



Status of the GEBCO Grid

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Status of the GEBCO Grid

- **Introduction: GEBCO's grids**
- **Updating the GEBCO grid**
- **Delivery of GEBCO's grids**
- **Source Identifier (SID) Grid metadata work**

Introduction: GEBCO's grids

GEBCO's current global bathymetric model is the GEBCO_08 Grid – a global terrain model at 30 arc-second intervals

- Originally built from a database of ship-track soundings with interpolation between soundings guided by satellite-derived gravity data. Where they improve on this base grid, other data sets have been included.
- With the exception of the polar regions, land data are based on the SRTM30 data set
- The grid is accompanied by a Source Identifier (SID) Grid
- The grid was first released in January 2009, with two updates released in 2010
- It has been used as a 'base' grid with new data sets added on top

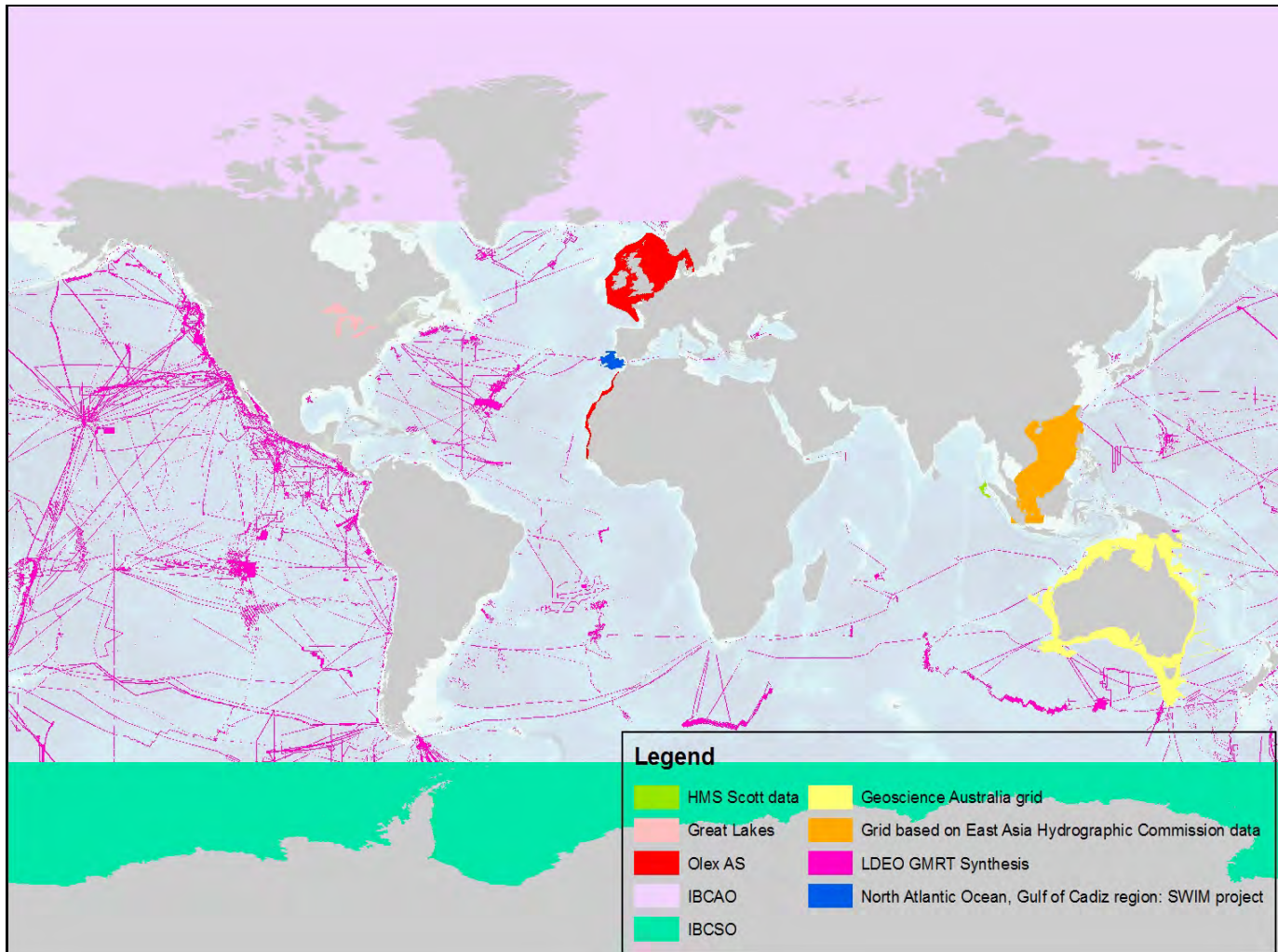
Updating the GEBCO grid

Since the last release of GEBCO_08 we have been working to update the data set.

- Work on a new release of the grid is now complete and it will be available late 2013
- The new grid will be called: **GEBCO_2013**
- In addition to updates reported on at last year's meeting, the following data sets have been added this year:
 - International Bathymetric Chart of the Southern Ocean (IBCSO) v1
 - Coverage of Olex data extended for the Northwest European shelf region
 - Bug fix for 'Sandy Island' in the Coral Sea area of the South Pacific

Updating the GEBCO grid

Updates included in the GEBCO_2013 Grid:



Updating the GEBCO grid

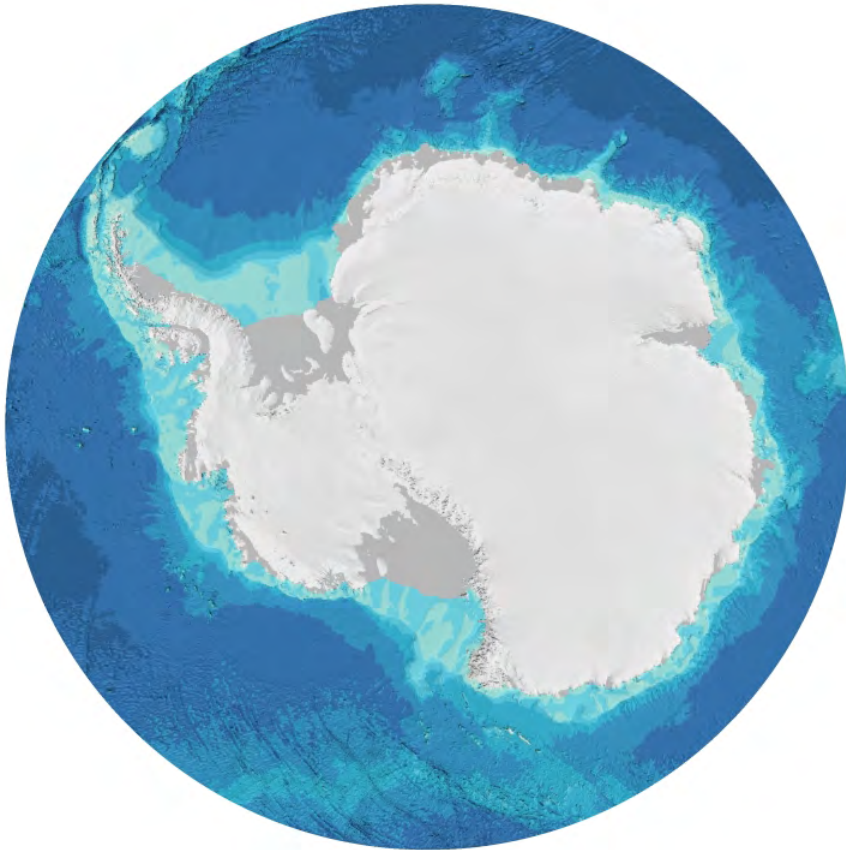
The full list of updates included in the GEBCO_2013 Grid:

