

# Report of the GEBCO Digital Atlas Manager (October 2012 – October 2013)

This report covers the work carried out at the British Oceanographic Data Centre (BODC) for GEBCO since the previous GEBCO meetings in October 2012.

Annex I includes statistics on the distribution of GEBCO's data sets. Annex II includes information on access to GEBCO's web site.

## Status of GEBCO's global 30 arc-second interval grid

During the year, work has been done to finalise a new release of the GEBCO 30 arc-second grid. In addition to the list of updates reported at the last GEBCO meeting, we have now included version 1 of the International Bathymetric Chart of the Southern Ocean (IBCSO) for the area south of 60°S; extended the coverage of Olex data for the Northwest European Shelf area (from 0°E to 15° 30'E) and fixed a bug in the GEBCO grid due to the erroneous inclusion of 'Sandy Island' (Coral Sea, South Pacific Ocean area) in the existing GEBCO grid.

This update work is now completed and we are in the process of making the grid available for download via the internet. Through discussions with GEBCO colleagues it was decided to call this release of the grid: **The GEBCO\_2013 Grid**.

The new grid includes the following updates:

- International Bathymetric Chart of the Arctic Ocean (IBCAO) V3
- International Bathymetric Chart of the Southern Ocean (IBCSO) V1
- Waters around Australia: Australian Bathymetry and Topography Grid, June 2009
- Bathymetry data for all ocean regions: From the Global Multi-Resolution Topography (GMRT) synthesis, provided by the Lamont-Doherty Earth Observatory at Columbia University
- South China Sea region: update based on sounding data extracted from Electronic Navigation Charts (ENC), provided by the East Asia Hydrographic Commission
- North American Great Lakes: Bathymetric grids provided by the US National Oceanic and Atmospheric Administration (NOAA), US National Geophysical Data Center (NGDC)
- North Atlantic Ocean, Gulf of Cadiz region: Bathymetric compilation produced under the European Social Fund (ESF) EuroMargins SWIM project "Earthquake and Tsunami hazards of active faults at the South West Iberian Margin: deep structure, high-resolution imaging and paleoseismic signature"
- Indian Ocean, region off Sumatra: Bathymetric survey carried out by HMS Scott in 2005
- Waters off the West Coast of Africa: update based on bathymetry data from Olex (between 8°N and 34°N)

- Northwest European Continental Shelf area: update based on bathymetry data from Olex AS. Olex data coverage extended from 0°E to 15° 30'E
- South Pacific Ocean, Coral Sea region, update to correct an error in the GEBCO grid due to the inclusion of an erroneous island ("Sandy Island") using data supplied by Geoscience Australia (on behalf of the data set originators at the University of Sydney) for data from R/V Southern Surveyor (survey code SS2012\_v06) and The Royal Australian Navy, Australian Hydrographic Service for data from hydrographic surveys of the region.

### **Making GEBCO's grids available**

The new GEBCO grid will be made available in netCDF forms as both two-dimensional (2D) and one-dimensional (1D) arrays of signed 2-byte integers. The 1D grid file format is aimed specifically for use with the GEBCO Digital Atlas software interface and GEBCO Grid Display software. The 2D grids are suitable for direct import into GIS-type applications and other software systems.

This release of the grid will use the NetCDF Climate and Forecast (CF) metadata conventions (<http://cf-pcmdi.llnl.gov/>) for the 2D grids. This includes the use of a 'standard\_name' and/or 'long\_name' to describe the variables in the netCDF file, i.e. the elevation value and latitude and longitude values. The CF community maintains a list of 'standard\_names' to describe variables: <http://cf-pcmdi.llnl.gov/documents/cf-standard-names/>, this helps with operability between data sets, i.e. comparing like with like. For example, the 'z' value of the grid has been given the standard\_name: "height\_above\_reference\_ellipsoid" .

The grid will be made available via the internet and also as part of the GEBCO Digital Atlas. Via the internet, the grid will be available as a complete global grid file or for user-defined sub areas. The existing web application for delivering GEBCO's grids has been updated and extended, allowing the 'cutting' of user-selected areas to be done in the background so that the data can be collected later. This is useful when selecting data for a large geographic area.

A new version of the GEBCO Web Map Service (WMS), based on the GEBCO\_2013 Grid, will be made available. See the metadata work section below for further information on the development of the WMS.

### **Metadata work**

A Source Identifier (SID) Grid is made available to accompany the GEBCO global 30 arc-second grid. The SID grid shows which of the corresponding grid cells in the GEBCO grid are based on soundings or existing grids and which are interpolated. At present, the SID grid is largely made available as a 'yes/no' grid, i.e. cells are coded as constrained by data or interpolated.

