NAME

mbhistogram – Generate a histogram of bathymetry, amplitude, or sidescan values from swath sonar data files.

VERSION

Version 5.0

SYNOPSIS

mbhistogram [**–A***kind* **–B***yr/mo/da/hr/mn/sc* **–C** **–D***min/max* **–E***yr/mo/da/hr/mn/sc* **–F***format* **–G** **–I***filename* **–L***lonflip* **–M***nintervals* **–N***nbins* **–P***ping* **–R***west/east/south/north* **–S***speed* **–V** **–H]**

DESCRIPTION

mbhistogram reads a swath sonar data file and generates a histogram of the bathymetry, amplitude, or sidescan values. Alternatively, mbhistogram can output a list of values which break up the distribution into equal sized regions. These values can be used to construct a color table, producing an image which is histogram equalized. If desired, the histogram can be recast into a Gaussian distribution before output or the calculation of the histrogram equalization This feature is similar to the Gaussian option of **grdhisteq**. The linear histogram equalization is most appropriate for use with grayscale images, such as those produced from amplitude or sidescan data, and is used by the macro **mbm_plot** for that purpose. The Gaussian histogram equalization is well suited for shading of images, and is used by **mbm_plot** for shading of color bathymetry with amplitude data. The results are dumped to stdout.

AUTHORSHIP

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OPTIONS

–A *kind*
Sets the kind of data to be processed, where
kind = 0 : histogram of bathymetry data
kind = 1 : histogram of beam amplitude data
kind = 2 : histogram of sidescan data Default: *kind* = 2.

–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.

–D *min/max*
Specifies the minimum and maximum data values used for constructing the histogram. The width of the bins is determined by (*max* – *min*) divided by *nbins* (see the **–N** option). The *min* value is the center of the first histogram bin, and the *max* value is the center of the last histogram bin. Data values falling outside the range of the bins are ignored.

–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. Default: *format* = 11.

−G This option causes the data histogram to be recast into a Gaussian distribution.

−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: *lonflip* = 0.

−M *nintervals*
If *nintervals* > 0 then **mbhistogram** will calculate and output a list of values which break up the data distribution into equal sized regions. This can be useful for constructing color tables which accentuate features in amplitude and sidescan data (the macro **mbm_plot** makes use of this feature). If this option is enabled, then the raw histogram is not output.

−N *nbins*
Sets the number of bins used to calculate the histogram.

−P *pings*
Sets the ping averaging of the input data. If *pings* = 1, then no ping averaging is performed. If *pings* > 0, then that number of input pings will be averaged to produce one output ping. If *pings* = 0, then the ping averaging will automatically be done so that the along-track ping spacing is equal to the across-track beam spacing. Default: *pings* = 1 (no ping averaging).

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

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

EXAMPLES

Suppose one wishes to obtain a histogram of the sidescan data in a file called mbexample.mb41 containing raw data from a SeaBeam 2112 sonar (format 41). The following will suffice:

```
mbhistogram −F41 −I sb199411211212.rec −D0.0/45000 −N25
```

to yield the following histogram:

```
0.000000 183814
1875.000000 30845
3750.000000 5365
5625.000000 1918
7500.000000 951
9375.000000 591
11250.000000 403
13125.000000 232
15000.000000 189
16875.000000 127
18750.000000 108
20625.000000 75
22500.000000 85
24375.000000 48
26250.000000 30
28125.000000 31
30000.000000 28
31875.000000 21
33750.000000 10
35625.000000 9
37500.000000 4
39375.000000 2
41250.000000 2
43125.000000 2
45000.000000 1
```

In order to obtain 16 values breaking up the distribution into equal sized regions, use the **−M** option:

```
mbhistogram −F41 −I sb199411211212.rec −D0.0/45000 −N45000 −M25
```

giving:

```
−0.500011
110.657221
137.446811
165.916284
199.635469
239.900007
287.726270
345.615610
418.142114
513.487776
639.986551
824.475879
1140.372280
1994.280032
44803.495633
```

SEE ALSO

mbsystem(1), **mbm_plot**(1), grdhisteq(1)

BUGS

You find em, we fix 'em...