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IOC-IHO/GEBCO XXIX Guiding Committee

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INTERNATIONAL HYDROGRAPHIC ORGANIZATION

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

General Bathymetric Chart of the Oceans (GEBCO)

Twenty-Ninth Meeting of the GEBCO Guiding Committee

October 5, 2012

at
International Hydrographic Bureau
International Hydrographic Organization
Principality of Monaco

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Chairman's opening remarks. Chairman Robin Falconer opened the meeting by welcoming all participants. He also thanked the International Hydrographic Organization for hosting the meeting at the International Hydrographic Bureau Headquarters in the Principality of Monaco. Falconer reviewed the goals of the meeting. See Annex 1.

GEBCO Financial Report. David Clark reported on the financial state of GEBCO. See URL http://www.gebco.net/about_us/meetings_and_minutes/ggc_2012_presentations.html. There are two GEBCO accounts at Stockholm University which acts as the financial agent for GEBCO. These are Nippon Foundation Account and GEBCO Operations Account. The Nippon Foundation Account is divided into two accounts, the Main Account and the Special Projects sub account. The Main Account, which was previously used to fund the Nippon Training Program at University of New Hampshire, currently contains $33,776USD. These funds are residual funds which resulted from accrued interest when the account was at the University of Southampton. The Nippon Special Projects Account is currently valued at $265,852.93USD and is being used primarily to support Nippon Scholars participation in mapping projects. The GEBCO Operations Account has $20,863.84 available as of October 2012. Known 2012 expenditures will result in negative balance of -$9,284.96 in the GEBCO Operations Account and zero balance in the main GEBCO Main Account. It is noted that the grants for the Nippon Training Program at UNH, now financially managed by UNH, totaled $1,250,000 for 2011 and 2012.

Raising support for GEBCO operations. Falconer opened the session with the challenge to the Committee in coming up with ways to keep GEBCO going financially. Chris Fox reported the he has approached ESRI and Google asking for support. They have both declined, although Lisa Taylor did offer that Google has supported the GEBCO Gazetteer activities at NGDC. Martin Jakobsson suggested that GEBCO should approach the Prince Albert Foundation. This has been considered before but nothing has been done. The Foundation would want a proposal for a project, e.g., the Polar areas. Jakobsson said that if a project is proposed, it should include GEBCO operations funding. Robert Ward urged GEBCO to keep IHB informed of our plans. Ward also said that there might be some IHB funds left over in 2012 to help financially in the short term. Taylor asked what procedures do we have for budget approval and review. Clark replied that the budget for the GEBCO Operations funds is ad-hoc and expenditures are approved by the GEBCO Chair and Vice Chair. Ward informed the Committee that if IOC was no longer a sponsor of GEBCO, then GEBCO could revert to being wholly directed and governed by the IHO. This may be a final option in the next few years if active IOC support remains at its current low level. This could be considered in a year or so if appropriate. A question was raised on what this would entail, but it is too early to describe any details.

GEBCO organizational issues

Vacancies and succession on Guiding Committee.

Falconer started noting that the GGC Terms of Reference/Rules of procedure were revised five years ago and that the term of a GGC member is five years. Therefore, all members of the GGC, except Hyo Hyun Sung, will be up for reappointment. There are ten members of the GGC, five appointed by IOC and five appointed by IHO. Etienne Cailliau said he would resign from the GGC in six months. Chris Fox said he may also resign within the year. Paolo Lusiani said he will serve one more year. Martin Jakobsson and Nataliya Turko will seek reappointment for another five-year term. Hans-Werner Schenke will step down for the GGC but will remain chair

of SCUFN for one or two more years. For one previous vacancy, Jose Frias, the GGC supports Bruce Goleby, who is Vice Chair of the TSCOM, to fill the vacancy. Ward said that upon formal notification of the vacancies IHB will send out requests for nominations to the member states. IOC procedures seem less formal but it is unclear what the procedure will be. Therefore, as it stands, there will be four vacancies for the GGC in 2013, two each for IHO and IOC.

TSCOM membership/succession plan

The ToR states TSCOM will normally consist of ten members. TSCOM elects it own Chair and Vice Chair. It was noted that the current Chair, Walter Smith, wants to step down for the Chairmanship. It was also noted that many of the TSCOM members were not present this week in Monaco. Fox said that there are many important topics that TSCOM is addressing so it should continue to be active. It was proposed (and passed) to appoint Karen Marks and Bruce Goleby as interim Co-Chairs of TSCOM in order to start the process of renewing/revitalizing the membership. Marks suggested that a new position be created to organize and lead the GEBCO Bathymetric Science Day. Previously the Chair of TSCOM has acted in this capacity. Shin Tani remarked that ABLOS has different organizers for their conferences. Falconer stressed that continuity of the membership of TSCOM is very important. It was noted that Marks and Goleby will work with Smith on the renewal of the TSCOM membership. The GGC thanks Walter Smith for a job well done in his service as Chair of the TSCOM.

SCRUM membership

Falconer pointed out that SCRUM is still waiting endorsement by the IOC. It has been endorsed by the IHO earlier this year. SCRUM membership has a different structure from the other GEBCO Sub-Committees. Its membership is intended to be regional in nature. It also has a Chair and Vice Chair. Martin Jakobsson is the Chair. He welcomes names to be considered for membership. Jakobsson proposed Pauline Weatherall for Vice Chair. Proposal was passed. Fox suggested that representatives from the IHO Regional Hydrographic Commissions should be considered for membership in SCRUM, nominally the RHC Chairs. Jakobsson would rather keep the membership more fluid. It was decided to keep SCRUM like it is for now. Finally, it was noted the we should still reference SCRUM as Interim SCRUM (iSCRUM) until IOC endorses it.

GEBCO Bathymetric Editor vacancy

The GEBCO Bathymetric Editor, Colin Jacobs of the UK's National Oceanographic Center, has left his post due to NOC's restructuring. Prospects for his replacement are not encouraging. The GGC formally notes the good work of Colin and wishes him well in his new endeavors. Falconer said now is not the right time to discuss any prospects for replacing him.

Future GEBCO Directions. Because of the previous discussions noted above, this item was tabled. The only discussion was concerning Science Day. Paul Elmore of NRL was the Science Day lead this year. It was re-iterated that the Science Day lead be separate from the TSCOM Chair. Jakobsson nominated Elmore for the position of GEBCO Bathymetric Science Day Lead. Motion Carried. Since Elmore was unable to attend the meeting due to a visa snafu, Falconer will contact him with the proposal.

IHO report. David Wyatt presented the IHO report on behalf of Director Mustafa Ipteş, who was elected to the Directing Committee at the 18th IHC in April of this year. The IHO currently has 81 Member States, of which two: Democratic Republic of the Congo; and the Dominican Republic are suspended due to non-payment of fees. Eight States have applied for membership of which four: Bulgaria; Mauritania; Montenegro and Sierra Leone have received the required support and only have to deposit their letter of accession with the Government of Monaco. As of today, the remaining four candidates: Brunei Darussalam, Georgia, Haiti and Vietnam have 26, 3, 51 and 29 respectively of the required 52 approvals.

As of October 2012, thirty-six Governments, out of a required forty-eight, have ratified the Protocol of Amendments to the IHO Convention, which was approved by Member States at an Extraordinary International Hydrographic Conference in 2005.

A comprehensive report was provided to the 18th IHC under the general report for Work Programme 3 (Inter Regional Coordination and Support). The report covered the following areas:

a. Data Sets and Products
    - Highlighted GEBCO's continued development and availability of data sets and products in recognition of their importance and value to the international scientific community.
    - Details were given of the various gridded data sets available via the web site, including the release of GEBCO_08 Grid as a Web Map Service.
    - The diverse uses to which GEBCO data sets and products are put and the wide range of users was highlighted. The use of GEBCO_08 Grid by Google Earth was of particular interest.
    - The contribution of data from a wide variety of sources was noted and the ongoing requirement for more data, particularly in shallow water areas was noted.
b. Electronic Nautical Charts - The use of bathymetric data published by MS in their ENCs was highlighted as a valuable and expanding data source in the shallow water area. The Conference encouraged all MS to contribute their data so as to improve overall coverage in this vital zone.
c. GEBCO Web Site - The success of the revitalized British Oceanographic Data Centre maintained GEBCO web site was highlighted with an emphasis on the regularly updated 'news and events' pages.
d. Nippon Foundation - The ongoing co-operation and success of the Nippon Foundation partnership with GEBCO for the encouragement of young scientists and hydrographers was praised. The Conference was particularly encouraged by the broad geographical spread and the successful progress of previous beneficiaries of the programme.
e. Gazetteer of Undersea Feature Names - The work of SCUFN was noted and the progress on migrating to a geospatial database was welcomed.
f. Improving Ocean Mapping Technology - The successful creation of a GEBCO data flow model was particularly welcomed and the follow-on benefits were much anticipated.
g. Revitalizing Regional Mapping - The Conference welcomed the formal creation of SCRUM and the ToRs. The work on IBCSO and IBCAO was acknowledged and the Conference urged continued effort on this important project. Further workshops similar to those held in Stockholm and Cartagena were supported.

h. Distribution of GEBCO Bathymetric Data Sets and Products -Details of the various data sets and downloads were provided.

