**Cruise : MW9719**

Overview of MR1 Data Processing Survey mw9719 The GENERAL menus contain general information regarding the data processing techniques used during this cruise. SUBJECT MENU NAME DOC FILE -------- --------- -------- 1. How to use DOC files USING DOC FILES $DOC/general/docfiles.doc 2. Operational and personnel stuff OPS LOG $DOC/general/opslog.doc 3. UNIX aliases used in data processing ALIASES $DP/aliases.doc 4. Organization of directories DIRECTORIES $DP/directories.doc 5. Shell scripts used to process data SCRIPTS $DOC/general/scripts.doc 6. How to backup project data BACKUPS $DOC/general/backups.doc 7. Writing data to CDs CD BACKUPS $DP/cd\_tutor.doc

Using MR1 Data Processing Doc Files Survey mw9719 CONTENTS 1. Initializing the data processing environment 2. How to use the menus or doc files ######################################################################## 1. Initializing the data processing environment In order to access data processing directories and scripts, you must first configure your terminal by entering the name of the survey. Cruise names can be found in the file $ENV/.aliases For example: jus4 This command is an alias that execute the command source $ENV/japanus4.env which defines all the directory settings, scripts, and aliases that you'll need to process data from this survey. ######################################################################## 2. How to use the menus or doc files What's to learn? The doc files are arranged in the order they need to be accessed, so data processing is as simple as pulling open the top menu, doing what it tells you to do, and moving down to the next menu. If you don't have access to the menu window system, use the corresponding doc file to access the data processing steps. SUBJECT MENU NAME DOC FILE -------- --------- -------- 1. BTYP processing BTYP $DOC/btyp/ovrvw.doc 2. Ship and towfish navigation NAV $DOC/nav/ovrvw.doc 3. Bathymetry data processing BTY PROC $DOC/bty\_proc/ovrvw.doc 4. Sidescan data processing SS PROC $DOC/ss\_proc/ovrvw.doc 5. Bathymetry chart construction BTY CHART $DOC/bty\_chart/ovrvw.doc 6. Sidescan chart construction SS CHART $DOC/ss\_chart/ovrvw.doc 7. General chart information CHART INFO $DOC/chart\_info/ovrvw.doc 8. Post-cruise data processing REPROC $DOC/reproc/ovrvw.doc There ya go.

Operations Log Survey mw9719 Client: National Science Foundation Purpose: HAWAII MR1 Survey and Sampling of the Mariana Backarc and Forearc Vessel: R/V Moana Wave Owner: University of Hawaii Depart (port and date): Agana, Guam 08/23/97 Arrive (port and date): Agana, Guam 09/09/97 PI: Dr. Patricia Fryer (University of Hawaii) Co PI: Dr. Gregory Moore (University of Hawaii) HMRG Personnel: Party Chief: Bruce Appelgate Engineer: Steven Tottori Data Processor: Lisa Petersen Data Processor: Fernando Martinez Science Personnel (Name, institution, and contact info): Other Personnel (Name, institution, and contact info): Navigation system: P-Code GPS ############################################################################### REFERENCE SECTION MR1 Settings versus Depth (determined during JapanUS) Fish Pulse Ping Altitude Width Rate -------- ----- ---- < 1000 m 2 4 1000 - 1500 2 6 1500 - 3000 5 10 > 3000 m 10 15 OPERATIONS

MR1 Data Processing Scripts Survey mw9719 CONTENTS 1. Location 2. ISO-9003 format ########################################################################## 1. Locations of scripts A complete scripts directory should be created for each survey. Usually a new scripts directory is created by copying the contents of the previous survey's scripts directory. The scripts directory is located beneath $CRUISE. To get there, you need to initialize your environmental variables like so ew9606 and then type the magic word thusly: scripts and there ya go. In this case (at HMRG), you go to /home/kaulu5h/hmrg\_dar/ew9606/scripts ALL the scripts that you use to do ANYTHING to ANY data from this cruise, EVER, go here. ########################################################################## 2. ISO-9003 format It is decreed that all scripts will be internally documented at a level to pass the Appelgate test. This test is easily performed: give the script to Bruce, and if he can figure it out you pass. At a minimum, all scripts should include: 1. a header that describes what the script does 2. a list of command-line arguements 3. a copyright 4. an example of how to invoke the script 5. a list of all other scripts and programs called within the script 6. an automatic help function 7. enough internal description of what's going on so as not to confuse Bruce Here's an example: #backup\_sschart odd\_even tape\_device # : :.........../dev/rmt/0n or /dev/rmt/1n # :.....................tape number # Copyright 1998 Hawaii Mapping Research Group. All rights reserved. # Daily backup script. Run this using different tapes on # alternate days. Tape labelling convention is "sschart 1" and # "sschart 2", with the odd numbered tape used on odd numbered # julian days. # Behavior: # 1. Creates a tar file for each of the subdirectories beneath $CHART/ss # 2. Does not backup individual files within the $CHART/ss directory # 3. Tar file 0 contains the TARME job used to create this backup # Automatic help function if( $#argv < 2 || $1 == "h" || $1 == "help" ) then echo " " head -16 $0 goto end endif # Set up... set tapenum = $1 set tape = $2 set bupdate = `date '+%y.%j'` set outfile = $ARCHIVE/$PROJ.$bupdate.sschart.$tapenum cd $CHART/ss # Check for valid tape device: if (($tape != "/dev/rmt/0n") && ($tape != "/dev/rmt/1n")) then echo " " echo "Invalid tape device. Use /dev/rmt/0n or /dev/rmt/1n" goto end endif # Write header of ARCHIVE file... echo Backup of seagoing files using backup\_sschart on `date` > $outfile echo GMT Julian Day `date '+%j'` >> $outfile echo host computer: `hostname` >> $outfile echo " " >> $outfile # Write header of TARME... mt -f $tape rewind echo "#TARME" > TARME echo "# Backup of seagoing files using backup\_sschart on "`date` >> TARME echo "# GMT Julian Day "`date '+%j'` >> TARME echo " " >> TARME # Write tar commands as first tar file on backup tape... echo "Constructing tar job..." set file = 0 echo "echo Tar file "$file >> TARME echo "tar -cvf $tape TARME" >> TARME echo "Tar file "$file": "TARME echo "Tar file "$file": "TARME >> $outfile # Write contents of control file as successive tar files... set file = 1 /usr/bin/ls -l | sed '/drwx/\!d' | awk '{print $9}' > tmp0 foreach dir (` cat tmp0 `) echo "Tar file "$file": "$dir echo "Tar file "$file": "$dir >> $outfile echo "echo Tar file "$file >> TARME echo "tar -cvf $tape "$dir >> TARME @ file++ end # Write the tar file using TARME... echo "Writing tar files..." echo " " >> $outfile echo "Files written to tape:" >> $outfile echo " " >> $outfile chmod +x TARME TARME >>& $outfile # Cleanup... if ($OSTYPE == "IRIX") then mt -f $tape rewind mt -f $tape unload else if ( $OSTYPE == "SunOS" ) then mt -f $tape rewind mt -f $tape offline else mt -f $tape rewind endif /bin/rm TARME tmp0 echo "Backup pau." # All pau end:

Backup Schedule for Shipboard Computers Survey mw9719 1. Philosophy 2. Cookbook ####################################################################### 1. Philosophy DAILY BACKUPS Once processing gets going, backups should be run daily. Use two sets of tapes, with one set used on odd days and the other set on even days. FINAL BACKUPS After shipboard data acquisition/processing is pau, make two complete sets of backup tapes so that the final shipboard data are all backed up. PROCEDURE Backups are written from scripts that use the tar command. For fastest transfer to tape, write the tapes on the same machine where the data reside. In the cookbook below, the preferred machine is indicated. As each backup tape is written, the contents of the tape are listed in log files in the $ARCHIVE directory. Log files are automatically created by the backup script, and use the following file name convention: cruisename.year.julian\_day.backup\_type.tapenumber For example: ODD days: EVEN days: backup\_misc 1 /dev/rmt/0n backup\_misc 2 /dev/rmt/0n creates: creates: $ARCHIVE/japanus.98.224.misc.1 japanus.98.224.misc.2 ALWAYS INSPECT THE LOG FILE FROM EACH BACKUP TO MAKE SURE THERE WERE NO TAPE ERRORS. ############################################################################ 2. COOKBOOK For fastest transfer to tape, execute the backup scripts on the same machine where the data reside. You can issue the backup commands from any working directory on that machine -- the scripts know where to find the data and where to write the log files. Usually done in this order, here they are: Data to backup Machine Command -------------- ------- ------- Miscellaneous directories MALEI backup\_misc 2 /dev/rmt/0n Raw MR1 bathy MALEI backup\_btyraw 2 /dev/rmt/0n Final MR1 bathy MALEI backup\_btyfin 2 /dev/rmt/0n XYZ directory MALEI backup\_btyxyz 2 /dev/rmt/0n Bathy chart directory KANOA backup\_btychart 2 /dev/rmt/0n Raw MR1 sidescan KANOA backup\_ssraw 2 /dev/rmt/0n Intermediate MR1 sidescan KANOA backup\_ssint 2 /dev/rmt/0n Final MR1 sidescan KANOA backup\_ssfin 2 /dev/rmt/0n Sidescan grid directory KANOA backup\_ssgrid 2 /dev/rmt/0n Sidescan chart directory KANOA backup\_sschart 2 /dev/rmt/0n IMPORTANT! After each backup is finished, check to make sure the files were written to tape correctly by looking at the backup log in the $ARCHIVE directory like so: more $ARCHIVE/japanus.98.299.btyxyz.2 If you see messages that look like this: tar: /dev/rmt/0n: I/O error or any other kind of error message, try re-running the backup job. If that fails, try using a new tape. If that fails, ...you get the picture.

MR1 Data Processing Using BTYP Survey mw9719 The BTYP menus contain information on how to process MR1 data using the program btyp. SUBJECT MENU NAME DOC FILE -------- --------- -------- 1. How to be a data processor METHOD $DOC/btyp/method.doc 2. Accessing & archiving raw MR1 files RAW FILES $DOC/btyp/rawfiles.doc 3. Log of btyp commands BTYP GEN $DOC/btyp/btyp\_gen.doc 4. Log of min/max bathy clipping values BTYP CLIP $DOC/btyp/btyp\_clip.doc 5. Log of bottom-detect information B DETECT $DOC/btyp/b\_detect.doc 6. Creating AA tables for this cruise AA TABLES $DOC/btyp/aatable.doc 7. Primer: Bottom detect editing in btyp BD EDITING $DP/bd\_edit/bd\_edit.doc 8. Primer: Using MFE to create AA tables AA GEN-MFE $DP/mfe\_tutor/aatable\_mfe.doc #########################################################################

How To Process HAWAII MR1 Data Survey mw9719 CONTENTS 1. Your mission as a data processor 2. Using BTYP to process MR1 bathymetry data 2A Open a raw file in btyp 2B Generate the bottom-detect file 2C Generate bathymetry and...........................save .bdb 2D Flip/unflip bathymetry pings (if necessary).......save .bty 2E Clip outlying high and low soundings..............save .btyw 2F Trim outer edge of swath..........................save .btywt 2G Record btyp command line in $DOC/btyp\_gen.doc 2H Record bottom detect information in $DOC/btyp\_bd.doc 2I Record clipping window depths in $DOC/btyp\_clip.doc 3. Generate sidescan in btyp 3A Reopen the raw data file in btyp 3B Generate sidescan 3C Edit bottom detect if necessary...................save .bds and when satisfied................................save .bss 4. Move the processed files to JD directories ######################################################################## 1. Your mission As a data processor, your primary jobs are: a. Copy each MR1 file from the logging computer onto the processing computer as soon as each MR1 file closes (after the hour). b. Process the MR1 data file using btyp c. Maintain documentation files files for parameters that you will modify for each MR1 file d. Replace, verify and label raw data logging tapes (see the doc file $DOC/btyp\_rawfiles for info on how) e. Conduct daily backups of the data processing directories (see the doc file $DOC/backups.doc for info) This file will provide an overview of how to do the btyp processing. ######################################################################## 2. Using BTYP to process MR1 bathymetry data Raw MR1 data files contain both bathymetry and sidescan data. We use btyp to process bathy and sidescan independently, and there are several types of files that are output from BTYP processing. Output files from btyp will include: filename.bdb - bottom detect file used to generate bathymetry filename.bds - bottom detect file used to generate sidescan filename.bty - original raw bathy file after manual ping flipping filename.btyw - output from depth windowing step filename.btywt - output from edge trimming step filename.ss - first-pass processed MR1 sidescan file ------------------------------------------------------------------------- 2A Open a raw file in btyp... All your data processing will take place in the $RAW directory, and the first thing you need to do is copy a raw MR1 file into this directory. For detailed instructions, see the file $DOC/btyp\_rawfiles.doc From the $RAW directory, run btyp like this: btyp MR19731711.34 -a $PARMS/proc/parmfile.parms ...where the -a indicates a parameter file located in the $PARMS/raw directory. To make sure you're using the correct parameter file, check the documentation file $DOC/btyp\_gen to see how the previous file was processed. RECORD your btyp command line in the $DOC/btyp\_gen.doc file. ------------------------------------------------------------------------- 2B Generate the bottom-detect file Select Bottom Detect => Attributes, and make sure that the relative threshold is equal (or similar) to the value used for the previous file (documented in $DOC/btyp\_bd.doc). Then generate the bottom detects and see how reasonable they look on the graphical display. A reasonable bottom detect has no outliers, and begins at the same depth that the last file ended. A look ahead: We'll maintain two sets of bottom detects, one for bathy and one for sidescan (see $DOC/bd\_edit for explanation). To make processing easier, both will be from the same side (ie, both port or both stbd). First we'll generate the bathymetry, make sure it looks good, and then save the bottom detect for bathy, using the file suffis .bdb (for "bottom detect bathy"), eg: MR1file.bdb Then we'll re-run btyp and read in the .bdb file, and generate sidescan. In rugged terrain we often edit the bottom detect to eliminate the water column from the near-nadir part of the record, and once we're satisfied we save the bottom detect with the file suffix .bds (for "bottom detect sidescan"): MR1file.bds ------------------------------------------------------------------------- 2C Generate bathymetry and save the bottom detect Select Bathymetry => Generate Inspect bathymetry for degradation indicative of changing properties (such as water depth) that require new processing parameters. If a new set of parameters is created, save the parameters according to the existing filename convention (look in the $PARMS/raw directory for examples), and move the new parameter file into $PARMS/raw. Some bathy files need to be subdivided in cases where data are bad (for instance at the beginning of a tow) or where we don't have navigation data. If you've got a file like this, see the doc file $DOC/bty\_cat\_trim.doc for instructions on how to cut files. If you subdivide a file, record it in $DOC/bty\_cat\_trim.doc. Evaluate the bottom-detect: an accurate bottom detect will result in bathy that has no gap at nadir. RECORD the bottom detect values in $DOC/btyp\_bd.doc SAVE the bottom detect for bathy with the suffix .bdb Bottom Detect => Save ------------------------------------------------------------------------- 2D Flip/unflip bathymetry pings (if necessary) and save .bty Inspect bathymetry for pings that need to be manually flipped or unflipped. If you find such a ping, select Bathymetry => Attributes, and turn on manual ping flipping. Accept the attribute menu, then select Bathymetry => Flip (or Unflip). Then position your cursor over the ping to be flipped, hold down the button, and click the left button to flip the ping. Once you've taken care of all the flipped / unflipped pings, SAVE the bathymetry data with the suffix .bty, but don't exit yet. ------------------------------------------------------------------------- 2E Clip outlying high and low soundings (windowing) Sometimes there's speckle noise in the bathymetry (unrealistically deep and shallow points), which will screw up subsequent filtering and imaging. These points should be removed in btyp by setting the minimum and maximum depth values in the Bathymetry -> Attributes popup window, and then regenerating the bathy. RECORD the port/stbd min/max clip values in $DOC/btyp\_clip.doc SAVE the bathymetry data with the suffix .btyw, but don't exit yet. ------------------------------------------------------------------------- 2F Trim outer edge of swath and save .btywt Frequently the outer part of the swath exhibits curl or scatter that needs to be removed for Best Results. You can interactively trim files within btyp by selecting the Bathymetry => Delete => Swath Edge option, and then trimming the file. When pau... SAVE the bathymetry data with the suffix .btywt. Now you can EXIT BTYP. ------------------------------------------------------------------------- 2G Record what you've done in $DOC/btyp\_gen.doc Open the doc file $DOC/btyp\_gen.doc, and copy the btyp command line into the doc file. This will serve as a record of the parameter file used on this file, assist with reprocessing, and help the next guy on watch figure out where to start. ######################################################################## 3. Generate sidescan in btyp After you've finished processing bathymetry, its time to process sidescan. Here's how: ------------------------------------------------------------------------- 3A Reopen the raw data file in btyp Open the $DOC/btyp\_gen.doc and create a new btyp command that will reopen the same raw file you're working on, reading in the .bdf file you just created, like so: btyp MR19731712.00 -bdf MR19731712.00.bdb -a $PARMS/raw/parmfile.parms & copy the command line and paste it into your terminal window, but make sure retain a copy in the $DOC/btyp\_gen.doc file. ------------------------------------------------------------------------- 3B Generate sidescan and save .bds Select Sidescan => Generate, and when the image is displayed, check it for image effects attributable to incorrect bottom detect values. Use the near-nadir sidescan quality to guide further manual editing of the bottom detects. Sidescan imagery near nadir is sensitive to the bottom detect used, and incorrect (early or late) bottom detect values produce predictable patterns. In rugged terrain, several iterations of editing and regenerating sidescan may be required to produce a satisfactory bottom detect. For detailed info on how to edit and evaluate bottom detects, see the file $DOC/bd\_edit.doc. Remember to edit THE SAME SIDE bottom detect as bathymetry (port or stbd) 3C When satisfied, RECORD the bottom detect values in $DOC/btyp\_bd.doc SAVE the bottom detect for sidescan with the suffix .bds Bottom Detect => Save SAVE the sidescan with the suffix .ss. Select Output As with the bathy, some ss files need to be subdivided where data are bad (for instance at the beginning of a tow) or where we don't have navigation data. If you've got a file like this, see the doc file $DOC/ss\_cat\_trim.doc for instructions on how to cut files. If you subdivide a file, record it in $DOC/ss\_cat\_trim.doc. ######################################################################## 4. Move the processed files to JD directories Bottom-detect files go into the $BD directory: mv \*.bd\* $BD Processed MR1 bathy goes into the $BTYR directory, under the appropriate day subdirectory: mv \*.bty\* $BTYR/btyr--- (where --- is the julian day number) Processed MR1 sidescan goes into the $SSRAW directory, under the appropriate day subdirectory: mv \*.ss $SSRAW/ssr--- (where --- is the julian day number) That wraps up the initial data processing in btyp. Have a Kit-Kat bar.

