	Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor.
CER5.1P1	Instantaneous SARB Subsystem Main-Processor.
CER7.2.1P1	Synoptic SARB Subsystem Main-Processor.

1.2 Operating Environment

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

Table 1-3. Runtime Parameters for CER12.1P1

Parameter	Description	Data Type	Valid Values
PCF	Process Control File	PCF name	CER12.1P1_PCF_$SS12_$PS12out_$CC12.yyyymmdd
yyyymmdd	Data Date yyyy = 4-digit year mm = 2-digit month dd = 2-digit day	I(8), where year = I(4) month = I(2) day = I(2)	 > 1996 01 .. 12 01 .. 31

1.2.2 Environment Script Requirements

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

The following environment variable parameters must be set:

SS12 - Sampling Strategy for Regrid MOA: see Production Request
PS12in - Production Strategy for Regrid MOA: see Production Request – Valid PS12in values: GMAO-G5-CERES
PS12out - Production Strategy for Regrid MOA: see Production Request
CC12 - Configuration Code for Regrid MOA: see CM Database
SW12 - SCCR version number for Regrid MOA software: see CM Database
DATA12 - SCCR version number for Regrid MOA input data: see CM Database
G5Stream - Variable to indicate G5 data stream:
Valid values: 0 for sample processing, 1 for reprocessing, 2 for forward processing.
InputCheck - Variable to enable or disable PCF input checking: see CM database
PROD - Yes if being run in production, no if being run in testing

1.2.3 Execution Frequency (daily, hourly, or monthly)

This PGE is processed once per day, a maximum total of 31 days per month. Execution of this PGE for a given day will produce four six-hourly files.

1.2.4 Memory/Disk Space/Time Requirements

1. Execution using Primary Input Meteorological Data Source and Primary Ozone Data Source (G5-CERES and SMOBA)

Memory:	68064 KB
Disk Space:	740 MB
Total Run Time:	1:55 minutes

1.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available.

1.3 Processor Dependencies (Previous PGEs, Ingest Data)

1.3.1 Input Dataset Name (#1): G5-CERES
Available beginning October 2008

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

Reprocessing for December 1, 1997 through March 1, 2000:
$CERESHOME/sarb/data/GMAO/CERES100/yyyy/mm
CERES100.prod.assim.tavg1_2d_slv_Nx.yyyymmdd.hdfa**,**
CERES100.prod.assim.inst6_3d_ana_Np.yyyymmdd.hdfb**,**

Forward processing for February 1, 2000 through 2012:
$CERESHOME/sarb/data/GMAO/CERES200/yyyy/mm
CERES200.prod.assim.tavg1_2d_slv_Nx.yyyymmdd.hdf[a]**,**
CERES200.prod.assim.inst6_3d_ana_Np.yyyymmdd.hdf[b]**,**

where
yyyymmdd equals a four digit year, a two digit month and a two digit day of the PGE run.

a - see file size a in Section 1.3.1e
b - see file size b in Section 1.3.1e

1. Mandatory/Optional: G5-CERES is the primary meteorological input to the RegridMOA subsystem. **Information regarding G5-CERES is in Section 1.3.1**.
2. Time Related Dependency:
   The processing day (*yyyymmdd)* must be available.
3. Waiting Period: **Two weeks unless requested differently by the CERES Team.**

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

Ingest Source: GSFC DAAC

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

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

e. Typical file size (MB):

File Size a = 288 MB
b = 281 MB

1.3.2 Input Dataset Name (#2): SSM/I Microwave Precipitable Water

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

$CERESHOME/sarb/data/GHRC/SSMI/yyyy/
f13_iwva_*yyjp2*_dayAD.hdf, f13_iwva_*yyjp1*_dayAD.hdf,
f13_iwva_*yyjjj*_dayAD.hdf, f13_iwva_*yyjn1*_dayAD.hdf,
f13_iwva_*yyjn2*_dayAD.hdf
f14_iwva_*yyjp2*_dayAD.hdf, f14_iwva_*yyjp1*_dayAD.hdf,
f14_iwva_*yyjjj*_dayAD.hdf, f14_iwva_*yyjn1*_dayAD.hdf,
f14_iwva_*yyjn2*_dayAD.hdf

where
yyjjj equals a 2 digit year and a 3 digit day of year for PGE run.
yyjp1 equals a 2 digit year and a 3 digit day of year for one day prior to PGE run.
yyjp2 equals a 2 digit year and a 3 digit day of year for two days prior to PGE run.
yyjn1 equals a 2 digit year and a 3 digit day of year for next day after PGE run.
yyjn2 equals a 2 digit year and a 3 digit day of year for two days after PGE run.

1. Mandatory/Optional: **Mandatory if available. While the RegridMOA Subsystem may be successfully executed without SSM/I data, if the SSM/I data are available they must be used.**

2. Time Related Dependency:
The processing day (*yyjjj*), previous two days (*yyjp1*, *yyjp2*) and next two days (*yyjn1*, *yyjn2*) must be available.