The Conference noted the progress achieved by GEBCO in these areas over the previous 5 years and expressed its gratitude for the efforts of the GGC in moving these issues forward.

The IHB would like to emphasize the importance for GEBCO of attendance at meetings and its contribution to the work of IRCC and RHCs. It is through IRCC that the inclusion of work programme items and any necessary funding can be achieved.

The IHO's Capacity Building work is based upon the requirements established by the RHCs. These are reviewed and prioritized, based on available funding, by the Capacity Building Sub-Committee (CBSC) and implemented following endorsement by the IRCC. In addition to a contribution from IHO central funds, the CB Fund currently receives support from Japan (Nippon Foundation) and the Republic of Korea.

The involvement in and attendance at meetings of RHCs is strongly encouraged and it is pleasing to note the efforts being made to attend by GEBCO members. They have a valuable contribution to make to these meetings which also provide an ideal opportunity to highlight the case for the provision of shallow water data sets for inclusion in GEBCO products.

IHO/IOC - GEBCO ToRs and Rules of Procedure are due for review with any proposed amendments submitted to IHO and IOC for approval.

B-11, GEBCO Cookbook, was approved by IHO MS in early May. The publication has been forwarded to IOC for approval, the result of which is awaited. The IHO would like to highlight the considerable contribution and on-going efforts of Dr Karen Marks, who continues to edit and maintain this live publication.

The IHO appreciates the ongoing co-operation and support provided by the IOC, particularly in the present challenging financial circumstances. The IHO looks forward to maintaining the successful collaboration across a number of mutually beneficial projects in the future.

IHO/IRCC-4 Meeting. Jose Gianella attended the IRCC4 meeting representing GEBCO. Gianella gave a GEBCO presentation and submitted the GEBCO report, both of which were prepared by Chris Fox. See: http://www.gebco.net/about_us/presentations_and_publications/#ircc4
There were no questions and everyone seemed pleased that GEBCO was in attendance. Gianella noted the IHO recommendation that GEBCO be an active participant in the IRCC meetings since organizationally GEBCO is under the IRCC. Falconer thinks GEBCO should make a strong commitment to the IRCC. Ward suggested that GEBCO's IRCC commitment would make a strong statement to the IHO member states. Fox again emphasized that GEBCO regional mapping activities should coordinate with the RHCs. Ward noted that the EIHC will take place on October 2014 *(NB: 06 - 10 October 2014 in Monaco*) and that GEBCO attendance will be strongly encouraged.

IHO DCDB report. Lisa Taylor reported on the IHO Data Center for Digital Bathymetry. See: http://www.gebco.net/about_us/meetings_and_minutes/ggc_2012_presentations.html
As a result of the 2011 review of the GEBCO Gazetteer, and as part of the IHO GEBCO Workplan task 3.8.8, NGDC is moving forward with the Phase II GEBCO Gazetteer Enhancement. The deliverables for this task are to quality control and update a geospatially enabled Gazetteer as a web service and to enable user specific online downloads. Much progress has been done but there are a number of outstanding tasks to be completed. These include incorporating updated approved information, improving feature geometries, developing user interfaces and implementing as a web map viewer. Taylor also reported that the GEBCO Data Store will be implemented at NGDC using existing NGDC resources. Issues such as two-way rsync read only connectively between BODC and Scripps Institution of Oceanography and security concerns have been resolved. Taylor noted that with enhanced resources the IHO DCDB web presence could be improved to enhance data contributions and access to international bathymetric data.

Schenke thanked NGDC for its work on the Gazetteer and also thanked Google for its support to NGDC for this work.

IHO RHC meetings inventory list. David Clark presented the most recent compilation of the list of Regional Hydrographic Commission meetings. With input from the members, he made some updates to the list. It was noted that the list is useful for easily looking up the current information for the RHC meetings. It is hoped that the list will facilitate more participation in the RHCs. See Annex 2.

IOC report. David Wyatt presented the report on behalf of Mitrasen Bhikajee, Deputy Executive Secretary of IOC.

"The Intergovernmental Oceanographic Commission of UNESCO is very proud to be associated with the General Bathymetric Chart of the Ocean (GEBCO). The outstanding set of the 5th edition of GEBCO charts produced between 1975 and 1982 and subsequently the digital charts, are a wonderful example of the benefits of the synergy that can be generated through international collaboration. Our arrangement whereby the IHO maintains the international collection of echo-sounding data and the IOC community provides the scientific expertise for contouring these data continues to the present day.

Concerning recent interactions, we would like to report on a request from Captain Hugo Gorziglia to include an item on GEBCO during the last Executive Council of IOC in June of this year. Because of cost-cutting measures, IOC had a shortened meeting and only pressing issues pertaining to budgets and programmes were discussed during the last Executive Council. This did not leave much time to discuss some of the other important programmes which IOC runs in collaboration with partner organizations. However, during the Executive Council, Captain Gorziglia met with the Deputy Executive Secretary and the Executive Officer of IOC to brief them about various issues concerning GEBCO. This was also an opportunity for him to inform IOC about his completion of ten years as Director of the IHB on 31st August 2012.

IOC received a request for approval of the “IHO-IOC GEBCO Cook Book”. We should be able to send an approval notification soon. IOC would like to thank the Working group and its

chairperson, Karen Marks, for providing through the GEBCO Cook Book the most authoritative publicly available manual on the bathymetry of the world's ocean. IOC is also grateful to IHO colleagues for accepting the reference to an IOC series on the Cook Book; this publication will be also available as IOC Manuals and Guides, 63 on the IOC and UNESCO websites (http://www.ioc-unesco.org/documents).

With the recent general reduction of the staff and budget of the Intergovernmental Oceanographic Commission (IOC) of UNESCO, it is becoming increasingly difficult for the IOC to maintain the level of activity that it previously had with GEBCO. Despite this challenge, IOC is trying its best to meet the needs and expectations of GEBCO and we do hope that this is only a temporary situation such that things will improve in the coming years.

The IOC will be looking forward to the recommendations of this meeting so that we can provide any support which is required. We shall also share with you our new Medium Term Strategy once it is approved by the Assembly of the IOC in June 2013.

IOC would like to thank all GEBCO members for their contribution in furthering the ideals and programmes of the IOC of UNESCO."

Falconer noted that working with and defining our role within IOC is a top priority for GEBCO. We welcome IOC's renewed interest in GEBCO.

Digital Atlas Manager Report Pauline Weatherall presented the GEBCO Digital Atlas Manager report. See:
http://www.gebco.net/about_us/meetings_and_minutes/ggc_2012_presentations.html
Weatherall reported that the new version of the of the GEBCO_08 Grid will be release before the end of 2012. This version will use the existing GEBCO 'base' grid (SRTM30_plus version 5) with new and existing regional compilations and surveys included on top. Further 'significant' release of the GEBCO grid is planned for publication in the summer of 2013. The GEBCO_08 has been downloaded 19,000 times since its release in 2009 and over 6,000 times since October 2011. The Global Digital Atlas (GDA) has been distributed to 1500 users since its release in 2003 and has generated over 77,000 British Pounds Sterling in royalties for GEBCO. She noted that the purchases have been tailing off in recent years. Weatherall reports that the GEBCO web page since its re-launch in 2008 have been viewed 800K times with most of the users from Europe, North America and Asia. Finally, she noted that the official IOC logo has changed and therefore the GEBCO logo has also been revised.

Chris Fox asked about the GEBCO Facebook site and if we could track accesses and users. Paolo Lusiani suggested that we put a link for donating to GEBCO on the GEBCO web site. Juan Brown noted that from past experience, it would be expensive to implement this. Etienne Cailliau noted that there were less downloads and revenue in recent years. The reason probably is that the product, GDA is aging and many users already have it. Nataliya Turko said it was difficult to support many GEBCO products. Tony Pharaoh suggested a web link back to GEBCO from the ESRI and Google web sites. Maybe other web sites that use the GEBCO data could do this; it would be an advertisement for GEBCO. Another possibility would be to ask for payment to use GEBCO data commercially on web sites.

SCUFN report. Hans-Werner Schenke made the SCUFN report.
See: http://www.gebco.net/about_us/meetings_and_minutes/ggc_2012_presentations.html
Schenke gave an overview of the membership. He notes that there are now three Nippon Foundation Scholars on SCUFN. There were 10 out of the 12 sub-committee members at the last meeting in Beijing and 12 observers. At the last meeting, 92 undersea features were considered, 81 accepted, one not accepted, six are pending and four were removed from B-8. He notes that the SCUFN works very hard to keep the IHO B6, "Standardization of Undersea Feature Names" up to date. It is the bible of undersea names. He also said that the SCUFN Working Group on generic terms is always busy with newly proposed terms. The GEBCO Gazetteer, B8, is the other main task of the sub-committee and noted again the implementation of the web based gazetteer. The upcoming meeting in Wellington, NZ, (October 2012) will consider 104 items and reiterates the need for a full five-day meeting.

David Wyatt asked if the meetings could be virtual meetings over the internet. Schenke replied that the sub-committee is made up of a diverse group of scientists. It is not possible to have it virtual because you need decision meeting face to face to debate the issues and opinions. Jakobsson noted that he uses the use feature names with bathymetry and it is good for teaching. There was a demonstration of this and said web site will be very valuable addition. Kunio Yashima noted that there are still flaws in the Gazetteer and requests that these be changed. Taylor said that they are addressing these with help from Google. In closing, the Guiding Committee offered many thanks for SCUFN's efforts.