Raw MR1 Data Handling Survey mw9719 CONTENTS 1. Copying raw data onto the processing computer 2. Verifying raw data tapes ###################################################################### 1. Copying from acquisition computer to processing computer After each hour file is acquired, use FTP to transfer the data from the acquisition computer to the $RAW directory, like this: on olomana... cd $RAW ftp nono ftp> name: navmap ftp> password: mr1ops ftp> cd /export/nono1/navmap/raw ftp> binary ftp> ls ftp> get rawfile ftp> get mr1log ftp> bye mv mr1log $RAWLOG At the beginning of each tow, check the towfish depth values while the fish is at the surface. You can run the check in real time using the program adp on the acquisition system. Later, when you've got a processed data file for the beginning of the tow, you can plot the towfish attitude data using $SCRIPTS/pltatt. Save this plot with the cruise documentation. If the recorded depths while the fish is at the surface are not equal to zero, you'll need to set a pressure depth offset in btyp, and use that offset for the entire tow. ###################################################################### 2. Load and verify tapes: cd $RAW; cd .. On olomana: tart >& $VERIFY/11287.red.ver & or tar tvf /dev/rmt/tps1d4nrnsv.8500 >& $VERIFY/11287.red.ver & On malei: tar tvf /dev/rst4 >& $VERIFY/11361.blue.ver Once the verify files have been created, compare them: diff $VERIFY/11483.red.ver $VERIFY/11483.blue.ver If there is no difference between the tapes, you are in good shape. Now look at the files and compare the beginning of the present tape with the end of the last tape written. tail $VERIFY/11438.blue.ver #and compare with head $VERIFY/11439.blue.ver If there is a difference between the red and blue versions, figure out which one is good and which one is not. A good tape should have 12 hour files on it with some Log\* files too. You'll need to throw out the bad tape (but keep the label) and create a replacement manually. Be sure to label the tape with the begining and ending times in minutes, e.g.: 11:00 - 22:59

Bathymetry generation in BTYP Cruise mw9719 This file contains listings of the parameter files and angle-angle tables used to generate each processed hour file in btyp, and also lists the actual btyp command used to open a file in btyp for sidescan and bathymetry processing. Parameters and tables... AA tables used for acquisition and initial shipboard processing: Begin End parms portmap stbdmap 235/0700 ---/---- mw9719.01.parms smw3\_16.60d.portmap smw3\_16.53d.stbdmap Below are the btyp command lines used (organized by julian day): # jday 235 btyp MR19723507.00 -a mw9719.01.parms btyp MR19723507.00 -bdf MR19723507.00.bds -a mw9719.01.parms & btyp MR19723508.00 -a mw9719.01.parms btyp MR19723508.00 -bdf MR19723508.00.bds -a mw9719.01.parms & btyp MR19723509.00 -a mw9719.01.parms btyp MR19723509.00 -bdf MR19723509.00.bds -a mw9719.01.parms & btyp MR19723510.00 -a mw9719.01.parms btyp MR19723510.00 -bdf MR19723510.00.bds -a mw9719.01.parms & btyp MR19723511.00 -a mw9719.01.parms btyp MR19723511.00 -bdf MR19723511.00.bds -a mw9719.01.parms & btyp MR19723512.00 -a mw9719.01.parms btyp MR19723512.00 -bdf MR19723512.00.bds -a mw9719.01.parms & btyp MR19723513.00 -a mw9719.01.parms btyp MR19723513.00 -bdf MR19723513.00.bds -a mw9719.01.parms btyp MR19723514.00 -a mw9719.01.parms btyp 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btyp MR19723600.00 -bd -a mw9719.01.parms & btyp MR19723600.00 -bdf MR19723600.00.bds -a mw9719.01.parms & btyp MR19723601.00 -bd -a mw9719.01.parms & btyp MR19723601.00 -bdf MR19723601.00.bds -a mw9719.01.parms & btyp MR19723602.00 -bd -a mw9719.01.parms & btyp MR19723602.00 -bdf MR19723602.00.bd1 -a mw9719.01.parms & btyp MR19723603.00 -bd -a mw9719.01.parms & btyp MR19723603.00 -bdf MR19723603.00.bd1 -a mw9719.01.parms & btyp MR19723604.00 -bd -a mw9719.01.parms & btyp MR19723604.00 -bdf MR19723604.00.bds -a mw9719.01.parms & btyp MR19723605.00 -bd -a mw9719.01.parms & btyp MR19723605.00 -bdf MR19723605.00.bds -a mw9719.01.parms & btyp MR19723606.00 -bd -a mw9719.01.parms & btyp MR19723606.00 -bdf MR19723606.00.bd1 -a mw9719.01.parms & btyp MR19723607.00 -bd -a mw9719.01.parms & btyp MR19723607.00 -bdf MR19723607.00.bd1 -a mw9719.01.parms & btyp MR19723608.00 -bd -a mw9719.01.parms & btyp MR19723608.00 -bdf MR19723608.00.bd1 -a mw9719.01.parms & btyp MR19723609.00 -bd -a 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-bdf MR19723618.00.bds -a mw9719.01.parms & btyp MR19723619.00 -bd -a mw9719.01.parms & btyp MR19723619.00 -bdf MR19723619.00.bds -a mw9719.01.parms & btyp MR19723620.00 -bd -a mw9719.01.parms & btyp MR19723620.00 -bdf MR19723620.00.bds -a mw9719.01.parms & btyp MR19723621.00 -bd -a mw9719.01.parms & btyp MR19723621.00 -bdf MR19723621.00.bds -a mw9719.01.parms & btyp MR19723622.00 -bd -a mw9719.01.parms & btyp MR19723622.00 -bdf MR19723622.00.bds -a mw9719.01.parms & btyp MR19723623.00 -bd -a mw9719.01.parms & btyp MR19723623.00 -bdf MR19723623.00.bds -a mw9719.01.parms & # jday 237 btyp MR19723700.00 -bd -a mw9719.01.parms & btyp MR19723700.00 -bdf MR19723700.00.bd1 -a mw9719.01.parms & btyp MR19723701.00 -bd -a mw9719.01.parms & btyp MR19723701.00 -bdf MR19723701.00.bd1 -a mw9719.01.parms & btyp MR19723702.00 -bd -a mw9719.01.parms & btyp MR19723702.00 -bdf MR19723702.00.bd1 -a mw9719.01.parms & btyp MR19723703.00 -bd -a mw9719.01.parms & btyp MR19723703.00 -bdf MR19723703.00.bd1 -a 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MR19724907.00 -bd -a mw9719.02.parms & btyp MR19724907.00 -bdf MR19724907.00.bdb -a mw9719.02.parms & btyp MR19724908.00 -bd -a mw9719.02.parms & btyp MR19724908.00 -bdf MR19724908.00.bdb -a mw9719.02.parms & btyp MR19724909.00 -bd -a mw9719.02.parms & btyp MR19724909.00 -bdf MR19724909.00.bdb -a mw9719.02.parms & btyp MR19724910.00 -bd -a mw9719.02.parms & btyp MR19724910.00 -bdf MR19724910.00.bdb -a mw9719.02.parms & btyp MR19724911.00 -bd -a mw9719.02.parms & btyp MR19724911.00 -bdf MR19724911.00.bdb -a mw9719.02.parms & btyp MR19724912.00 -bd -a mw9719.02.parms & btyp MR19724912.00 -bdf MR19724912.00.bdb -a mw9719.02.parms & btyp MR19724913.00 -bd -a mw9719.02.parms & btyp MR19724913.00 -bdf MR19724913.00.bdb -a mw9719.02.parms & btyp MR19724914.00 -bd -a mw9719.02.parms & btyp MR19724914.00 -bdf MR19724914.00.bdb -a mw9719.02.parms & # JD 250 TOW 4 # NO USEFUL DATA --> MR19725000.48 btyp MR19725001.00 -bd -a mw9719.02.parms & btyp MR19725001.00 -bdf $BD/MR19725001.00.bdb -a mw9719.02.parms & btyp MR19725002.00 -bd -a mw9719.02.parms & btyp MR19725002.00 -bdf MR19725002.00.bdb -a mw9719.02.parms & btyp MR19725003.00 -bd -a mw9719.02.parms & btyp MR19725003.00 -bdf MR19725003.00.bdb -a mw9719.02.parms & btyp MR19725004.00 -bd -a mw9719.02.parms & btyp MR19725004.00 -bdf MR19725004.00.bdb -a mw9719.02.parms & btyp MR19725005.00 -bd -a mw9719.02.parms & btyp MR19725005.00 -bdf MR19725005.00.bdb -a mw9719.02.parms & btyp MR19725006.00 -bd -a mw9719.02.parms & btyp MR19725006.00 -bdf MR19725006.00.bdb -a mw9719.02.parms & btyp MR19725007.00 -bd -a mw9719.02.parms & btyp MR19725007.00 -bdf MR19725007.00.bdb -a mw9719.02.parms & btyp MR19725008.00 -bd -a mw9719.02.parms & btyp MR19725008.00 -bdf MR19725008.00.bdb -a mw9719.02.parms & btyp MR19725009.00 -bd -a mw9719.02.parms & btyp MR19725009.00 -bdf MR19725009.00.bdb -a mw9719.02.parms & btyp MR19725010.00 -bd -a mw9719.02.parms & btyp MR19725010.00 -bdf MR19725010.00.bdb -a mw9719.02.parms & btyp MR19725011.00 -bd -a mw9719.02.parms & btyp MR19725011.00 -bdf MR19725011.00.bdb -a mw9719.02.parms & btyp MR19725012.00 -bd -a mw9719.02.parms & btyp MR19725012.00 -bdf MR19725012.00.bdb -a mw9719.02.parms & btyp MR19725013.00 -bd -a mw9719.02.parms & btyp MR19725013.00 -bdf MR19725013.00.bdb -a mw9719.02.parms & btyp MR19725014.00 -bd -a mw9719.02.parms & btyp MR19725014.00 -bdf MR19725014.00.bdb -a mw9719.02.parms & btyp MR19725015.00 -bd -a mw9719.02.parms & btyp MR19725015.00 -bdf MR19725015.00.bdb -a mw9719.02.parms & btyp MR19725016.00 -bd -a mw9719.02.parms & btyp MR19725016.00 -bdf MR19725016.00.bdb -a mw9719.02.parms & btyp MR19725017.00 -bd -a mw9719.02.parms & btyp MR19725017.00 -bdf MR19725017.00.bdb -a mw9719.02.parms & btyp MR19725018.00 -bd -a mw9719.02.parms & btyp MR19725018.00 -bdf MR19725018.00.bdb -a mw9719.02.parms & btyp MR19725019.00 -bd -a mw9719.02.parms & btyp MR19725019.00 -bdf MR19725019.00.bdb -a mw9719.02.parms & btyp MR19725020.00 -bd -a mw9719.02.parms & btyp MR19725020.00 -bdf MR19725020.00.bdb -a mw9719.02.parms & btyp MR19725021.00 -bd -a mw9719.02.parms & btyp MR19725021.00 -bdf MR19725021.00.bdb -a mw9719.02.parms & btyp MR19725022.00 -bd -a mw9719.02.parms & btyp MR19725022.00 -bdf MR19725022.00.bdb -a mw9719.02.parms & btyp MR19725023.00 -bd -a mw9719.02.parms & btyp MR19725023.00 -bdf MR19725023.00.bdb -a mw9719.02.parms & ## JD 251 btyp MR19725100.00 -bd -a mw9719.02.parms & btyp MR19725100.00 -bdf MR19725100.00.bdb -a mw9719.02.parms & btyp MR19725101.00 -bd -a mw9719.02.parms & btyp MR19725101.00 -bdf MR19725101.00.bdb -a mw9719.02.parms & btyp MR19725102.00 -bd -a mw9719.02.parms & btyp MR19725102.00 -bdf MR19725102.00.bdb -a mw9719.02.parms & btyp MR19725103.00 -bd -a mw9719.02.parms & btyp MR19725103.00 -bdf MR19725103.00.bdb -a mw9719.02.parms & btyp MR19725104.00 -bd -a mw9719.02.parms & btyp MR19725104.00 -bdf MR19725104.00.bdb -a mw9719.02.parms & btyp MR19725105.00 -bd -a mw9719.02.parms & btyp MR19725105.00 -bdf MR19725105.00.bdb -a mw9719.02.parms & btyp MR19725106.00 -bd -a mw9719.02.parms & btyp MR19725106.00 -bdf MR19725106.00.bdb -a mw9719.02.parms & btyp MR19725107.00 -bd -a mw9719.02.parms & btyp MR19725107.00 -bdf MR19725107.00.bdb -a mw9719.02.parms & btyp MR19725108.00 -bd -a mw9719.02.parms & btyp MR19725108.00 -bdf MR19725108.00.bdb -a mw9719.02.parms & btyp MR19725109.00 -bd -a mw9719.02.parms & btyp MR19725109.00 -bdf MR19725109.00.bdb -a mw9719.02.parms & btyp MR19725110.00 -bd -a mw9719.02.parms & btyp MR19725110.00 -bdf MR19725110.00.bdb -a mw9719.02.parms & btyp MR19725111.00 -bd -a mw9719.02.parms & btyp MR19725111.00 -bdf MR19725111.00.bdb -a mw9719.02.parms & #################################### Parameter files used... mw9719.01.parms BTYP-BD 0 0.230 300.00 1 500 BTYP-BDRS 0 BTYP-BDDR 0 1 673 1313 BTYP-MFD 2 /home/malei0d/mw9719/tables BTYP-MFP smw3\_16.60d.portmap BTYP-MFS smw3\_16.53d.stbdmap BTYP-CNS 1 3.00 1.00 1.00 BTYP-BC 1 0 0 80000.00 80000.00 BTYP-PDP 35.00 38.00 BTYP-MNA 60.00 53.00 BTYP-MEDFLT 1 5 0 5 1.00 0.75 BTYP-PDPTH 500.00 1700.00 BTYP-SDPTH 500.00 1700.00 BTYP-BCSW 20.00 0.75 15000 BTYP-BCCSF 0.30 3.00 BTYP-DS 0 -69.0 100.00 BTYP-CNTR 0 0 0 50 BTYP-FP 4 100 BTYP-PLT 0 BTYP-BTYDR 0 -5000 5000 BTYP-PW 1 BTYP-TD 0 BTYP-SSBB 15000.00 BTYP-SSSW 5.00 15000 BTYP-SSCSF 4.00 1.00 BTYP-SSPR 0 BTYP-SSFILL 0 0 0.00 0 0 0 BTYP-SSLH 1.00 20000000.00 BTYP-SSGR 1 0 mw9719.02.parms BTYP-BD 0 0.10 300.00 1 500 BTYP-BDRS 0 BTYP-BDDR 0 1 3527 3719 BTYP-MFD 2 /home/malei0d/mw9719/tables BTYP-MFP smw3\_16.60d.portmap BTYP-MFS smw3\_16.53d.stbdmap BTYP-CNS 1 3.00 1.00 1.00 BTYP-BC 0 0 0 8000.00 8000.00 BTYP-PDP 35.00 38.00 BTYP-MNA 60.00 53.00 BTYP-MEDFLT 1 5 0 5 1.00 0.75 BTYP-PDPTH 500.00 5000.00 BTYP-SDPTH 500.00 5000.00 BTYP-BCSW 20.00 0.75 15000 BTYP-BCCSF 0.30 3.00 BTYP-DS 0 -81.00 100.00 BTYP-CNTR 0 0 0 50 BTYP-FP 4 100 BTYP-PLT 0 BTYP-BTYDR 0 -4885 4855 BTYP-PW 1 BTYP-TD 0 BTYP-SSBB 15000.00 BTYP-SSSW 5.00 15000 BTYP-SSCSF 4.00 1.00 BTYP-SSPR 0 BTYP-SSFILL 0 0 0.00 0 0 0 BTYP-SSLH 400000.00 100000000.00 BTYP-SSGR 1 1