We have been working to extend this so that information on the survey used to develop the grid at that location is made available. This would provide some quality assurance information to users and provide attribution to data contributors.

In collaboration with GEBCO colleagues, a set of attribute fields has been defined – covering the type of metadata that we would like to make available for each SID record. There are currently over 8,000 SID records.

We have been working to populate the metadata fields and also on a mechanism for making the metadata information available via web services. Building on an existing system at BODC, we have created a set of dummy metadata records which can be accessed via the internet in xml:

<http://vocab.nerc.ac.uk/collection/GGS/current>

It is aimed that this information will be accessible through GEBCO's WMS and also displayed on GEBCO's web site.

A demonstration web map service has been created that includes the GEBCO 30 arc second grid and SID grid as separate layers. Both layers can be plotted using an Open Geospatial Consortium (OGC) WMS 'getmap' request. The SID layer can be queried using an OGC WMS 'getfeatureinfo' request. This will return a link to the metadata information about the queried SID grid cell.

### **Miscellaneous activities**

BODC was pleased to host a lab visit by Nippon Foundation/GEBCO Scholar, Lt Cdr Lim Siong Hui in July 2013.

I attended the EMODnet Hydrography (<http://www.emodnet-hydrography.eu/>) Phase 2 Kick-off Meeting in Lisbon, Portugal, June 2013 and gave a presentation about GEBCO.

### **Access to GEBCO's data sets and products**

GEBCO's bathymetric data sets are made available, on behalf of GEBCO, by BODC via the internet and on DVD as part of the GEBCO Digital Atlas.

Since the last GEBCO meetings there have been:

- over 11,000 requests for downloads of GEBCO's gridded data sets (GEBCO\_08 Grid, Source Identifier (SID) Grid and GEBCO One Minute Grid)
- over 2,500 requests for GEBCO's viewing software for displaying and accessing data from GEBCO's grids

During the year 102 copies of the GDA have been distributed. This includes 48 copies sold and 54 complimentary copies distributed. Of these complimentary copies, 52 have been given to participants on IODE training programmes. Royalties contributed to GEBCO from the sale of the GDA for 2012 amounted to £3,900. This money has been transferred to the GEBCO account held at Stockholm University.

We have answered 96 email enquiries relating to GEBCO's data sets and products. Some users provide feedback or ask permission to use our data in their products and services. From information supplied by users over the last 12 months, the following are just some of the ways that GEBCO's data sets are being used:

- GEBCO\_08 Grid used in developing a printed world map

- Use of the GEBCO world map by an Austrian newspaper in a special issue about life in the sea, deep-sea exploration and natural resources
- GEBCO\_08 Grid used to develop a new hydrodynamic model of the Brazilian coastline and adjacent waters
- GEBCO\_08 Grid used to build a model for an internal research project on the South China Sea which would subsequently be used to create a commercially available metocean database
- GEBCO\_08 grid to support the planning and design of offshore wind farms in North European waters

See Annex I for further information on data access statistics.

## **GEBCO's web site**

Since July 2008, GEBCO's web site has been maintained and updated on behalf of GEBCO by BODC. It can be accessed at [www.gebco.net](http://www.gebco.net).

In addition to general site maintenance and request for content updates by GEBCO colleagues, the following pages/sections have been added to GEBCO's web site during the year:

- the addition of 'news and events' items: [http://www.gebco.net/about\\_us/news\\_and\\_events/](http://www.gebco.net/about_us/news_and_events/) and [http://www.gebco.net/about\\_us/news\\_and\\_events/index\\_2012.html](http://www.gebco.net/about_us/news_and_events/index_2012.html)
- presentation and poster information for the Seventh GEBCO Science Day: [http://www.gebco.net/about\\_us/gebco\\_science\\_day/](http://www.gebco.net/about_us/gebco_science_day/)
- a new page for the GEBCO Cook Book: [http://www.gebco.net/data\\_and\\_products/gebco\\_cook\\_book/](http://www.gebco.net/data_and_products/gebco_cook_book/)
- the 'meetings and minutes' pages have been updated: [http://www.gebco.net/about\\_us/meetings\\_and\\_minutes/](http://www.gebco.net/about_us/meetings_and_minutes/)

Since the last GEBCO meetings, we have had over 79,700 visitors to site, accessing 243,000 web pages.

