LMG0304

Cruise Data Report

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Introduction

The LMG data acquisition systems continuously log data from a suite of instrumentation throughout the cruise. This document describes the format of that data and its location on the distribution CDs. It also contains important information which may affect how this data is processed such as instrument failures or other known problems with acquisition.

The data collected during this cruise is distributed on a CD-ROM written in ISO9660 level-1 format. This data format has very strict requirements on filenames and organization. However, it is readable by virtually every computing platform.

All of the data has been archived with the Unix “tar” command and/or compressed using Unix “gzip” compression. Tar files have a “.tar” extension and Gzipped files have a “.gz” extension. Tools are available on all platforms for uncompressing and de-archiving these formats. On Macintosh, Stuffit Expander with DropStuff will open a tar archive and uncompress gzipped and Unix compressed files. For Windows9X, WinZip, a shareware utility included on this CD (remember, it is shareware) will open these files.

In some cases to adhere to the ISO9660 format the .tar extension was removed. When we tarred the files then gzip the tar archive the name of the file became *File*.tar.gz. This name does not follow the 8.3 naming convention of the ISO9660 format. So the file was renamed without .tar making the file name **File**.gz. On Windows and Mac Platforms Winzip and Stuffit Expander handles this just fine. When they expand the *File*.gz the expanded file becomes *File*.tar, which both software packages can handle. On Unix platform gunzip expands *File*.gz but it does not append the .tar extension. So you may not recognize the file as a tar archive, but OS does recognize it as a tar archive. If you use the file command it will return saying it is a tar file. The below tar command will un-archive the file just fine.

IMPORTANT: Read the last section in this document, Acquisition Problems and Events, for important information that may affect the processing of this data.

Archive Data Extraction

It is often useful to know exactly how an archive was produced when expanding its contents. Tar files were created using the following commands:

```
tar cvf archive-file files-to-be-archived
```

To create a list of the files in the archive:

```
tar tvf  archive-file  > contents.list
```

To extract the files from the archive:

```
tar xvf  archive-file file(s)-to-extract
```

G-zipped files will have a ".gz" extension on the filename. These files can be decompressed after de-archiving, using:

```
gunzip filename.gz
```

CD Directory Structure

/ADCP/

Pingdata/

Gentoo/

/CAL/

SVP_CALS.tar

UW_CALS.tar

CTD_CALS.tar

MET_CALS.tar

Instrument.cof

/CTD/

Raw.gz

Process.gz

Graph.gz

/ICE_IMAGE/

*.jpg

/ISOBARS/

ISOBAR.tar

/JGOF/

lmgjgof.tar

/QC_PLOTS/

metXXX.ps

navXXX.ps

oceanXXX.ps

/REPORT/

Report.doc

Report.html

Report.txt

/RVDAS/

Lmguw.tar

Lmgnav.tar

/SCIENCE/

Salts/

/UTILITY/

Winzip

Stuffit Expander

/XBT-XCTD/

XBT/

SFILES.zip

NAV.zip

LOG.zip

DAT.zip

XBTLOG.txt

XCTD/

*.EDF

*.RDF

XCTDLOG.txt

Distribution Contents

ADCP

/Adcp/

The ADCP DAS data files are named pingdata.xxx (xxx representing a file number). Note that these extensions do NOT represent Julian day numbers. Please refer to the file's creation date. The ADCP DAS computer creates a new pingdata file when the current one reaches a size of 320K. The ping files logged on Gentoo, the Linux processing computer, however are created new each day.

Some ADCP data is also transmitted to RVDAS. East and North vectors for ship's speed relative to the reference layer and ship's heading are archived in the navigational data section of RVDAS.

Calibration

/Cal/

The tar files in the Cal directory contain images of calibration sheets for each of the following systems: Sound Velocity Probe(SVP_CALS.TAR), Meteorological System(MET_CALS.TAR), Underway System(UW_CALS.TAR), and CTD(CTD_CALS.TAR).