Bathymetry clipping in BTYP Cruise mw9719 This file lists the max and min depths set manually in btyp to clip outlying high and low data points. Port Stbd File Min Max Min Max ------------- ---- ---- ---- ---- MR19723507.00 500 5000 500 5000 MR19723508.00 500 5000 500 5000 MR19723509.00 500 5000 500 5000 MR19723510.00 500 5000 500 5000 MR19723511.00 500 5000 500 5000 MR19723512.00 500 5000 500 5000 MR19723517.00 500 4000 500 4000 MR19723518.00 500 5000 500 5000 MR19723519.00 500 5000 500 5000 MR19723520.00 2500 4000 2500 4000 MR19723521.00 2800 3600 2900 3800 MR19723522.00 2400 3600 1600 3600 MR19723523.00 2250 4000 2600 4000 MR19723600.00 3500 4100 3400 4150 MR19723601.00 3000 4300 3600 4300 MR19723602.00 3000 4400 3000 4300 MR19723603.00 2500 3850 2500 3900 MR19723604.00 2600 3850 2600 3850 MR19723605.00 2800 3600 2800 3600 MR19723606.00 2800 3600 2800 3600 MR19723607.00 2900 3900 2900 3700 MR19723608.00 1700 3700 1900 3750 MR19723609.00 1000 4000 1000 4000 MR19723610.00 2500 4500 2500 4500 MR19723611.00 2500 4500 2500 4500 MR19723612.00 1000 4000 1000 4000 MR19723613.00 2000 4000 2000 4000 MR19723614.00 2000 4000 2000 4000 MR19723615.00 2500 3500 2500 3500 MR19723616.00 2500 4000 2500 4000 MR19723617.00 2500 3500 2500 3500 MR19723618.00 2500 3500 2500 3500 MR19723619.00 2000 4500 2000 4500 MR19723620.00 3000 4500 3000 4500 MR19723621.00 2500 4500 2500 4500 MR19723622.00 2000 4500 2000 4500 MR19723623.00 3000 4500 3000 4500 MR19723700.00 3150 4000 3200 4100 MR19723701.00 3100 3800 3000 3700 MR19723702.00 2450 3700 3100 3700 MR19723703.00 2700 3500 2700 3500 MR19723704.00 2900 3300 3000 3550 MR19723705.00 2800 3300 2750 3500 MR19723706.00 2700 3600 2700 3600 MR19723707.00 2550 3700 2550 3650 MR19723708.00 2975 3900 2450 3700 MR19723709.00 3400 4100 3300 3900 MR19723710.00 2000 4100 2900 4200 MR19723711.00 1400 3900 1800 4100 MR19723712.00 3400 4500 3300 4300 MR19723713.00 3500 4300 3400 4000 MR19723714.00 1500 4000 1500 4000 MR19723715.00 2000 4000 2000 4000 MR19723716.00 2500 4000 2500 4000 MR19723717.00 2500 3500 2500 3500 MR19723718.00 2500 3500 2500 3500 MR19723719.00 2500 3500 2500 3500 MR19723720.00 2000 3500 2000 3500 MR19723721.00 2500 4000 2500 4000 MR19723722.00 2000 4000 2000 4000 MR19723723.00 3000 4500 3000 4500 MR19723800.00 3000 4500 3000 4500 MR19723801.00 500 5000 500 5000 MR19723802.00 600 3800 600 3900 MR19723803.00 3600 4600 3600 4600 MR19723804.00 3500 4000 3500 4000 MR19723805.00 2900 4000 3000 4000 MR19723806.00 2300 3900 2300 3600 MR19723807.00 2700 3800 2700 3800 MR19723808.00 2700 3700 2200 3500 MR19723809.00 2900 3600 2700 3300 MR19723810.00 2800 3400 2800 3400 MR19723811.00 2600 3400 2900 3400 MR19723812.00 2800 3400 2700 3600 MR19723813.00 2600 3300 2300 3400 MR19723814.00 2500 3500 2500 3500 MR19723815.00 2500 4000 2500 4000 MR19723816.00 1500 4000 1500 4000 MR19723817.00 2500 4000 2500 4000 MR19723818.00 2000 4000 2000 4000 MR19723819.00 2500 4500 2500 4500 MR19723820.00 3000 4500 3000 4500 MR19723821.00 3500 4500 3500 4500 MR19723822.00 1500 5000 2000 5000 MR19723823.00 1000 5000 2000 4500 MR19723900.00 3000 5300 3000 5000 MR19723901.00 MR19723902.00 3500 4300 3500 4200 MR19723903.00 2600 4100 2400 4000 MR19723904.00 2500 3500 2300 3800 MR19723905.00 2700 3900 2600 4000 MR19723906.00 2600 3700 2600 3600 MR19723907.00 2500 3700 2400 3500 MR19723908.00 2200 3500 2600 3600 MR19723909.00 2800 4100 2900 4100 MR19723910.00 2500 4100 2900 4100 MR19723911.00 2200 3600 2200 3700 MR19723912.00 2200 3800 2200 4000 MR19723913.00 3200 4000 3400 4000 MR19723914.00 2500 4500 2500 4500 MR19723915.00 2500 4000 2500 4000 MR19723916.00 2400 4000 2400 4000 MR19723917.00 2500 5000 2500 5000 MR19723918.00 3000 5000 3500 5000 MR19723919.00 2500 4200 2000 4600 MR19723920.00 3000 6000 3000 6000 MR19723921.00 2500 6000 2500 6000 MR19723922.00 3100 6000 3100 6000 MR19723923.00 2500 5100 2500 5100 MR19724000.00 3000 5000 3000 5000 MR19724001.00 3000 4500 3000 4500 MR19724002.00 3500 4500 3300 4500 MR19724003.00 3500 4000 3500 4350 MR19724004.00 3500 4200 3300 4400 MR19724005.00 3300 4200 3300 4100 MR19724006.00 3300 4100 3100 4100 MR19724007.00 3400 4100 3100 4300 MR19724008.00 3640 4100 3640 4100 MR19724009.00 3500 4150 3500 4150 MR19724010.00 3600 4150 3400 4100 MR19724011.00 3400 4100 3400 4250 MR19724012.00 3300 4400 3300 4400 MR19724013.00 3300 4500 3300 4900 MR19724014.00 3500 5200 3500 5200 MR19724015.00 2500 5500 2500 5500 MR19724016.00 3000 8000 3000 8700 MR19724017.00 4800 8900 6000 8500 MR19724018.00 6000 9000 6000 8500 MR19724019.00 4000 7500 3500 7000 MR19724020.00 4000 7200 4000 5300 MR19724021.00 4000 7000 3500 5500 MR19724022.00 3700 5300 3700 5000 MR19724023.00 3000 4500 3500 4500 MR19724000.00 3000 4000 3300 4100 MR19724101.00 3000 4000 3500 4100 MR19724102.00 3500 4300 3500 4200 MR19724103.00 3700 4300 3500 4300 MR19724104.00 3600 4400 3600 4200 MR19724105.00 2800 4000 2600 4100 MR19724106.00 2900 4000 2600 4000 MR19724107.00 3200 4200 3200 4200 MR19724108.00 3400 4500 3800 4700 MR19724109.00 4000 5300 4200 5450 MR19724110.00 4800 6400 4800 7900 MR19724111.00 4300 6700 5400 8000 MR19724112.00 4000 8800 5000 8000 MR19724113.00 7000 9200 5000 9200 MR19724114.00 7300 9900 7000 9000 MR19724115.00 7000 9000 6500 9000 MR19724116.00 6500 8300 6300 7700 MR19724117.00 5700 8700 5700 7700 MR19724118.00 5000 6900 4500 7400 MR19724119.00 3000 6500 3500 6000 MR19724120.00 2700 4500 3500 4800 MR19724121.00 2800 4400 3500 4600 MR19724122.00 2400 4500 2300 4500 MR19724123.00 2600 4500 2500 4200 MR19724200.00 3000 4900 3400 4200 MR19724201.00 3000 4700 3000 4700 MR19724202.00 2800 4500 2550 4400 MR19724203.00 3300 4700 3400 4450 MR19724204.00 2300 4250 2200 5000 MR19724205.00 2300 4000 2250 3400 MR19724206.00 2600 4200 2600 6000 MR19724207.00 3500 6000 3700 7400 MR19724208.00 5400 8000 6000 7800 MR19724209.00 6800 8700 6800 8700 MR19724210.00 6800 8000 7200 9600 MR19724211.00 used rectangle delete on a few points MR19724212.00 6700 9400 7900 9700 MR19724213.00 8100 9800 7300 9700 MR19724214.00 7000 9800 6400 8500 MR19724215.00 6500 9100 6000 7900 MR19724216.00 5700 8500 4000 7500 MR19724217.00 3500 7500 3000 6500 MR19724218.00 3000 7000 2500 4000 MR19724219.00 3000 6500 2100 5000 MR19724220.00 3000 6000 3000 5000 MR19724221.00 2500 5000 2500 3700 MR19724222.00 2300 4000 2000 4000 MR19724223.00 2700 4100 3300 4500 MR19724300.00 3000 4000 3500 4100 MR19724301.00 3500 4500 3500 4500 MR19724302.00 2300 4500 2100 4000 MR19724303.00 used rectangle delete for a few points # Tow 2 JD 244 MR19724413.01 5500 7000 6000 7500 MR19724414.00 4500 7000 5000 7500 MR19724415.00 5500 6700 5500 8000 MR19724416.00 5000 7500 6000 8900 MR19724417.00 6000 7800 6900 9500 MR19724418.00 6500 8000 7000 9000 MR19724419.00 5500 8900 7000 9000 MR19724420.00 6000 8200 7800 9000 MR19724421.00 6000 8500 6000 9000 MR19724422.00 6000 8500 6000 9000 MR19724423.00 7000 9500 7000 9900 # JD 245 MR19724500.00 8000 10000 7500 9800 MR19724501.00 8000 10000 8000 10000 MR19724502.00 6300 9500 6500 9500 MR19724503.00 5100 8200 6500 8600 MR19724504.00 4300 6600 4600 7800 MR19724505.00 3800 5000 4200 5400 MR19724506.00 3800 5000 4300 5000 MR19724507.00 4300 6200 4300 5600 MR19724508.00 5400 7200 5200 8300 MR19724509.00 5700 7800 6400 8700 MR19724510.00 5100 7200 5100 7100 MR19724511.00 4200 6000 3800 5800 MR19724512.00 3900 4700 3500 4400 MR19724513.00 3600 4400 3800 4400 MR19724514.00 3500 4500 3500 4500 MR19724515.00 3000 4800 2500 4800 MR19724516.00 3000 5600 2500 5600 MR19724517.00 4600 7000 4600 7000 MR19724518.00 6000 7700 6000 8200 MR19724519.00 6000 7500 6000 8900 MR19724520.00 5000 7500 5000 7500 MR19724521.00 4000 6000 4000 6000 MR19724522.00 3500 5000 3500 5000 MR19724523.00 3000 5000 3000 5000 # JD 246 MR19724600.00 3400 5000 2800 5000 MR19724601.00 4000 5000 3500 5000 MR19724602.00 3300 4700 3100 4400 MR19724603.00 4000 6500 3800 6300 MR19724604.00 5900 7900 5400 7100 MR19724605.00 6220 7800 5700 6600 MR19724613.00 3800 4500 3700 4500 MR19724614.00 3000 4500 3000 4500 MR19724615.00 3500 4700 3500 4700 MR19724616.00 2800 4000 2500 4200 MR19724617.00 3500 4700 3000 4900 MR19724618.00 3000 4700 3000 4800 MR19724619.00 3000 5000 3000 5000 MR19724620.00 4500 6000 4500 6000 MR19724621.00 4500 5500 4500 5500 MR19724622.00 4000 5900 4000 5900 MR19724623.00 3500 5000 3000 5000 # JD 247 MR19724700.00 3700 5000 3700 5000 MR19724701.00 3700 5000 3700 5000 MR19724702.00 3700 4550 3800 4550 MR19724703.00 4000 5200 3900 4700 MR19724704.00 4000 5400 4000 5100 MR19724705.00 3800 5000 3800 4700 MR19724706.00 4400 5700 4300 5700 MR19724707.00 5200 6100 5000 6000 MR19724708.00 5500 6000 4900 5900 MR19724709.00 5250 6300 5200 5600 MR19724710.00 5000 5700 5000 5800 MR19724711.00 5200 5950 4700 5600 MR19724712.00 4600 5700 4900 5600 MR19724712.21 4300 5400 3900 5500 MR19724713.00 3800 5300 3400 5150 MR19724714.00 4500 5500 4200 5300 MR19724715.00 3500 5000 3500 4500 MR19724716.00 3500 4100 3000 4100 MR19724717.00 3000 4000 3000 4000 MR19724718.00 3400 4200 3400 4200 MR19724719.00 3700 4700 3700 4700 MR19724720.00 4000 4900 3200 4700 MR19724721.00 4000 4800 3600 4800 MR19724722.00 4000 5000 3700 5000 MR19724723.00 4000 5000 4000 5000 # JD 248 MR19724800.00 3000 4800 3500 4800 MR19724801.00 3000 4200 3000 4000 MR19724802.00 3800 5000 3800 4800 MR19724803.00 3900 4700 3600 4600 MR19724804.00 2000 4100 3000 4000 MR19724805.00 2100 3800 3000 3800 MR19724806.00 3200 4350 3600 4450 MR19724807.00 4000 4800 4200 4950 MR19724808.00 4000 4900 3400 4950 MR19724809.00 4100 5300 3500 5500 MR19724810.00 MR19724811.00 4350 5200 4400 4950 MR19724812.00 4000 5000 3700 4700 MR19724813.00 3300 4400 3300 4200 MR19724814.00 2000 3800 2500 3800 MR19724815.00 2000 4100 2500 4100 MR19724816.00 3400 5200 3500 6000 MR19724817.00 4000 5300 4400 6000 MR19724818.00 3300 5000 3500 5500 MR19724819.00 3000 5000 3500 5500 MR19724820.00 4000 5100 4000 5500 MR19724821.00 3500 5500 4000 5500 MR19724822.00 4300 5500 4300 5900 MR19724823.00 4800 7000 4800 7000 # JD 249 MR19724900.00 5500 7000 5500 7000 MR19724901.00 4300 6530 3900 6350 MR19724902.00 3100 4750 3100 4500 MR19724903.00 3000 4750 3200 4800 MR19724904.00 4400 4600 4400 4800 MR19724904.14 4100 4750 4100 4800 MR19724905.00 3900 4450 3900 4400 MR19724906.00 3450 4200 3600 4300 MR19724907.00 3500 3900 3500 4100 MR19724908.00 3400 4100 3400 4300 MR19724909.00 1800 3850 1700 3700 MR19724910.00 1900 4100 1900 4300 MR19724910.54 3700 4100 4100 4800 MR19724911.00 3600 5200 3600 4900 MR19724912.00 4300 6100 4100 6100 MR19724913.00 4100 6200 4500 6200 MR19724914.00 3500 5300 4500 6300 # JD 250 TOW 4 MR19725000.48 NO USEFUL DATA MR19725001.00 3200 5200 3200 4200 MR19725002.00 3700 4800 3500 4300 MR19725003.00 3400 4800 3200 4300 MR19725004.00 3300 4100 3200 3700 MR19725005.00 3450 4100 3350 4400 MR19725006.00 3700 4900 4000 4900 MR19725007.00 4300 5000 4300 5000 MR19725008.00 4100 4700 3800 4800 MR19725009.00 3700 4700 3800 4800 MR19725010.00 3400 4800 3500 5400 MR19725011.00 4500 5500 4700 6000 MR19725012.00 3900 5000 3900 5400 MR19725013.00 3800 6100 3900 5700 MR19725014.00 5300 6500 5200 6200 MR19725015.00 4500 5800 4800 6000 MR19725016.00 4000 5500 4000 5500 MR19725017.00 3800 5000 3600 5200 MR19725018.00 4000 5000 4000 5000 MR19725019.00 4000 5000 4000 4800 MR19725020.00 3800 4700 3700 4600 MR19725021.00 4000 5000 4000 5000 MR19725022.00 4000 5000 3600 5000 MR19725023.00 4000 5200 4000 5200 # JD 251 MR19725100.00 4100 5200 4100 5200 MR19725101.00 4500 5500 4500 5500 MR19725102.00 4900 5700 4600 5400 MR19725103.00 4600 5400 4000 5300 MR19725103.37 4800 5400 4100 5700 MR19725104.00 3600 5300 4300 5500 MR19725105.00 3500 4500 3700 4800 MR19725106.00 3400 4500 3700 4300 MR19725107.00 3400 4500 3900 4500 MR19725108.00 2700 4400 3400 4400 MR19725109.00 3000 5600 3600 5500 MR19725110.00 5100 7100 4800 6700 MR19725111.00 6200 8200 5800 8600