Report on the 28th International Hydrographic Conference. Paolo Lusiani and Hyo Hyun Sung reported on the IHC. They attended and represented GEBCO. There were 70 member countries represented at the IHC. Lusiani reported on the GEBCO activities and noted that we are part of the IHO 2013-17 Work Plan section 3 "Ocean Mapping Program, task 3.8. The GEBCO report was accepted with enthusiasm. GEBCO is under the IHO Inter-Regional Coordinating Committee (IRCC). The next IRCC meeting is June 2013 and GEBCO should be represented, with Lusiani emphasizing that it is very important that GEBCO participate. GEBCO should be prepared to report, but the report must be brief. It was suggested that a standard GEBCO presentation be prepared as a template for future presentations. He said that the GEBCO participation in the IRCC and IHC meetings is being noticed.

TSCOM Report. Karen Marks reported on the TSCOM activities. See:
http://www.gebco.net/about_us/meetings_and_minutes/ggc_2012_presentations.html
GEBCO Bathymetric Science Day was a success with 14 oral and 13 poster presentations. The Science Day was well attended with some members of ABLOS in attendance.
Marks reported that the GEBCO Cookbook approved as IHO Pub #11. It is waiting IOC approval and when approved will be listed formally as an IOC publication. The sub-committee is working on an announcement of the Cookbook in the American Geophysical Union's EOS publication. Marks noted that the GEBCO Data Store is working and it is beginning to move data between institutions. The Working Group on Metadata is working on activities for metadata verification and STRM SID metadata. A breakout group on gridding met and discussed gridding errors. It was noted that there were various gridding techniques developed for the Cook Book.

Fox remarked that an item for EOS is good but TSCOM should think about submitting one for the Hydro International. The GGC thanked TSCOM for its activities and offered its compliments on a job well done. The GGC endorses the TSCOM actions and activities.

iSCRUM Report. Martin Jakobsson reported on the iSCRUM activities. He noted that the two sub-committees meeting together for two days was a good idea and that it should continue. He was very complimentary of the new iSCRUM Vice Chair, Pauline Weatherall, who will greatly help with the iSCRUM activities. He briefly reviewed the status of the regional mapping activities. These included: the Antarctic Ocean/IBCSO - paper will published at Fall 2012 AGU and grid and map will be completed mid 2013; Baltic Grid - beginning in early 2013 and completion end of 2013; Australian Grid - new grid available in 2012; Indian Ocean - getting underway in 2013; IBCCA - maybe no products before the end of 2013; EMODnet - should be included in next GEBCO update; and IBCM - there are completed areas which can be included. Falconer noted that several of the regional mapping projects, e.g., the Indian Ocean Regional Mapping Project, involved the Nippon Foundation Scholars. Schenke noted the IBCSO meeting in early 2012 which also included the NF scholars. There were two major breakouts during the meeting this week, Gridding and Regional Mapping. A gridding workshop is proposed before the next GEBCO meeting in 2013.

NF/GEBCO Training Project Management Committee report. Robin Falconer reported on the activities of the committee. After nine years, the project at UNH has trained 54 students from 20 countries in ocean mapping, awarding them a Postgraduate Certificate in Ocean Bathymetry. Dave Monahan is the current leader of the program which is transitioning to Rochelle Wigley, a former NF Scholar, over the next several years. Falconer reports that the Nippon Foundation is very satisfied with the program and will continue to support it next year. As has been reported there are several regional mapping projects that involve the NF Scholars. One in particular, the Indian Ocean Mapping Project, is being lead by Wigley and involves a number of other NF Scholars. The NF GEBCO TPMC strongly supports the regional mapping projects as a way to involve the NF Scholars and build capacity in the regions and associated countries. The TPMC also considered proposals on an Ocean GIS and a Global Bathymetric Workshop as part of the NF Special Projects, but did not endorse them. The Nippon Foundation would like a 10-year celebration of the UNH training project in 2014. This topic was discussed in some detail but no decision was made, only to keep the initial planning going. It was pointed out that the NF would like some tangible results of the 10-year project and would like to have some publicity promoting the program. The GGC acknowledges the very, very good work of Dave Monahan over the last ten years.

GEBCO IHO Workplan 2013- 2017. Chris Fox briefly reviewed the tasks associated with the GEBCO part of the IHO 2013-17 Work Plan. Summary sheet attached as Annex 3. IHO reported that the GEBCO tasks in the IHO Workplan Element 3.8 of the Ocean Mapping Programmes were approved at the recent IHC. There are eight GEBCO tasks. Clark noted that there were no funding levels associated with the final approved version, so this will need to be sorted out. There was an action to the leads of the individual tasks to develop a task specific work plan. Falconer and Clark will work to resolve the funding question.

Outreach Working Group report. Palo Lusiani and Hyo Hyun Sung reported on the activities of the Outreach Working Group. Lusiani showed a GEBCO "flier" which he made up for the Genoa Boat Show. It consisted of an image of the GEBCO World Map. It costs two Euro and is very popular. For the boat show last year, he produced 1000 and will produce 1000 for this year's show. Sung described an authoring tool for KML files. It is very easy to produce KML files for Google. She made a demonstration and it was very well received. She described how to take information for IHO Publication B8, make the information into a KML, and put it into Google maps. Pharaoh remarked that it is a very useful tool and asked if it will be available? Sung said it is available now and is very simple to use since it is based on Excel spreadsheets.

GEBCO Globes. Bob Anderson gave an update on the GEBCO Globe project. See: http://www.gebco.net/about_us/meetings_and_minutes/ggc_2012_presentations.html He said that the globes are very popular and a number of organizations have requested large globes. He has given a number of globes away and has shipped the rest to IHB for sale and distribution. Falconer suggested that we need a write-up or some user guidance on how to use the globes. In addition, the globes should have some undersea feature names, and such, to make it more useful. How can this be done easily? Taylor suggested doing on the web using the KML generator.

Falconer asked if this is to broaden GEBCO outreach? Google is using the Gazetteer, but we can't rely entirely on Google. Taylor suggested using the new GEBCO base map and layer various KMLs on it. Weatherall asked if Google was going to implement this. However, it was noted that Google will only take what GEBCO gives them and uses it as extra information.

Falconer would like to formalize the Outreach Working Group. Lusiani asked for new members two years ago, but no one volunteered. Anderson said he would volunteer. Taylor sees lots of opportunities with existing constituents and notes that the IHO GEBCO 2013-17 Workplan asked for 50K EUR over the next five years. Schenke suggested one member from each of GEBCO Sub-Committees should be assigned to the Outreach WG. Schenke also proposed that GEBCO consider making our maps into 3D lenticular versions. This was discussed and Schenke was asked to follow-up on it. Falconer voiced many thanks for the work of the Outreach WG and sees lots of potential in the future.

GEBCO World Map publication. Martin Jakobsson updated the status of the world map. It is almost done and is ready for publishing and printing. He proposed that the official GEBCO version would be a base map, without any undersea feature names, geographic names or names water bodies. Since the world map is in a highly reproducible digital form, this official GEBCO base world map could then be overlain with thematic data, such as the information in IHO S-23, "Limits of Oceans and Seas". This GEBCO World Base Map would be useful for many other types of thematic data such as earthquakes, volcanoes, tsunamis, etc. Therefore, GEBCO would end up having many versions of the maps, driven by the thematic make-up. These thematic maps could be produced by GEBCO, relevant organizations and institutions, etc.

Etienne Cailliau asked for clarification of what would be on the base map. Jakobsson said it will be only the ocean bathymetry and the embedded topography. Adding undersea feature names would be a version of a thematic map. Schenke thought this was a very good suggestion. However, there will be a need for more instructions on how to place themes on maps. Some

guidelines may be needed. The question was asked about copyrights. Juan Brown said the GEBCO data are not copyrighted. If a commercial company uses that data, GEBCO asks for acknowledgement and a reference. This also applies for research and education users. Jakobsson proposed adoption of the "GEBCO Map Production Principles" (see Annex 4). Lusiani asked what standard products are and does GEBCO produce standard products? What happens if an organization copyrights our product after putting their thematic data on the World Base Map? It was noted that this happens all the time, National Geographic, for example. Anderson asked is there a standard GEBCO citation if a commercial printer wanted to list the GEBCO map. Brown and Weatherall said the standard GEBCO citation is on the GEBCO web site. Schenke asked if the principles could be modified if it turns out that they needed revision. Lusiani was not happy with principles. He recommends that GEBCO should resolve problem of what is a standard product. Sung Ho Choi said that guidelines are needed for on putting on sea names. It was noted that this needed more discussion. Nataliya Turko was happy with base map and liked the concept of thematic layers. She proposed that SCUFN produce a thematic map. Motion was made to accept the principles. The motion to accept the was passed by consensus.