- International Bathymetric Chart of the Arctic Ocean (IBCAO) V3
- International Bathymetric Chart of the Southern Ocean (IBCSO) V1
- Data from the Australian Bathymetry and Topography Grid, June 2009
- Bathymetry data for all ocean regions: From the LDEO Global Multi-Resolution Topography (GMRT) synthesis
- South China Sea region: update based on sounding data extracted from ENC's, provided by the EAHC
- North American Great Lakes: Bathymetric grids provided by NOAA/NGDC
- North Atlantic Ocean, Gulf of Cadiz region: Bathymetric compilation produced under the European Social Fund (ESF) EuroMargins SWIM project
- Indian Ocean, region off Sumatra: Bathymetric survey carried out by HMS Scott in 2005
- Waters off the West Coast of Africa: update based on bathymetry data from Olex (between 8°N and 34°N)
- Northwest European Continental Shelf area: update based on bathymetry data from Olex AS. Olex data coverage extended from 0°E to 15° 30'E
- South Pacific Ocean, Coral Sea region, update to correct an error in the GEBCO grid due to the inclusion of an erroneous island ("Sandy Island") using data supplied by Geoscience Australia (on behalf of the data set originators at the University of Sydney)

Updating the GEBCO grid

Updates included in the GEBCO_2013 Grid:

**International Bathymetric Chart of the Southern Ocean (IBCSO) v1 – south of 60°S
(www.ibcso.org)**



Bathymetry grid

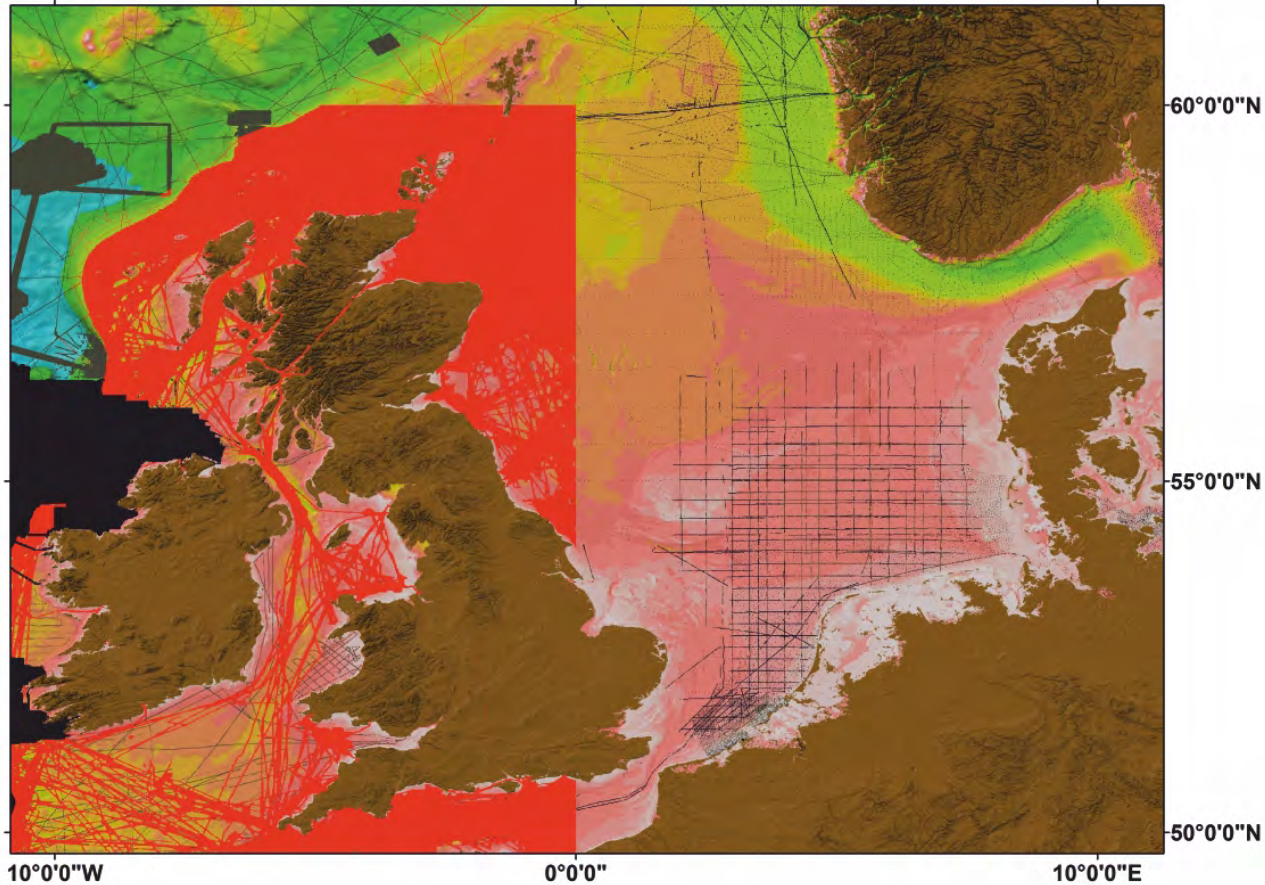


Source Identifier Grid

Updating the GEBCO grid

Updates included in the GEBCO_2013 Grid:

OLEX data coverage extended for the Northwest European Shelf region

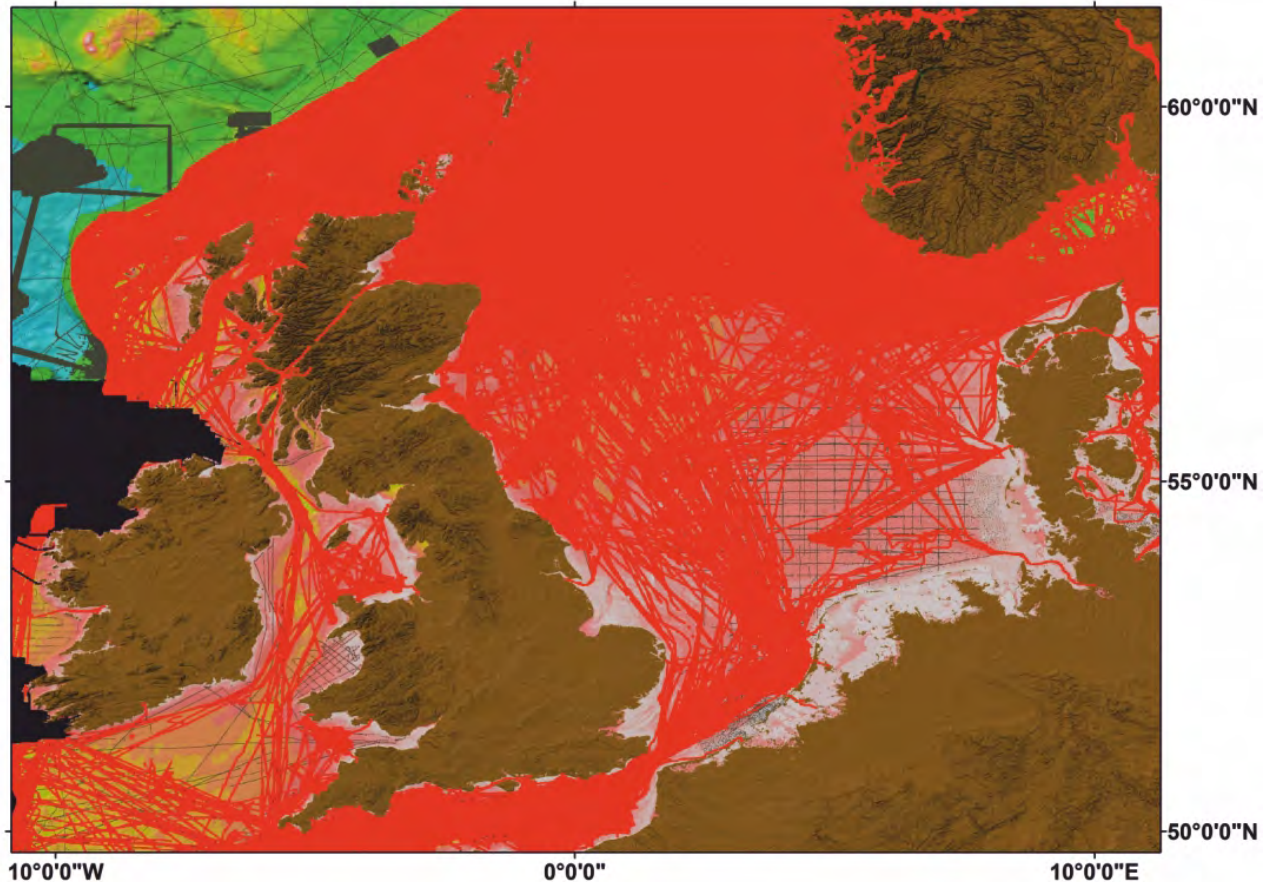


Coverage of Olex data in GEBCO_08 Grid shown in red

Updating the GEBCO grid

Updates included in the GEBCO_2013 Grid:

OLEX data coverage extended for the Northwest European Shelf region

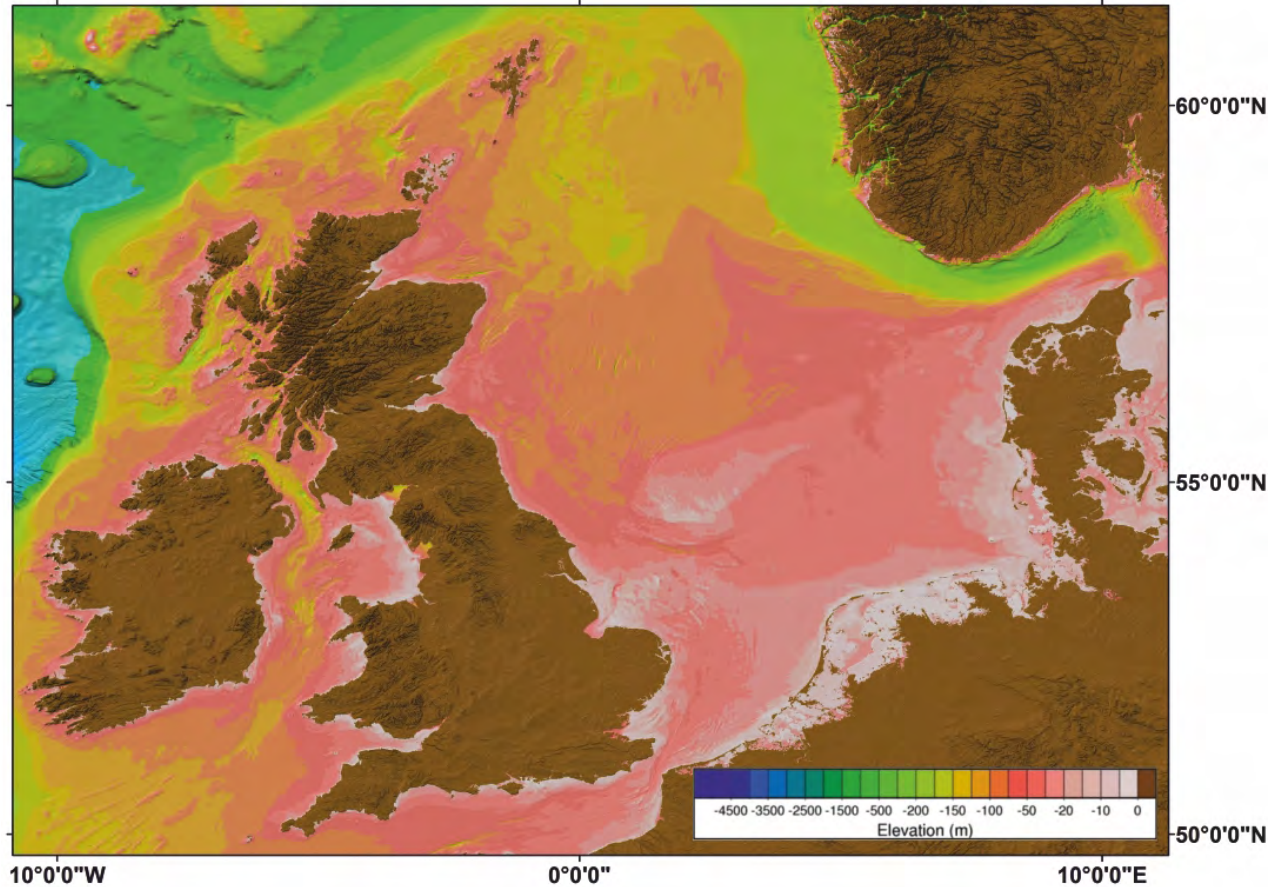


Coverage of Olex data in [GEBCO_2013](#) Grid shown in red

Updating the GEBCO grid

Updates included in the GEBCO_2013 Grid:

OLEX data coverage extended for the Northwest European Shelf region



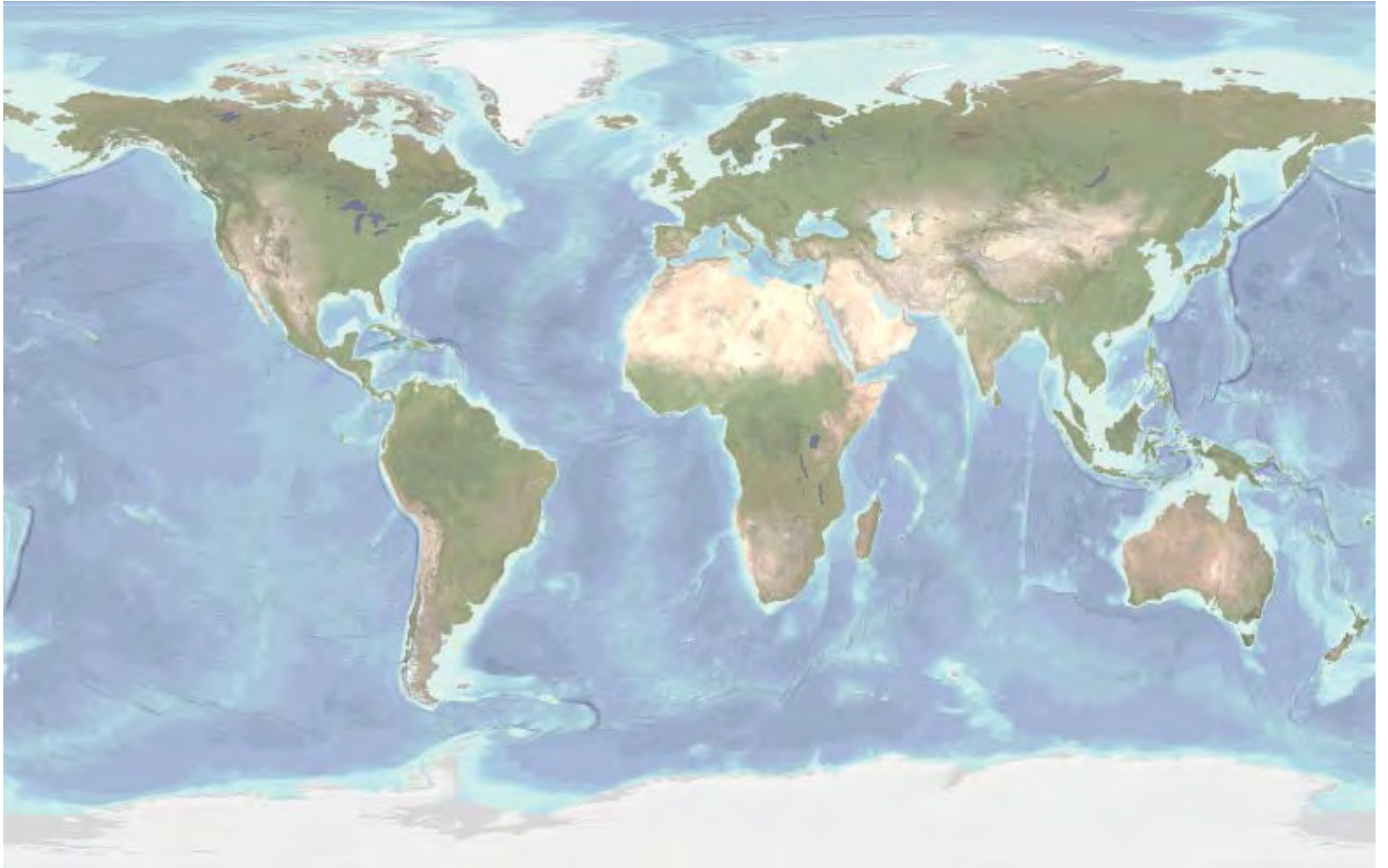
GEBCO_2013 Grid

Updating the GEBCO grid

Summary:

- 11 new data sets included in the next release of the GEBCO grid
- The grid will be called GEBCO_2013
- It is aimed that the grid will be available late 2013

Delivery of GEBCO's grids



Delivery of GEBCO's grids

- GEBCO's grids are made available on behalf of GEBCO by BODC:
https://www.bodc.ac.uk/data/online_delivery/gebco/
- As with the current release, the new GEBCO grid will be available in netCDF form for download from the internet – as a global file or for user-defined areas
- and as part of the GEBCO Digital Atlas (GDA)
- The existing web application for delivering GEBCO's grids has been updated and extended, allowing the 'cutting' of user-selected areas to be done in the background so that the data can be collected later

Delivery of GEBCO's grids

For this release, the grids will include the NetCDF Climate and Forecast (CF) metadata conventions (<http://cf-pcmdi.llnl.gov/>)

The conventions are designed to promote the processing and sharing of netCDF files

i.e. it allows metadata to be carried as part of the data set

As part of these conventions the following items are included within the netCDF file:

- 'standard_names' and 'long_names' to define the data set variables
- Global attributes to provide information about the data set, e.g. its title, history, source, references etc

Delivery of GEBCO's grids

example CF metadata from within the netCDF file:

variables:

short elevation(lat, lon);

elevation:standard_name = "height_above_reference_ellipsoid" ;

elevation:long_name = "Elevation relative to sea level" ;

elevation:units = "m" ;

double lat(lat) ;

lat:standard_name = "latitude" ;

lat:long_name = "latitude" ;

lat:units = "degrees_north" ;

at:axis = "Y" ;

double lon(lon) ;

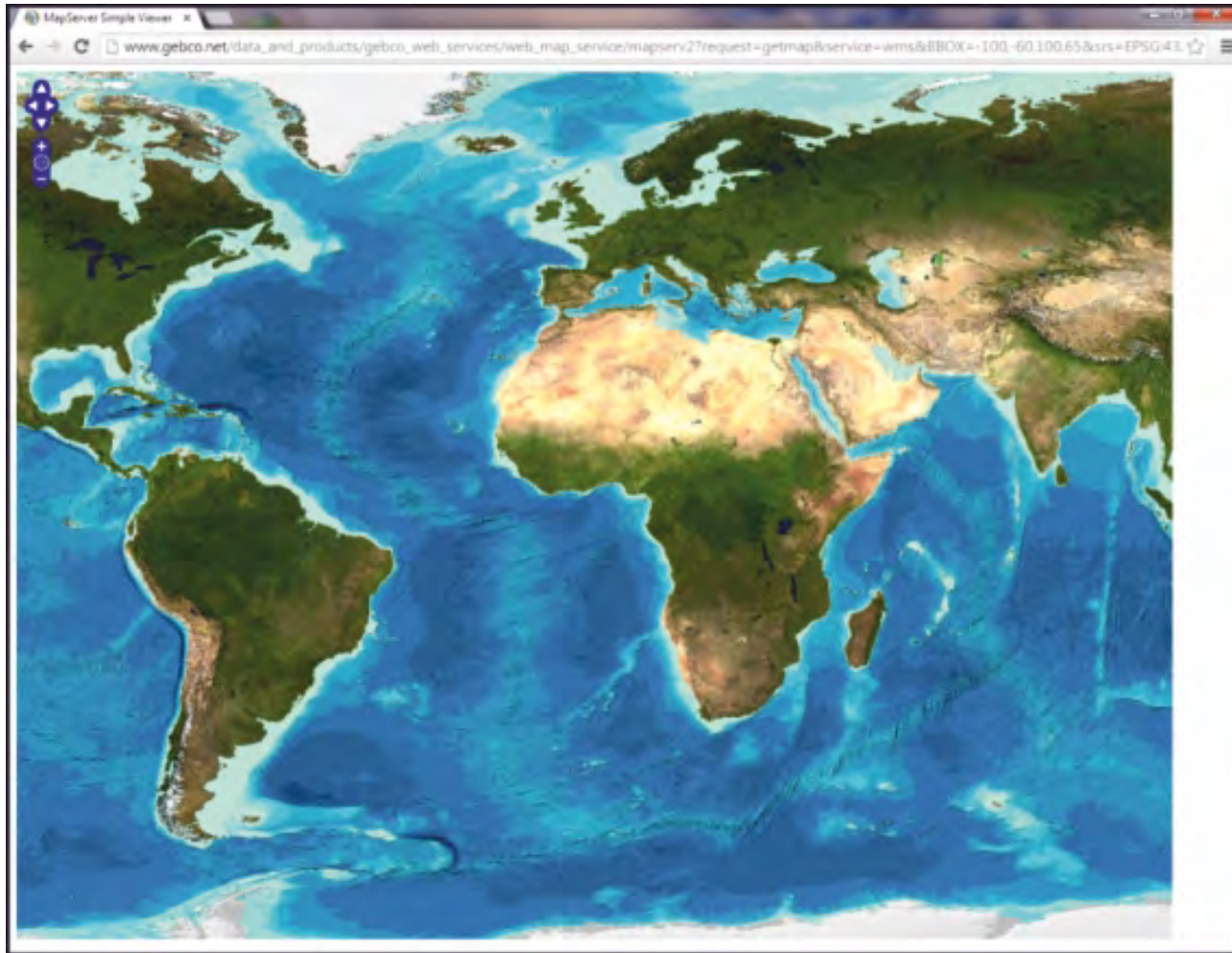
lon:standard_name = "longitude" ;

lon:long_name = "longitude" ;

lon:units = "degrees_east" ;

lon:axis = "X" ;

Delivering imagery based on GEBCO's grids – web map service



Updated version of the GEBCO WMS - Image produced in a web browser from a 'getmap' request to the GEBCO WMS – displaying the bathymetry layer

