

GEBCO Digital Atlas Manager's Report

Submitted by UK / British Oceanographic Data Centre (BODC) of the UK National Oceanography Centre (NOC)

SUMMARY

Executive Summary: This report covers the work carried out at the British Oceanographic Data Centre of the UK National Oceanography Centre (NOC) for GEBCO since the previous GEBCO meetings in November 2017. Annex I includes statistics on the distribution of GEBCO's data sets. Annex II includes information on access to the GEBCO and Nippon Foundation GEBCO Seabed 2030 web sites.

Action to be taken:

Related documents: None

To note: statistics relating to the number of downloads of GEBCO's data sets and access to its web sites are given for the reporting period: 1st October 2017 – 30th September 2018. This is the approximate 12 months since the last GDA manager's report to the Guiding Committee.

1. Activities of the Global Centre for the Nippon Foundation GEBCO Seabed 2030 Project

In February 2018, BODC, a part of the National Oceanography Centre, Southampton, UK, became the Global Centre for the Nippon Foundation GEBCO Seabed 2030 Project. Since then, most of the GEBCO activity at BODC has been carried out as a part of the project. The primary role of the Global Centre is to compile the global GEBCO grid from data provided by the Seabed 2030 Regional Centres, and to maintain and deliver the grid on behalf of the GEBCO project.

Centre Staff:

- Dr Helen Snaith, Head of the Global Centre
- Ms Pauline Weatherall, GEBCO Digital Atlas Manager

Plus additional IT support from BODC's IT team.

Development of the next release of the GEBCO global grid

We have been working with colleagues at the four Seabed 2030 Regional Centres on the development of the next GEBCO global grid.

The draft 'GEBCO_2017' Grid, as described in the GDA managers report to 34th Guiding Committee meeting in 2017, has been used as a base for the new grid and the Regional Centres are each providing updates for their areas for inclusion into the GEBCO global grid, incorporating significantly increased volume of source data. It is expected that the next GEBCO grid will be at 15 arc-second intervals and it is aimed for the release by end of 2018.

Updating the web application for delivering the GEBCO global grid

The existing web application for delivering the current global GEBCO grid (30 arc-second intervals) is being updated to allow effective delivery of the new grid at 15 arc-seconds. Further updates to the application are being planned to help with ease of access to the data sets.

Supporting the work on the Nippon Foundation-GEBCO Seabed 2030 Project

As part of its role as the Global Centre, BODC has also provided support for the Seabed 2030 project through:

- Working with colleagues at the Arctic and North Pacific Regional Centre to establish a baseline value of the percentage of the oceans mapped, based on the source bathymetry data included in the GEBCO_2014 Grid
- Working with Regional Centre colleagues to establish the technical details of the structure of the GEBCO grid to be produced through the Seabed 2030 project, i.e. the grid interval, registration and data type and metadata requirements to describe the source data sets included in the GEBCO grid
- Supporting the Project Director in reporting on project activities and creating project work plans.
- Maintenance and update of a project wiki for collaboration
- Setting up Seabed 2030 email addresses and joint drive space for the Project Team
- Archiving project related documentation, reports and presentations
- Arranging Project Team Skype meetings
- Adding news items to the Seabed 2030 web site

Outreach:

Centre staff gave presentations about the Nippon Foundation GEBCO Seabed 2030 Project to UK organisations and to the international community:

- UK Hydrographic Office, January 2018
- North Sea Regional Hydrographic Commission, March 2018
- Southern Region of the Hydrographic Society (UK), May 2018
- Poster abstract about Seabed 2030 accepted for IMDIS 2018 (International Conference on Marine Data and Information Systems) – November 2018

Attended meetings on behalf of the project:

- Atlantic Seabed Mapping International Working Group (ASMIWG), May 2018

Publications:

- Contributed to the SeaBed 2030 concept paper: Mayer, L.; Jakobsson, M.; Allen, G.; Dorschel, B.; Falconer, R.; Ferrini, V.; Lamarche, G.; Snaith, H.; Weatherall, P. The Nippon Foundation — GEBCO Seabed 2030 Project: The Quest to See the World's Oceans Completely Mapped by 2030. *Geosciences* 2018, 8, 63.
- Lead contributor to an OceanObs '19 community white paper

2. Maintenance of GEBCO's web sites

GEBCO's web site (www.gebco.net) and the sub-web site for the Nippon Foundation-GEBCO Seabed 2030 Project (<https://seabed2030.gebco.net>) are maintained and updated at BODC. Since the last GEBCO Guiding Committee meeting, over 327,600 web pages have been accessed on GEBCO's web site.

Following feedback given at the last GEBCO meeting, BODC has undertaken a project to update the GEBCO and Seabed 2030 web sites. An external web site design company was engaged to re-design the site and to provide web page templates. These templates were then implemented and content developed at the Centre. It is aimed that the revised web sites will be published towards the end of October 2018.