CTD diagrams can be found in the ctd Cal directory for voltage and frequency sensors.

CTD

/CTD/

The ctd data was collected and processed on a windows 98 computer, using Seasave Win32 – Version 5.25a and SBE Data Processing – Version 5.21. For more information and software visit the web site at www.seabird.com.

All the o-rings in the bottle were replaced with baked o-ring, except for the vent o-rings. It was determined that it was not necessary to replace them since they were on the outside of the bottle. We had trouble for the first few cast with the bottle triggers sticking and not firing, but after a couple good rinsings the problem was resolved. The Transmissometer CST-248DR failed after the 1st cast, but was not noticed until after the 4th Cast. It was replaced with Transmissometer CST-406DR, and work fine for the rest of the cast. The Secondary Conductivity Sensor s/n 2247 failed at the bottom of the 15th Cast and was notice bad on the 16th Cast. It was replaced with s/n 2250 for the 17th Cast and work fine for the rest of the cast. These where the only problems we had with the CTD.

/CTD/raw

This directory contains the original .con, .dat, .bl, and .hdr files files produced for each CTD cast.

/CTD/process

Each processed cast is represented here by a set of ten files. Note that cast 1 was split into a separate data set for the up and down segments. Also, the DO2 sensor was only added onto to the instrument package for the 4th cast. In addition to the standard files listed below, an additional round of post processing was done to produce rg302EEE.cnv and .asc files containing non-bin averaged data and an ascii conversion of that data.

g302EEE.con	A copy of the configuration file for the cast.
g302EEE.cnv	The converted file for the whole cast.
g302EEE.ros	The rosette file that contains the scan lines for each bottle trip.
g302EEE.btl	The bottle file that contains the avg, standard deviation, min, and max for a select set of variables for each bottled fired during the upcast.
dg302EEE.cnv	The converted file for the down cast.

dg302EEE.asc	An ASCII formatted file for the down cast without a header.
dg302EEE.hdr	The header for the down cast.
ug302EEE.cnv	The converted file for the up cast.
ug302EEE.asc	An ASCII formatted file for the up cast without a header.
ug302EEE.hdr	The header for the up cast.

CTD/Data/graphs

The graph.gz file is a tar archive file that has been compressed with gzip, for more information on this see the above *Introduction* section. This archive contains three postscript files for each cast, which are plots of the processed CTD data. The graphs were generated with a CShell script written by Fred Stuart, which uses the GMT, General Mapping Tool, software package. The file naming convention is TTT.LMG0301.EEE.ps where TTT represents the graph type(Pri, Sec, Other) and EEE is the event number for the cast. The Pri graph type is a plot of the primary sensors, the Sec graph type is a plot of the secondary sensors, and the Other graph type is a plot of all the other sensor on the CTD. These files were use to compare the data from cast to cast to make sure that all the sensors were working properly.

Ice Images

/ICE_IMAGE/

This tar archive contains .jpg files of Terrascan ice imagery sent to the ship from Palmer station before and during the cruise.

Isobar Charts

/Isobars/

This directory contains GIF image files. These file are an analysis of mean sea level pressure from the National Center for Environmental Prediction's Medium Range Forecast Model. They are updated every 6 hours. Naming the convention is as follows yyjjj.hh.gif where yy is the year, jjj is the day number, and hh is the hour.

Data and Science Report

/Report/

Copies of this report in MS Word, HTML, and text formats.

QC Plots

/QC_PLOTS/

Postscript files of data stored each day on RVDAS for quality control analysis during the cruise. There are 3 types of files, named metXXX.ps, navXXX.ps, and oceanXXX.ps, where XXX is represents the Julian day. Met files are a summary of the data from the meteorological instruments, Nav files are a summary of navigational data, and Ocean files are a summary of the underway seawater and bathymetry data.