Delivering imagery based on GEBCO's grids – web map service

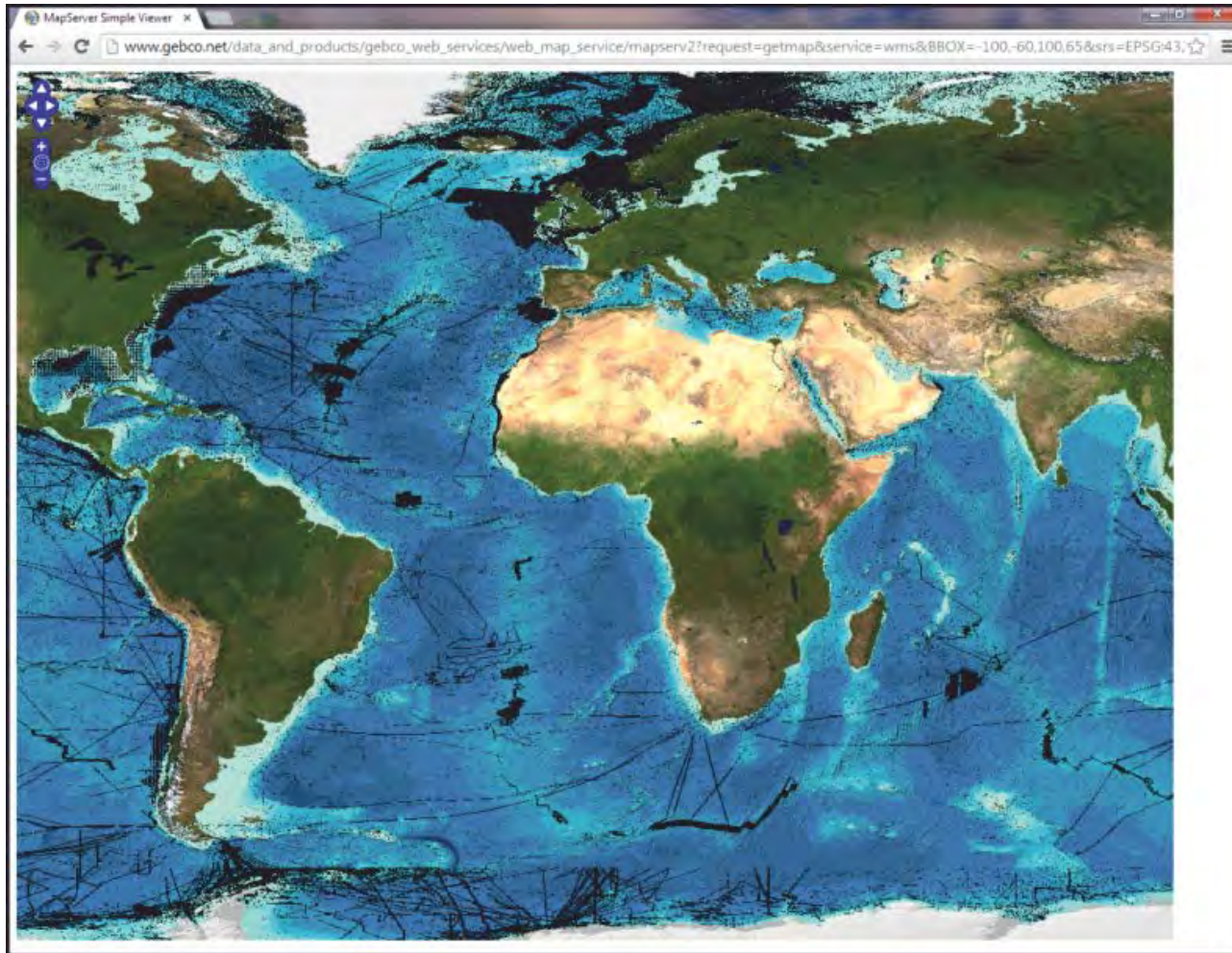


Image produced in a web browser from a 'getmap' request to the GEBCO WMS – **new for the next release displaying the bathymetry layer and SID layer**

Delivering imagery based on GEBCO's grids – web map service

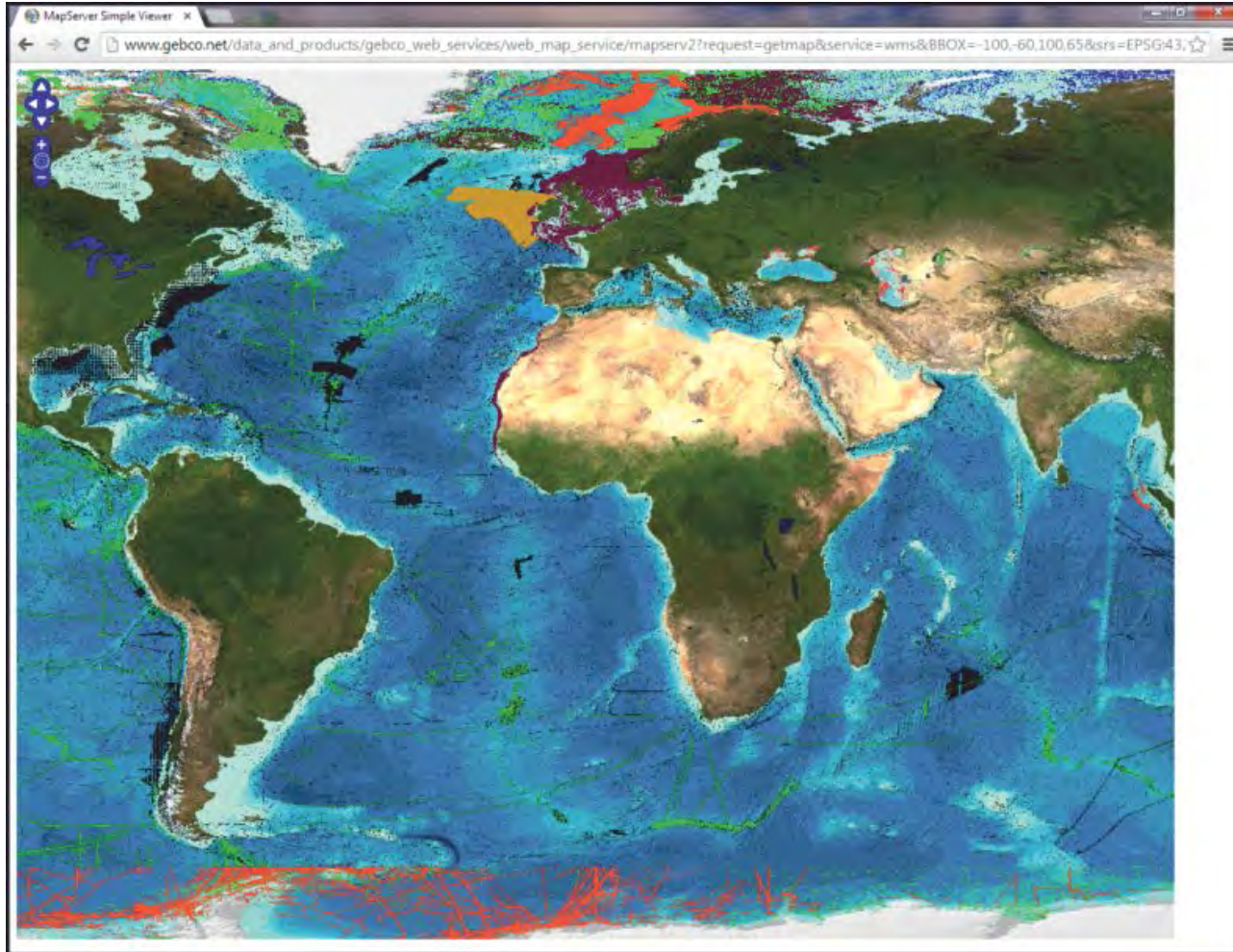
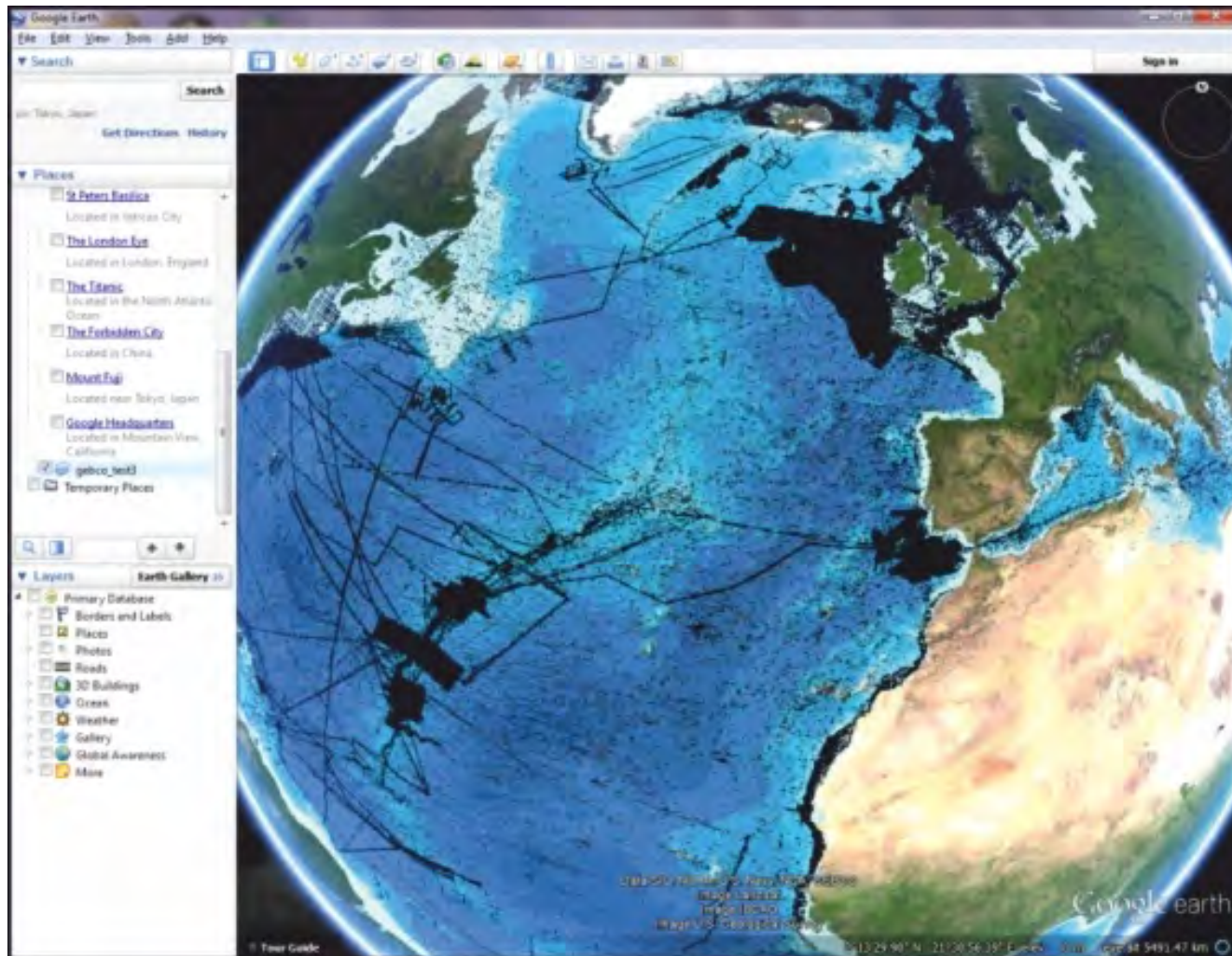