Dates and Places of Next Meetings, 2013 and 2014. Falconer noted that there were two offers for hosting the upcoming GEBCO meetings. The Malaysian National Hydrographic Centre offered to host the next meeting, 2013, in Kula Lumpur. The date is expected to be between mid-August and mid- October. For 2014, the Italian Marine Sciences Research Institute offered to host the meeting in Venice, Italy. *(NB: 2013 meeting will be held in Venice. 2015 meeting tentatively scheduled for Kula Lumpur)*

Action item review and wrap up. David Clark reviewed the actions resulting from the meeting. See Annex 5. Falconer thanked the hosts, the International Hydrographic Bureau, for all the fine facilities and support of the meeting, especially with the IHB hosting the ABLOS meeting also this week. Falconer also thanked the Guiding Committee members for their continued participation in and support of GEBCO.

Attendees

Joint IOC-IHO GEBCO Guiding Committee

IOC
Dr. Robin Falconer (Chairman)
Dr. Martin Jakobsson (Chairman iSCRUM)
Dr. Hans-Werner Schenke (Chairman SCUFN)
Dr. Nataliya Turko

IHO
Ingénieur général Etienne Cailliau
Dr. Christopher Fox (Vice Chairman)
Commander Paolo Lusiani
Ms. Hyo Hyun Sung
Dr. Kunio Yashima

Mr. David Clark (Permanent Secretary)
Ms. Lisa Taylor (Director, IHO Data Center for Digital Bathymetry) *ex officio*

Other Attendees

Robert Anderson	Science Applications International Corporation, USA
Juan Brown	British Oceanographic Data Centre, United Kingdom
Shin Ho Choi	Korea Hydrographic and Oceanographic Administration
Boris Dorschel	Alfred Wegener Institute for Polar and Marine Research
Jose Gianella	Dirección de Hidrografía y Navegación, Chile
John Hall	Geological Survey of Israel
Norhizam Hassan	National Hydrographic Centre, Malaysia
Michel Huet	International Hydrographic Bureau
Mustafa Ipteş	International Hydrographic Bureau
Yasutaka Katagiri	Japan Hydrographic and Oceanographic Department
I Ji Kim	Korea Hydrographic and Oceanographic Administration, Korea
Karen Marks	NOAA Laboratory for Satellite Altimetry, USA
Dave Monahan	Center for Coastal and Ocean Mapping/UNH, USA
Taisei Morishita	Japan Hydrographic and Oceanographic Department
Tony Pharaoh	International Hydrographic Bureau
Shin Tani	Japan Hydrographic and Oceanographic Department
Robert Ward	International Hydrographic Bureau
PaulineWeatherall	British Oceanographic Data Centre, United Kingdom
Rochelle Wigley	Center for Coastal and Ocean Mapping/UNH, USA
David Wyatt	International Hydrographic Bureau

Annex 1

Agenda

Version 3.2

09:00 – 09:10	Chairman's opening remarks	*R. Falconer*
	• Goals of the meeting	
	• Agenda changes	
09:10 – 09:30	GEBCO Financial Report	*D. Clark*
	• Raising support for GEBCO operations	*R. Falconer*
09:30 – 10:00	GEBCO organizational issues	*R. Falconer*
	• Vacancies and succession on Guiding Committee	
	• TSCOM membership/succession plan	
	• SCRUM membership	
	• GEBCO Bathymetric Editor vacancy	
10:00 – 10:30	Future GEBCO Directions	*R. Falconer & C. Fox*
10:30 – 10:45	Coffee Break	
10:45 – 11:00	IHO report	*D. Wyatt*
11:00 – 11:15	IHO/IRCC-4 meeting	*J. Gianella*
11:15 – 11:45	IHO DCDB report – policy issues only	*L. Taylor*
11:45 – 12:00	IHO RHC meetings inventory list	*D. Clark*
12:00 – 13:00	Lunch (at IHB)	
13:00 – 13:15	IOC report	*TBD*
13:15 – 13:30	Digital Atlas Manager report - policy issues only	*P. Weatherall*
13:30 – 14:00	SCUFN report	*H-W. Schenke*
14:00 – 14:15	Report on the International Hydrographic Conference	*P. Lusiani & Sung*
14:15 – 14:45	TSCOM Report	*K. Marks*
14:45 – 15:30	SCRUM Report	*M. Jakobsson*
	• IBCSO Meeting Report	*H-W. Schenke*
	• Nippon Projects	*R. Falconer*
15:30 – 15:45	Coffee Break	
15:45 – 16:00	NF/GEBCO training project management committee report	*R. Falconer*
16:00 – 16:15	GEBCO IHO Workplan 2013- 2017	*C. Fox & D. Wyatt*
16:15 – 16:45	Outreach Working Group report	*P. Lusiani & H. Sung*
16:45 – 17:00	GEBCO Globes	*R. Anderson*
17:00 – 17:20	GEBCO World Map publication	*M. Jakobsson*
17:20 – 17:35	New/Other Business	*R. Falconer*
17:35 – 17:40	Dates and Places of Next Meetings, 2013 and 2014	*R. Falconer*
17:40 – 18:00	Action item review and wrap up	*R. Falconer & D. Clark*

Reference Documents:

1. IHO Regional Hydrographic Commissions and International Bathymetric Projects listing
2. 28th GEBCO Guiding Committee meeting actions

Annex 2

IHO Regional Hydrographic Commissions and International Bathymetric Projects								D.Clark 09/23/2012
Regional Hydrographic Commissions		**Meeting**	**Location**	**Date**	**IOC IBC project**	**Potential GEBCO participants (TBC)**	**Possible other Participants (Nippon Scholars)**	**GEBCO Attendees to past meetings**
Arctic	ARHC	3nd meeting	Tromsø, Norway	9-11 October 2012	International Bathymetric Chart Of The Arctic Ocean (IBCAO)	Martin Jakobsson	Anastasia Abramova, Yulia Zarayskaya	
Baltic	BSHC	17th Meeting	Helsinki, Finland	18 - 20 September 2012		Martin Jakobsson	Anastasia Abramova, Yulia Zarayskaya	
East Asia	EAHC	11th Meeting	Chang Mai, Thailand	4 - 6 September 2012	International Bathymetric Chart of the Western Pacific (IBCWP)	Hyo Hyun Sung, Shin TANI	Taisei Morishita, Djoko HARTOYO, Apolonio Lagonsin, Tsuyoshi YOSHIDA, Nguyen Duy THANH, Katagiri YASUTAKA, Muhammad YAZID, Koji Ito, Kentaro KANEDA, Anastasia Abramova, Rachot OSIRI, Francis Fletcher Freire, Athur Yordan Herwindya, Yulia Zarayskaya, Naot	
East Atlantic	EAtHC	12th Meeting	Lisbon, Portugal	14-16 November 2012	International Bathymetric Chart of the Central Eastern Atlantic (IBECA)	Etienne Cailliau	Abubakar Mustapha,	
Mediterranean and Black Sea	MBSHC	18th Meeting	Istanbul, turkey	1st half October 2013	International Bathymetric Chart of the Mediterranean (IBCM)	John Hall, Paolo Lusiani		
MESO American & Caribbean Sea	MACHC	13th Meeting	Antigua, Guatemala	19-23 November 2012	International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA)	Dagoberto Uriel David Viteri (confirmed)	Jorge Luis Heredia BUSTAMANTE, Leonardo TUN Humbert, Guillermo Humberto DIAZ PEÑA, Bernice Geraldine Mahabier	
Nordic	NHC	57th Meeting	Sweden	April 2013	International Bathymetric Chart Of The Arctic Ocean (IBCAO)	Martin Jakobsson	Neil Tinmouth	
North Indian Ocean	NIOHC	13th Meeting	Myanmar (TBC)	2013	International Bathymetric Chart of the Western Indian Ocean (IBCWIO)	Rochelle Wigley	Karlapati Srinivas, Muhammad BASHIR, Vasudev MAHALE, Priyantha Jinadasa, Mohammad Jashim Uddin	Rochelle Wigley
North Sea	NSHC	31th Meeting	TBD	TBD	International Bathymetric Chart Of The Arctic Ocean (IBCAO)			
ROPME Sea Area	RSAHC	5th Meeting	Kuwait	February 2013 (TBC)		Rochelle Wigley, Muhammad BASHIR		
South East Pacific	SEPHC	11th Meeting	Lima, PERU	June 2013	International Bathymetric Chart of the South East Pacific (IBCSEP)	Jose GIANELLA (confirmed), Hugo Montoro	Jose GIANELLA, Felipe Rafael BARRIOS Burnett,	
South West Atlantic	SWAtHC	7th Meeting	Argentina	2013		Walter Reynoso (confirmed) , Izabel King Jeck	Christina Franco de LACERDA	
South West Pacific	SWPHC	12th Meeting	Republic of Vanuatu	November 2013	International Bathymetric Chart of the Western Pacific (IBCWP)	Shereen Sharma, Bruce Goleby	James Daniell	
Southern Africa and Islands	SAIHC	9th Meeting	Mauritius	18 - 19 September 2012	International Bathymetric Chart of the Western Indian Ocean (IBCWIO)	Rochelle Wigley		
US Canada	USCHC	36th Meeting	New Orleans, USA	March 2013	International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico (IBCCA)	Chris Fox, Paola Travaglini, Lisa Taylor		Chris Fox
IHO Commissions								
IHO Hydrographic Commission on Antarctica	HCA	12th Meeting	Montevideo, Uruguay	10-12 October 2012	International Bathymetric Chart of the Southern Ocean (IBCSO)	Hans Werner Schenke, Bruce Goleby, Walter Reynoso (confirmed)		
IHO Committees								
Inter-Regional Coordination Committee	IRCC	5th meeting	India or Australia	03-04 June 2013		Chris Fox, Robin Falconer,		Jose Gianella