3. Waiting Period:
Two weeks unless requested differently by the CERES Team. Process when one of the following groups of data sets becomes available:

1.3.1,
1.3.2,
and 1.3.3 (1.3.3.1).

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

Ingest Source: GHRC

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

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

e. Typical file size (MB): **2.2 MB**

1.3.3 Input Dataset Name (#3): Ozone

1.3.3.1 SMOBA

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

$CERESHOME/sarb/data/NCEP/SMOBA/yyyy/mm
oz*yymmdd*.dat
oz*yymmpd*.dat

where ***yymmdd*** equals a 2 digit year, month, and day of PGE run and
yymmpd equals a 2 digit year, month, and day of previous day.

1. Mandatory/Optional: **SMOBA is the primary source for ozone data. If SMOBA ozone data are not available, G5-CERES ozone data described in Section 1.3.1 is used.**
2. Time Related Dependency:
The processing day (*yymmdd*) and previous day (*yymmpd*) must be available.
3. Waiting Period: **When permissions are granted by the CERES Team.**

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

Ingest Source: GSFC DAAC, NCEP

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

N/A

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

e. Typical file size (MB): **2.3 MB**

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

The Regrid MOA Subsystem Main-Processor production script, **run-CER12.1P1.pl**, executes the software that generates the hourly MOA files for the specified run date. This script references a Process Control File (PCF) which contains the correct file names and paths for files used in the execution of the PGE. A separate PCF is required for each execution of the Subsystem. The PCF is created by executing the PCF generator, **CER12.1P1-pcfgen.pl** prior to executing the PGE.

1.4.1 How to Execute the ASCII File and PCF Generators

The PCF generator requires one command-line argument, ***yyyymmdd,***
where yyyymmdd equals a four digit year, a two digit month,
and a two digit day of the PGE run. Refer to Table 1-3.

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

> cd $CERESHOME/sarb/CER12.1P1/rcf
> ./CER12.1P1-pcfgen.pl *yyyymmdd*

The following PCF will be generated in **$CERESHOME/sarb/CER12.1P1/rcf/pcf/:**

CER12.1P1_PCF_$SS12_$PS12out_$CC12.*yyyymmdd*

1.4.2 How to Execute the Main Processor

The Main-Processor script, **run-CER12.1P1.pl**, is executed using the newly created PCF name listed in Section 1.4.1 as the command-line argument.

To run at the command line:

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

> cd $CERESHOME/sarb/CER12.1P1/rcf/
> ./run-CER12.1P1.pl CER12.1P1_PCF_$SS12_$PS12out_$CC12.*yyyymmdd*

To run using SGE:

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

To run a single date:

> cd $CERESHOME/sarb/CER12.1P1/rcf
> CER12.1P1-SGE_Driver.pl –date *yyyymmdd*

To run multiple sequential dates:

> cd $CERESHOME/sarb/CER12.1P1/rcf
> CER12.1P1-SGE_Driver –start *yyyymmdd* –end *yyyymmdd*

To run on a specific platform using SGE:

Note: The variable *cpu* represents the desired platform. It is either *x86* or *P6*.

To run a single date:

> cd $CERESHOME/sarb/CER12.1P1/rcf
> CER12.1P1-SGE_Driver.pl –date *yyyymmdd* –platform *cpu*

To run multiple sequential dates:

> cd $CERESHOME/sarb/CER12.1P1/rcf
> CER12.1P1-SGE_Driver –start *yyyymmdd* –end *yyyymmdd* –platform *cpu*

1.4.3 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 12.0 software. All output files listed in Section 1.6 for the reprocessing run must be removed before execution of the software. These files can be removed by executing the script, rm_script_12.1P1, using the PCF name listed in Section 1.4.2 as the command-line argument.

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

> cd $CERESHOME/sarb/CER12.1P1/rcf
> ./cleanup-CER12.1P1.pl CER12.1P1_PCF_$SS12_$PS12out_$CC12.*yyyymmdd*

1.5 Execution Evaluation

1.5.1 Exit Codes

The processor CER12.1P1 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System.

Table 1-4. Exit Codes for CER12.1P1

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

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

When running the production script, runmoa, the system message, "UX:rm: ERROR: Cannot access test: No such file or directory", may be written to the screen. This message occurs when the scripts try to remove an old output file that does not exist. This does not signify a problem.

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

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/sarb/runlogs/CER12.1P1**.

1. **Report Log File: CER12.1P1_LogReport_$SS12_$PS12out_$CC12.*yyyymmdd***

The Report Log File contains Subsystem 12.0 related messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal). A comprehensive list of the messages that can be generated during the execution of the PGE is contained in Appendix B.

2. **Status Log File: CER12.1P1_LogStatus_$SS12_$PS12out_$CC12.*yyyymmdd***

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

3. **User Log File: CER12.1P1_LogUser_$SS12_$PS12out_$CC12.*yyyymmdd***

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

1.5.4 Solutions to Possible Problems

As mentioned in Section 1.4.3, all output files are opened with Status = NEW in Subsystem 12.0 software. These files must be removed before reprocessing.

