NAME

mblevitus – Create a water velocity profile which is representative of the mean annual water column for a specified 1 degree by 1 degree region.

VERSION

Version 5.0

SYNOPSIS

mblevitus [**–R***lon/lat* **–O***outfile* **–V** **–H***]*

DESCRIPTION

mblevitus generates a mean water sound velocity profile for a specified location using temperature and salinity data from the 1982 Climatological Atlas of the World Ocean [Levitus, 1982]. The water velocity profile is representative of the mean annual water column structure for a specified 1 degree by 1 degree region. The profile is output to a specified file which can be read and used by programs (e.g. **mbbath** or **mbvelocitytool**) which calculate swath sonar sonar bathymetry from travel times by raytracing through a water velocity model.

The Levitus [1982] reference is:
  Levitus, S, Climatological Atlas of the World Ocean,
  NOAA Professional Paper 13, U.S. Government Printing Office,
  Washington D.C., 173pp, 1982.
The water sound velocity values are calculated using the DelGrosso equations, following:
  Dusha, B. D., P. F. Worcester, B. D. Cornuelle,
   B. M. Howe, "On equations for the speed of
   sound in seawater", J. Acoust. Soc. Am., 93,
   255-275, 1993
The implementation of these equations follows code written at the Ocean Data Facility of the Scripps Institution of Oceanography. The depth to which the Levitus database defines the water column reflects regional water depths which may be exceeded in places. **mblevitus** extends the water sound velocity profiles to a depth of 12000 meters using the deepest salinity and temperature values available in the database. If the specified location is subaerial, then no water velocity profile is calculated.

AUTHORSHIP

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OPTIONS

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

–O *outfile*
Sets the output file for the water velocity profile. Default: *outfile* = "velocity".

–R *lon/lat*
Sets the longitude and latitude of the location of the water velocity profile. Whole degrees should be used, as the database has a 1 degree by 1 degree resolution. Default: *lon*=0, *lat*=0.

–V Normally, **mblevitus** outputs only a minor bit of information to the stdout stream. If the **–V** flag is given, then **mblevitus** works in a "verbose" mode and also outputs the program version being used and the complete water column structure used to calculate the water velocity profile.

EXAMPLES

Suppose that one wishes to obtain a mean annual water velocity profile for processing Hydrosweep DS bathymetry data collected on the Cocos-Nazca spreading center at 95W longitude and 2N latitude. The following will suffice:

mblevitus −R-95/2 −Ovelocity_profile −V

The output will be:

```
Program MBLEVITUS
MB-system Version 4.5

Location for mean annual water velocity profile:
  Requested:  −95.0000 longitude   2.0000 latitude
  Used:       265.5000 longitude   2.5000 latitude
Values defined directly by Levitus database:      27
Values assuming deepest salinity and temperature: 19
Velocity points written:                          46
Output file: velocity_profile

Mean annual water column profile:
     Depth Temperature Salinity   Velocity
    0.0000   25.6560   33.8830   1534.6998
   10.0000   25.4080   33.8230   1534.2112
   20.0000   24.5410   34.0190   1532.5010
   30.0000   23.3290   34.2400   1529.9032
   50.0000   19.7940   34.7450   1521.4298
   75.0000   15.9700   34.9210   1510.8373
  100.0000   14.5630   34.9400   1506.8495
  125.0000   13.9500   34.9320   1505.2728
  150.0000   13.5920   34.9270   1504.5077
  200.0000   13.0430   34.9100   1503.4935
  250.0000   12.4510   34.8780   1502.2893
  300.0000   11.4720   34.8190   1499.6840
  400.0000    9.4060   34.6990   1493.8119
  500.0000    8.0400   34.6390   1490.2903
  600.0000    7.0330   34.5950   1488.0126
  700.0000    6.2200   34.5740   1486.4380
  800.0000    5.5640   34.5620   1485.4464
  900.0000    5.0280   34.5620   1484.9211
 1000.0000    4.5840   34.5650   1484.7546
 1100.0000    4.1950   34.5730   1484.8076
 1200.0000    3.8570   34.5820   1485.0649
 1300.0000    3.5860   34.5970   1485.6061
 1400.0000    3.3320   34.6090   1486.2123
 1500.0000    3.1020   34.6140   1486.9097
 1750.0000    2.6290   34.6280   1489.0920
 2000.0000    2.3010   34.6440   1491.9139
 2500.0000    1.8770   34.6670   1498.6154
 3000.0000    0.0000    0.0000   1507.2345
 3500.0000    0.0000    0.0000   1515.9406
 4000.0000    0.0000    0.0000   1524.7273
 4500.0000    0.0000    0.0000   1533.5883
 5000.0000    0.0000    0.0000   1542.5173
 5500.0000    0.0000    0.0000   1551.5078
 6000.0000    0.0000    0.0000   1560.5533
```

```
 6500.0000   0.0000   0.0000  1569.6471
 7000.0000   0.0000   0.0000  1578.7823
 7500.0000   0.0000   0.0000  1587.9523
 8000.0000   0.0000   0.0000  1597.1499
 8500.0000   0.0000   0.0000  1606.3682
 9000.0000   0.0000   0.0000  1615.6001
 9500.0000   0.0000   0.0000  1624.8383
10000.0000   0.0000   0.0000  1634.0754
10500.0000   0.0000   0.0000  1643.3042
11000.0000   0.0000   0.0000  1652.5171
11500.0000   0.0000   0.0000  1661.7062
12000.0000   0.0000   0.0000  1670.8641
```

The contents of the output file velocity_profile are:

```
# Water velocity profile created by program MBLEVITUS
# MB-system Version 4.5
# Run by user <caress> on cpu <menard> at <Wed Mar 26 15:43:53 1997>
# Water velocity profile derived from Levitus
# temperature and salinity database.  This profile
# represents the annual average water velocity
# structure for a 1 degree X 1 degree area centered
# at 265.5000 longitude and 2.5000 latitude.
# This water velocity profile is in the form
# of discrete (depth, velocity) points where
# the depth is in meters and the velocity in
# meters/second.
# The first 27 velocity values are defined using the
# salinity and temperature values available in the
# Levitus database; the remaining 19 velocity values are
# calculated using the deepest temperature
# and salinity value available.
0.000000 1534.699829
10.000000 1534.211182
20.000000 1532.500977
30.000000 1529.903198
50.000000 1521.429810
75.000000 1510.837280
100.000000 1506.849487
125.000000 1505.272827
150.000000 1504.507690
200.000000 1503.493530
250.000000 1502.289307
300.000000 1499.683960
400.000000 1493.811890
500.000000 1490.290283
600.000000 1488.012573
700.000000 1486.437988
800.000000 1485.446411
900.000000 1484.921143
1000.000000 1484.754639
1100.000000 1484.807617
1200.000000 1485.064941
1300.000000 1485.606079
1400.000000 1486.212280
```

```
1500.000000 1486.909668
1750.000000 1489.092041
2000.000000 1491.913940
2500.000000 1498.615356
3000.000000 1507.234497
3500.000000 1515.940552
4000.000000 1524.727295
4500.000000 1533.588257
5000.000000 1542.517334
5500.000000 1551.507812
6000.000000 1560.553345
6500.000000 1569.647095
7000.000000 1578.782349
7500.000000 1587.952271
8000.000000 1597.149902
8500.000000 1606.368164
9000.000000 1615.600098
9500.000000 1624.838257
10000.000000 1634.075439
10500.000000 1643.304199
11000.000000 1652.517090
11500.000000 1661.706177
12000.000000 1670.864136
```

SEE ALSO

mbsystem(1), **mbvelocitytool**(1), **mbprocess**(1), **mbset**(1), **mbm_xbt**(1)

BUGS

None known.