3. Access to GEBCO's bathymetric data sets and projects

GEBCO's gridded data sets

GEBCO's bathymetric data sets are made available, on behalf of GEBCO, by BODC via the internet (www.gebco.net/data_and_products/gridded_bathymetry_data/) and on DVD as part of the GEBCO Digital Atlas (GDA).

During the reporting period, October 2017 to end September 2018, there have been over 36,600 downloads of GEBCO's gridded data sets.

Downloads of GEBCO's grids from October 2017 to end September 2018, split by grid type:

- GEBCO_2014 Grid: 30,229
- GEBCO_2014 SID Grid: 3,726
- GEBCO One Minute Grid: 2,674

Statistics showing the breakdown of data downloads by grid export format are given in Annex I.

Web Map Services (WMS)

On behalf of GEBCO, BODC makes available a number of WMS based on GEBCO's gridded data sets. There have been over 6,800,000 requests to the service in 2018. This includes request to the services from applications, such as external web sites.

Further information is given in Annex I.

GEBCO Digital Atlas (GDA)

BODC distributes the GEBCO Digital Atlas – a collection of GEBCO’s bathymetric data sets accompanied by data viewing and access software on DVD, on behalf of GEBCO.

During 2017, six copies of the GDA were distributed. This includes four copies sold.

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 GEBCO Grid Viewing Software
- Distribution of the GEBCO Digital Atlas on DVD

To note: statistics relating to the number of downloads of GEBCO's data sets and access to its web sites are given for the reporting period: 1st October 2017 – 30th September 2018. This is the approximate 12 months since the last GDA manager's report to the Guiding Committee.

Internet downloads of GEBCO's gridded bathymetric data sets

Total number of downloads of GEBCO's gridded data sets: 36,629

- GEBCO_2014 Grid: 30,229
- GEBCO_2014 SID Grid: 3,726
- GEBCO One Minute Grid: 2,674

GEBCO's grids are available to download in netCDF, Esri ASCII raster and Data GeoTiff formats.

The table below shows the number of downloads per export format for each data set during the reporting period.

Data set	1D NetCDF	CF NetCDF	Esri ASCII raster	Data Geotiff
GEBCO_2014	2,809	7,923	10,181	9,316
GEBCO_2014 SID	492	960	1,197	1,077
GEBCO One Minute Grid	899	1,775	-	-

Explanation of formats:

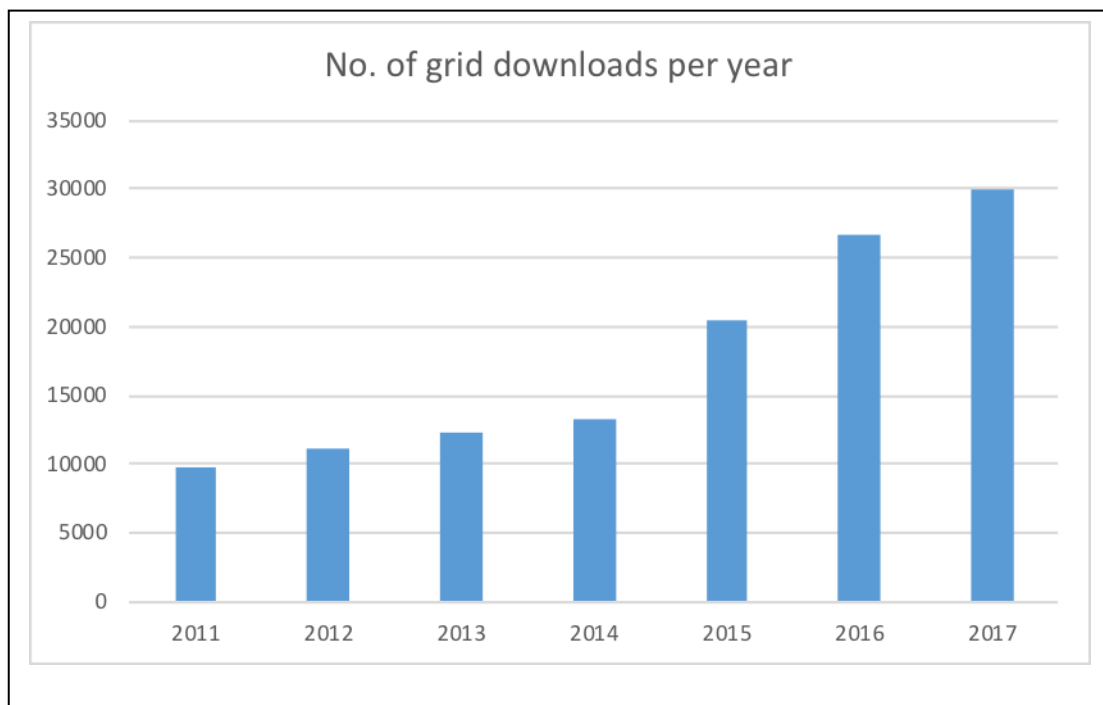
In netCDF format, GEBCO's grids are available in the form of both two-dimensional (2D) and one-dimensional (1D) arrays of signed 2-byte integers. The 2D gridded data set uses the netCDF Climate and Forecast (CF) Metadata Convention. The 1D array grids are, primarily, for use with GEBCO's Grid Display and GEBCO Digital Atlas (GDA) software packages and so are only available as a global grid.

