Global Multi-Resolution Topography Update

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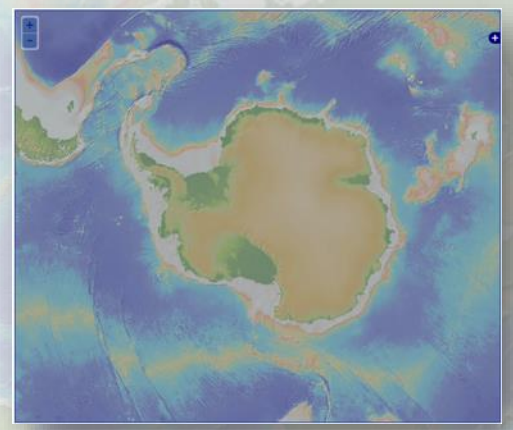
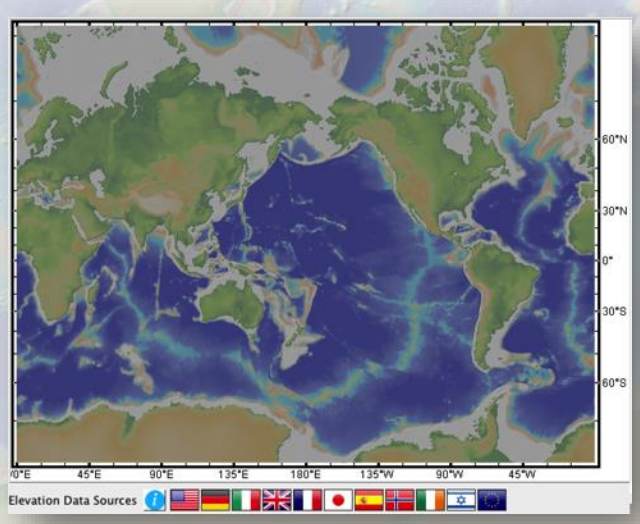
MARINE GEOSCIENCE DATA SYSTEM
marine-geo.org

Global Multi-Resolution Topography

- Dynamically maintained tiled synthesis
- Mercator, South Polar, North Polar
  - Images, Grids, Mask
- Comprehensive Metadata
  - Attribution
  - Access to source data
- Multiple Access Tools/Services
  - Web, Java, iOS, Web Services
- Usage Statistics





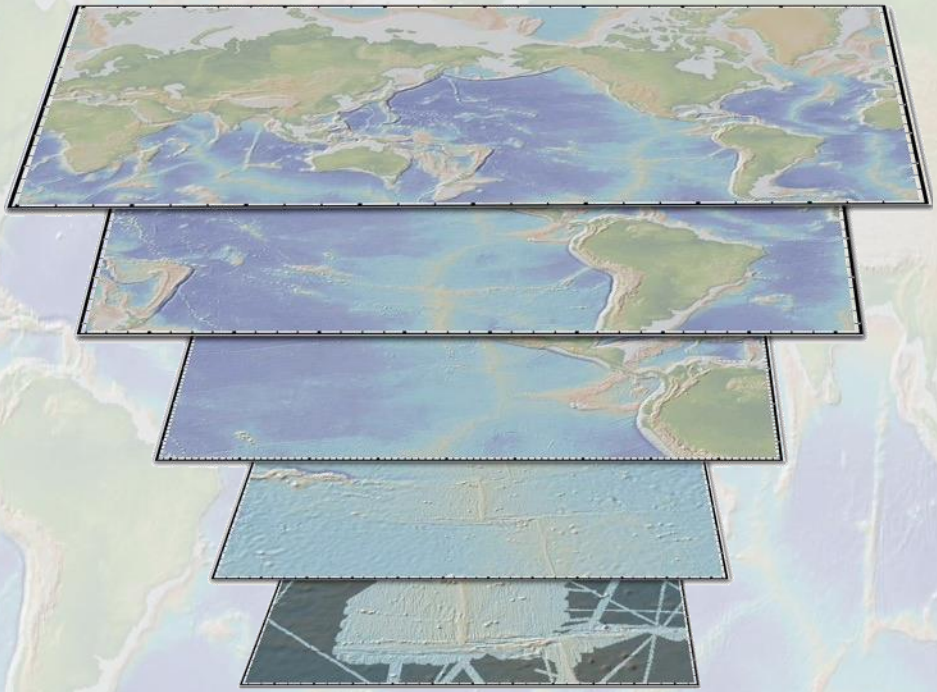
GMRT Grid Components

Land elevation
(30-10 m res)

Global & Regional Grids (>= 500 m res.)
e.g. GEBCO_2014

Contributed Grids (< 500 m res.)

