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.

MB-SYSTEM 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 pro-
          gram 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 de-
          grees. 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 fea-
          ture). 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...