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JASON Geophysical Data Record (GDR) Processing

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Foreword

This document is a compendium of the WFF JASON Software Development Team's knowledge regarding Geophysical Data Record (GDR) Processing. It includes many elements of a Requirements Document, a Software Specification Document, a Software Design Document, and a User's Manual. In the more technical sections, this document assumes the reader is familiar with JASON and GDR files.

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Section 1
Introduction

1.1 Purpose

This document provides a detailed description of the CNES/NASA JASON-1 Interim Geophysical Data Record (IGDR) and Geophysical Data Record (GDR) processing at NASA Goddard Space Flight Center's Wallops Flight Facility (WFF).

Reference will be made to I/GDR in this document when the information is relevant for both products.

Section 2

Related Documentation

2.1 Publications

D.W. Lockwood, D.W. Hancock III, G.S. Hayne and R.L. Brooks, *TOPEX Radar Altimeter Engineering Assessment Report, Update: From Side B Turn-On to January 1, 2003*, May 2003. [http://topex.wff.nasa.gov/docs.html]

N. Tran, D.W. Hancock III, G.S. Hayne, D.W. Lockwood, et al., *Assessment of the Cycle-Per-Cycle Noise Level of the Geosat Follow-On, TOPEX, and Poseidon Altimeters*, September 2001. [http://gfo.wff.nasa.gov/docs.html]

N. Picot, K. Case, S. Desai and P. Vincent, 2001, "AVISO and PODAAC User Handbook. IGDR and GDR Jason Products", SMM-MU-M5-OP-13184-CN (AVISO), (PODAAC) JPL D-21352.

Section 3

Geophysical Data Record Files

3.1 Definition

The I/GDR is an Off-Line (OFL) geophysical product generated from operational and science telemetry from: (a) the Poseidon-2 altimeter on JASON-1; (b) processed DORIS (Doppler Orbitography and Radiopositioning Integrated by Satellite) data for the JASON-1 orbit; and (c) telemetry from the JASON-1 Microwave Radiometer (JMR). The I/GDR contains all the modeled environmental and geophysical corrections. Instrument corrections have been applied to I/GDR data. Furthermore, dedicated ground re-tracking has been performed on the waveforms to improve accuracy of the product. The meteorological corrections have been computed using predicted meteorological fields for the IGDR and analyzed meteorological fields for the GDR.

The I/GDR is a non-fully-validated product that contains data for both bands (Ku and C) at a rate of 1 Hz and 20 Hz. It is structured in pass files (pole to pole structure).

The GDR is identical to the IGDR except for the following points:

- a more precise orbit is used
- improved pole location data are used
- analyzed meteorological fields are used
- it is a fully validated product

A detailed file description can be found in the "AVISO and PODAAC User Handbook. IGDR and GDR Jason Products" document.

3.2 Distribution

I/GDR files are distributed through the Physical Oceanography Distributed Active Archive Center (PODAAC) at the Jet Propulsion Laboratory (JPL). I/GDR's are retrieved using standard FTP protocols and are processed by WFF.

3.3 Storage

A single I/GDR pass file requires approximately 1.5 megabytes of disk storage. A full cycle of I/GDR pass files consumes approximately 381 megabytes of disk space. When a complete cycle, 254 passfiles, have been received, the cycle is archived to a DLT tape.

Section 4

I/GDR Processing Components

4.1 Components of Processing

The WFF processing program for the I/GDR data is called **IGDR_reader** and is written in Fortran 90. This program is capable of calling four separate processing types with various parameters. Table 4-1 "Processing Modules and Parameters", lists the modules called and the corresponding parameters.

Table 4-1 Processing Modules and Parameters

Process Type	Proc_Type	Time Parameter	Filter
Product Dump	WriteProd	Listing of all parameters (raw), full rate	no filtering
Algorithm Dump	WriteAlg	Listing of all parameters (scaled), full rate	no filtering
Science Averaging	GeoAverage	Any selected time averaging (scaled)	filtered
Science Database	WriteDB	60 second average (scaled)	filtered

4.2 Processing by Control File

The input to the IGDR_reader program is a control file that is generated by hand. The format is standard "keyword=value" method; it should be consistent with the following conventions:

- The start of a control file is delimited by an "=" in the first character position. The value after the "=" defines the name of the processor.
- Keywords and values (except for filenames) are not case sensitive.
- Comments must be preceded by the "#" sign.
- Blank lines are allowed, but not recommended.

Table 4-2 "Control File Keyword/Value" lists acceptable keyword/value combinations for the IGDR_reader.

Table 4-2 Control File Keyword/Value

=IGDR_reader	Name of Processor to be used
EXEC_KEY	(sequence:string)
DATE_GENERATED	(date:string)
OPERATOR	(userid:string)
INPUT_FILE	(filename:string)(starttime:float)(stoptime:float) or (all:string)
OUTPUT_FILE	(filename:string)(starttime:float)(stoptime:float) or (all:string)

Table 4-2 Control File Keyword/Value (Continued)

PROC_TYPE	WriteProd
PROC_TYPE	WriteAlg
PROC_TYPE	WriteDB
PROC_TYPE	GEOAverage
AVG_OPT	(average rate: integer); -1 for full rate (default = 60)

See Appendix A, "Control File Examples", for examples of a control file used for processing each process type listed in Table 4-3.

4.2.1 Control File Input Products

The I/GDR product filenames used in control files follow the file naming convention shown below:

IGDR files: **JA1_IGD_2P*v*P*ccc_ppp*.CNES**

GDR files: **JA1_GDR_2P*v*P*ccc_ppp*.CNES**

where ***v*** is the version, ***ccc*** is the cycle number, and ***ppp*** is the pass number

For example, an IGDR file for cycle 25, pass 113 would be named **JA1_IGD_2PaP025_113.CNES**.

The I/GDR product formats are defined in the "AVISO and PODAAC User Handbook. IGDR and GDR Jason Products" document.

4.2.2 Control File Output Products

See Table 4-2, for the various types of output available. Output filenames have a set prefix for each process type as shown in Table 4-3 "Processing Modules and Output" on page 4-3.

For example, an output Product Dump file for the above IGDR file for cycle 25, pass 113 would be named **PRD_IGD_2PaP025_113.CNES**.

See Appendix B for various output file formats and Appendix A for additional examples of control files.

4.2.3 Execution Using Control File

The control file is the only input argument when running the IGDR_reader. There are no fixed rules for naming the control files used by the IGDR_reader as long as the control file contains the desired control keywords listed in Table 4-2, Control File Keyword/Value, and values are defined. An example of a command line using the control file **control.alg** is:

IGDR_reader **control.alg**

Table 4-3 Processing Modules and Output

Process Type	Proc_Type	Data Type Output (Filename Prefix)	Data Type Format
Product Dump	WriteProd	PRD_IGD PRD_GDR	Single line listing of all variables and values. (Appendix F.4)
Algorithm Dump	WriteAlg	ALG_IGD ALG_GDR DMP_IGD DMP_GDR	Single line listing of each variable and value. (Appendix F.5) Dump Format (Appendix B.4) Dump Format (Appendix B.4)
Science Averaging	GeoAverage	AVG_HDR AVG_IGD AVG_GDR	Header Format (Appendix B.1) Average Format (Appendix B.3) Average Format (Appendix B.3)
Science Database	WriteDB	DBF_HDR DBF_GDR DBF_IGD	Header Format (Appendix B.1) Database Format (Appendix B.2) Database Format (Appendix B.2)
All processing types		JAS_LOG	Processing output log (Appendix F.8)

Section 5

I/GDR Processing

5.1 Daily Processing

On a daily basis, the **jason_igdr/data/c###** directory at podaac.jpl.nasa.gov is viewed for new IGDR passes. If there are new IGDRs, WFF retrieves and processes each pass file. Figure 5-1 provides a diagram of the daily processing, containing the following attributes:

- **ftp**; transfer IGDR pass files from JPL to WFF into the incoming data directory, **/gen/jason/data/IGDR/incoming**. Appendix G shows an example of retrieving an I/GDR pass file from PODAAC.
- **IGDR_reader**; create 10-second science averages file (AVG_IGD) and a pass header file (AVG_HDR) for each pass file.
- **jasongdrpass**, a UNIX script that runs the IDL program, **jasongdrpass.pro**. This program reads the AVG_IGD and the AVG_HDR files and creates an I/GDR pass plot. See Appendix F.1 for sample pass plot.
- **IGDR_reader**; create a 60-second science averages file (DBF_IGD) and a pass header file (DBF_HDR) for the database import files.
- Move the DBF_IGD file and the DBF_HDR file to the database storage directory, **/gen/jason/data/IGDR/database**.

5.2 Per-Cycle Processing

At the completion of each 10-day Jason-1 cycle, the following processes are performed to produce per-cycle and launch-to-date trend plots. See Figure 5-2 for a diagram of the per-cycle processing.

- The UNIX script, **load_jason_gdr_db.sh**, executes; 1) the **sqlldr** utility to load the data into the database tables; 2) the **sqlplus** utility to execute **PL/SQL** procedures to check for duplicate data and create entries in the summary table. The datafile used as input to this script is created by the science database processing, **WriteDB**. See Appendix D.1 for a listing of the script.
- **create_cycle_sci_file.sh**, runs the **sqlplus** utility to execute a **PL/SQL** procedure to create a cycle summary file, **jasCycleSci###-###.GDR,** where ### represents a cycle number, by extracting data from the Science Table. See Appendix D.3 for a listing of the script.
- **jasongdrhist**, a UNIX script that runs the IDL program, **jasongdrhist.pro**. This program reads the science file, **jasCycleSci###.GDR,**and header file, **jasCycleSci###.HDR,**and produces a cycle science history plot of selected parameters from the Science Table. See Appendix F.3 for sample history plot.

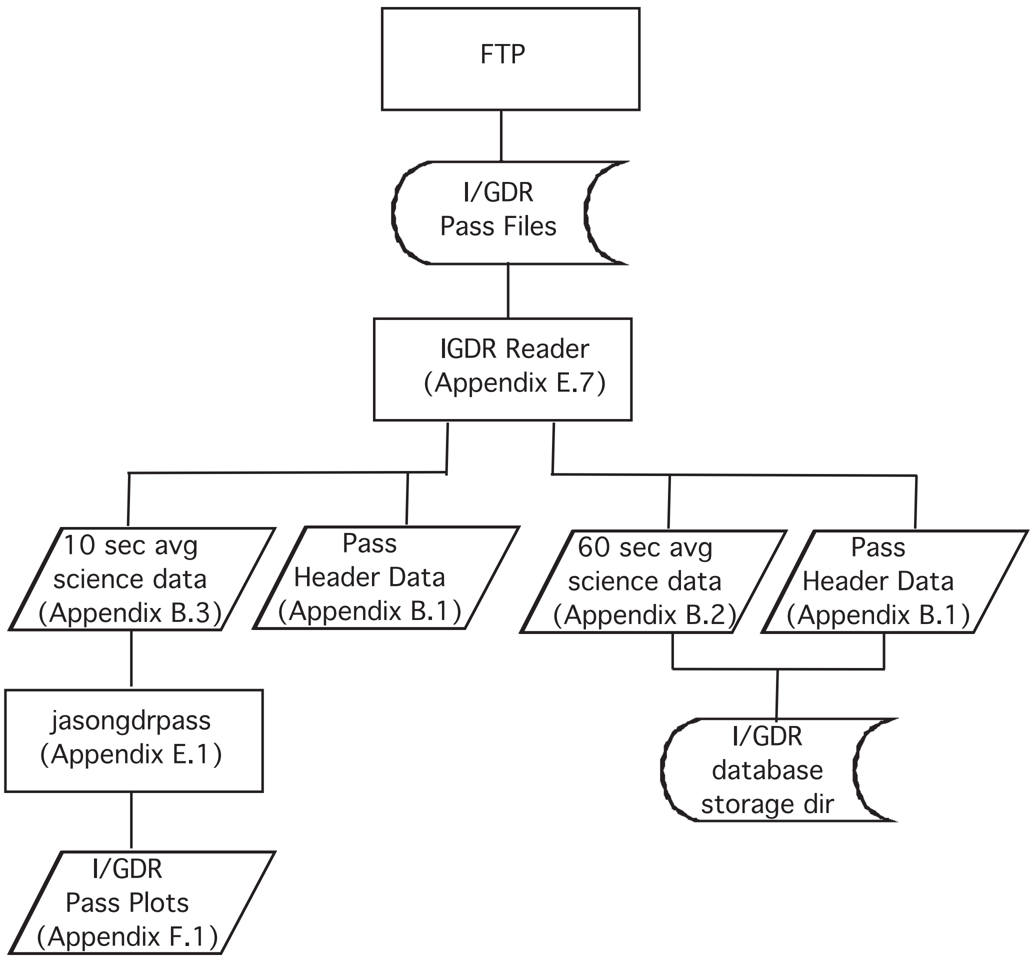


Figure 5-1 Jason-1 I/GDR Daily Processing

- **create_ltd_sum_file.sh**, runs the **sqlplus** utility to execute a **PL/SQL** procedure to create an output launch-to-date summary file, **jasLTDSum.GDR**, by extracting data from the Summary Table. See Appendix D.2 for a listing of the script.
- **jasoncycletrend**, a UNIX script that runs the IDL program, **jasoncycletrend.pro**. This program reads the cycle launch-to-date summary file, **jasLTDSum.GDR**, and produces a cycle launch-to-date trend plot of all parameters or selected parameters from the Summary Table. See Appendix F.2 for sample trend plot.

5.3 Special Processing

Special processing is defined as that processing which is not done on a regular chronological basis.

IGDR_reader can be used to create special average science files. The resulting files are then copied to a user directory for analysis and/or custom IDL program plot.

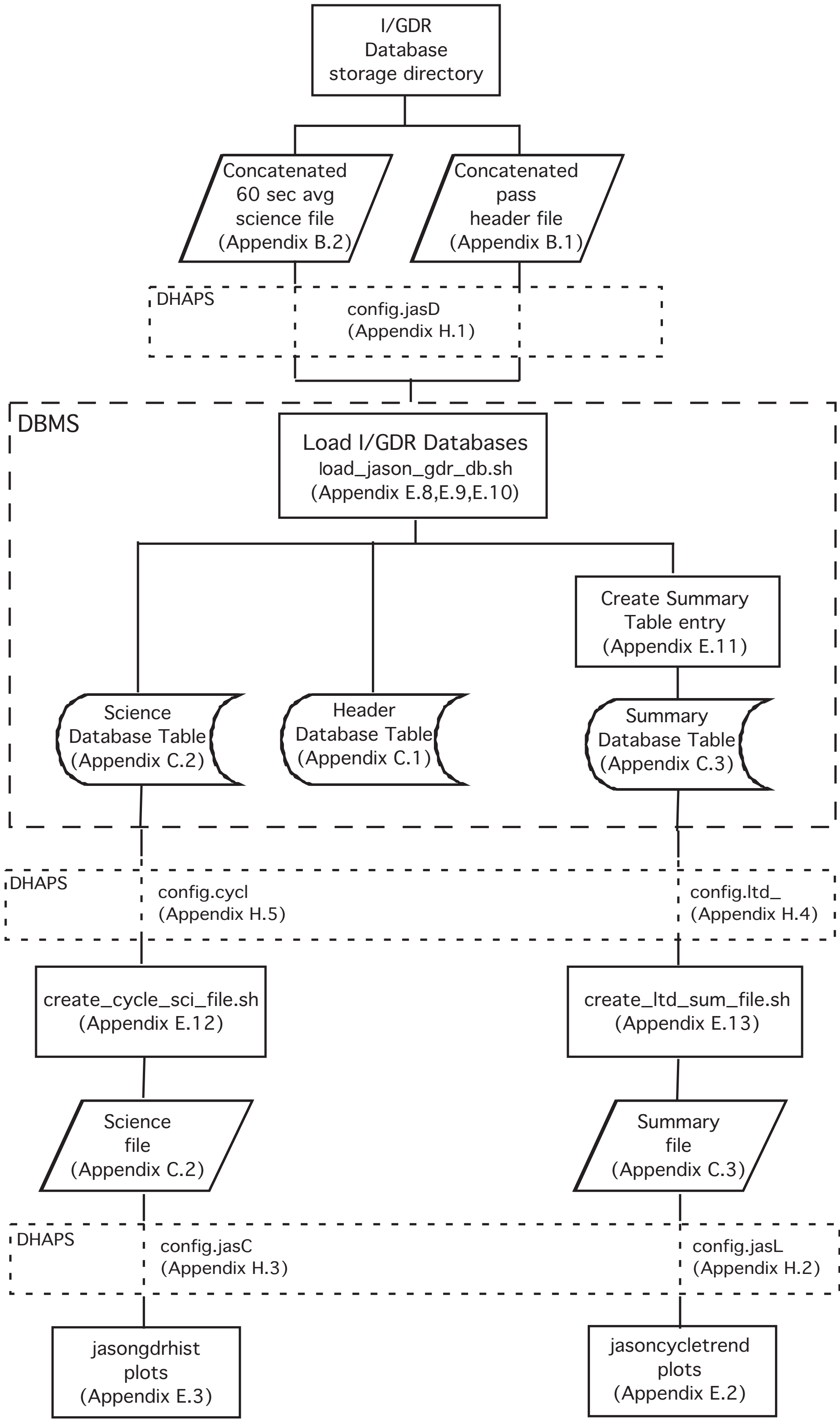


Figure 5-2 Per Cycle Processing

Custom Oracle database procedures can be written to extract selected data from the database science table.

IDL plot programs can create special plots for papers and/or presentations.

5.3.1 Plotting Science Averages

- **IGDR_reader**, create, any rate, science averages.
- **jasongdravg**, a UNIX script that runs the IDL program, jasongdravg.pro. this program reads any science average file (AVG_IGD) and products a plot of all parameters or selected parameters. See Appendix F.6 for sample plot.

5.3.2 Highpassfilter Process

See Figure 5-3 for a diagram of the highpassfilter process.

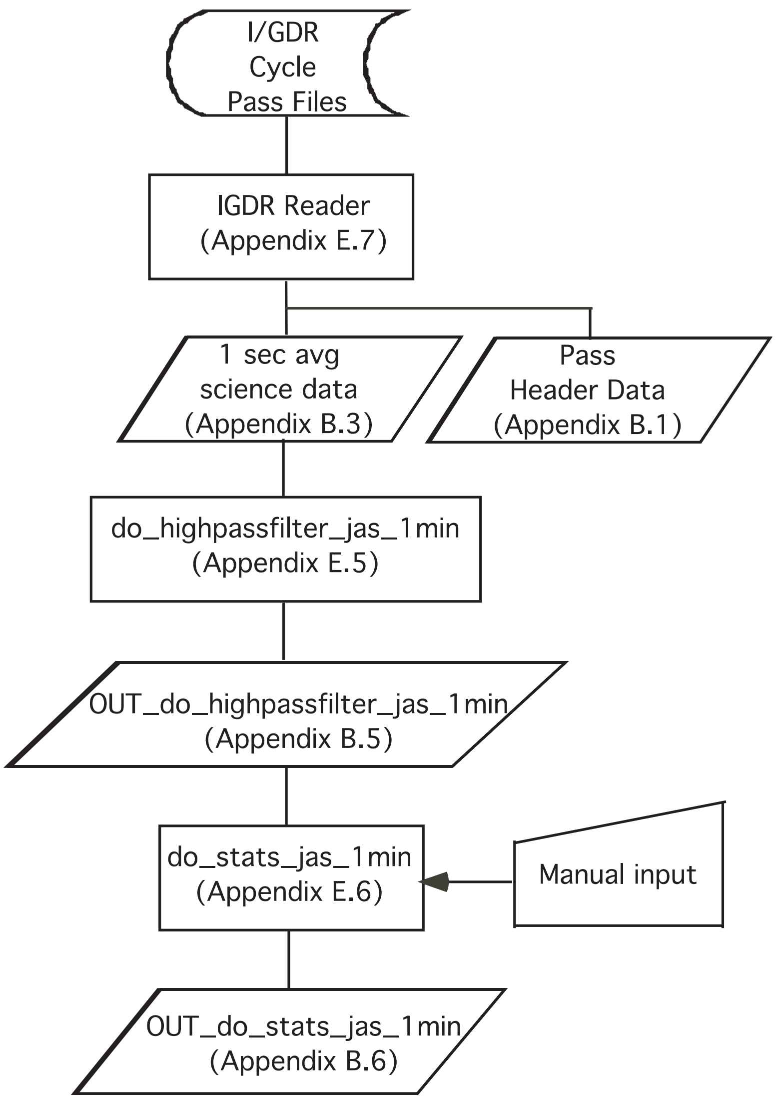


Figure 5-3 Highpassfilter Process

- **IGDR_reader**, create 1-second science averages for each pass file.
- **do_highpassfilter_jas_1min**, a UNIX script that runs the Fortran 90 program, **highpassfilter_jas_1min.f90**. This Fortran 90 program reads a 60-second average file (AVG_IGD) and creates an output file, **OUT_do_highpassfilter_jas_1min**.
- **do_stats_jas_1min**, a UNIX script that runs the Fortran 90 program, **do_stats_jas_1min.f90**. This program calculates statistics from the file **OUT_do_highpassfilter_jas_1min** and creates an output file, **OUT_do_stats_jas_1min**. There is manual input to this program that is based on the "year, cycle number, first day of the data and last day of the data".

Edit Criteria for Processing Science Averaging

6.1 Data Editing Sequence and Criteria

The following editing criteria (Figure 6-1) are the recommended guidelines from "AVISO and PODAAC User Handbook. IGDR and GDR Jason Products", Chapter 3, Section 3.6.