 Bottom-detect creation in BTYP Cruise mw9719 This file lists parameter settings used to generate bottom detects, shows various useful depth data (min/max depth in a file, begin and end depth), and notes any other significant information. Significant information includes things such as times between good/bad data, launch/recovery info, power settings etc. We use sidescan imagery to evaluate the acceptability of the bottom detects. Sidescan imagery near nadir is sensitive to the bottom detect used, and incorrect (early or late) bottom detect values produce prectable patterns. In rugged terrain, several iterations of editing and regenerating sidescan may be required to produce a satisfactory bottom detect. In cases where the imaging geometry requires severe editing to the bottom detect file, use the PORT bottom detect to generate sidescan, and STBD for bathymetry When editing bottom detects, make sure that the beginning depth of the file you're working on is consistent with the ending depth of the previous file. Threshold Depth BD Source file-name length/value begin end min max ss bty Notes ------------- --------- -------------------------- ---------------- MR19723507.00 1/.23 2963 3125 2750 3140 MR19723509.00 1/.23 3728 3221 3170 4996 MR19723510.00 1/.23 3219 2997 2847 3477 MR19723511.00 1/.23 2996 3485 2996 3622 MR19723512.00 1/.23 3484 3216 3053 3500 MR19723513.00 1/.23 3253 3359 2458 3474 MR19723514.00 1/.23 3357 3030 3030 3700 MR19723515.00 1/.23 3019 3296 2920 3925 MR19723516.00 1/.23 3297 3526 3184 3573 MR19723517.00 1/.23 3527 3711 3527 3719 MR19723518.00 1/.23 3709 2399 2397 3912 MR19723519.00 1/.23 2399 3387 2344 3442 p p MR19723520.00 1/.23 3369 3319 3162 3550 p p MR19723521.00 1/.23 3352 3162 3040 3450 p p MR19723522.00 1/.23 3155 2735 2141 3310 p p MR19723523.00 1/.23 2735 3793 2689 3830 p p MR19723600.00 1/.23 3794 3912 3487 3912 p p 2 pings to unflip MR19723601.00 1/.23 3915 3882 3882 4027 p p MR19723602.00 1/.23 3886 3684 2965 3886 p p MR19723603.00 1/.23 3630 3042 2640 3635 p p MR19723604.00 1/.23 3045 3282 3045 3635 p p MR19723605.00 1/.23 3281 3433 3060 3433 p p MR19723606.00 1/.23 3433 2957 2859 3471 p p MR19723607.00 1/.23 2960 3408 2928 3471 p p MR19723608.00 1/.23 3421 1850 1850 3435 p p MR19723609.00 1/.23 1670 3779 1087 3788 p p MR19723610.00 1/.23 3779 4036 3613 4079 p p MR19723611.00 1/.23 4034 4008 3982 4035 p p MR19723612.00 1/.23 4011 3634 3422 4011 p p MR19723613.00 1/.23 3617 3295 3639 3295 p p 4 pings flipped MR19723614.00 1/.23 3287 3158 2655 3400 p p MR19723615.00 1/.23 3143 3172 2746 3246 p p MR19723616.00 1/.23 3177 3126 3060 3250 p p MR19723617.00 1/.23 3129 2797 2717 3259 p p MR19723618.00 1/.23 2794 3180 2785 3195 p p MR19723619.00 1/.23 3177 3522 2980 3520 p p MR19723620.00 1/.23 3522 3727 3372 4010 p p 2 pings flipped MR19723621.00 1/.23 3723 4037 2978 4050 p b 2 flipped 1 unflipped MR19723622.00 1/.20 4051 3803 3343 4064 p b 1 unflipped ping MR19723623.00 1/.10 3769 3513 3326 3783 p p MR19723700.00 1/.23 3533 3132 3095 3860 p p 2 flipped, 2 unflipped pings MR19723701.00 1/.23 3130 3132 3095 3860 p p MR19723702.00 1/.23 3005 3204 2990 3470 p p 1 ping flipped MR19723703.00 1/.23 3204 3081 2711 3261 p p MR19723704.00 1/.23 3079 3098 2970 3150 p p MR19723705.00 1/.23 3102 2809 2755 3130 p p MR19723706.00 1/.23 2809 3271 2627 3271 p p MR19723707.00 1/.23 3271 3137 2497 3350 p p MR19723708.00 1/.23 3151 3502 3151 3575 p p MR19723709.00 1/.23 3502 3703 3346 3703 p p MR19723710.00 1/.23 3702 2905 2905 3815 p p pings flipped/unflipped MR19723711.00 1/.23 2901 3410 1791 3410 p p MR19723712.00 1/.23 3447 3630 3320 4085 p p MR19723713.00 1/.23 3643 3504 3450 3793 p p MR19723714.00 1/.025 3482 2222 1976 3500 p p MR19723715.00 1/.100 2255 3259 2242 3332 p p MR19723716.00 1/.100 3389 2884 2872 3400 p p MR19723717.00 1/.100 2867 3137 2824 3164 p p MR19723718.00 1/.100 3132 3078 2773 3132 p p MR19723719.00 1/.100 3080 2921 2840 3144 p p MR19723720.00 1/.100 2901 2933 2554 3095 p p MR19723721.00 1/.100 2955 2931 2867 3446 p p MR19723722.00 1/.100 2925 3433 2038 3544 p p MR19723723.00 1/.100 3454 3875 3423 4000 p p MR19723800.00 1/.100 3873 3971 3592 3982 p p MR19723801.00 1/.100 3950 842 831 4429 p p MR19723802.00 1/.10 849 3625 634 3625 p p MR19723803.00 1/.10 3653 3672 3649 4300 p p MR19723804.00 1/.10 3677 3677 3520 3700 p p MR19723805.00 1/.10 3681 3384 3384 3779 p p MR19723806.00 1/.10 3395 2795 2450 3398 p p MR19723807.00 1/.10 2811 3248 2811 3520 p p MR19723808.00 1/.10 3227 3019 2472 3227 p p 3 pings flipped, 3 unflipped MR19723809.00 1/.10 3018 3064 2816 3128 p p MR19723810.00 1/.10 3075 2919 2740 3145 p p MR19723811.00 1/.10 2921 2980 2814 3090 p p MR19723812.00 1/.10 2988 2796 2792 3120 p p MR19723813.00 1/.10 2816 2990 2646 3100 p p MR19723814.00 1/.10 3033 3050 2568 3222 p p MR19723815.00 1/.10 3052 3222 2870 3335 p p MR19723816.00 1/.10 3190 3382 2315 3391 p p MR19723817.00 1/.10 3406 3234 2126 3621 p p MR19723818.00 1/.10 3249 2979 2587 3348 P P MR19723819.00 1/.10 2898 3791 2854 3820 p p MR19723820.00 1/.10 3774 3751 3562 3775 p p MR19723821.00 1/.15 3752 3963 3722 4087 p p MR19723822.00 1/.15 3971 2416 2409 4120 p p MR19723823.00 1/.10 2369 3836 2279 3836 p p MR19723900.00 1/.10 3869 3512 3493 4440 p p MR19723901.00 1/.10 3479 3605 3200 3661 p p MR19723902.00 1/.10 3608 3447 3358 3973 p p MR19723903.00 1/.10 3458 2571 2562 3703 p p MR19723904.00 1/.10 2564 3144 2545 3225 p p MR19723905.00 1/.10 3135 2798 2798 3655 p p MR19723906.00 1/.10 2805 3005 2492 3378 p p MR19723907.00 1/.10 2996 2715 2383 3200 p p MR19723908.00 1/.10 2685 3144 2371 3200 p p MR19723909.00 1/.10 3143 3558 2986 3620 p p MR19723910.00 1/.10 3566 2858 2858 3870 p p MR19723911.00 1/.10 2879 2195 2195 2915 p p MR19723912.00 1/.10 2234 3459 2200 3585 p p MR19723913.00 1/.10 3421 3501 3326 3727 p p MR19723914.00 1/.10 3524 3543 3600 2748 p p MR19723915.00 1/.10 3342 2920 2860 3521 p p MR19723916.00 1/.10 2884 3275 2854 3463 p p MR19723917.00 1/.10 3262 3884 2891 4117 p p MR19723918.00 1/.10 3920 3735 3509 4430 p p 5 pings flipped/unflipped MR19723919.00 1/.10 3770 3711 2748 3807 p p MR19723920.00 1/.23 3812 4715 3812 5655 p p 7 pings flipped/unflipped MR19723921.00 1/.23 4686 5046 4340 5051 p p 7 pings flipped/unflipped MR19723922.00 1/.10 5097 3260 3260 5803 p p MR19723923.00 1/.10 3267 4295 2959 4397 p p MR19724000.00 1/.10 4277 3614 3595 4400 p b MR19724001.00 1/.10 3602 4134 3401 4100 p p MR19724002.00 1/.10 4013 3423 3382 4013 p p MR19724003.00 1/.10 3430 3692 3430 3772 p p MR19724004.00 1/.10 3708 3544 3463 3839 p p MR19724005.00 1/.10 3547 3646 3238 3706 p p MR19724006.00 1/.10 3653 3466 3316 3800 p p MR19724007.00 1/.10 3467 3750 3431 3750 p p MR19724008.00 1/.10 3756 3705 3655 3845 p p MR19724009.00 1/.10 3705 3773 3565 3940 p p MR19724010.00 1/.10 3762 3496 3496 3831 p p MR19724011.00 1/.10 3487 3487 3359 3680 p p MR19724012.00 1/.10 3494 3209 3158 4090 p p MR19724013.00 1/.10 3246 4215 3188 4220 p p MR19724014.00 1/.10 4237 4335 4004 4500 p p MR19724015.00 1/.10 4350 4130 3328 4542 p p MR19724016.00 1/.10 4177 6742 4127 7000 p p MR19724017.00 1/.10 6757 7996 6114 8200 p p 6 pings flipped/unflipped MR19724018.00 1/.50 7925 6352 6352 7881 p p 11 pings flipped/unflipped MR19724019.00 1/.30 6173 4754 3758 6184 p p MR19724020.00 1/.20 4535 4891 4154 5188 p p MR19724021.00 1/.23 4831 4349 4088 5276 p p MR19724022.00 1/.23 4357 4034 3797 4391 p p MR19724023.00 1/.23 4025 3514 3330 4200 p p MR19724100.00 1/.23 3500 3552 3409 3800 p p MR19724101.00 1/.23 3539 3542 3389 3770 p p MR19724102.00 1/.23 3558 3812 3558 3980 p p MR19724103.00 1/.23 3814 3794 3744 3860 p p MR19724104.00 1/.23 3789 3622 3580 4000 p p MR19724105.00 1/.23 3607 2858 2795 3625 p p MR19724106.00 1/.23 2878 3621 2826 3650 p p MR19724107.00 1/.23 3620 3948 3196 3952 p p MR19724108.00 1/.23 3922 4122 3900 4223 p p flipped 1 ping MR19724109.00 1/.23 4124 5131 4073 5125 p p MR19724110.00 1/.23 5134 5424 5134 6176 p p MR19724111.00 1/.23 5425 5636 5240 6527 p p MR19724112.00 1/.40 5605 7270 5605 7310 p p 7 pings flipped/unflipped MR19724113.00 1/.40 7614 7885 7300 8440 p p 21 pings fliped/unflipped MR19724114.00 1/.23 7822 7325 7325 8069 p p 7 pings flipped/unflipped MR19724115.00 1/.23 7324 7120 6792 7344 p p 11 pings flipped/unflipped MR19724116.00 1/.23 7118 7235 6511 7250 p p MR19724117.00 1/.23 7288 6261 6261 7492 p p 3 pings flipped/unflipped MR19724118.00 1/.23 6269 4925 6269 4925 p p MR19724119.00 1/.23 4895 3601 3578 4915 p p MR19724120.00 1/.23 3614 3409 3390 4182 p p MR19724121.00 1/.23 3421 3785 3351 4000 p p MR19724122.00 1/.23 3788 2747 2519 3886 p p MR19724123.00 1/.23 2753 3841 2726 3841 p p # JD 242 MR19724200.00 1/.10 3787 3962 3393 3969 p p MR19724201.00 1/.10 3957 3524 3413 4069 p p MR19724202.00 1/.10 3387 3985 2681 4025 p p MR19724203.00 1/.10 4061 3431 3428 4102 p p MR19724204.00 1/.10 3422 2665 2210 4038 p p MR19724205.00 1/.10 2658 2611 2324 3100 p p MR19724206.00 1/.10 2591 3618 2547 3897 p p MR19724207.00 1/.10 3607 5791 3607 5791 p p MR19724208.00 1/.10 5811 6842 5811 6842 p p flipped several pings MR19724209.00 1/.10 6842 7103 6749 7244 p p unflipped 2 pings MR19724210.00 1/.10 7099 7404 7094 7561 p p flipped 1 ping MR19724211.00 1/.10 7400 7788 7400 8220 p p flipped some pings MR19724212.00 1/.10 7790 8680 7740 8680 p p flipped several pings MR19724213.00 1/.10 8659 8136 8145 9127 p p flipped a few pings MR19724214.00 1/.10 8123 7004 7004 8161 p p MR19724215.00 1/.10 7004 6757 6606 7031 p p 4 pings flipped/unflipped MR19724216.00 1/.10 6749 5696 5683 6768 p p MR19724217.00 1/.10 5691 3607 5695 3607 p p MR19724218.00 1/.10 3584 3082 2888 3600 p p MR19724219.00 1/.10 3102 4156 3088 4744 p p MR19724220.00 1/.10 4168 3261 3260 4427 p p MR19724221.00 1/.10 3265 2566 2561 3275 p p MR19724222.00 1/.10 2559 3638 2330 3639 p p MR19724223.00 1/.10 3670 3701 3377 3791 p p MR19724300.00 1/.10 3706 3750 3645 3772 p p MR19724301.00 1/.10 3754 3989 3740 4040 p p MR19724302.00 1/.10 3989 2448 2112 3992 p p MR19724303.00 1/.10 2479 3056 2479 3218 p p trimmed at 03:07 # Tow 2 JD 244 MR19724413.01 1/.10 6311 5996 5996 6374 p p 9 pings flipped/unflipped MR19724414.00 1/.10 5957 5683 5311 5963 p p MR19724415.00 1/.10 5686 6130 5681 6349 p p 7 pings flipped/unflipped MR19724416.00 1/.10 6120 6514 5853 6500 p p 1 ping unflipped MR19724417.00 1/.125 6518 7157 6518 7532 p p 7 pings flipped/unflipped MR19724418.00 1/.125 7170 7508 7170 7600 p p 5 pings flipped/unflipped MR19724419.00 1/.125 7494 7601 7434 7700 p p 11 pings flipped/unflipped MR19724420.00 1/.120 7603 7652 7592 7843 p p 20 ping flipped/unflipped MR19724421.00 1/.15 7667 6242 6130 7862 p p 5 pings flipped/unflipped MR19724422.00 1/.15 6244 7795 6244 7955 p p 10 pings flipped/unflipped MR19724423.00 1/.15 7782 8660 7706 8660 p p 14 pings flipped/unflipped # JD 245 MR19724500.00 1/.20 8652 8692 8507 8723 p p 12 pings flipped/unflipped MR19724501.00 1/.15 8702 8585 8585 9000 p p 57 pings flipped/unflipped MR19724502.00 1/.10 8575 6666 6341 8576 p p lots of pings flipped MR19724503.00 1/.10 6672 6391 6391 7664 p p several pings flipped MR19724504.00 1/.10 6391 4547 4514 6416 p p MR19724505.00 1/.10 4550 4309 4298 4579 p p MR19724506.00 1/.10 4310 4442 4310 4442 p p flipped a few pings MR19724507.00 1/.10 4444 5389 4441 5393 p p flipped a few pings MR19724508.00 1/.10 5392 6804 5392 6804 p p MR19724509.00 1/.15 6805 6328 6328 6960 p p flipped a dozen pings MR19724510.00 1/.10 6304 5177 5177 6304 p p MR19724511.00 1/.10 5155 4175 4159 5209 p p MR19724512.00 1/.10 4181 3992 3947 4186 p p MR19724513.00 1/.10 3392 3958 3840 4018 p p MR19724514.00 1/.10 3958 4195 3957 4195 p p MR19724515.00 1/.10 4195 3139 3122 4205 p p MR19724516.00 1/.10 3148 5135 3146 5135 p p MR19724517.00 1/.10 5141 6302 5138 6305 p p 2 pings flipped/unflipped MR19724518.00 1/.15 6311 6856 6309 6872 p p 4 pings flipped/unflipped MR19724519.00 1/.17 6856 6597 6597 7264 p p 15 pings flipped/unflipped MR19724520.00 1/.10 6580 5385 5380 6597 p p MR19724521.00 1/.10 5380 4493 4485 5380 p p 1 ping flipped MR19724522.00 1/.10 4492 3778 3755 4492 p p MR19724523.00 1/.10 3747 3879 3745 3964 p p # JD 246 MR19724600.00 1/.10 3880 3981 3629 4400 p p MR19724601.00 1/.10 3968 4145 3907 4439 p p MR19724602.00 1/.10 4142 3945 3284 4142 p p MR19724603.00 1/.10 3949 5986 3949 5986 p p 2 pings flipped MR19724604.00 1/.15 5988 6342 5987 6765 p p 8 pings flipped/unflipped MR19724605.00 1/.10 6337 6233 6225 6337 p p 4 pings flipped mrcat'ed at 246/0519 Tow 3 MR19724613.00 1/.10 4206 3833 3827 4206 p p flipped 2 pings MR19724614.00 1/.10 3833 3990 3768 3990 p p 11 pings flipped/unflipped MR19724615.00 1/.10 3990 3684 3680 4100 p p 1 ping flipped MR19724616.00 1/.10 3678 3396 2956 3678 p p MR19724617.00 1/.10 3404 4447 3402 4447 p p 11 pings flipped/unflipped MR19724618.00 1/.10 4448 3248 3247 4463 p p 13 pings flipped/unflipped MR19724619.00 1/.10 3247 4658 3240 4663 p p MR19724620.00 1/.10 4663 4939 4663 5174 p p flipped 2 pings MR19724621.00 1/.10 4938 4875 4817 5098 p p MR19724622.00 1/.10 4889 4402 4379 4955 p p MR19724623.00 1/.10 4413 3904 3893 4400 p p # JD 247 MR19724700.00 1/.10 3912 4240 3912 4595 p p MR19724701.00 1/.10 4243 4185 4158 4329 p p MR19724702.00 1/.10 4186 3859 3704 4192 p p unflipped 1 ping MR19724703.00 1/.10 3865 4102 3865 4202 p p MR19724704.00 1/.10 4101 3969 3969 4482 p p MR19724705.00 1/.10 3967 4367 3673 4375 p p MR19724706.00 1/.10 4362 5295 4362 5295 p p MR19724707.00 1/.10 5296 5614 5295 5631 p p unflipped 1 ping MR19724708.00 1/.10 5614 5508 5370 5614 p p flipped 2 pings MR19724709.00 1/.10 5509 5350 5341 5515 p p flipped 2 pings MR19724710.00 1/.10 5353 5209 5017 5353 p p MR19724711.00 1/.10 5213 5242 5207 5309 p p MR19724712.00 1/.10 5242 5078 5057 5242 p p pings 0-69 MR19724712.21 1/.10 5055 4185 4185 5055 p p pings 72-330 MR19724713.00 1/.10 4181 4896 3707 4922 p p MR19724714.00 1/.10 4890 4521 4518 4893 p p MR19724715.00 1/.10 4520 3652 3652 4520 p p MR19724716.00 1/.10 3651 3585 3504 3671 p p MR19724717.00 1/.10 3584 3581 3263 3615 p p MR19724718.00 1/.10 3581 3880 3577 3932 p p MR19724720.00 1/.10 4311 4527 4049 4530 p p MR19724721.00 1/.10 4528 4100 4528 4197 p p MR19724722.00 1/.10 4100 4377 4085 4377 p p MR19724723.00 1/.10 4376 4372 4299 4500 p p # JD248 MR19724800.00 1/.10 4372 3588 3565 4381 p p MR19724801.00 1/.10 3585 3744 3059 3751 p p MR19724802.00 1/.15 3757 4357 3757 4570 p p flipped many pings MR19724803.00 1/.10 4357 3776 3776 4357 p p MR19724804.00 1/.10 3774 2956 2904 3774 p p MR19724805.00 1/.10 2956 3528 2881 3555 p p MR19724806.00 1/.10 3543 4107 3543 4107 p p MR19724807.00 1/.10 4116 4612 4116 4612 p p flipped 1 ping MR19724808.00 1/.10 4617 4040 3929 4719 p p MR19724809.00 1/.10 4041 4964 4041 5014 p p flipped 1 ping MR19724810.00 1/.10 4962 4752 4752 4762 p p mrcat'd at 10:27:15 MR19724810.27 1/.10 4749 4666 4666 4749 p p MR19724811.00 1/.10 4663 4391 4378 4663 p p MR19724812.00 1/.10 4392 3899 3899 4393 p p MR19724813.00 1/.10 3896 3235 3235 3896 p p MR19724814.00 1/.10 3234 2846 2846 3250 p p MR19724815.00 1/.10 2845 3826 2466 3868 p p MR19724816.00 1/.10 3857 4883 3857 4883 p p MR19724817.00 1/.10 4884 4354 4354 5140 p p MR19724818.00 1/.10 4334 3770 3570 4334 p p MR19724819.00 1/.10 3764 4771 3636 4771 p p MR19724820.00 1/.10 4772 4377 4377 4782 p p MR19724821.00 1/.10 4376 5100 4322 5100 p p MR19724822.00 1/.10 5101 5266 5101 5274 p p MR19724823.00 1/.10 5272 6272 5272 6283 p p 4 pings flipped/unflipped # JD 249 MR19724900.00 1/.10 6275 6046 6036 6420 p p 1 ping unflipped MR19724901.00 1/.10 6031 4036 4036 6031 p p MR19724902.00 1/.10 4009 3139 3137 4009 p p MR19724903.00 1/.10 3141 4481 3141 4507 p p MR19724904.00 1/.10 4484 4363 4363 4484 p p mrcat'd at 04:14:20 MR19724904.14 1/.10 4361 4075 4075 4362 p p MR19724905.00 1/.10 4075 3983 3983 4130 p p flipped 1 ping MR19724906.00 1/.10 3982 3631 3631 3983 p p MR19724907.00 1/.10 3628 2638 3577 3741 p p MR19724908.00 1/.10 3656 3344 3344 3833 p p MR19724909.00 1/.10 3346 1813 1724 3492 p p MR19724910.00 1/.10 1816 3910 1816 3910 p p mrcat'd at 10:54:15 MR19724910.54 1/.10 3913 3937 3913 3944 p p MR19724911.00 1/.10 3935 4142 3535 4142 p p MR10724912.00 1/.10 4164 5819 4164 5819 p p MR19724913.00 1/.10 5798 4758 4754 5825 p p MR19724914.00 1/.10 4750 4655 4655 5000 p p END of TOW 3 # JD 250 TOW 4 MR19725000.48 <-NO USEFUL DATA BEGIN TOW 4 MR19725001.00 1/.10 3735 3769 3543 3795 p p MR19725002.00 1/.10 3773 4028 3703 4117 p p MR19725003.00 1/.10 4017 3335 3335 4017 p p MR19725004.00 1/.10 3327 3463 3274 3467 p p MR19725005.00 1/.10 3469 3965 3363 3965 p p MR19725006.00 1/.10 3967 4610 3967 4610 p p MR19725007.00 1/.10 4610 4415 4415 4631 p p MR19725008.00 1/.10 4412 4395 4223 4412 p p MR19725009.00 1/.10 4394 3697 3697 4448 p p MR19725010.00 1/.10 3699 4546 3449 4557 p p MR19725011.00 1/.10 4569 4756 4569 5244 p p MR19725012.00 1/.10 4754 3932 3917 4754 p p MR19725013.00 1/.10 3929 5349 3837 5349 p p MR19725014.00 1/.15 5362 5645 5362 5845 p p 3 pings flipped/unflipped MR19725015.00 1/.10 5628 5007 4798 5600 p p MR19725016.00 1/.10 5006 4334 4325 5006 p p 4 pings flipped/unflipped MR19725017.00 1/.10 4331 4518 3953 4573 p p MR19725018.00 1/.10 4515 4359 4202 4545 p p MR19725019.00 1/.10 4365 4251 4122 4425 p p MR19725020.00 1/.10 4251 4210 4107 4262 p p MR19725021.00 1/.10 4219 4167 4167 4340 p p MR19725022.00 1/.10 4169 4579 4138 4579 p p MR19725023.00 1/.10 4581 4679 4580 4754 p p # JD 251 MR19725100.00 1/.10 4578 4788 4550 4788 p p MR19725101.00 1/.10 4789 4968 4721 4969 p p MR19725102.00 1/.10 4968 4895 4895 4980 p p MR19725103.00 1/.10 4890 4749 4521 4890 p p flipped several pings MR19725103.37 1/.10 4755 4951 4755 4999 p p MR19725104.00 1/.10 4977 4182 4182 5039 p p flipped several pings MR19725105.00 1/.10 4180 3956 3850 4249 p p flipped 2 pings MR19725106.00 1/.10 3977 4127 3962 4142 p p flipped some pings MR19725107.00 1/.10 4116 4126 3998 4187 p p MR19725108.00 1/.10 4123 3459 3324 4123 p p MR19725109.00 1/.15 3500 5066 3500 5067 p p MR19725110.00 1/.15 5066 6301 5065 6301 p p flipped 2 pings MR19725111.00 1/.20 6325 7818 6320 7824 p p

MR1 Bathymetry Processing Generating Angle-Angle tables Cruise mw9719 Overview: 1) Collect initial raw data 2) Manually edit bottom detect data (program btyp) 3) Generate an angle-angle table (programs stack8 and xvgr) 4) Apply resulting a-a table to raw data (program btyp or tblsw2) 5) Some notes -------------------------------------- Tables used: 1. smw3\_16.53d.stbdmap smw3\_16.60d.portmap See $DOC/bty\_gen.doc for tables used See SMW3\_04/$DOC/aatable.doc to see how these tables were created.

Overview of Ship and Towfish Navigation Processing Survey mw9719 The NAV menus and doc files illustrate how to process and incorporate navigation data with MR 1 data. In order, the steps are: PROCEDURE MENU DOC FILE --------- ---- -------- 1. Process the ship's navigation SHIP NAV $DOC/nav/nav\_ship.doc 2. Plot the ship's nav NAV PLOT $DOC/nav/nav\_plot.doc 3. Apply nav to bathymetry data BTY NAV $DOC/nav/bty\_nav.doc 4. Apply nav to sidescan data BTY NAV $DOC/nav/ss\_nav.doc 5. Data file: wireout WIREOUT $DOC/nav/wireout.doc 6. Data file: magnetic corrections MAG COR $DOC/nav/mag\_cor.doc 7. Primer: using GEOMAG program USING GEOMAG $DOC/nav/use\_geomag.doc 8. Primer: calculating towfish layback LAYBACK CALC $DOC/nav/layback\_calc.doc

Navigation Data Processing Information Cruise mw9719 Daily nav processing to make day nav files, which we'll combine into a cruise file and tow segment files (where appropriate). 1. Transfer raw P-code GPS nav to the $NAV/raw directory... ls /home/midway/mon/mw9719/PGPS cp /home/midway/mon/mw9719/PGPS/pgps.235.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.236.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.237.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.238.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.239.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.240.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.241.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.242.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.243.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.244.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.245.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.246.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.247.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.248.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.249.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.250.raw\* $NAV/raw cp /home/midway/mon/mw9719/PGPS/pgps.251.raw\* $NAV/raw 2. Edit and rename the nav so that the first time in today's nav does not overlap the last time in yesterday's nav... cd $NAV/raw uncompress \*.raw.Z cp pgps.234.raw $NAV/raw\_edit/pgps.2342222.raw cp pgps.235.raw $NAV/raw\_edit/pgps.2350000.raw cp pgps.236.raw $NAV/raw\_edit/pgps.2360000.raw cp pgps.236.raw $NAV/raw\_edit/pgps.2362149.raw cp pgps.237.raw $NAV/raw\_edit/pgps.2370000.raw cp pgps.238.raw $NAV/raw\_edit/pgps.2380000.raw cp pgps.239.raw $NAV/raw\_edit/pgps.2390028.raw cp pgps.239.raw $NAV/raw\_edit/pgps.2390106.raw cp pgps.240.raw $NAV/raw\_edit/pgps.2400041.raw cp pgps.241.raw $NAV/raw\_edit/pgps.2410231.raw cp pgps.242.raw $NAV/raw\_edit/pgps.2420008.raw cp pgps.243.raw $NAV/raw\_edit/pgps.2430000.raw cp pgps.244.raw $NAV/raw\_edit/pgps.2441320.raw cp pgps.245.raw $NAV/raw\_edit/pgps.2450000.raw cp pgps.246.raw $NAV/raw\_edit/pgps.2460020.raw cp pgps.247.raw $NAV/raw\_edit/pgps.2470014.raw cp pgps.248.raw $NAV/raw\_edit/pgps.2480316.raw cp pgps.249.raw $NAV/raw\_edit/pgps.2490100.raw cp pgps.250.raw $NAV/raw\_edit/pgps.2500205.raw cp pgps.251.raw $NAV/raw\_edit/pgps.2510014.raw cp pgps.251.raw $NAV/raw\_edit/pgps.2510852.raw 3. Run a script to build new navigation (masochists can skip to step 4 to process each step individually). For now, run this on OLOMANA (last processed file ).... cd $NAV/raw\_edit; ls $SCRIPTS/nav\_ship.job 2510852 :....... nav file you're working on 4. Hey -- the above works fine until a bad bit of nav sneaks through, after which its a pain to fix all the nav files. To keep bad nav out, make sure you read the output from fcheck (which automatically prints to the screen when you run nav\_ship.job) and check for gaps in the nav or redundant nav fixes. If you find a problem, edit it out of the guilty .GPS file in the $NAV/raw directory, and then re-run nav\_ship.job. If you think you've made a mistake, don't delete any files -- tell Bruce and he'll fix it. --------------You're Pau!----------------------------- Stuff below explains the manual way of doing all the things that nav\_ship.job does automatically... -------------------------------------------------------- 4. Convert the data to old kine STAG format on malei or olomana: awk '{print $1,$2,$3,$4,$5,$6,$7,$8,$9}' pgps.$file.raw > $NAV/$file.nav 5. Check the new navigation file for gaps using the interactive program fcheck. Here's an example: on olomana, run /home/malei1d/karens/bin/mips/fcheck fcheck.f - File checker for data event file or for nav fix files - 28-jul-89 Enter input file name: infile.nav Want hardcopy ? (y or n) : y Enter hardcopy output file name: infile.fcheck Is this a new formatted type file?(y or n)y Do you want time defaults ? (y or n) y What type of input file do you want to look at? d = data event file or f = fix file : f Enter max allowed time gap (hh,mm,ss): 0,5,0 FILE: 961109.nav File begins at: 96/314 10:49:00 File ends at: 96/314 23:59:00 791. Summary of 791fixes -- Longitude: 1.612282 degrees from 88.46634 to 90.07862 Latitude: 1.416260 degrees from -25.12549 to -23.70923 Note: When pau, check the begin and end times to make sure you're all there. 6. If indicated by fcheck, edit the nav file to remove redundant fixes. 7. Run avgfix on the new nav... avgfix AVGFIX -- Fix / GPS Averaging Program 29-jul-89 Enter input file name: 961109.1sec.nav Is input file NEW format?? (y or n) y Enter output file name: 961109.1min.nav Is the input file a GPS fix file? (y or n) y Do you wish default output interval & search window output intvl=5 min, search win=15 min ? (y or n): n Enter output interval (minutes): 1 Enter search window (minutes): 2 Note: The avgfix program won't let you overwrite an existing file. If you need to write to an existing file name, you've got to remove that file manually first. 8. Cat the new nav files into the master nav files set file = 1470522 cp seamewe3.nav seamewe3.nav.prev cat $file.nav >> seamewe3.nav cat $file.1min.nav >> seamewe3.1min.nav 9. File naming convention. Give the final daily nav a name based on its jd and time, for instance 1382115.nav 7. Run fcheck on the composite nav files (regular and 1-minute) to make sure they're OK. on olomana, run /home/malei1d/karens/bin/mips/fcheck Enter input file name: infile.nav Want hardcopy ? (y or n) : y Enter hardcopy output file name: infile.fcheck Is this a new formatted type file?(y or n)y Do you want time defaults ? (y or n) y What type of input file do you want to look at? d = data event file or f = fix file : f Enter max allowed time gap (hh,mm,ss): 0,5,0 10. Copy the new filtered 1 minute nav to directory one\_min: mv one\_min/seamewe3.1min.nav one\_min/seamewe3.1min.nav.prev cp seamewe3.1min.nav one\_min/seamewe3.1min.nav 11. Cat the appropriate day files into segment files for each tow. cat $file.1min.nav >> segments/seamewe3.tow3c.nav 12. Clean-up the mess.... mv $file.1min.nav one\_min mv \*.fcheck fcheck\_data