Esri ASCII raster format is an ASCII format developed for the export/exchange of Esri ARC/INFO rasters, it is used as an input format for a number of software packages.

The GeoTiff format contains geo-referencing (geographic extent and projection) information embedded within a Tiff file. The GEBCO_2014 Grid and SID grids are made available as single-channel INT16 (two byte signed integer) data values for user-defined areas in GeoTiff format.

Comparisons of number of downloads of GEBCO's gridded data sets per year

The graph below shows the number of downloads per year of GEBCO's global 30 arc-second gridded data set.



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

The software is a 'cut down' version of the GEBCO Digital Atlas software interface. It can be used to view and access data from GEBCO's global gridded data sets.

http://www.gebco.net/data_and_products/grid_display_software/

Total number of downloads for the reporting period: 584

Access to GEBCO's Web Map Services (WMS)

On behalf of GEBCO, BODC have developed a number of WMS (a means of accessing geo-referenced map images over the internet) based on the GEBCO_2014 Grid:

www.gebco.net/data_and_products/gebco_web_services/web_map_service/.

This includes imagery based on the GEBCO_2014 bathymetric grid as shaded relief and also as a 'flat map' coloured-coded for depth. The flat-map image also supports 'GetFeatureInfo' requests, allowing users to query the elevation value in each pixel (based on data from the GEBCO_2014 Grid).

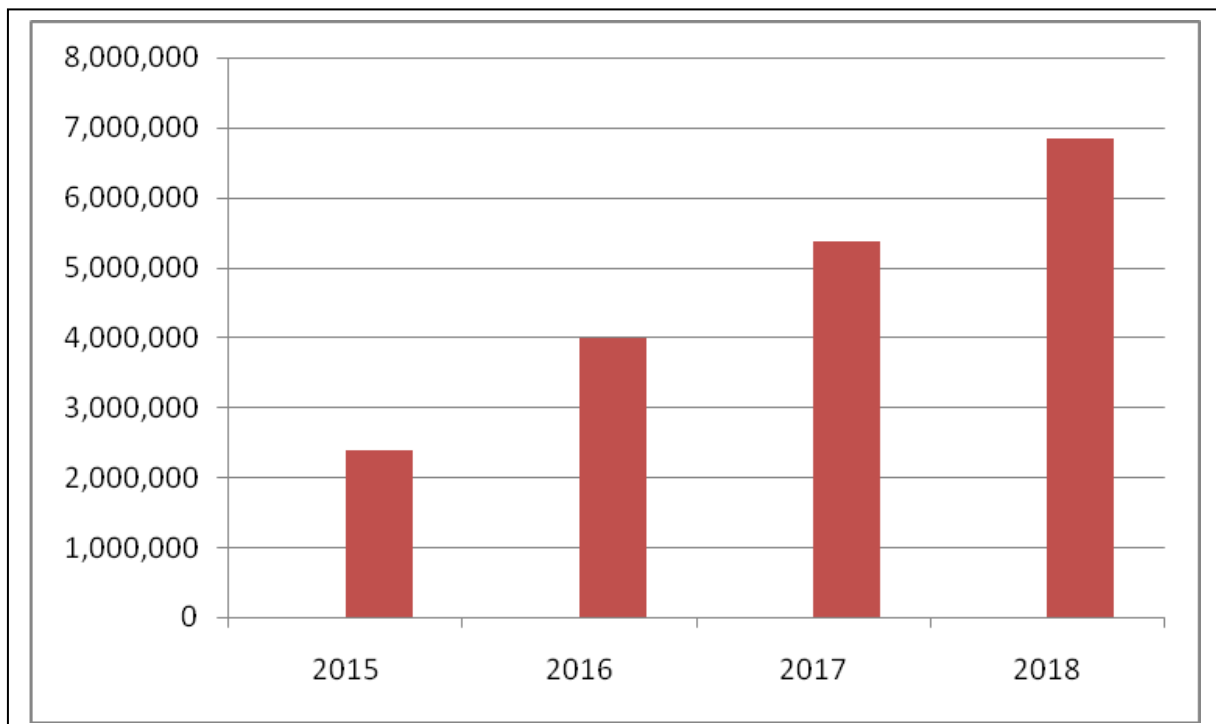
The Source Identifier (SID) Grid is also available as a flat-map, coloured coded for SID value. The SID layer also support GetFeatureInfo requests – allowing users to retrieve information on the source data that each 30 arc-second grid cell is based on.