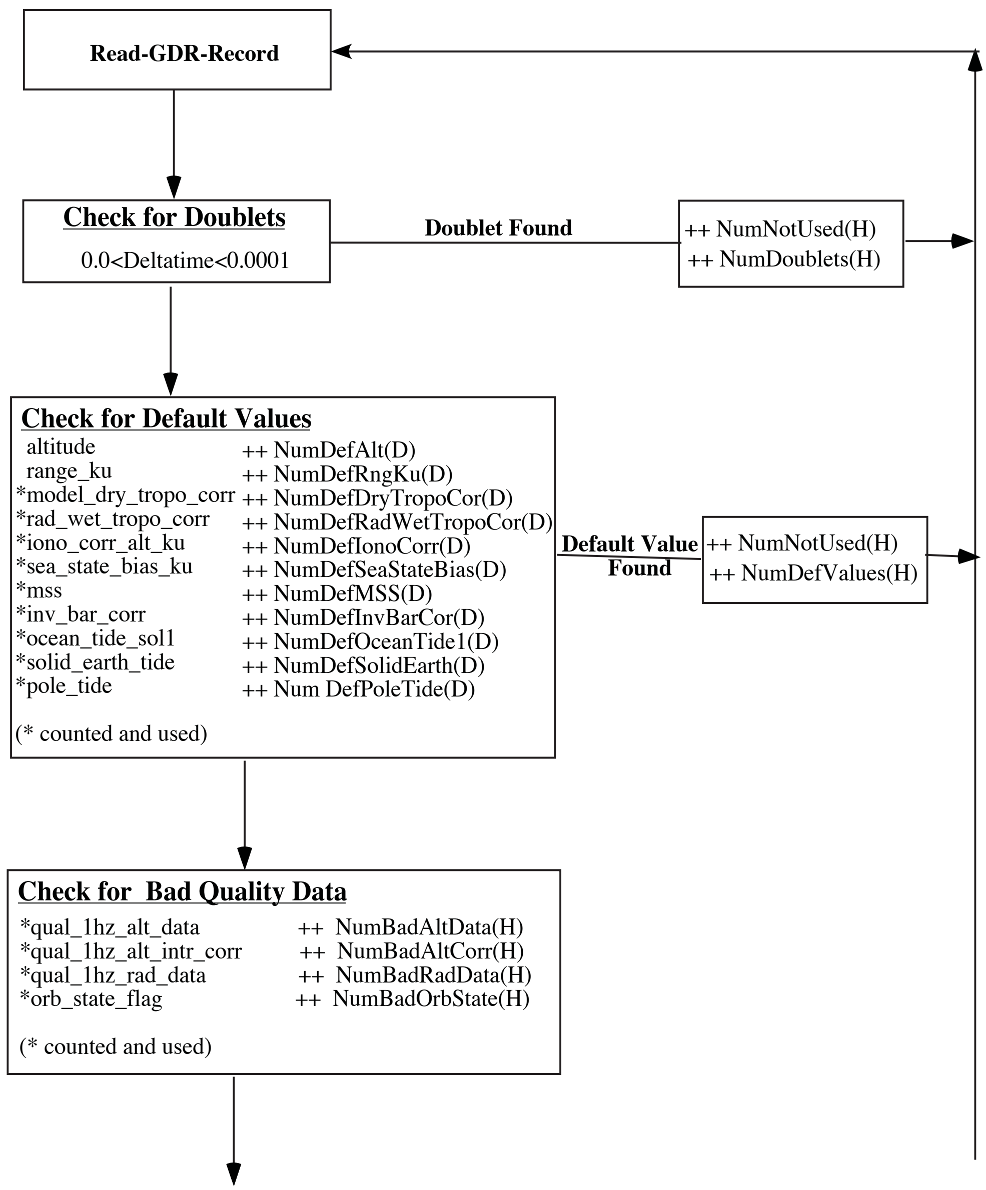
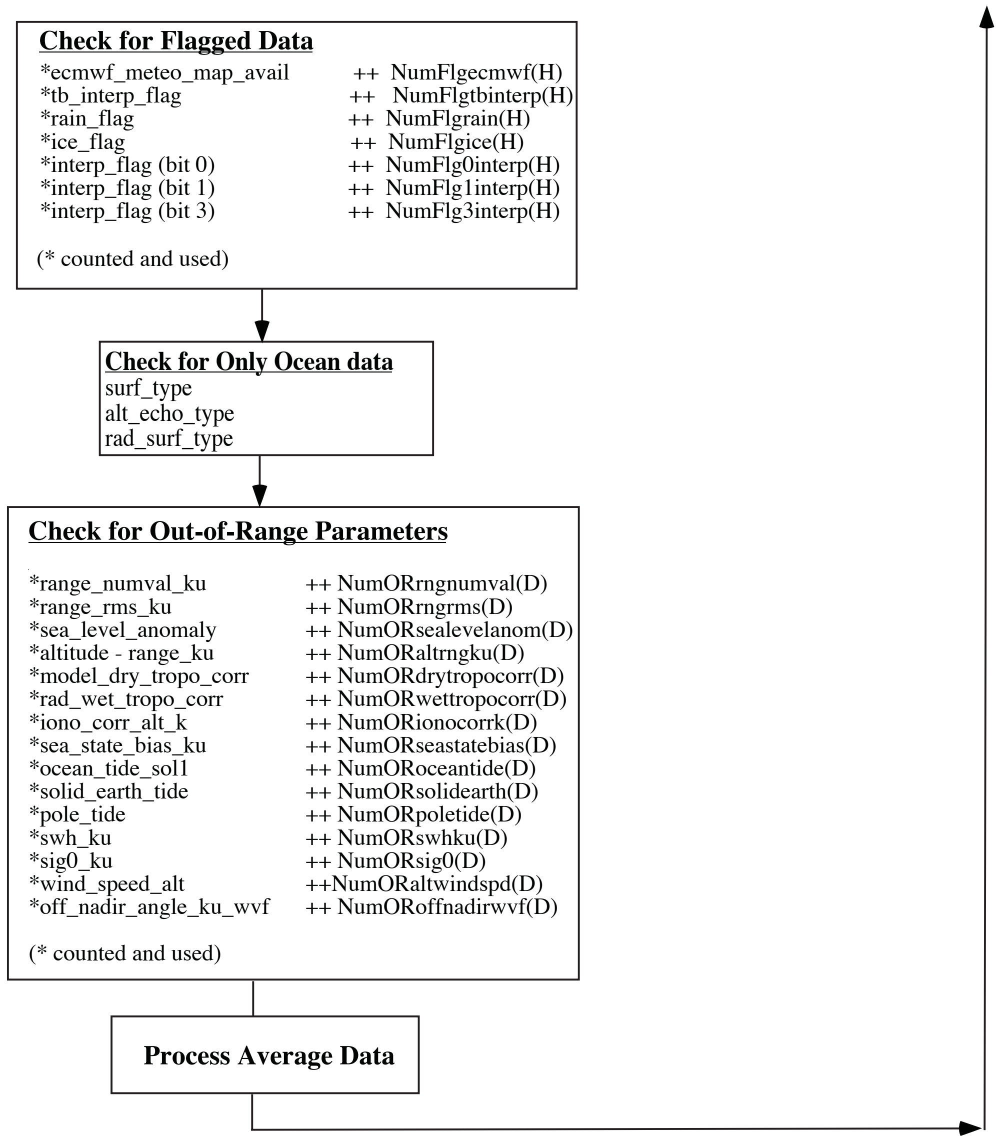


Figure 6-1 Editing Sequence and Criteria Flowchart for Averaging



(H) - Parameter in Header Record
(D) - Parameter in Data Record

Figure 6-1 Editing Sequence and Criteria Flowchart for Averaging (Continued)

Section 7

Edit Criteria for Processing Science Database

7.1 Data Editing Sequence and Criteria

The following editing criteria (Figure 7-1) are the recommended guidelines from "AVISO and PODAAC User Handbook. IGDR and GDR Jason Products", Chapter 3, Section 3.6.

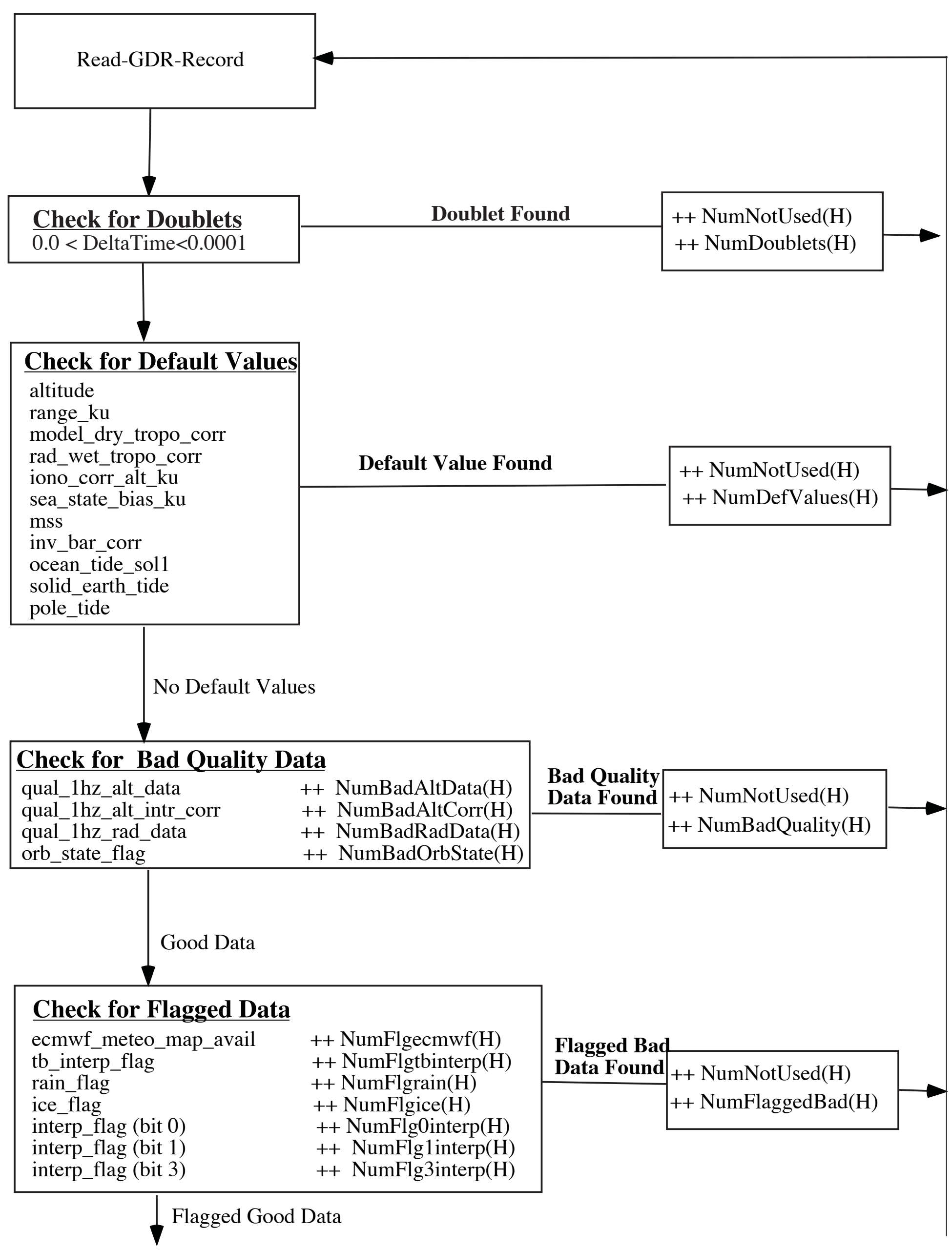
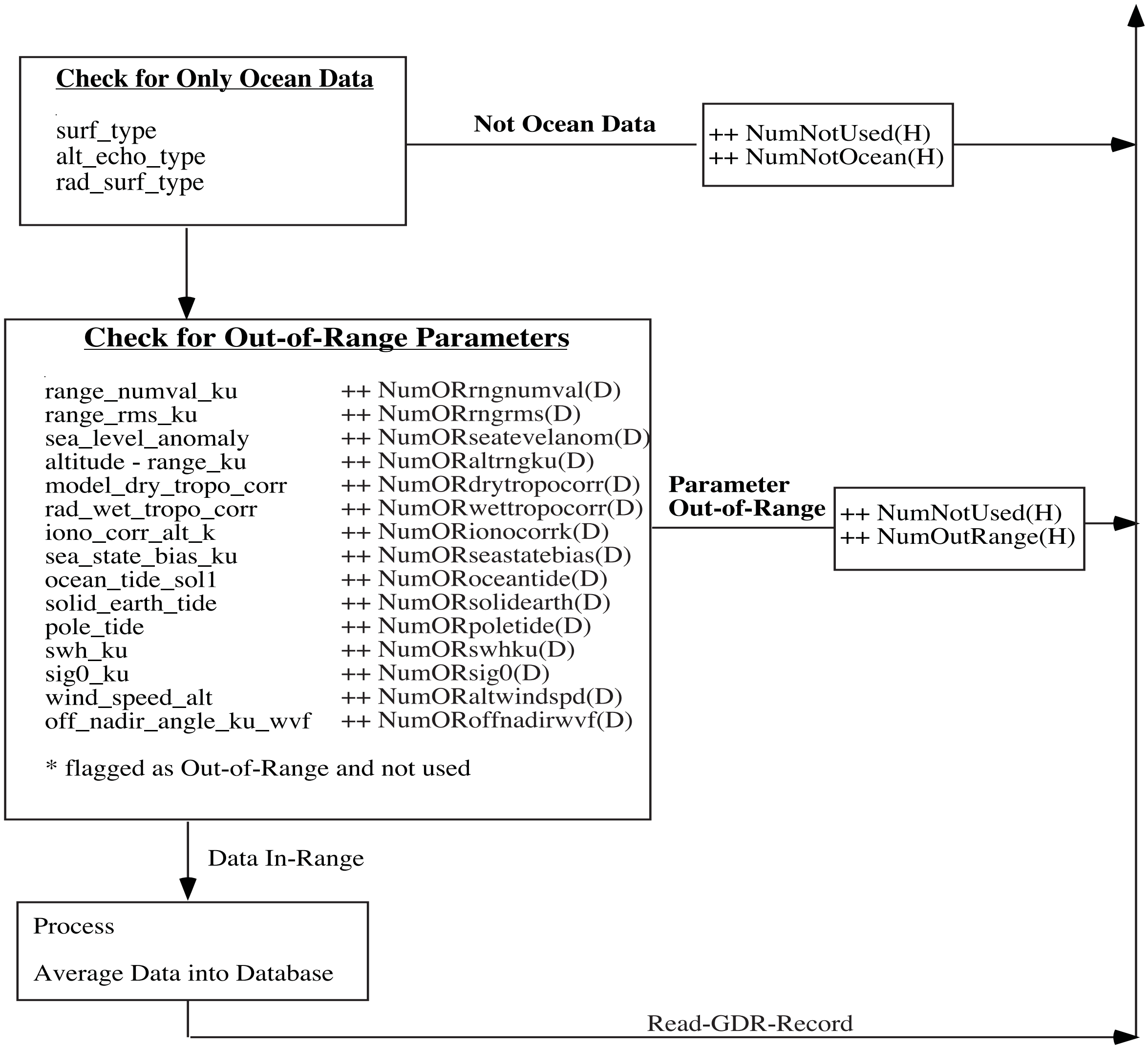


Figure 7-1 Editing Sequence and Criteria Flowchart for Database



(H) - Parameter in Header Record
(D) - Parameter in Data Record

Figure 7-1 Editing Sequence and Criteria Flowchart for Database (Continued)

Section 8

I/GDR Database Management System (DBMS)

The ORACLE Relational Database Management System (RDBMS) is being used to manage the Jason I/GDR data. Using this system, I/GDR data can be loaded, extracted, searched, and sorted. Data is stored in database objects called tables.

8.1 Database Table Definitions

There are three database tables used in storing the I/GDR data.

- **JAS_GDR_HEADER** table contains header information for each pass of a cycle. (Appendix C-1)
- **JAS_GDR_SCIENCE** table contains 60-second averaged scientific data records. (Appendix C-2)
- **JAS_GDR_SUMMARY** table contains a summarized scientific data record for each cycle. (Appendix C-3)

These database table definitions are documented in Appendix C.

8.2 Loading Data into the Database Tables

The I/GDR database tables are loaded using the Oracle utilities, **sqlldr**, **sqlplus**, and **PL/SQL**. The **sqlldr** utility loads data into the database tables using a control file, which maps the format of the input datafile to the database table. The **sqlplus** utility and **PL/SQL** procedures are used to perform miscellaneous checks and updates to database tables after loading. See Table 8-1 for specific config.*filetype* used for loading data into the database tables.

Table 8-1 config.*filetype* vs. Database Management Tables

config.**jasD**	Loading data into JAS_GDR_HEADER table JAS_GDR_SCIENCE table
config.**cycl**	Extracting data from JAS_GDR_HEADER table JAS_GDR_SCIENCE table and loading data into JAS_GDR_SUMMARY table

8.3 Extracting Data from the Database Tables

The Oracle utilities, **sqlplus** and **PL/SQL** are also used for extracting data from the database tables. These utilities are used to filter data and create output files to be used in further processing. See Table 8-1 for specific config.*filetype* used for extracting data from the database tables.

Section 9

Directory Structure for I/GDR Processing

9.1 File System Directory Structure

The I/GDR processing and data storage are performed on the OSB3 workstation. The I/GDR Database Management is currently performed on the ORACLE workstation. The Jason file system is located on OSB3 with a root directory of **/gen/jason**, with unique directories for data, source code, libraries, executables, etc. Table 9-1 details the function of each directory. Figure 9-1 on page 9-2 provides a diagram for the Jason file system.

Table 9-1 OSB3:/gen/jason Filesystem

Directory	Contents
/bin	Executable binaries and script files
/data	Various Jason data directories
/IGDR	I/GDR data processing and storage files
/OSDR	OSDR data processing and storage files
/SGDR	SGDR data processing and storage files
/dhaps	Data handling and processing system files
/bad	Rejected records from the database load
/bin	Executable script files
/config	Filetype configuration files
/dbtemp	Temporary holding area for processing group files
/error	Where unknown files found in the "in" directory are placed
/in	Where all files to be processed by this system originate
/log	Log entries for all Jason processing
/out	Where processed files may be retrieved
/proc	Temporary holding area for files while they are being processed
/idl	IDL programs
/lib	Compiled libraries
/src	Program F90 source codes
/vob	Configuration controlled software
/wrk	Temporary working files

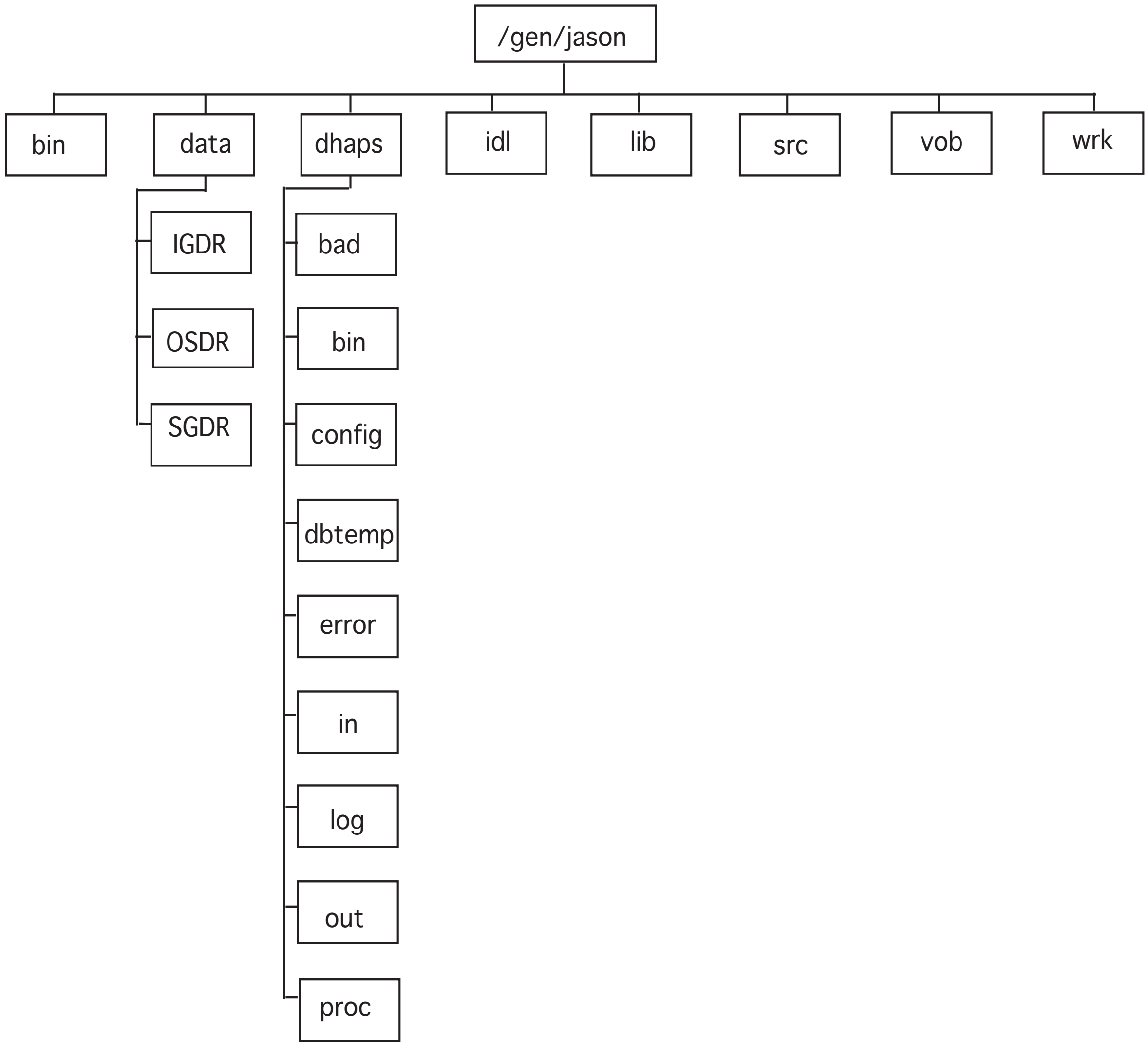


Figure 9-1 Directory Structure

Section 10

Data Handling and Processing System (DHAPS)

10.1 Definition

The Data Handling and Processing System (DHAPS) was designed to automate the handling of data with minimal user intervention. The Jason DHAPS is being used for the handling and processing of the Jason-1 I/GDR data.

The DHAPS was written using UNIX shell scripts and is based on several facilities of the UNIX operating system and the ORACLE database management system. The host OSB3 is the client system and the host ORACLE is currently the ORACLE server.

All files to be processed by the Jason DHAPS are placed in the "/gen/jason/dhaps/in" directory. A process checks this directory every minute to see if a file has been placed in it. If so, this file is processed based on the existence of a filetype configuration (config.*filetype*) file in the "/gen/jason/dhaps/config" directory. The config.*filetype* is a simple method of allowing the user to customize what happens to the files that are received, using the functions listed in Table 10-1.

Table 10-1 config.*filetype* File Functions

Functions	Definition
MOVE	Moves specified file to another directory
COPY	Copies specified file to another directory
FTP	FTP's specified file to a remote host and places it in the specified directory on that host
NOTIFY	Notifies the email user upon receipt of a file
MAIL	Mails the file to an SMTP address
PROCESS	Processes the file with the script named in the second argument
#	Lines beginning with "#" are considered comments

There is a relationship between the filename being processed and the config.*filetype* name. The *filetype* is a unique 4-letter identifier based on the filename being processed. See Table 10-2, which shows this relationship.

Table 10-2 config.*filetype* vs. Filename to be Processed

config.*filetype*	Filename to be Processed
config.**jasL**	**jasL**TDSum.GDR
config.**jasD**	**jasD**BCycle###.HDR **jasD**BCycle###.IGD **jasD**BCycle###.GDR
config.**ltd_**	**ltd**_summary.req
config.**cycl**	**cycl**science.req
config.**jasC**	**jasC**ycleSci###-###.HDR **jasC**ycleSci###-###.GDR

See Appendix H for examples of the configuration files used for processing data that is placed in the "/gen/jason/dhaps/in" directory.