Plotting ship navigation Survey mw9719 Ship's navigation can be quickly plotted using the script nplot (or its variants) or the script key\_maker. CONTENTS 1. General notes 2. Location maps with chart boxes 3. Page size nav charts, for each official chart ###################################################################### 1. General notes The nav plotting routines require a nav fix at the hour in order to properly annotate the nav times. For large-area plots, you can use widely-spaced nav data to speed up plotting and optimize the size of your PostScript output file. Try decimating to 10 minute intervals. The script nplot (or its variants specific to each survey) requires the files $PARMS/chart/boxes and $PARMS/chart/chart.labels to annotate each survey box. These files are set up in $DOC/chart\_box.doc. The nplot script looks for navigation in the directory $NAV/segments, with the nav for each MR1 tow named survey.tow##.nav. ###################################################################### 2. Location maps with chart boxes cd $CHART/nav $SCRIPTS/nplot\_mw9719 P 142 149 11.2 20.2 none marianas.nav.ps $SCRIPTS/nplot\_mw9719 L 142.4 146.8 11.5 14.8 four south.nav.ps $SCRIPTS/nplot\_mw9719 L 144.4 148.8 14.5 17.8 four north.nav.ps ########################################################################## 3. Page size nav charts, for each official chart HEY! To create a page-sized nav chart, the chart boundaries need to be specified in the file $PARMS/chart/boxes. To create the boundaries, use the doc file $DOC/chart\_info/chart\_box.doc. The chartnav script: chartnav\_page chart\_ID UTM\_zone segment\_ID

Navigating MR1 Bathymetry data Survey mw9719 A Cookbook For info on how the fish positions are calculated, see $DOC/nav/layback\_calc.doc ############################################ Do this AFTER the most recent navigation has been processed and the cruise navigation file has been updated. 1. Check the file $DOC/nav/wireout.doc to make sure that the wireout value there matches the value recorded in the real-time log book. Update if necessary. 2. Make sure the ship navigation spans the entire time range of the MR1 files you want to navigate. 3. Log into malei or kanoa, and do the following: Multiple files: set jd = 251 cd $BTYR/btyr$jd ls \*btywt > files te files (... to delete any files that have already been processed or whose times exceed the limits of the navigation data.) make\_navm $jd btywt btywtn : :... answer the question about wire out. Submit each job using this for/each loop... foreach file (`ls MR1\*.navm.job `) $file end Move the navigated data to the final directory and clean up... foreach file (`ls \*btywtn `) mv $file $BTYF/btyf$jd end Pau with regular-kine processing! ----------------------------------------------------------------- To navigate an individual file, try this: (change $jd, file\_# for every individual file) cd $BTYR/btyr274 ls MR19827419.00.btywt > files mk\_navm.job 274 btywt btywtn Wait for prompt; answer wire out question, then type: MR19827418.00.btywt.navm.job foreach file (`ls \*btywtn `) mv $file $BTYF/btyf$jd end To plot out a navigated bathymetry hour file... see $DOC/bty\_chart/hourplot.doc

Navigating MR1 Bathymetry data Survey mw9719 A Cookbook For info on how the fish positions are calculated, see $DOC/nav/layback\_calc.doc ############################################ Do this AFTER the most recent navigation has been processed and the cruise navigation file has been updated. 1. Check the file $DOC/nav/wireout.doc to make sure that the wireout value there matches the value recorded in the real-time log book. Update if necessary. 2. Make sure the ship navigation spans the entire time range of the MR1 files you want to navigate. 3. Log into malei or kanoa, and do the following: Multiple files: set jd = 251 cd $BTYR/btyr$jd ls \*btywt > files te files (... to delete any files that have already been processed or whose times exceed the limits of the navigation data.) make\_navm $jd btywt btywtn : :... answer the question about wire out. Submit each job using this for/each loop... foreach file (`ls MR1\*.navm.job `) $file end Move the navigated data to the final directory and clean up... foreach file (`ls \*btywtn `) mv $file $BTYF/btyf$jd end Pau with regular-kine processing! ----------------------------------------------------------------- To navigate an individual file, try this: (change $jd, file\_# for every individual file) cd $BTYR/btyr274 ls MR19827419.00.btywt > files mk\_navm.job 274 btywt btywtn Wait for prompt; answer wire out question, then type: MR19827418.00.btywt.navm.job foreach file (`ls \*btywtn `) mv $file $BTYF/btyf$jd end To plot out a navigated bathymetry hour file... see $DOC/bty\_chart/hourplot.doc

 Wireout Survey mw9719 DATA: stern2GPSrcvr = 0.0 umbilical = 50.0 NOTE: make sure you've measured the stern2GPSrcvr distance and entered the correct value in the script $SCRIPTS/delaycalc. On japanus, the FUGRO nav guys calculated the stern2GPSrcvr distance and incorporated that value into the nav they're giving us (that is, the position of each fix is the stern of the vessel), so the stern2GPSrcvr value is 0.0 \*\* Tow 1 \*\* 235/0700 - 235/2335 turns = 134 235/2335 - 240/0300 turns = 137 240/0300 - 243/0400 turns = 138 \*\* Tow 2 \*\* 244/1329 - 246/0518 turns = 135 \*\* Tow 3 \*\* 246/1300 - 249/1430 turns = 135 \*\* Tow 4 \*\* 250/0100 - 250/0259 turns = 100 250/0300 - 251/0259 turns = 130 251/0300 - ---/---- turns = 138

Magnetic Corrections Survey mw9719 CONTENTS 1. How this file is used 2. Listing of magnetic corrections by CHART and by FILE ############################################################################## 1. How this file is used The values in this file are used to correct towfish compass values to eliminate the influence of the Earth's magnetic field, which changes through time around the world. The data are incorporated into the bathymetry and sidescan processing in different ways: BATHYMETRY uses corrections on a file-by-file basis, and requires that the file name be listed in the first column below. Only include bathymetry files that you want to grid (ie, don't include turns or pieces of data that you don't want plotted -- this is how we kept unwanted bathy data out of the charts). To see how the magnetic corrections are incorporated, see the doc file $DOC/bty\_chart/MR1\_to\_xyzw.doc. SIDESCAN uses corrections on a chart-by-chart basis, and requires the prefix of the chart name in the first column. The declinations are called in the gridding loop in the doc file $DOC/ss\_chart/ss\_grid.doc EXAMPLE of how to list the data. Note that negative values require the minus signs for both degrees and minutes: dec dec chart or MR1 file deg min ----------------- ----- ----- JU:08:100-002 -6 -27.6 MR19822407.00.btywtnc -6 -27.6 MR19822408.00.btywtnc -6 -27.6 ############################################################################ 2. Listing of magnetic corrections by CHART and by FILE dec var chart or MR1 file deg min --------------- --- --- JD235 MR19723507.00 1.5 0.0 MR19723508.00 1.5 0.0 MR19723509.00 1.5 0.0 MR19723510.00 1.5 0.0 MR19723511.00 1.5 0.0 MR19723512.00 1.5 0.0 MR19723513.00 1.5 0.0 MR19723514.00 1.5 0.0 MR19723515.00 1.5 0.0 MR19723516.00 1.5 0.0 MR19723517.00 1.5 0.0 MR19723518.00 1.5 0.0 MR19723519.00 1.5 0.0 MR19723520.00 1.5 0.0 MR19723521.00 1.5 0.0 MR19723522.00 1.5 0.0 MR19723523.00 1.5 0.0 JD236 MR19723600.00 1.5 0.0 MR19723601.00 1.5 0.0 MR19723602.00 1.5 0.0 MR19723603.00 1.5 0.0 MR19723604.00 1.5 0.0 MR19723605.00 1.5 0.0 MR19723606.00 1.5 0.0 MR19723607.00 1.5 0.0 MR19723608.00 1.5 0.0 MR19723609.00 1.5 0.0 MR19723610.00 1.5 0.0 MR19723611.00 1.5 0.0 MR19723612.00 1.5 0.0 MR19723613.00 1.5 0.0 MR19723614.00 1.5 0.0 MR19723615.00 1.5 0.0 MR19723616.00 1.5 0.0 MR19723617.00 1.5 0.0 MR19723618.00 1.5 0.0 MR19723619.00 1.5 0.0 MR19723620.00 1.5 0.0 MR19723621.00 1.5 0.0 MR19723622.00 1.5 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1.3 0.0 MR19724914.00 1.3 0.0 JD250 MR19725001.09 1.5 0.0 MR19725002.00 1.5 0.0 MR19725003.00 1.5 0.0 MR19725004.00 1.5 0.0 MR19725005.00 1.5 0.0 MR19725006.00 1.5 0.0 MR19725007.00 1.5 0.0 MR19725008.00 1.5 0.0 MR19725009.00 1.5 0.0 MR19725010.00 1.5 0.0 MR19725011.00 1.5 0.0 MR19725012.00 1.5 0.0 MR19725013.00 1.5 0.0 MR19725014.00 1.5 0.0 MR19725015.00 1.5 0.0 MR19725016.00 1.5 0.0 MR19725017.00 1.5 0.0 MR19725018.00 1.5 0.0 MR19725019.00 1.5 0.0 MR19725020.00 1.5 0.0 MR19725021.00 1.5 0.0 MR19725022.00 1.5 0.0 MR19725023.00 1.5 0.0 JD251 MR19725100.00 1.8 0.0 MR19725101.00 1.8 0.0 MR19725102.00 1.8 0.0 MR19725103.00 1.8 0.0 MR19725103.37 1.8 0.0 MR19725104.00 1.8 0.0 MR19725105.00 1.8 0.0 MR19725106.00 1.8 0.0 MR19725107.00 1.8 0.0 MR19725108.00 1.8 0.0 MR19725109.00 1.8 0.0 MR19725110.00 1.8 0.0 MR19725111.00 1.8 0.0

Magnetic Corrections Survey mw9719 CONTENTS 1. Cookbook for using GEOMAG scripts in HMRG processing 2. Using GEOMAG in stand-alone mode ############################################################################## 1. Cookbook for using GEOMAG In order to correctly navigate the towfish, the magnetic compass data from the fish needs to be corrected to account for variation in the Earth's magnetic field. Magnetic declination changes from place to place, and through time. Corrections to towfish heading are determined using scripts that incorporate the NGDC program GEOMAG. The corrections need to be added to the doc file $DOC/nav/mag\_corr.doc in order to be implimented by HMRG processing scripts. Here's how to use the scripts: Calculate the (lon,lat) positions of the centers of each chart. This step requires the file $PARMS/chart/boxes, which contains the bounds for each chart: \cp $PARMS/chart/JU:03/JU:03.boxes $PARMS/chart/boxes get\_boxcenters Now calculate the magnetic declination for each chart. This requires as input the date when data were acquired: mag\_declins 1998.855 That creates a file called $PARMS/geomag/boxes.mag\_corrs, which contains the corrections for each chart. Look at the output: more $CRUISE/geomag/boxes.mag\_corrs ...and cut and paste the declinations for the most current charts into the end of the doc file $DOC/nav/mag\_corr.doc (you'll need to edit that doc file to list the MR1 files that occur within that chart). ############################################################################## 2. Using GEOMAG in stand-alone mode Numbers derived from program geomag30 For info on geomag30 see $DAR/geomag/geomag30.txt Example: cd $DAR/geomag geomag30 igrf 1998.61 D K0.00 41.05 149.4 | | | | | |\_\_\_\_ Longitude (west is -) | | | | |\_\_\_\_\_\_\_\_\_\_ Latitude | | | |\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Kilometers above sea level | | |\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Datum is sea level | |\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date (decimal year) |\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Magnetic model Results: D I H X Y Z F (deg) (deg) (nt) (nt) (nt) (nt) (nt) -6d 43.1m 53d 49.9m 27483 27294 -3215 37594 46568 | |\_\_\_ This is the significant value to be entered below East is positive. Change East is positive, west is negative. dec deg = declination (degrees) var min = annual variation (minutes) The geomag30 program requires that the date be specified as a decimal year.

A Method for Calculating Horizontal Ship-To-Fish Distances (Layback) Survey mw9719 CONTENTS 1. General preface 2. Description of how layback is calculated 3. Cookbook a. bathymetry b. sidescan ############################################ PREFACE The default MR1 technique involves using a standard offset in time between the ship and towfish (typically 90-180 seconds). Alternatively, a towfish offset that varies with ship speed, towfish depth and wire out can be estimated using the method below. The first time you navigate the fish, you need to make sure that the following variables are correctly set in the script $SCRIPTS/delaycalc: set umbil = 50 set stern2GPSrcvr = 0.00 The standard MR1 umbilical length is 50 m, but you'll have to measure the distance from your GPS antenna to the ship's stern (to be really accurate, you should measure from the antenna to the point where the depressor weight sits on the LRS when the H-links are attached. When you're deploying, you begin counting revolutions of the winch from zero at this point). On japanus, the FUGRO nav guys calculated the stern2GPSrcvr distance and incorporated that value into the nav they're giving us (that is, the position of each fix is the stern of the vessel), so the stern2GPSrcvr value is 0.0 HEY! Skip right to the cookbook to make this go. ############################################ THE METHOD The heart of the algorithm is within a script called delaycalc.northstar (in the $SCRIPTS directory). The algorithm has 2 parts: it first estimates the horizontal distance to the fish; and then it estimates the effect of towfish pitch on the location of the insonified seafloor. Here's how it works: hor\_dist = sqrt [(umb+wirout+gpsdist)^2 - (fishdepth)^2 ] + pitch\_offset where wireout = meters of wire out = turns\*5 gpsdist = distance from winch to gps receiver umb = umbilical length pitch\_offset = (sin (pitch\* -1.\* rad ) ) \* alt where pitch = fishpitch + fudge fudge = 0.0 [set to zero for first pass, assumming no pitch correction until proven] The distance is then converted to a time offset for use in mrnavm. Error is introduced in this method due to the assumption that the (umb+wirout+gpsdist) distance is a straight line from the gps antenna to the towfish, although in reality there are two horizontal segments (umb and gpsdist) and a catenary curve (wireout). However, we've measured the catenary curve on the Ewing and it's essentially a straight line. The efficacy of the pitch correction has not been documented, although it was empirically determined to improve data quality on mw9603 where a pitch "fudge" factor of 1.0 was used and the remaining pitch was about 1.2 degrees. ############################################ THE COOKBOOK Do this AFTER the most recent navigation has been processed and the cruise navigation file has been updated. --------------------------------------------- Bathymetry 1. Check the file $DOC/wireout.doc to make sure that the wireout value there matches the value recorded in the real-time log book. Update if necessary. 2. Run the script mk\_navm.job to generate the navigation merging jobs. Make sure the ship navigation spans the entire time range of the MR1 files you want to navigate. The following example is shown for bathymetry but works for sidescan also. Multiple files: set jd = 270 cd $BTYR/btyr$jd ls \*btywt > files vi files (or whatever editor you chose, to delete any files that have already been processed or whose times exceed the limits of the navigation data.) mk\_navm.job $jd btywt btywtn : :... answer the question about wire out. Submit each job using this for/each loop... foreach file (`ls MR198\*.navm.job `) $file end Move the navigated data to the final directory and clean up... foreach file (`ls \*btywtn `) mv $file $BTYF/btyf$jd end Individual file (change $jd, file\_# for every individual file), e.g.: cd $BTYR/btyr269 ls MR19826915.00\*btywt > files mk\_navm.job 269 btywt btywtn Wait for prompt; answer wire out question, then type: $BTYR/btyr251/MR19825100.00.btywt.navm.job mv MR19825100.00.btywtn $BTYF/btyf251 To plot out a navigated bathymetry hour file... see $DOC/hourplot.doc --------------------------------------------- Sidescan Here's the cookbook: set jd = 269 cd $SSRAW/ssr$jd ls \*ssd > files vi files (...if you need to edit the file list) mk\_navm.job $jd ssd ssdn : :... answer the question about wire out. Submit each job using a foreach loop... foreach file (`ls MR198\*.navm.job`) $file end Move the navigated data to the final directory and clean up... foreach file (`ls \*ssdn `) mv $file $SSINT/ssi$jd end Individual file (change $jd, file\_# for every individual file), e.g.: cd $SSRAW/ssr266 ls MR19826618.50.ssd > files mk\_navm.job 266 ssd ssdn Execute the job: MR19826618.50.ssd.navm.job

Overview of Advanced Sidescan Processing Survey mw9719 The SS\_PROC menus and doc files illustrate the steps required to prepare MR1 sidescan files for gridding/charting. These steps include navigating the towfish, filtering the sidescan compass data, and removing unwanted periods from the data set. PROCEDURES MENU DOC FILE ---------- ---- -------- 1. Remove unwanted survey data SS CAT $DOC/ss\_proc/ss\_cat.doc 2. Merge nav with bathymetry SS JOB $DOC/ss\_proc/ss\_job.doc 3. Merge nav with bathymetry SS NAV $DOC/ss\_proc/ss\_nav.doc 4. Filter bathymetry compass SS COMPASS $DOC/ss\_proc/ss\_compass.doc 5. Apply Angle Varying Gain APPLY AVG $DOC/ss\_proc/apply\_AVG.doc 6. Apply amplitude scaling APPLY GAIN $DOC/ss\_proc/apply\_gain.doc INFORMATION MENU DOC FILE ----------- ---- -------- 1. Compass Filtering FILTCOMP INFO $DOC/ss\_proc/ss\_power.doc 2. MR1 power settings POWER SETTINGS $DOC/ss\_proc/ss\_power.doc 3. Magnetic corrections MAG COR $DOC/ss\_proc/mag\_cor.doc 4. Creating AVG corrections MAKE AVG $DOC/ss\_proc/make\_AVG.doc

ss\_cat\_trim.doc Survey mw9719 This file documents manual splitting of individual MR1 files. Splitting should be performed on .ss files BEFORE they are processed by SSJOB. Always split MR1 sidecan files when any of the following occur: 1. The transmit power changes 2. The pulse width changes 3. The ping rep rate changes 4. Noisy data during launch or recovery The power/ping/pulse settings are documented in the Log files recorded on the acquisition tapes and copied into the directory $RAWLOG ##################################################################### Examples: Initial settings: Power = FULL; Rate = 10s; Pulse width = 5.0 msec Delete noisy data at beginning of line cd $SSRAW/ssr297 #mv MR19829701.09.ss MR19829701.09.ss.orig mrcat -bt 98/297/01:54:00 MR19829701.09.ss.orig > MR19829701.54.ss Rate = 15 Pulse = 10.0 #mv MR19829703.00.ss MR19829703.00.ss.orig mrcat -et 98/297/03:41:11 MR19829703.00.ss.orig > MR19829703.00.ss mrcat -bt 98/297/03:41:11 MR19829703.00.ss.orig > MR19829703.41.ss ##################################################################### Tow 1: Start mv MR19723921.00.ss MR19723921.00.ss.orig mrcat -et 97/239/21:42:53 MR19723921.00.ssd.orig > MR19723921.00.ss mrcat -bt 97/239/21:43:02 -et 97/239/21:46:56 MR19723921.00.ssd.orig > MR19723921.46.ss mrcat -bt 97/239/21:47:14 MR19723921.00.ssd.orig > MR19723921.47.ss Tow 2: Start 244/13:01:58 mv MR19724413.01.ssd MR19724413.01.ssd.orig mrcat -et 97/244/13:29:14 MR19724413.01.ssd.orig > MR19724413.01.ssd ### first file is mostly garbage ### mrcat -bt 97/244/13:29:32 MR19724413.01.ssd.orig > MR19724413.29.ssd ### Tow 3: mv MR19724620.00.ssd MR19724620.00.ssd.orig mrcat -et 97/246/20:50:32 MR19724620.00.ssd.orig > MR19724620.00.ssd mrcat -bt 97/246/20:50:59 MR19724620.00.ssd.orig > MR19724620.50.ssd mv MR19724904.00.ss MR19724904.00.ss.orig mrcat -et 97/249/04:14:30 MR19724904.00.ss.orig > MR19724904.00.ss mrcat -bt 97/249/04:14:30 MR19724904.00.ss.orig > MR19724904.14.ss mv MR19724910.00.ss MR19724910.00.ss.orig mrcat -et 97/249/10:53:45 MR19724910.00.ss.orig > MR19724910.00.ss mrcat -bt 97/249/10:53:45 MR19724910.00.ss.orig > MR19724910.53.ss mv MR19724914.00.ssd MR19724914.00.ssd.orig mrcat -et 97/249/14:36:44 MR19724914.00.ssd.orig > MR19724914.00.ssd mrcat -bt 97/249/14:37:02 MR19724914.00.ssd.orig > MR19724914.37.ssd # MR19724914.37.ssd contains the bad data at end of tow ### END OF TOW 3 ### TOW 4 mv MR19725001.00.ss MR19725001.00.ss.orig mrcat -et 97/250/01:04:21 MR19725001.00.ss.orig > MR19725001.00.ss mrcat -bt 97/250/01:04:33 -et 97/250/01:08:54 MR19725001.00.ss.orig > MR19725001.04.ss mrcat -bt 97/250/01:09:03 MR19725001.00.ss.orig > MR19725001.09.ss mv MR19725001.00.ssd MR19725001.00.ssd.orig mrcat -et 97/250/01:04:21 MR19725001.00.ssd.orig > MR19725001.00.ssd mrcat -bt 97/250/01:04:33 -et 97/250/01:08:54 MR19725001.00.ssd.orig > MR19725001.04.ssd mrcat -bt 97/250/01:09:03 MR19725001.00.ssd.orig > MR19725001.09.ssd