There have been over 6,800,000 requests to the service in 2018. This includes requests from applications, such as external web sites, that use these services.

The table below shows the number of requests to the services since 2015.

Year	Request to the WMS
2018 (to 1 st October)	6,838,200
2017	5,362,520
2016	3,987,500
2015	2,375,100

The table below shows the number of requests to GEBCO's WMS per year.



Distribution of the GEBCO Digital Atlas (GDA)

During 2017, six copies of the GDA were distributed. This includes four copies sold and two complimentary copies distributed. Since its release in 2003, 1,794 copies of the GDA have been distributed.

The net income received from sales of the GDA is shared equally between BODC and GEBCO. Royalties owed to GEBCO from the sale of the GDA for 2017 amounted to £279.

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

Year	Amount
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
2013	£5,617
2014	£2,867
2015	£960
2016	£1,740
2017	£279

Annex II

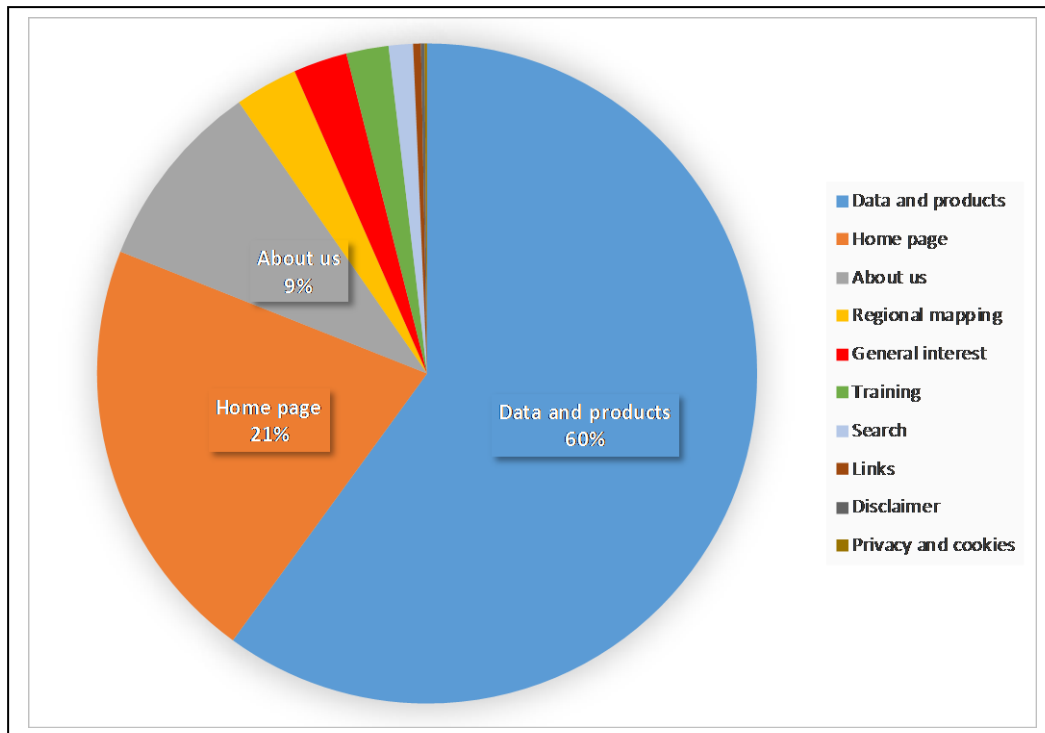
Access to GEBCO’s web site (www.gebco.net)

GEBCO’s web site is maintained, on behalf of GEBCO, by BODC.

The following tables and images provide information and statistics about access to GEBCO’s web site (www.gebco.net) for the reporting period. In summary, there were over 327,600 were pages accessed.

Information is also provided at the end of this section on access to the Seabed 2030 sub web (<http://seabed203.gebco.net>) and GEBCO’s Facebook page.

The image below shows the frequency of visits to the various areas of GEBCO’s web site.