Appendix A
Control File Examples

A.1 Example of an Algorithm Dump Control File

```
#----------Processor Name
=IGDR_reader
#
#--------- Start of Control File
#
EXEC_KEY=abcd
DATE_GENERATED=07 November 2001
OPERATOR=aconger
#
INPUT_FILE=JA1_IGD_2PaP008_085.CNES 70625816 70625821
OUTPUT_FILE=ALG_IGD_2PaP008_085.CNES all
OUTPUT_FILE=DMP_IGD_2PaP008_085.CNES all
OUTPUT_FILE=JAS_LOG_IGD_2PaP008_085.CNES all (optional)
#
# Execution control
#
PROC_TYPE=WriteAlg
#
#---------- End of Control File
#
```

A.2 Example of a Science Averaging Control File

```
#----------Processor Name
=IGDR_reader
#
#--------- Start of Control File
#
#EXEC_KEY=abcd
#DATE_GENERATED=07 November 2001
#OPERATOR=aconger
#
INPUT_FILE=JA1_IGD_2PaP008_092.CNES all
OUTPUT_FILE=AVG_IGD_2PaP008_092.CNES all
OUTPUT_FILE=AVG_HDR_2PaP008_092.CNES all
OUTPUT_FILE=JAS_LOG_IGD_2PaP008_092.CNES all (optional)
#
# Execution control
#
PROC_TYPE=GEOAverage
AVG_OPT=1
#
#---------- End of Control File
#
```

A.3 Example of a Science Database Control File

```
#----------Processor Name
=IGDR_reader
#
#--------- Start of Control File
#
EXEC_KEY=abcd
DATE_GENERATED=07 November 2001
OPERATOR=aconger
#
INPUT_FILE=JA1_IGD_2PaP009_172.CNES all
OUTPUT_FILE=DBF_IGD_2PaP009_172.CNES all
OUTPUT_FILE=DBF_HDR_2PaP009_172.CNES all
OUTPUT_FILE=JAS_LOG_IGD_2PaP009_172.CNES all (optional)
#
# Execution control
#
PROC_TYPE=WriteDB
AVG_OPT=60
#
#---------- End of Control File
#
```

A.4 Example of a Product Dump Control File

```
#----------Processor Name
=IGDR_reader
#
#--------- Start of Control File
#
EXEC_KEY=abcd
DATE_GENERATED=07 November 2001
OPERATOR=aconger
#
INPUT_FILE=JA1_IGD_2PaP008_085.CNES 70625816 70625821
OUTPUT_FILE=PRD_IGD_2PaP008_085.CNES all
OUTPUT_FILE=JAS_LOG_IGD_2PaP008_085.CNES all (optional)
#
# Execution control
#
PROC_TYPE=WriteProd
#
#---------- End of Control File
#
```

Appendix B
I/GDR Output Data Type Formats

B.1 Header Format

Table B-1 GDR Header Format

Field	Name	Units	Fmt	Description
1	Cycle_Number	#	I3	Cycle= 9.92 days
2	Pass_Number	#	I3	Pass = 3372.885 Seconds
3	File_Data Type	#	A4	Data Type (IGDR, GDR, SGDR)
4	Reference_Software	#	A20	Software ID Used to Create Product
5	Pass_Data_Count	#	A5	Number of 1Hz Measurements in Product File
6	Ocean_Pass_Data_Count	#	A5	Number of 1Hz Measurements over Ocean
7	Range_Offset	km	A4	Offset Added to Altitude (1300km)
8	Time_Shift_Mid_Frame	ms	A10	Offset for TimeTag First 20 Hz Waveforms
9	Time_Shift_Interval	ms	A10	Time Interval between 20 Hz Waveforms
10	NumNotOcean	cnts	I5	Number Ocean Data not used
11	NumBadAltData	cnts	I5	Number of Bad 1Hz Alt Data not used
12	NumBadAltCorr	cnts	I5	Number of Bad 1Hz Alt Instru Corr not used
13	NumBadRadData	cnts	I5	Number of Bad 1Hz Radiometer Data not used
14	NumDefValues	cnts	I5	Number of Default Values not used
15	NumBadOrbState	cnts	I5	Number of Bad Adjusted Orbit not used
16	NumFlgecmwf	cnts	I5	Number ECMWF meteorological map availability (not 0) not used
17	NumFlgtbinterp	cnts	I5	Number radiometer brightness temperatures interpolation Flag (not equal 0 or 1) not used
18	NumFlgrain	cnts	I5	Number rain Flag (equal 1 (rain)) not used
19	NumFlgice	cnts	I5	Number ice Flag (equal 1 (ice)) not used
20	NumFlg0interp	cnts	I5	Number interpolation Flag (bit 0 mss) Bad not used
21	NumFlg1interp	cnts	I5	Number interpolation Flag (bit 1 - ocean tide sol1) Bad not used

Table B-1 GDR Header Format (Continued)

Field	Name	Units	Fmt	Description
22	NumFlg3interp	cnts	I5	Number interpolation Flag (bit 3 - met data) Bad not used
23	NumNotUsed	cnts	I5	Number of Data Records not used
24	NumBadQuality	cnts	I5	Number of Bad Data Quality not used
25	NumFlaggedBad	cnts	I5	Number of Flagged Bad Data not used
26	NumOutRange	cnts	I5	Number of Out-of-Range not used
27	FirstATB	date	A24	First measured UTC Time
28	FirstJ2K	sec	F17.6	First measured 2000 Epoch Time
29	Last ATB	date	A24	Last measured UTC Time
30	Last J2K	sec	F17.6	Last measured 2000 Epoch Time
31	First Latitude	deg	F6.2	First measured Latitude
32	Last Latitude	deg	F6.2	Last measured Latitude
33	First Longitude	deg	F7.2	First measured Longitude
34	Last Longitude	deg	F7.2	Last measured Longitude
35	NumDoublets	cnts	I5	Number of Doublets not used
Note: TAB delimited file				

B.2 Database Format

Table B-2 GDR Database Format

Field	Name	Units	Fmt	Description
1	TEpochSec	sec	F16.3	Converted to 2000 Epoch
2	ATB	date	A24	UTC Time
3	cycle	#	I3	Cycle = 9.92 days
4	pass	#	I3	Pass = 3372.885 seconds
5	RecCount	#	I5	Nbr frames used in 60 sec avg
6	altitude	m	F12.4	1 Hz altitude of satellite
7	latitude	deg	F12.6	Latitude
8	longitude	deg	F12.6	Longitude
9	orb_alt_rate	cm/s	F8.2	orbital altitude rate
10	range_ku	m	F12.4	1 Hz Ku band range
11	range_c	m	F12.4	1 Hz C band range
12	range_rms_ku	m	F12.4	RMS of Ku Band Range
13	range_rms_c	m	F12.4	RMS of C Band Range
14	net_instr_corr_ku	m	F16.4	net instrumental correction Ku band range
15	net_instr_corr_c	m	F16.4	net instrumental correction C-Band range
16	model_dry_trop_corr	m	F16.4	model dry tropospheric correction
17	model_wet_trop_corr	m	F16.4	model wet tropospheric correction
18	rad_wet_tropo_corr	m	F16.4	radiometer wet tropospheric correction
19	iono_corr_alt_ku	m	F16.4	altimeter ionospheric correction Ku band
20	iono_corr_doris_ku	m	F16.4	Doris iono correction Ku band
21	sea_state_bias_ku	m	F16.4	sea state bias correction Ku band
22	sea_state_bias_c	m	F16.4	sea state bias correction C-band
23	sea_state_bias_comp	m	F16.4	composite sea state bias correction
24	swh_ku	m	F16.4	Ku band significant waveheight
25	swh_c	m	F16.4	C band significant waveheight
26	swh_rms_ku	m	F16.4	RMS Ku band significant waveheight
27	swh_rms_c	m	F16.4	RMS C band significant waveheight
28	net_instr_corr_swh_ku	m	F16.4	net instrumental correction ku band swh

Table B-2 GDR Database Format (Continued)

Field	Name	Units	Fmt	Description
29	net_instr_corr_swh_c	m	F16.4	net instrumental correction on C band swh
30	sig0_ku	dB	F16.4	Ku band backscatter coefficient
31	sig0_c	dB	F16.4	C band backscatter coefficient
32	sig0_rms_ku	dB	F16.4	RMS of the Ku band backscatter coefficient
33	sig0_rms_c	dB	F16.4	RMS of the C band backscatter coefficient
34	agc_ku	dB	F16.4	Ku band AGC
35	agc_c	dB	F16.4	C band AGC
36	agc_rms_ku	dB	F16.4	RMS of the Ku band AGC
37	agc_rms_c	dB	F16.4	RMS of the C band AGC
38	net_instr_sig0_corr_ku	dB	F16.4	net instrumental correciton on Ku band back-scatter coefficient
39	net_instr_sig0_corr_c	dB	F16.4	net instrumental correction on C band back-scatter coefficient
40	atmos_sig0_corr_ku	dB	F16.4	Atmospheric attenuation correction on Ku band backscatter coefficient
41	atmos_sig0_corr_c	dB	F16.4	Atmospheric attentuation correction on C band backscatter coefficient
42	off_nadir angle_ku_wvf	deg	F16.4	Square root of the squared off nadir angle computed from Ku waveforms (sign carried over)
43	off_nadir_angle_ptf	deg	F16.4	Square root of the squared off nadir angle computed from platform data (sign carried over)
44	tb_187	K	F16.4	18,7 GHz brightness temperature
45	tb_238	K	F16.4	23,8 GHz brightness temperature
46	tb_340	K	F16.4	34 GHz brightness temperature
47	mss	m	F16.4	mean sea surface height
48	mss_tp_along_trk	m	F16.4	TP along-track mean sea surface
49	geoid	m	F16.4	geoid height
50	bathymetry	m	F16.4	ocean depth/land elevation
51	inv_bar_corr	m	F16.4	inverted barometer height correction
52	hf_fluctuations_corr	m	F16.4	High frequency fluctuations of the sea surface topography

Table B-2 GDR Database Format (Continued)

Field	Name	Units	Fmt	Description
53	ocean_tide_sol1	m	F16.4	geocentric ocean tide height (solution 1)
54	ocean_tide_sol2	m	F16.4	geocentric ocean tide height (solution 2)
55	load_tide_sol1	m	F16.4	loading tide height for geocentric ocean tide solution 1
56	load_tide_sol2	m	F16.4	loading tide height for geocentric ocean tide solution 2
57	solid_earth_tide	m	F16.4	solid earth tide height
58	pole_tide	m	F16.4	geocentric pole tide height
59	wind_speed_model_u	cm/s	F16.4	U component of the model wind vector
60	wind_speed_model_v	cm/s	F16.4	V component of the model wind vector
61	wind_speed_alt	m/s	F16.4	altimeter wind speed
62	wind_speed_rad	m/s	F16.4	radiometer wind speed
63	rad_water_vapor	g/cm2	F16.4	radiometer water vapor content
64	rad_liquid_water	kg/cm2	F16.4	radiometer liquid water
65	CorrRangeKu	m	F16.4	range_ku + rad_wet_tropo_corr + model_dry_tropo_corr + iono_corr_alt_ku + sea_state_bias_ku (per 3.3 Altimeter Range)
66	SeaSurfHeight	m	F16.4	altitude - CorrRangeKu (per 3.4 SeaSurf-Height)
67	SeaLvlAnomaly	m	F16.4	SeaSurfHeight - mss - ocean_tide_sol1 - solid_earth_tide - inv_bar_corr (per G. Hayne)
68	NumORrngnumval	cnts	I5	Number of valid points ku range “Out-of-Range”
69	NumORrngrms	cnts	I5	Number of rms ku range “Out-of-Range”
70	NumORsealevelanom	cnts	I5	Number of sea level anomaly “Out-of-Range”
71	NumORdrytropocorr	cnts	I5	Number of model dry tropospheric correction “Out-of-Range”
72	NumORwettropocorr	cnts	I5	Number of radiometer wet tropospheric correction “Out-of-Range”
73	NumORionocorrk	cnts	I5	Number of ionospheric correction ku “Out-of-Range”
74	NumORseastatebias	cnts	I5	Number of sea state bias correction “Out-of-Range”

Table B-2 GDR Database Format (Continued)

Field	Name	Units	Fmt	Description
75	NumORoceantide	cnts	I5	Number of ocean tide correction solution 1 “Out-of-Range”
76	NumORsolidearth	cnts	I5	Number of solid earth tide correction “Out-of-Range”
77	NumORpoletide	cnts	I5	Number of pole tide correction “Out-of-Range”
78	NumORswhku	cnts	I5	Number of significant waveheight ku “Out-of-Range”
79	NumORsig0	cnts	I5	Number of sigma0 ku (backscatter) “Out-of-Range”
80	NumORoffnadirwvf	cnts	I5	Number of Off Nadir from ku waveforms “Out-of-Range”
81	NumORaltwindspd	cnts	I5	Number of altimeter wind speed “Out-of-Range”
82	NumORaltrngku	cnts	I5	Number of (altitude - range_ku) “Out-of-Range”

Note: TAB delimited file

B.3 Average Format

Table B-3 GDR Average Format

Field	Name	Units	Fmt	Description
1	J2KSeconds	sec	F17.6	Converted to 2000 Epoch
2	ATB	date	A24	UTC Time
3	cycle	#	I3	Cycle = 9.92 days
4	pass	#	I3	Pass = 3372.885 seconds
5	RecCount	#	I5	Nbr frames used in 60 sec avg
6	latitude	deg	F17.6	Latitude
7	longitude	deg	F17.6	Longitude
8	surface_type	#	F6.0	surface type
9	alt_echo_type	#	F6.0	altimeter echo type (0 = ocean-like, 1 = non ocean-like)
10	rad_surf_type	#	F6.0	radiometer surface type (0 = ocean, 1 = land)
11	qual_1hz_alt_data	#	F6.0	quality flag for 1 Hz altimeter data
12	qual_1hz_alt_instr_corr	#	F6.0	quality flag for 1 Hz altimeter instrumental corrections
13	qual_1hz_rad_data	#	F6.0	quality flag for 1 Hz radiometer data
14	alt_state_flag	#	F6.0	Altimeter state flag
15	rad_state_flag	#	F6.0	Radiometer state flag
16	orb_state_flag	#	F6.0	orbit state flag
17	altitude	m	F17.6	1 Hz altitude of satellite
18	orb_alt_rate	cm/s	F17.6	orbital altitude rate
19	range_ku	m	F17.6	1 Hz Ku band range
20	range_c	m	F17.6	1 Hz C band range
21	range_rms_ku	m	F17.6	RMS of the Ku band range
22	range_rms_c	m	F17.6	RMS of the C band range
23	range_numval_ku	#	F6.0	number of valid points for Ku range
24	range_numval_c	#	F6.0	number of valid points for C range
25	net_instr_corr_ku	m	F17.6	net instrumental correction on Ku-band range
26	net_instr_corr_c	m	F17.6	net instrumental correction on C-band range
27	model_dry_tropo_corr	m	F17.6	model dry tropospheric correction

Table B-3 GDR Average Format (Continued)

Field	Name	Units	Fmt	Description
28	model_wet_tropo_corr	m	F17.6	model wet tropospheric correction
29	rad_wet_tropo_corr	m	F17.6	radiometer wet tropospheric correction
30	iono_corr_alt_ku	m	F17.6	altimeter ionospheric correction on Ku-band
31	iono_corr_doris_ku	m	F17.6	Doris iono correction on Ku-band
32	sea_state_bias_ku	m	F17.6	sea state bias correction in Ku-band
33	sea_state_bias_c	m	F17.6	sea state bias correction in C-band
34	sea_state_bias_comp	m	F17.6	composite sea state bias correction
35	swh_ku	m	F17.6	Ku-band significant waveheight
36	swh_c	m	F17.6	C-band significant waveheight
37	swh_rms_ku	m	F17.6	RMS of the Ku band significant waveheight
38	swh_rms_c	m	F17.6	RMS of the C band significant waveheight
39	swh_numval_ku	#	F6.0	number of valid points to compute ku SWH
40	swh_numval_c	#	F6.0	number of valid points to compute c SWH
41	net_instr_corr_swh_ku	m	F17.6	net instrumental correction on Ku band significant waveheight
42	net_instr_corr_swh_c	m	F17.6	net instrumental correction on C band significant waveheight
43	sig0_ku	dB	F17.6	Ku-band backscatter coefficient
44	sig0_c	dB	F17.6	C-band backscatter coefficient
45	sig0_rms_ku	dB	F17.6	RMS of the Ku band backscatter coefficient
46	sig0_rms_c	dB	F17.6	RMS of the C band backscatter coefficient
47	sig0_numval_ku	#	F6.0	number of valid points to compute Ku backscatter coefficient
48	sig0_numval_c	#	F6.0	number of valid points to compute C backscatter coefficient
49	agc_ku	dB	F17.6	Ku band AGC
50	agc_c	dB	F17.6	C band AGC
51	agc_rms_ku	dB	F17.6	RMS of the Ku-band AGC
52	agc_rms_c	dB	F17.6	RMS of the C-band AGC
53	agc_numval_ku	#	F6.0	number of valid points to compute Ku AGC
54	agc_numval_c	#	F6.0	number of valid points to compute C AGC

Table B-3 GDR Average Format (Continued)

Field	Name	Units	Fmt	Description
55	net_instr_sig0_corr_ku	dB	F17.6	net instrumental correction on Ku-band backscatter coefficient
56	net_instr_sig0_corr_c	dB	F17.6	net instrumental correction on C-band backscatter coefficient
57	atmos_sig0_corr_ku	dB	F17.6	Atmospheric attenuation correction on Ku-band backscatter coefficient
58	atmos_sig0_corr_c	dB	F17.6	Atmospheric attenuation correction on C-band backscatter coefficient
59	off_nadir_angle_ku_wvf	deg	F17.6	Square Root of the squared off nadir angle computed from Ku waveforms (sign carried over)
60	off_nadir_angle_ptf	deg	F17.6	Square Root of the squared off nadir angle computed from platform data (sign carried over)
61	tb_187	K	F17.6	18,7 GHz brightness temperature
62	tb_238	K	F17.6	23,8 GHz brightness temperature
63	tb_340	K	F17.6	34 GHz brightness temperature
64	mss	m	F17.6	mean sea surface height
65	mss_tp_along_trk	m	F17.6	TP along-track mean sea surface
66	geoid	m	F17.6	geoid height
67	bathymetry	m	F17.6	ocean depth/land elevation
68	inv_bar_corr	m	F17.6	inverted barometer height correction
69	hf_fluctuations_corr	m	F17.6	High frequency fluctuations of the sea surface topography
70	ocean_tide_sol1	m	F17.6	geocentric ocean tide height (solution 1)
71	ocean_tide_sol2	m	F17.6	geocentric ocean tide height (solution 2)
72	ocean_tide_eq_lp	m	F17.6	equilibrium long-period ocean tide height
73	ocean_tide_neq_lp	m	F17.6	non_equilibrium long-period ocean tide height
74	load_tide_sol1	m	F17.6	loading tide height for geocentric ocean tide solution 1
75	load_tide_sol2	m	F17.6	loading tide height for geocentric ocean tide solution 2
76	solid_earth_tide	m	F17.6	solid earth tide height
77	pole_tide	m	F17.6	geocentric pole tide height
78	wind_speed_model_u	cm/sec	F17.6	U component of the model wind vector

Table B-3 GDR Average Format (Continued)

Field	Name	Units	Fmt	Description
79	wind_speed_model_v	cm/sec	F17.6	V component of the model wind vector
80	wind_speed_alt	cm/sec	F17.6	altimeter wind speed
81	wind_speed_rad	cm/ secs	F17.6	radiometer wind speed
82	rad_water_vapor	g/cm2	F17.6	radiometer water vapor content
83	rad_liquid_water	kg/cm2	F17.6	radiometer liquid water
84	CorrRangeKu	m	F17.6	range_ku + rad_wet_tropo_corr + model_dry_tropo_corr + iono_corr_alt_ku + sea_state_bias_ku (per 3.3 Altimeter Range)
85	SeaSurfHeight	m	F17.6	altitude - CorrRangeKu (per 3.4 SeaSurf Height)
86	SeaLvlAnomaly	m	F20.6	SeaSurfHeight - mss - ocean_tide_sol1 - solid_earth_tide - inv_bar_corr (per G.Hayne)
87	LandWater	#	F6.0	Land Water Flag
88	RainFlag	#	F6.0	Rain Flag
89	IceFlag	#	F6.0	Ice Flag
90	NumORrngnumval	cnts	I5	Number of valid points Ku range “Out-of-Range”
91	NumORrngrms	cnts	I5	Number of rms Ku range “Out-of-Range”
92	NumORsealevelanom	cnts	I5	Number of sea level anomaly “Out-of-Range”
93	NumORdrytropocorr	cnts	I5	Number of dry tropospheric correction “Out-of-Range”
94	NumORwettropocorr	cnts	I5	Number of wet tropospheric correction “Out-of-Range”
95	NumORionocorrk	cnts	I5	Number of ionospheric correction ku “Out-of-Range”
96	NumORseastatebias	cnts	I5	Number of sea state bias correction “Out-of-Range”
97	NumORoceantide	cnts	I5	Number of ocean tide correction solution 1 “Out-of-Range”
98	NumORsolidearth	cnts	I5	Number of solid earth tide correction “Out-of-Range”
99	NumORpoletide	cnts	I5	Number of pole tide correction “Out-of-Range”
100	NumORswhku	cnts	I5	Number of significant waveheight ku “Out-of-Range”

Table B-3 GDR Average Format (Continued)

Field	Name	Units	Fmt	Description
101	NumORsig0	cnts	I5	Number of sigma0 ku (backscatter) “Out-of-Range”
102	NumOROffnadirwvf	cnts	I5	Number of Off-nadir from waveforms “Out-of-Range”
103	NumORaltwindspd	cnts	I5	Number of altimeter wind speed “Out-of-Range”
104	NumORaltrngku	cnts	I5	Number of (altitude - range_ku) “Out-of-Range”
105	NumDefAlt	cnts	I5	Number of altitude default values
106	NumDefRngKu	cnts	I5	Number of range_ku default values
107	NumDefDryTropCor	cnts	I5	Number of model_dry_tropo_cor default values
108	NumDefRadWetTropCor	cnts	I5	Number of rad_wet_tropo_cor default values
109	NumDefIonoCorr	cnts	I5	Number of iono_corr_alt_ku default values
110	NumDefSeaStateBias	cnts	I5	Number of sea_state_bias_ku default values
111	NumDefMSS	cnts	I5	Number of mss default values
112	NumDefInvBarCor	cnts	I5	Number of inv_bar_corr default values
113	NumDefOceanTide1	cnts	I5	Number of ocean_tide_sol1 default values
114	NumDefSolidEarth	cnts	I5	Number of solid_earth_tide default values
115	NumDefPoleTide	cnts	I5	Number of pole_tide default values

Note: TAB delimited file

B.4 Dump Format

Table B-4 GDR Dump Format

Field	Name	Units	Fmt	Description
1	J2KSeconds	sec	F17.6	Converted to 2000 Epoch
2	UTCTime	date	A24	UTC Time
3	Latitude	deg	F17.6	Latitude
4	Longitude	deg	F17.6	Longitude
5	SurfType	#	F6.0	surface type
6	AltEchoType	#	F6.0	altimeter echo type (0 = ocean-like, 1 = non ocean-like)
7	RadSurfType	#	F6.0	radiometer surface type (0 = ocean, 1 = land)
8	QF1AltData	#	F6.0	quality flag for 1 Hz altimeter data
9	QF1AltInstCor	#	F6.0	quality flag for 1 Hz altimeter instrumental corrections
10	QF1RadData	#	F6.0	quality flag for 1 Hz radiometer data
11	AltStateFlag	#	F6.0	Altimeter state flag
12	RadStateFlag	#	F6.0	Radiometer state flag
13	OrbStateFlag	#	F6.0	orbit state flag
14	SatAltitude	m	F17.6	1 Hz altitude of satellite
15	AltMeasDiff(1)	m	F17.6	Difference between altitude(1) and averaged altitude
16	AltMeasDiff(2)	m	F17.6	Difference between altitude(2) and averaged altitude
17	AltMeasDiff(3)	m	F17.6	Difference between altitude(3) and averaged altitude
18	AltMeasDiff(4)	m	F17.6	Difference between altitude(4) and averaged altitude
19	AltMeasDiff(5)	m	F17.6	Difference between altitude(5) and averaged altitude
20	AltMeasDiff(6)	m	F17.6	Difference between altitude(6) and averaged altitude
21	AltMeasDiff(7)	m	F17.6	Difference between altitude(7) and averaged altitude
22	AltMeasDiff(8)	m	F17.6	Difference between altitude(8) and averaged altitude

