Report of the GEBCO Digital Atlas Manager
(June 2006 – September 2007)

This report covers the work carried out at the British Oceanographic Data Centre (BODC) for GEBCO between June 2006 and September 2007.

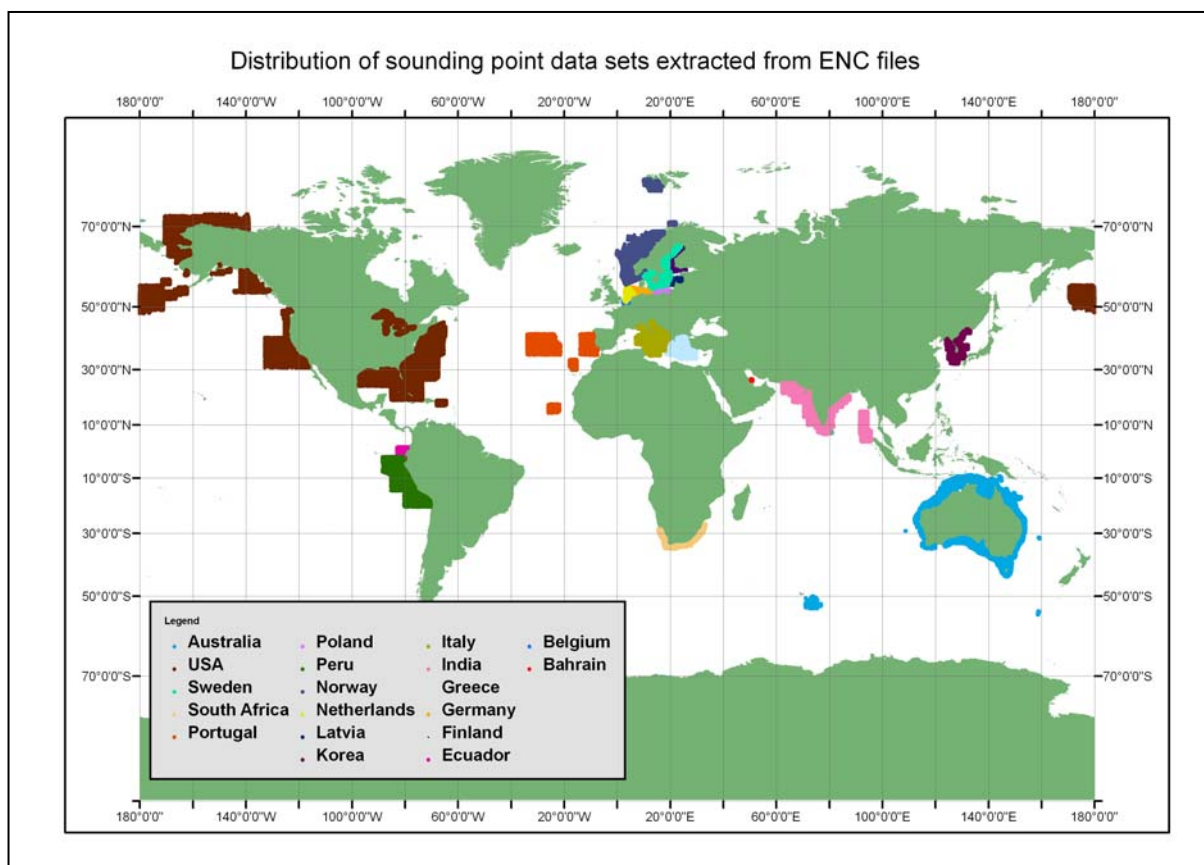## 1. Improving the GEBCO One Minute Grid in shallow water areas

Background

At the IHO/IOC GEBCO meetings held in Augascalientes, Mexico, in 2005, the need to improve the GEBCO One Minute Grid in shallow water areas was discussed. It was recognised that the data held collectively by IHO member states could be used to significantly improve the existing and future GEBCO bathymetric grids in shallow water regions.

A software application was developed at BODC that allows the extraction of bathymetric soundings, contour, metadata and coastline features from Electronic Navigation Charts (ENC) into simple ASCII format files.