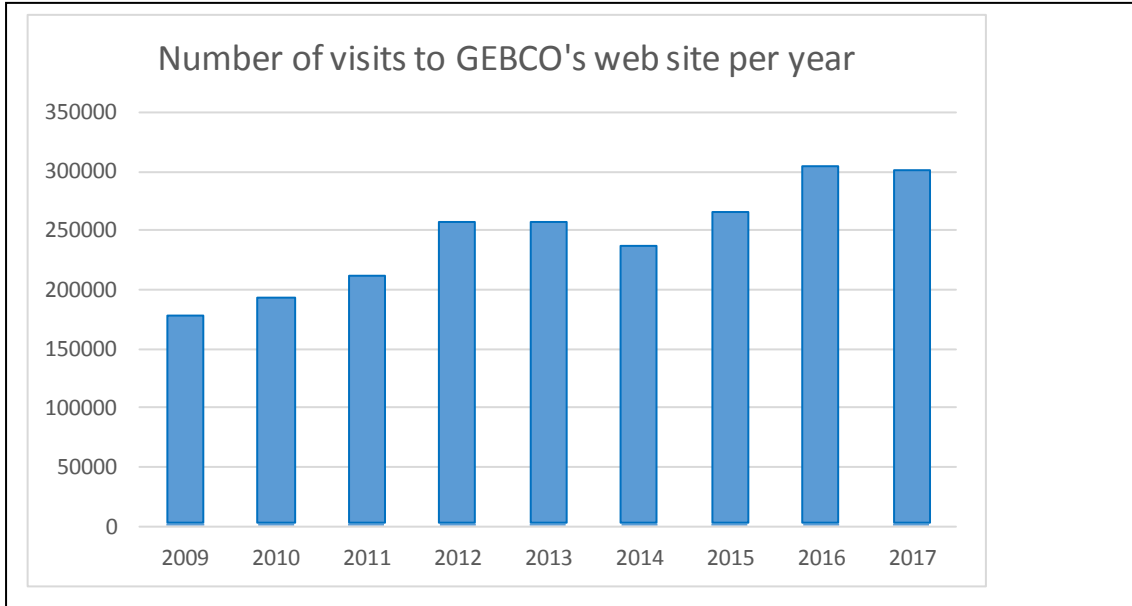


The table below shows the pages viewed and number of visitors per calendar year.

Year	Number of pages viewed
2009	176,759
2010	191,037
2011	210,188
2012	255,241
2013	254,804
2014	235,273
2015	263,689
2016	302,252
2017	299,654

2018 (to 30 th September)	251,707

The figure below shows the number of visits to GEBCO's web site per year since 2009.



Number of visits to individual web pages

The following table details the number of visits to the 'top 20' most popular pages on GEBCO's web site for the reporting period.

Explanation of terms used:

Page title and URL	Title of the GEBCO web page viewed with URL
No. page views	The total number of pages viewed during the reporting period
Average time on page (minutes)	The average amount of time that visitors spent viewing this set of pages or page.

Page title and URL	No. of page views	Avg. time on page (minutes)
Gridded bathymetry data* www.gebco.net/data_and_products/gridded_bathymetry_data/index.html	85,092	04:00
GEBCO home page www.gebco.net/index.html	68,810	01:20
Information about the GEBCO_2014 Grid www.gebco.net/data_and_products/gridded_bathymetry_data/gebco_30_second_grid/index.html	26,081	01:12
Web map service page www.gebco.net/data_and_products/gebco_web_services/web_map_service/index.html	17,896	02:41
GEBCO's data and products www.gebco.net/data_and_products/index.html	15,316	00:33

GEBCO world map www.gebco.net/printable_maps/gebco_world_map/index.html	8,045	02:30
Undersea feature names www.gebco.net/data_and_products/undersea_feature_names/index.html	6,716	04:40
GEBCO Digital Atlas www.gebco.net/data_and_products/gebco_digital_atlas/index.html	5,490	01:21
Regional mapping projects overview www.gebco.net/regional_mapping/mapping_projects/index.html	5,373	02:37
NF/GEBCO Training project page www.gebco.net/training/training_project/index.html	4,895	04:16
GEBCO grid display software www.gebco.net/data_and_products/grid_display_software/index.html	4,486	03:00
Information about the GEBCO One Minute Grid www.gebco.net/data_and_products/gridded_bathymetry_data/gebco_one_minute_grid/index.html	4,322	00:40
Imagery index page www.gebco.net/data_and_products/imagery/index.html	3,615	00:45
General interest – FAQ page www.gebco.net/general_interest/faq/index.html	3,267	02:49
Contact information www.gebco.net/about_us/contact_us/index.html	3,008	03:15
Visualisations of bathymetry data www.gebco.net/general_interest/bathymetry_visualisations/index.html	2,943	01:04
Gridded Bathymetry data - export formats www.gebco.net/data_and_products/gridded_bathymetry_data/data_formats/index.html	2,799	01:54
About GEBCO www.gebco.net/about_us/index.html	2,759	01:01
Regional mapping www.gebco.net/regional_mapping/index.html	2,685	00:24
Grid plots www.gebco.net/data_and_products/gridded_bathymetry_data/grid_plots/	2,667	01:58