Sidescan image processing using the ssjob script Survey mw9719 The sidescan data processing Scheme that worked best is hard-wired into the script SCRIPTS/ssjob. The Scheme is determined early in the survey, using the interactive program SSP to try different modules and filters. Run this stuff on the .ss files located in $SSRAW. After you're done, the new files will have the suffix .ssd, and will stay in $SSRAW. ----------------- HISTORY Hey! document times of changes of ssjob parameters here. ----------------- Cookbook Cruise mw9719 had a unique noise characteristic ("speckle bands") that required special processing using demicrostripe. The filtering pipeline that worked best is hard-wired into the script SCRIPTS/ssjob, and involved two passes through mrdemicrostripe. To process a day's worth of sidescan data, run the following: cd $SSRAW/ssr251 ls MR197251\*ss > ssjob.files ssjob\_mw9719 ssjob.files ss ssd To process a single file, try cd $SSRAW/ssr251 ls MR19725101.00.ss > ssjob.files ssjob\_mw9719 ssjob.files ss ssd The first argument to ssjob is the input file suffix, the second is the output file suffix. Processing can be done before or after nav merging and/or compass filtering. If it is done in a different order, however you must adjust the suffix variables in the scripts above. For detailed description of the sidescan processing, see the "COMMENTS" section at the end of the ssjob script. Inspect the files using ssp or the for-loop below, and make sure they look OK: foreach file (`ls \*ssd`) echo 'displaying' $file ssp $file end At the end of this step the .ss and .ssd files will be located in the $SSRAW/ssr--- directory (where "---" is the julian day)

 Navigating MR1 Sidescan data Survey mw9719 A Cookbook For info on how the fish positions are calculated, see $DOC/nav/layback\_calc.doc ############################################ Do this AFTER the most recent navigation has been processed and the cruise navigation file has been updated. 1. Check the file $DOC/nav/wireout.doc to make sure that the wireout value there matches the value recorded in the real-time log book. Update if necessary. 2. Make sure the ship navigation spans the entire time range of the MR1 files you want to navigate. 3. Log into malei or kanoa, and do the following: Multiple files: set jd = 251 cd $SSRAW/ssr$jd ls \*ssd > files te files (... to delete any files that have already been processed or whose times exceed the limits of the navigation data.) make\_navm $jd ssd ssdn : :... answer the question about wire out. Submit each job using a foreach loop... foreach file (`ls MR198\*.navm.job`) $file end Move the navigated data to the final directory and clean up... foreach file (`ls \*ssdn`) mv $file $SSINT/ssi$jd end All pau. ------------------------------------------------------------------ To navigate an individual file: (change $jd, file\_# for every individual file), cd $SSRAW/ssr251 ls MR19825122.00.ssd > files make\_navm 251 ssd ssdn Execute the job: MR19826618.50.ssd.navm.job

 Towfish Compass Processing for Sidescan Data Survey mw9719 A COOKBOOK For more info on how these scripts work, or info on how to correctly edit the FILTCONTROL control file, see $DOC/compass\_ovrvw.doc Sidescan ---------- 1. Strip out compass data from processed sidescan files. The routine below uses the MR1 program mrstrip. Note: In order for the compass filtering to work, you need to have compass data that extends several pings before and after the time interval you're trying to filter. Because we're processing by julian day, we include the previous day's 2300 file and the next day's 0000 file in the filtering scheme set up below. set jd = 328 cd $SSINT/ssi$jd; ls MR\*.ssdn > getcomp.files foreach file (`cat getcomp.files`) echo "Stripping compass data from file: "$file set f = $file:r mrstrp -compass < $file > $COMPASS/ss/$f.comp end # Only run the next block when you are postprocessing an entire JD... cd $SSRAW/ssr`expr $jd + 1` set file = MR1?????00.00.ss set f = $file:r echo "Stripping compass data from file: "$file mrstrp -compass < $file > $COMPASS/ss/$f.comp 2. Make a control file to direct how the files are processed during the filtering step. From any directory, type $SCRIPTS/filtcontrol ss $jd : :.........Answer the questions. :.........For more info on how to modify this file, see :.........$DOC/compass\_ovrvw.doc 3. Create the executable job that will filter the compass data. In the $COMPASS/bathy directory, execute the following: cd $COMPASS/ss make\_filtcomp day$jd.control 7 98 4. Execute the job: day$jd.filtcomp.job >& day$jd.filtcomp.log This job calls a script called $SCRIPTS/filtcomp, which in turn runs the GMT program filter1d. 5. Insert the filtered data into the processed bathy files, using the script $SCRIPTS/recompbty.job. cd $SSINT/ssi$jd ls \*ssdn > files $SCRIPTS/recompss.job ssdn ssdnc if the above is OK, then \rm \*.ssdn All Pau!

Applying Angle-Varying Gain (AVG) to sidescan data Survey mw9719 CONTENTS 1. Introduction 2. Log of AVG correction tables used for this survey 3. Cookbook ##################################################################### 1. Introduction This file shows you how to apply angle-varying gain (AVG) corrections to sidescan data. The mravg program is also used here to remove high- amplitude specular reflections at nadir. This is often done with several iterative calls to mravg that use progressively smaller values for the -swp and -ma options (see the mravg manpage for descriptions of the variables). These steps should be done after the sidescan files have been navigated and compass-corrected. To see how the AVG corrections were generated, check out the file $DOC/ss\_proc/make\_AVG.doc. ##################################################################### 2. Log of AVG correction tables used for this survey: Pulse Width Inclusive Times Cookbook # AVG correction name ----------- -------------------- ---------- ------------------- 5 ms 235/0700 to 239/2147 mw9719\_05 mw9719.05ms.avg 10 ms ba 239/2148 to 243/0330 mw9719\_06 mw9719.10ms.backarc.avg 10 ms fa 244/1300 to 246/0530 mw9719\_07 mw9719.10ms.forearc.avg 5 ms 246/1300 to 246/2050 mw9719\_05 mw9719.05ms.avg 10 ms fa 246/2051 to 247/1220 mw9719\_07 mw9719.10ms.forearc.avg 5 ms 247/1221 to 248/1026 mw9719\_05 mw9719.05ms.avg 10 ms fa 248/1027 to 249/0413 mw9719\_07 mw9719.10ms.forearc.avg 5 ms 249/0414 to 249/1052 mw9719\_05 mw9719.05ms.avg 10 ms fa 249/1053 to 251/0336 mw9719\_07 mw9719.10ms.forearc.avg 5 ms 251/0337 to 251/0959 mw9719\_05 mw9719.05ms.avg 10 ms fa 251/1000 to 251/1159 mw9719\_07 mw9719.10ms.forearc.avg \* ba = backarc \* fa = forearc ##################################################################### 3. Cookbook 5 ms pulse width (235/0700 to 239/2147): set jd = 235 set jd = 236 set jd = 237 set jd = 238 cd $SSINT/ssi$jd set corr = $AVG/mw9719.05ms.avg foreach file (`ls MR1\*.ssdnc `) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 239 cd $SSINT/ssi$jd set corr = $AVG/mw9719.05ms.avg foreach file (`ls MR197239{0,1}\*.ssdnc MR19723920\*.ssdnc MR19723921.00.ssdnc MR19723921.46.ssdnc `) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 246 cd $SSINT/ssi$jd set corr = $AVG/mw9719.05ms.avg foreach file (`ls MR1972461\*.ssdnc MR19724620.00.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 247 cd $SSINT/ssi$jd set corr = $AVG/mw9719.05ms.avg foreach file (`ls MR19724712.21.ssdnc MR1972471{3,4,5,6,7,8,9}.??.ssdnc MR1972472?.??.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 248 cd $SSINT/ssi$jd set corr = $AVG/mw9719.05ms.avg foreach file (`ls MR1972480?.??.ssdnc MR19724810.00.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 249 cd $SSINT/ssi$jd set corr = $AVG/mw9719.05ms.avg foreach file (`ls MR19724904.14.ssdnc MR1972490{5,6,7,8,9}.??.ssdnc MR19724910.00.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 251 cd $SSINT/ssi$jd set corr = $AVG/mw9719.05ms.avg foreach file (`ls MR19725103.37.ssdnc MR1972510{4,5,6,7,8,9}.??.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 251 cd $SSINT/ssi$jd set corr = $AVG/mw9719.05ms.avg foreach file (`ls MR1972510{7,8,9}.??.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end 10 ms pulse width (Backarc): set jd = 239 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.backarc.avg foreach file (`ls MR19723921.47.ssdnc MR1972392{2,3}\*.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 240 set jd = 241 set jd = 242 set jd = 243 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.backarc.avg foreach file (`ls MR197\*.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end 10 ms pulse width (Forearc): set jd = 244 set jd = 245 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.forearc.avg foreach file (`ls MR197\*.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 246 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.forearc.avg foreach file (`ls MR1972460\*.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 246 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.forearc.avg foreach file (`ls MR19724620.50\*ssdnc MR1972462{1,2,3}\*ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 247 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.forearc.avg foreach file (`ls MR1972470\*.ssdnc MR1972471{0,1,2}.00.\*ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 248 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.forearc.avg foreach file (`ls MR19724810.27.ssdnc MR1972481{1,2,3,4,5,6,7,8,9}.00.\*ssdnc MR1972482?.00.\*ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 249 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.forearc.avg foreach file (`ls MR1972490{0,1,2,3,4}.00.\*ssdnc MR19724910.53.\*ssdnc MR1972491{1,2,3,4}.\*ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 250 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.forearc.avg foreach file (`ls MR197\*ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 251 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.forearc.avg foreach file (`ls MR1972510{0,1,2,3}.00.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end set jd = 251 cd $SSINT/ssi$jd set corr = $AVG/mw9719.10ms.forearc.avg foreach file (`ls MR1972511\*.00.ssdnc`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $SSFIN/ssf$jd/$f.ssdnca end

 Applying scaling factors to sidescan data Survey mw9719 Following the AVG correction, each file should be run through mrscale to equalize the gray values between files that were acquired using different transmit power settings or pulse lengths. The procedure below requires a doc file $DOC/ss\_proc/ss\_power.doc that contains power and pulse width settings. ##################################################################### Corrections for different power settings. These corrections were determined empirically by 1) running ssp on a several AVG'd files (.ssdnca), and 2) using the "scale" process to interactively view the scaled data: FULL POWER 2 msec 5 msec 10 msec ------ ------ ------- x 3.15 x 1.6 x 1.0 ##################################################################### NOTE: The following steps require that the power settings for each hour file be recorded in a data filed named $DOC/ss\_proc/ss\_power.doc (pull- down menu ss\_proc -> power settings) No gain correction applied

Filtering compass heading using FILTCONTROL Survey mw9719 Contents: 1. Preface 2. Editing the FILTCONTROL control file 3. Troubleshooting PREFACE To correct for yaw variation in the towfish we use the compass data collected by the fish to correct the heading of the fish prior to creating navigated gridded data. The towfish compass headings require some filtering in order to prevent wild deviations in sidescan pings at the gridding stage. There are three steps to compass processing: 1. Strip the compass data out of the individual processed MR1 data files 2. Apply a median filter to the data using the GMT routine filter1d, which is called by the insideous FILTCONTROL step. 3. Insert the smoothed compass data back into the processed MR1 files ########################################################################## The FILTCONTROL control file: 2. Make a control file to direct how the files are processed during the filtering step. From any directory, type $SCRIPTS/filtcontrol bathy $jd The filtcontrol script will operate on compass data extracted from either the bathymetry or sidescan files, located in either $COMPASS/bathy or $COMPASS/ss. An output file named day---.control (where "---" is the day number) will be written to the bathy or ss directory under $COMPASS/bathy or $COMPASS/ss. The script will display the resulting file and ask if you need to modify it. Enter "y" to vi the file. This needs to be done only if there are time gaps between any two files. if there is a data gap between files, edit in a line with the word "none" between the files where there is the gap. e.g.: where 10618.00 is the first file after system start and there is gap between files 10619.00 and 10619.28... . . . . 10618.00 10618.00 10619.00 10619.00 10619.28 none 10620.00 10619.28 10621.00 10620.00 10622.00 10621.00 10623.00 10622.00 10623.00 ######################################################################### Troubleshooting if the filtering routine fails: a. If the compass headings are very erratic then the filtering routine can fail. To fix the problem, run a check on the new smoothed compass files to find large jumps, and then manually edit the files that fail: cd /home/malei1d/northstar/compass/bathy ls MR196323\*f7.comp > files ckcompass.job 10 ...where "10" is the acceptable variation in degrees between subsequent pings. If unacceptable jumps are found, the ckcompass script will write debugging files in the durrent working directory that have the suffix "DEBUG". The DEBUG files will list the ping numbers that failed the angle test -- edit the appropriate \*f7.comp file to decrease the ping-to-ping angular variation. Note that it is very rare for a file to fail this check.

Sidescan power settings Survey mw9719 This file contains the names of each processed sidescan file, and lists the power settings used. Data in this file are used in the $DOC/apply\_gain.doc file. EXAMPLE Pulse Filename Power Length -------- ----- ------ MR19828815.00 full 2 MR19828815.03 full 5 MR19828816.00 full 5 ##################################################################### 2. Log of pulse widths used Pulse Width Inclusive Times Cookbook # AVG correction name ----------- -------------------- ---------- ------------------- 5 ms 235/0700 to 239/2147 mw9719\_05 mw9719.05ms.avg 10 ms ba 239/2148 to 243/0330 mw9719\_06 mw9719.10ms.backarc.avg 10 ms fa 244/1300 to 246/0530 mw9719\_07 mw9719.10ms.forearc.avg 5 ms 246/1300 to 246/2050 mw9719\_05 mw9719.05ms.avg 10 ms fa 246/2051 to 247/1220 mw9719\_07 mw9719.10ms.forearc.avg 5 ms 247/1221 to 248/1026 mw9719\_05 mw9719.05ms.avg 10 ms fa 248/1027 to 249/0413 mw9719\_07 mw9719.10ms.forearc.avg 5 ms 249/0414 to 249/1052 mw9719\_05 mw9719.05ms.avg 10 ms fa 249/1053 to 251/0336 mw9719\_07 mw9719.10ms.forearc.avg 5 ms 251/0337 to 251/0959 mw9719\_05 mw9719.05ms.avg 10 ms fa 251/1000 to 251/1159 mw9719\_07 mw9719.10ms.forearc.avg \* ba = backarc \* fa = forearc

Magnetic Corrections Survey mw9719 CONTENTS 1. How this file is used 2. Listing of magnetic corrections by CHART and by FILE ############################################################################## 1. How this file is used The values in this file are used to correct towfish compass values to eliminate the influence of the Earth's magnetic field, which changes through time around the world. The data are incorporated into the bathymetry and sidescan processing in different ways: BATHYMETRY uses corrections on a file-by-file basis, and requires that the file name be listed in the first column below. Only include bathymetry files that you want to grid (ie, don't include turns or pieces of data that you don't want plotted -- this is how we kept unwanted bathy data out of the charts). To see how the magnetic corrections are incorporated, see the doc file $DOC/bty\_chart/MR1\_to\_xyzw.doc. SIDESCAN uses corrections on a chart-by-chart basis, and requires the prefix of the chart name in the first column. The declinations are called in the gridding loop in the doc file $DOC/ss\_chart/ss\_grid.doc EXAMPLE of how to list the data. Note that negative values require the minus signs for both degrees and minutes: dec dec chart or MR1 file deg min ----------------- ----- ----- JU:08:100-002 -6 -27.6 MR19822407.00.btywtnc -6 -27.6 MR19822408.00.btywtnc -6 -27.6 ############################################################################ 2. Listing of magnetic corrections by CHART and by FILE dec var chart or MR1 file deg min --------------- --- --- JD235 MR19723507.00 1.5 0.0 MR19723508.00 1.5 0.0 MR19723509.00 1.5 0.0 MR19723510.00 1.5 0.0 MR19723511.00 1.5 0.0 MR19723512.00 1.5 0.0 MR19723513.00 1.5 0.0 MR19723514.00 1.5 0.0 MR19723515.00 1.5 0.0 MR19723516.00 1.5 0.0 MR19723517.00 1.5 0.0 MR19723518.00 1.5 0.0 MR19723519.00 1.5 0.0 MR19723520.00 1.5 0.0 MR19723521.00 1.5 0.0 MR19723522.00 1.5 0.0 MR19723523.00 1.5 0.0 JD236 MR19723600.00 1.5 0.0 MR19723601.00 1.5 0.0 MR19723602.00 1.5 0.0 MR19723603.00 1.5 0.0 MR19723604.00 1.5 0.0 MR19723605.00 1.5 0.0 MR19723606.00 1.5 0.0 MR19723607.00 1.5 0.0 MR19723608.00 1.5 0.0 MR19723609.00 1.5 0.0 MR19723610.00 1.5 0.0 MR19723611.00 1.5 0.0 MR19723612.00 1.5 0.0 MR19723613.00 1.5 0.0 MR19723614.00 1.5 0.0 MR19723615.00 1.5 0.0 MR19723616.00 1.5 0.0 MR19723617.00 1.5 0.0 MR19723618.00 1.5 0.0 MR19723619.00 1.5 0.0 MR19723620.00 1.5 0.0 MR19723621.00 1.5 0.0 MR19723622.00 1.5 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1.3 0.0 MR19724914.00 1.3 0.0 JD250 MR19725001.09 1.5 0.0 MR19725002.00 1.5 0.0 MR19725003.00 1.5 0.0 MR19725004.00 1.5 0.0 MR19725005.00 1.5 0.0 MR19725006.00 1.5 0.0 MR19725007.00 1.5 0.0 MR19725008.00 1.5 0.0 MR19725009.00 1.5 0.0 MR19725010.00 1.5 0.0 MR19725011.00 1.5 0.0 MR19725012.00 1.5 0.0 MR19725013.00 1.5 0.0 MR19725014.00 1.5 0.0 MR19725015.00 1.5 0.0 MR19725016.00 1.5 0.0 MR19725017.00 1.5 0.0 MR19725018.00 1.5 0.0 MR19725019.00 1.5 0.0 MR19725020.00 1.5 0.0 MR19725021.00 1.5 0.0 MR19725022.00 1.5 0.0 MR19725023.00 1.5 0.0 JD251 MR19725100.00 1.8 0.0 MR19725101.00 1.8 0.0 MR19725102.00 1.8 0.0 MR19725103.00 1.8 0.0 MR19725103.37 1.8 0.0 MR19725104.00 1.8 0.0 MR19725105.00 1.8 0.0 MR19725106.00 1.8 0.0 MR19725107.00 1.8 0.0 MR19725108.00 1.8 0.0 MR19725109.00 1.8 0.0 MR19725110.00 1.8 0.0 MR19725111.00 1.8 0.0

Generating Angle Varying Gain (AVG) Corrections Survey mw9719 CONTENTS 1. Summary 2. Cookbook For Segment ## ############################################################################# 1. Summary This is a method to generate depth-dependent angle varying gain (AVG) corrections. When choosing the input files to create final AVG curves, be sure to include files that represent the extreme depth ranges of the data set. If you don't, then AVG corrections for those depth ranges won't be calculated. The names of the files used to generate each AVG correction are saved in $AVG/$table/$table.avglist To APPLY the AVG correction, see the file $DOC/ss\_proc/apply\_AVG.doc On past surveys we've had good luck regenerating AVG corrections on a daily basis, with new AVG tables using all the data from preceding days. This method yielded pretty good matches between hour files that were processed with different AVG corrections. ############################################################################# 2. Cookbook 1. Create a list of sidescan file names with their complete path name. Try running... Days included: 235 set dwr = 50 cd $AVG/mw9719 01: ls $SSINT/ssi235/\*ssd $SSINT/ssi236/\*ssd > mw9719\_01.avglist avg\_gen mw9719\_01 $dwr 200000000 200000000 800 2000 02: ls $SSFIN/ssf235/\*ssda $SSFIN/ssf236/\*ssda > mw9719\_02.avglist avg\_gen mw9719\_02 $dwr 200000000 200000000 800 2000 03: ls $SSINT/ssi236/\*ssd > mw9719\_03.avglist avg\_gen mw9719\_03 $dwr 200000000 200000000 800 2000 04: set dwr = 500 ls $SSINT/ssi236/\*ssd > mw9719\_04.avglist avg\_gen mw9719\_04 $dwr 200000000 200000000 800 2000 05: set dwr = 500 ls $SSINT/ssi235/\*ssd $SSINT/ssi236/\*ssd > mw9719\_05.avglist avg\_gen mw9719\_05 $dwr 200000000 200000000 500 8000 cd $AVG/mw9719 mv mw9719\_05.raw.avgcorrs $AVG/mw9719.05ms.avg 06: set dwr = 500 ls $SSINT/ssi24{0,1}/\*ssd > mw9719\_06.avglist avg\_gen mw9719\_06 $dwr 200000000 200000000 500 9500 cd $AVG/mw9719 mv mw9719\_06.raw.avgcorrs $AVG/mw9719.10ms.backarc.avg 07: set dwr = 500 ls $SSINT/ssi24{4,5}/\*ssd $SSINT/ssi246/MR1972460{1,2,3,4,5}\*ssd > mw9719\_07.avglist avg\_gen mw9719\_07 $dwr 200000000 200000000 500 10000 cd $AVG/mw9719 mv mw9719\_07.raw.avgcorrs $AVG/mw9719.10ms.forearc.avg 2. Testing the AVG correction: set corr = $AVG/mw9719/mw9719\_07.raw.avgcorrs set jd = 246 cd $SSINT/ssi$jd foreach file (`ls \*.ssd`) echo "Correcting AVG on file: "$file set f = $file:r mravg $file -rcf $corr > $f.test end 3. Check out the results: foreach file (`ls MR1\*.test`) echo "Displaying file: "$file ssp $file -a $RAW/ssp.parms end BEST RESULTS ...using mw9719\_05.raw.avgcorrs