Image produced in a web browser from a 'getmap' request to the GEBCO WMS – displaying the bathymetry layer and SID layer – colour-coded for survey source

Delivering imagery based on GEBCO's grids – web map service

Viewing the new GEBCO WMS layers in Google Earth



Delivery of GEBCO's grids – web map service

Test WMS based on the new grid:

http://www.gebco.net/data_and_products/gebco_web_services/web_map_service/mapserv2?request=get_map&service=wms&BBOX=-70,30,5,65&srs=EPSG:4326&format=image/jpeg&layers=gebco_grid&width=900&height=600&version=1.1

GEBCO's current WMS can be accessed from:

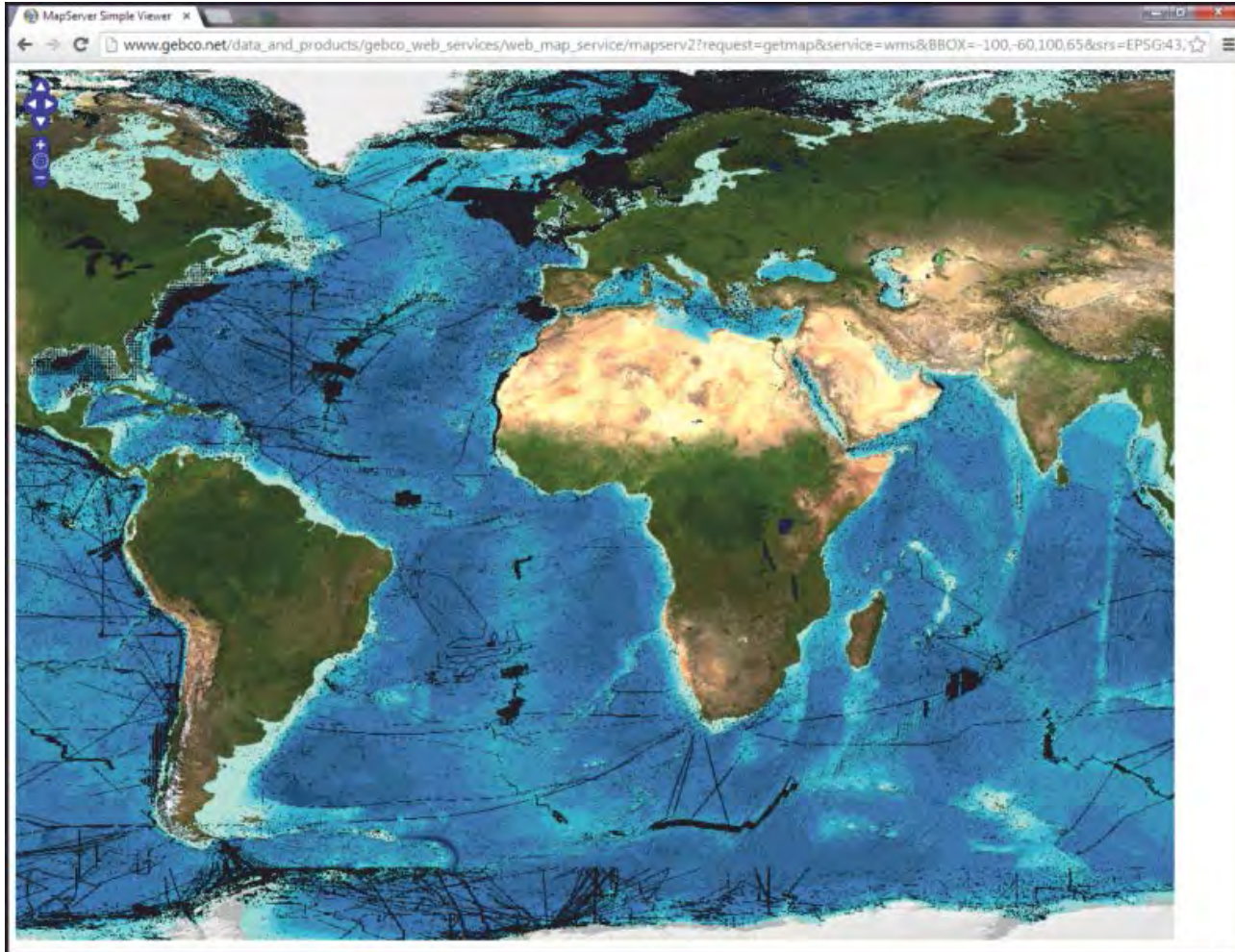
www.gebco.net/data_and_products/gebco_web_services

Delivery of GEBCO's grids

Summary

- The GEBCO_2013 Grid will be made available in netCDF form to download from the internet and also as part of the GEBCO Digital Atlas
- The grids will include CF metadata
- The existing GEBCO WMS will be updated and extended to use the new GEBCO grid and to include the SID Grid as a separate layer

Source Identifier (SID) Grid metadata work



Source Identifier (SID) Grid metadata work

- A Source Identifier (SID) Grid is made available to accompany the GEBCO global 30 arc-second grid.
- The SID grid shows which of the corresponding grid cells in the GEBCO grid are based on soundings or existing grids and which are interpolated.
- At present, the SID grid is largely made available as a 'yes/no' grid, i.e. cells are coded as constrained by data or interpolated
- We have been working to extend this so that information on the survey used to develop the grid at that location is made available.
- This would provide some quality assurance information to users and provide attribution to data contributors.