We have also added 17 posts to GEBCO's Facebook page: <http://www.facebook.com/GEBCO>

See Annex II for further information on web site statistics.

BODC gratefully acknowledges the receipt of funding (5K Euro) for GEBCO web site maintenance work (part of the IHO funding for GEBCO work plan tasks).

P. Weatherall (2nd October 2013)

# Annex I

## Distribution of GEBCO's bathymetric data sets and products

This includes:

- Downloads of GEBCO's gridded data sets from the Internet
- Downloads of the Grid Viewing Software
- Distribution of the GEBCO Digital Atlas on DVD

## Internet downloads of GEBCO's gridded bathymetric data sets

Numbers of downloads are given until the 16<sup>th</sup> September 2013, a selected 'cut off' date used for calculating the statistics for this report as presented below.

### GEBCO\_08 Grid

**From the data set's release in 29<sup>th</sup> January 2009 to 16<sup>th</sup> September 2013**

- Total number of downloads: 25,624
- Full global data set: 8,301
- User-selected sub-regions of the global grid: 17,323

**Since last year's meeting: 1<sup>st</sup> October 2012 to 16<sup>th</sup> September 2013**

- Total number of downloads: 6,630
- Full global grid: 2,196
- User-selected sub-regions of the global grid: 4,434

### GEBCO\_08 Source Identifier Grid

**From the data set's release in 27<sup>th</sup> November 2009 to 16<sup>th</sup> September 2013**

- Total number of downloads: 6,137
- Full global data set: 3,020
- User-selected sub-regions of the global grid: 3,117

**Since last year's meeting: 1<sup>st</sup> October 2012 to 16<sup>th</sup> September 2013**

- Total number of downloads: 1,886
- Full global grid: 882
- User-selected sub-regions of the global grid: 1,004

### GEBCO One Minute Grid

**Since 1<sup>st</sup> January 2009 to 16<sup>th</sup> September 2013**

- Total number of downloads: 11,205
- Full global data set: 5,211

- User-selected sub-regions of the global grid: 5,994

**Since last year's meeting: 1<sup>st</sup> October 2012 to 16<sup>th</sup> September 2013**

- Total number of downloads: 2,664
- Full global data set: 1,260
- User-selected sub-regions of the global grid: 1,404

**Internet downloads of viewing software for displaying and accessing data from GEBCO's grids**

- Total number of downloads since January 2009: 12,899
- Total number of downloads since October 2012: 2,588

**Distribution of the GEBCO Digital Atlas (GDA)**

Since 01 October 2012, 102 copies of the GDA have been distributed. This includes 48 copies sold and 54 complimentary copies. This year, 52 copies have been given to participants on IODE training courses.

Since its release in 2003, 1,586 copies of the GDA have been distributed.

The net income received from sales of the GDA is shared equally between BODC and GEBCO. Royalties contributed to GEBCO from the sale of the GDA for 2012 amounted to £3,900. This makes a total of £81,526 since the re-release of the GDA in 2003.

Royalties contributed to GEBCO for the sale of the GDA per year:

<b>Year</b>	<b>Amount</b>
2003	£10,222
2004	£9,053
2005	£8,474
2006	£12,433
2007	£8,754
2008	£8,216
2009	£11,580
2010	£5,720
2011	£3,174
2012	£3,900