Annex 3

Element 3.8 Ocean Mapping Programmes

Objective: To contribute to global ocean mapping programmes through the IHO/IOC General Bathymetric Chart of the Oceans (GEBCO) Project, the International Bathymetric Chart (IBC) Projects and other related international initiatives

Task 3.8.1	Participate in annual meetings of relevant GEBCO bodies (including GC, TSCOM, SCUFN, SCRUM (desig) and Science Day)	2013-17	3 meetings each year; 1 IHO Director or 1 IHO Professional Assistant per meeting
Task 3.8.2	Monitor and advise the IHO Data Center for Digital Bathymetry (DCDB) operators on the operation of the IHO DCDB	2013 2015 2017	1 IHO Professional Assistant visit every 2 years
Task 3.8.3	Promote and encourage States and authorities to contribute bathymetric data to the IHO DCDB	2013-17	5K€/year; 25K€ total 2013 - 2017
Task 3.8.4	Contribute to the maintenance and extension of the following IHO standards, specifications and publications:		No significant IHO expense anticipated
	On-line function of B-4 B-6, B-7, B-8, B-10		
	B-9 (including gridded datasets)	2013-17	
Task 3.8.5	Contribute to outreach and education about ocean mapping	2013-17	10K€/year, 50K€ total for 2013 - 2017
Task 3.8.6	Support to continue to maintain the GEBCO Web site	2013-17	5K€/yr; 25K€ total 2013 - 2017
Task 3.8.7	Development of short course and course material on compiling digital bathymetric models (DBMs) to be included in GEBCO from a heterogeneous bathymetric source database	2013	10K€ for 2013
Task 3.8.8	Update and enhance the GEBCO Gazetteer	2013	15K€ for 2013, 2014, 2015; 45K€ total

Annex 4

GEBCO Map Production Principles

1. Introduction

1.1 Three of the eight goals of the IHO-IOC GEBCO Project are to:

- *Develop and constantly improve the authoritative description of global ocean depths*
- *Act as the designated international authority for undersea feature names*
- *Promote education and training in ocean mapping*

1.2 In order to provide greater flexibility and the widest possible use of GEBCO map products for educational purposes, awareness building and many other purposes, particularly in the digital environment, the following principles shall apply in relation to the production and use of GEBCO map products.

2. Principles

2.1 The primary GEBCO map product will be based on the relevant bathymetric datasets under the stewardship of the GEBCO Project. Such map products shall be described as GEBCO Primary Products.

2.2 Derived Products may then be created by any party through the inclusion of additional layers of information added to any GEBCO Primary Product.

2.3 A Derived Product containing additional layers of information shall retain the title and get-up of the GEBCO Primary Product, including notes, cautions references and logos, but shall also clearly indicate any additional information in its title; for example:

General Bathymetric Chart of the Oceans (GEBCO) *World Ocean Bathymetry together with …..*

2.4 Any additional information in a Derived Product that is not included in the corresponding GEBCO Primary Product shall be properly referenced to include the source of the additional information; for example:

… Names of sea areas shown in this product are taken from ….., or
… Geological/Plate tectonic information shown in this product is taken from …., or
… Boundaries shown on this product are taken from ….
and so on ….

2.5 The creation of a Derived Product based on a GEBCO Primary Product shall not require a license or permission for use provided that these guidelines are followed and the Derived Product is published on a not-for-profit or not for financial gain basis.

2.6 The compiler and publisher of a Derived Product shall clearly indicate their identity and their contact details on the Derived Product.

2.7 Derived Products, once published, may be listed and made available alongside the relevant GEBCO Primary Product; for example, via the GEBCO website.

Annex 5
Action Items

As of 03/04/2013

Number	Action	Name	Due Date	Status
GGC29 – 01	Write Letter to the Malaysia Hydrographic Office regarding the 2013 GEBCO meeting	Clark*, Falconer		Completed
GGC29 – 02	Actively look at the Prince Albert Foundation for GEBCO funding	Jakobsson, Fox	Postponed	
GGC29 – 03	Clarify procedure for IOC appointments to the GGC	Falconer, Clark	12/1/12	In progress
GGC29 – 04	Compile and distribute to GGC the list of GGC tenure	Clark, Falconer		Completed
GGC29 – 05	TSCOM co-chairs recruit members for the sub-committee	GGC		In progress
GGC29 – 06	Offer Paul Elmore position as Science Day Convener	Falconer, Clark		Completed
GGC29 – 07	Keep list of RHCs up to date through 2014 and track GEBCO participation	Clark	On going	In progress
GGC29 – 08	Send clean copy of GEBCO Bathymetry Cookbook to IHO and IOC for posting on the web	Marks		Completed
GGC29 – 09	Resolve IOC logo requirements and develop options	Weatherall. Wyatt	1/1/2013	Completed
GGC29 – 10	Explore link from ESRI to GEBCO web site	Weatherall		
GGC29 – 11	Develop Standard GEBCO Power Point presentation, place to the GEBCO web site	Fox, Weatherall		Completed
GGC29 – 12	Send Walter Peralta the Standard GEBCO presentation	Fox		Completed
GGC29 – 13	Develop plan for GEBCO outreach	Weatherall, Lusiani	2/1/2013	
GGC29 – 14	Develop proposal for a Lenticular Map of the Southern Ocean (IBCSO).	Schenke		In progress
GGC29 – 15	Send out the GEBCO portion of the approved 2013-17 IHO Workplan with funding levels	Clark, Fox	1/1/2013	In progress
GGC29 – 16	For 2013-17 IHO/GEBCO work plan, develop individual GEBCO task work plans	Task Leaders	3/1/2013	
*GGC28 – 02***	Formally submit the	Falconer		In progress

	recommendation of Bruce Goleby as member of the GEBCO Guiding Committee to IOC			
*GGC28 – 08***	Develop ideas for media involvement in Science day with Hali Felt and distribute to GGC	Falconer		
*GGC28 – 09***	Investigate availability of NOAA "print on demand" for GEBCO World Map	Fox		In progress

* First names have the lead
** From 2011 GGC meeting

Annex 6

Acronyms

ABLOS	Advisory Board on the Law of the Sea
AGU	American Geophysical Union
BODC	British Oceanographic Data Centre
CCOM	Centre for Coastal and Ocean Mapping
CGOM	Consultative Group on Ocean Mapping
DCDB	Data Center for Digital Bathymetry
DHN	Direccion de Hidrografia y Navegacion
EIHC	Extraordinary International Hydrographic Conference
ENC	Electronic Navigational Chart
FGDC	Federal Geographic Data Committee
GA	Geoscience Australia
GGC	GEBCO Guiding Committee
GIS	Geographical information system
IBC	International Bathymetric Chart
IBCAO	International Bathymetric Chart of the Arctic Ocean
IBCCA	International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico
IBCM	International Bathymetric Chart of the Mediterranean
IBCSO	International Bathymetric Chart of the Southern Oceans
IHB	International Hydrographic Bureau
IHO	International Hydrographic Organization
IMO	International Maritime Organization
IOC	Intergovernmental Oceanographic Commission
IRCC	Interregional Coordination Committee
iSCRUM	Interim Sub-Committee for Regional Undersea Mapping (GEBCO)
LDEO	Lamont-Doherty Earth Observatory
NF	Nippon Foundation
NGDC	National Geophysical Data Center, Boulder (USA)
NOAA	National Oceanographic and Atmospheric Administration
NOC	National Oceanographic Center, (UK)
NOCS	National Oceanography Centre - Southampton
NRL	Naval Research Laboratory (USA)
PMEL	Pacific Marine Environmental Laboratory
PRC	People's Republic of China
RHC	Regional Hydrographic Commission
RM	Regional Mapping
SCUFN	Sub-Committee on Undersea Feature Names (GEBCO)
ToR/RoP	Terms of Reference/ Rules of Procedure
TSCOM	Technical Sub-Committee on Ocean Mapping (GEBCO)
UNH	University of New Hampshire
WG	Working group

Annex 7

Report of the GEBCO Digital Atlas Manager (October 2011 – October 2012)

This report covers the work carried out at the British Oceanographic Data Centre (BODC) for GEBCO since the previous GEBCO meetings in October 2011.

In addition, Attachment I includes statistics on the distribution of GEBCO's data sets. Attachment II includes information on access to GEBCO's web site.

Updating the GEBCO_08 Grid

The GEBCO_08 Grid is a global terrain model at 30 arc-second intervals and is GEBCO's latest bathymetric data set. It is planned to continually update the data set with new bathymetric compilations. The following lists some of the data sets planned for inclusion in the next grid release. Details of some of these data sets have been reported on previously.

The aim is to release a new version of the GEBCO_08 Grid by the end of 2012.

Planned inclusions for the next release of the GEBCO_08 grid

1. Version 3 of the International Bathymetric Chart of the Arctic Ocean (IBCAO) http://www.ibcao.org/, doi: **10.1029/2012GL052219.**

This data set was published in June 2012 and supplied to GEBCO on behalf of the IBCAO by Prof. Martin Jakobsson of Stockholm University, Sweden. The grid covers the Arctic region north of 64°N.