Source Identifier (SID) Grid metadata work

- GEBCO has adopted the SID grid, numbering system and associated metadata records used by the SRTM30_plus team
- There are currently over 8,000 SID records
- In collaboration with GEBCO colleagues, a set of attribute fields has been defined – covering the type of metadata that we would like to make available for each SID record.
- We have been working to populate the metadata fields and also on a mechanism for making the metadata information available via web services.

Source Identifier (SID) Grid metadata work

Defined metadata fields for surveys:

- Cruise ID
- Chief Scientist or Investigator
- Contributing organisation
- Country
- 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

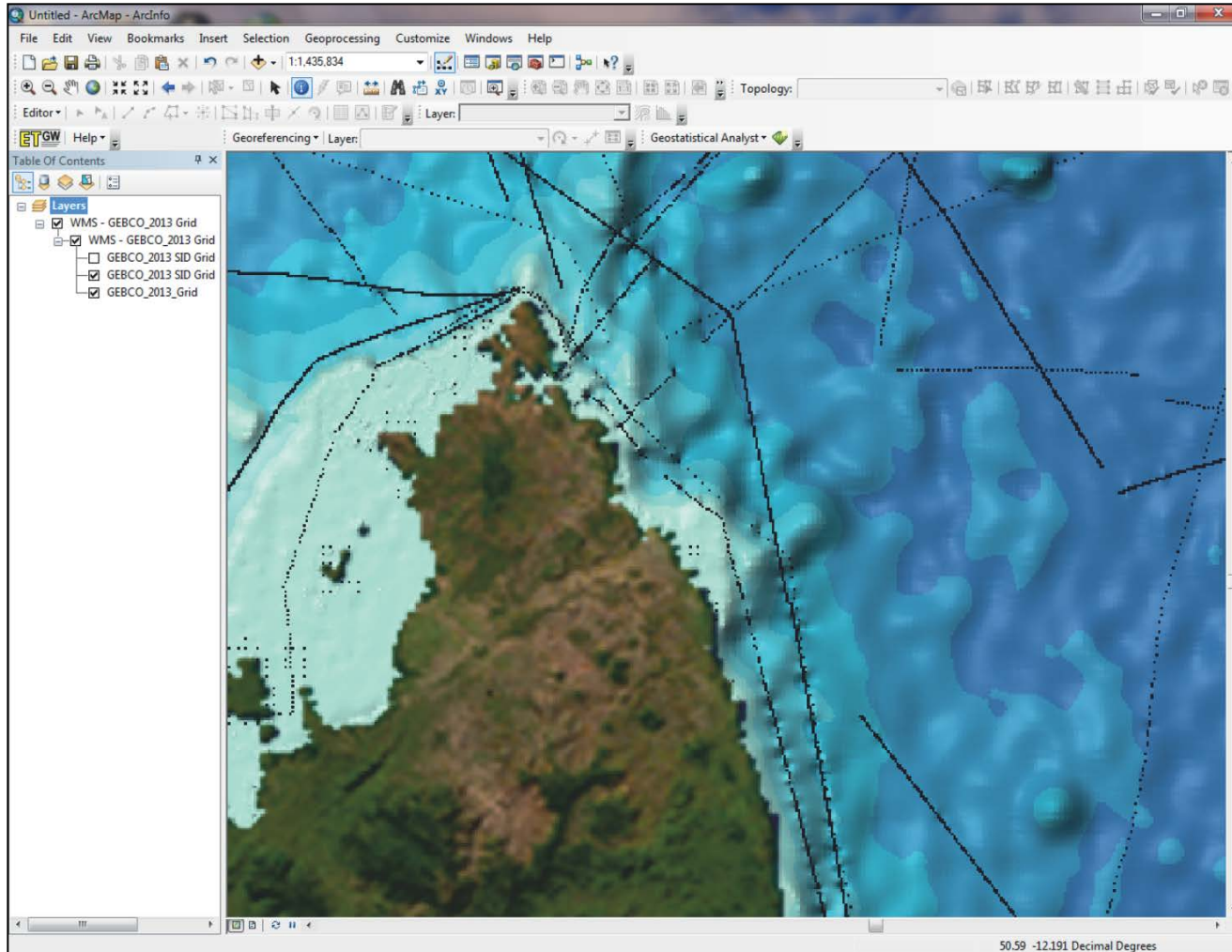
Source Identifier (SID) Grid metadata work

- We are investigating managing and delivering the metadata via the NERC vocab service, it is a means of making the data available in xml form via the internet

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

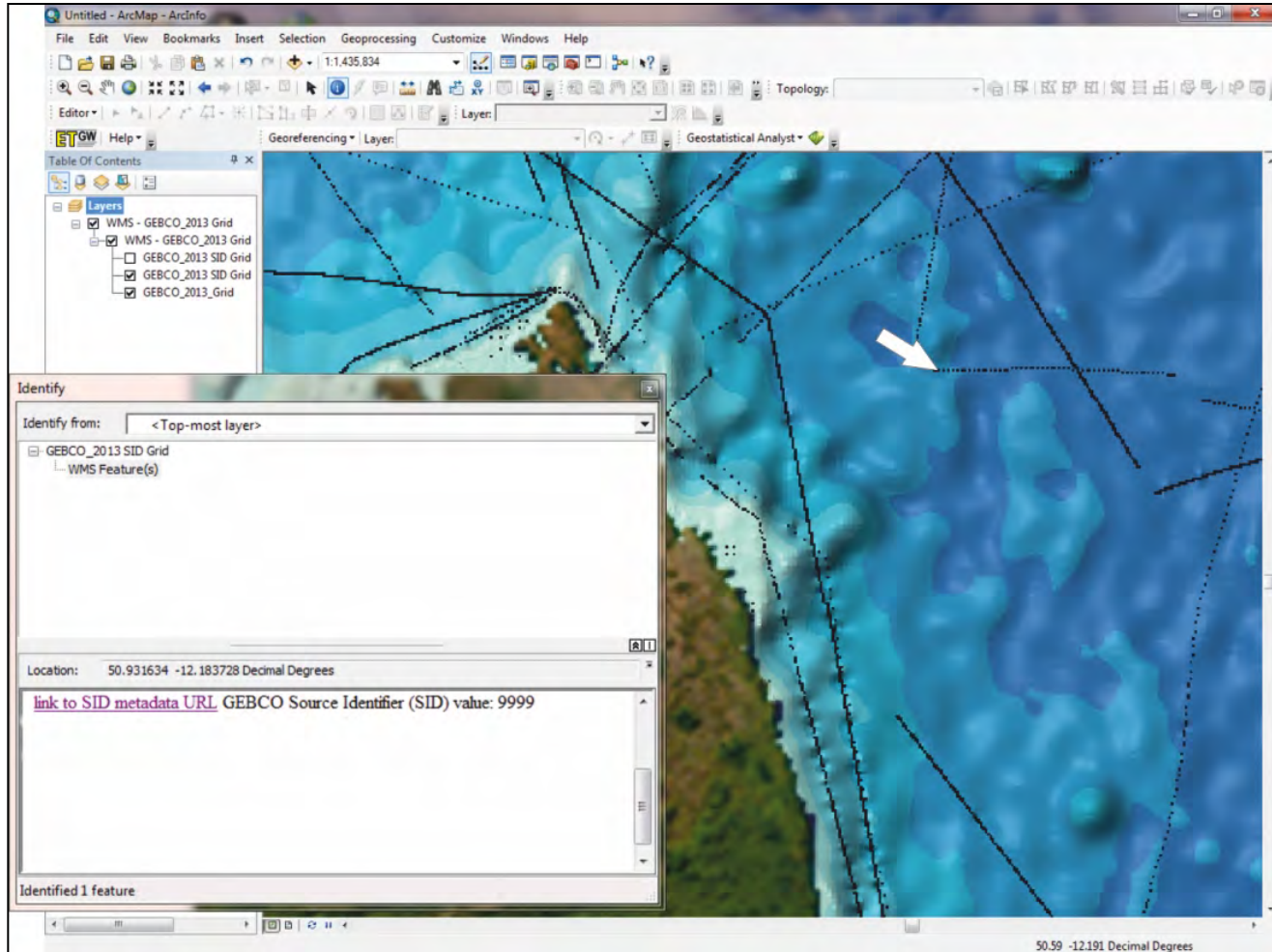
- We have developed a test WMS for the SID grid with each pixel coded for a SID value
- Using a 'getfeatureinfo' call to a WMS it is possible to link to the metadata for each SID grid cell