Table B-4 GDR Dump Format (Continued)

Field	Name	Units	Fmt	Description
23	AltMeasDiff(9)	m	F17.6	Difference between altitude(9) and averaged altitude
24	AltMeasDiff(10)	m	F17.6	Difference between altitude(10) and averaged altitude
25	AltMeasDiff(11)	m	F17.6	Difference between altitude(11) and averaged altitude
26	AltMeasDiff(12)	m	F17.6	Difference between altitude(12) and averaged altitude
27	AltMeasDiff(13)	m	F17.6	Difference between altitude(13) and averaged altitude
28	AltMeasDiff(14)	m	F17.6	Difference between altitude(14) and averaged altitude
29	AltMeasDiff(15)	m	F17.6	Difference between altitude(15) and averaged altitude
30	AltMeasDiff(16)	m	F17.6	Difference between altitude(16) and averaged altitude
31	AltMeasDiff(17)	m	F17.6	Difference between altitude(17) and averaged altitude
32	AltMeasDiff(18)	m	F17.6	Difference between altitude(18) and averaged altitude
33	AltMeasDiff(19)	m	F17.6	Difference between altitude(19) and averaged altitude
34	AltMeasDiff(20)	m	F17.6	Difference between altitude(20) and averaged altitude
35	OrbAltRate	cm/s	F17.6	orbital altitude rate
36	RangeKu	m	F17.6	1 Hz Ku band range
37	RngKuMeasDiff(1)	m	F17.6	Differences between Ku range(1) and averaged Ku range
38	RngKuMeasDiff(2)	m	F17.6	Differences between Ku range(2) and averaged Ku range
39	RngKuMeasDiff(3)	m	F17.6	Differences between Ku range(3) and averaged Ku range
40	RngKuMeasDiff(4)	m	F17.6	Differences between Ku range(4) and averaged Ku range
41	RngKuMeasDiff(5)	m	F17.6	Differences between Ku range(5) and averaged Ku range

Table B-4 GDR Dump Format (Continued)

Field	Name	Units	Fmt	Description
42	RngKuMeasDiff(6)	m	F17.6	Differences between Ku range(6) and averaged Ku range
43	RngKuMeasDiff(7)	m	F17.6	Differences between Ku range(7) and averaged Ku range
44	RngKuMeasDiff(8)	m	F17.6	Differences between Ku range(8) and averaged Ku range
45	RngKuMeasDiff(9)	m	F17.6	Differences between Ku range(9) and averaged Ku range
46	RngKuMeasDiff(10)	m	F17.6	Differences between Ku range(10) and averaged Ku range
47	RngKuMeasDiff(11)	m	F17.6	Differences between Ku range(11) and averaged Ku range
48	RngKuMeasDiff(12)	m	F17.6	Differences between Ku range(12) and averaged Ku range
49	RngKuMeasDiff(13)	m	F17.6	Differences between Ku range(13) and averaged Ku range
50	RngKuMeasDiff(14)	m	F17.6	Differences between Ku range(14) and averaged Ku range
51	RngKuMeasDiff(15)	m	F17.6	Differences between Ku range(15) and averaged Ku range
52	RngKuMeasDiff(16)	m	F17.6	Differences between Ku range(16) and averaged Ku range
53	RngKuMeasDiff(17)	m	F17.6	Differences between Ku range(17) and averaged Ku range
54	RngKuMeasDiff(18)	m	F17.6	Differences between Ku range(18) and averaged Ku range
55	RngKuMeasDiff(19)	m	F17.6	Differences between Ku range(19) and averaged Ku range
56	RngKuMeasDiff(20)	m	F17.6	Differences between Ku range(20) and averaged Ku range
57	RangeC	m	F17.6	1 Hz C band range
58	RngCMeasDiff(1)	m	F17.6	Differences between C range(1) and averaged C range
59	RngCMeasDiff(2)	m	F17.6	Differences between C range(2) and averaged C range
60	RngCMeasDiff(3)	m	F17.6	Differences between C range(3) and averaged C range

Table B-4 GDR Dump Format (Continued)

Field	Name	Units	Fmt	Description
61	RngCMeasDiff(4)	m	F17.6	Differences between C range(4) and averaged C range
62	RngCMeasDiff(5)	m	F17.6	Differences between C range(5) and averaged C range
63	RngCMeasDiff(6)	m	F17.6	Differences between C range(6) and averaged C range
64	RngCMeasDiff(7)	m	F17.6	Differences between C range(7) and averaged C range
65	RngCMeasDiff(8)	m	F17.6	Differences between C range(8) and averaged C range
66	RngCMeasDiff(9)	m	F17.6	Differences between C range(9) and averaged C range
67	RngCMeasDiff(10)	m	F17.6	Differences between C range(10) and averaged C range
68	RngCMeasDiff(11)	m	F17.6	Differences between C range(11) and averaged C range
69	RngCMeasDiff(12)	m	F17.6	Differences between C range(12) and averaged C range
70	RngCMeasDiff(13)	m	F17.6	Differences between C range(13) and averaged C range
71	RngCMeasDiff(14)	m	F17.6	Differences between C range(14) and averaged C range
72	RngCMeasDiff(15)	m	F17.6	Differences between C range(15) and averaged C range
73	RngCMeasDiff(16)	m	F17.6	Differences between C range(16) and averaged C range
74	RngCMeasDiff(17)	m	F17.6	Differences between C range(17) and averaged C range
75	RngCMeasDiff(18)	m	F17.6	Differences between C range(18) and averaged C range
76	RngCMeasDiff(19)	m	F17.6	Differences between C range(19) and averaged C range
77	RngCMeasDiff(20)	m	F17.6	Differences between C range(20) and averaged C range
78	RangeKuRMS	m	F17.6	RMS of the Ku band range
79	RangeCRMS	m	F17.6	RMS of the C band range

Table B-4 GDR Dump Format (Continued)

Field	Name	Units	Fmt	Description
80	RangeKuPts	#	F6.0	number of valid points for Ku range
81	RangeCPts	#	F6.0	number of valid points for C range
82	NetInstRngKuCor	m	F17.6	net instrumental correction on Ku band range
83	NetInstRngCCor	m	F17.6	net instrumental correction on C band range
84	DryTropoCor	m	F17.6	model dry tropospheric correction
85	WetTropoCorr	m	F17.6	model wet tropospheric correction
86	RadWetTropoCor	m	F17.6	radiometer wet tropospheric correction
87	AltIonoCorKu	m	F17.6	altimeter ionospheric correction on Ku band
88	DorisIonoCorKu	m	F17.6	Doris iono correction on Ku band
89	SeaStBiasCorKu	m	F17.6	sea state bias correction in Ku-band
90	SeaStBiasCorC	m	F17.6	sea state bias correction in C-band
91	CompSeaStBiasCor	m	F17.6	composite sea state bias correction
92	SWHKu	m	F17.6	Ku band significant waveheight
93	SWHC	m	F17.6	C band significant waveheight
94	SWHKuRMS	m	F17.6	RMS of the Ku band significant waveheight
95	SWHCRMS	m	F17.6	RMS of the C band significant waveheight
96	SWHKuPts	#	F6.0	number of valid points to compute ku SWH
97	SWHCPts	#	F6.0	number of valid points to compute c SWH
98	NetInstSWHKuCor	m	F17.6	net instrumental correction on Ku band significant waveheight
99	NetInstSWHCCor	m	F17.6	net instrumental correction on C band significant waveheight
100	Sigma0Ku	dB	F17.6	Ku band backscatter coefficient
101	Sigma0C	dB	F17.6	C band backscatter coefficient
102	Sigma0KuRMS	dB	F17.6	RMS of the Ku band backscatter coefficient
103	Sigma0CRMS	dB	F17.6	RMS of the C band backscatter coefficient
104	Sigma0KuPts	#	F6.0	number of valid points to compute Ku backscatter coefficient
105	Sigma0CPts	#	F6.0	number of valid points to compute C backscatter coefficient
106	AGCKu	dB	F17.6	Ku band AGC

Table B-4 GDR Dump Format (Continued)

Field	Name	Units	Fmt	Description
107	AGCC	dB	F17.6	C band AGC
108	AGCKuRMS	dB	F17.6	RMS of the Ku band AGC
109	AGCCRMS	dB	F17.6	RMS of the C band AGC
110	AGCKuPts	#	F6.0	number of valid points to compute Ku AGC
111	AGCCPts	#	F6.0	number of valid points to compute C AGC
112	NetInstSigKuCor	dB	F17.6	net instrumental correction on Ku band backscatter coefficient
113	NetInstSigCCor	dB	F17.6	net instrumental correction on C band backscatter coefficient
114	AtmosAttSigKuCor	dB	F17.6	Atmospheric attenuation correction on Ku band backscatter coefficient
115	AtmosAttSigCCor	dB	F17.6	Atmospheric attenuation correction on C band backscatter coefficient
116	OffnadirWFKu	deg	F17.6	Square Root of the squared off nadir angle computed from Ku waveforms (sign carried over)
117	OffnadirWFKuSqR	deg	F17.6	
118	OffnadirPlat	deg	F17.6	Square Root of the squared off nadir angle computed from platform data (sign carried over)
119	BrightTemp187	K	F17.6	18,7 GHz brightness temperature
120	BrightTemp238	K	F17.6	23,8 GHz brightness temperature
121	BrightTemp340	K	F17.6	34 GHz brightness temperature
122	MeanSeaSurf	m	F17.6	mean sea surface height
123	TPMeanSeaSurf	m	F17.6	TP along-track mean sea surface
124	Geoid	m	F17.6	geoid height
125	Bathymetry	m	F17.6	ocean depth/land elevation
126	InvBaroCor	m	F17.6	inverted barometer height correction
127	HfSeaSurfTopo	m	F17.6	High frequency fluctuations of the sea surface topography
128	GeoOceanTide1	m	F17.6	geocentric ocean tide height (solution 1)
129	GeoOceanTide2	m	F17.6	geocentric ocean tide height (solution 2)
130	EquilOcTide	m	F17.6	equilibrium long-period ocean tide height
131	NonEquilOcTide	m	F17.6	non_equilibrium long-period ocean tide height

Table B-4 GDR Dump Format (Continued)

Field	Name	Units	Fmt	Description
132	LoadTide1	m	F17.6	loading tide height for geocentric ocean tide solution 1
133	LoadTide2	m	F17.6	loading tide height for geocentric ocean tide solution 2
134	SolidEarthTide	m	F17.6	solid earth tide height
135	GeoPoleTide	m	F17.6	geocentric pole tide height
136	WindVectorU	cm/sec	F17.6	U component of the model wind vector
137	WindVectorV	cm/sec	F17.6	V component of the model wind vector
138	AltWindSpeed	cm/sec	F17.6	altimeter wind speed
139	RadWindSpeed	cm/ secs	F17.6	radiometer wind speed
140	RadWaterVapor	g/cm2	F17.6	radiometer water vapor content
141	RadLiquidWater	kg/cm2	F17.6	radiometer liquid water
142	ECMWFMetFlag	#	F6.0	ECMWF meteorological map available flag
143	RadBTempFlag	#	F6.0	Radiometer State Flag
144	RainFlag	#	F6.0	Rain Flag
145	IceFlag	#	F6.0	Ice Flag
146	InterpFlag	#	F6.0	MSS Interpolation Flag

Note: TAB delimited file

B.5 Highpassfilter Format

Table B-5 Highpassfilter Format

Field	Name	Units	Fmt	Description
1	swh_ku_moy	m	F7.3	mean of the Ku SWH
2	swh_ku_std	m	F7.3	standard deviation of the Ku SWH
3	swh_ku_min	m	F7.3	minimum value of the Ku SWH
4	swh_ku_max	m	F7.3	maximum value of the Ku SWH
5	lat_1	deg	F9.3	latitude of the first point of the considered time series
6	lat_2	deg	F9.3	latitude of the last point of the considered time series
7	lon_1	deg	F9.3	longitude of the first point of the considered time series
8	lon_2	deg	F9.3	longitude of the last point of the considered time series
9	nb_data_seg	#	I5	number of points of segment
10	sigma	cm	F18.6	RMS noise level

B.6 Highpassfilter Statistics Format

Table B-6 Highpassfilter Statistics Format

Field	Name	Units	Fmt	Description
1	year	#	I5	year
2	cycle	#	I5	cycle number
3	dayi	#	I5	first day of cycle
4	dayf	#	I5	last day of cycle
5	n	#	I7	number of segments
6	mean_swh	m	F7.3	mean of the distribution of the averaged Ku SWH (mean for each segment)
7	std_swh		F7.3	standard deviation of the distribution of the averaged Ku SWH
8	mean_nl		F7.3	mean of the distribution of the RMS noise level estimates
9	std_nl		F7.3	standard deviation of the distribution of the RMS noise level estimates
10	a		F7.3	the slope of the linear fit
11	sqrt(var-a)		F7.3	the error on the estimation of a
12	b		F7.3	the intercept of the linear fit
13	sqrt(var_b)		F7.3	the error in the estimation of b
14	nl_at_2	cm	F7.3	the noise level estimated at 2m Ku SWH from the fit

Appendix C
Database Table Definitions

C.1 Header Table Definition

Table C-1 JAS_GDR_HEADER Format

Field	Name	Units	Format	Description
1	Cycle_Number	#	NUMBER(3)	Cycle= 9.92 days
2	Pass_Number	#	NUMBER(3)	Pass = 3372.885 Seconds
3	File_Data Type	#	VARCHAR2(4)	Data Type (IGDR, GDR, SGDR)
4	Reference_Software	#	VARCHAR2(20)	Software ID Used to Create Product
5	Pass_Data_Count	#	VARCHAR2(5)	Number of 1Hz Measurements in Product File
6	Ocean_Pass_Data_Count	#	VARCHAR2(5)	Number of 1Hz Measurements over Ocean
7	Range_Offset	km	VARCHAR2(4)	Offset Added to Altitude (1300km)
8	Time_Shift_Mid_Frame	ms	VARCHAR2(10)	Offset for TimeTag First 20 Hz Waveforms
9	Time_Shift_Interval	ms	VARCHAR2(10)	Time Interval between 20 Hz Waveforms
10	NumNotOcean	cnts	NUMBER(5)	Number Ocean Data not used
11	NumBadAltData	cnts	NUMBER(5)	Number of Bad 1Hz Alt Data not used
12	NumBadAltCorr	cnts	NUMBER(5)	Number of Bad 1Hz Alt Instru Corr not used
13	NumBadRadData	cnts	NUMBER(5)	Number of Bad 1Hz Radiometer Data not used
14	NumDefValues	cnts	NUMBER(5)	Number of Default Values not used
15	NumBadOrbState	cnts	NUMBER(5)	Number of Bad Adjusted Orbit not used
16	NumFlgecmwf	cnts	NUMBER(5)	Number ECMWF meteorological map availability (not 0) not used
17	NumFlgtbinterp	cnts	NUMBER(5)	Number radiometer brightness temperatures interpolation Flag (not equal 0 or 1) not used

Table C-1 JAS_GDR_HEADER Format (Continued)

Field	Name	Units	Format	Description
18	NumFlgrain	cnts	NUMBER(5)	Number rain Flag (equal 1 (rain)) not used
19	NumFlgice	cnts	NUMBER(5)	Number ice Flag (equal 1 (ice)) not used
20	NumFlg0interp	cnts	NUMBER(5)	Number interpolation Flag (bit 0 mss) Bad not used
21	NumFlg1interp	cnts	NUMBER(5)	Number interpolation Flag (bit 1 - ocean tide sol1) Bad not used
22	NumFlg3interp	cnts	NUMBER(5)	Number interpolation Flag (bit 3 - met data) Bad not used
23	NumNotUsed	cnts	NUMBER(5)	Number of Data Records not used
24	NumBadQuality	cnts	NUMBER(5)	Number of Bad Data Quality not used
25	NumFlaggedBad	cnts	NUMBER(5)	Number of Flagged Bad Data not used
26	NumOutRange	cnts	NUMBER(5)	Number of Out-of-Range not used
27	FirstATB	date	VARCHAR2(24)	First measured UTC Time
28	FirstJ2K	sec	NUMBER(17,6)	First measured 2000 Epoch Time
29	Last ATB	date	VARCHAR2(24)	Last measured UTC Time
30	Last J2K	sec	NUMBER(17,6)	Last measured 2000 Epoch Time
31	First Latitude	deg	NUMBER(6,2)	First measured Latitude
32	Last Latitude	deg	NUMBER(6,2)	Last measured Latitude
33	First Longitude	deg	NUMBER(7,2)	First measured Longitude
34	Last Longitude	deg	NUMBER(7,2)	Last measured Longitude
35	NumDoublets	cnts	NUMBER(5)	Number of Doublets not used

C.2 Science Table Definition

Table C-2 JAS_GDR_SCIENCE Format

Field	Name	Units	Format	Description
1	TEpochSec	sec	NUMBER(16,3)	Converted to 2000 Epoch
2	ATB	date	VARCHAR2(24)	UTC Time
3	cycle	#	NUMBER(3)	Cycle = 9.92 days
4	pass	#	NUMBER(3)	Pass = 3372.885 seconds
5	AvgCount	#	NUMBER(5)	Nbr frames used in 60 sec avg
6	altitude	m	NUMBER(12,4)	1 Hz altitude of satellite
7	latitude	deg	NUMBER(12,6)	Latitude
8	longitude	deg	NUMBER(12,6)	Longitude
9	orb_alt_rate	cm/s	NUMBER(10,4)	orbital altitude rate
10	range_ku	m	NUMBER(12,4)	1 Hz Ku band range
11	range_c	m	NUMBER(12,4)	1 Hz C band range
12	range_rms_ku	m	NUMBER(10,4)	RMS of Ku Band Range
13	range_rms_c	m	NUMBER(10,4)	RMS of C Band Range
14	net_instr_corr_ku	m	NUMBER(10,4)	net instrumental correction Ku band range
15	net_instr_corr_c	m	NUMBER(10,4)	net instrumental correction C-Band range
16	model_dry_trop_corr	m	NUMBER(10,4)	model dry tropospheric correction
17	model_wet_trop_corr	m	NUMBER(10,4)	model wet tropospheric correction
18	rad_wet_tropo_corr	m	NUMBER(10,4)	radiometer wet tropospheric correction
19	iono_corr_alt_ku	m	NUMBER(10,4)	altimeter ionospheric correction Ku band
20	iono_corr_doris_ku	m	NUMBER(10,4)	Doris iono correction Ku band
21	sea_state_bias_ku	m	NUMBER(10,4)	sea state bias correction Ku band
22	sea_state_bias_c	m	NUMBER(10,4)	sea state bias correction C-band
23	sea_state_bias_comp	m	NUMBER(10,4)	composite sea state bias correction

Table C-2 JAS_GDR_SCIENCE Format (Continued)

Field	Name	Units	Format	Description
24	swh_ku	m	NUMBER(10,4)	Ku band significant waveheight
25	swh_c	m	NUMBER(10,4)	C band significant waveheight
26	swh_rms_ku	m	NUMBER(10,4)	RMS Ku band significant wave-height
27	swh_rms_c	m	NUMBER(10,4)	RMS C band significant wave-height
28	net_instr_corr_swh_ku	m	NUMBER(10,4)	net instrumental correction ku band swh
29	net_instr_corr_swh_c	m	NUMBER(10,4)	net instrumental correction on C band swh
30	sig0_ku	dB	NUMBER(10,4)	Ku band backscatter coefficient
31	sig0_c	dB	NUMBER(10,4)	C band backscatter coefficient
32	sig0_rms_ku	dB	NUMBER(10,4)	RMS of the Ku band backscatter coefficient
33	sig0_rms_c	dB	NUMBER(10,4)	RMS of the C band backscatter coefficient
34	agc_ku	dB	NUMBER(10,4)	Ku band AGC
35	agc_c	dB	NUMBER(10,4)	C band AGC
36	agc_rms_ku	dB	NUMBER(10,4)	RMS of the Ku band AGC
37	agc_rms_c	dB	NUMBER(10,4)	RMS of the C band AGC
38	net_instr_sig0_corr_ku	dB	NUMBER(10,4)	net instrumental correciton on Ku band backscatter coefficient
39	net_instr_sig0_corr_c	dB	NUMBER(10,4)	net instrumental correction on C band backscatter coefficient
40	atmos_sig0_corr_ku	dB	NUMBER(10,4)	Atmospheric attenuation correction on Ku band backscatter coefficient
41	atmos_sig0_corr_c	dB	NUMBER(10,4)	Atmospheric attentuation correction on C band backscatter coefficient
42	off_nadir angle_ku_wvf	deg	NUMBER(10,4)	Square root of the squared off nadir angle computed from Ku waveforms (sign carried over)

Table C-2 JAS_GDR_SCIENCE Format (Continued)

Field	Name	Units	Format	Description
43	off_nadir_angle_ptf	deg	NUMBER(10,4)	Square root of the squared off nadir angle computed from platform data (sign carried over)
44	tb_187	K	NUMBER(10,4)	18,7 GHz brightness temperature
45	tb_238	K	NUMBER(10,4)	23,8 GHz brightness temperature
46	tb_340	K	NUMBER(10,4)	34 GHz brightness temperature
47	mss	m	NUMBER(10,4)	mean sea surface height
48	mss_tp_along_trk	m	NUMBER(16,4)	TP along-track mean sea surface
49	geoid	m	NUMBER(10,4)	geoid height
50	bathymetry	m	NUMBER(10,4)	ocean depth/land elevation
51	inv_bar_corr	m	NUMBER(10,4)	inverted barometer height correction
52	hf_fluctuations_corr	m	NUMBER(10,4)	High frequency fluctuations of the sea surface topography
53	ocean_tide_sol1	m	NUMBER(10,4)	geocentric ocean tide height (solution 1)
54	ocean_tide_sol2	m	NUMBER(10,4)	geocentric ocean tide height (solution 2)
55	load_tide_sol1	m	NUMBER(10,4)	loading tide height for geocentric ocean tide solution 1
56	load_tide_sol2	m	NUMBER(10,4)	loading tide height for geocentric ocean tide solution 2
57	solid_earth_tide	m	NUMBER(10,4)	solid earth tide height
58	pole_tide	m	NUMBER(10,4)	geocentric pole tide height
59	wind_speed_model_u	cm/s	NUMBER(10,4)	U component of the model wind vector
60	wind_speed_model_v	cm/s	NUMBER(10,4)	V component of the model wind vector
61	wind_speed_alt	m/s	NUMBER(10,4)	altimeter wind speed
62	wind_speed_rad	m/s	NUMBER(10,4)	radiometer wind speed
63	rad_water_vapor	g/cm2	NUMBER(10,4)	radiometer water vapor content
64	rad_liquid_water	kg/cm2	NUMBER(10,4)	radiometer liquid water

Table C-2 JAS_GDR_SCIENCE Format (Continued)