SouthBound Drake Crossing

XBT

/XBT-XCTD/XBT

During the Northbound crossing Expendable Bathythermographic (XBT) probes were used to obtain water column temperature profiles. These XBT were launched from the auto-launcher off the port aft quarter of the ship. The data files from these launches are included here in the SFILES.ZIP. The NAV.ZIP file contains the navigation files. The LOG.ZIP contains log files generated by the auto-xbt software. The DAT.ZIP file contains the configuration file used and generated by the auto-xbt software. The handwritten logs take during the transect were scanned in and saved as .jpg files (XBTlog1.jpg, XBTlog2.jpg, XBTlog3.jpg). For more information contact Glenn Pezzoli, project coordinator, at gpezzoli@ucsd.edu.

XCTD

/XBT-XCTD/XCTD

During the Northbound crossing, Expendable Conductivity Temperature Depth (XCTD) probes were used to obtain water column conductivity and temperature profiles. These XCTD were the analog type, and where manually launch from tube 1 of auto-launcher. The data files from these launches are included both in binary (RDF.ZIP) and ascii (EDF.ZIP) format. The logsheet (XCTDLog) has been saved as three different formats excel spreadsheet, HTML, and text file.

Salt Data

Drake Crossings

/SALTS/DrkeSalt/

Water Sample were take on each CTD Cast. These sample were analyzed with the AutoSal. The AutoSal output three different files: .dat, .hdr, .raw. These file for each cast are include in this directory. The .txt file is a strip version of the .dat file. It was created for the .m matlab scripts.

CTD

/SALTS/CTDSalt/

During both South and North Bound Crossings water sample were taking and analyzed with an AutoSal. The result have been place in a excel spreadsheet, .prn file, and a html file.

JGOFS Data Set

/JGOF/

The JGOFS data set consists of a single file produced each day named jg<julian_day>.dat.gz where <julian_day> is the day the data was acquired. The ".gz" extension indicates that the individual files are compressed before archiving. The daily file consists of 22 separate columnar fields in text format, which are described below. The JGOFS data set is obtained primarily by applying calibrations to raw data and decimating to whole minute intervals. However, several fields are derived measurements from more than a single raw input. *Note: Null, unused, or unknown fields are filled with 9's in the JGOFS data.*

Additionally, 3 separate QC plots are generated daily by the ET using the JGOFS data set. These plots include TSG and Bathymetry data, meteorological data, and navigation data. The files are called ocean<julian_day>.ps, met<julian_day>.ps, and nav<julian_day>.ps respectively.

Field	Data	Units
01	GMT date	dd/mm/yy

Field	Data	Units
02	GMT time	hh:mm:ss
03	PCOD latitude (negative is South)	Ddd.dddd
04	PCOD longitude (negative is West)	Ddd.dddd
05	Ships speed	Knots
06	GPS HDOP	-
07	Gyro Heading	Degrees (azimuth)
08	Course over ground	Degrees (azimuth)
09	Mast PAR	μEinsteins/meters^2 sec
10	Sea surface temperature	°C
11	Not used	-
12	Sea surface salinity	PSU
13	Sea depth (uncorrected, calc. sw sound vel. 1500 m/s)	meters
14	True wind speed (port windbird)	meters/sec
15	True wind direction (port windbird)	degrees (azimuth)
16	Ambient air temperature	°C
17	Relative humidity	%
18	Barometric pressure	mBars
19	Sea surface fluorometry	volts (0-5 FSO)
20	Not used	-
21	PSP	W/m^2
22	PIR	W/m^2

RVDAS

/rvdas/

RVDAS (Research Vessel Data Acquisition System) was developed at Lamont-Doherty Earth Observatory of Columbia University and has been used on the R/V Maurice Ewing for several years. It was adapted for use on the Nathaniel B. Palmer and her sister ship, the R/V Laurence M. Gould.

Below you will find detailed information on the data included. Be sure to read the "Significant Acquisition Events" section below for important information about data acquisition during this cruise.