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

a. Subsystem Termination

   There are no foreseeable Subsystem terminating conditions at this time. If one day fails, continue processing the next day.

b. Target PGE Termination

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

1.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process once per day, producing four 6-hour data files per run. The binary output file sizes for a daily run are dependent on the meteorological input data source.

Table 1-5. Expected Output File Listing for CER12.1P1

File Name/Directory[a]	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_MOA_$SS12_$PS12out_$CC12.*yyyymmddhh* (.met)@($CERESHOME/sarb/data/CERES/MOA/ CERES_$SS12_$PS12out/yyyy/mm)	m	42.0	4/day	4.1-4.1P1, 4.5-6.1P1, 9.1P1, 5.0P1, 5.1P1, 7.2.1P1 through 7.2.1P8	Archive	No
CER_PQCR_$SS12_$PS12out_$CC12.*yyyymmdd* (.met) @($CERESHOME/sarb/data/CERES/PQCR/CERES_ $SS12_$PS12out/yyyy/mm)	m	.02	1/day	N/A	rm	No
CER_PCF_$SS12_$PS12out_$CC12.*yyyymmdd* @($CERESHOME/sarb/CER12.1P1/rcf/pcf)	m	.01	1/day	N/A	Archive, rm	No
CER_LogReport_$SS12_$PS12out_$CC12.*yyyymmdd* @($CERESHOME/sarb/runlogs/CER12.1P1)	m	.003	1/day	N/A	rm	No
CER_LogStatus_$SS12_$PS12out_$CC12.*yyyymmdd* @($CERESHOME/sarb/runlogs/CER12.1P1)	m	.01	1/day	N/A	rm	No
CER_LogUser_$SS12_$PS12out_$CC12.*yyyymmdd* @($CERESHOME/sarb/runlogs/CER12.1P1)	m	.001	1/day	N/A	rm	No

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

b. rm - remove
m - mandatory output
o - optional output

2.0 PGEName: CER12.1P2

CER12.1P2 - CERES Regrid Meteorological, Ozone, and Aerosol (MOA) Subsystem.

2.1 PGE Details

2.1.1 Responsible Persons

Table 2-1. Subsystem Software Analysts Contacts

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

2.1.2 E-mail Distribution List

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

2.1.3 Parent PGE(s)

The Regrid MOA Subsystem is only dependent on outside data sources and has no Parent PGEs within the CERES processing system.

2.1.4 Target PGE(s)

Table 2-2. Target PGEs after CER12.1P2

PGEName	Description
CER4.1-4.1P1	Cloud Property Retrieval and Convolution of Imager Cloud properties with CERES Footprint Point spread function
CER4.5-6.1P1	Inversion to Instantaneous TOA Fluxes and Surface Fluxes
CER9.1P1	Post-Processor for MOA Data, create PMOA
CER5.0P1	Instantaneous SARB Subsystem Surface Albedo Monthly Pre-Processor.
CER5.1P1	Instantaneous SARB Subsystem Main-Processor.
CER7.2.1P1	Synoptic SARB Subsystem Main-Processor.

2.2 Operating Environment

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

Table 2-3. Runtime Parameters for CER12.1P2

Parameter	Description	Data Type	Valid Values
PCF	Process Control File	PCF name	CER12.1P2_PCF_$SS12_$PS12out_$CC12.yyyymmdd
yyyymmdd	Data Date yyyy = 4-digit year mm = 2-digit month dd = 2-digit day	I(8), where year = I(4) month = I(2) day = I(2)	 > 1996 01 .. 12 01 .. 31

2.2.2 Environment Script Requirements

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

The following environment variable parameters must be set:

SS12	-	Sampling Strategy for Regrid MOA: see Production Request
PS12in	-	Production Strategy for Regrid MOA: see Production Request – Valid PS12in values: GMAO-G5-CERES
PS12out	-	Production Strategy for Regrid MOA: see Production Request
CC12	-	Configuration Code for Regrid MOA: see CM Database
SW12	-	SCCR version number for Regrid MOA software: see CM Database
DATA12	-	SCCR version number for Regrid MOA input data: see CM Database
OZ12	-	Variable to indicate source of ozone data: see CM database
G5Stream	-	Variable to indicate G5 data stream: Valid values: 0 for sample processing, 1 for reprocessing, 2 for forward processing.
InputCheck	-	Variable to enable or disable PCF input checking: see CM database
PROD	-	Yes if being run in production, no if being run in testing
InputArchive	-	Variable to set location of input data: see Production Request
OutputArchive	-	Variable to set location of output data: see Production Request

2.2.3 Execution Frequency (daily, hourly, or monthly)

This PGE is processed once per day, a maximum total of 31 days per month. Execution of this PGE for a given day will produce four six-hourly files.

