NAME

mb7kpreprocess – performs preprocessing of Reson 7k multibeam data in the 7k format (**MBIO** format 88).

VERSION

Version 5.0

SYNOPSIS

mb7kpreprocess [**–A** **–B** **–C***rollbias/pitchbias* **–D***offx/offy[/offdepth]* **–F***format* **–I***file* **–K***klugemode* **–L** **–M***rockfile* **–N***insfile* **–O***outfile* **–P***sonardepthfile* **–PF***filterlength/filterdepth* **–T***timelag* **–W***dslfile* **–H** **–V***]*

DESCRIPTION

mb7kpreprocess reads a Reson 7k (format 88) file, interpolates the asynchronous navigation and attitude onto the multibeam data, and writes a new 7k file with that information correctly embedded in the multibeam data. This program can also fix various problems with 7k data (early generations of the 6046 datalogger failed to to meet the data format specification exactly).

AUTHORSHIP

David W. Caress (caress@mbari.org)
Monterey Bay Aquarium Research Institute
Dale N. Chayes (dale@ldeo.columbia.edu)
Lamont-Doherty Earth Observatory

OPTIONS

–A

This option causes the program to output multibeam records occuring before the first available navigation and attitude data. Normally, these records are ignored.

–B *mode*

This option is only relevant to MBARI Mapping AUV data that includes Edgetech sidescan and subbottom profiler data with multibeam data in a Reson 7k format file, and where the sonars are all synchronized to ping simulataneously. If **–B** is specified with *mode*=1, then the multibeam time stamps will be reset to the time stamp values of the Edgetech data records. If **–B** is given with *mode*=2, then the Edgetech data time stamps will be reset to the values of the multibeam data records. Although the sonar computer clocks are supposed to be synchronized, this clock discipline sometimes fails.

–C *rollbias/pitchbias*

This option sets the roll and pitch bias of the sonar with respect to the attitude sensor in degrees. If specified, these parameters are applied to the sonar attitude data prior to the calculation of bathymetry from travel times and angles.

–D *offx/offz[/offdepth]*

This option sets horizontal and vertical.distance offsets between the vehicle's depth sensor and the multibeam receive head. If specified, these values are used in a lever-arm calculation to determine the sonar depth change associated with vehicle pitch. The *offdepth* value, if specified, is a static depth offset to be applied to the vehicle depth data.

–F *format*

Sets the data format used if the input is read from stdin or from a file. If *format* < 0, then the input file specified with the **–I** option will actually contain a list of input swath sonar data files. This program only reads Reson 7k format data files (**MBIO** format 88).

–H This "help" flag cause the program to print out a description of its operation and then exit immediately.

–I *infile*
Sets the input file path. If *format* > 0 (set with the **–f** option or **mbdefaults**) then the swath sonar data contained in *infile* is read and processed. If *format* < 0, then *infile* is assumed to be an ascii file containing a list of the input swath sonar data files to be processed and their formats. The program will read the data in each one of these files. In the *infile* file, each data file should be followed by a data format identifier, e.g.:

datafile1 88
datafile2 88

This program only reads Reson 7k format data files (**MBIO** format 88).

–K *klugemode*
This option causes the program to implement one of the available processing "kluge" fixes. This are unusual steps required to fix data with particular, unusual problems. Kluge 1 forces **mb7kpreprocess** to replace the sonar depth value with values from vertical depth data records. Kuge 2 forces **mb7kpreprocess** to zero the initial beam alongtrack distance values.

–L
This option causes the program to list the timetags of bathymetry, sidescan, subbottom, navigation, and attitude data records.

–M *rockfile*
The program will read navigation and attitude from the Steve Rock navigation and attitude file *rockfile* and merge those data with the multibeam, sidescan, and subbtottom data in the 7k file.If a timelag model is specified using **–T***timelag*, the time lag will be applied to the navigation and attitude data before merging with the sonar data. The navigation and attitude data from *rockfile* will also be embedded in asynchronous data records in the output 7k format data. Any pre-existing navigation data records will be replaced. The similar **–N***insfile* and **–W***dslfile* options cause merging of data from MBARI AUV logfiles and WHOI DSL navigation files, respectively. The Steve Rock navigation and attitude file is a text file with seven space delimited columns:

time_d longitude latitude sonardepth heading roll pitch

where time_d is decimal seconds since the start of 1970, longitude, latitude, heading, roll, and pitch are in decimal degrees, and sonardepth is in meters.