NOTE:

The Port windbird was swapped out several times on this cruise. It was first swapped out due to the bearing going bad. Then the replacement windbird's azimuth pot failed and had to be replace again. Please see the Errors and Events section at the bottom of this report for times and serial numbers.

Meteorological and Light Data

Measurement	File ID	Collect. Status	Rate	Instrument
Air Temperature	lmet	continuous	1 sec	R. M. young 41372VC
Relative Humidity	lmet	continuous	1 sec	R. M. young 41372VC
Wind Speed/Direction	lmet	continuous	1 sec	R. M. young 5106
PIR (LW radiation)	lmet	continuous	1 sec	Eppley PIR
PSP (SW radiation)	lmet	continuous	1 sec	Eppley PSP
Photosynthetically-Available Radiation	lmet	continuous	1 sec	BSI QSR-240
Barometer	lmet	continuous	1 sec	R. M. young 61201

Navigational Data

Measurement	File ID	Collect. Status	Rate	Instrument
Attitude GPS	lash	continuous	1 sec	Ashtec ADU-2
P-Code GPS	lpcd	Not collected	1 sec	Trimble 20636-00SM
Gyro	lgyr	continuous	0.2 sec	Anschutz Gyro
Trimble GPS	tgps	continuous	1 sec	NT200

Geophysical Data

Measurement	File ID	Collect. Status	Rate	Instrument
Bathymetry	lknu	variable	Varies	Knudsen 320B/R

Oceanographic Data

Measurement	File ID	Collect. Status	Rate	Instrument
Salinity	ltsg	continuous	15 sec	SeaBird 21
Sea S Temperature	ltsg	continuous	15 sec	SeaBird 3-01/S
Fluorometry (analog)	ltsg	continuous	15 sec	Turner 10-AU-005
ADCP	ladc	continuous	1 sec	RD Instruments

Data File Names and Structures

RVDAS data is divided into two broad categories, ***Underway*** and ***Navigation***. The groups are abbreviated "uw" and "nav". Thus, these two tar files, lmguw.tar and lmgnav.tar exist under the top-level rvdas directory. The instruments are broken down as shown. Each data file is g-zipped to save space on the distribution. Not all data types are collected everyday or on every cruise.

RVDAS data files are named following the convention: LMG[FileID].dDDD.

- The FileID is a 4-character code representing the system being logged, for example: lmet (for meteorology)
- DDD is the Julian day of the data collection

Underway Data	File ID
Meteorolical	lmet
Knudsen	lknu
Thermosalinograph	ltsg
ADCP	ladc
Sound Velocity Probe	lsvp

Navigation Data	File ID
Gyro Compass	lgyr
P-CODE GPS	lpcd
Ashtech ADU2 GPS	lash
Trimble NT2100 GPS	tgps
PCO2 System	lpco

Data is received by the RVDAS system via RS-232 serial connections. The data files that comprise the rvdas data set are described below. A time tag is added to each line of data received and the data is written to disk.

```
YY+DDD:HH:MM:SS.SSS [data stream from instrument]
```

Where, YY: two-digit year, DDD: Julian Day, HH: 2 digit hours, MM: 2 digit minutes SS.SSS: seconds. All times are UTC.

The delimiters used to separate fields in the raw data files are usually spaces and commas, but other delimiters are used (::, =, @) and occasionally there is no delimiter. Care should be taken when reprocessing the data that the fields separations are clearly understood. An example data

lknu

```
99+099:00:18:19.775 hf,305.2,lf,304.3
```

Field	Data	Units
1	RVDAS Time Tag	
2	hf – high frequency flag (12 kHz)	
3	high fequency depth	meters
4	lf – low frequency flag (3.5 kHz)	
5	low frequency depth	meters

lmet

```
02+314:23:59:50.067 01.2 047 028 01.3 063 042 0988.8 001.7 084 -000.2192 0000.9358 0025.5875
```