This release represents the largest improvement to the data set since 1999. It includes new bathymetric data from a number of sources, such as the circum-Arctic nations, fishing vessels, US Navy submarines and research ships from various nations.

The data set has been edge-matched with the existing GEBCO grid along 64°N. A source identifier (SID) grid has been supplied for the IBCAO grid for inclusion in the GEBCO SID grid.

2. Waters around Australia

The Geoscience Australia (GA) gridded data set: 'Australian Bathymetry and Topography Grid, June 2009' (www.ga.gov.au/meta/ANZCW0703013116.html) covering the area 92°E-172°E; 8°S-60°S has been supplied to GEBCO.

Data from the GA grid based on Multibeam, Fairsheets and LADS data sets, mainly in near-shore regions, have been extracted and included in the GEBCO_08 Grid ready for publication in the

next release of the data set.

3. Olex data

Olex is a Norwegian company that produces mapping and visualisation software, largely based on data collected from fishing vessels. They have made a sub-sample of their global marine soundings database available to GEBCO. This data set is largely focussed in shallower water areas, mainly in the North Atlantic Ocean region. Part of the data set, for regions around the UK, has already been included in the GEBCO_08 Grid.

Work has been done to update the GEBCO_08 Grid with Olex data off the west coast of Africa from approximately 11°N to 33°N.

4. South China Sea region

As part of the initiative to request shallow water bathymetry data from hydrographic organisations to help improve GEBCO's grids in shallower water regions, bathymetry data extracted from ENCs has been received from the East Asia Hydrographic Commission for part of the South China Sea region (101°E-122°E; 5°S-25°N).

Data for shallower water regions has been used to update the GEBCO_08 Grid ready for publication in the next release of the data set.

5. North Atlantic Ocean – Gulf of Cadiz region

A bathymetric grid, based on multibeam data from a number of cruises, has been received for the Gulf of Cadiz region, west of the Strait of Gibraltar. The data set has been developed as part of a study into the fault system at the plate boundary between Eurasia and Africa in the central Atlantic.

Further information about the data set can be found in "The quest for the Africa–Eurasia plate boundary west of the Strait of Gibraltar: Zitellini, N., Gràcia, E., Matias, L., Terrinha, P., Abreu, M.A., DeAlteriis, G., Henriet, J.P., Dañobeitia, J.J., Masson, D.G., Mulder, T., Ramella, R., Somoza, L. and Diez, S. (2009). Earth and Planetary Science Letters, 280, (1-4), 13-50. (doi:10.1016/j.epsl.2008.12.005)".

The data set has been merged into the existing GEBCO_08 Grid ready for publication in the next release of the data set.

6. Sumatra subduction zone area

Work is being done to include multibeam bathymetry data from the 2004 HMS Scott survey of the Sumatra subduction zone, 93°E-96°E; 2°N-6°N, into the GEBCO_08 Grid.

7. Lamont-Doherty Earth Observatory (LDEO) Global Multi-Resolution Topography (GMRT) synthesis

The Lamont-Doherty Earth Observatory (LDEO) at Columbia University have provided over 9,600 data tiles from their Global Multi-Resolution Topography (GMRT) tile set (400m resolution) for updating GEBCO's grid. The data set contains significant data contributions in all ocean regions. However, some data sets are already included in the GEBCO_08 Grid.

The LDEO GMRT synthesis makes use of sonar data collected by scientists and institutions worldwide, merging them into a single, continuously-updated compilation of high-resolution seafloor topography. The synthesis began in 1992 as the Ridge Multibeam Synthesis (RMBS). It was expanded to include multibeam bathymetry data from the Southern Ocean and now includes other bathymetry from throughout the global and coastal oceans.

Further information about the source data set can be found on the GMRT web site: http://www.marine-geo.org/portals/gmrt/

Work has been done to include the data into the existing GEBCO grid using the 'remove-restore' procedure. Final quality control checks, for example to look for edgematch artifacts, need to be carried out before this update can be finalized.

8. Multibeam data

A copy of the multibeam data held at the US National Geophysical Data Center (NGDC), which have been filtered to 500m resolution, has been supplied by David Sandwell and colleagues at Scripps Institution of Oceanography (SIO) for GEBCO grid updating work. The data set consists of over 600 files, identified by their cruise name.

Work is being done to compare this data set with the existing GEBCO grid and with the LDEO tile set, where there are overlaps in data set coverage. Investigations into any potential data spikes in the multibeam data set are also being carried out. Procedures such as 'remove-restore' are being looked at as a way to include these data sets into the existing GEBCO_08 Grid.

Updating GEBCO's base grid

The GEBCO_08 Grid uses as its base version 5.0 of the SRTM30_plus data set. This data set was developed from a database of ship-track soundings with interpolation between soundings guided by satellite-derived gravity data. Where they improve on this base grid, data sets developed by other methods such as regional contributions for the Arctic Ocean (IBCAO), Weddell, Caspian and Black Sea areas have been included to create the GEBCO_08 Grid.

During the year work has been done to assist Dr. Karen Marks of the US National Oceanic and Atmospheric Administration (NOAA) Laboratory for Satellite Altimetry, in looking at the differences between the latest version of the SRTM30_plus grid (version 7.0) and the existing GEBCO_08 Grid. Compared to version 5.0, version 7.0 is based on a larger number of soundings data sets and uses an updated bathymetric model that combines depth estimates from altimetric gravity with ship soundings.

The comparison work has been done with a view of adopting version7.0 as a base for building

the next GEBCO grid, adding regional compilations on top of this base grid. However, the comparison work and discussions over the use of the data set by GEBCO are currently ongoing.

It is planned to continue to use and update the existing GEBCO base grid at present with new surveys and bathymetric compilations while this matter is investigated further.

Metadata work

GEBCO makes available a Source Identifier (SID) Grid to accompany the GEBCO_08 Grid. This indicates which of the corresponding cells in the GEBCO_08 Grid are based on soundings or existing grids and which have been interpolated. At present this is of the form of a 'yes'/'no' grid – i.e. a cell is marked as constrained or unconstrained by survey/gridded data.

As mentioned above, the 'base' for the GEBCO_08 Grid is version 5.0 of the SRTM30_plus data set. GEBCO has adopted the SID grid, numbering system and associated metadata records used by the SRTM30_plus team. Since the last GEBCO meeting work has been done in collaboration with David Sandwell and colleagues at SIO to quality control the SID records, for example, checking that the SID numbers are attributed to the correct survey information. The data set contains over 8,000 records. This quality control work is ongoing.

In addition, GEBCO has defined a set of attribute fields for the source survey data sets that it would like to be able to deliver metadata for.

Proposed SID file attribute fields for survey data sets:

- Cruise ID
- Chief Scientist or Investigator
- Contributing organisation
- Country
- Platform
- Device Type e.g. multibeam, singlebeam
- Device name (if known)
- Cruise Dates (start date and end date)
- URL of original dataset at repository (can be multiple)
- URL of the original metadata

Proposed SID file attribute fields for contributed grids:

- Originating Bathymetric Compilation and version number
- Additional metadata pertaining to the compilation
- Contributing organisation (if applicable)
- Contributing country (if applicable)
- URL of the original data set

- URL of accompanying metadata
- DOI or reference

Work is being done to populate these attribute fields. These additional attribute data are taken from many sources. Further work is needed to quality control the information; this involves using standardised sets of terms (controlled vocabularies) to define the information in some of the fields, for example, ship names and organisation names.

As a means of allowing users to view and interrogate the SID file and its accompanying metadata, it is intended to develop a queryable Web Map Service for the SID Grid. This would allow individual grid cells/pixels within the WMS image to be queried and metadata associated with the corresponding cell in the GEBCO_08 SID Grid to be viewed and retrieved.

Hosting a Nippon Foundation/ GEBCO student laboratory visit

BODC was pleased to have the opportunity to host a two-week visit by Cdr. Norhizam Hassan, of the Malaysian Hydrographic Office, in June/July 2012. Hizam is involved in the Indian Ocean Regional Mapping project and during his visit we looked at the use of Generic Mapping Tools (GMT) software and Esri ArcGISDesktop software in generating and quality controlling gridded bathymetric data sets.

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.

The 'news and events' web pages: (www.gebco.net/about_us/news_and_events/) are regularly updated throughout the year. Users can be kept informed about the release of news items via a Really Simple Syndication (RSS) feed.

Since the web site relaunch in July 2008, there have been over 800,000 page views. Further statistics concerning access to GEBCO's web site can be found in Attachment II of this report.

During the year the following information has been added to the site:

- Imagery collated onto one web page: http://www.gebco.net/data_and_products/imagery/
- Links pages updated and extended: http://www.gebco.net/links/
- Presentations from the GEBCO Centenary Conference: http://www.gebco.net/about_us/presentations_and_publications/#centenary_conference
- Information for GEBCO's meetings in 2012: http://www.gebco.net/about_us/meetings_and_minutes/gebco_meetings_2012.html

http://www.gebco.net/about_us/meetings_and_minutes/gebco_science_day_2012/

- Presentations from the Sixth GEBCO Science Day: http://www.gebco.net/about_us/gebco_science_day/
- Privacy and cookies: http://www.gebco.net/privacy_and_cookies/

GEBCO's Facebook page (http://www.facebook.com/GEBCO) has been regularly updated with news and events stories from our web site and other articles of interest about bathymetry. We have around 220 friends of GEBCO who access our Facebook pages.

