NAME

mbrollbias – Assess roll bias of swath sonar sonar systems.

VERSION

Version 5.0

SYNOPSIS

mbrollbias –F*format1/format2* **–L***lonflip* **–I***file1* **–J***file2* **–R***west/east/south/north [***–D***xdim/ydim* **–H –V***]*

DESCRIPTION

mbrollbias is a utility used to assess roll bias of swath sonar sonar systems using bathymetry data from two swaths covering the same seafloor in opposite directions. The program takes two input files and calculates best fitting planes for each dataset. The roll bias is calculated by solving for a common roll bias factor which explains the difference between the seafloor slopes observed on the two swaths. This approach assumes that pitch bias is not a factor; this assumption is most correct when the heading of the two ship-tracks are exactly opposite. The area is divided into a number of rectangular regions and calculations are done in each region containing a sufficient number of data from both swaths. The data contained in the two datafiles should be processed to ensure that no artifacts will bias the roll bias calculations. Typically, this means using **mbclean** and or **mbedit** to remove noisy outer beams. A positive roll bias value means that the the vertical reference used by the swath sonar system is biased to starboard, giving rise to shallow bathymetry to port and deep bathymetry to starboard. Results are written to stdout.

AUTHORSHIP

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

OPTIONS

–F *format1/format2*
Sets the **MBIO** format identifiers for the first and second data files, respectively. 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.

–D *xdim/ydim*
The area specified using the **–R** option is divided up into a grid of rectangular regions; roll bias calculations are done in each of these regions providing sufficient data is available from both data files. This option sets the dimensions of the region grid. Use *xdim* = *ydim* = 1 to make one calculation for the entire area. Default: *xdim* = *ydim* = 1.

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

–I *file1*
Sets the filename of the first data file to be analyzed.

–J *file2*
Sets the filename of the second data file to be analyzed.

–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.

–R *west/east/south/north*
Sets the longitude and latitude bounds of the area of the roll bias test.

–V The **–V** option causes the program to print out the program name and version during execution.

EXAMPLE

Suppose you want to calculate roll bias using two coincident swaths of Hydrosweep DS data collected in nearly opposite directions. Run **mbrollbias** as follows:

```
mbrollbias –R-51.07/-50.98/9.0166/9.117 –D1/1 –F22/22
        -Ihs_leg1_z.mb22 –Jhs_leg2_z.mb22 –V
```

The output looks like:

```
Program mbrollbias
Version $Id: mbrollbias.ps 2191 2014-06-05 00:59:01Z caress $
MB-system Version 4.00

mbrollbias Parameters:
Input file 1:    hs_leg1_z.mb22
Input file 2:    hs_leg2_z.mb22
Region grid bounds:
  Longitude:  –51.0700  –50.9800
  Latitude:     9.0166    9.1170
Region grid dimensions: 1 1
Longitude interval: 0.090000 degrees or 9.894392 km
Latitude interval:  0.100400 degrees or 11.104426 km
Longitude flipping:   0

4840 depth points counted in hs_leg1_z.mb22
1733 depth points counted in hs_leg2_z.mb22
4840 depth points read from hs_leg1_z.mb22
1733 depth points read from hs_leg2_z.mb22

Region 0 (0 0) bounds:
    Longitude:  –51.0700  –50.9800
    Latitude:     9.0166    9.1170
First data file:    hs_leg1_z.mb22
    Number of data: 4840
    Mean heading:   107.845062
    Plane fit:      4.759709 –0.002327 –0.004623
Second data file:   hs_leg2_z.mb22
    Number of data: 1733
    Mean heading:   302.022793
    Plane fit:      4.640304 0.008438 0.008494
Roll bias:   –0.007288 (-0.417598 degrees)
Roll bias is positive to port, negative to starboard.
A postive roll bias means the ship rolls to port,
    giving rise to shallow bathymetry to port and
    deep bathymetry to starboard.
```

SEE ALSO

mbsystem(1)

BUGS

Probably.