In March 2006, a Circular Letter (accompanied by a CDROM containing the data extraction software) was sent out to IHO member states, by the International Hydrographic Bureau (IHB). Member states were invited to use the software to extract data from their ENC data sets (usage bands two and three) and supply it for use in updating the GEBCO One Minute Grid. This work has been led by Tony Pharaoh at the IHB.

The image below shows the distribution of the data sets received to date.

Distribution of sounding point data sets extracted from ENC files

Legend
- Australia
- USA
- Sweden
- South Africa
- Portugal
- Poland
- Peru
- Norway
- Netherlands
- Latvia
- Korea
- Italy
- India
- Greece
- Germany
- Finland
- Ecuador
- Belgium
- Bahrain

The table below details the number of bathymetric soundings and the depth levels contained in the bathymetric contour data sets that have been received from IHO member states to date:

Contributing IHO Member State	Total number of soundings	Total number of soundings shallower than or equal to a depth of 200 m	Depth levels in supplied bathymetric contour data sets (m)
Australia	1,291,809	1,185,031	–
Sweden	23,331	23,219	–
Italy	52,498	36,928	0,2,5,6,10,20,30,50, 100,200,500,1000, 2000,2500,3000,4000
Korea (Republic of)	110,050	104,375	0, 2, 5,10,20,30,50,100, 200,500,1000,2000
Poland	5,062	5,062	5,10,20,50,100
Portugal	7,691	1,826	0,10,20,30,50,100,200, 500,1000,2000,3000, 4000,5000
India	51,135	36,396	0, 2, 5,10,15,20,30,50, 100,200,500,1000,2000, 3000,4000
Latvia	2,424	2,397	5,10,15,20,50,100,150, 200
Belgium	6,764	6,764	0,2,5,8,10,20,30
Netherlands	6,249	6,249	0, 2, 5,10,20,30,40,50
Norway	18,468	11,493	0.5,3,5,10,20,30,40, 50, 60,70,75,80,90,100, 120,140,150,160,180, 200,220,240,250,260, 280,300,350,400,450,500, 600,700,800,900,1000,1100, 1200,1300,1400,1500, 2000
Finland	8,265	8,224	10,20,40,50,60,80,100,200
Peru	3,612	877	0,30,50,100,200,400, 1000,200,3000,4000, 5000,6000,7000
Ecuador	1,374	622	0,10,20,30,50,100, 200, 500,1000,2000,3000, 4000

South Africa	14,143	11,842	0,15,20,30,50,100, 200, 500,1000,2000,3000
Germany	6,841	6,841	0,2,5,10,17,20,30,40,50
Greece	45,619	28,168	0,2,5,10,20,30,50,100,200,50 0,1000,2000,3000,4000,5000
Kingdom of Bahrain.	5,025	5,025	0,2,5,10,15,20
USA	202,273	138,047	0, and various levels to 7315.2

Updating the GEBCO One Minute Grid

Work has been done to update the GEBCO One Minute Grid in shallow water regions, using the data supplied by the IHO Member States. Test grids have been produced for regions off India, South Africa and the Korean Peninsula.

The bathymetric soundings from the ENC data sets were used in shallow water regions (generally at a depth of 200m or shallower) and the original GEBCO bathymetric contours were used in regions deeper than this. Additional soundings were used from the GEODAS data set in some areas to help constrain the grid. Coastline data from the World Vector Shoreline data set and land topography from the Global Land One-Km Base Elevation (GLOBE) data set were also used during the creation of the updated grids.

The gridding work was done using the Generic Mapping Tools (GMT) software.

The ENC shallow water sounding data are relative to Chart Datum, the data have not been adjusted to another vertical datum.

The test grids will be made available from BODC's ftp site or on request (paw@bodc.ac.uk).

Grid comparison work

The National Institute of Oceanography (NIO), India, have produced a modified version of the ETOPO2 bathymetric grid covering part of the Indian Ocean area from approximately 20°E – 112°E; 32°N-38°S. The grid was created by incorporating bathymetry data (contours and soundings) from hydrographic charts in regions shallower than 200m into the original data set.

A number of images have been produced to compare the modified ETOPO2 grid, the original ETOPO2 grid and a modified version of the GEBCO One Minute Grid (which includes the shallow water bathymetry data extracted from ENC files).