## Annex II

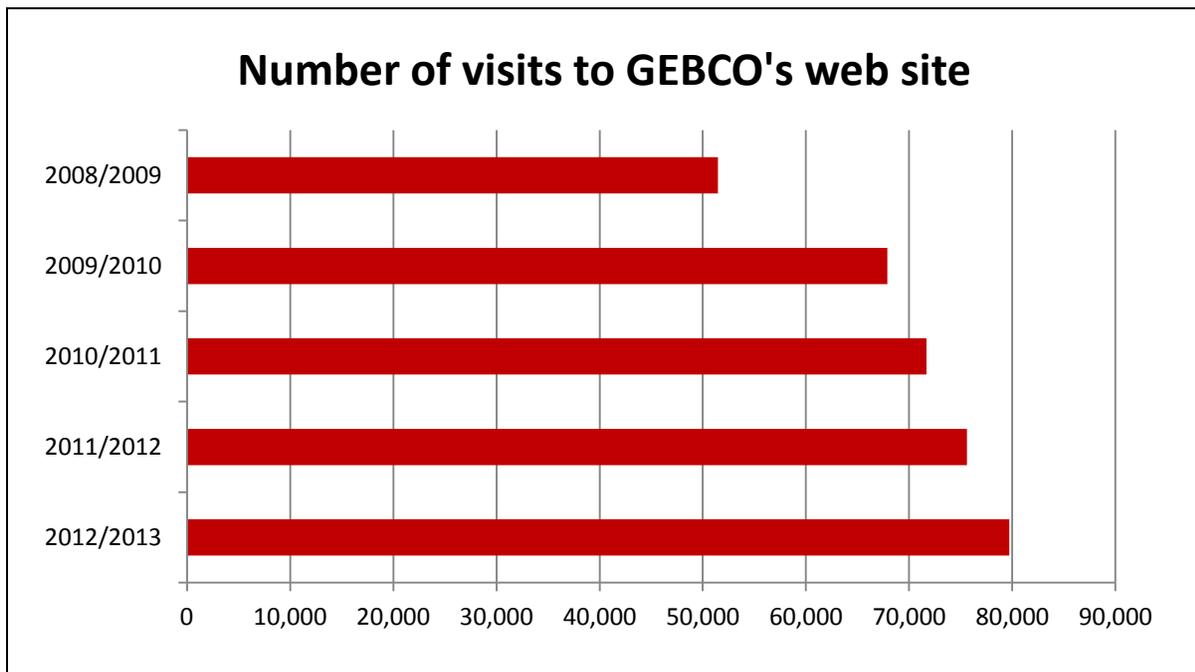
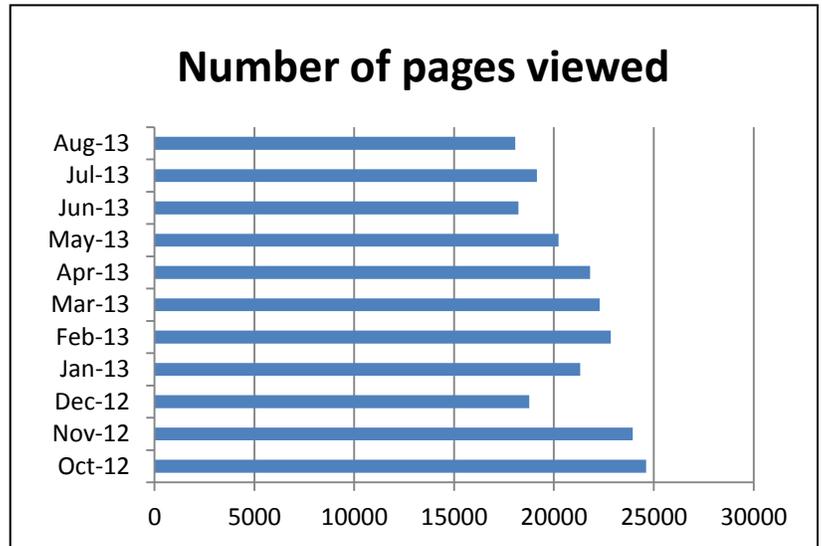
GEBCO's web site was re-launched in July 2008. The web site is maintained, on behalf of GEBCO, by the British Oceanographic Data Centre (BODC).

### 1. Visits to GEBCO's web site

The following tables and diagrams provide statistics about access to GEBCO's web site ([www.gebco.net](http://www.gebco.net)) for the reporting period 1<sup>st</sup> October 2012 to 13th September 2013.

In summary, there were over 79,700 visits to the site, viewing over 243,000 pages.

Month	Number of pages viewed
Oct-12	24,613
Nov-12	23,946
Dec-12	18,771
Jan-13	21,320
Feb-13	22,852
Mar-13	22,283
Apr-13	21,818
May-13	20,237
Jun-13	18,219
Jul-13	19,148
Aug-13	18,068



## 2. Number of visits to individual GEBCO web pages

The following table details the number of visits to the 'top 20' most popular pages on GEBCO's web site since the last GEBCO meeting in October 2012. Information is also included to show if a page has increased or decreased in popularity when compared with the period between GEBCO's meetings in 2011 and 2012.

Explanation of terms used:

<b>Ranking in 'top 20' for 2012/2013</b>	From the web page access statistics for the period between GEBCO's meetings in 2012 and 2013 – the pages are ranked 1 to 20 with 1 being the most popular
<b>Ranking in 'top 20' for 2011/2012</b>	From the web page access statistics for the period between GEBCO's meetings in 2011 and 2012 – the pages are ranked 1 to 20 with 1 being the most popular
<b>Page title and URL</b>	Title of the GEBCO web page viewed with URL
<b>No. page views (2012/2013)</b>	The total number of pages viewed since the last GEBCO meeting in October 2012. Repeated views of a single page are counted.
<b>No. page views (2011/2012)</b>	The total number of pages viewed between GEBCO's meetings in 2011 and 2012.
<b>Average time on page (minutes)</b>	The average amount of time that visitors spent viewing this set of pages or page.