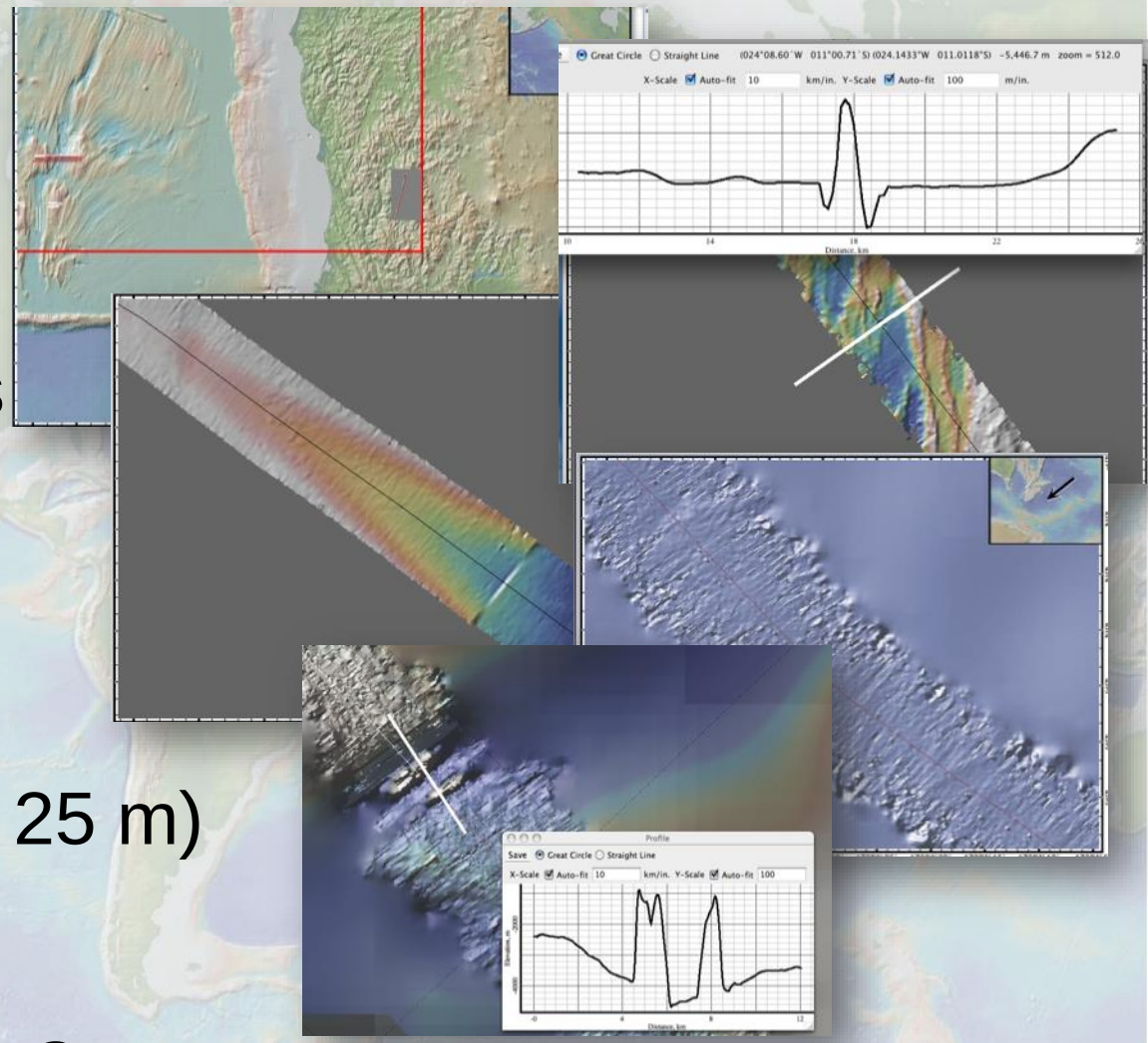
LDEO 100-m MB compilation*



*LDEO team processes swath files (public domain, primarily US Academic)