Field	Name	Units	Format	Description
65	CorrRangeKu	m	NUMBER(12,4)	range_ku + rad_wet_tropo_corr + model_dry_tropo_corr + iono_corr_alt_ku + sea_state_bias_ku (per 3.3 Altimeter Range)
66	SeaSurfHeight	m	NUMBER(12,4)	altitude - CorrRangeKu (per 3.4 SeaSurfHeight)
67	SeaLvlAnomaly	m	NUMBER(10,4)	SeaSurfHeight - mss - ocean_tide_sol1 - solid_earth_tide - inv_bar_corr (per G. Hayne)
68	NumORrngnumval	cnts	NUMBER(5)	Number of valid points ku range “Out-of-Range”
69	NumORrngrms	cnts	NUMBER(5)	Number of rms ku range “Out-of-Range”
70	NumORsealevelanom	cnts	NUMBER(5)	Number of sea level anomaly “Out-of-Range”
71	NumORdrytropocorr	cnts	NUMBER(5)	Number of model dry tropospheric correction “Out-of-Range”
72	NumORwettropocorr	cnts	NUMBER(5)	Number of radiometer wet tropospheric correction “Out-of-Range”
73	NumORionocorrk	cnts	NUMBER(5)	Number of ionospheric correction ku “Out-of-Range”
74	NumORseastatebias	cnts	NUMBER(5)	Number of sea state bias correction “Out-of-Range”
75	NumORoceantide	cnts	NUMBER(5)	Number of ocean tide correction solution 1 “Out-of-Range”
76	NumORsolidearth	cnts	NUMBER(5)	Number of solid earth tide correction “Out-of-Range”
77	NumORpoletide	cnts	NUMBER(5)	Number of pole tide correction “Out-of-Range”
78	NumORswhku	cnts	NUMBER(5)	Number of significant waveheight ku “Out-of-Range”
79	NumORsig0	cnts	NUMBER(5)	Number of sigma0 ku (backscatter) “Out-of-Range”
80	NumORoffnadirwvf	cnts	NUMBER(5)	Number of Off Nadir from ku waveforms “Out-of-Range”

Table C-2 JAS_GDR_SCIENCE Format (Continued)

Field	Name	Units	Format	Description
81	NumORaltwindspd	cnts	NUMBER(5)	Number of altimeter wind speed "Out-of-Range"
82	NumORaltrngku	cnts	NUMBER(5)	Number of (altitude - range_ku) "Out-of-Range"

C.3 Summary Table Definition

Table C-3 JAS_GDR_SUMMARY Format

Field	Name	Units	Format	Description
1	TEpochSec	sec	NUMBER(16,3)	Converted to 2000 Epoch
2	ATB	date	VARCHAR2(24)	UTC Time
3	cycle	#	NUMBER(3)	Cycle = 9.92 days
4	RecCount	#	NUMBER(8)	Nbr frames used in 60 sec avg
5	altitude	m	NUMBER(12,4)	1 Hz altitude of satellite
8	orb_alt_rate	cm/s	NUMBER(10,4)	orbital altitude rate
9	range_ku	m	NUMBER(12,4)	1 Hz Ku band range
10	range_c	m	NUMBER(12,4)	1 Hz C band range
11	range_rms_ku	m	NUMBER(10,4)	RMS of Ku Band Range
12	range_rms_c	m	NUMBER(10,4)	RMS of C Band Range
13	net_instr_corr_ku	m	NUMBER(10,4)	net instrumental correction Ku band range
14	net_instr_corr_c	m	NUMBER(10,4)	net instrumental correction C-Band range
15	model_dry_trop_corr	m	NUMBER(10,4)	model dry tropospheric correction
16	model_wet_trop_corr	m	NUMBER(10,4)	model wet tropospheric correction
17	rad_wet_tropo_corr	m	NUMBER(10,4)	radiometer wet tropospheric correction
18	iono_corr_alt_ku	m	NUMBER(10,4)	altimeter ionospheric correction Ku band
19	iono_corr_doris_ku	m	NUMBER(10,4)	Doris iono correction Ku band
20	sea_state_bias_ku	m	NUMBER(10,4)	sea state bias correction Ku band
21	sea_state_bias_c	m	NUMBER(10,4)	sea state bias correction C-band
22	sea_state_bias_comp	m	NUMBER(10,4)	composite sea state bias correction
23	swh_ku	m	NUMBER(10,4)	Ku band significant waveheight
24	swh_c	m	NUMBER(10,4)	C band significant waveheight

Table C-3 JAS_GDR_SUMMARY Format

Field	Name	Units	Format	Description
25	swh_rms_ku	m	NUMBER(10,4)	RMS Ku band significant wave-height
26	swh_rms_c	m	NUMBER(10,4)	RMS C band significant wave-height
27	net_instr_corr_swh_ku	m	NUMBER(10,4)	net instrumental correction ku band swh
28	net_instr_corr_swh_c	m	NUMBER(10,4)	net instrumental correction on C band swh
29	sig0_ku	dB	NUMBER(10,4)	Ku band backscatter coefficient
30	sig0_c	dB	NUMBER(10,4)	C band backscatter coefficient
31	sig0_rms_ku	dB	NUMBER(10,4)	RMS of the Ku band backscatter coefficient
32	sig0_rms_c	dB	NUMBER(10,4)	RMS of the C band backscatter coefficient
33	agc_ku	dB	NUMBER(10,4)	Ku band AGC
34	agc_c	dB	NUMBER(10,4)	C band AGC
35	agc_rms_ku	dB	NUMBER(10,4)	RMS of the Ku band AGC
36	agc_rms_c	dB	NUMBER(10,4)	RMS of the C band AGC
37	net_instr_sig0_corr_ku	dB	NUMBER(10,4)	net instrumental correciton on Ku band backscatter coefficient
38	net_instr_sig0_corr_c	dB	NUMBER(10,4)	net instrumental correction on C band backscatter coefficient
39	atmos_sig0_corr_ku	dB	NUMBER(10,4)	Atmospheric attenuation correction on Ku band backscatter coefficient
40	atmos_sig0_corr_c	dB	NUMBER(10,4)	Atmospheric attentuation correction on C band backscatter coefficient
41	off_nadir angle_ku_wvf	deg	NUMBER(10,4)	Square root of the squared off nadir angle computed from Ku waveforms (sign carried over)
42	off_nadir_angle_ptf	deg	NUMBER(10,4)	Square root of the squared off nadir angle computed from platform data (sign carried over)
43	tb_187	K	NUMBER(10,4)	18,7 GHz brightness temperature

Table C-3 JAS_GDR_SUMMARY Format

Field	Name	Units	Format	Description
44	tb_238	K	NUMBER(10,4)	23,8 GHz brightness temperature
45	tb_340	K	NUMBER(10,4)	34 GHz brightness temperature
46	mss	m	NUMBER(10,4)	mean sea surface height
47	mss_tp_along_trk	m	NUMBER(16,4)	TP along-track mean sea surface
48	geoid	m	NUMBER(10,4)	geoid height
49	bathymetry	m	NUMBER(10,4)	ocean depth/land elevation
50	inv_bar_corr	m	NUMBER(10,4)	inverted barometer height correction
51	hf_fluctuations_corr	m	NUMBER(10,4)	High frequency fluctuations of the sea surface topography
52	ocean_tide_sol1	m	NUMBER(10,4)	geocentric ocean tide height (solution 1)
53	ocean_tide_sol2	m	NUMBER(10,4)	geocentric ocean tide height (solution 2)
54	load_tide_sol1	m	NUMBER(10,4)	loading tide height for geocentric ocean tide solution 1
55	load_tide_sol2	m	NUMBER(10,4)	loading tide height for geocentric ocean tide solution 2
56	solid_earth_tide	m	NUMBER(10,4)	solid earth tide height
57	pole_tide	m	NUMBER(10,4)	geocentric pole tide height
58	wind_speed_model_u	cm/s	NUMBER(10,4)	U component of the model wind vector
59	wind_speed_model_v	cm/s	NUMBER(10,4)	V component of the model wind vector
60	wind_speed_alt	m/s	NUMBER(10,4)	altimeter wind speed
61	wind_speed_rad	m/s	NUMBER(10,4)	radiometer wind speed
62	rad_water_vapor	g/cm2	NUMBER(10,4)	radiometer water vapor content
63	rad_liquid_water	kg/cm2	NUMBER(10,4)	radiometer liquid water

Table C-3 JAS_GDR_SUMMARY Format

Field	Name	Units	Format	Description
64	CorrRangeKu	m	NUMBER(12,4)	range_ku + rad_wet_tropo_corr + model_dry_tropo_corr + iono_corr_alt_ku + sea_state_bias_ku (per 3.3 Altimeter Range)
65	SeaSurfHeight	m	NUMBER(12,4)	altitude - CorrRangeKu (per 3.4 SeaSurfHeight)
66	SeaLvlAnomaly	m	NUMBER(10,4)	SeaSurfHeight - mss - ocean_tide_sol1 - solid_earth_tide - inv_bar_corr (per G. Hayne)
67	NumORrngnumval	cnts	NUMBER(5)	Number of valid points ku range “Out-of-Range”
68	NumORrngrms	cnts	NUMBER(5)	Number of rms ku range “Out-of-Range”
69	NumORsealevelanom	cnts	NUMBER(5)	Number of sea level anomaly “Out-of-Range”
70	NumORdrytropocorr	cnts	NUMBER(5)	Number of model dry tropospheric correction “Out-of-Range”
71	NumORwettropocorr	cnts	NUMBER(5)	Number of radiometer wet tropospheric correction “Out-of-Range”
72	NumORionocorrk	cnts	NUMBER(5)	Number of ionospheric correction ku “Out-of-Range”
73	NumORseastatebias	cnts	NUMBER(5)	Number of sea state bias correction “Out-of-Range”
74	NumORoceantide	cnts	NUMBER(5)	Number of ocean tide correction solution 1 “Out-of-Range”
75	NumORsolidearth	cnts	NUMBER(5)	Number of solid earth tide correction “Out-of-Range”
76	NumORpoletide	cnts	NUMBER(5)	Number of pole tide correction “Out-of-Range”
77	NumORswhku	cnts	NUMBER(5)	Number of significant waveheight ku “Out-of-Range”
78	NumORsig0	cnts	NUMBER(5)	Number of sigma0 ku (backscatter) “Out-of-Range”
79	NumORoffnadirwvf	cnts	NUMBER(5)	Number of Off Nadir from ku waveforms “Out-of-Range”

Table C-3 JAS_GDR_SUMMARY Format

Field	Name	Units	Format	Description
80	NumORaltwindspd	cnts	NUMBER(5)	Number of altimeter wind speed “Out-of-Range”
81	NumORaltrngku	cnts	NUMBER(5)	Number of (altitude - range_ku) “Out-of-Range”

Appendix D
Database Scripts

D.1 Script for Loading Database Tables

```
#!/bin/sh
#
# load_jason_gdr_db.sh [FTYPE] [TEMPDIR] [FILENAME]
#==============================================================
#
# Handle Errors
#
handle_error()
{
  mv $PROCDIR/$FILENAME $ERRORDIR/$FILENAME
  MAILF="/tmp/mail.$$"
  echo "ERROR - No config file exists in $CONFDIR for $FILENAME" > $MAILF
  echo "        Bad file has been moved into $ERRORDIR" >> $MAILF
  $BINMAIL -s "Bad file in $PROCDIR" "$OPERATOR" < $MAILF
  rm -f $MAILF
  echo `date +"%D %T"`"\tproc_config.sh \t" \
    "Error: Cannot process $FILENAME, " \
    " copied to $ERRORDIR."
  exit 1
}
#
#==============================================================
#
# Main Routine
#
# Include globals
#
```

```
. $HOME/bin/config.incl
#
# Set arguments
#
FTYPE=$1
TEMPDIR=$2
FILENAME=$3
#
# Set project
#
PROJECT="jason"
PROCDIR="$ROOTDIR/proc"
CONFDIR="$ROOTDIR/config"
LOGDIR="$ROOTDIR/log"
LOGFILE="$LOGDIR/$PROJECT.log"
LOADLOGFILE="$LOGDIR/$FILENAME.$$.log"
LOADFILE="$LOGDIR/sqlload.log"
DBTEMP="$ROOTDIR/dbtemp"
BADDIR="$ROOTDIR/bad"
OUTDIR="$ROOTDIR/out"
#
if [ "$FTYPE" = “jasD” ]; then
  BASE=`basename $FILENAME`
  EXT=`echo $BASE | awk -F. '{printf "%s", $2}'`
  BASE1=`echo $BASE | awk -F. '{printf "%s", $1}'`
  CYCLE=`echo $BASE1 | awk '{printf "%s",substr($0,10,3)}'`
  CYCLE=`expr $CYCLE`
  EXT=`$BINDIR/toupper.sh "$EXT"`
# mate to header is either .IGD or .GDR, use *G* to find either one
  MATE1="$DBTEMP/$BASE1."*G*
# mate to .IGD or .GDR is .HDR
```

```
MATE2="$DBTEMP/$BASE1.HDR"
  case "$EXT"  in
    "HDR")
        CONTROL="jas_gdr_header.ctl"
        ;;
    "IGD")
        CONTROL="jas_gdr_science.ctl"
         ;;
  "GDR")
        CONTROL="jas_gdr_science.ctl"
        ;;
  *)
        (handle_error) >> $LOGFILE
        ;;
esac
#
 echo `date +"%D %T"`"\tproc_$PROJECT    \t" \
      "Loading Oracle with $CONTROL, file $DBTEMP/$FILENAME." >> $LOGFILE
#
# run SQL Loader to load the data into the database
#
 ( $ORACLE_HOME/bin/sqlldr jason@prod/t2gjg control="$BINDIR/$CON-
TROL"  \
   data="$DBTEMP/$FILENAME"  log="$LOADLOGFILE" )
#
# Print results of database load by grepping the log file.
#
egrep -e "File|Rows|Total" $LOADLOGFILE > out.lis; /gen/topex/bin/lprt topex4
out.lis
#
BADFILE="$BASE1.bad"
```

```
if [ -f $BINDIR/$BADFILE ]; then
  mv $BINDIR/$BADFILE $BADDIR/$BADFILE
fi
rm $LOADLOGFILE
#
# when both the hdr and sci files are available, run the stored procedure,
#   jason_load_gdr1, to update the data in the database
#
  SCRIPTNAME=jason_load_gdr.sql
  SCRIPTERROR=0
  PROCNAME=jason_load_gdr1
  LOCK="$DBTEMP/$BASE1.lock"
  PROCESS=1
  REQUIRE="$MATE1 $MATE2"
#
# check to see if both the header and science files are available, if so process
#
  for TARGET in $REQUIRE
    do
      if [ ! -f $TARGET -o -f $TARGET.lock ]; then
         PROCESS=0
      fi
    done
  if [ $PROCESS -eq 1 -a ! -f $LOCK ] ; then
     touch $LOCK
     SCRIPTOUTPUT=$LOGDIR/temp.$$.out
     cat /dev/null > $SCRIPTOUTPUT
#
# run procedure to move files from the temporary tables to the permanent tables
#
     echo `date +"%D %T"`"\tproc_$PROJECT    \t" \
```

```
        "Running Procedure $PROCNAME, file $DBTEMP/$FILENAME." >> $LOG-
FILE
#
  $ORACLE_HOME/bin/sqlplus -s jason@prod/t2gjg @$BINDIR/$SCRIPTNAME
> $SCRIPTOUTPUT
#
# check success of procedure
#
   SCRIPTERROR=$?
   cat $SCRIPTOUTPUT | grep 'SP2-|ORA-'
   GREPOUTPUT=$?
   if [ $GREPOUTPUT = 0 ]; then
     SCRIPTERROR=`expr $SCRIPTERROR + 1`
   fi
   if [ $SCRIPTERROR != 0 ]; then
     echo `date +"%D %T"`"\tproc_$PROJECT    \t" \
        "Error Running Procedure $PROCNAME, file $DBTEMP/$FILENAME." >>
$LOGFILE
     exit 99
   fi
#
   SCRIPTNAME=jason_process_summary.sql
   PROCNAME=jason_process_gdr_summary_new
#
# run procedure to update the summary table
#
   echo `date +"%D %T"`"\tproc_$PROJECT    \t" \
    "Running Procedure $PROCNAME, file $DBTEMP/$FILENAME." >> $LOGFILE
#
   $ORACLE_HOME/bin/sqlplus -s jason@prod/t2gjg @$BINDIR/$SCRIPTNAME
$CYCLE $CYCLE >> $SCRIPTOUTPUT
#
```

```
# check success of procedure
#
    SCRIPTERROR=$?
    grep 'SP2- | ORA-' $SCRIPTOUTPUT
    GREPOUTPUT=$?
    if [ $GREPOUTPUT = 0 ]; then
      SCRIPTERROR=`expr $SCRIPTERROR + 1`
    fi
    if [ $SCRIPTERROR != 0 ]; then
      echo `date +"%D %T"`"\tproc_$PROJECT    \t" \
         "Error Running Procedure $PROCNAME, file $DBTEMP/$FILENAME." >>
$LOGFILE
    fi
    rm $DBTEMP/$BASE1.*
    rm $SCRIPTOUTPUT
    rm out.lis
    exit 0
fi
else
 (handle_error) >> $LOGFILE
fi
#
# End of Processing
#
```

D.2 Script for Extracting Data for Launch-to-Date File

```
#! /bin/sh
#
# create_ltd_sum_file.sh [FTYPE] [TMPDIR] [FILENAME]
#
# Main Routine
#
# Include globals
#
. $HOME/bin/config.incl
#
# Set arguments
#
FTYPE=$1
TMPDIR=$2
FILENAME=$3
#
# Set project variables
#
PROJECT="jason"
PROCDIR="$ROOTDIR/proc"
LOGDIR="$ROOTDIR/log"
LOGFILE="$LOGDIR/$PROJECT.log"
#
# read file for cycle numbers
#
if [ -f $TMPDIR/$FILENAME ]; then
  read LINE < $TMPDIR/$FILENAME
  STARTCYCLE=`echo $LINE | awk -F: '{printf "%s",$1}'`
  STARTCYCLE=`expr $STARTCYCLE`
  ENDCYCLE=`echo $LINE | awk -F: '{printf "%s",$2}'`
```

```
 ENDCYCLE=`expr $ENDCYCLE`
#
# set process parameters
#
 SCRIPTNAME=jason_ltd_summary.sql
 SCRIPTOUTPUT=$LOGDIR/ltd.$$.out
 cat /dev/null > $SCRIPTOUTPUT
#
# run procedure to create the cycle summary report
#
 echo `date +"%D %T"`"\tproc_$PROJECT     \t" \
   "Running Procedure $SCRIPTNAME, for $STARTCYCLE, $ENDCYCLE." >>
$LOGFILE
#
 $ORACLE_HOME/bin/sqlplus -s jason@prod/t2gjg @$BINDIR/$SCRIPTNAME
$STARTCYCLE $ENDCYCLE > $SCRIPTOUTPUT
#
# check success of procedure
#
    SCRIPTERROR=$?
    grep ‘SP2- | ORA-’ $SCRIPTOUTPUT
    GREPOUTPUT=$?
    if [GREPOUTPUT = 0 ] ; then
      SCRIPTERROR=`expr $SCRIPTERROR + 1`
fi
    if   [ $SCRIPTERROR ! = 0 ]; then
      echo `date + “%D %T”`”/tproc_$PROJECT \t” \
        “Error Running $SCRIPTNAME, file $PROCDIR/$FILENAME.” >> $LOGFILE
fi
rm $SCRIPTOUTPUT
mv $ROOTDIR/out/jasLTDSum* $ROOTDIR/in/.
```

```
rm ltdfile.sql
exit 0
fi
exit 0
#
# End of processing
#
```

D.3 Script for Extracting Data for Cycle Summary File

```
#! /bin/sh
#
# create_cycle_sci_file.sh[FYTPE] [TMPDIR] [FILENAME]
#
# Main Routine
#
# Include globals
#
. $HOME/bin/config.incl
#
# Set arguments
#
FTYPE=$1
TMPDIR=$2
FILENAME=$3
#
# Set project variables
#
PROJECT="jason"
PROCDIR="$ROOTDIR/proc"
LOGDIR="$ROOTDIR/log"
LOGFILE="$LOGDIR/$PROJECT.log"
#
# read file for cycle numbers
#
if [ -f $TMPDIR/$FILENAME ]; then
  read LINE < $TMPDIR/$FILENAME
  STARTCYCLE=`echo $LINE | awk -F: '{printf "%s",$1}'`
  STARTCYCLE=`expr $STARTCYCLE`
  ENDCYCLE=`echo $LINE | awk -F: '{printf "%s",$2}'`
```

```
 ENDCYCLE=`expr $ENDCYCLE`
#
# set process parameters
#
 SCRIPTNAME=jason_cycle_science.sql
 SCRIPTOUTPUT=$LOGDIR/cycle.$$.out
 cat /dev/null > $SCRIPTOUTPUT
#
# run procedure to create the cycle summary report
#
 echo `date +"%D %T"`"\tproc_$PROJECT     \t" \
   "Running Procedure $SCRIPTNAME, for $STARTCYCLE, $ENDCYCLE." >>
$LOGFILE
#
 $ORACLE_HOME/bin/sqlplus -s jason@prod/t2gjg @$BINDIR/$SCRIPTNAME
$STARTCYCLE $ENDCYCLE > $SCRIPTOUTPUT
#
# check success of procedure
#
    SCRIPTERROR=$?
    grep 'SP2- | ORA-' $SCRIPTOUTPUT
    GREPOUTPUT=$?
    if [ $GREPOUTPUT = 0 ] ; then
      SCRIPTERROR=`expr $SCRIPTERROR + 1`
    fi
    if   [ $SCRIPTERROR ! = 0 ]; then
      echo `date + "%D %T"`"/tproc_$PROJECT \t" \
        "Error Running $SCRIPTNAME, file $PROCDIR/$FILENAME." >> $LOGFILE
fi
rm $SCRIPTOUTPUT
mv $ROOTDIR/out/jasCycleSci* $ROOTDIR/in/.
```

```
rm cyclefile.sql
exit 0
fi
exit 0
#
# End of processing
#
```

Appendix E
Software Matrix

Table E-1 Software Matrix

	Execution Process	Software/Oracle Utility	Data Source	Output Products/Files
E.1	UNIX script: jasongdrpass (filename)	jasongdrpass.pro readjasongdravg.proj readjasongdrhdr.pro	10-second Science Average File (Appendix B.3)	I/GDR Pass Plots (Appendix F.1)
E.2	UNIX script: jasoncycletrend (filename)	jasoncycletrend.pro readjasontrend.pro readjasonhdr.pro	Cycle Summary File (Appendix C.3)	I/GDR Launch-to-Date Trend Plot (Appendix F.2)
E.3	UNIX script: jasongdrhist (filename)	jasongdrhist.pro readjasongdrdbf.pro	60-second Science Database File (Appendix B.1 & B.2) (Appendix C.1 & C.2)	I/GDR Cycle History Plot (Appendix F.3)
E.4	UNIX script: jasongdravg (filename)	jasongdravg.pro readjasongdravg.pro	(Any Rate) Science Average File (Appendix B.3)	I/GDR Parameter Plot (Appendix F.6)
E.5	Binary file: highpassfilter_jas_1min (filename) UNIX script: do_highpassfilter_jas_1min	highpassfilter_jas_1min.f	1-second Science Average File (Appendix B.3)	OUT_do_highpassfilter_jas_1min
E.6	Binary file: do_stats_jas_1min	do_stats_jas.1min.f	OUT_do_highpassfilter_jas_1min	OUT_do_stats_jas_1min
E.7	Binary file: IGDR_reader (control file)	IGDR_reader.f90 IGDR_alg_mod.f90 IGDR_avg_mod.f90 IGDR_prod_mod.f90 IGDR_computeSLA_mod.f90 IGDR_scal_mod.f90 IGDR_db_mod.f90 IGDR_hdr_mod.f90 IGDR_defs_mod.f90 IGDR_filter_mod.f90 IGDR_mod.f90 IGDR_read_mod.f90 eCntl_mod.f90 getControl_mod.f90	Jason-1 Raw I/GDR pass files (see Section 2.1 publications)	See Table 4-3 for possible products.
E.8	UNIX script: load_jas_gdr_db.sh sqlldr jason@prod/password control=jas_gdr_header.ctl data=jasDBCycle###.HDR See Note 1	SQLLoader	Concatenated header records for cycle	temp_jas_gdr_header table
E.9	UNIX script: load_jas_gdr_db.sh sqlldr jason@prod/password control=jas_gdr_science.ctl data=jasDBCycle###.IGD See Note 2	SQLLoader	Concatenated 60-second average science records for cycle	temp_jas_gdr_science table
E.10	UNIX script: load_jas_gdr_db.sh sqlplus –s jason@prod/password @jason_load_gdr.sql See Note 3	SQLPlus	temp_jas_gdr_header table temp_jas_gdr_science table	jas_gdr_science table jas_gdr_header table
E.11	UNIX script: load_jas_gdr_db.sh sqlplus –s jason@prod/password @jason_process_summary.sql BeginCycle EndCycle See Note 4	SQLPlus	jas_gdr_science table jas_gdr_header table	jas_gdr_summary table

Table E-1 Software Matrix

	Execution Process	Software/Oracle Utility	Data Source	Output Products/Files
E.12	UNIX script: create_cycle_sci_file.sh sqlplus –s jason@prod/password @jason_cycle_science.sql StartCycle EndCycle	SQLPlus	jas_gdr_header table jas_gdr_science table	jasCycleSci###-###.HDR jasCycleSci###-###.GDR where ### is the cycle number
E.13	UNIX script: create_ltd_sum_file.sh sqlplus –s jason@prod/password @jason_ltd_summary.sql StartCycle EndCycle	SQLPlus	jas_gdr_summary table	jasLTDSumGDR

Note 1: Load the header data into temporary header table.
Note 2: Load the science data into temporary science table.
Note 3: Once both header and science data have been loaded into the temporary tables, the data is checked for existing entries, and the header and science tables are updated.
Note 4: Update the summary table with the summarized science data for the cycle.