<b>Ranking in 'top 20' for 2012/2013</b>	<b>Ranking in 'top 20' for 2011/2012</b>	<b>Page title and URL</b>	<b>No. of page views (2012/2013)</b>	<b>No. of page views (2011/2012)</b>	<b>Avg. Time on Page (minutes)</b>
1	1	<b>Gridded bathymetry data*</b> www.gebco.net/data_and_products/gridded_bathymetry_data/index.html	40,726	37,202	01:30
2	2	<b>GEBCO home page</b> www.gebco.net /index.html	39,086	36,067	01:08
3	3	<b>GEBCO world map</b> www.gebco.net/data_and_products/gebco_world_map/index.html	27,164	29,279	01:05
4	4	<b>GEBCO Digital Atlas</b> www.gebco.net/data_and_products/gebco_digital_atlas/index.html	11,240	12,090	00:48
5	6	<b>External link to grid data download page*</b> www.bodc.ac.uk/data/online_delivery/gebco/index.html	9,471	8,115	08:04
6	5	<b>GEBCO's data and products</b> www.gebco.net/data_and_products/index.html	8,855	8,527	00:21
7	12	<b>Web map service overview page</b> www.gebco.net/data_and_products/gebco_web_services/web_map_service/index.html	6,643	3,681	03:00
8	8	<b>GEBCO grid display software</b>	6,571	5,732	01:17

		<a href="http://www.gebco.net/data_and_products/grid_display_software/index.html">www.gebco.net/data_and_products/grid_display_software/index.html</a>			
9	**	<b>Imagery index page</b> <a href="http://www.gebco.net/data_and_products/imagery/index.html">www.gebco.net/data_and_products/imagery/index.html</a>	6,450	-	00:24
10	10	<b>Undersea feature names</b> <a href="http://www.gebco.net/data_and_products/undersea_feature_names/index.html">www.gebco.net/data_and_products/undersea_feature_names/index.html</a>	5,677	5,251	01:35
11	9	<b>General interest</b> <a href="http://www.gebco.net/general_interest/index.html">www.gebco.net/general_interest/index.html</a>	5,564	5,513	00:43
12	13	<b>Grid imagery</b> <a href="http://www.gebco.net/data_and_products/gridded_bathymetry_data/grid_plots/index.html">www.gebco.net/data_and_products/gridded_bathymetry_data/grid_plots/index.html</a>	3,447	3,107	01:15
13	7	<b>Contacts information</b> <a href="http://www.gebco.net/about_us/contact_us/index.html">www.gebco.net/about_us/contact_us/index.html</a>	3,238	5,836	02:04
14	15	<b>General interest – FAQ page</b> <a href="http://www.gebco.net/general_interest/faq/index.html">www.gebco.net/general_interest/faq/index.html</a>	3,195	2,711	02:25
15	***	<b>NF/GEBCO Training project page</b> <a href="http://www.gebco.net/training/training_project/index.html">www.gebco.net/training/training_project/index.html</a>	2,941	-	02:51
16	16	<b>Regional mapping projects overview</b> <a href="http://www.gebco.net/regional_mapping/mapping_projects/index.html">www.gebco.net/regional_mapping/mapping_projects/index.html</a>	2,819	2,700	01:37
17	19	<b>Web services overview page</b> <a href="http://www.gebco.net/data_and_products/gebco_web_services/index.html">www.gebco.net/data_and_products/gebco_web_services/index.html</a>	2,656	2,423	00:18
18	***	<b>Visualisations of GEBCO's bathymetric data sets</b> <a href="http://www.gebco.net/general_interest/bathymetry_visualisations.html">www.gebco.net/general_interest/bathymetry_visualisations.html</a>	2,532	-	00:32
19	11****	<b>GEBCO world map – large JPEG image</b> <a href="http://www.gebco.net/data_and_products/gebco_world_map/images/gda_world_map_large.jpg">www.gebco.net/data_and_products/gebco_world_map/images/gda_world_map_large.jpg</a>	2,267	3,877	04:16
20	17	<b>SCRUM information page</b> <a href="http://www.gebco.net/regional_mapping/index.html">www.gebco.net/regional_mapping/index.html</a>	2,199	2,567	00:22

\* See Annex I for details on Internet downloads of GEBCO's gridded bathymetric data sets.