2.2.4 Memory/Disk Space/Time Requirements

1. Execution using Primary Input Meteorological Data Source and Primary Ozone Data Source (G5-CERES and SMOBA)

Memory:	68064 KB
Disk Space:	840 MB
Total Run Time:	3:42 minutes

2.2.5 Restrictions Imposed in Processing Order

None. Process when Input Data are available.

2.3 Processor Dependencies (Previous PGEs, Ingest Data)

2.3.1 Input Dataset Name (#1): G5-CERES
Available beginning October 2008

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

Reprocessing for December 1, 1997 through March 1, 2000:
$CERESHOME/sarb/data/GMAO/CERES054/yyyy/mm
G541CER10.prod.assim.tavg1_2d_slv_Nx.yyyymmdd.hdfa**,**
G541CER10.prod.assim.inst3_3d_asm_Np.yyyymmdd.hdfb**,**

Forward processing for February 1, 2000 through 2012:
$CERESHOME/sarb/data/GMAO/CERES054/yyyy/mm
G541CER20.prod.assim.tavg1_2d_slv_Nx.yyyymmdd.hdf[a]**,**
G541CER20.prod.assim.inst3_3d_asm_Np.yyyymmdd.hdf[b]**,**

where
yyyymmdd equals a four digit year, a two digit month and a two digit day of the PGE run.

a - see file size a in Section 2.3.1e
b - see file size b in Section 2.3.1e

1. Mandatory/Optional: G5-CERES is the primary meteorological input to the RegridMOA subsystem. **Information regarding G5-CERES is in Section 2.3.1**.
2. Time Related Dependency:
   The processing day (*yyyymmdd)* must be available.
3. Waiting Period: **Two weeks unless requested differently by the CERES Team.**

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

Ingest Source: GSFC DAAC

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

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

e. Typical file size (MB):

File Size a = 288 MB
b = 284 MB

2.3.2 Input Dataset Name (#2): SSM/I Microwave Precipitable Water

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

$CERESHOME/sarb/data/GHRC/SSMI/yyyy
f13_iwva_*yyjp2*_dayAD.hdf, f13_iwva_*yyjp1*_dayAD.hdf,
f13_iwva_*yyjjj*_dayAD.hdf, f13_iwva_*yyjn1*_dayAD.hdf,
f13_iwva_*yyjn2*_dayAD.hdf
f14_iwva_*yyjp2*_dayAD.hdf, f14_iwva_*yyjp1*_dayAD.hdf,
f14_iwva_*yyjjj*_dayAD.hdf, f14_iwva_*yyjn1*_dayAD.hdf,
f14_iwva_*yyjn2*_dayAD.hdf

where
yyjjj equals a 2 digit year and a 3 digit day of year for PGE run
yyjp1 equals a 2 digit year and a 3 digit day of year for one day prior to PGE run.
yyjp2 equals a 2 digit year and a 3 digit day of year for two days prior to PGE run.
yyjn1 equals a 2 digit year and a 3 digit day of year for next day after PGE run.
yyjn2 equals a 2 digit year and a 3 digit day of year for two days after PGE run.

1. Mandatory/Optional: **Mandatory if available. While the RegridMOA Subsystem may be successfully executed without SSM/I data, if the SSM/I data are available they must be used.**

2. Time Related Dependency:
The processing day (*yyjjj*), previous two days (*yyjp1*, *yyjp2*) and next two days (*yyjn1*, *yyjn2*) must be available.

3. Waiting Period:
Two weeks unless requested differently by the CERES Team. Process when one of the following groups of data sets becomes available:

2.3.1,
2.3.2,
and 2.3.3 (2.3.3.1).

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

Ingest Source: GHRC

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

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

e. Typical file size (MB): **2.2 MB**

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

The Regrid MOA Subsystem Main-Processor production script, **run-CER12.1P2.pl**, executes the software that generates the hourly MOA files for the specified run date. This script references a Process Control File (PCF) which contains the correct file names and paths for files used in the execution of the PGE. A separate PCF is required for each execution of the Subsystem. The PCF is created by executing the PCF generator, **CER12.1P2-pcfgen.pl** prior to executing the PGE..

2.4.1 How to Execute the ASCII File and PCF Generators

The PCF generator requires one command-line argument, ***yyyymmdd,***
where yyyymmdd equals a four digit year, a two digit month,
and a two digit day of the PGE run. Refer to Table 2-3.

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

> cd $CERESHOME/sarb/CER12.1P2/rcf
> ./CER12.1P2-pcfgen.pl *yyyymmdd*

The following PCF will be generated in **$CERESHOME/sarb/CER12.1P2/rcf/pcf/:**

CER12.1P2_PCF_$SS12_$PS12out_$CC12.*yyyymmdd*

2.4.2 How to Execute the Main Processor

The Main-Processor script, **run-CER12.1P2.pl**, is executed using the newly created PCF name listed in Section 2.4.1 as the command-line argument.

