NAME

mbinfo − Output some basic statistics of swath sonar data files.

VERSION

Version 5.0

SYNOPSIS

mbinfo [**−B***yr/mo/da/hr/mn/sc* **−C** **−E***yr/mo/da/hr/mn/sc* **−F***format* **−G** **−I***filename* **−L***lonflip* **−M***londim/latdim* **−N** **−O** **−P***ping* **−R***west/east/south/north* **−S***speed* **−W** **−X***outputformat* **−V** **−H]**

DESCRIPTION

MBinfo is a utility for reading a swath sonar data file or files and outputting some basic statistics. The table generated shows the filename, the data format id, a brief description of the format, any metadata that have been inserted into the data, data counts, navigation totals, time and navigation of the first and last data records, minimum and maximum data values, and the geographic bounding box of the data. The data counts include the total number of bathymetry, amplitude, and sidescan values read. These totals may be less than the maximum possible (number of data records times the maximum number of data supported for the particular data format) for formats supporting variable numbers of beams or pixels. Also reported are the numbers and percentages of good, zero, and flagged data values (good values are those which are neither zero nor flagged as bad).

An important function of **mbinfo** is to generate ".inf" files that may be parsed by other **MB-System** programs and macros. Programs such as **mbgrid** and **mbmosaic**, read ".inf" files, when available, to determine whether input swath data files actually contain any data in the area of interest. The efficiency of these programs is enhanced by their ability to avoid reading files with no data in the area to be gridded or mosaiced. Programs such as **mbm_plot** and **mbm_grid** run **mbinfo** on input files to determine the data bounds. The availability of ".inf" files allows this information to be determined without having to read through each swath file.To create an ".inf" file, simply direct the output of **mbinfo** to a file named by adding the suffix ".inf" to the input swath data filename. This can also be accomplished using the **−O** option of **mbinfo**, or the **−N** and **−O** options of **mbdatalist**.

Data archives use metadata harvesting tools that often work better with information structured for machine parsing rather than for easy reading by humans. To output a variant of "*.inf" files in the JSON format (with "_inf.json" suffixes), use the **−X***1* option. Similarly, specifying the **−X***2* option will result in XML output in files with "_xml.inf" suffixes.

The program **mbprocess** can insert metadata recognized and printed by **mbinfo**. These metadata include items such as the sonar model, the vessel name, and bias parameters. See the **mbprocess** and **mbset** manual pages for details.

The data input may be averaged over several pings and/or windowed in time and space. Comments in the data stream may also be printed out. The results are dumped to stdout.

If pings are averaged (*pings* > 2) **mbinfo** estimates the variance for each of the bathymetry beams and sidescan pixels by reading a set number of pings and then finding the variance of the values for each beam. The bathymetry values are detrended before variances are calculated.

The program output can also be extended to include a coarse mask representing where data lies within the file's bounding box. This mask is shown as a table of 0's and 1's, where the 1's indicate bins with data. The dimensions of the mask are specified with the **−M***londim/latdim* option. For instance, if the user specifies **−M***10/10*, then **mbinfo** will read through the data once to establish the usual statistics, including the data bounding box. Then, the program will initialize a 10 X 10 grid with the minimum and maximum longitude and latitude of the bounding box, and read the data a second time. Each bin in which a sounding or pixel falls will be set to 1. After the second reading pass, the data location mask will be output at the end of the **mbinfo** output.

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OPTIONS

–B *yr/mo/da/hr/mn/sc*
This option sets the starting time for data allowed in the input data. The **–E** option sets the ending time for data. If the starting time is before the ending time, then any data with a time stamp before the starting time or after the ending time is ignored. If instead the starting time is after the ending time, then any data between the ending and starting time will be ignored. This scheme allows time windowing both inside and outside a specified interval. Default: *yr/mo/da/hr/mn/sc* = 1962/2/21/10/30/0.

–C Normally, **mbinfo** ignores comments encountered in the data file. If the **–C** flag is given, all of the comments will be printed out.