\*\* This is a new web page.

\*\*\* The page was not included in last year's 'top 20' list of most popular web pages.

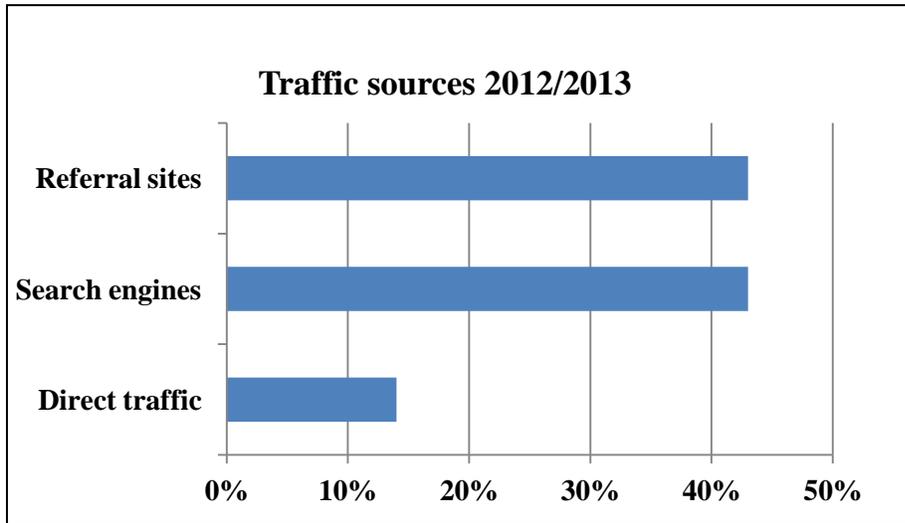
\*\*\*\* Please note that this map image has now been replaced by an updated version.

### 3. Traffic sources to GEBCO's web site

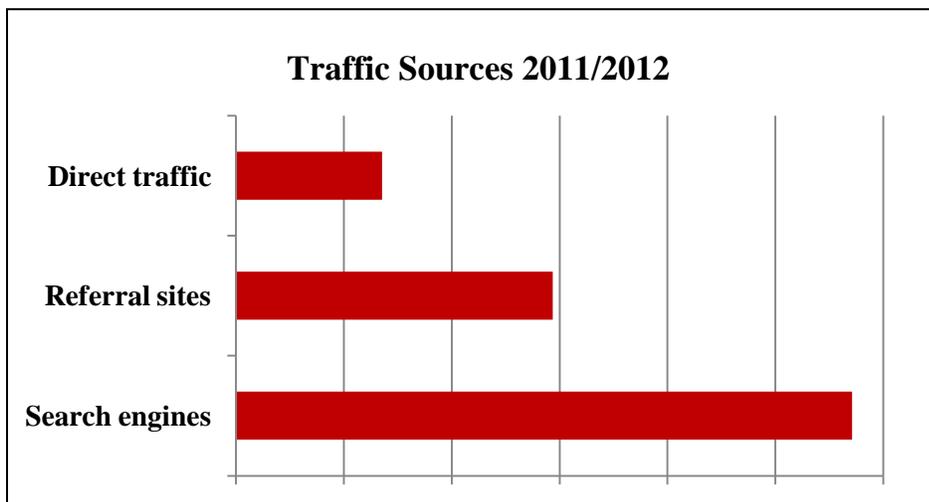
The following section details the routes used to find GEBCO's web pages.

Explanation of terms used:

Direct traffic	The user has entered the URL of a GEBCO web page directly
Search engines	Web pages found by searching using a keyword in a search engine such as Google or Yahoo etc.
Referral sites	Web page found by following a link from another web site



The above graph shows the routes used to find pages on GEBCO's web site since the last GEBCO meeting. For comparison, the same information is shown in the graph below for the previous reporting year. To note, we are now getting more 'traffic' from referral sites.



The table below lists the top 15 most popular routes for people to find GEBCO's web pages.