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

To run at the command line:

> cd $CERESHOME/sarb/CER12.1P2/rcf/
> ./run-CER12.1P2.pl CER12.1P2_PCF_$SS12_$PS12out_$CC12.*yyyymmdd*

To run using SGE:

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

To run a single date:

> cd $CERESHOME/sarb/CER12.1P2/rcf
> CER12.1P2-SGE_Driver.pl –date *yyyymmdd*

To run multiple sequential dates:

> cd $CERESHOME/sarb/CER12.1P2/rcf
> CER12.1P2-SGE_Driver –start *yyyymmdd* –end *yyyymmdd*

To run on a specific platform using SGE:

Note: The variable *cpu* represents the desired platform. It is either *x86* or *P6*.

To run a single date:

> cd $CERESHOME/sarb/CER12.1P2/rcf
> CER12.1P2-SGE_Driver.pl –date *yyyymmdd* –platform *cpu*

To run multiple sequential dates:

> cd $CERESHOME/sarb/CER12.1P2/rcf
> CER12.1P2-SGE_Driver –start *yyyymmdd* –end *yyyymmdd* –platform *cpu*

2.4.3 Special Reprocessing Instructions

All output files are opened with Status = NEW in Subsystem 12.0 software. All output files listed in Section 2.6 for the reprocessing run must be removed before execution of the software. These files can be removed by executing the script, cleanup-CER12.1P2, using the PCF name listed in Section 2.4.2 as the command-line argument.

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

> cd $CERESHOME/sarb/CER12.1P2/rcf
> ./cleanup-CER12.1P2.pl CER12.1P2_PCF_$SS12_$PS12out_$CC12.*yyyymmdd*

2.5 Execution Evaluation

2.5.1 Exit Codes

The processor CER12.1P2 terminates using the CERES-defined EXIT CODES for the Langley TRMM Information System.

Table 2-4. Exit Codes for CER12.1P2

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

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

When running the production script, runmoa, the system message, "UX:rm: ERROR: Cannot access test: No such file or directory", may be written to the screen. This message occurs when the scripts try to remove an old output file that does not exist. This does not signify a problem.

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

The Log files contain all error and/or status messages produced by the PGE. The files are located in directory: **$CERESHOME/sarb/runlogs/CER12.1P2/**.

1. **Report Log File: CER12.1P2_LogReport_$SS12_$PS12out_$CC12.*yyyymmdd***

The Report Log File contains Subsystem 12.0 related messages. These messages may be strictly informative (Error Type = Status or Warning) or may indicate a fatal condition that results in premature PGE termination (Error Type = Fatal). A comprehensive list of the messages that can be generated during the execution of the PGE is contained in Appendix B.

2. **Status Log File: CER12.1P2_LogStatus_$SS12_$PS12out_$CC12.*yyyymmdd***

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

3. **User Log File: CER12.1P2_LogUser_$SS12_$PS12out_$CC12.*yyyymmdd***

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

2.5.4 Solutions to Possible Problems

As mentioned in Section 2.4.3, all output files are opened with Status = NEW in Subsystem 12.0 software. These files must be removed before reprocessing.

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

a. Subsystem Termination

   There are no foreseeable Subsystem terminating conditions at this time. If one day fails, continue processing the next day.

b. Target PGE Termination

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

2.6 Expected Output Dataset(s)

The expected Output Datasets are listed below for each instance of the PGE. This PGE is expected to process once per day, producing four 6-hour data files per run. The binary output file sizes for a daily run are dependent on the meteorological input data source.

Table 2-5. Expected Output File Listing for CER12.1P2

File Name/Directory[a]	m/o	File Size (MB)	Freq/ PGE	Target PGE	Destination[b]	Available Through Ordering Tool
CER_MOA_$SS12_$PS12out_$CC12.*yyyymmddhh* (.met) @($CERESHOME/sarb/data/CERES/MOA/CERES_ $SS12_$PS12out/yyyy/mm)	m	70.0	4/day	4.1-4.1P1, 4.5-6.1P1, 9.1P1, 5.0P1, 5.1P1, 7.2.1P1 through 7.2.1P8	Archive	No
CER_PQCR_$SS12_$PS12out_$CC12.*yyyymmdd*(.met) @($CERESHOME/sarb/data/CERES/PQCR/CERES_ $SS12_$PS12out/yyyy/mm)	m	.02	1/day	N/A	rm	No
CER_PCF_$SS12_$PS12out_$CC12.*yyyymmdd* @($CERESHOME/sarb/CER12.1P2/rcf/pcf)	m	.01	1/day	N/A	Archive, rm	No
CER_LogReport_$SS12_$PS12out_$CC12.*yyyymmdd* @($CERESHOME/sarb/runlogs/CER12.1P2)	m	.003	1/day	N/A	rm	No
CER_LogStatus_$SS12_$PS12out_$CC12.*yyyymmdd* @($CERESHOME/sarb/runlogs/CER12.1P2)	m	.01	1/day	N/A	rm	No
CER_LogUser_$SS12_$PS12out_$CC12.*yyyymmdd* @($CERESHOME/sarb/runlogs/CER12.1P2)	m	.001	1/day	N/A	rm	No

