NAME

mb7k2ss − extracts sidescan sonar data from Reson 7k format data, bins and lays the sidescan onto the seafloor, and outputs files in the MBF_MBLDEOIH formst (MBIO format id 71).

VERSION

Version 5.0

SYNOPSIS

mb7k2ss [**−A***type* **−B***bottompickmode/bottompickthreshold* **−C** **−D***interpbins* **−F***format* **−I***file* **−L***startline/lineroot* **−M** **−O***outfile* **−Q***routetimefile* **−R***routefile* **−T***topogridfile* **−U***rangethreshold* **−X** **−H** **−V**]

DESCRIPTION

mb7k2ss is a utility that extracts Edgetech sidescan data from Reson 7k format (MBIO format 88) data and outputs in the MBF_MBLDEOIH format (MBIO format 71). Edgetech sonar systems may include dual frequency sidescans and a subbottom profiler. Users may use the **−A** option to specify whether low frequency or high frequency sidescan data are extracted. By default, low frequency sidescan is extracted. **MB7k2ss** can operate on a single input file or on a datalist referencing many input files.

The raw sidescan consists of port and starboard channels, each with thousands of samples ordered uniformly in time from the sonar ping. **MB7k2ss** outputs a lower resolution single sidescan swath laid out onto the seafloor and ordered in pixels with uniform spacing in acrosstrack distance. Typically the output swath will have 4001 sidescan pixels, each representing an average of several raw samples. To achieve this result, the program calculates the location of each raw sample, and bins the samples into the output swath. By default, the program uses the sonar altitude and a flat bottom assumption to calculate the sample positions. If a topography grid covering the survey area is input using the **−T** option, then the sample positions will be calculated using that topography and the resulting sidescan will be properly located on the seafloor (that is, if the topography is accurate...).

The method used to determine the sonar altitude is controlled using the **−B** option. By default, the program will use the altitude value recorded in the vehicle navigation records. Users may also specify use of nadir bathymetry from co-recorded multibeam bathymetry, or the altitude can be picked from the first arrival observed in the sidescan data itself.

The extracted sidescan data file(s) can be organized three ways.By default there will be a separate output file for every input file. If the **−O** option is used to specify a single output file, then all of the specified sidescan data will be output to that file. If the **−Q** or **−R** option is used to specify a survey route file that includes the waypoints covered while collecting the data file(s) referenced by **−I***file*, then the output sidescan data will be broken up by the sequential lines defined by the waypoints. The **−R** option requires a route file of the form exported by **MBgrdviz**. The **−Q** option requires a route file that includes the time at which each waypoint is reached in the data; this can be generated from a regular route file using **mbroutetime**. In either of these cases each output file will be named using the line root name specified by **−L***startline/lineroot* with a sequential line number starting from *startline*. All output files will have a ".mb71" suffix.

The program **mbextractsegy** is available to extract subbottom profiler data from Reson 7k data.

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OPTIONS

−A *mode*

This option sets the types of data to be extracted and output. If **−A***1* is given, then any low frequency sidescan in the input will be extracted to the output. If **−A***2* is given, then any high frequency sidescan records are extracted. Default: Low frequency sidescan records are extracted.

−B *bottompickmode/bottompickthreshold*

This option sets the source of the sonar first arrival time used for laying out sidescan on the seafloor. If *bottompickmode* = 1, then **mb7k2ss** will use the altitude value associated with platform navigation. If *bottompickmode* = 2, then **mb7k2ss** will extract the first arrival time from multibeam bathymetry in the 7k data stream. If *bottompickmode* = 3, then **mb7k2ss** will pick the first arrival time in the sidescan sonar data by looking for the first sample with an amplitude > *bottompickthreshold* times the maximum amplitude in the trace. The altitude used will be the average of the first arrival times calculated for the port and starboard channels. Default: fIbottompickmode = *1*.