–N *insfile*
The program will read navigation and attitude from the MBARI AUV navigation log file *insfile* and merge those data with the multibeam, sidescan, and subbtottom data in the 7k file. If a timelag model is specified using **–T***timelag*, the time lag will be applied to the navigation and attitude data before merging with the sonar data. The navigation and attitude data from *insfile* will also be embedded in asynchronous data records in the output 7k format data. Any pre-existing navigation data records will be replaced. MBARI AUV navigation files are binary and specific to MBARI.

–O *outfile*
This option causes **mb7kpreprocess** to output all data to a single file specified as *outfile*. By default, the program creates output files for each input file.

–P *sonardepthfile*
The program will read sonar depth data from *sonardepthfile* and merge those data with the multibeam, sidescan, and subbtottom data in the 7k file. The *sonardepthfile* is a text data file containing two space delimited columns:

time_d sonardepth

where:

time_d – decimal epoch seconds (since start of 1970)
sonardepth – sonar depth in meters, positive down

–PF **–PF***filterlength/filterdepth* This option specifies Gaussian tapered time domain filtering of the sonar depth data to be merged with the survey data, regardless of source. The *filterlength* value specifies the filter window length in seconds, and the *filterdepth* value controls the depths to which filtering is applied. The filtered sonar depth is used to depths up to twice the *filterdepth* value. Below that threshold, the value used transitions to unfiltered with an exponential taper. This filtering is used in two ways. First, one can apply short period smoothing of noisy sonar depth at all by specifying a small *filterlength* (e.g. 2 seconds) and a *filterdepth* value deeper than the vehicle's track. Second, when an AUV or ROV is operated at shallow depths, the pressure values used to determine depth are affected by waves at the sea surface. In this case, a longer period *filterlength* (e.g. 10 seconds) and a shallower *filterdepth* (e.g. 50 meters) may be used to lessen the artifacts due to surface swell.

–S *sidescansource*
This option specifies the data record type source of the backscatter data used to generate pseudo-sidescan data from Reson multibeam sonars. If *sidescansource* = 'C' then the sidescan will be derived from calibrated "snippet" records, if the *sidescansource* = 'S' then the sidescan will be derived from "snippet" records. If *sidescansource* = 'B' then the sidescan will be derived from "backscatter" records. The difference is that the "backscatter" records contain port and starboard time series derived from beams formed with a large acrosstrack beamwidth, and the "snippet" records contain short sections of beamformed time series centered on the bottom return times in each of the valid bathymetry beams.

–T *timelag*
This option specifies a *timelag* value in seconds to be applied to the navigation and attitude data prior to it being merged with the bathymetry. If *timelag* is a valid path to a file containing time stamp and time lag pairs, then these data will be read and the time lag applied to particular records will be interpolated by time.

–W *dslfile*
The program will read navigation and attitude from the WHOI DSL navigation and attitude file *dslfile* and merge those data with the multibeam, sidescan, and subbtottom data in the 7k file.If a timelag model is specified using **–T***timelag*, the time lag will be applied to the navigation and attitude data before merging with the sonar data. Any pre-existing navigation data records will be replaced. The similar **–N***insfile* and **–W***dslfile* options cause merging of data from MBARI AUV logfiles and WHOI DSL navigation files, respectively. The WHOI DSL navigation and attitude file is a text file with eleven space delimited columns:

PPL date time vehicle latitude longitude depth heading pitch roll id

where:

PPL – tag indicating processed navigation and attitude
date – yyyy/mm/dd
time – hh:mm:ss.sss
vehicle – SEN for Sentry
latitude – decimal degrees
longitude – decimal degrees
depth – sonar depth in meters
pitch – decimal degrees
roll – decimal degrees
id – seems to be 1.00

EXAMPLES

Suppose that one has collected a Reson 7k datafile incorporating multibeam sonar data, sidescan data, and subbottom profiler data, and that the filename is:

20050418_150155.s7k

In order to preprocess the data in a 7k data file, one can use **mb7kpreprocess** with no special arguments:

mb7kpreprocess –I 20040722_152111.s7k

SEE ALSO

mbsystem(1), **mbformat**(1), **mbinfo**(1)

BUGS

Oh yeah.