Explanation of terms used:

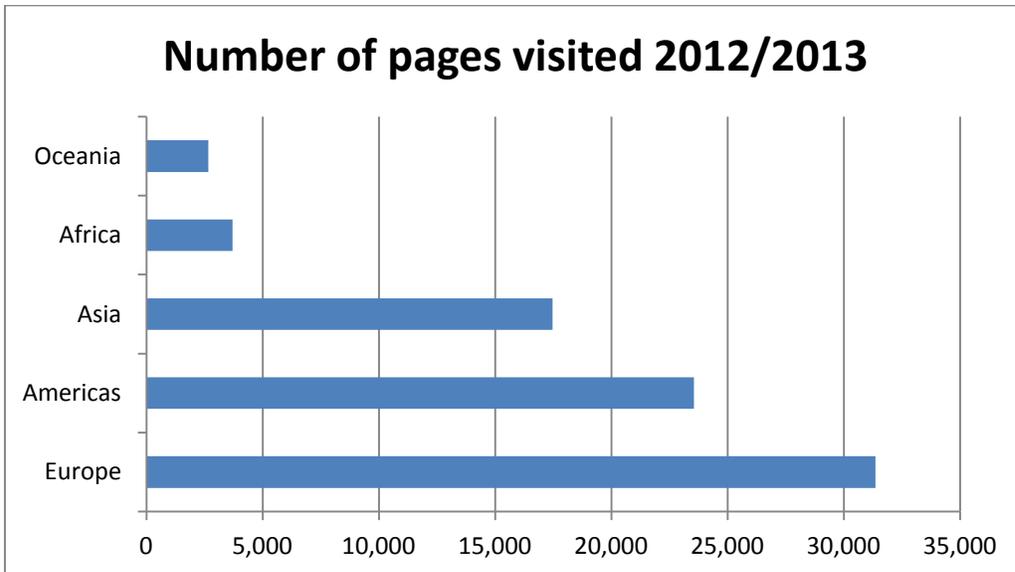
<b>Ranking in 'top 15' for 2012/2013</b>	From the web page access statistics for the period between GEBCO's meetings in 2012 and 2013 – the pages are ranked 1 to 15 with 1 being the most popular method for finding GEBCO's web site.
<b>Ranking in 'top 15' for 2011/2012</b>	From the web page access statistics for the period between GEBCO's meetings in 2011 and 2012 – the pages are ranked 1 to 15 with 1 being the most popular method for finding GEBCO's web site.
<b>Source</b>	The source of traffic to the site, e.g. the name of the referral site or search engine:
<b>Medium</b>	The type of traffic: Organic = search engine Referral = from an external web link (none) = direct – i.e. the user has entered the URL of a GEBCO web page
<b>Visits</b>	The number of visits to the site
<b>Pages/visit</b>	The average number of pages per visit
<b>Average time on site (minutes)</b>	The average amount of time spent on the site in minutes

<b>Ranking in 'top 15' for 2012/2013</b>	<b>Ranking in 'top 15' for 2011/2012</b>	<b>Source / Medium</b>	<b>Visits (2012/2013)</b>	<b>Pages / visit (2012/2013)</b>	<b>Average time on site (minutes)</b>
1	1	google / organic	39,156	3.08	03:15
2	2	(direct) / (none)	11,989	2.97	03:16
3	3	ngdc.noaa.gov / referral	3,275	4.37	03:43
4	*	worldmapfinder.com / referral	2,318	1.33	00:31
5	4	google.com / referral	1,920	1.68	00:53
6	6	iho.int / referral	1,162	4.11	04:24
7	5	en.wikipedia.org / referral	1,024	4.01	03:16
8	*	marineregions.org / referral	965	3.35	04:13
9	10	openseamap.org / referral	831	4.57	03:04
10	12	google.co.uk / referral	759	1.51	00:33
11	7	bodc.ac.uk / referral	691	4.09	03:30
12	9	bing / organic	586	3.05	02:29
13	14	facebook.com / referral	522	3.15	04:51
14	*	maps.ngdc.noaa.gov / referral	515	3.63	03:07
15	8	yahoo / organic	483	3.47	03:41