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

Geographic distribution of Internet Protocol (IP) addresses accessing GEBCO’s web site

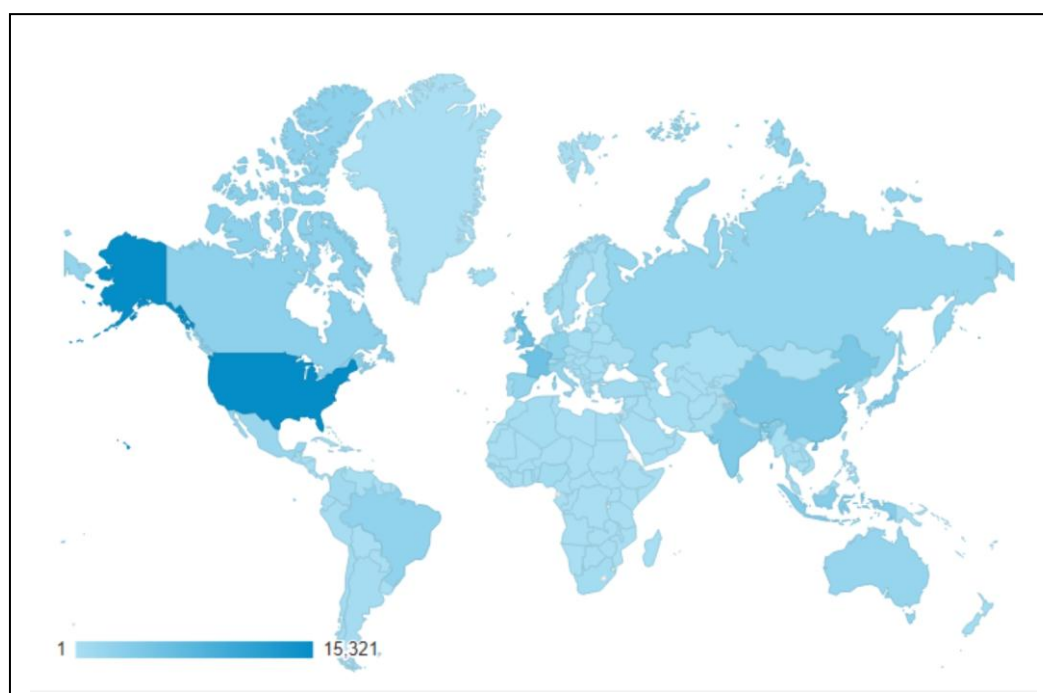
The table below details the geographic distribution by country (top 20 ‘number of visits’ listed) of IP addresses accessing GEBCO’s web site.

Explanation of terms used:

Country/Territory	The name of the country or territory of the origin of the IP address accessing GEBCO’s web site
Visits	The total number of visits to the site from this country/territory
Pages/visit	The number of pages viewed per visit
Average time on site (minutes)	The average amount of time that visitors spent on the site

Country / Territory	Visits	Pages / visit	Average visit duration (minutes)
United States of America	15,321	2.32	02:33
United Kingdom	5,549	3.22	04:35
France	5,492	2.3	02:09
China	4,473	2.94	04:22
India	3,762	2.47	03:39
Indonesia	3,246	3.23	06:21
Japan	3,220	2.67	03:14
Canada	2,606	2.64	03:06
Germany	2,465	2.81	03:20
Brazil	2,338	2.34	03:03
Spain	2,078	2.91	03:19
Italy	1,975	3.08	03:09
Russia	1,926	2.61	03:14
Australia	1,800	2.5	03:11
Mexico	1,469	2.77	04:25
Netherlands	1,205	2.78	03:10
South Korea	1,067	3.11	03:50
Norway	979	2.67	03:29
Colombia	882	2.95	08:34
Philippines	805	3.04	03:52

The image below shows the geographic distribution of IP addresses accessing GEBCO's web site during the reporting period. The colour indicates the number of web site visits for a particular country, from 0 (white) to 15,321 (dark blue).



Access to the Nippon Foundation GEBCO Seabed 2030 web site

(<http://seabed2030.gebco.net>)

The Seabed 2030 web site was setup to provide information specifically related to this project and to provide links back to the main GEBCO web site. The web site went live on June 6th 2017 as a single page. Since its release there have been over 51,500 visits to the site.

An interim update to the site was made in April 2018 to include structure and additional pages, i.e. a news section and a section for each of the Regional Centres, plus a section on how to get involved in the project.

The table below shows the number of visits to the various sections of the web site since 1st October 2017.

*Indicates pages published in April 2018.