Overview of Bathymetry Charting Survey mw9719 The BTY\_CHART menus and doc files document how to create bathymetry charts. PROCEDURE MENU DOC FILE --------- ---- -------- 1. Convert MR1 bathy to xyzw MR1 TO XYZW $DOC/bty\_chart/MR1\_to\_xyzw.doc 2. Grid the xyzw data BTY GRIDDING $DOC/bty\_chart/bty\_grid.doc 3. Image A0-size charts A0 CHARTS $DOC/bty\_chart/A0\_charts.doc 4. Image page-size charts PAGE CHARTS $DOC/bty\_chart/page\_charts.doc 5. View and print charts VIEW & PRINT $DOC/bty\_chart/view\_print.doc PROCEDURE MENU DOC FILE ---- ---- -------- 1. Plot individual hour file HOURPLOTS $DOC/bty\_chart/hourplot.doc

 Bathymetry Charting: MR1 to XYZW Conversion Survey mw9719 CONTENTS 1. What This Does 2. Da Cookbook ############################################################################ 1. What This Does Although the mr1 software allows you to grid and display bathymetry data, many people want to generate xyz bathymetry for their own evil purposes. The programs mr2gmt and mr2xyzw allow you to do this. We'll use mr2xyzw to convert the data to values that are weighted such that points closest to nadir have the most significance. The MR -> XYZ conversion was changed during japanus leg 3, to correct a problem that caused adjacent charts to exhibit unacceptable levels of mismatch where they overlapped. The new technique applies the noise suppression and most of the GMT filtering on individual hour files. This results in less mismatch between adjacent charts, and in cleaner bathy overall. The conversion to xyz requires an input file that contains magnetic corrections, in $DOC/nav/mag\_corr.doc (pull-down menu: btychart -> magcorr) ############################################################################ 2. Da Cookbook foreach jd ( 251 ) cd $BTYF/btyf$jd foreach file ( ` ls MR1972510{7,8,9}.??.btywtnc MR1972511\*.??.btywtnc ` ) set f = $file:r set mc = ` nawk ' {if ($1 == "'$f'") print $2 + ($3\*10)/60}' $DOC/mag\_corr.doc ` echo "Convert "$file" using magnetic correction "$mc mr2xyzw -bty -mc $mc $file > $f.xyzw xyzw2bm25 $f.xyzw /bin/rm $f.xyzw gzip $f.blk25m.xyzw /usr/bin/mv $f.blk25m.xyzw.gz $XYZ/xyz$jd end cd $XYZ/xyz$jd replace MR1971 1 echo "Combine .xyzw files..." gunzip \*.gz ls \*.xyzw > files nice xyzw\_combo\_bm50b files jd$jd.xyzwb gzip \*.xyzw end

Gridding MR1 Bathymetry by Chart Survey mw9719 CONTENTS 1. How this works 2. Gridding commands ############################################################################ 1. How this works It's easy. All the hard stuff is neatly entombed in the scripts btygrid\_utm\_100k, btygrid\_utm\_025k, and btygrid\_utm\_010k. If you want to see how they work, have a look at them in the $SCRIPTS directory. As currently configured, the gridding scripts: 1) Need an input file called $PARMS/chart/boxes that contains the boundaries for all the charts. 2) Require individual box definition files ($PARMS/chart/\*.box) 3) extend the gridded area 3 minutes beyond the plot edges defined in $PARMS/chart/boxes ############################################################################ 2. Gridding commands: This is faster on olomana \*\*Need to exclude days that are not within GAOI\*\* cd $CHART/bty foreach c ( 08 07 ) nice btygrid\_mw9719\_100k $c cd $CHART/bty/bty$c grdmath chart$c.nr.f.grd chart$c.nr.f.grd DIV .2 ADD = chart$c.int.grd end ############################################################################ 3. Make an intensity grid to lighten the colors... This is fast enough on malei foreach c ( 00 ) cd $CHART/bty/bty$c gunzip \*grd.gz grdmath chart$c.nr.f.grd chart$c.nr.f.grd DIV .2 ADD = chart$c.int.grd end

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| Bathymetry Charting - Imaging Charts Survey mw9719 CONTENTS 1. How this works 2. Doing it ############################################################################ Image the bathymetry... Run on malei For 1:100,000... btyimage\_mw9719\_100k 01 145 01 btyimage\_mw9719\_100k 02 145 01 btyimage\_mw9719\_100k 03 145 01 btyimage\_mw9719\_100k 04 145 01 btyimage\_mw9719\_100k 05 145 01 btyimage\_mw9719\_100k 06 145 01 btyimage\_mw9719\_100k 07 145 01 btyimage\_mw9719\_100k 08 145 01 btyimage\_mw9719\_100k 09 145 02 btyimage\_mw9719\_100k 10 145 02 btyimage\_mw9719\_100k 11 145 02 btyimage\_mw9719\_100k 12 145 02 btyimage\_mw9719\_100k 13 145 02  |

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Bathymetry Charting: Create page-sized bathymetry charts Survey mw9719 1. Executing The Plan ########################################################################### Page sized plots.... btyimage\_mw9719\_page 01 145 01 btyimage\_mw9719\_page 02 145 01 btyimage\_mw9719\_page 03 145 01 btyimage\_mw9719\_page 04 145 01 btyimage\_mw9719\_page 05 145 01 btyimage\_mw9719\_page 06 145 01 btyimage\_mw9719\_page 07 145 01 btyimage\_mw9719\_page 08 145 01 btyimage\_mw9719\_page 09 145 01 btyimage\_mw9719\_page 10 145 01 btyimage\_mw9719\_page 11 145 01 btyimage\_mw9719\_page 12 145 01 btyimage\_mw9719\_page 13 145 01

Viewing and Printing Bathymetry Charts Survey mw9719 ###################################################################### 1. View A0 charts... on olomana: xpsview -ps 47.5 33.5 -maxp 38m chart01.ps & on malei: pageview -w 47.5 -h 33.5 chart13.ps & to view as a raster on either machine: ps2rast -r 100 -X 47.5 -Y 31.5 -d 8 chart01.ps chart01.ras xv chart01.ras & ###################################################################### 2. Plot A0 charts on HP755: singly: nice ps2hp650 -r 300 -X 47.5 -Y 33.5 -d 8 chart08.ps chart08.rtl lpr -s -Php755 chart08.rtl multiple files: foreach c (02 03 04 05) cd $CHART/bty/bty$c ps2hp650 -r 300 -X 47.5 -Y 33.5 -d 8 chart$c.ps chart$c.rtl lpr -s -Php755 chart$c.rtl sleep 750 end

Hourfile bathymetry plotting Survey mw9719 This method allows you to plot a gridded color contour bathymetry plot of an hour file in near-real time. Method ------ 1. Finish the processing of the hour file in btyp Transfer the .btync file to $BTYR/btyr### 2. Process the ship navigation as described in $DOC/nav\_ship.doc 3. Navigate the data as described in $DOC/nav\_bathy.doc 4. Filter the towfish compass data as described in $DOC/compass\_bathy.doc The final file should have the suffix .btywtnc, located in $BTYFIN/btyf### 5. Now do the following: cd $BTYF/work set jd = 326 set hr = 23.00 set zone = 54 set mc = -6.48 ln -s $BTYF/btyf$jd/MR198$jd$hr.btywtnc . pltbtypcln MR198$jd$hr.btywtnc $mc $zone cont \rm MR198$jd$hr.btywtnc Note: for more info on pltbtypcln, just type in "pltbtypcln"

Overview of Sidescan Charting Survey mw9719 The SS\_CHART menus and doc files document how to create sidescan charts. PROCEDURE MENU DOC FILE --------- ---- -------- 1. Establish chart parameters CHART SETUP $DOC/ss\_chart/setup.doc 2. Grid the ss data by chart SS GRIDDING $DOC/ss\_chart/ss\_grid.doc 3. Create mosaics of imagery SS MOSAIC $DOC/ss\_chart/ss\_mosaic.doc 4. Create chart frames in GMT GMT FRAMES $DOC/ss\_chart/GMT\_frames.doc 5. Make page-sized ss charts PAGE CHARTS $DOC/ss\_chart/page\_charts.doc 6. View and print charts VIEW & PRINT $DOC/ss\_chart/view\_print.doc

Establishing common parameters for sidescan grids Survey mw9719 Results from the following 4 steps are incorporated into the script $SCRIPTS/gridss, which will be used to grid each chart. CONTENTS 1. Scale 2. Declination 3. Reference point 4. Graymap ######################################################################## 1. Scale The grid cell size controls the scale of the final output image, and is controlled by the output device resolution (dots per inch). For a 300 dpi output device (IRIS plotter, HP750, etc) scale 1:50,000 => cell size 4.233333 scale 1:100,000 => cell size 8.466666 scale 1:200,000 => cell size 16.933333 scale 1:400,000 => cell size 33.866666 scale 1:450,000 => cell size 38.099999 scale 1:800,000 => cell size 67.733333 scale 1:1,000,000 => cell size 84.666666 For a 203 dpi output device (Raytheon thermal printer) scale 1:100,000 => cell size 12.5123153 scale 1:200,000 => cell size 25.0246306 scale 1:400,000 => cell size 50.0492612 scale 1:800,000 => cell size 100.0985200 ######################################################################## 2. Declination The sidescan gridding is configured to read the magnetic declination data stored in the file $DOC/mag\_corr.doc . The header of that file explains how the magnetic corrections were derived. The format of the mag\_corr.doc file must have the following format: Chart name deg min ---------- --- --- JU:09:100-001 16 7.9 MR19826614.00.btywtnc 16 7.9 MR19826615.00.btywtnc 16 7.9 JU:09:100-002 15 57.5 MR19826610.03.btywtnc 15 57.5 MR19826610.13.btywtnc 15 57.5 Note: Sidescan processing makes magnetic corrections by CHART NAME, whereas bathymetry processing uses FILE NAME. Both coexist within mag\_corr.doc ######################################################################## 3. Reference point Because japanus data were gridded on a chart by chart (as opposed to a day by day) basis, gridss\_japanus processes all of the files needed for one chart at the same time. It is therefore unnecessary to generate a reference point for each chart. To see how reference points can be determined and used, try check a previous cruise's documentation. ######################################################################## 4. Graymap A common graymap needs to be generated to use on all the sidescan mosaics. Here's the bottom line: Best results so far: log.inv.07.grm - good balance log.inv.10.grm - more uniformly gray cp log.inv.07.grm mw9719.grm ----------------------------- Testing graymaps for HP755... set grid = 16m set num = 01 set lh = "300000 400000000" set num = 02 set lh = "3000000 4000000000" set num = 03 set lh = "1000000 1000000000" set num = 04 set lh = "1000000 3000000000" set num = 05 set lh = "1000000 4000000000" set num = 06 set lh = "1000000 6000000000" set num = 07 set lh = "1000000 12000000000" set num = 08 set lh = "1000000 48000000000" set num = 09 set lh = "1000000 120000000000" set num = 10 set lh = "1000000 600000000000" set num = 11 set lh = "800000 10000000" Save log.inv.07.grm as mw9719.grm Save log.inv.11.grm as mw9719.screen.grm cd $SSFIN/ssf235 mrgrm -lh $lh \ -log < MR19723508.00.ssdnca > $SSGRID/graymap/log.$num.grm Invert the graymap so that black is high backscatter: cd $SSGRID/graymap invgrm log.$num.grm > log.inv.$num.grm set graymap = $SSGRID/graymap/log.inv.$num.grm cd $SSGRID/grid$grid/grids\_all mrovl mw9719.16m.cf \ -rf test.$num.ras \ -os 143.916 13.5 1500 1125 \ -gmf $graymap \ -display olomana:0 \ -movl 0 0 0 \ -mbg 255 255 255 \ -mti 1m 1m \ -mtw 1 \ -mtl 11 \ -fbw 3 \ -fti 5m 5m \ -ftw 3 \ -ff Helvetica 8 \ -ftl 4 \ -v 2

Gridding Sidescan Survey mw9719 GRIDDING BY DAY 1. Create symbolic links from each $SSGRID/ssg--- day directory to the data files that reside in the $SSFIN/ssf--- directories. The method below also includes the previous day's 2300 hour file (because navigation for this file usually isn't available until the following day). set day = 235 set dec = 1.5 set day = 236 set dec = 1.5 set day = 237 set dec = 1.5 set day = 238 set dec = 1.7 set day = 239 set dec = 1.7 set day = 240 set dec = 1.7 set day = 241 set dec = 1.7 set day = 242 set dec = 1.7 set day = 243 set dec = 1.7 set day = 244 set dec = 1.9 set day = 245 set dec = 1.8 set day = 246 set dec = 1.8 set day = 247 set dec = 1.5 set day = 248 set dec = 1.3 set day = 249 set dec = 1.3 set day = 250 set dec = 1.5 set day = 251 set dec = 1.8 set grid = 16m set cell = 16.933333 set grid = 38m set cell = 38.099999 foreach jd ( $day ) echo "Gridding jd"$jd" " `date` cd $SSGRID/grid$grid/ssg$jd ln -s `ls $SSFIN/ssf$jd/MR197\*ssdnca` . /bin/ls MR\*ssdnca > jd$jd.files $SCRIPTS/gridss\_mw9719 jd$jd.files $cell $dec end set day = 235 foreach jd ( $day ) cd $SSGRID/grid$grid/mosaic cp $SSGRID/grid$grid/ssg$day/jd$jd.$grid.cf . foreach file (`ls $SSGRID/grid$grid/ssg$day/\*cswr`) echo $file ln -s $file . end end

Generating Sidescan Mosaics Survey mw9719 CONTENTS 1. Organize the control files 2. Generate a mosaic of a day's worth of data 3. Generate a composite mosaic of all data 4. Generate CHART mosaics ######################################################################### 1. Organize the control files (bury the inside of turns, etc): set grid = 84m set grid = 38m set grid = 16m cd $SSGRID/grid$grid/mosaic ls jd???.$grid\*.cf > mw9719.$grid.cflist catcf mw9719.$grid.cflist mw9719.$grid.orig.cf fixcf2 mw9719.$grid.orig.cf mw9719.$grid.cf ######################################################################### 2. Generate a mosaic of a day's worth of data: set grid = 84m set grid = 38m set grid = 16m set graymap = $SSGRID/graymap/mw9719.grm set graymap = $SSGRID/graymap/log.inv.11.grm set jd = 235 cd $SSGRID/grid$grid/mosaic ovlss\_mw9719 jd$jd.$grid.cf $graymap ######################################################################### 3. Generate a composite mosaic of all data: set grid = 84m set grid = 16m set graymap = $SSGRID/graymap/mw9719.grm cd $SSGRID/grid$grid/grids\_all ovlss\_mw9719 mw9719.$grid.cf $graymap ######################################################################### 4. Generate CHART mosaics... set grid = 16m set graymap = $SSGRID/graymap/mw9719.grm set cf = $SSGRID/grid$grid/grids\_all/mw9719.$grid.cf cd $SSGRID/grid$grid/grids\_all ssimage 01 $cf $graymap 2 ssimage 02 $cf $graymap 2 ssimage 03 $cf $graymap 2 ssimage 04 $cf $graymap 2 ssimage 05 $cf $graymap 2 ssimage 06 $cf $graymap 2 ssimage 07 $cf $graymap 2 ssimage 08 chart08.16m.cf $graymap 2 ssimage 09 $cf $graymap 2 ssimage 10 $cf $graymap 2 ssimage 11 $cf $graymap 2 ssimage 12 $cf $graymap 2 ssimage 13 $cf $graymap 2 mv \*ras $CHART/ss

Combine sidescan with GMT framt Survey mw9719 CONTENTS 1. Determine chart offset 2. Create GMT sidescan frames 3. Merge sidescan raster with GMT postscript ########################################################################

Creating page-size sidescan mosaics Survey mw9719 CONTENTS 1. Generate PAGE mosaics... 2. Create GMT frame for sidescan 3. Combine ss image and frame ######################################################################## 1. Generate PAGE mosaics... Charts with customized .cf files: chart08 chart12 chart13 set grid = 38m set graymap = $SSGRID/graymap/mw9719.screen.grm set cf = $SSGRID/grid$grid/mosaic/mw9719.$grid.cf ssimage\_page 08 $SSGRID/grid$grid/grids\_all/chart08.38m.cf \ $graymap 38.099999 ssimage\_page 12 $SSGRID/grid$grid/grids\_all/chart12.38m.cf \ $graymap 38.099999 ssimage\_page 13 $SSGRID/grid$grid/grids\_all/chart13.38m.cf \ $graymap 38.099999 foreach c ( 01 02 03 04 05 06 07 09 10 11 ) cd $SSGRID/grid$grid/mosaic ssimage\_page $c $cf $graymap 38.099999 /bin/mv \*ras $CHART/ss/chart$c end ######################################################################## 2. Create GMT frame for sidescan cd $CHART/ss ssframe\_mw9719\_page 01 145 01 ssframe\_mw9719\_page 02 145 01 ssframe\_mw9719\_page 03 145 01 ssframe\_mw9719\_page 04 145 01 ssframe\_mw9719\_page 05 145 01 ssframe\_mw9719\_page 06 145 01 ssframe\_mw9719\_page 07 145 01 ssframe\_mw9719\_page 08 145 01 ssframe\_mw9719\_page 09 145 01 ssframe\_mw9719\_page 10 145 01 ssframe\_mw9719\_page 11 145 01 ssframe\_mw9719\_page 12 145 01 ssframe\_mw9719\_page 13 145 01 ######################################################################## 3. Combine ss image and frame foreach c ( 08 ) cd $CHART/ss/chart$c rasttopnm chart$c.38.ras | pnmflip -r90 |\ pnmgamma .4 | pnmtorast > chart$c.38.r.ras /bin/rm chart$c.38.ras.gz; gzip chart$c.38.ras # ps2rast -r 300 -X 8.5 -Y 11 -d 8 \ # chart$c.ssframe.ps chart$c.ssframe.ras rasmask -f chart$c.ssframe.ras -x -130 \ -y -347 < chart$c.38.r.ras > chart$c.page.final.ras end

Viewing and Printing Sidescan Charts Survey mw9719 1. Print PAGE size mosaics... foreach c ( 08 ) cd $CHART/ss/chart$c alchemy chart$c.page.final.ras --r2 -o -8 -D 300 300 \ chart$c.page.final.rtl /bin/rm chart$c.page.final.ras.gz; gzip chart$c.page.final.ras end foreach c ( 12 11 10 09 08 07 06 05 04 03 02 01) cd $CHART/ss/chart$c lpr -s -Php755 chart$c.page.final.rtl end

Overview of Chart Information Survey mw9719 The CHART\_INFO menus and doc files illustrate how to create chart boxes, how to label them, and how to prepare non-MR1 data for inclusion on the charts. Any other maps that are created to support the survey (like regional Geosat imagery or whatever) are documented in MISC MAPS. PROCEDURE MENU DOC FILE --------- ---- -------- 1. Establish chart boundaries CHART BOX $DOC/chart\_info/chart\_box.doc 2. Create chart labels CHART LABELS $DOC/chart\_info/chart\_labels.doc 3. Route Position List data SURVEY ROUTE $DOC/chart\_info/rpl\_data.doc 4. Other data to plot on charts OTHER DATA $DOC/chart\_info/other\_data.doc PROCEDURE MENU DOC FILE --------- ---- -------- 1. Other survey-related maps MISC MAPS $DOC/chart\_info/misc\_maps.doc INFORMATION MENU DOC FILE ----------- ---- -------- 1. HP755 printer information HP755 INFO $DP/hp755\_info.doc