Multibeam Data Preparation

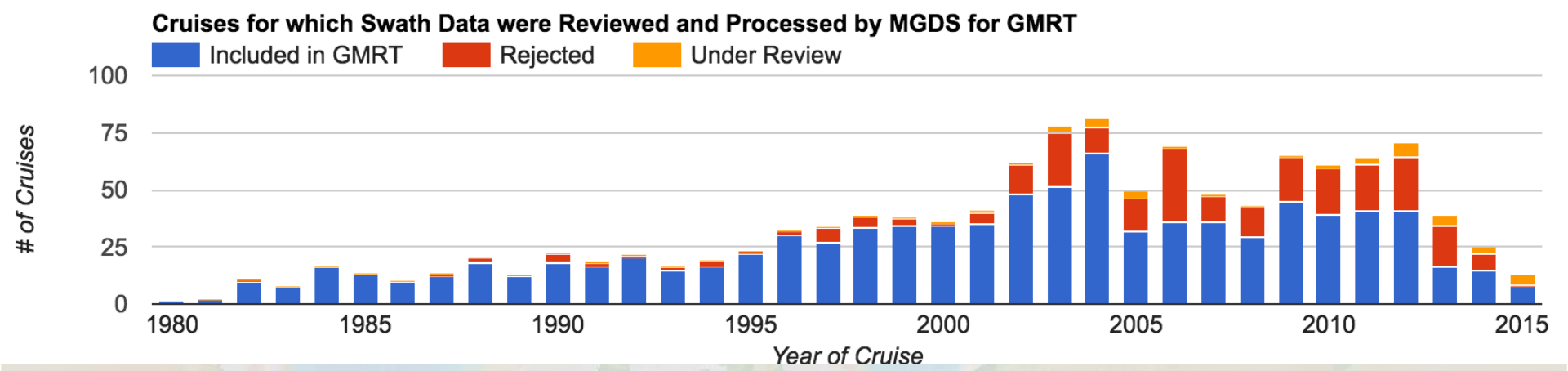
- Bad navigation
- Bad soundings
- Instrument problems
- Sound velocity
- Attitude Offsets
- Grid weighting
- Resolution (**100**, 50, 25 m)



Processing leverages MB-System
2016: integrated QPS Qimera into data processing workflow

GMRT High-resolution Data

- Processed MB Data [GMRT v3.2]
  - Gridded to 100m resolution
  - 906 cruises
  - 26 ships
  - 187,045 swath files
  - 4.6 million ship-track km
  - 27 million km^2 (~ 8% ocean)