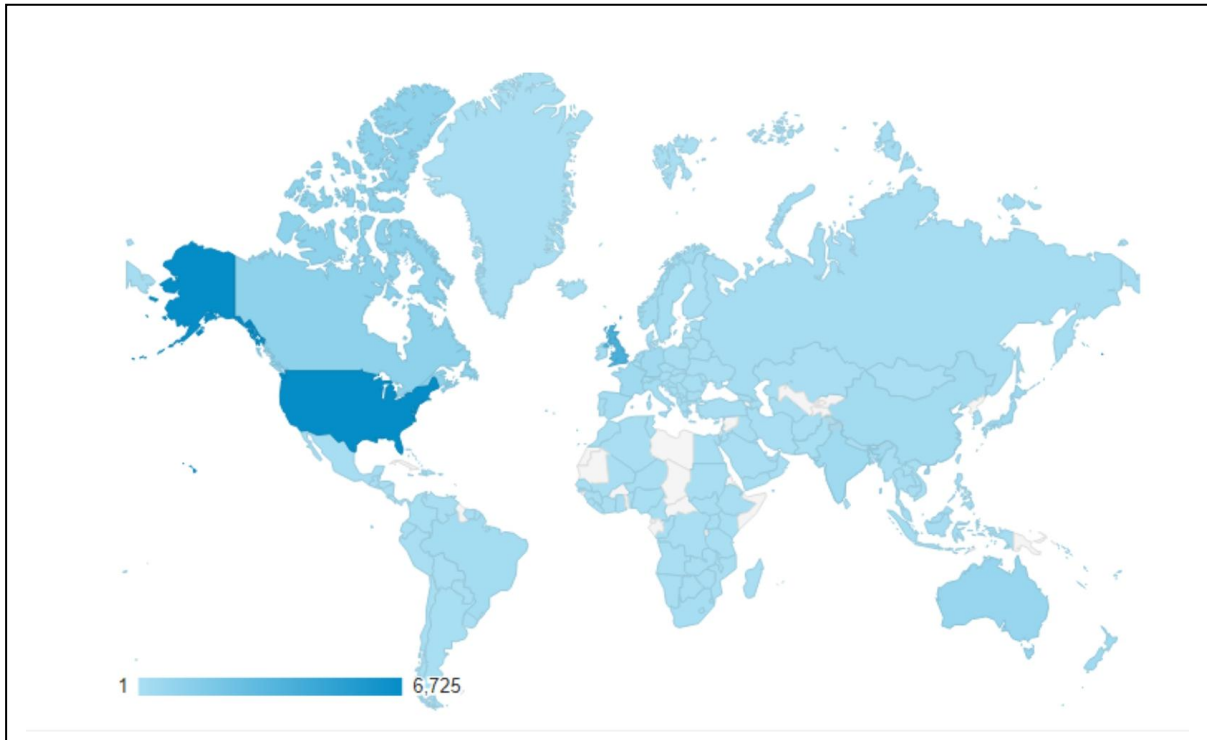
Page title and URL	Title of the Seabed 2030 web page viewed with URL
No. page views	The total number of pages viewed during the reporting period
Average time on page (minutes)	The average amount of time that visitors spent viewing this set of pages or page.

Page title and URL	No. of page views	Avg. time on page (minutes)
Home page https://seabed2030.gebco.net/	33,534	01:32
News* https://seabed2030.gebco.net/news/	2,272	02:14
Data Centres* https://seabed2030.gebco.net/data_Centres/	1,772	01:36
About* https://seabed2030.gebco.net/about_us/	1,765	01:26
Get involved* https://seabed2030.gebco.net/get_involved/	697	01:16
Atlantic and Indian Ocean Regional Centre* https://seabed2030.gebco.net/atlantic_indian/	652	00:41
FAQ* https://seabed2030.gebco.net/faq/	574	02:24
Arctic and North Pacific Regional Centre* https://seabed2030.gebco.net/arctic_pacific/	486	01:34
Resources for journalists* https://seabed2030.gebco.net/resources_for_journalists/	448	01:20
Global Centre* https://seabed2030.gebco.net/gdacc/	419	00:52
South and West Pacific Centre* https://seabed2030.gebco.net/pacific/	398	01:19
Southern Ocean* https://seabed2030.gebco.net/southern_ocean/	321	00:42

The table below shows the visits per country to the Seabed 2030 web site since 1st October 2017.