Field	Data	Units
1	RVDAS Time Tag	
2	Port Wind Speed	m/s
3	Port Wind Direction	deg
4	Port Wind Direction (standard deviation)	deg
5	Starboard Wind Speed	m/s
6	Starboard Wind Direction	deg
7	Starboard Wind Direction (standard deviation)	deg
8	Barometer	millibars
9	Temperature	°C
10	Relative humidity	%
11	PSP (long wave radiometer)	Volts
12	PIR (short wave radiometer)	Volts

Field	Data	Units
13	PAR (photo-synthetically available radiation, 400 - 700 nm)	Volts

ltsg

```
02+310:23:57:30.200        8542    -1.2580    34.1740    -1.2030      3.435      0.349  27.361205
```

Field	Data	Units
1	RVDAS Time Tag	
2	Scan number	
3	Internal water temperature	°C
4	Salinity	PSU
5	External water temperature	°C
6	Transmissometer signal	Volts
7	Fluorometer signal (analog)	Volts
8	Conductivity	S/cm

lpco

```
02+319:23:59:13.748 2002319.99851    7154.27     26.49    1033.6     325.79      6.74     329.3
53.76    0   Equil
```

Field	Data	Units
1	RVDAS Time Tag	
2	Julian date file string	Julian
3	IR voltage reading	mV
4	Cell temperature	°C
5	Barometer	millibars
6	VCO2	mL
7	Equilibrator temperature	°C
8	PCO2	millibars
9	Gas flow	mL/min
10	Solenoid position ID	number
11	Measured gas	name

svp1

```
00+348:01:59:52.128  1539.40
```

Field	Data	Units
1	RVDAS Time Tag	
2	Sound velocity	m/s

ladc

```
00+019:23:59:59.099 $PUHAW,UVH,-1.48,-0.51,250.6
```

Field	Data	Units
1	RVDAS Time Tag	
2	$PUHAW	
3	UVH (E-W, N-S, Heading)	
4	Ship Speed relative to reference layer[1] velocity[2], East vector	knots
5	Ship Speed relative to reference layer[1] velocity[2], North vector	knots
6	Ship heading	degrees

[1]The reference layer is an average velocity measured in a number of depth "bins". On the LMG, the bins are eight meters deep and bins 3-10 define the reference layer. Hence, the reference layer is the water column from 16-80 meters beneath the ship.

[2]The speed ouput is water velocity relative to the ship's hull and is therefore opposite of the actual movement of the ship. For example, if the ship's heading is due north, the North/South reference layer velocity is likely to be negative (southerly).

lash

ATTD: Attitude Data

```
01+081:00:00:00.806 $PASHR,ATT,345605.0,165.03,+001.86,-01.96,0.0018,0.0173,0*22
```

Field	Data	Units
1	RVDAS Time Tag $PASHR	
2	ATT	
3	GPS Time sec. of the week	seconds
4	heading (rel. to true North)	degrees
5	pitch	degrees
6	roll	degrees
7	Measurement RMS error	meters
8	Baseline RMS error	meters
9	attitude reset flag	

```
01+081:00:00:00.966 $GPGGA,235952.00,6051.7937,S,06030.2175,W,1,08,01.0,+00068,M,,M,,*79
```

Field	Data	Units
1	RVDAS Time Tag $GPGGA	
2	UTC time at position	hhmmss.ss
3	Latitude	ddmm.mmm
4	North (N) or South (S)	
5	Longitude	ddmm.mmm
6	East (E) or West (W)	
7	GPS quality (1=GPS 2=DGPS)	
8	Number of GPS satellites used	
9	HDOP	
10	Antenna Height	meters
11	M for Meters	
12	Geoidal height	meters
13	M for meters	
14	age of diff. GPS data	sss
15	differential reference station ID	aaaa

lgyr

```
02+315:23:59:58.194 $PASVW,00.1,A*1D
02+315:23:59:58.414 $IIVHW,287.7,T,,M,,N,,K*71
02+315:23:59:58.616 $HEHDT,287.7,T*25
02+315:23:59:58.821 $HEROT,001.6,A*2C
02+315:23:59:58.984 $HCHDT,,T*07
```

