Bathymetry of the LOIS SES Area

Introduction

A swath bathymetry survey was carried out on the first LOIS SES cruise (Charles Darwin CD91A). The data are presented in the bathym directory as two files.   The file grid.txt contains the gridded data set whilst the file countour.txt contains the co-ordinates of the contour vectors. Details of the formats are given below.

The PDF documentation also includes two images created from the data set, a colour contour plot and a 3-D representation of the data.

Data Acquisition and Processing

The data set contains depth values at node points on a three seconds of latitude by three seconds of longitude grid for the area 9° 25'W - 8° 55'W; 56°N - 57°N. The bathymetry data used to create this data set were collected during RRS Charles Darwin cruise 91 (leg A), between 2 March 1995 and 22 March 1995 and processed by the British Oceanographic Data Centre.

Data collection by: Simrad EM12S-120 Multibeam echo-sounder system

Positioning: Differential GPS

Depths: Corrected metres

The bathymetry data were initially processed onboard ship to remove erroneous data points using Simrad's data processing software. Work was then done at BODC to produce a three seconds of latitude by three seconds of longitude grid from the processed data using a Nearest Neighbour gridding method.

Due to the poor quality of the data in some areas, (caused by adverse weather conditions during data collection), it was necessary to smooth and edit the data set. This was done by manually editing out data spikes from the grid file and then using software employing a matrix-smoothing algorithm to remove further noise. In regions of sparse data coverage, the grid nodes are assigned a null value.

ASCII Grid File Format

The data are stored in an ASCII file. The first line of the file gives the data area co-ordinates, i.e. the longitude and latitude limits of the grid file, (XMIN, XMAX, YMIN, YMAX), with the convention that west and south are negative, east and north are positive. This is followed by the number of rows, (IROW) and the number of columns, (ICOLUMN), in the grid.

The remainder of the records in the file contains the grid point data values, with 10 data values per line, (except the last line, which has one value only).

The record format description and feature coding information are given below:

Each record is made up of 80 bytes and is coded as follows:

Header record :   XMIN, XMAX, YMIN, YMAX, IROW, ICOLUMN in the format
                        (2(F10.6,1X),2(F4.1,1X),I4,1X,I3,40X)

Data Records: 10 grid point data values in the format (10(F7.1,1X))
(lines 2-72181)

Data Record: 1 grid point data value in the format (F7.1,73X),CR
(line 72182)

The grid point data values are coded as follows :

   Grid points containing bathymetry data: depth value given in metres
   Null or blanked grid points: -9999.9

Records are terminated by standard PC record terminators (0D0A hex)

The data records which follow the header record start at XMIN, YMAX, (9° 25'W, 57° 0'N) and begin a sequence of data values stored at 3'' longitude intervals. The data values are read from left to right across each record. Once the sequence of values at the given latitude is completed, i.e. ICOLUMN values, the latitude is decreased by 3'' and a new sequence of values is started. This process is continued for IROW separate latitude values with the last data value being at the grid point XMAX,YMIN, (8° 55'W, 56° 0'N).

To illustrate the file format description described above the following is a listing of part of the data file:

```
 -9.416667 -8.916667 56.0 57.0 1201 601 - Header record
 -9999.9 -9999.9 -9999.9 -9999.9 -9999.9 -9999.9 -9999.9 -9999.9 -9999.9 -9999.9    Line 2
 -9999.9 -9999.9 -9999.9 1635.5 1633.7 1631.7 1629.2 1626.5 1623.9 1621.2    Line 3
  1619.4 1618.2 1615.9 1613.0 1609.9 1608.3 1606.7 1604.7 1602.9 1600.8    Line 4
```

The depth value given by the 4th number in line 3 of the above data file, i.e. 1635.5 metres, is in row 1 column 14 of the grid file and its geographic position is 9° 24' 21''W; 57° 0'N.

Bathymetric Contour File Format Description

An ASCII file of bathymetric contour data at 10m intervals has been produced from the gridded data set. The format description of the data file is given below:

Each contour stream is preceded by a header record containing a feature code 'ICODE' which gives the depth value for the contour in metres and a count 'ICOUNT' of the number of succeeding co-ordinate pairs making up the contour.

Each co-ordinate pair is stored in a record with geographic latitude 'ALAT' and longitude 'ALONG', each expressed in decimal degrees, with the convention that west and south are negative, east and north are positive.

Each record is made up of 20 bytes as follows:

      Header record: ICODE, ICOUNT in format (2I6,8X)

      Co-ordinate pair record: ALAT, ALONG in format (F9.5,1X,F9.5,1X)

Records are terminated by standard PC record terminators (0D0A hex)