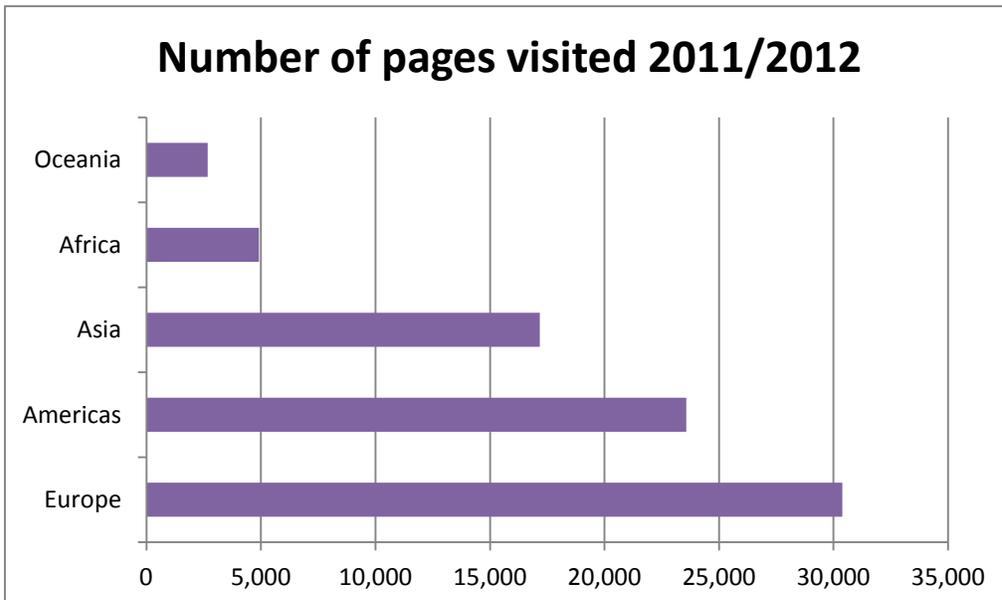
\* The traffic source was not included in last year's 'top 15' list.

#### 4. Geographic distribution of Internet Protocol (IP) addresses accessing GEBCO's web site

The graph below outlines the numbers per continent of IP addresses accessing GEBCO's web site since the last GEBCO meeting.



For comparison, the graph below gives the same information for the previous reporting period (2011/2012). The numbers of visits to GEBCO's web site per continent remains largely static; there has been a slight decrease in the visits from IP addresses in Africa over the last twelve months and a slight increase in those from Europe.



The table below details the geographic distribution by country (top 20 'number of visits' listed) of IP addresses accessing GEBCO's web site.

Explanation of terms used:

<b>Visits to GEBCO's web site ranking in 'top 20' for 2012/2013</b>	From the web page access statistics for the period between GEBCO's meetings in 2012 and 2013 – the pages are ranked 1 to 15 with 1 being the most popular
<b>Visits to GEBCO's web site ranking in 'top 20' for 2011/2012</b>	From the web page access statistics for the period between GEBCO's meetings in 2011 and 2012 – the pages are ranked 1 to 15 with 1 being the most popular
<b>Country/Territory</b>	The name of the country or territory of the origin of the IP address accessing GEBCO's web site
<b>Visits</b>	The total number of visits to the site from this country/territory
<b>Pages/visit</b>	The number of pages viewed per visit
<b>Average time on site (minutes)</b>	The average amount of time that visitors spent on the site

<b>Visits to GEBCO's web site ranking in 'top 20' for 2012/2013</b>	<b>Visits to GEBCO's web site ranking in 'top 20' for 2011/2012</b>	<b>Country / Territory</b>	<b>Number of visits to site in 2012/2013</b>	<b>Number of visits to site in 2011/2012</b>	<b>Pages / visit (2012/2013)</b>	<b>Average visit duration (minutes) 2012/2013</b>
1	1	United States	15,818	14,644	2.79	02:23
2	2	United Kingdom	7,698	7,885	2.98	02:49
3	4	France	4,145	3,075	3.3	03:17
4	3	Germany	3,373	3,618	3.55	03:17
5	5	India	2,804	2,880	2.77	02:45
6	9	Spain	2,572	1,993	3.82	03:57
7	6	Canada	2,535	2,395	2.99	02:58
8	8	Japan	2,529	2,076	3.22	03:00
9	13	Indonesia	2,245	1,638	3.57	05:00
10	10	Italy	2,236	1,770	3.82	03:01
11	7	Russia	2,040	2,269	3.18	03:04
12	11	Australia	1,976	1,751	2.86	02:46
13	12	China	1,811	1,673	3.53	04:39
14	14	Brazil	1,300	1,248	3.23	03:13
15	15	Netherlands	1,129	984	3.36	02:46
16	16	Mexico	1,046	971	3.76	04:02
17	17	South Korea	1,018	938	3.38	03:25
18	*	(not set)	998	-	2.35	03:22
19	18	Norway	903	872	3.55	03:54
20	*	Portugal	864	-	3.52	03:10

\* This country was not included in last year's 'top 20' number of visits from IP addresses located in particular countries.

## **5. GEBCO's Facebook page (<https://www.facebook.com/GEBCO>)**

During the year we have posted 17 news items to GEBCO's Facebook page. There have been 317 likes of these pages compared with 233 likes for the previous year.