Appendix F

Product Samples

F.1 Jason-1 I/GDR Pass Plot

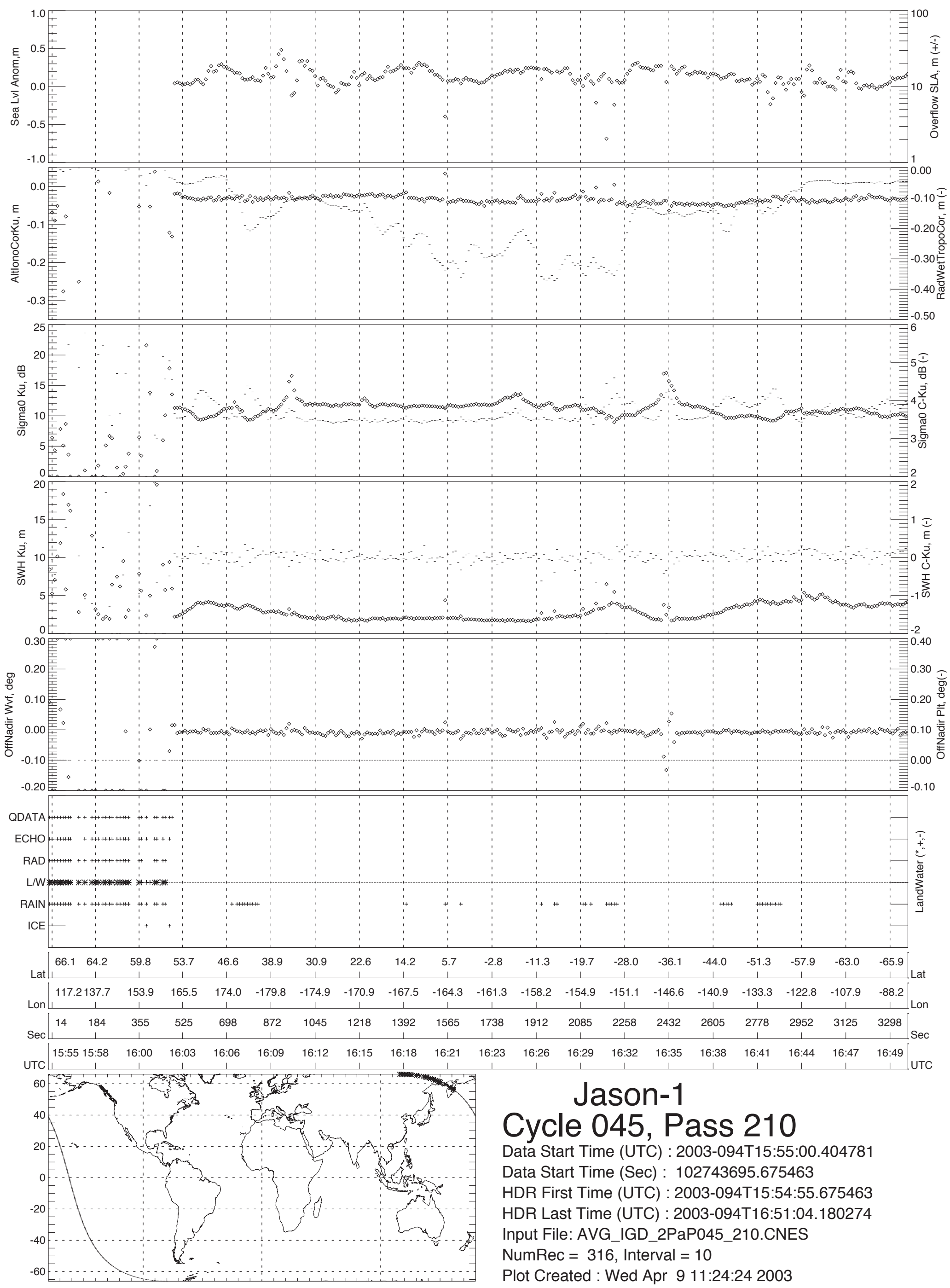


Figure F-1 Jason-1 I/GDR Pass Plot

F.2 Jason-1 I/GDR Cycle Trend Plot

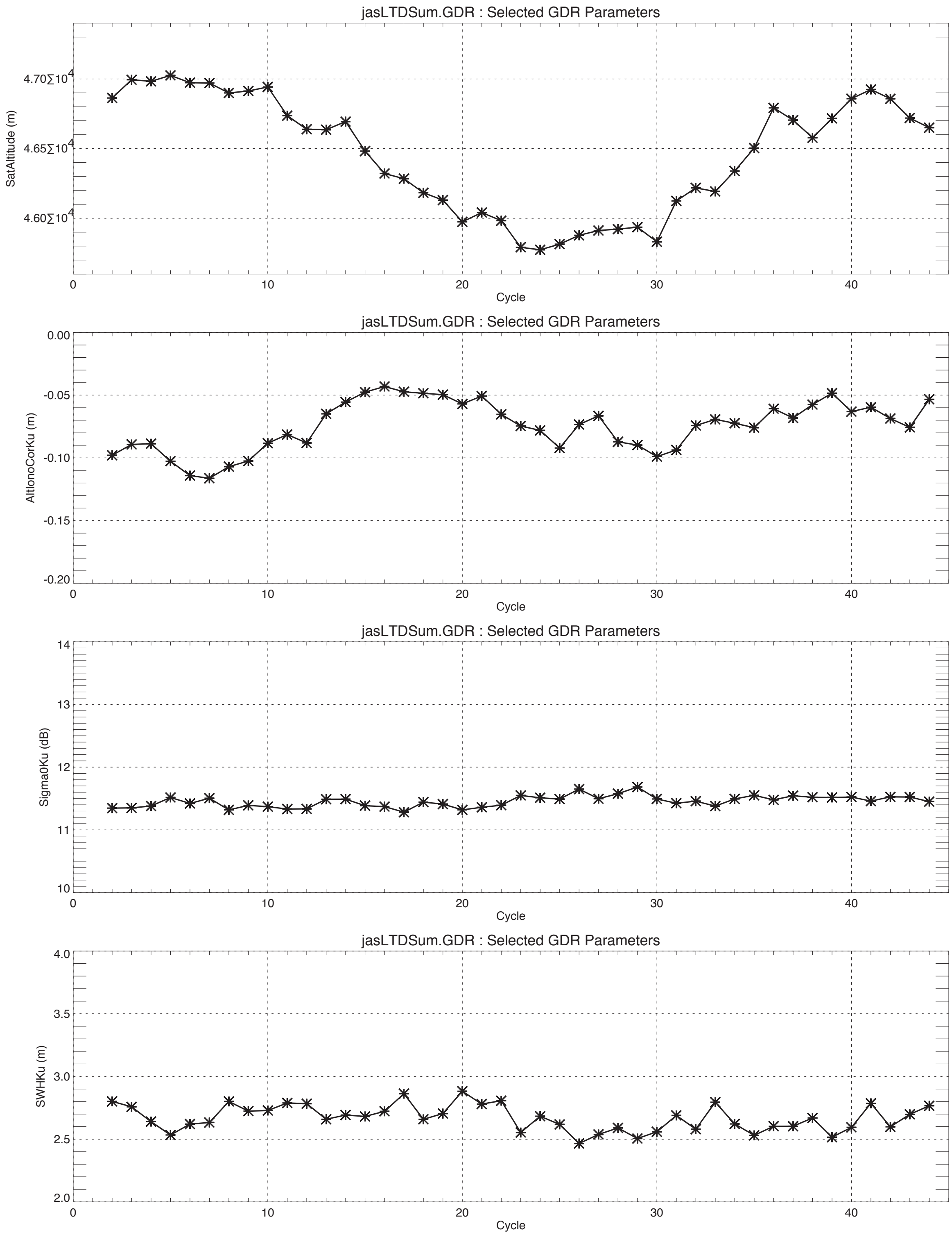


Figure F-2 Jason-1 I/GDR Cycle Trend Plot

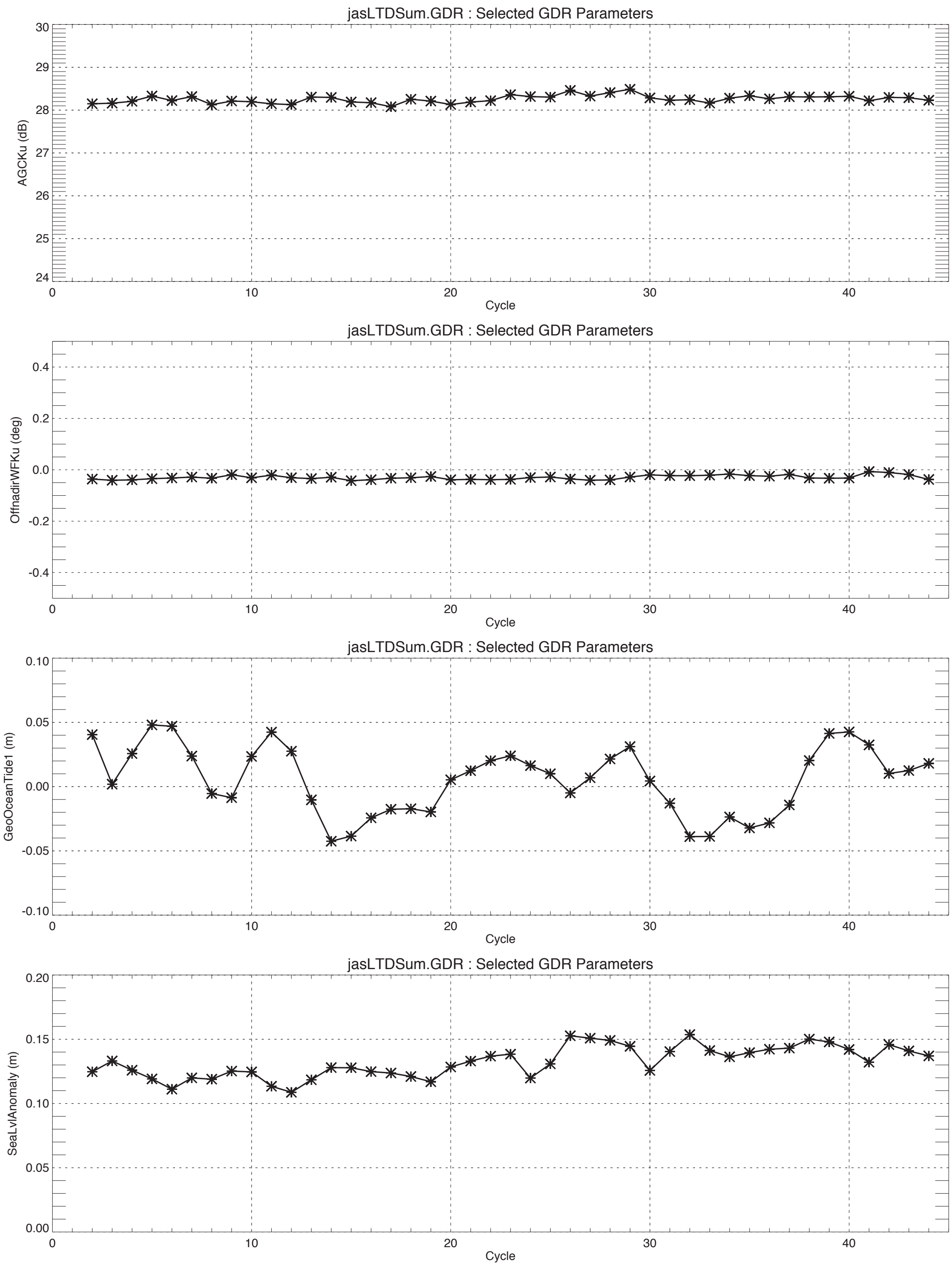


Figure F-2 Jason-1 I/GDR Cycle Trend Plot (Continued)

F.3 Jason-1 I/GDR Cycle History Plot

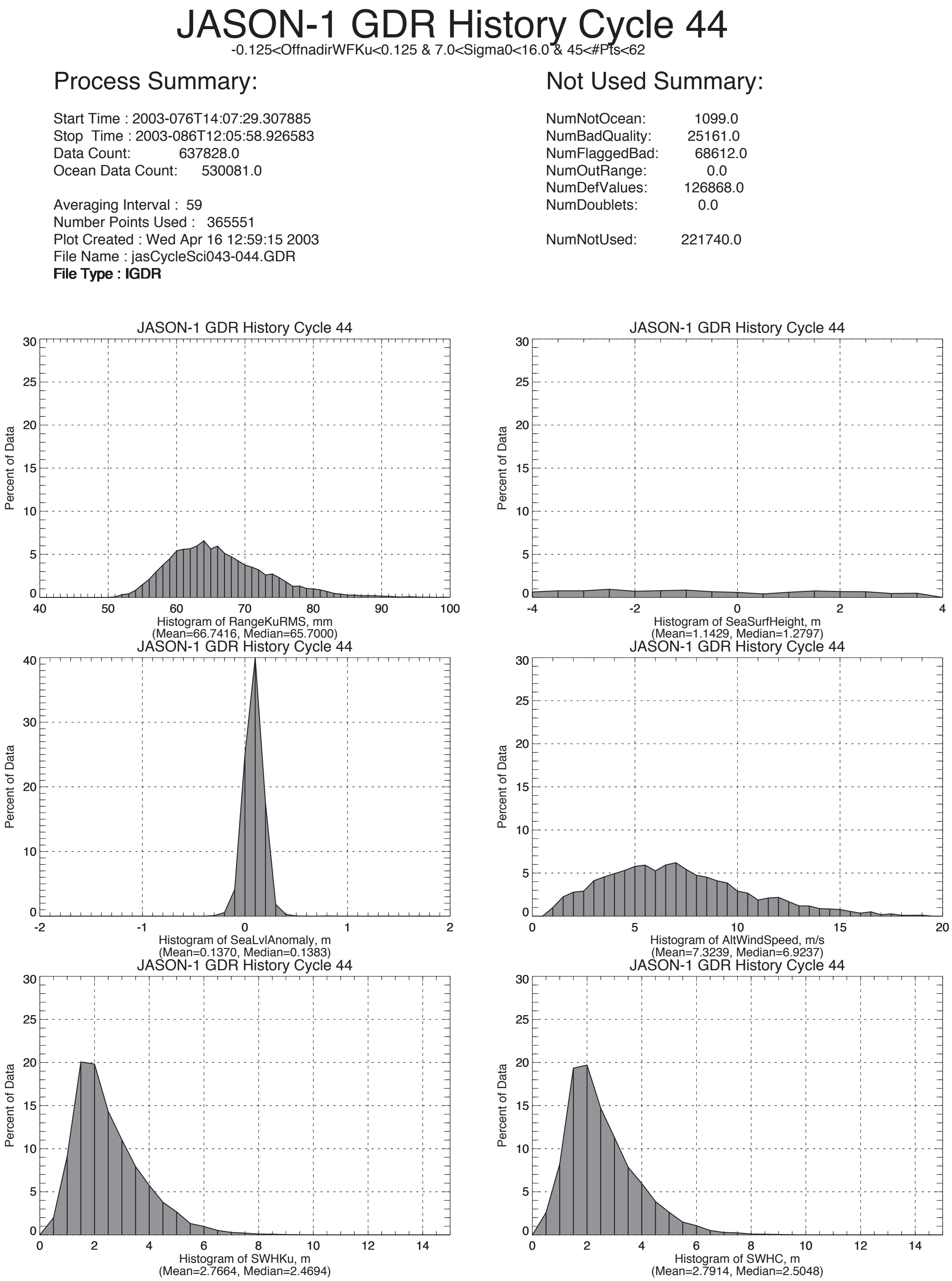


Figure F-3 Jason-1 I/GDR Cycle History Plot

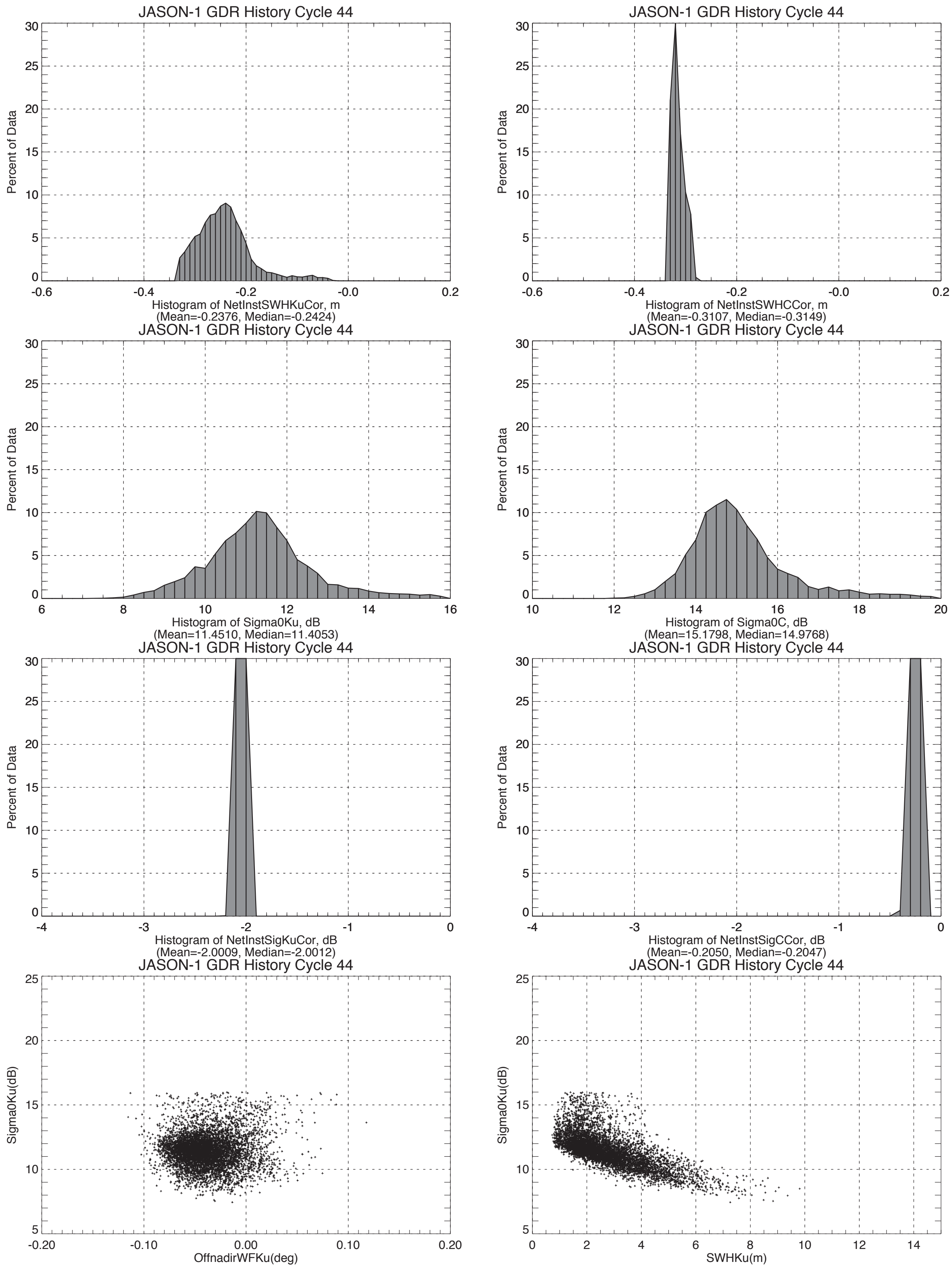


Figure F-3 Jason-1 I/GDR Cycle History Plot (Continued)