–E *yr/mo/da/hr/mn/sc*
This option sets the ending time for data allowed in the input data. The **–B** option sets the starting time for data. If the starting time is before the ending time, then any data with a time stamp before the starting time or after the ending time is ignored. If instead the starting time is after the ending time, then any data between the ending and starting time will be ignored. This scheme allows time windowing both inside and outside a specified interval. Default: *yr/mo/da/hr/mn/sc* = 2062/2/21/10/30/0.

–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 uses the **MBIO** library and will read or write any swath sonar format supported by **MBIO**. A list of the swath sonar data formats currently supported by **MBIO** and their identifier values is given in the **MBIO** manual page. The default format is set using **mbdefaults**.

–G Enables checking for reasonable navigation to be used in calculating the minimum and maximum longitude and latitude values. This mode excludes longitude and latitude values of 0.0 or those values associated with very large apparent speeds between pings (calculated using distance and time differences between adjacent pings). This option is particularly useful when one is trying to obtain reasonable bounds for a plot.

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

–I *filename*
Sets the input filename. If *format* > 0 (set with the **–f** option) 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 11
datafile2 24
```

This program uses the **MBIO** library and will read or write any swath sonar format supported by **MBIO**. A list of the swath sonar data formats currently supported by **MBIO** and their identifier values is given in the **MBIO** manual page. Default: *infile* = "stdin".

−L *lonflip*
Sets the range of the longitude values returned. If *lonflip*=−1 then the longitude values will be in the range from −360 to 0 degrees. If *lonflip*=0 then the longitude values will be in the range from −180 to 180 degrees. If *lonflip*=1 then the longitude values will be in the range from 0 to 360 degrees. Default: **mbinfo** selects the bext longitude range based on the first data.

−M *londim/latdim*
The program output can be extended to include a coarse mask representing where data lies within the file's bounding box. This mask is shown as a table of 0's and 1's, where the 1's indicate bins with data. The dimensions of the mask are specified with the **−M***londim/latdim* option.

−N
Extends the program output to include notices. These notices include three sections. The first is a list of all of the data record types (e.g. survey, comment, navigation, parameter) encountered while reading the file. Some formats are quite simple and only include survey records and comments. Other formats are complex and may contain many different sorts of data records, including some that only derive from a particular sonar model. The second section lists any nonfatal error messages (e.g. unintelligible record) generated while reading the file. Finally, the third section of notices lists any particular problems with the data that have been identified (e.g. some navigation is zero or some depths are too large to be correct).

−O
This option causes the program output to be directed to "inf" files rather than to stdout. Each "inf" file is named using the original data file path with an ".inf" suffix appended.

−P *pings*
Turns on variance calculations for the bathymetry, amplitude, and sidescan data (as available in the data stream). If *pings* = 1, then no variance calculations are made. If *pings* > 1, then variances are calculated for each beam and pixel using groups of *pings* values. The bathymetry values are detrended before the variances are calculated; the amplitude and sidescan values are not detrended. The variance calculations can provide crude measures of noise and/or signal as a function of beam and pixel number. Default: *pings* = 1 (no variance calculations).

−R *west/east/south/north*
Sets the longitude and latitude bounds within which swath sonar data will be read. Only the data which lies within these bounds will be read. Default: *west*=−360, east=*360*, *south*=−90, *north*=90.

−S *speed*
Sets the minimum speed in km/hr (5.5 kts ˜ 10 km/hr) allowed in the input data; pings associated with a smaller ship speed will not be copied. Default: *speed* = 0.

−T *timegap*
Sets the maximum time gap in minutes between adjacent pings allowed before the data is considered to have a gap. Default: *timegap* = 1.

−V Normally, **mbinfo** only prints out the statistics obtained by reading all of the data. If the **−V** flag is given, then **mbinfo** works in a "verbose" mode and outputs the program version being used and all read error status messages.

−W Normally, **mbinfo** reports depth values in meters. If the **−W** flag is given, then **mbinfo** reports these values in feet.

−X *outputformat*
Normally, **mbinfo** reports information as text formatted for easy reading. If this option is given with *outputformat*=1, then the output will be in the JSON format. If the **−O** option is used to explicitly make "*.inf" files, then the output will be JSON and the output filenames will be named using the original data file path with an "_inf.json" suffix appended. If this option is given with *outputformat*=2, then the output will be in the XML format. If the **−O** option is used to explicitly make "*.inf" files, then the output will be XML and the output filenames will be named using the original data file path with an "_inf.xml" suffix appended.

EXAMPLES

Suppose one wishes to know something about the contents of a Hydrosweep file (format 24) called example_hs.mb24. The following will suffice:

mbinfo –F24 –Iexample_hs.mb24

The following output is produced:

```
Swath Data File:      example_hs.mb24
MBIO Data Format ID:  24
Format name:          MBF_HSLDEOIH
Informal Description: L-DEO in-house binary Hydrosweep
Attributes:           Hydrosweep DS, 59 beams, bathymetry and amplitude,
                      binary, centered, L-DEO.

Data Totals:
Number of Records:            263
Bathymetry Data (59 beams):
  Number of Beams:          15517
  Number of Good Beams:     13661     88.04%
  Number of Zero Beams:       868      5.59%
  Number of Flagged Beams:    988      6.37%
Amplitude Data (59 beams):
  Number of Beams:          15517
  Number of Good Beams:     13661     88.04%
  Number of Zero Beams:       868      5.59%
  Number of Flagged Beams:    988      6.37%
Sidescan Data (0 pixels):
  Number of Pixels:             0
  Number of Good Pixels:        0      0.00%
  Number of Zero Pixels:        0      0.00%
  Number of Flagged Pixels:     0      0.00%

Navigation Totals:
Total Time:            1.2425 hours
Total Track Length:   20.9421 km
Average Speed:        16.8548 km/hr ( 9.1107 knots)

Start of Data:
Time:  08 14 1993 18:00:25.000000  JD226
Lon:  –49.3011     Lat:   12.1444     Depth:  4920.0000 meters
Speed: 18.3600 km/hr ( 9.9243 knots)  Heading:  97.2000 degrees
Sonar Depth:    0.0000 m  Sonar Altitude: 4920.0000 m

End of Data:
Time:  08 14 1993 19:14:58.000000  JD226
Lon:  –49.1111     Lat:   12.1149     Depth:  5021.0000 meters
Speed: 17.2800 km/hr ( 9.3405 knots)  Heading:  97.0000 degrees
Sonar Depth:    0.0000 m  Sonar Altitude: 5021.0000 m

Limits:
Minimum Longitude:     –49.3061   Maximum Longitude:     –49.1064
Minimum Latitude:       12.0750   Maximum Latitude:       12.1806
Minimum Sonar Depth:     0.0000   Maximum Sonar Depth:     0.0000
```

```
Minimum Altitude:     4087.0000   Maximum Altitude:     5034.0000
Minimum Depth:        3726.0000   Maximum Depth:        5190.0000
Minimum Amplitude:     100.0000   Maximum Amplitude:    6380.0000
```

Suppose we wanted to know how noisy the outer beams are relative to the inner beams. We might try:

```
mbinfo −F24 −P5 −Iexample_hs.mb24
```

obtaining:

```
Swath Data File:      example_hs.mb24
MBIO Data Format ID:  24
Format name:          MBF_HSLDEOIH
Informal Description: L-DEO in-house binary Hydrosweep
Attributes:           Hydrosweep DS, 59 beams, bathymetry and amplitude,
                      binary, centered, L-DEO.

Data Totals:
Number of Records:             263
Bathymetry Data (59 beams):
  Number of Beams:           15517
  Number of Good Beams:      13661     88.04%
  Number of Zero Beams:        868      5.59%
  Number of Flagged Beams:     988      6.37%
Amplitude Data (59 beams):
  Number of Beams:           15517
  Number of Good Beams:      13661     88.04%
  Number of Zero Beams:        868      5.59%
  Number of Flagged Beams:     988      6.37%
Sidescan Data (0 pixels):
  Number of Pixels:              0
  Number of Good Pixels:         0      0.00%
  Number of Zero Pixels:         0      0.00%
  Number of Flagged Pixels:      0      0.00%