HDT: True Heading

```
01+083:00:00:02.893 $HEHDT,246.3,T*2C
```

Field	Data	Units
1	RVDAS Time Tag $HEHDT	
2	Heading XXXXX = ddd.d	degrees
3	T flag for true heading, checksum	

ROT: Rate of Turn

```
01+083:00:00:03.093 $HEROT,-006.3,A*03
```

Field	Data	Units
1	RVDAS Time Tag $HEROT	
2	Rate of turn	degrees/min
3	Status: A = data valid, checksum	

tgps

GGA: Global Positioning Fix Data

```
00+040:00:00:00.985 $GPGGA,000003,6139.961,S,05949.422,W,1,6,001.64,-00036,M,00000,M,,
```

Field	Data	Units
1	RVDAS Time Tag $GPGGA	
2	Latitude in degrees with decimal minutes	ddmm.mmm
3	North (N) or South (S)	
4	Longitude in degrees with decimal minutes	ddmm.mmm
5	East (E) or West (W)	
6	GPS quality (1=GPS 2=DGPS)	
7	Number of GPS satellites used	
8	Horizontal dilution of precision (HDOP)	
9	Antenna height above/below mean-sea-level (geoid)	meters
10	Units for antenna height (M = Meters)	
11	Geoidal Separation[1]	
12	Units for Geoidal Separation (M = Meters)	meters
13	Age of differential GPS data, number of seconds since last SC104 Type 1 or 9	
14	Differental reference station ID	

[1]Geoidal Separation: the difference between the WGS-84 earth ellipsoid and mean-sea-level (geoid). A negative value represents mean-sea-level below ellipsoid.

GLL: Geographic Position – Latitiude/Logitude

```
00+040:00:00:00.065 $GPGLL,6139.96,S,05949.42,W,000002,A
```

Field	Data	Units
1	RVDAS Time Tag $GPGLL	
2	Latitude	ddmm.mmm
3	North (N) or South (S)	
4	Logitude	ddmm.mmm
5	East (E) or West (W)	
6	UTC of position	hhmmss.ss
7	Status: A = Data Valid	

VTG: Track Made Good and Speed over Ground

```
00+040:00:00:00.213 $GPVTG,161,T,149,M,009.6,N,017.8,K
```

Field	Data	Units
1	RVDAS Time Tag $GPVTG	
2	Track, degrees true	degrees
3	T flag for True	
4	Track, degrees magnetic	degrees
5	M flag for Magnetic	
6	Speed over Ground	knots
7	N flag for Knots	
8	Speed over Ground	kmhr
9	K flag for km/hr	

VHW: Speed Through Water and Heading

```
00+040:00:00:00.212 $GPVHW,246,T,234,M,012.3,N,022.8,K
```

Field	Data	Units
1	RVDAS Time Tag $GPVHW	
2	Heading, degrees True	degrees
3	T flag for True	
4	Heading, degrees Magnetic	degrees
5	M flag for Magnetic	
6	Speed through water	knots
7	N flag for Knots	
8	Speed through water	km/hr
9	K flag for km/hr	

ZDA: Time and Date

```
00+040:00:00:00.285 $GPZDA,000002,09,02,2000,00,00
```

Field	Data	Units
1	RVDAS Time Tag $GPZDA	
2	UTC time	hhmmss.ss
3	Day: 01 – 31	dd
4	Month: 01 – 12	mm
5	Year	yyy
6	Local time zone description[1], 00 +/-13 hrs	
7	Local time zone minutes description, same sign as local hours	

[1]Zone description is the number of whole hours added to local time to obtain GMT, values are negative for East longitudes.