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

b. rm - remove
m - mandatory output
o - optional output

References

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

Appendix A
Acronyms and Abbreviations

ASDC	Atmospheric Science Data Center
CERES	Clouds and the Earth's Radiant Energy System
DAAC	Distributed Active Archive Center
DAS	Data Assimilation System
ECMWF	European Centre for Medium-Range Weather Forecasting
EOS	Earth Observing System
EOS-AM	EOS Morning Crossing Mission
EOS-PM	EOS Afternoon Crossing Mission
EP-TOMS	Earth Probe - Total Ozone Mapping Spectrometer
ERBE	Earth Radiation Budget Experiment
ERBS	Earth Radiation Budget Satellite
GHRC	Global Hydrology Resource Center
GMAO	Global Modeling and Assimilation Office
GSFC	Goddard Space Flight Center
LaRC	Langley Research Center
LaTIS	Langley TRMM Information System
MB	Megabytes
met	metadata file
μm	microns
MOA	Meteorological, Ozone, and Aerosol
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NCEP	National Centers for Environmental Prediction
NOAA	National Oceanic and Atmospheric Administration
OMI	Ozone Monitoring Instrument
PCF	Process Control File
PGE	Product Generation Executives
QC	Quality Control
SMOBA	Stratospheric Monitoring Group Ozone Blended Analysis
SSAI	Science Systems and Applications Incorporated
SSM/I	Special Sensor Microwave/Imager
TRMM	Tropical Rainfall Measuring Mission

Appendix B
Error Messages

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

Table B-1 contains a list of the PGE CER12.1P1 and CER12.1P2 diagnostic messages. Each table entry includes the message, a description of the message, and an action number.

Operator Instructions:

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

1. Look at the last few records on the LogStatus file discussed in Section 1.5.3.
2. Find the error message in the Error Message listing(s), and follow the appropriate ACTION.
3. If there is no error message present in the LogStatus File, then repeat steps 1 and 2 using the LogReport File.
4. If no information is derived, then call the responsible person in Table 1-1.
5. If the appropriate ACTION failed, then call the responsible person in Table 1-1.
6. In all cases, log all steps that were taken after the PGE failure, and send a copy to the responsible person listed in Table 1-1.

Action Codes for Table B-1: (Note if an ACTION does not work, call the Responsible Person in Table 1-1.)

1. Verify that file exists.
2. Verify that the file size is correct.
3. Check the PCF ascii input file and PCF file for correctness.
4. No Action, notify the Responsible Person in Table 1-1.
5. No Action, message is for information only and does not affect data production.

Table B-1. Example of TK (SMF) Utility Message Table

Message / Description	Action Code
***Subroutine Name()*: Error ... Invalid Arguments.** An algorithm error has occurred in sphertlib3.	4
***Subroutine Name()*: Error ... Invalid Character Flag.** An invalid flag value was passed into the subroutine.	4
***Subroutine Name()*: Error ... Invalid Date.** The software to determine the type of season given an integer version of the data date failed.	4
***Subroutine Name()*: Error ... Invalid Grid Index Number.** Software was unable to identify existing output grid.	4
***Subroutine Name()*: Error ... Invalid Hour Number.** An invalid hour value was passed into the subroutine.	4
***Subroutine Name()*: Error ... Invalid IDIR Value.** An algorithm error has occurred in sphertlib3.	4
***Subroutine Name()*: Error ... Invalid ITER Value.** An algorithm error has occurred in sphertlib3.	4
***Subroutine Name()*: Error ... Invalid LIMWV Value.** An algorithm error has occurred in sphertlib3.	4
***Subroutine Name()*: Error ... Invalid LIMWVX Value.** An algorithm error has occurred in sphertlib3.	4
***Subroutine Name()*: Error ... Unable to close Column Aerosol file.** The file listed in the PCF for logic ID # 16 was not closed.	4
***Subroutine Name()*: Error ... Unable to close Column Ozone file.** A file listed in the PCF for logic ID # 500 or 501 was not closed.	4
***Subroutine Name()*: Error ... Unable to close DAO data file.** A file listed in the PCF for logic IDs # 101 through 133 was not closed.	4
***Subroutine Name()*: Error ... Unable to close NGrid12 file.** The file listed in the PCF for logic ID # 2 was not closed.	4
***Subroutine Name()*: Error ... Unable to close Ozone Weight file.** The file listed in the PCF for logic ID # 1 was not closed.	4
***Subroutine Name()*: Error ... Unable to close RegCenters file.** The file listed in the PCF for logic ID # 3 was not closed.	4
***Subroutine Name()*: Error ... Unable to close SAGE data file.** The file listed in the PCF for logic ID # 15 was not closed.	4
***Subroutine Name()*: Error ... Unable to close SKIN TEMP file.** A file listed in the PCF for logic IDs # 300 through 304 was not closed.	4