Making GEBCO's bathymetric data sets available

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.

Internet access

Through a web application, GEBCO's grids can be downloaded from the internet. Users can download global grid files or data for a user-defined geographic area.

Since its release in January 2009, there have been over 18,900 downloads of data from the GEBCO_08 Grid and over 31,700 downloads of data from all GEBCO's gridded data sets (i.e. GEBCO_08 Grid, SID Grid and GEBCO One Minute Grid).

GEBCO's grids can be accessed from:

- http://www.gebco.net/data_and_products/gridded_bathymetry_data/
- https://www.bodc.ac.uk/data/online_delivery/gebco/

Statistics detailing access to GEBCO's gridded data sets from the internet can be found in Attachment I of this report.

GEBCO Digital Atlas (GDA)

The GEBCO Digital Atlas is a collection of GEBCO's digital bathymetric data sets. The data sets can be viewed and accessed through a software interface. It is distributed on DVD.

Since its release in 2003, 1,586 copies of the GDA have been distributed. Further statistics about the distribution of the GDA can be found in Attachment I of this report.

Data set user support

We have dealt with 115 email enquiries concerning GEBCO's data sets and products since October 2011.

The enquiries range from requests for information on the availability of bathymetry data sets for specific geographic areas to general information on GEBCO's data sets and products.

GEBCO's data sets have a wide range of users. In addition to the scientific community we receive requests from the general public, students wanting to access data for their project work and also commercial companies requesting use of the data in their products and models. Over the last year we have had a number of enquiries from organisations, including TV and film companies, just interested in accessing imagery showing the shape of the sea floor.

Further information concerning some of these requests can be found in Attachment I.

P. Weatherall (paw@bodc.ac.uk), 26,09,2012

Attachment 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 13th September 2012, 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 January 2009 to 13th September 2012

- Total number of downloads: 18,994
- Full global data set: 6,105
- User-selected sub-regions of the global grid: 12,889

Since last year's meeting: 01 October 2011 to 13th September 2012

- Total number of downloads: 6,326
- Full global grid: 1,972
- User-selected sub-regions of the global grid: 4,354

GEBCO_08 Source Identifier Grid

From the data set's release in 27 November 2009 to 13th September 2012

- Total number of downloads: 4,251
- Full global data set: 2,138
- User-selected sub-regions of the global grid: 2,113

Since last year's meeting: 01 October 2011 to 13th September 2012

- Total number of downloads: 1,735
- Full global grid: 851
- User-selected sub-regions of the global grid: 884

GEBCO One Minute Grid

Since last year's meeting: 01 January 2009 to 13th September 2012

- Total number of downloads: 8,541
- Full global data set: 3,951
- User-selected sub-regions of the global grid: 4,590

Since last year's meeting: 01 October 2011 to 13th September 2012

- Total number of downloads: 2,407
- Full global data set: 1,115
- User-selected sub-regions of the global grid: 1,292

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

- Total number of downloads since January 2009: 10,311
- Total number of downloads since October 2011: 3,232

Distribution of the GEBCO Digital Atlas (GDA)

Since 01 October 2011, 84 copies of the GDA have been distributed. This includes 29 copies sold and 55 complimentary copies. This year, 53 copies have been given to participants on training programmes.

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 2011 amounted to £3,174. This makes a total of £77, 626 since the re-release of the GDA in 2003.

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

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

Requests to use GEBCO's data sets in specific projects

The following are some of the requests we have received concerning the use of GEBCO's data sets in specific products, some commercially. For user confidentiality reasons, only general information about the nature of the requests is given. Enquirers are asked to acknowledge the source of the data set.

Use of the GEBCO world map

1. Request to use a section of the map image in a Hollywood film
2. Use of the image as a background for a game for use on smart phones
3. Use as a web site background by a ballast water treatment company
4. Use of the image on a music CD cover

Use of the GEBCO_08 Grid

1. Request to use data from the GEBCO_08 Grid in developing a 3D 'immersive environment' package about the oceans for the educational market.
2. Use of the GEBCO_08 Grid to prepare bathymetric images for a study report concerning the evaluation of potential geo-hazards related to proposed gas pipeline routes off Turkey and surrounding waters.
3. Use of GEBCO bathymetry as a background/reference layer in a public interface for viewing meteorological and forecast information around Australia.
4. Use of the GEBCO_08 Grid for investigating the propagation of underwater noise in environmental impact assessments for offshore developments.
5. Use in software which predicts underwater sound propagation for testing SONAR.
6. Use of the GEBCO_08 Grid in a commercially-developed numerical wave model.

Use of the GEBCO Web Map Service (WMS)

1. Inclusion of the GEBCO WMS in a map application for waters around Norway.

Attachment II

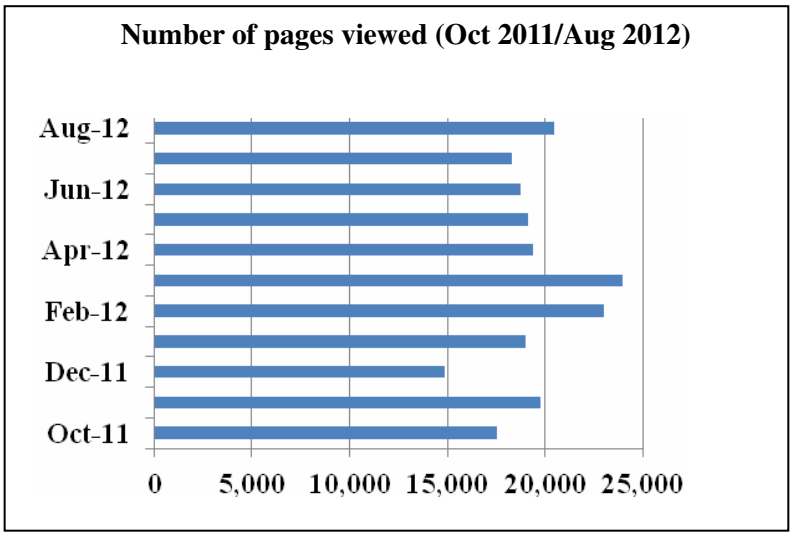
GEBCO's web site was re-launched in July 2008; since then there have been over 800,000 web pages viewed. The web site is maintained, on behalf of GEBCO, by the British Oceanographic Data Centre (BODC).

1. Visits to GEBCO's web site

The following tables and diagrams provide statistics about access to GEBCO's web site (www.gebco.net) for the reporting period 1st October 2011 to 13th September 2012.

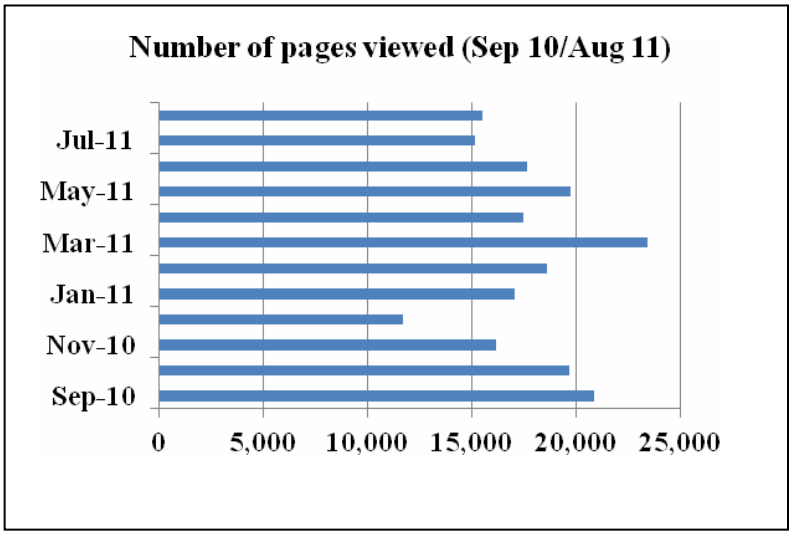
In summary, there were over 75,600 visits to the site, viewing over 224,600 pages.

Month	Number of pages viewed
Oct-11	17,516
Nov-11	19,803
Dec-11	14,859
Jan-12	18,977
Feb-12	23,019
Mar-12	23, 971
Apr-12	19, 387
May-12	19,109
Jun-12	18,769
Jul-12	18,335
Aug-12	20,471



For comparison purposes, details on the number of web pages viewed for the previous 12 month reporting period are given below.

Month	Number of pages viewed
May-11	19,709
Jun-11	17,639
Sep-10	20,863
Jul-11	15,166
Oct-10	19,682
Aug-11	15,492
Nov-10	16,144
Dec-10	11,685
Jan-11	17,082
Feb-11	18,618
Mar-11	23,450
Apr-11	17,485



2. Number of visits to individual GEBCO web pages

The following table details the number of visits to the most popular pages on GEBCO's web site.

Explanation of terms used:

Page title and URL	Title of the GEBCO web page viewed with URL
Page views	The total number of pages viewed. Repeated views of a single page are counted.
Average time on page (minutes)	The average amount of time that visitors spent viewing this set of pages or page.