−C

This option causes **mb7k2ss** to print out any comment records encountered in the input Reson 7k data.

−D *interpbins*

Causes interpolation over gaps in the output sidescan resulting from draping the sidescan on topography. The *interpbins* values sets the maximum gap size over which interpolation will be applied.

−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).

−L *startline/lineroot*

This option sets the starting line number and the output filename root used when **−R** is specified so that data are output according to planned survey lines. Default: *startline* = 1; *lineroot* = "jstar".

−M

This option causes **mb7k2ss** to omit data during turns when extracting into line files according to a specified set of waypoints (**−R** option). The traces will not be output until the heading is within 15 degrees of the next survey line's bearing.

−O

This option sets the output MBF_LDEOIH (**MBIO** format 71) format file path. If **−O** is not invoked, the output filename (or filenames if a datalist is being processed) will be the input swath filename with the ".s7k" or ".mb88" suffix replaced by a ".mb71) suffix. The record types to be extracted are set using the **−A** option.

−Q *routetimefile*

This option specifies a file containing the times that the survey reached the intended waypoints. This text file consists of lines of the form:

count waypoint longitude latitude heading time_d

where count is just an integer counter starting at 0, waypoint is the waypoint number starting at 0, longitude and latitude are the waypoint position in decimal degrees, heading is the heading in decimal degrees, and time_d is the unix or epoch time (time since 00:00:00 January 1, 1970) in decimal seconds that the survey reached this waypoint. This file can be generated from an **mbgrdviz** route file and survey data using the program **mbroutetime**. If *routetimefile* is specified, **mb7k2ss** will output data in files corresponding to the planned survey lines. The output file names will be based on *lineroot* and will include the line number starting with *starline*, both of which are specified using the **–L** options. If none of **–O**, **–Q**, or **–R** are invoked, the output filename (or files if a datalist is being processed) will be the input swath filename with an ".mb71" suffix appended.

–R *routefile*
This option specifies an **mbgrdviz** route file containing the intended waypoints of the survey. If *routefile* is specified, **mb7k2ss** will output sidescan data in files corresponding to the planned survey lines. The output file names will be based on *lineroot* and will include the line number starting with *starline*, both of which are specified using the **–L** options. If none of **–O**, **–Q**, or **–R** are invoked, the output filename (or files if a datalist is being processed) will be the input swath filename with an ".mb71" suffix appended.

–T *topogridfile*
This option specifies a GMT grid file containing a topography model of the survey area. When available, **mb7k2ss**, uses the topography to calculate the position of each raw sidescan sample on the seafloor prior to binning the sample into the swath data. This method is considerable improvement over the flat bottom assumption used when topography is unavailable. The grid file must contain topography (positive up) rather than bathymetry (positive down).

–U *rangethreshold*
If the **–R** option is specified, **mb7k2ss** breaks up the output into files corresponding to survey lines specified in a route file. This option sets the threshold distance in meters used to determine when a waypoint along the route has been reached; the program considers the next waypoint reached when the range to the waypoint becomes smaller than *rangethreshold* and then ceases to decrease. Default: *rangethreshold* = 50 m.

–V This option increases the verbosity of **mb7k2ss**, causing it to print out messages regarding its progress to stdout.

–W *swathwidth* This option sets the output sidescan swath width in meters. By default **mb7k2ss** calculates the swath width to use all of the samples available in the original data.

–X This option switches port and starboard sidescan channels.