BWC: Bearing and Distance to Waypoint

```
00+040:00:00:00.865 $GPBWC,000003,6209.70,S,05824.00,W,127.2,T,115.3,M,050.1,N,014
```

Field	Data	Units
1	RVDAS Time Tag $GPBWC	
2	UTC of bearing	hhmmss.ss
3	Destination waypoint latitude in degrees, decimal minutes	ddmm.mmm
4	Hemisphere Flag: N or S	
5	Destination waypoint longitude in degrees, decimal minutes	ddmm.mmm
6	Hemisphere Flag: E or W	
7	Bearing, degrees true	degrees
8	T flag for True	
9	Bearing, degrees magnetic	degrees
10	M flag for Magnetic	
11	Distance to waypoint in nautical miles	nm
12	N flag for Nautical Miles	
13	Waypoint ID	

lpcd

GGA: GPS Position Fix – Geoid/Ellipsoid

```
00+019:23:59:59.301 $GPGGA,235958.409,6849.6944,S,13712.8472,W,1,06,1.2,092.4,M,047.3,M,,*67
```

Field	Data	Units
1	RVDAS Time Tag $GPGGA	
2	UTC time at position	hhmmss.sss
3	Latitude	ddmm.mmm
4	North (N) or South (S)	
5	Longitude	ddmm.mmm
6	East (E) or West (W)	
7	GPS quality (1=GPS 2=DGPS 3=P-CODE)	
8	Number of GPS satellites used	
9	HDOP	
10	Antenna Height	meters
11	M for Meters	
12	Geoidal height	meters
13	M for meters	
14	Null field	
15	Checksum	

GLL: GPS Latitude/Longitude

```
00+019:23:59:59.381 $GPGLL,6849.6944,S,13712.8472,W,235958.409,A*35
```

Field	Data	Units
1	RVDAS Time Tag $GPGLL	

Field	Data	Units
2	Latitude	degrees
3	North or South	
4	Longitude	degrees
5	East or West	
6	UTC of position	hhmmss.sss
7	staus of data (A = valid)	
8	Checksum	

VTG: GPS Track and Ground Speed

```
00+019:23:59:59.382 $GPVTG,238.7,T,182.3,M,001.8,N,003.3,K*41
```

Field	Data	Units
1	RVDAS Time Tag $GPVTG	
2	Heading	degrees
3	degrees True (T)	
4	Heading	degrees
5	degrees magnetic (M)	
6	Ship speed	knots
7	N = knots	
8	Speed	km/hr
9	Checksum	

LMG Sensors

Shipboard Sensors

Sensor	Description	Serial #	Cal. Date	Status
Port Anemometer	R.M. Young 105106	WM35061 WM28392 WM28394	07/28/02 07/28/02 07/28/02	collected
Stbd Anemometer	R.M. Young 105106	WM28393	07/28/02	collected
Barometer	R.M. Young 61201	BP00873	08/15/01	collected
Humidity/Wet Temp	R.M. Young 41372VC	6133	09/13/02	collected
Mast PAR	BSI QSR-240	6394	06/05/01	collected
Pyranometer	Eppley PSP	31701F3	09/18/02	collected
Pyrgeometer	Eppley PIR	32031F3	09/18/02	collected
TSG	SeaBird SBE21	1789	08/02/02	collected
TSG Remote Temp	SeaBird 3-01/S	1619	09/13/02	collected
Fluorometer	Turner 10-AU-005 Lamp: daylight 10-045, reference filter: 10-052, emission filter: 10-051, excitation filter: 10-050.	6046RTD	n/a	collected
Transmissometer	WET Labs 9707017	CST-424R	07/31/02	collected
P-Code GPS	Trimble 20636-00 (SM)	220035265	n/a	collected
Bathymetry	Knudsen 320B/R		n/a	collected