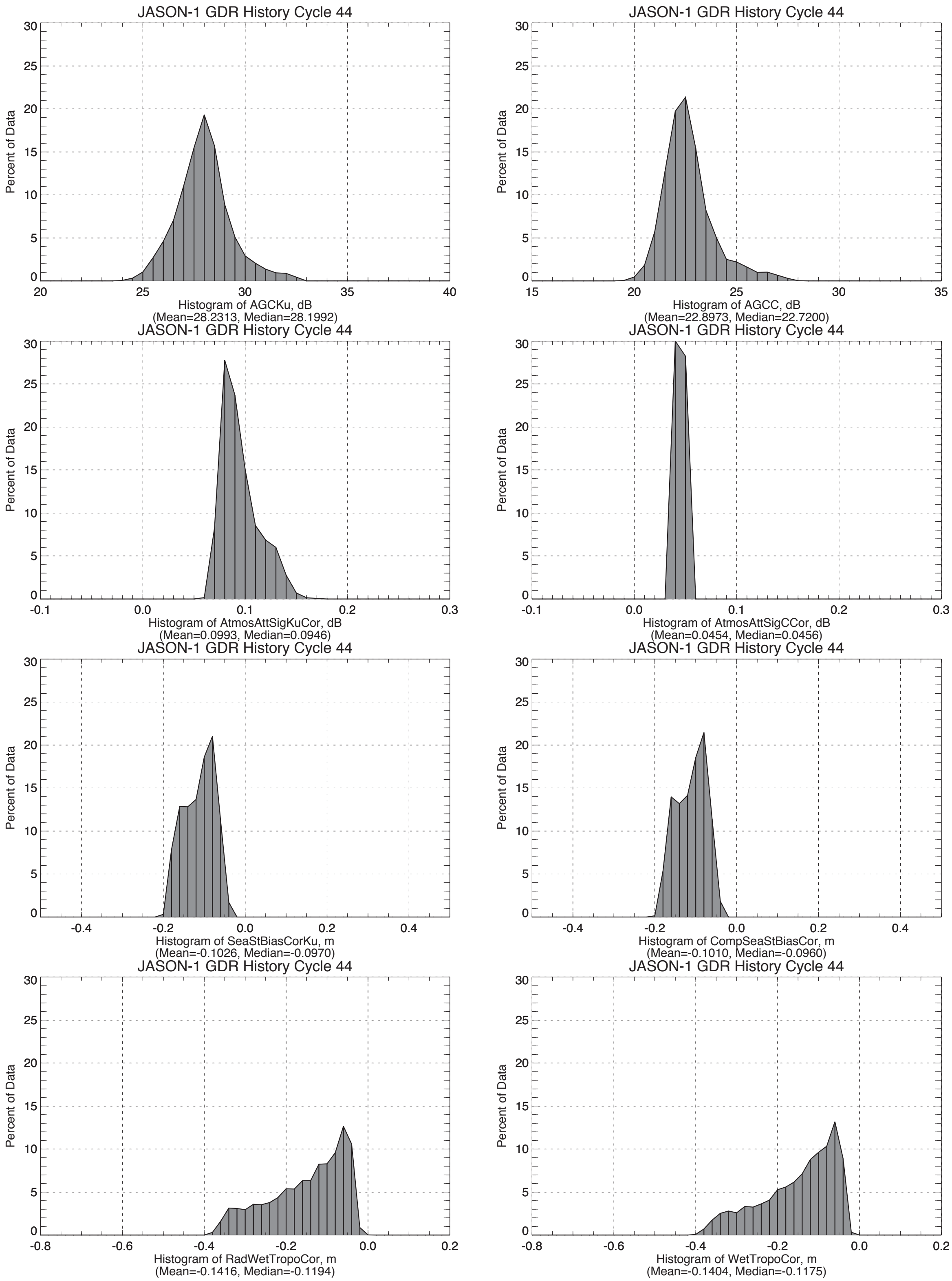


Figure F-3 Jason-1 I/GDR Cycle History Plot (Continued)

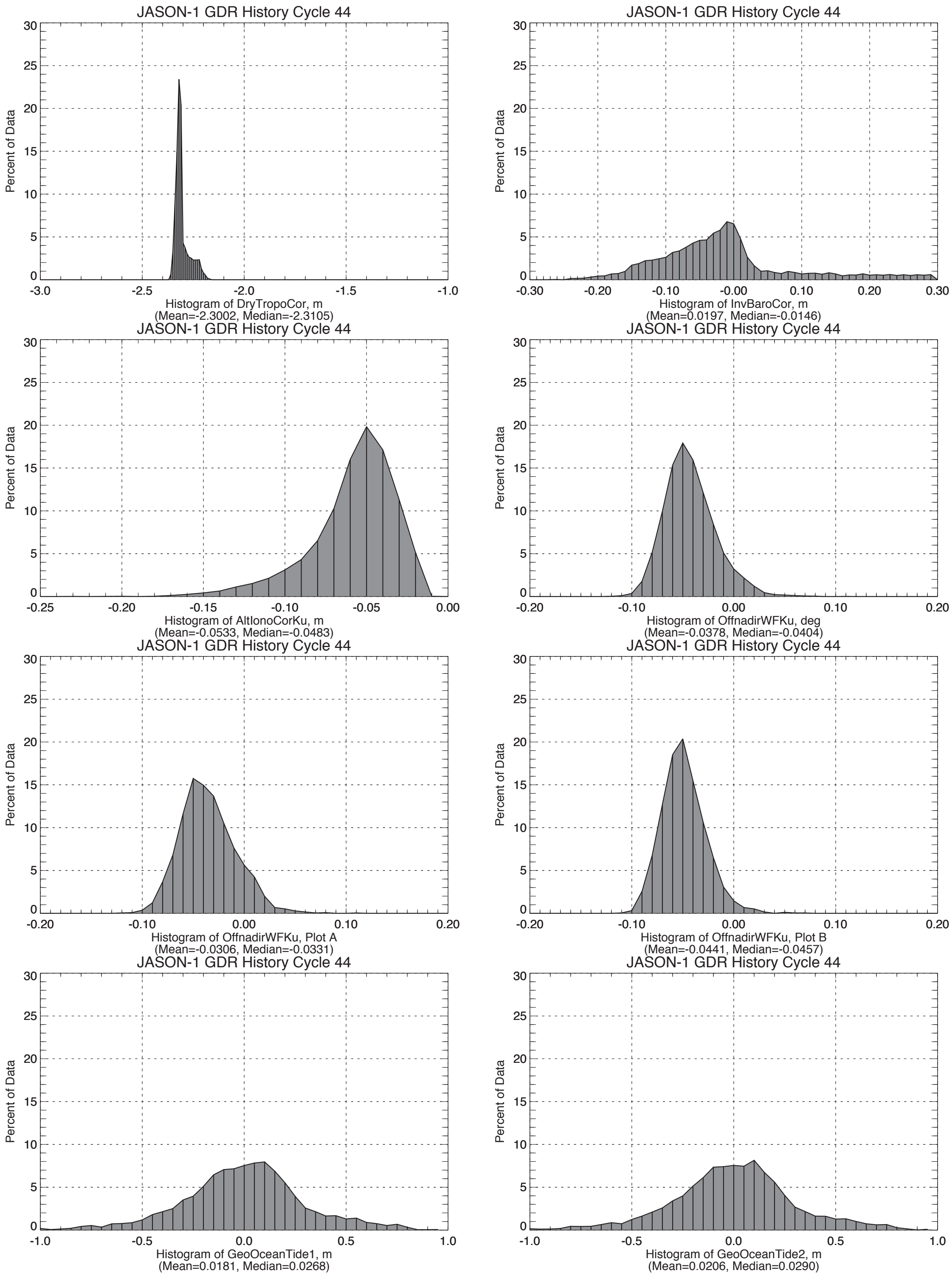
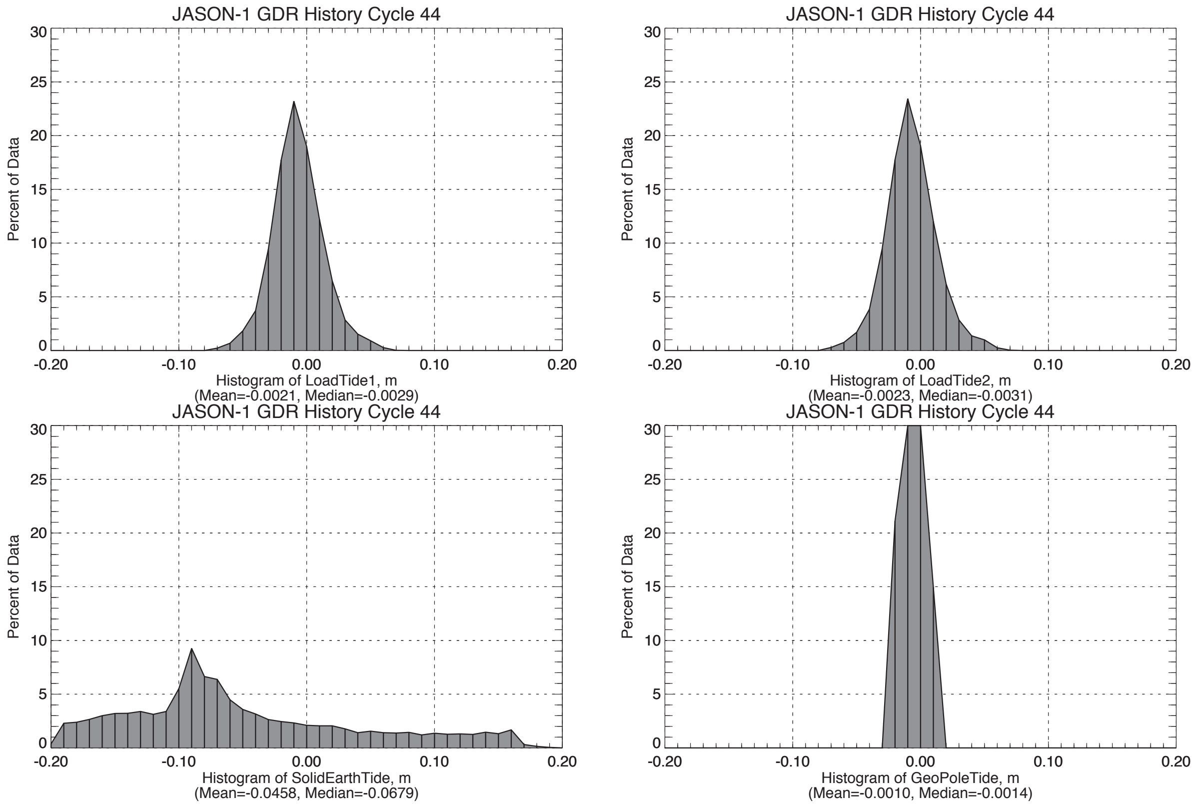


Figure F-3 Jason-1 I/GDR Cycle History Plot (Continued)



Out-of-Range Counts:

range_numval_ku<10:	0.0
0.0>range_rms_ku(m)>0.20:	0.0
-2.5>Sea Level Anomaly(m)>2.5:	18.0
-2.5>model_dry_tropo_corr(m)>-1.9:	0.0
-0.5>rad_wet_tropo_corr(m)>-0.001:	132.0
-0.4>iono_corr_alt_k(m)>0.04:	47.0
-0.5>sea_state_bias(m)>0.0:	0.0
-5.0>ocean_tide_sol1(m)>5.0:	0.0
-1.0>solid_earth_tide(m)>1.0:	0.0
-0.15>pole_tide(m)>0.15:	0.0
0.0>swh_ku(m)>11.0:	57.0
7.0>sigma0_ku(dB)>30.0:	1.0
0.0>wind_speed_alt(m/s)>30.0:	258.0
-0.12>off_nadir_wvf_ku>0.25:	1762.0

Bad Quality/Flagged Data Counts:

NumBadAltData:	5782.0
NumBadAltCorr:	14687.0
NumBadRadData:	3145.0
NumBadOrbState:	9415.0

ice_flag:	2088.0
rain_flag:	56905.0
mss interp_flag bit 0:	0.0
ocean_tide interp_flag bit 1:	7555.0
Meteror interp_flag bit 3:	5274.0
ecmwf_memeo_map_avail:	0.0
tb_interp_flag:	19248.0

Figure F-3 Jason-1 I/GDR Cycle History Plot (Continued)

F.4 Jason-1 Product Dump Listing

i_TimeTag = 16533
28753
668862
i_Latitude = 66139489
i_Longitude = 224024933
i_SurfType = 3
i_AltEchoType = 1
i_RadSurfType = 1
i_QF1AltData = -1
i_QF1AltInstCor = 63
i_QF1RadData = 7
i_AltStateFlag = 8
i_RadStateFlag = 4
i_OrbStateFlag = 3
i_SpareQual = 0
0
0
i_SatAltitude = 547082146
i_AltMeasDiff = -753
-671
-590
-509
-429
-349
-270
-192
-115
-38
38

113
188
262
335
408
480
551
622
691
i_OrbAltRate = 20
i_SpareOrb = 0
0
i_RangeKu = -1
i_RngKuMeasDiff = 2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647

2147483647
2147483647
i_RangeC = -1
i_RngCMeasDiff = 2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
2147483647
i_RangeKuRMS = -1
i_RangeCRMS = -1
i_RangeKuPts = 0
i_RangeCPts = 0
i_SpareRng = 0
0
i_RangeKuMapPts = 1048575
i_RangeCMapPts = 1048575

i_NetInstRngKuCor = -44562
i_NetInstRngCCor = -43430
i_DryTropoCor = -20753
i_WetTropoCor = -246
i_RadWetTropoCor = -105
i_AltIonoCorKu = 32767
i_DorisIonoCorKu = 32767
i_SeaStBiasCorKu = 32767
i_SeaStBiasCorC = 32767
i_CompSeaStBiasCor = 32767
i_SWHKu = -1
i_SWHC = -1
i_SWHKuRMS = -1
i_SWHCRMS = -1
i_SWHKuPts = 0
i_SWHCPts = 0
i_NetInstSWHKuCor = -216
i_NetInstSWHCCor = -302
i_Sigma0Ku = -1
i_Sigma0C = -1
i_Sigma0KuRMS = -1
i_Sigma0CRMS = -1
i_Sigma0KuPts = 0
i_Sigma0CPts = 0
i_AGCKu = 2222
i_AGCC = 2142
i_AGCKuRMS = 74
i_AGCCRMS = 136
i_AGCKuPts = 20
i_AGCCPts = 20
i_NetInstSigKuCor = -253

```
i_NetInstSigCCor   =        -51
i_AtmosAttSigKuCor =         16
i_AtmosAttSigCCor  =         9
i_OffnadirWFKU  =       32767
i_OffnadirPlat  =          0
i_BrightTemp187 =       23582
i_BrightTemp238 =       22410
i_BrightTemp340  =       20273
i_MeanSeaSurf   =       68305
i_TPMeanSeaSurf =   2147483647
i_Geoid         =       63070
i_Bathymetry =         787
i_InvBaroCor    =        8006
i_HfSeaSurfTopo =       32767
i_SpareGEO       =          0
          0
i_GeoOceanTide1 =   2147483647
i_GeoOceanTide2 =   2147483647
i_EquilOcTide   =         258
i_NonEquilOcTide =       32767
i_LoadTide1      =          0
i_LoadTide2      =          6
i_SolidEarthTide =         -23
i_GeoPoleTide    =         -55
i_WindVectorU    =        -358
i_WindVectorV    =        -135
i_AltWindSpeed   =          -1
i_RadWindSpeed   =       13611
i_RadWaterVapour =          16
i_RadLiquidWater =        -116
i_ECMWFMetFlag   =           0
```

i_RadBTempFlag = 0
i_RainFlag = 1
i_IceFlag = 0
i_InterpFlag = 6
i_SpareFlag = 0
0
0

F.5 Jason-1 Algorithm Dump Listing

d_TimeTag = 16533.0 28753.0 0.668862
d_Latitude = 66.139489
d_Longitude = 224.02493299999997
d_SurfType = 3.0
d_AltEchoType = 1.0
d_RadSurfType = 1.0
d_QF1AltData = -1.0
i_QF1AltData (Bits 0 to 7) = 1 1 1 1 1 1 1 1
d_QF1AltInstCor= 63.0
i_QF1AltInstCor (Bits 0 to 7) = 1 1 1 1 1 1 0 0
d_QF1RadData = 7.0
i_QF1RadData (Bits 0 to 7) = 1 1 1 0 0 0 0 0
d_AltStateFlag = 8.0
i_AltStateFlag (Bits 0 to 7) = 0 0 0 1 0 0 0 0
d_RadStateFlag = 4.0
i_RadStateFlag (Bits 0 to 7) = 0 0 1 0 0 0 0 0
d_OrbStateFlag = 3.0
i_OrbStateFlag = 3
d_SpareQual = 0.0E+0 0.0E+0 0.0E+0
d_SatAltitude = 54708.2146

d_AltMeasDiff = -0.0753 -0.0671 -0.059000000000000003 -0.0509 -0.0429 -0.0349 -0.027 -0.01920000

0000000001 -0.0115 -3.8E-3 3.8E-3 0.011300000000000001 0.0188 0.0262 0.0335 0.0408 0.048 0.0551 0.06

220000000000005 0.069100000000000001

d_OrbAltRate = 20.0

d_SpareOrb = 0.0E+0 0.0E+0

d_RangeKu = -1.0

d_RngKuMeasDiff = 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0

E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0 0.0E+0

d_RangeC = -1.0

d_RngCMeasDiff = 2.147483647E+9 2.147483647E+9 2.147483647E+9 2.147483647E+9 2.147483647E+9 2.147

483647E+9 2.147483647E+9 2.147483647E+9 2.147483647E+9 2.147483647E+9 2.147483647E+9 2.147483647E+9

2.147483647E+9 2.147483647E+9 2.147483647E+9 2.147483647E+9 2.147483647E+9 2.147483647E+9 2.14748364

7E+9 2.147483647E+9

d_RangeKuRMS = -1.0

d_RangeCRMS = -1.0

d_RangeKuPts = 0.0E+0

d_RangeCPts = 0.0E+0

d_SpareRng = 0.0E+0 0.0E+0

d_RangeKuMapPts = 1048575.0

d_RangeCMapPts = 1048575.0

d_NetInstRngKuCor = -4.4562

d_NetInstRngCCor = -4.343

d_DryTropoCor = -2.0753

d_WetTropoCor = -0.0246

d_RadWetTropoCor = -0.0105

d_AltIonoCorKu = 32767.0

d_DorisIonoCorKu = 32767.0

d_SeaStBiasCorKu = 32767.0
d_SeaStBiasCorC = 32767.0
d_CompSeaStBiasCor = 32767.0
d_SWHKu = -1.0
d_SWHC = -1.0
d_SWHKuRMS = -1.0
d_SWHCRMS = -1.0
d_SWHKuPts = 0.0E+0
d_SWHCPts = 0.0E+0
d_NetInstSWHKuCor = -0.216
d_NetInstSWHCCor = -0.302
d_Sigma0Ku = -1.0
d_Sigma0C = -1.0
d_Sigma0KuRMS = -1.0
d_Sigma0CRMS = -1.0
d_Sigma0KuPts = 0.0E+0
d_Sigma0CPts = 0.0E+0
d_AGCKu = 22.22
d_AGCC = 21.42
d_AGCKuRMS = 0.74
d_AGCCRMS = 1.36
d_AGCKuPts = 20.0
d_AGCCPts = 20.0
d_NetInstSigKuCor = -2.5300000000000002
d_NetInstSigCCor = -0.51
d_AtmosAttSigKuCor = 0.16
d_AtmosAttSigCCor = 0.09
d_OffnadirWFKU = 32767.0
d_OffnadirWFKUSqR = 0.0E+0
d_OffnadirPlat = 0.0E+0
d_BrightTemp187 = 235.82

```
d_BrightTemp238 = 224.1
d_BrightTemp340  = 202.73000000000001
d_MeanSeaSurf   = 6.830500000000001
d_TPMeanSeaSurf = 2.147483647E+9
d_Geoid         = 6.307
d_Bathymetry = 787.0
d_InvBaroCor    = 0.8006000000000001
d_HfSeaSurfTopo = 32767.0
d_SpareGEO       = 0.0E+0 0.0E+0
d_GeoOceanTide1 = 2.147483647E+9
d_GeoOceanTide2 = 2.147483647E+9
d_EquilOcTide   = 0.0258
d_NonEquilOcTide = 32767.0
d_LoadTide1      = 0.0E+0
d_LoadTide2      = 6.000000000000001E-4
d_SolidEarthTide = -2.3E-3
d_GeoPoleTide    = -5.5000000000000005E-3
d_WindVectorU    = -3.58
d_WindVectorV    = -1.35
d_AltWindSpeed   = -1.0
d_RadWindSpeed   = 136.11
d_RadWaterVapour = 0.16
d_RadLiquidWater = -1.16
i_ECMWFMetFlag   = 0
i_RadBTempFlag   = 0
i_RainFlag       = 1
i_IceFlag        = 0
d_InterpFlag = 6.0
i_InterpFlag (Bits 0 to 7) = 0 1 1 0 0 0 0 0
d_SpareFlag        = 0.0E+0 0.0E+0 0.0E+0
d_CorrRangeKu      = 0.0E+0
```