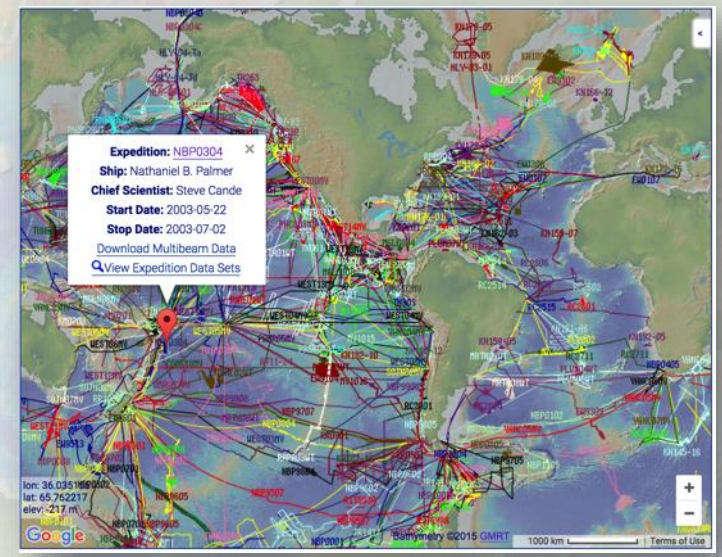
GMRT High-resolution Data

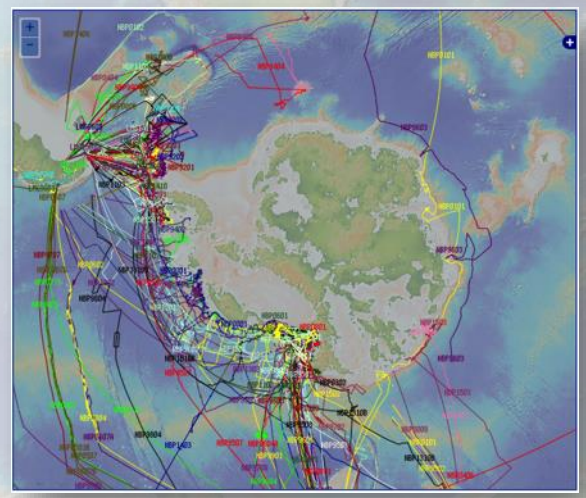
- 78 Contributed Grids
- Sources include:
  - NOAA
  - EMODNET
  - Scientists in 8 Nations
- Variable resolution
  - 100s m -> 1 m
- Data from Ships & Submersibles

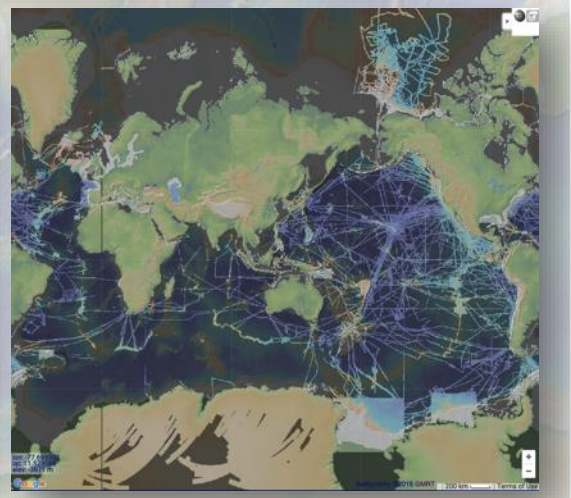
GMRT – Web Map Services

- Three Projections
  - Mercator
  - South Polar
  - North Polar 

- Multiple Components
  - Images
  - Masked Images
  - Tracklines
  - Grid extent