Country/Territory	The name of the country or territory of the origin of the IP address accessing the Seabed 2030 web site
Visits	The total number of visits to the site from this country/territory
Pages/visit	The number of pages viewed per visit
Average time on site (minutes)	The average amount of time that visitors spent on the site

Country / Territory	Visits	Pages / visit	Average visit duration (minutes)
United States of America	6,725	1.57	00:49
United Kingdom	3,859	1.93	01:37
Canada	1,101	1.6	00:59
Australia	757	1.63	00:55
Japan	486	2.15	01:58
France	414	1.92	01:14
India	407	1.69	01:05
Germany	386	1.8	00:58
New Zealand	364	1.82	01:02
Netherlands	348	1.73	01:21
China	305	1.82	01:25
Norway	274	1.99	01:49
Singapore	258	1.39	00:41
Brazil	239	1.73	01:15
Sweden	206	2.31	01:30
Italy	188	1.88	00:59
Ireland	173	1.57	00:41
Malaysia	164	1.53	00:47



The image above shows the geographic distribution of IP addresses accessing the Seabed 2030 web site from 1st October 2017 – 30th September 2018. The colour indicates the number of web site visits for a particular country, from 0 (white) to 6,725 (dark blue).

GEBCO’s Facebook page (<https://www.facebook.com/GEBCO>)

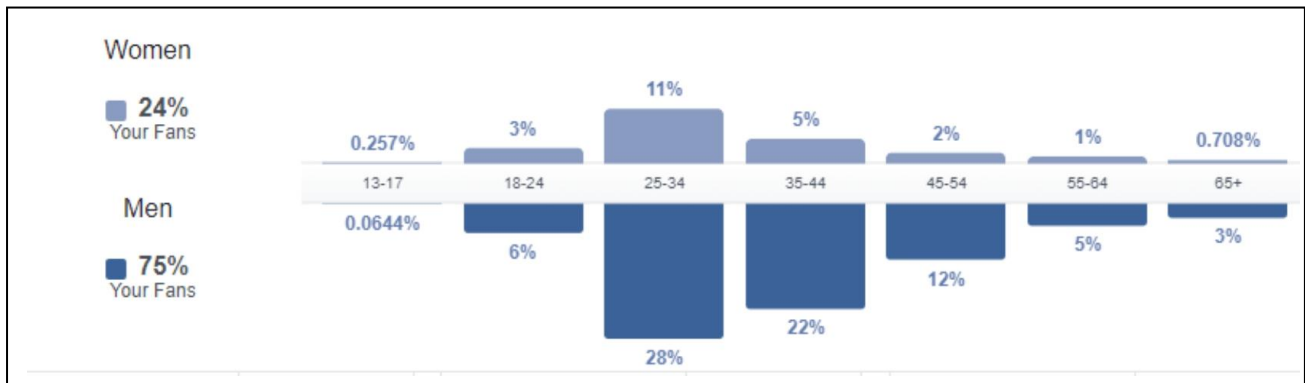
In 2018 we have posted 26 news items to GEBCO’s Facebook page relating to GEBCO, bathymetry data and sea floor-related research.

The table below gives information on the last nine posts to GEBCO’s Facebook page, a link to information about the post and the number of people that the post has reached.

Date of post	Link to posted item	Number of people reached
17/10/2018	https://www.hydro-international.com/content/article/where-do-we-map-next	213
09/10/2018	https://www.bbc.co.uk/news/science-environment-45801983	1,100
03/10/2018	https://careers.sciencenewzealand.org/jobdetails/ajid/F2VG8/D ata-Manager-for-Seabed-2030-Centre,30005.html	402
25/09/2018	http://www.emodnet-bathymetry.eu/news/news-details/new-2018-release-of-emodnet-dtm--with-many-new-features/58	190
18/09/2018	https://inews.co.uk/news/environment/ocean-floor-research-maps-sir-ranulph-fiennes-seabed-exhibition/	1,500
13/09/2018	https://www.bbc.co.uk/news/science-environment-45503144	1,800
12/09/2018	https://www.usgs.gov/news/moving-mountains-elwha-river-	319

	still-changing-five-years-after-world-s-largest-dam-removal	
10/09/2018	https://www.niwa.co.nz/news/new-discoveries-on-marlborough-seafloor	313
13/08/2018	https://phys.org/news/2018-08-scientists-reveal-submarine-canyon-edge.html	451

The graphic below gives information from Facebook’s insights statistics on the gender and age range of people who ‘liked’ GEBCO’s Facebook page during the reporting period.



The table below gives information on the countries where people who ‘liked’ GEBCO’s Facebook pages (during the reporting period) are from.

Country	No. of GEBCO’s Facebook page ‘fans’	Country	No. of GEBCO’s Facebook page ‘fans’
United States of America	209	Australia	33
India	90	Spain	30
Indonesia	87	France	27
Malaysia	84	Chile	27
Egypt	73	Germany	25
United Kingdom	71	Argentina	23
Brazil	60	Turkey	22
Mexico	45	Colombia	21
Bangladesh	43	Portugal	20
Canada	38	Thailand	20
Italy	37	Vietnam	20
Philippines	35	Peru	19