CTD Sensors

Sensor	Description	Serial #	Cal. Date
CTD Fish - Pressure	Sea-Bird 9Plus-3400m	53952	29-Jun-01
CTD Deck Unit	Sea-Bird 11Plus	288	n/a
Prim. Temp. Sensor	Sea-Bird 3-02/F	2637	25-Jul-02
Sec. Temp. Sensor	Sea-Bird 3-02/F	2658	25-Jun-02
Prim. Cond. Sensor	Sea-Bird 4-02/0	2293	25-Jun-02
Sec. Cond. Sensor	Sea-Bird 4C	2247 2250	25-Jun-02 25-Jul-02
Prim. Diss. Oxy Sensor	Sea-Bird SBE43	0196	05-Nov-02
Sec. Diss. Oxy Sensor	Sea-Bird SBE43	0179	19-Nov-02
Fluorometer	Chelsea model Mk III Aquatracka	088015	08-Aug-02
Transmissometer	C-Star Transmissometer	CST-248DR CST-406DR	31-Jul-02 31-Jul-02

Acquisition and Processing Information

Processing Specifics

Refer to the instrmnt.cof file along with the specific instrument calibration sheets, both located in the Cal/ directory of the data distribution, for information on how the RVDAS data was collected and processed.

Errors and Events

This section lists all significant events and known problems with acquisition during this cruise including instrument failures, data acquisition system failures, and other factors affecting this data set.

Date (Julian)	Time (GMT)	Event	Location
096	03:25	Turned on Seawater, TSG, & PCO2	68 West
096	03:46	Turned on ADCP	68 West
096	03:54	Reset Ashtech – need to clean Ant4 connector	
097	15:45	Reset Ashtech	
097	16:47	Reset Ashtech	
099	16:05	Seawater, TSG, PCO2 Turned off	@ Palmer Station
099	16:07	Sonar Turned off	@ Palmer Station
101	14:10	Sonar Turned on	Left Palmer Station
101	14:24	Turned on Seawater, TSG, & PCO2	Left Palmer Station
101	14:55	Reset Ashtech	
103	08:11	Reset Ashtech	
104	11:56	Seawater, TSG, PCO2 Turned off Cleaned TSG and Fluorometer	@ Palmer Station
104	12:03	Sonar Turned off	@ Palmer Station
104	15:58	Turn of MET system to swap out port WindBird due to bad bearings replaced with s/n WM28392	
104	20:12	Sonar Turned on	Left Palmer Station
104	20:21	Turned on Seawater, TSG, & PCO2	Left Palmer Station
106	13:55	Reset Ashtech	
107	14:55	Turn of MET system to swap out port WindBird due to bad Azimuth pot. Replaced with WM28394	
108	16:45	Shutdown DAS logger and log in as root to clean message from mail system. System was bogging down due to full swap space. Believed cause by full mailbox	
109	02:42	Restart DAS due to system bogging down again.	
109	09:00	Shut off Seawater to fix Ice Strainer leak	
109	09:35	Seawater back on	
109		Windbirds Froze up	
111	05:08	RVDAS Lockup, Shutdown Hard and restarted	

111	14:44	Remove Ice from Windbirds	
112	03:53	Reset Ashtech	
113	03:53	Reset Ashtech	
115	16:46	Seawater, TSG, PCO2 Turned off	@ Palmer Station
115	16:51	Sonar off	@ Palmer Station
118	12:64	Sonar Turned on	Left Palmer Station
118	12:41	Turned on Seawater, TSG, & PCO2	Left Palmer Station
118	13:49	Reset Ashtech	
119	02:23	Reset Ashtech	
120	22:41	Reset Ashtech	
121	12:13	Seawater, TSG, PCO2 Turned off Winds to high so left palmer to they die down	@ Palmer Station
121	19:05	Sonar off	Back @ Palmer Station
122	14:48	Reset Ashtech	
123	14:12	Sonar Turned on	Left Palmer Station
123	14:28	Turned on Seawater, TSG, & PCO2	Left Palmer Station
125	02:56	Reset Ashtech	
126	02:48	Reset Ashtech	
127	01:50	Seawater, TSG, PCO2, and ADCP were shut off	@ 68 West