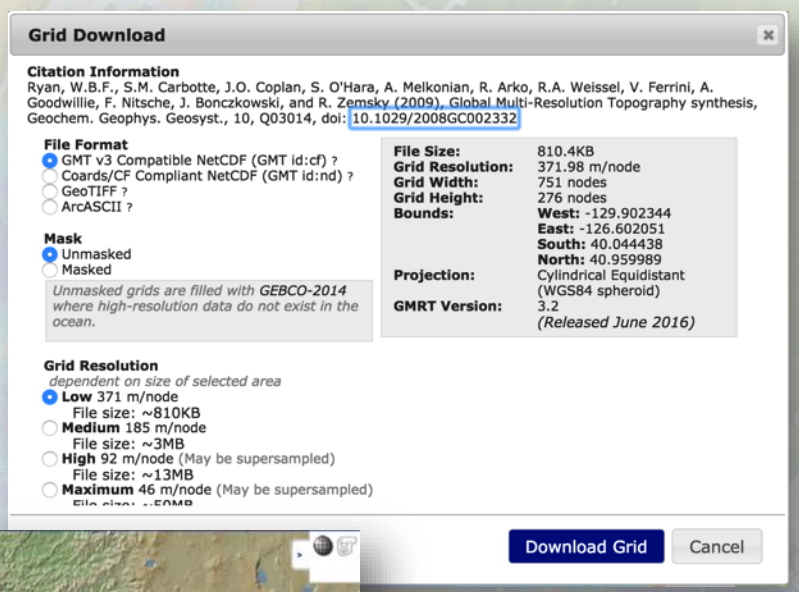


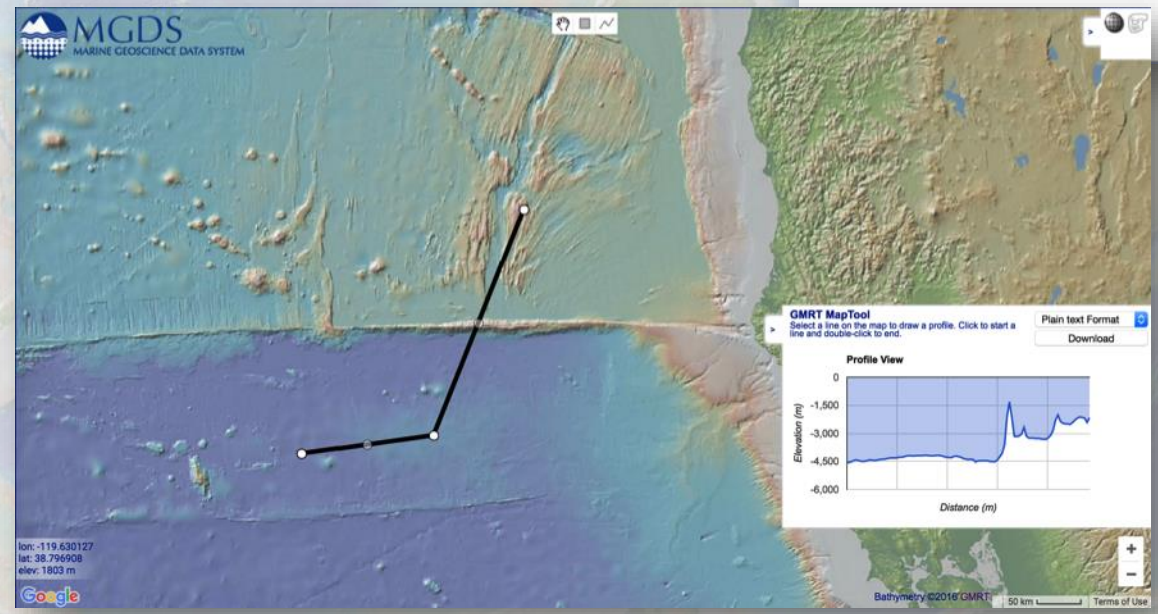




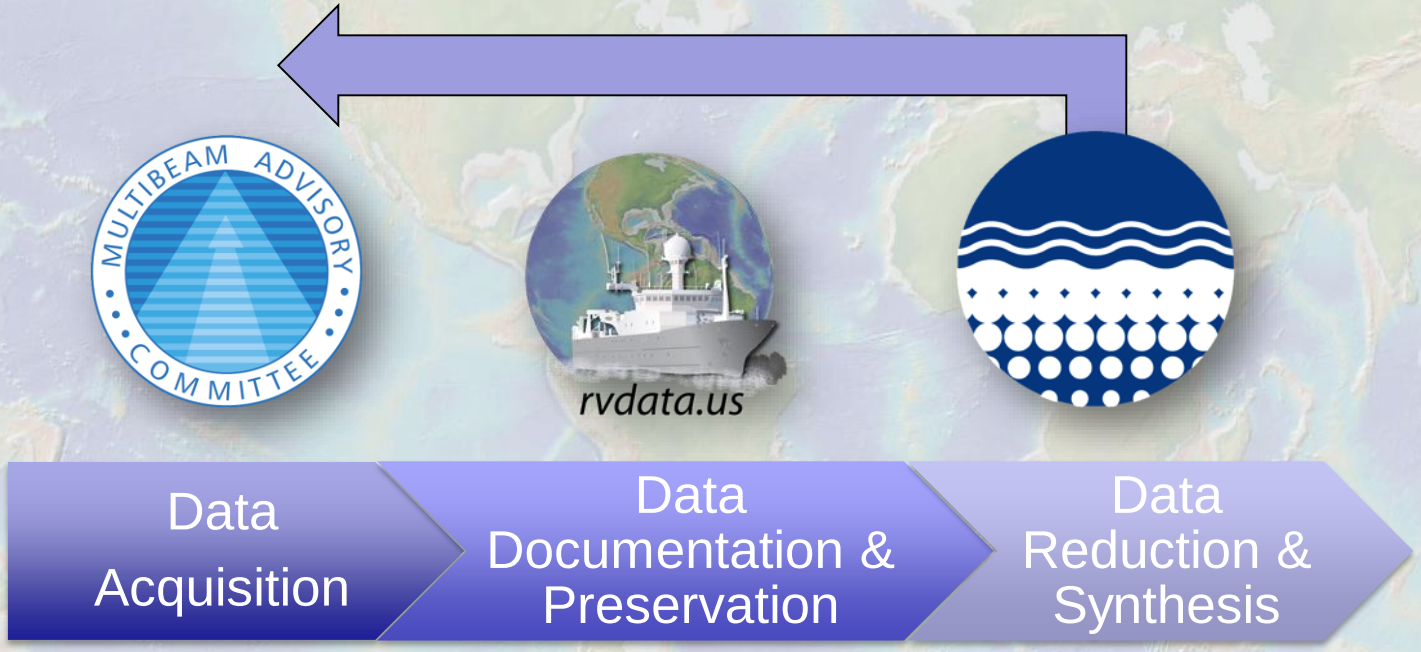
GMRT – RESTful Web Services

- Grid Service
- Attribution Service
- Image Server
- Point/Profile Service





Integration and Coordination Across US Academic Fleet



Goal: Optimize data quality & promote best practices