2. Release of version 2.0 of the GEBCO Digital Atlas Software Interface

In July 2006 a revised version of the GDA Software Interface was released. In addition to fixing known bugs, it includes a number of new features:

- Add data from your own files of data points for display. The data points can be accompanied by attribute information which can be displayed on screen.
- Select to display the position of features from the IHO/IOC Gazetteer of Geographic Names of Undersea Features by feature type. For example, the user can select to display the position of just seamounts or just seamounts and ridges.
- Select to display the name text of one and two point features from IHO/IOC Gazetteer of Geographic Names of Undersea Features.
- Use a 'magnify' tool to visualise areas of the map.

The software, documentation and installation instructions are available for download:

http://www.bodc.ac.uk/help_and_hints/software_updates/gebco.html

3. Release of software for viewing and accessing data from the GEBCO One Minute Grid

Ray Cramer at BODC has developed a modified version of the GEBCO Digital Atlas software interface for viewing and accessing data from the GEBCO One Minute Grid. It is designed for those users who download the full GEBCO One Minute Grid file from the web.

The software was released in January 2007 and is available for download:

http://www.bodc.ac.uk/products/software_products/gebco_grid_display/

Since its release there have been over 700 downloads of the software.

4. Building a database from the IHO/IOC Gazetteer of Geographic Names of Undersea Features data set

The IHO/IOC Gazetteer of Geographic Names of Undersea Features data set is made available in spreadsheet form from GEBCO's web site. Software has been developed at BODC to create database tables from the spreadsheet. Quality control checks have been included in the software so that any potential errors can be reported to the GEBCO Sub-Committee on Undersea Feature Names (SCUFN).

This work has been done with a view to updating the version of the gazetteer used in the GDA and also to develop a Web Feature Service from the data set. It builds on the substantial effort carried out at the US National Geophysical Data Center (NGDC) in reformatting the gazetteer data set.

A report on the progress with this work was prepared for the SCUFN meeting held in Monaco in July 2007, and included information on some quality control issues within the data set.

5. GEBCO Digital Atlas user support and data set distribution

Since July 2006 we have dealt with 93 enquiries concerning the GDA and the availability of bathymetric data sets. During this time, 131 copies of the GDA CDROM have been distributed. The royalties owed to GEBCO from the sale of the GDA CDROMs for 2006 amounted to £12,433.

In June 2006 BODC launched a new web application for access to the GEBCO One Minute Grid.

http://www.bodc.ac.uk/data/online_delivery/gebco/

Through this application, the user can select to download the complete global grid file or select an area - either via an interactive map or by defining co-ordinates in a dialog box.

There have been over 3,800 downloads of data from the GEBCO One Minute Grid since the launch of this application. This includes 1,240 downloads of the full global grid file.

This application improves on an earlier version, released in January 2004, which allowed access to the grid in the form of 20 degree square tiles.

6. Poster displays

A poster was produced to illustrate GEBCO's work and the Natural Environment Research Council's (NERC) involvement in GEBCO. It was displayed at a NERC-sponsored reception, held as part of the Scientific Committee on Oceanic Research's (SCOR) Summit of International Marine Research Projects, held in London in December 2006.

http://www.ngdc.noaa.gov/mgg/gebco/posters/gebco_poster_20061219.pdf

To demonstrate the progress with the initiative to improve the GEBCO One Minute Grid in shallow water regions, using data supplied by IHO Member States, a poster was produced for display at the XVIIth International Hydrographic Conference, held in Monaco in May 2007.

http://www.ngdc.noaa.gov/mgg/gebco/posters/gebco_shallow_bath_20070501.pdf

7. Nippon Foundation/GEBCO Training Project student visit

In July 2007, BODC hosted a two-week visit by Nippon Foundation/GEBCO Training Project student, Leonardo Tun Humbert. During his visit, Leonardo worked on the production of a gridded bathymetry data set for an area off Peru and Ecuador. This work

is being done as part of a project, in collaboration with other GEBCO Training Project colleagues.

Leonardo's trip to the UK also included a visit to the National Oceanography Centre, Southampton (NOCS), where Colin Jacobs and Peter Hunter demonstrated the various techniques that they use to assess and quality control bathymetric survey data.

8. Web page development

A web page has been produced to advertise the availability of the GEBCO world map.

http://www.bodc.ac.uk/projects/international/gebco/gebco_world_map/

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