Page title and URL	Page views	Average time on page (minutes)
Gridded bathymetry data* www.gebco.net/ /data_and_products/gridded_bathymetry_data/index.html	37,202	01:39
GEBCO home page www.gebco.net/index.html	36,067	01:02
GEBCO world map www.gebco.net/data_and_products/gebco_world_map/index.html	29,279	01:06
GEBCO Digital Atlas www.gebco.net/data_and_products/gebco_digital_atlas/index.html	12,090	00:56
GEBCO's data and products www.gebco.net/data_and_products/index.html	8,527	00:21
External link to grid data download page* www.bodc.ac.uk/data/online_delivery/gebco/index.html	8,115	06:49
Contacts information www.gebco.net/about_us/contact_us/index.html	5,836	03:12
GEBCO grid display software	5,732	01:19

www.gebco.net/data_and_products/grid_display_software/index.html		
General interest www.gebco.net/general_interest/index.html	5,513	00:30
Undersea feature names www.gebco.net/data_and_products/undersea_feature_names/index.html	5,251	01:22
GEBCO world map – large JPEG image www.gebco.net/data_and_products/gebco_world_map/images/gda_world_map_large.jpg	3,877	04:01
GEBCO web map service www.gebco.net/data_and_products/gebco_web_services/web_map_service/index.html	3,681	02:29
Grid plots www.gebco.net/data_and_products/gridded_bathymetry_data/grid_plots/index.html	3,107	01:01
GEBCO Nippon Foundation Training Project www.gebco.net/training/training_project/index.html	3,058	03:01
General interest – FAQ page www.gebco.net/general_interest/faq/index.html	2,711	02:26
Mapping projects www.gebco.net/regional_mapping/mapping_projects/index.html	2,700	01:07
Regional mapping overview www.gebco.net/regional_mapping/index.html	2,567	00:24
Hard copy charts www.gebco.net/data_and_products/hard_copy_charts/index.html	2,456	00:50
Web services overview web page www.gebco.net/data_and_products/gebco_web_services/index.html	2,423	00:16

Training overview web page www.gebco.net/training/index.html	1,763	00:40
Committees and groups www.gebco.net/about_us/committees_and_groups/index.html	1,721	02:19

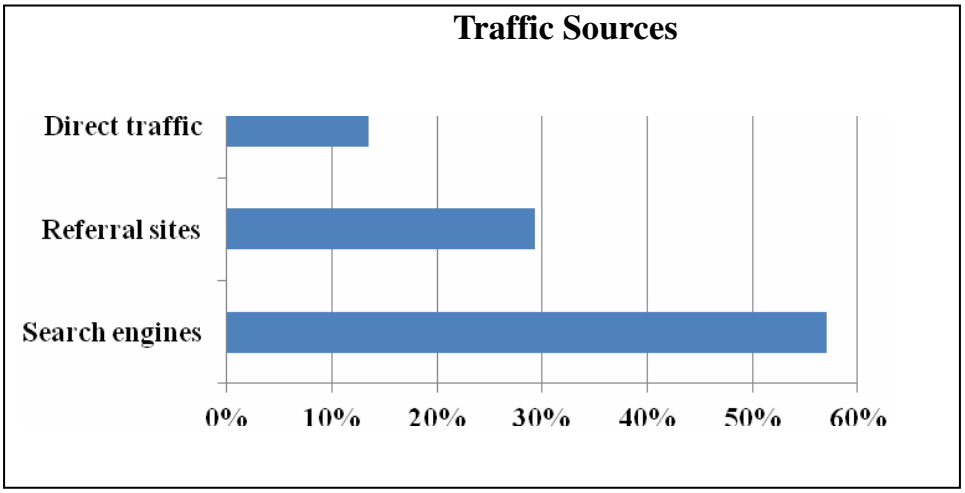
*See Attachment I for details on Internet downloads of GEBCO's gridded bathymetric data sets.

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 table below details how users are finding GEBCO's web site, either directly, using keywords in a search engine or from referral sites. The 'top 15' traffic sources are listed.

Note the number of referrals from sites that use the GEBCO_08 Grid as background imagery, i.e. OpenSeaMap and Esri ArcGIS Online.

Explanation of terms used:

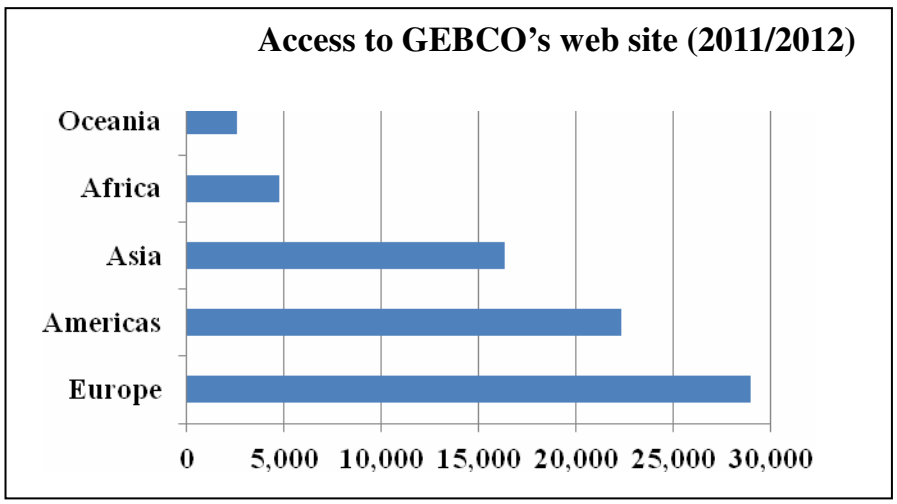
Source	The source of traffic to the site, e.g. the name of the referral site or search engine:

Medium	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
Visits	The number of visits to the site
Pages/visit	The average number of pages per visit
Average time on site (minutes)	The average amount of time spent on the site in minutes

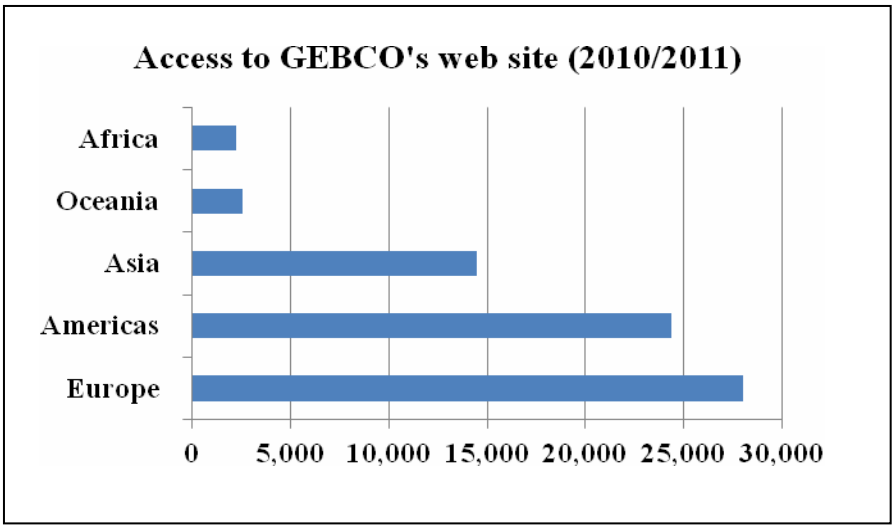
Source/Medium	Visits	Pages/visit	Average time on site (minutes)
google / organic	40,503	2.88	02:47
(direct) / (none)	10,233	2.90	03:18
ngdc.noaa.gov / referral	4,056	4.29	03:44
google.com / referral	2,101	1.68	00:55
en.wikipedia.org / referral	1,374	4.14	03:37
iho.int / referral	1,079	3.29	03:23
bodc.ac.uk / referral	1,055	3.15	03:18
yahoo / organic	834	2.46	01:54
bing / organic	783	2:21	02:21
openseamap.org / referral	777	4.71	02:46
arcgis.com / referral	592	3.57	05:18
google.co.uk / referral	570	1.50	00:33
maps.ngdc.noaa.gov / referral	481	3.29	03:52
facebook.com / referral	451	2.47	03:59
de.wikipedia.org / referral	289	4.89	05:38

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

The diagram below outlines the numbers per continent of IP addresses accessing GEBCO's web site.



For comparison, the table below gives the same information for the previous reporting period. To note, a slight increase during this reporting year in the number of visits from Africa and Asia and slight decrease from the Americas.



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 time on site (minutes)
United States	14,644	2.91	02:30
United Kingdom	7,885	2.61	02:14
Germany	3,618	3.67	02:57
France	3,075	3.60	03:07
India	2,880	2.42	02:16

Canada	2,395	3.06	02:19
Russia	2,269	2.94	03:09
Japan	2,076	3.27	02:58
Spain	1,993	3.69	03:18
Italy	1,770	3.77	03:16
Australia	1,751	3.14	03:21
China	1,673	3.01	04:01
Indonesia	1,638	3.24	04:27
Brazil	1,248	3.29	03:42
Netherlands	984	3.17	03:01
Mexico	971	3.57	04:06
South Korea	938	3.91	05:18
Norway	872	3.74	03:47
Nigeria	846	1.65	01:51
Philippines	843	2.25	02:17