Chart\_box.doc Survey mw9719 CONTENTS 1. Overview of the technique 2. Your Mission 3. The make\_boundbox script 4. Create .box files ############################################################################ 1. Overview of the technique The scripts that construct the bathymetry and sidescan charts require a chart definition file, which we call a "box" file. The cookbook below shows you how to create these box files. Box files should be located in the directory $PARMS/chart (or, for complex surveys, in subdirectories beneath $PARMS/chart) and have the suffix ".box". In addition, all the .box files should be concatinated into a single file ($PARMS/chart/boxes) that contains all the boxes. The geographic area imaged within each chart is determined by figuring out how big a space (in inches) is available for printing within the chart format. The A0-size chart format we've developed allows you to plot an area that is 31.49610" wide by 23.42520" tall. To determine the lat/lon bounds for each chart that conform to these measurements, you'll use the script make\_boundbox (Step 4 below). ############################################################################ 2. Your Mission Your mission is to create adjacent charts that have enough overlap so that you capture all the swath data without creating too many charts. Here's how: 1. Create a chart box by specifying the lower-left corner of the chart on the make\_boundbox command line. 2. Make a page-sized nav chart to check the degree of overlap with adjacent charts. Use the method shown in $DOC/nav/nav\_plot.doc. The boundaries of other charts are plotted as dashed lines, which allows you to determine whether there's enough overlap to accommodate the full sidescan swath. 3. Make a page-sized regional trackline plot, which automatically plots the positions of each chart. 4. If the chart area is OK, move on. If its not, go directly to Step 1 above. ############################################################################ 3. The make\_boundbox script The script make\_boundbox calculates the four corners of each chart, based on info that you provide on the command line. The output from make\_boundbox is formatted such that it can be input directly into other HMRG scripts and GMT programs. The general form of the command is like this: make\_boundbox chart\_ID minlon minlat x\_inches y\_inches dpi proj scale make\_boundbox JU:01:100-002 237.06929 34.8667 31.49610 23.42520 300 u10 100000 : : :........:.....Adjust these number to move the chart's lower left corner For a given survey you probably won't change the values for x\_inches or y\_inches. ############################################################################ Transverse Mercator Projection cd $CHART/parms make\_boundbox 50k\_01 142.95 12.416 39.3701 30.7087 300 t145 50000 > 50k\_01.box make\_boundbox 50k\_02 143.217 12.416 39.3701 30.7087 300 t145 50000 > 50k\_02.box make\_boundbox 01 143.4700 13.033 39.3701 30.7087 300 t145 100000 > 01.box make\_boundbox 02 143.4167 12.370 39.3701 30.7087 300 t145 100000 > 02.box make\_boundbox 03 143.4167 11.707 39.3701 30.7087 300 t145 100000 > 03.box make\_boundbox 04 142.7000 12.370 39.3701 30.7087 300 t145 100000 > 04.box make\_boundbox 05 142.7000 11.707 39.3701 30.7087 300 t145 100000 > 05.box make\_boundbox 06 145.1000 12.550 39.3701 30.7087 300 t145 100000 > 06.box make\_boundbox 07 145.6333 13.000 39.3701 30.7087 300 t145 100000 > 07.box make\_boundbox 08 145.6666 13.500 39.3701 30.7087 300 t145 100000 > 08.box make\_boundbox 09 146.1000 14.163 39.3701 30.7087 300 t145 100000 > 09.box make\_boundbox 10 146.2500 14.826 39.3701 30.7087 300 t145 100000 > 10.box make\_boundbox 11 146.6666 15.489 39.3701 30.7087 300 t145 100000 > 11.box make\_boundbox 12 146.8000 16.050 39.3701 30.7087 300 t145 100000 > 12.box make\_boundbox 13 146.8000 16.600 39.3701 30.7087 300 t145 100000 > 13.box cat \*.box > boxes

chart\_labels.doc Survey mw9719 CONTENTS 1. How this works 2. The make\_labels script 3. The cookbook ######################################################################### 1. How this works You need to create ID labels for each chart. These labels will identify the charts when they're plotted on chart keys, legends, or regional trackline plots. The make\_labels script requires the file $PARMS/chart/boxes, which contains the boundary information for each chart. Output from make\_labels is in a format that can be read by the GMT program pstext, written in a file named chartlabels.dat located in the directory $PARMS/chart ######################################################################### 2. The make\_labels script The general form of the command is like this: make\_labels chart\_ID offset posn fontsize font label\_text make\_labels SMW:100-001 $off br $size $font 001 - Offset is in inches (a good value is .03) - Fontsize is in points - Font numbers are identified in the GMTDEFAULTS man page - label\_text is the text string that actually gets printed - Position categories: tl = top left rt = right top br = bottom right lb = left bottom tc = top center rc = right center bc = bottom center lc = left center tr = top right rb = right bottom bl = bottom left lt = left top ######################################################################### 3. The cookbook Create labels for chart boundaries: cd $CHART/parms set off = .03 set size = 08 set font = 0 make\_labels 01 $off rb $size $font 01 > chart.labels make\_labels 02 $off rb $size $font 02 >> chart.labels make\_labels 03 $off rb $size $font 03 >> chart.labels make\_labels 04 $off lb $size $font 04 >> chart.labels make\_labels 05 $off lb $size $font 05 >> chart.labels make\_labels 06 $off rb $size $font 06 >> chart.labels make\_labels 07 $off rb $size $font 07 >> chart.labels make\_labels 08 $off rb $size $font 08 >> chart.labels make\_labels 09 $off rb $size $font 09 >> chart.labels make\_labels 10 $off rb $size $font 10 >> chart.labels make\_labels 11 $off rb $size $font 11 >> chart.labels make\_labels 12 $off rb $size $font 12 >> chart.labels make\_labels 13 $off rt $size $font 13 >> chart.labels

RPL Data Survey mw9719 This file documents any survey route positions you want to include on charts ############################################################################

Plotting Other Data on Charts Survey mw9719 You can plot whatever you want on charts. During japanus, we wanted to plot positions of existing submarine cables and cable repeaters. To do this, we modified the scripts btyimage\_utm\_100k, btyimage\_page, ssframe\_utm\_100k, and ssframe\_page to include data from the files $PARMS/chart/cables.xy $PARMS/chart/cable\_repeaters.xy There you go.

 Documentation for other charts made to support the survey Survey mw9719 CONTENTS 1. Example: GEOSAT map of segment 09 ############################################################################# Example: GEOSAT map of segment 08 cd $CHART/misc/seg08geosat grdcut $DAR/$PROJ/world\_relief/world.topo.grd \ -G$CHART/misc/seg08geosat/japanus.grd \ -R140/240/10/60 -V grdgradient japanus.grd -A90 -Gslope.grd -Nt -V grdimage japanus.grd -C$CPT/japanus.neg.cpt \ -Islope.grd -JM9.25 -R140/240/10/60 \ -V -K > img.ps foreach file (`ls $NAV/segments/\*tow\*.seg\*.nav`) cat $file | nawk '{if (($4=="00") && ($5=="00")) print $9,$8}' | \ psxy -JM9.25 -R140/240/10/60 -V -W4/255/255/255 -O -K >> track.ps end pscoast -JM9.25 -R140/240/10/60 -B10/5:."Japan-US Cable Route Survey": \ -Dl -W2/0/0/0 -O -V > frame.ps cat img.ps track.ps frame.ps > japanus.seg8.geosat.ps /bin/rm track.ps img.ps frame.ps pageview japanus.seg8.geosat.ps lppp japanus.seg8.geosat.ps ps2hp1200 -r 300 -X 8.5 -Y 11 -d 8 japanus.seg8.geosat.ps japanus.seg8.geosat.rtl lpr -s -Php755 japanus.seg8.geosat.rtl

Overview of Reprocessing Documentation Survey mw9719 When reprocessing data, don't modify the seagoing doc files. Instead, make new doc files the show what you did and tell why you did it. PROCEDURE MENU DOC FILE --------- ---- -------- 1. Reprocessed bathy data BATHY $DOC/chart\_info/chart\_box.doc 2. Reprocessed ss data SS $DOC/chart\_info/chart\_labels.doc

Reprocessing Bathymetry Data: Hana Hou Survey mw9719 Make sure you record 1. Your goals for reprocessing 2. The data you are starting with 3. What you are doing differently than at sea 4. Your name and the date Also, when you're pau make sure you back up your reprocessed data in a systematic way (similar to the way we do it at sea). You can use the script backdir to backup the contents of a processing directory using multiple tar files. Make sure you write the date and nature of the reprocessed data on the tape (or CD) that contain the backed up data.

 Reprocessing Sidescan Data: Hana Hou Survey mw9719 Make sure you record 1. Your goals for reprocessing 2. The data you are starting with 3. What you are doing differently than at sea 4. Your name and the date Also, when you're pau make sure you back up your reprocessed data in a systematic way (similar to the way we do it at sea). You can use the script backdir to backup the contents of a processing directory using multiple tar files. Make sure you write the date and nature of the reprocessed data on the tape (or CD) that contain the backed up data.

Overview of Advanced Bathymetry Processing Survey mw9719 The BTY\_PROC menus and doc files illustrate the steps required to prepare MR1 bathymetry files for gridding/charting. These steps include navigating the towfish, PROCEDURE MENU DOC FILE --------- ---- -------- 1. Merge nav with bathymetry BTY NAV $DOC/bty\_proc/bty\_nav.doc 2. Filter bathymetry compass BTY COMPASS $DOC/bty\_proc/bty\_compass.doc 3. Remove unwanted survey data BTY CAT $DOC/bty\_proc/bty\_cat.doc INFORMATION MENU DOC FILE ----------- ---- -------- 1. Filtering compass headings FILTCOMP INFO $DOC/bty\_proc/filtcomp\_info.doc 2. Magnetic corrections MAG CORR $DOC/bty\_proc/mag\_corr.doc

Navigating MR1 Bathymetry data Survey mw9719 A Cookbook For info on how the fish positions are calculated, see $DOC/nav/layback\_calc.doc ############################################ Do this AFTER the most recent navigation has been processed and the cruise navigation file has been updated. 1. Check the file $DOC/nav/wireout.doc to make sure that the wireout value there matches the value recorded in the real-time log book. Update if necessary. 2. Make sure the ship navigation spans the entire time range of the MR1 files you want to navigate. 3. Log into malei or kanoa, and do the following: Multiple files: set jd = 251 cd $BTYR/btyr$jd ls \*btywt > files te files (... to delete any files that have already been processed or whose times exceed the limits of the navigation data.) make\_navm $jd btywt btywtn : :... answer the question about wire out. Submit each job using this for/each loop... foreach file (`ls MR1\*.navm.job `) $file end Move the navigated data to the final directory and clean up... foreach file (`ls \*btywtn `) mv $file $BTYF/btyf$jd end Pau with regular-kine processing! ----------------------------------------------------------------- To navigate an individual file, try this: (change $jd, file\_# for every individual file) cd $BTYR/btyr274 ls MR19827419.00.btywt > files mk\_navm.job 274 btywt btywtn Wait for prompt; answer wire out question, then type: MR19827418.00.btywt.navm.job foreach file (`ls \*btywtn `) mv $file $BTYF/btyf$jd end To plot out a navigated bathymetry hour file... see $DOC/bty\_chart/hourplot.doc

 Towfish Compass Processing Survey mw9719 A COOKBOOK For more info on how these scripts work, or info on how to correctly edit the FILTCONTROL control file, see $DOC/compass/filtcomp\_info.doc Bathymetry ---------- 1. Use the script getcompbty.job to strip out compass data from processed bathymetry files. The script uses the MR1 program mrstrip. Note: In order for the compass filtering to work, you need to have compass data that extends several pings before and after the time interval you're trying to filter. Because we're processing by julian day, we include the previous day's 2300 file and the next day's 0000 file in the filtering scheme set up below. set jd = 328 cd $BTYF/btyf$jd; ls MR\*.btywtn > getcomp.files foreach file (`cat getcomp.files`) echo "Stripping compass data from file: "$file set f = $file:r mrstrp -compass < $file > $COMPASS/bathy/$f.comp end # Only run this when you are postprocessing an entire JD... cd $BTYR/btyr`expr $jd + 1` set file = MR1?????00.00.btywt set f = $file:r echo "Stripping compass data from file: "$file mrstrp -compass < $file > $COMPASS/bathy/$f.comp 2. Make a control file to direct how the files are processed during the filtering step. From any directory, type $SCRIPTS/filtcontrol bathy $jd : :.........Answer the questions. :.........For more info on how to modify this file, see :.........$DOC/compass/filtcomp\_info.doc 3. Create the executable job that will filter the compass data. In the $COMPASS/bathy directory, execute the following: cd $COMPASS/bathy $SCRIPTS/make\_filtcomp day$jd.control 7 98 4. Execute the job: day$jd.filtcomp.job >& day$jd.filtcomp.log This job calls a script called $SCRIPTS/filtcomp, which in turn runs the GMT program filter1d. 5. Insert the filtered data into the processed bathy files, using the script $SCRIPTS/recompbty.job. cd $BTYF/btyf$jd ls MR\*btywtn > files $SCRIPTS/recompbty.job btywtn btywtnc if the above is OK, then \rm \*.btywtn All Pau!

bty\_cat\_trim.doc Survey mw9719 This file documents manual splitting of individual MR1 files that are necessary to remove noisy data during launch/recovery, large nav gaps, changes in ping rate or power settings, etc. How to find turn times: 1. run pltatt on a .bty file and view it like so: a. Figure out the ping number: cd $BTYR/btyr318 pltatt MR19829701.09.bty 100 300 v MR19829701.09.bty.ps b. Figure out the times: btyp -mr MR19829701.09.bty ########################################### Tow 1: Start 184/2000 mv MR19718420.00.bty MR19718420.00.bty.orig mrcat -bt 97/184/20:05:00 MR19718420.00.bty.orig > MR19718420.00.bty Tow 2: Start 244/13:01:58 mv MR19724413.01.bty MR19724413.01.bty.orig mrcat -et 97/244/13:29:14 MR19724413.01.bty.orig > MR19724413.01.bty mrcat -bt 97/244/13:29:32 MR19724413.01.bty.orig > MR19724413.29.bty mv MR19724413.01.btyw MR19724413.01.btyw.orig mrcat -et 97/244/13:29:14 MR19724413.01.btyw.orig > MR19724413.01.btyw mrcat -bt 97/244/13:29:32 MR19724413.01.btyw.orig > MR19724413.29.btyw mv MR19724413.01.btywt MR19724413.01.btywt.orig mrcat -et 97/244/13:29:14 MR19724413.01.btywt.orig > MR19724413.01.btywt mrcat -bt 97/244/13:29:32 MR19724413.01.btywt.orig > MR19724413.29.btywt Tow 3: # Ping rate change 9-18, pulse width change 5-10 mv MR19724620.00.bty MR19724620.00.bty.orig mrcat -et 97/246/20:50:32 MR19724620.00.bty.orig > MR19724620.00.bty mrcat -bt 97/246/20:50:59 MR19724620.00.bty.orig > MR19724620.50.bty mv MR19724620.00.btyw MR19724620.00.btyw.orig mrcat -et 97/246/20:50:32 MR19724620.00.btyw.orig > MR19724620.00.btyw mrcat -bt 97/246/20:50:59 MR19724620.00.btyw.orig > MR19724620.50.btyw mv MR19724620.00.btywt MR19724620.00.btywt.orig mrcat -et 97/246/20:50:32 MR19724620.00.btywt.orig > MR19724620.00.btywt mrcat -bt 97/246/20:50:59 MR19724620.00.btywt.orig > MR19724620.50.btywt ##### cut bad stuff at end of tow ## mv MR19724914.00.bty MR19724914.00.bty.orig mrcat -et 97/249/14:36:44 MR19724914.00.bty.orig > MR19724914.00.bty mrcat -bt 97/249/14:37:02 MR19724914.00.bty.orig > MR19724914.37.bty mv MR19724914.00.btyw MR19724914.00.btyw.orig mrcat -et 97/249/14:36:44 MR19724914.00.btyw.orig > MR19724914.00.btyw mrcat -bt 97/249/14:37:02 MR19724914.00.btyw.orig > MR19724914.37.btyw mv MR19724914.00.btywt MR19724914.00.btywt.orig mrcat -et 97/249/14:36:44 MR19724914.00.btywt.orig > MR19724914.00.btywt mrcat -bt 97/249/14:37:02 MR19724914.00.btywt.orig > MR19724914.37.btywt ### END OF TOW 3 ### BEGIN TOW 4 mv MR19725001.00.bty MR19725001.00.bty.orig mrcat -et 97/250/01:04:21 MR19725001.00.bty.orig > MR19725001.00.bty mrcat -bt 97/250/01:04:33 -et 97/250/01:08:54 MR19725001.00.bty.orig > MR19725001.04.bty mrcat -bt 97/250/01:09:03 MR19725001.00.bty.orig > MR19725001.09.bty mv MR19725001.00.btyw MR19725001.00.btyw.orig mrcat -et 97/250/01:04:21 MR19725001.00.btyw.orig > MR19725001.00.btyw mrcat -bt 97/250/01:04:33 -et 97/250/01:08:54 MR19725001.00.btyw.orig > MR19725001.04.btyw mrcat -bt 97/250/01:09:03 MR19725001.00.btyw.orig > MR19725001.09.btyw mv MR19725001.00.btywt MR19725001.00.btywt.orig mrcat -et 97/250/01:04:21 MR19725001.00.btywt.orig > MR19725001.00.btywt mrcat -bt 97/250/01:04:33 -et 97/250/01:08:54 MR19725001.00.btywt.orig > MR19725001.04.btywt mrcat -bt 97/250/01:09:03 MR19725001.00.btywt.orig > MR19725001.09.btywt

 Filtering compass heading using FILTCONTROL Survey mw9719 Contents: 1. Preface 2. Editing the FILTCONTROL control file 3. Troubleshooting PREFACE To correct for yaw variation in the towfish we use the compass data collected by the fish to correct the heading of the fish prior to creating navigated gridded data. The towfish compass headings require some filtering in order to prevent wild deviations in sidescan pings at the gridding stage. There are three steps to compass processing: 1. Strip the compass data out of the individual processed MR1 data files 2. Apply a median filter to the data using the GMT routine filter1d, which is called by the insideous FILTCONTROL step. 3. Insert the smoothed compass data back into the processed MR1 files ########################################################################## The FILTCONTROL control file: 2. Make a control file to direct how the files are processed during the filtering step. From any directory, type $SCRIPTS/filtcontrol bathy $jd The filtcontrol script will operate on compass data extracted from either the bathymetry or sidescan files, located in either $COMPASS/bathy or $COMPASS/ss. An output file named day---.control (where "---" is the day number) will be written to the bathy or ss directory under $COMPASS/bathy or $COMPASS/ss. The script will display the resulting file and ask if you need to modify it. Enter "y" to vi the file. This needs to be done only if there are time gaps between any two files. if there is a data gap between files, edit in a line with the word "none" between the files where there is the gap. e.g.: where 10618.00 is the first file after system start and there is gap between files 10619.00 and 10619.28... . . . . 10618.00 10618.00 10619.00 10619.00 10619.28 none 10620.00 10619.28 10621.00 10620.00 10622.00 10621.00 10623.00 10622.00 10623.00 ######################################################################### Troubleshooting if the filtering routine fails: a. If the compass headings are very erratic then the filtering routine can fail. To fix the problem, run a check on the new smoothed compass files to find large jumps, and then manually edit the files that fail: cd /home/malei1d/northstar/compass/bathy ls MR196323\*f7.comp > files ckcompass.job 10 ...where "10" is the acceptable variation in degrees between subsequent pings. If unacceptable jumps are found, the ckcompass script will write debugging files in the durrent working directory that have the suffix "DEBUG". The DEBUG files will list the ping numbers that failed the angle test -- edit the appropriate \*f7.comp file to decrease the ping-to-ping angular variation. Note that it is very rare for a file to fail this check.

Magnetic Corrections Survey mw9719 CONTENTS 1. How this file is used 2. Listing of magnetic corrections by CHART and by FILE ############################################################################## 1. How this file is used The values in this file are used to correct towfish compass values to eliminate the influence of the Earth's magnetic field, which changes through time around the world. The data are incorporated into the bathymetry and sidescan processing in different ways: BATHYMETRY uses corrections on a file-by-file basis, and requires that the file name be listed in the first column below. Only include bathymetry files that you want to grid (ie, don't include turns or pieces of data that you don't want plotted -- this is how we kept unwanted bathy data out of the charts). To see how the magnetic corrections are incorporated, see the doc file $DOC/bty\_chart/MR1\_to\_xyzw.doc. SIDESCAN uses corrections on a chart-by-chart basis, and requires the prefix of the chart name in the first column. The declinations are called in the gridding loop in the doc file $DOC/ss\_chart/ss\_grid.doc EXAMPLE of how to list the data. Note that negative values require the minus signs for both degrees and minutes: dec dec chart or MR1 file deg min ----------------- ----- ----- JU:08:100-002 -6 -27.6 MR19822407.00.btywtnc -6 -27.6 MR19822408.00.btywtnc -6 -27.6 ############################################################################ 2. Listing of magnetic corrections by CHART and by FILE dec var chart or MR1 file deg min --------------- --- --- JD235 MR19723507.00 1.5 0.0 MR19723508.00 1.5 0.0 MR19723509.00 1.5 0.0 MR19723510.00 1.5 0.0 MR19723511.00 1.5 0.0 MR19723512.00 1.5 0.0 MR19723513.00 1.5 0.0 MR19723514.00 1.5 0.0 MR19723515.00 1.5 0.0 MR19723516.00 1.5 0.0 MR19723517.00 1.5 0.0 MR19723518.00 1.5 0.0 MR19723519.00 1.5 0.0 MR19723520.00 1.5 0.0 MR19723521.00 1.5 0.0 MR19723522.00 1.5 0.0 MR19723523.00 1.5 0.0 JD236 MR19723600.00 1.5 0.0 MR19723601.00 1.5 0.0 MR19723602.00 1.5 0.0 MR19723603.00 1.5 0.0 MR19723604.00 1.5 0.0 MR19723605.00 1.5 0.0 MR19723606.00 1.5 0.0 MR19723607.00 1.5 0.0 MR19723608.00 1.5 0.0 MR19723609.00 1.5 0.0 MR19723610.00 1.5 0.0 MR19723611.00 1.5 0.0 MR19723612.00 1.5 0.0 MR19723613.00 1.5 0.0 MR19723614.00 1.5 0.0 MR19723615.00 1.5 0.0 MR19723616.00 1.5 0.0 MR19723617.00 1.5 0.0 MR19723618.00 1.5 0.0 MR19723619.00 1.5 0.0 MR19723620.00 1.5 0.0 MR19723621.00 1.5 0.0 MR19723622.00 1.5 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