Table B-1. Example of TK (SMF) Utility Message Table

Message / Description	Action Code
***Subroutine Name()*: Error ... Unable to GetParam Req_DataDay from PCF.** The software was unable to retrieve the data day given in the PCF for logic ID # 146.	3
***Subroutine Name()*: Error ... Unable to GetParam Req_DataMonth from PCF.** The software was unable to retrieve the data month given in the PCF for logic ID # 145.	3
***Subroutine Name()*: Error ... Unable to GetParam Req_DataYear from PCF.** The software was unable to retrieve the data year given in the PCF for logic ID # 144.	3
***Subroutine Name()*: Error ... Unable to open Column Aerosol file.** The file listed in the PCF for logic ID # 16 was not opened.	1,3
***Subroutine Name()*: Error ... Unable to open Column Ozone file.** A file listed in the PCF for logic ID # 500 or 501 was not opened.	1,3
***Subroutine Name()*: Error ... Unable to open NGrid12 file.** The file listed in the PCF for logic ID # 2 was not opened.	1,3
***Subroutine Name()*: Error ... Unable to open Ozone Weight file.** The file listed in the PCF for logic ID # 1 was not opened.	1,3
***Subroutine Name()*: Error ... Unable to open RegCenters file.** The file listed in the PCF for logic ID # 3 was not opened.	1,3
***Subroutine Name()*: Error ... Unable to open SAGE data file.** The file listed in the PCF for logic ID # 15 was not opened.	1,3
***Subroutine Name()*: Error ... Unable to open SKIN TEMP file.** A file listed in the PCF for logic IDs # 300 through 304 was not opened.	1,3
***Subroutine Name()*: Error ... Unable to read Column Aerosol file.** The file listed in the PCF for logic ID # 16 was not read.	2
***Subroutine Name()*: Error ... Unable to read Column Ozone file.** A file listed in the PCF for logic ID # 500 or 501 was not read.	2
***Subroutine Name()*: Error ... Unable to read DAO data file.** A file listed in the PCF for logic IDs # 101 through 133 was not read.	2
***Subroutine Name()*: Error ... Unable to read DAO1_grid.** The DAO1 Grid Namelist was not read from the NGrid12 file listed in the PCF for logic ID # 2.	2
***Subroutine Name()*: Error ... Unable to read DAO2_grid.** The DAO2 Grid Namelist was not read from the NGrid12 file listed in the PCF for logic ID # 2.	2
***Subroutine Name()*: Error ... Unable to read DAO3_grid.** The DAO3 Grid Namelist was not read from the NGrid12 file listed in the PCF for logic ID # 2.	2

Table B-1. Example of TK (SMF) Utility Message Table

Message / Description	Action Code
***Subroutine Name()*: Error ... Unable to read EPToms_Grid.** The EPToms Grid Namelist was not read from the NGrid12 file listed in the PCF for logic ID # 2.	2
***Subroutine Name()*: Error ... Unable to read MW_Grid.** The Microwave Grid Namelist was not read from the NGrid12 file listed in the PCF for logic ID # 2.	2
***Subroutine Name()*: Error ... Unable to read Ozone Weight file.** The file listed in the PCF for logic ID # 1 was not read.	2
***Subroutine Name()*: Error ... Unable to read Pinker_Grid.** The Pinker Grid Namelist was not read from the NGrid12 file listed in the PCF for logic ID # 2.	2
***Subroutine Name()*: Error ... Unable to read SAGE data file.** The file listed in the PCF for logic ID # 15 was not read.	2
***Subroutine Name()*: Error ... Unable to read SKIN TEMP file.** A file listed in the PCF for logic IDs # 300 through 304 was not read.	2
***Subroutine Name()*: Error ... Unable to read SMOBA_Grid.** The Microwave Grid Namelist was not read from the NGrid12 file listed in the PCF for logic ID # 2.	2
***Subroutine Name()*: Error ... Unable to read Stowe_Grid.** The Stowe Grid Namelist was not read from the NGrid12 file listed in the PCF for logic ID # 2.	2
***Subroutine Name()*: Error ... Unable to open ECMWF data file.** A file listed in the PCF for logic IDs # 351 through 361 was not opened.	1,3
***Subroutine Name()*: Error ... Unable to read ECMWF data file.** A file listed in the PCF for logic IDs # 351 through 361 could not be read.	2
***Subroutine Name()*: Error ... Unable to open DAO SPHU file.** A file listed in the PCF for logic IDs # 110 or 130 could not be opened.	1,3
***Subroutine Name()*: Error ... Unable to open DAO TMPU file.** A file listed in the PCF for logic IDs #111 or # 131 could not be opened.	1,3
***Subroutine Name()*: Error ... Unable to setup the GRIB Interpolation.** ECMWF library call to setup output fields has failed.	4
***Subroutine Name()*: Error ... Read to END of data file.** Data was not found in one of the files listed in the PCF for logic IDs # 351 through 361.	2,3
***Subroutine Name()*: Error ... Unable to retrieve buffer from GRIB file.** ECMWF library call to read packed data has failed.	4
***Subroutine Name()*: Error ... Unable to GRIB header information.** Header information from ECMWF file (logic IDs # 351 to 361) was not retrieved.	2,3