EXAMPLES

Suppose that we have collected two Reson 7k datafiles incorporating multibeam sonar data, sidescan data, and subbottom profiler data, and that the filenames are:

20070809_173212.s7k

20070809_175133.s7k After running **mb7kpreprocess** on these files to fix issues and prepare the data for processing, we will have two additional files named:

20070809_173212.mb88

20070809_175133.mb88 After editing the bathymetry in the ".mb88" files with **mbedit**, and running **mbprocess** to apply the edits, we will have two processed files that are, among other uses, suitable for sidescan extraction:

20070809_173212p.mb88

20070809_175133p.mb88 If we have two datalist files, one called datalist.mb-1 referencing the ".mb88" files with the following contents:

20070809_173212p.mb88 88

20070809_175133p.mb88 88 and another called datalistp.mb-1 referencing the first datalist with a $PROCESSED tag:

$PROCESSED

datalist.mb-1 −1 then we can extract the Edgetech sidescan from the processed files using:

```
mb7k2ss −v −A1 −B2 −I datalistp.mb-1 \
     -M −X −R MAUV_Axial_1v4.rte −L1/Axial07SS \
     -T AxialCalderaMBARIAllTopo.grd
```

Here the **−R** option specifies an **MBgrdviz** route file that was followed in collecting the data. By using this option, the output sidescan files will be broken into lines defined by the route waypoints, and the output filenames will be sequentially numbered. The **−T** option specifies a topography grid that is used by **mb7k2ss** to lay out the sidescan on the seafloor. The output appears as follows:

```
Program mb7k2ss
    Version $Id: mb7k2ss.ps 2191 2014-06-05 00:59:01Z caress $
    MB-system Version 5.1.1beta5

    Data records to extract:
       Low Sidescan
       Sidescan port and starboard exchanged

    Imported 45 waypoints from route file: MAUV_Axial_1v4.rte
    Grid read:
      Dimensions: 2072 3558
      Geographic Coordinate System Name: Geographic WGS84
      Geographic Coordinate System ID:   4326
      Longitude:  229.926767 230.060367  0.000065
      Latitude:   45.866667 46.026700  0.000045
      Internal Grid Projection Mode:         0
      Internal Grid Projection ID:           epsg4326
    Data Read:
      grid_projection_mode:     0
      grid_projection_id:       epsg4326
      nodatavalue:              −10000000.000000
      nx:                       2072
      ny:                       3558
      min:                      −2302.588135
      max:                      −1382.877319
      xmin:                     229.926767
      xmax:                     230.060367
      ymin:                     45.866667
      ymax:                     46.026700
      dx:                       0.000065
      dy:                       0.000045
      data:                     71467008

    Data records read from: 20070809_173212p.mb88
       Survey:        2330
       File Header:   2
       Bluefin CTD:   1152
       Bluefin Nav:   942
       Subbottom:     0
       Low Sidescan:  2328
       High Sidescan: 0

    Generating inf file for Axial07SS_0001_sslo.mb71
    Generating fnv file for Axial07SS_0001_sslo.mb71

    Data records written to: Axial07SS_0001_sslo.mb71
```

```
     Low Sidescan:  2759
     High Sidescan: 0

Generating inf file for Axial07SS_0002_sslo.mb71
Generating fnv file for Axial07SS_0002_sslo.mb71

Data records written to: Axial07SS_0002_sslo.mb71
     Low Sidescan:  369
     High Sidescan: 0

Data records read from: 20070809_175133p.mb88
     Survey:        2367
     File Header:   2
     Bluefin CTD:   1158
     Bluefin Nav:   942
     Subbottom:     0
     Low Sidescan:  2367
     High Sidescan: 0

Generating inf file for Axial07SS_0003_sslo.mb71
Generating fnv file for Axial07SS_0003_sslo.mb71

Total data records read:
     Survey:        4697
     File Header:   4
     Bluefin CTD:   2310
     Bluefin Nav:   1884
     Subbottom:     0
     Low Sidescan:  4695
     High Sidescan: 0
 Total data records written:
      Low Sidescan:  4160
      High Sidescan: 0
```

SEE ALSO

mbsystem(1), **mbformat**(1), **mbinfo**(1), **mb7kpreprocess**(1), **mb7k2jstar**(1), **mbextractsegy**(1), **mbbackangle**(1), **mbprocess**(1)

BUGS

No doubt.