Navigation Totals:
Total Time:             1.2425 hours
Total Track Length:    20.9421 km
Average Speed:         16.8548 km/hr ( 9.1107 knots)

Start of Data:
Time:  08 14 1993 18:00:25.000000  JD226
Lon:  −49.3011     Lat:   12.1444     Depth:  4920.0000 meters
Speed: 18.3600 km/hr ( 9.9243 knots)  Heading:  97.2000 degrees
Sonar Depth:    0.0000 m  Sonar Altitude: 4920.0000 m

End of Data:
Time:  08 14 1993 19:14:58.000000  JD226
Lon:  −49.1111     Lat:   12.1149     Depth:  5021.0000 meters
Speed: 17.2800 km/hr ( 9.3405 knots)  Heading:  97.0000 degrees
Sonar Depth:    0.0000 m  Sonar Altitude: 5021.0000 m

Limits:
Minimum Longitude:     −49.3061   Maximum Longitude:     −49.1064
```

Minimum Latitude: 12.0750 Maximum Latitude: 12.1806
Minimum Sonar Depth: 0.0000 Maximum Sonar Depth: 0.0000
Minimum Altitude: 4087.0000 Maximum Altitude: 5034.0000
Minimum Depth: 3726.0000 Maximum Depth: 5190.0000
Minimum Amplitude: 100.0000 Maximum Amplitude: 6380.0000

Beam Bathymetry Variances:
Pings Averaged: 5

Beam	N	Mean	Variance	Sigma
0	0	0.00	0.00	0.00
1	0	0.00	0.00	0.00
2	110	4719.59	342.69	18.51
3	105	4779.49	399.15	19.98
4	155	4748.81	280.18	16.74
5	155	4817.12	194.62	13.95
6	150	4826.44	197.76	14.06
7	160	4863.82	155.50	12.47
8	215	4806.08	229.11	15.14
9	235	4807.09	220.23	14.84
10	240	4766.29	158.83	12.60
11	250	4764.34	221.09	14.87
12	245	4765.35	146.24	12.09
13	250	4782.02	167.34	12.94
14	240	4798.38	92.98	9.64
15	245	4775.16	98.27	9.91
16	225	4782.35	136.30	11.67
17	210	4820.37	80.70	8.98
18	215	4821.15	80.97	9.00
19	215	4827.71	76.20	8.73
20	195	4842.65	84.22	9.18
21	190	4843.02	155.87	12.48
22	185	4884.28	73.69	8.58
23	175	4885.21	69.88	8.36
24	175	4871.47	52.01	7.21
25	180	4871.92	34.71	5.89
26	200	4830.80	36.83	6.07
27	205	4835.16	33.47	5.79
28	210	4809.96	43.07	6.56
29	190	4850.77	40.97	6.40
30	240	4768.69	64.23	8.01
31	240	4772.90	74.44	8.63
32	245	4760.11	57.97	7.61
33	255	4734.01	81.72	9.04
34	255	4728.19	82.21	9.07
35	260	4722.94	83.45	9.14
36	260	4721.95	102.02	10.10
37	260	4713.48	83.85	9.16
38	250	4715.40	101.33	10.07
39	255	4722.56	118.20	10.87
40	250	4727.48	109.13	10.45
41	255	4734.96	127.97	11.31
42	255	4724.53	124.06	11.14
43	230	4744.74	122.96	11.09

44	225	4752.16	98.22	9.91
45	230	4692.27	107.96	10.39
46	240	4696.93	95.93	9.79
47	230	4699.80	129.08	11.36
48	225	4696.32	145.20	12.05
49	220	4681.50	140.29	11.84
50	210	4676.16	103.35	10.17
51	180	4627.31	105.22	10.26
52	200	4654.55	207.85	14.42
53	130	4665.82	250.97	15.84
54	185	4704.29	300.80	17.34
55	135	4731.13	218.16	14.77
56	150	4736.29	178.16	13.35
57	115	4691.45	217.31	14.74
58	0	0.00	0.00	0.00

SEE ALSO

mbsystem(1)

BUGS

No bugs, only features. Maybe too many features...