Source Identifier (SID) Grid metadata work



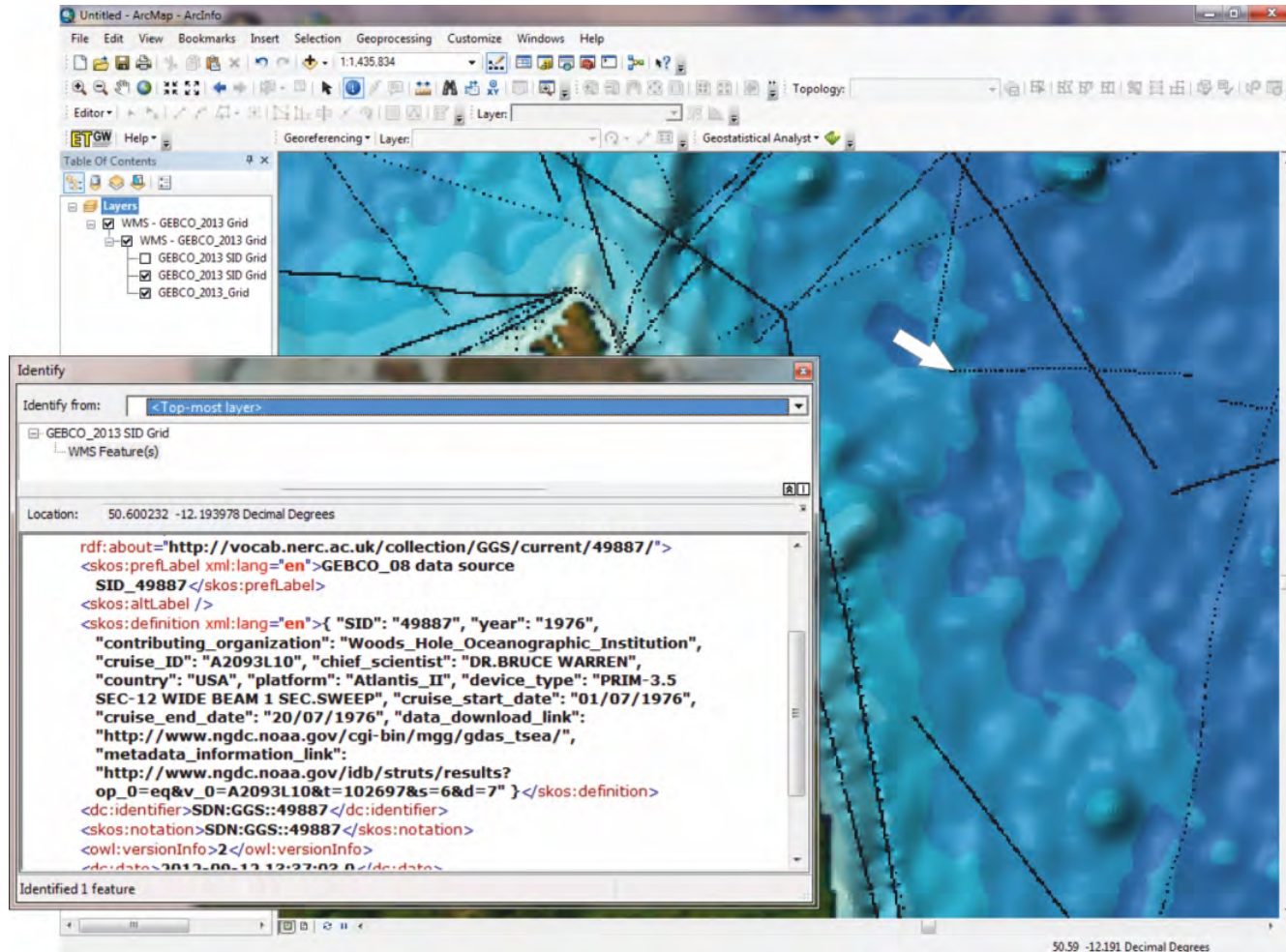
GEBCO SID WMS displayed in ArcMap

Source Identifier (SID) Grid metadata work



'Querying' a SID grid cell

Source Identifier (SID) Grid metadata work



The screenshot shows the ArcMap interface with a map of a coastal area. A grid of black lines is overlaid on the map. A white arrow points to a specific cell in the grid. The Identify window is open, showing the following metadata:

```
Identify from: <Top-most layer>
GEBCO_2013 SID Grid
  WMS Feature(s)

Location: 50.600232 -12.193978 Decimal Degrees

rdf:about="http://vocab.nerc.ac.uk/collection/GGS/current/49887/"
<skos:prefLabel xml:lang="en">GEBCO_08 data source
  SID_49887</skos:prefLabel>
<skos:altLabel />
<skos:definition xml:lang="en">{ "SID": "49887", "year": "1976",
  "contributing_organization": "Woods_Hole_Oceanographic_Institution",
  "cruise_ID": "A2093L10", "chief_scientist": "DR.BRUCE WARREN",
  "country": "USA", "platform": "Atlantis_II", "device_type": "PRIM-3.5
  SEC-12 WIDE BEAM 1 SEC.SWEEP", "cruise_start_date": "01/07/1976",
  "cruise_end_date": "20/07/1976", "data_download_link":
  "http://www.ngdc.noaa.gov/cgi-bin/mgg/gdas_tsea/",
  "metadata_information_link":
  "http://www.ngdc.noaa.gov/idb/struts/results?
  op_0=eq&v_0=A2093L10&t=102697&s=6&d=7" }</skos:definition>
<dc:identifier>SDN:GGS:49887</dc:identifier>
<skos:notation>SDN:GGS:49887</skos:notation>
<owl:versionInfo>2</owl:versionInfo>
<dc:date>2012-08-12 12:27:02.0</dc:date>
```

Identified 1 feature

50.59 -12.191 Decimal Degrees

Accessing a 'dummy' metadata record for the queried SID grid cell

Source Identifier (SID) Grid metadata work

Summary and future plans

- The population of the SID metadata fields has progressed during the year but needs to be finalised
- A mechanism for managing and delivering the SID metadata has been demonstrated
- This mechanism needs further testing before release
- Once finalised, the WMS could be included on GEBCO's web site – allowing the SID grid to be viewed and queried
- The SID grid metadata could also be displayed in table form on GEBCO's web site
- The use of controlled vocabularies could be used to describe information in some of the attribute fields

Summary

- A new release of the GEBCO Grid – GEBCO_2013 – is scheduled for release in late 2013
- The bathymetry and SID grids will be available via the internet and GDA in netCDF forms
- The grids will be available as a WMS
- Work is progressing with delivering compiling and delivering metadata for the source data sets used to develop GEBCO's grid

Thank you