d_SeaSurfHeight = 0.0E+0

d_SeaLvlAnomaly = 0.0E+0

i_LandWater = 0

d_J2KSeconds = 103060753.66886199

s_DateTime =2003-098T07:59:13.668862

F.6 Jason-1 I/GDR Science Average Plot

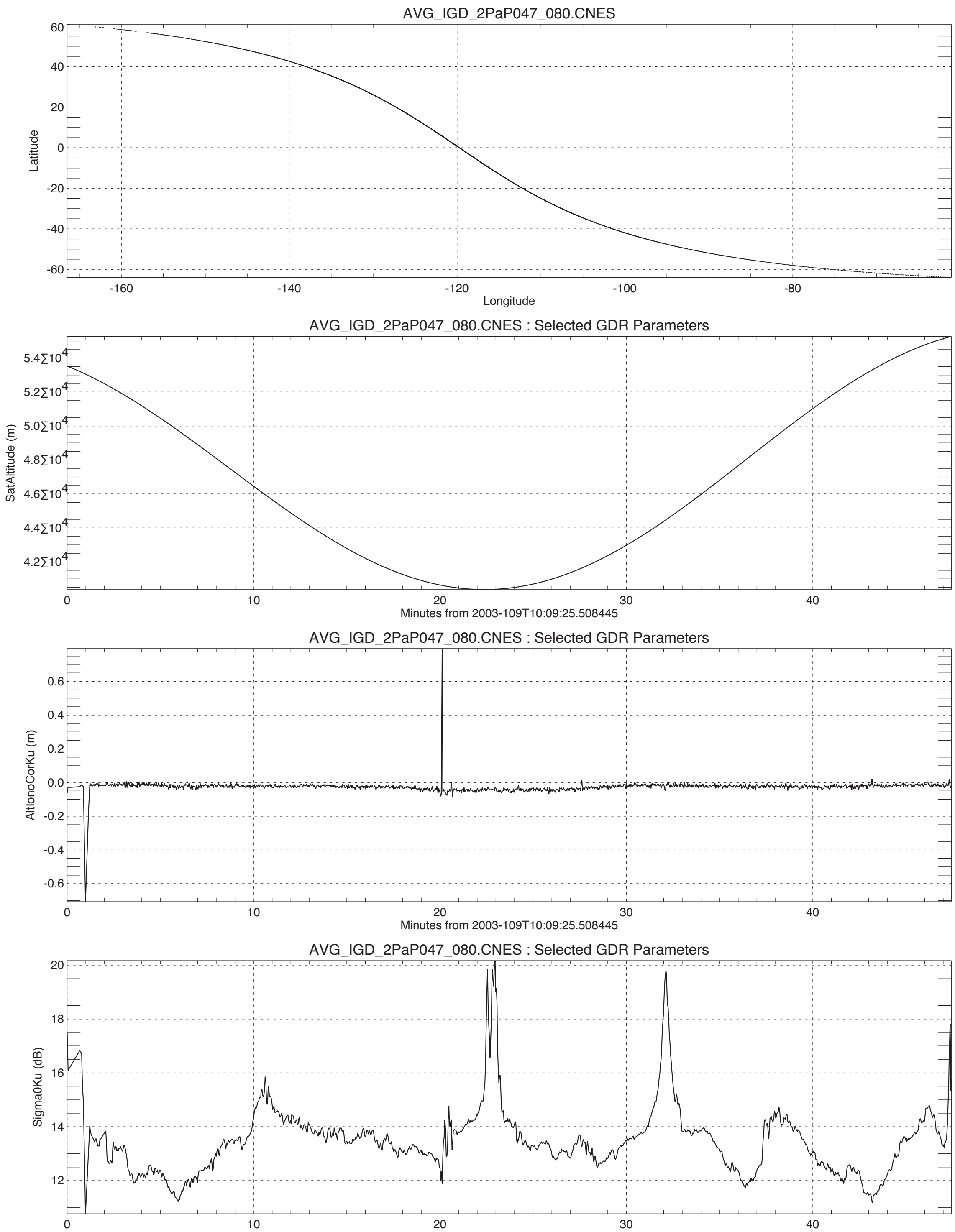


Figure F-4 Jason-1 I/GDR Sciencce Averag Plot

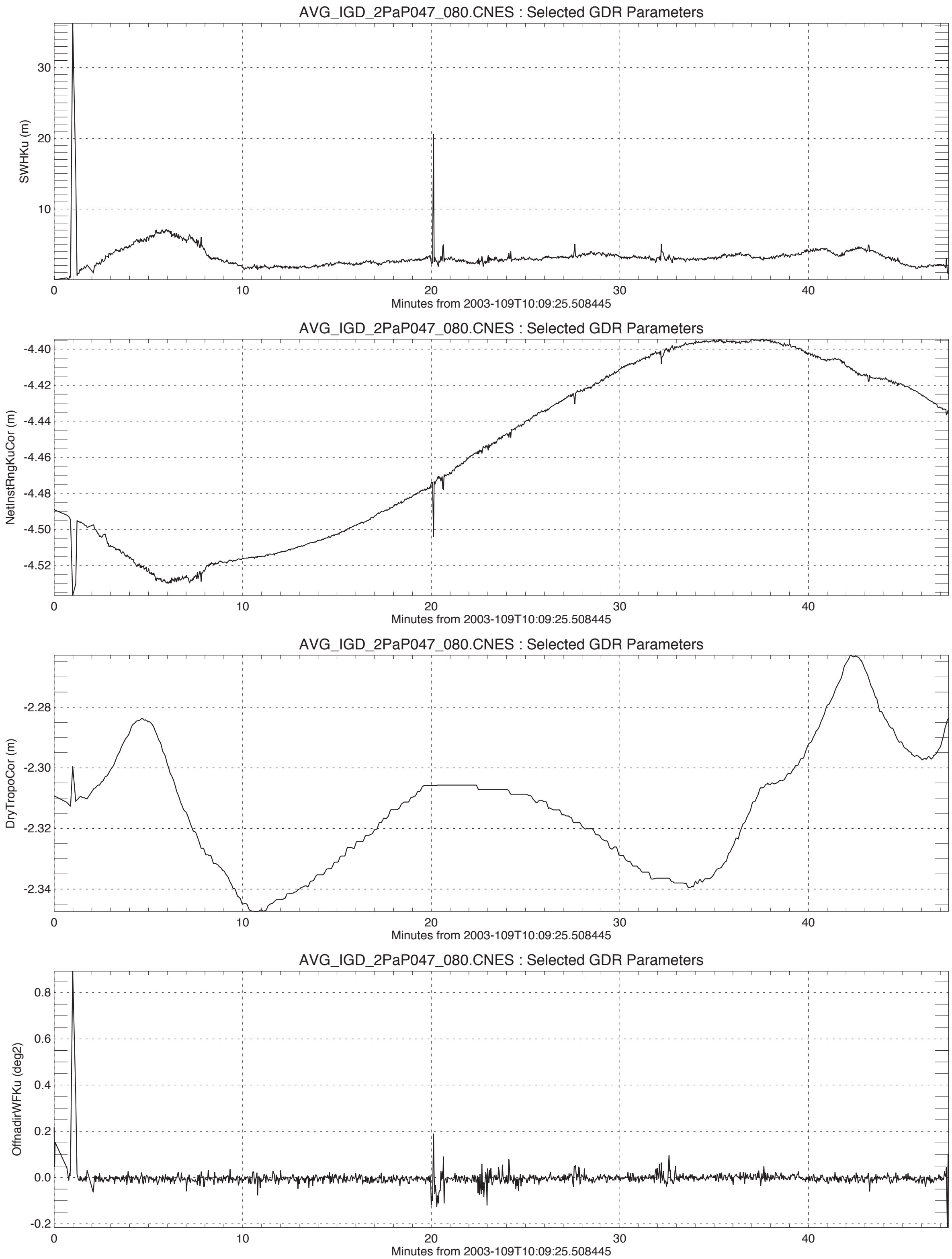


Figure F-4 Jason-1 I/GDR Sciencce Averag Plot

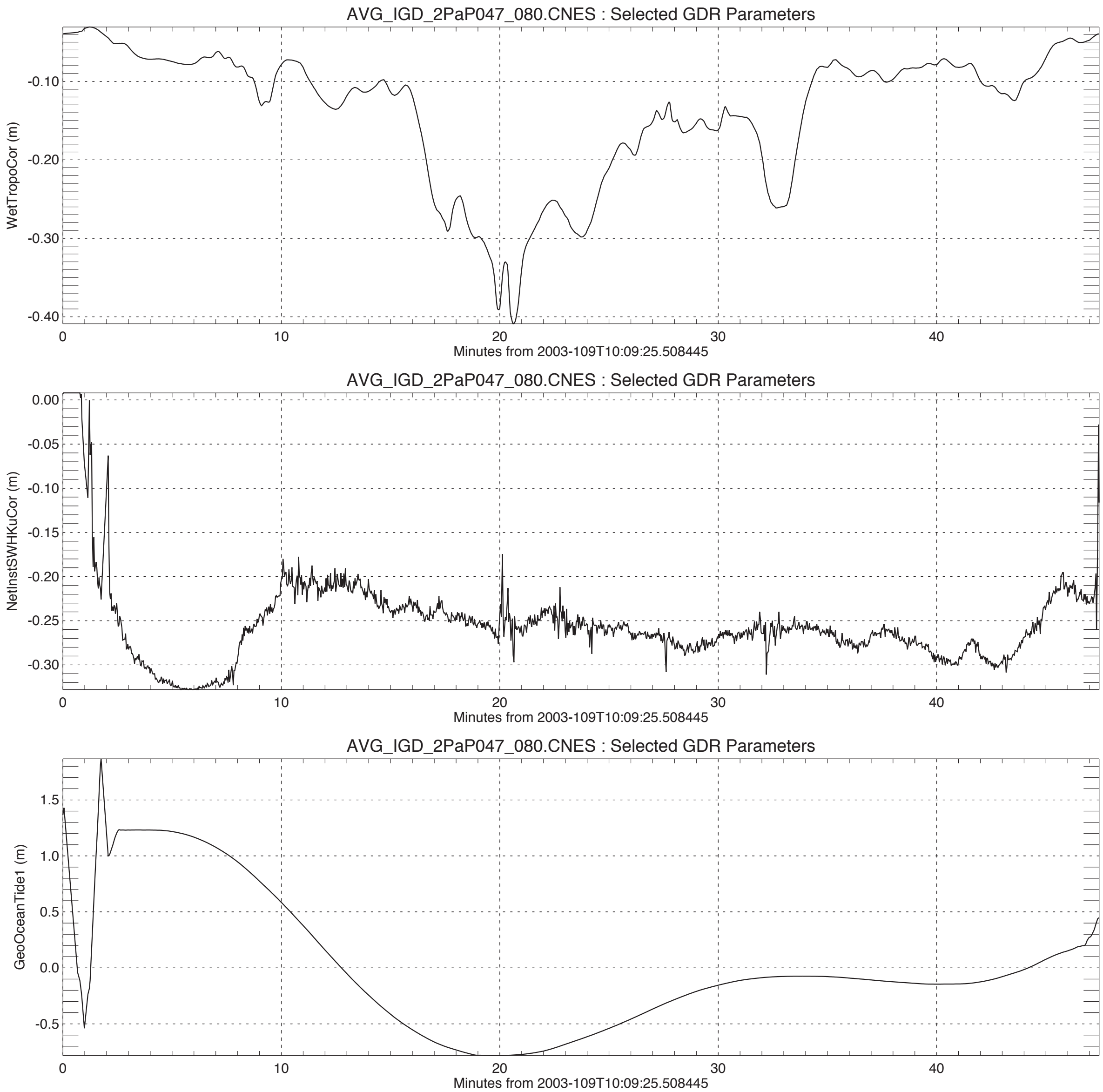


Figure F-4 Jason-1 I/GDR Sciencce Averag Plot

F.7 Jason-1 Database Load Log Listing

```
SQL*Loader: Release 8.1.7.0.0 - Production on Fri Sep 5 10:56:36 2003

(c) Copyright 2000 Oracle Corporation.  All rights reserved.

Control File:   /gen/jason/dhaps/bin/jas_gdr_header.ctl
Data File:      /gen/jason/dhaps/dbtemp/jasDBCycle016.HDR
  Bad File:     /gen/jason/dhaps/bin/jasDBCycle016.bad
  Discard File:  none specified

 (Allow all discards)

Number to load: ALL
Number to skip: 0
Errors allowed: 50
Bind array:     64 rows, maximum of 65536 bytes
Continuation:    none specified
Path used:      Conventional
Silent options: FEEDBACK, ERRORS and DISCARDS

Table TEMP_JAS_GDR_HEADER, loaded from every logical record.
Insert option in effect for this table: REPLACE

   Column Name                  Position   Len  Term Encl Datatype
------------------------------ ---------- ----- ---- ---- ---------------
CYCLE_NUMBER                      FIRST     *  WHT      CHARACTER
PASS_NUMBER                        NEXT     *  WHT      CHARACTER
FILE_DATA_TYPE                     NEXT     *  WHT      CHARACTER
REFERENCE_SOFTWARE                 NEXT     *  WHT      CHARACTER
PASS_DATA_COUNT                    NEXT     *  WHT      CHARACTER
OCEAN_PASS_DATA_COUNT              NEXT     *  WHT      CHARACTER
RANGE_OFFSET                       NEXT     *  WHT      CHARACTER
TIME_SHIFT_MID_FRAME               NEXT     *  WHT      CHARACTER
TIME_SHIFT_INTERVAL                NEXT     *  WHT      CHARACTER
NUMNOTOCEAN                        NEXT     *  WHT      CHARACTER
NUMBADALTDATA                      NEXT     *  WHT      CHARACTER
NUMBADALTCORR                      NEXT     *  WHT      CHARACTER
NUMBADRADDATA                      NEXT     *  WHT      CHARACTER
```

```
NUMDEFVALUES                         NEXT     *  WHT      CHARACTER
NUMBADORBSTATE                       NEXT     *  WHT      CHARACTER
NUMFLGECMWF                          NEXT     *  WHT      CHARACTER
NUMFLGTBINTERP                       NEXT     *  WHT      CHARACTER
NUMFLGRAIN                           NEXT     *  WHT      CHARACTER
NUMFLGICE                            NEXT     *  WHT      CHARACTER
NUMFLG0INTERP                        NEXT     *  WHT      CHARACTER
NUMFLG1INTERP                        NEXT     *  WHT      CHARACTER
NUMFLG3INTERP                        NEXT     *  WHT      CHARACTER
NUMNOTUSED                           NEXT     *  WHT      CHARACTER
NUMBADQUALITY                        NEXT     *  WHT      CHARACTER
NUMFLAGGEDBAD                        NEXT     *  WHT      CHARACTER
NUMOUTRANGE                          NEXT     *  WHT      CHARACTER
FIRSTATB                             NEXT     *  WHT      CHARACTER
FIRSTJ2K                             NEXT     *  WHT      CHARACTER
LASTATB                              NEXT     *  WHT      CHARACTER
LASTJ2K                              NEXT     *  WHT      CHARACTER
FIRSTLATITUDE                        NEXT     *  WHT      CHARACTER
LASTLATITUDE                         NEXT     *  WHT      CHARACTER
FIRSTLONGITUDE                       NEXT     *  WHT      CHARACTER
LASTLONGITUDE                        NEXT     *  WHT      CHARACTER
NUMDOUBLETS                          NEXT     *  WHT      CHARACTER


Table TEMP_JAS_GDR_HEADER:
  253 Rows successfully loaded.
  0 Rows not loaded due to data errors.
  0 Rows not loaded because all WHEN clauses were failed.
  0 Rows not loaded because all fields were null.


Space allocated for bind array:                  63210 bytes(7 rows)
Space allocated for memory besides bind array:        0 bytes

Total logical records skipped:          0
Total logical records read:           253
Total logical records rejected:         0
Total logical records discarded:        0
```

```
Run began on Fri Sep 05 10:56:36 2003
Run ended on Fri Sep 05 10:56:36 2003

Elapsed time was:     00:00:00.89
CPU time was:         00:00:00.06
```

F.7.1 Jason-1 Subset of sqlldr Log File Emailed to the JASON Administrator

```
Control File:   /gen/jason/dhaps/bin/jas_gdr_header.ctl
Data File:      /gen/jason/dhaps/dbtemp/jasDBCycle016.HDR
  Bad File:     /gen/jason/dhaps/bin/jasDBCycle016.bad
  Discard File:  none specified
  253 Rows successfully loaded.
  0 Rows not loaded due to data errors.
  0 Rows not loaded because all WHEN clauses were failed.
  0 Rows not loaded because all fields were null.
Total logical records skipped:          0
Total logical records read:           253
Total logical records rejected:         0
Total logical records discarded:        0
```

F.8 Processing Log File Listing

```
0 STATUS= 10005, 0, OpenFInFile, Opened file: (Input) JA1_IGD_2PaP086_001.CNES
0 STATUS= 10005, 0, OpenFOutFile, Opened file: (Output) AVG_IGD_2PaP086_001.CNES
0 STATUS= 10005, 0, OpenFOutFile, Opened file: (Output) AVG_HDR_2PaP086_001.CNES
0 STATUS= 10010, 0, exec_lib, OpenFiles Subroutine status End of execution
0 #=----------------------------
0 #=Control File Name
0 #=----------------------------
0 CF_NAME=control.avg
0 #=--------------------------------------
0 #=Control File Contents
0 #=--------------------------------------
0 CONTROL=#
0 CONTROL=#--------- Start of Control File
0 CONTROL=#
0 CONTROL=#EXEC_KEY=abcd
0 CONTROL=#DATE_GENERATED=07 November 2001
0 CONTROL=#OPERATOR=aconger
0 CONTROL=#
0 CONTROL= INPUT_FILE:JA1_IGD_2PaP086_001.CNES all
0 CONTROL= OUTPUT_FILE:AVG_IGD_2PaP086_001.CNES all
0 CONTROL= OUTPUT_FILE:AVG_HDR_2PaP086_001.CNES all
0 CONTROL= OUTPUT_FILE:JAS_LOG_IGD_2PaP086_001.CNES all
0 CONTROL=#
0 CONTROL=# Execution control
0 CONTROL=#
0 CONTROL= PROC_TYPE:GEOAverage
0 CONTROL= AVG_OPT:1
0 CONTROL=#
0 CONTROL=#---------- End of Control File
0 CONTROL=#
0 #=----------------------------
0 #=Exec Version Information
0 #=----------------------------
0 EXE_VERSION=IGDR_reader v1.0, 11-01-2001
0 #=--------------------------------------
0 #=Common Library Version Information
0 #=--------------------------------------
0 LIB_VERSION=libcntrl V1, 11-09-2001
0 LIB_VERSION=libconv V1, November 2001
0 LIB_VERSION=liberr V1, 11-09-2001
0 LIB_VERSION=libexec V1, November 2001
0 LIB_VERSION=libfile V1, 11-09-2001
0 LIB_VERSION=libfile V1, 11-09-2001
0 LIB_VERSION=libmath V1, 11-09-2001
0 LIB_VERSION=libplatform V1, 11-09-2001
0 LIB_VERSION=libfile V1, 11-09-2001
0 #=--------------------------------------
0 #=Execution Control Flags
0 #=--------------------------------------
0 PROC_TYPE=WriteProd =0
0 PROC_TYPE=WriteAlg =0
0 PROC_TYPE=GEOAverage =1
```

```
0 PROC_TYPE=WriteDB =0
0 AVG_OPT=AVG_OPT = 1
0 #=----------------------------
0 #=Execution Status
0 #=----------------------------
0 STATUS= 10012, 0, ReadData, ReadData Subroutine status
0 STATUS= 10007, 0, NextGranule, Finished reading file: JA1_IGD_2PaP086_001.CNES
0 STATUS= 10006, 0, CloseFile, Closed file: JA1_IGD_2PaP086_001.CNES
0 STATUS= 10013, 0, exec_lib, MainWrap Subroutine status Start of execution
0 #=---------------------------------------
0 #=Input/Output Wrapup Summary
0 #=---------------------------------------
0 INPUT_SUMMARY=JA1_IGD_2PaP086_001.CNES: read 2383 records
0 OUTPUT_SUMMARY=AVG_IGD_2PaP086_001.CNES: wrote 1754 records
0 OUTPUT_SUMMARY=AVG_HDR_2PaP086_001.CNES: wrote 1 records
0 OUTPUT_SUMMARY=JAS_LOG_IGD_2PaP086_001.CNES: wrote 67 records
0 #=---------------------------------------
0 #=Status/Error Wrapup Summary
0 #=---------------------------------------
0 STATUS_SUMMARY= 4 Opened file:
0 STATUS_SUMMARY= 1 Closed file:
0 STATUS_SUMMARY= 1 Finished reading file:
0 STATUS_SUMMARY= 2 MainInit Subroutine status
0 STATUS_SUMMARY= 2 fCntlInit Subroutine status
0 STATUS_SUMMARY= 2 OpenFiles Subroutine status
0 STATUS_SUMMARY= 2378 ReadData Subroutine status
0 STATUS_SUMMARY= 1 MainWrap Subroutine status
0 STATUS= 10013, 0, exec_lib, MainWrap Subroutine status End of execution
0 STATUS= 10014, 0, exec_lib, CloseFiles Subroutine status Start of execution
0 STATUS= 10006, 0, CloseFile, Closed file: AVG_IGD_2PaP086_001.CNES
0 STATUS= 10006, 0, CloseFile, Closed file: AVG_HDR_2PaP086_001.CNES
```

Appendix G
FTP Example

G.1 Example of Using FTP for Retrieving an IGDR

```
osb3/incoming# ftp -i podaac.jpl.nasa.gov
Connected to poseidon.jpl.nasa.gov.

220 poseidon FTP server (Version wu-2.6.2(1) Tue Sep 23 10:15:01 PDT 2003) ready.
Name (podaac.jpl.nasa.gov:anet): anonymous
331 Guest login ok, send your complete e-mail address as password.
Password:
230-
230-              *** NOTICE ***
230-
230-= = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
230-Welcome to the PO.DAAC FTP Server
230-For problems or questions contact PO.DAAC at:
230-Email:  podaac@podaac.jpl.nasa.gov,
230-Phone:     626-744-5508
230-WWW URL:  http://podaac.jpl.nasa.gov
230-= = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
230-
230-Please read the file README
230-  it was last modified on Wed Jul 28 10:32:39 2004 - 237 days ago
230 Guest login ok, access restrictions apply.
ftp> cd sea_surface_height
250 CWD command successful.
ftp> cd jason
250 CWD command successful.
ftp> cd igdr
250 CWD command successful.
ftp> cd data
250 CWD command successful.
ftp> cd c118
250 CWD command successful.
ftp> mget JA1_IGD_2PaP118_04*
200 PORT command successful.
150 Opening ASCII mode data connection for JA1_IGD_2PaP118_040.CNES (1212200 bytes).
226 Transfer complete.
local: JA1_IGD_2PaP118_040.CNES remote: JA1_IGD_2PaP118_040.CNES
```

1216840 bytes received in 4.5 seconds (263.29 Kbytes/s)
200 PORT command successful.
150 Opening ASCII mode data connection for JA1_IGD_2PaP118_041.CNES (1276000 bytes).
226 Transfer complete.
local: JA1_IGD_2PaP118_041.CNES remote: JA1_IGD_2PaP118_041.CNES
1281177 bytes received in 5 seconds (250.72 Kbytes/s)
200 PORT command successful.
150 Opening ASCII mode data connection for JA1_IGD_2PaP118_042.CNES (1292280 bytes).
226 Transfer complete.
local: JA1_IGD_2PaP118_042.CNES remote: JA1_IGD_2PaP118_042.CNES
1298117 bytes received in 5 seconds (252.23 Kbytes/s)
ftp> bye
221-You have transferred 3796134 bytes in 3 files.
221-Total traffic for this session was 3801476 bytes in 5 transfers.
221-Thank you for using the FTP service on poseidon.
221 Goodbye.

Note: Operator input indicated by underline.

Appendix H
Configuration File Examples

H.1 Example of config.jasD

```
# config.jasD
#================================================================
# Runs Oracle process to load incoming concatenated I/GDR DB data into the
# database.
# input file - jasDBCycle###.IGD or
#              jasDBCycle###.HDR or
#              jasDBCycle###.GDR
#
MOVE /gen/jason/dhaps/dbtemp
PROCESS load_jason_gdr_db.sh
NOTIFY anet@osb.wff.nasa.gov
NOTIFY lockwood@osb.wff.nasa.gov
```

H.2 Example of config.jasL

```
# config.jasL
#================================================================
# Delivers jasLTDSum.GDR files.
#
MOVE /gen/jason/data/IGDR/trend
NOTIFY anet@osb.wff.nasa.gov
NOTIFY lockwood@osb.wff.nasa.gov
```

H.3 Example of config.jasC

```
# config.jasC
#=============================================================
# Delivers jasCycleSci###-###.IGD or jasCycleSci###-###.HDR files.
#
MOVE /gen/jason/data/IGDR/trend
NOTIFY anet@osb.wff.nasa.gov
NOTIFY lockwood@osb.wff.nasa.gov
```

H.4 Example of config.ltd_

```
# config.ltd_
#=============================================================
# Runs Oracle process to create launch to date file from the summary table.
# This config file is triggered by a ltd_summary.req file containing
# start cycle:end cycle.
#
PROCESS create_ltd_sum_file.sh
NOTIFY anet@osb.wff.nasa.gov
NOTIFY lockwood@osb.wff.nasa.gov
```

H.5 Example of config.cycl

```
# config.cycl
#=============================================================
# Runs Oracle process to create cycle science/header files from the science and
# header tables. This config file is triggered by a cyclescience.req file containing
# start cycle:end cycle.
#
PROCESS create_cycle_sci_file.sh
NOTIFY anet@osb.wff.nasa.gov
NOTIFY lockwood@osb.wff.nasa.gov
```

Abbreviations & Acronyms

AVISO	Archivage, Validation et Interprétation des données des Satellites Océanographiques is the French multi-satellite databank dedicated to space oceanography, developed by CNES.
CNES	Centre National d'Etudes Spatiales, the French Space Agency
DORIS	Doppler Orbitography and Radiopositioning Integrated by Satellite
FTP	File Transfer Protocol
GDR	Geophysical Data Record
GSFC	Goddard Space Flight Center
IGDR	Interim Geophysical Data Record
IDL	Interactive Data Language
JPL	Jet Propulsion Laboratory
NASA	National Aeronautics and Space Administration
OFL	Off-line
PODAAC	Physical Oceanography Distributed Active Archive Center is one element of the Earth Observing System Data and Information System (EOSDIS), developed by NASA.
RDBMS	Relational Database Management System
SMTP	Simple Mail Transfer Protocol
UTC	Universal Time Coordinated
WFF	Wallops Flight Facility