Table B-1. Example of TK (SMF) Utility Message Table

Message / Description	Action Code
***Subroutine Name()*: Error ... Unable to interpolate buffer data.** ECWMF library call to interpolate GRIB data to native Gaussian grid has failed.	4
***Subroutine Name()*: Error ... Unable to close ECMWF data file.** A file listed in the PCF for logic IDs # 351 through 361 was not closed.	4
***Subroutine Name()*: Error ... Unable to read DAO2 surface data file.** A file listed in the PCF for logic IDs # 175 through 178 could not be read.	1,2,3
***Subroutine Name()*: Error ... Unable to read DAO2 profile data file.** A file listed in the PCF for logic IDs # 175 through 178 could not be read.	1,2,3
***Subroutine Name()*: Error ... Unable to read DAO3 surface data file.** A file listed in the PCF for logic IDs # 179 through 182 could not be read.	1,2,3
***Subroutine Name()*: Error ... Unable to read DAO3 profile data file.** A file listed in the PCF for logic IDs # 179 through 182 could not be read.	1,2,3
***Subroutine Name()*: Error ... Unable to get DAO2 data file identifier.** A filename for logic IDs # 175 through 178 could not be retrieved.	4
***Subroutine Name()*: Error ... Unable to get DAO3 data file identifier.** A filename for logic IDs # 179 through 182 could not be retrieved.	4
***Subroutine Name()*: Notice ... Invalid Latitude Number.** An invalid Co-Latitude value was passed into the subroutine.	5
***Subroutine Name()*: Notice ... Successful completion of code.** A notice for successful completion of software with no known problems.	5
***Subroutine Name()*: Notice ... Unable to average SSMI data.** A notice for an algorithm problem in averaging the SSMI data.	5
***Subroutine Name()*: Notice ... Unable to Close DAO input file.** A file listed in the PCF for logic IDs # 101 through 133 was not closed.	4,5
***Subroutine Name()*: Notice ... Unable to close Data file.** The file listed in the PCF for logic ID # 900 was not closed.	4
***Subroutine Name()*: Notice ... Unable to close file.** A file listed in the PCF for logic ID # 400, 401, 500 or 501 was not closed.	5
***Subroutine Name()*: Notice ... Unable to close MW data file.** A file listed in the PCF for logic IDs # 30 through 34 or logic IDs # 40 through 44 was not closed.	5
***Subroutine Name()*: Notice ... Unable to close Primary ColO3 data.** A file listed in the PCF for logic ID # 400 or 401 was not closed. This is a notice to report a failure with the Primary Ozone data set and continue using the Secondary data set listed in the PCF for logic ID # 500 and 501.	5
***Subroutine Name()*: Notice ... Unable to Get file name from PCF.** A file name listed in the PCF for logic IDs # 30 through 34 or logic IDs # 40 through 44 was not retrieved.	3

Table B-1. Example of TK (SMF) Utility Message Table

Message / Description	Action Code
Subroutine Name(): Notice ... Unable to open DAO data file. A file listed in the PCF for logic IDs # 101 through 133 was not opened.	1,3,5
***Subroutine Name()*: Notice ... Unable to open Data file.** The file listed in the PCF for logic ID # 900 was not opened.	3
***Subroutine Name()*: Notice ... Unable to open MW data file.** A file listed in the PCF for logic IDs # 30 through 34 or logic IDs # 40 through 44 was not opened.	1,3
***Subroutine Name()*: Notice ... Unable to open NVAP data file.** The file listed in the PCF for logic ID # 17 was not opened.	1,3
***Subroutine Name()*: Notice ... Unable to open Primary ColO3 data.** A file listed in the PCF for logic ID # 400 or 401 was not opened. This is a notice to report a failure with the Primary Ozone data set and continue using the Secondary data set listed in the PCF for logic ID # 500 and 501.	1,3,5
***Subroutine Name()*: Notice ... Unable to read MW data file.** A file listed in the PCF for logic IDs # 30 through 34 or logic IDs # 40 through 44 was not read.	2
***Subroutine Name()*: Notice ... Unable to read NVAP data file.** The file listed in the PCF for logic ID # 17 was not read.	2
***Subroutine Name()*: Notice ... Unable to read Primary ColO3 data.** A file listed in the PCF for logic ID # 400 or 401 was not read. This is a notice to report a failure with the Primary Ozone data set and continue using the Secondary data set listed in the PCF for logic ID # 500 and 501.	2
***Subroutine Name()*: Notice ... Unable to close ECMWF data file.** A file listed in the PCF for logic IDs # 351 through 361 was not closed.	4
***Subroutine Name()*: Warning ... Unable to write MOA_header.** The MOA Header Structure failed to write to the first record of the MOA output file listed in the PCF for logic IDs # 1000 through 1023 or 351 through 361.	4,5
***Subroutine Name()*: Warning ... Unable to Open MOA file.** One of the MOA output product files could not be opened.	1,3