MGL1212 (2012)

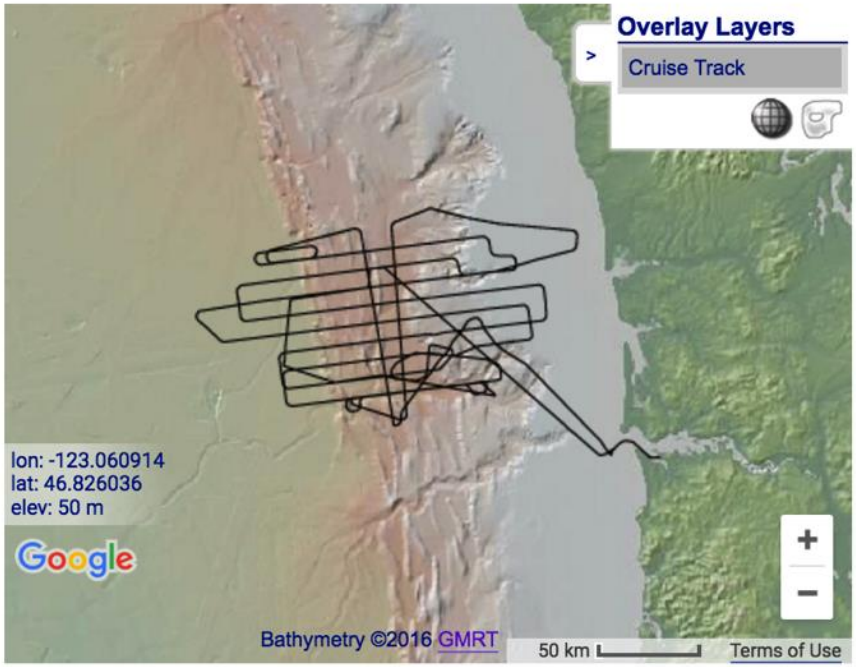
R/V Marcus G. Langseth
Kongsberg EM122
Chief Scientist: W. Steven Holbrook
Related Information at MGDS

Data Summary

369 Data Files Processed (572 Reviewed)
65% of swath files were included in GMRT
Total Ship-Track Coverage: 1,430 km
Total Area Mapped: 8,698 km^2

Data Processing Notes:

Roll bias added.

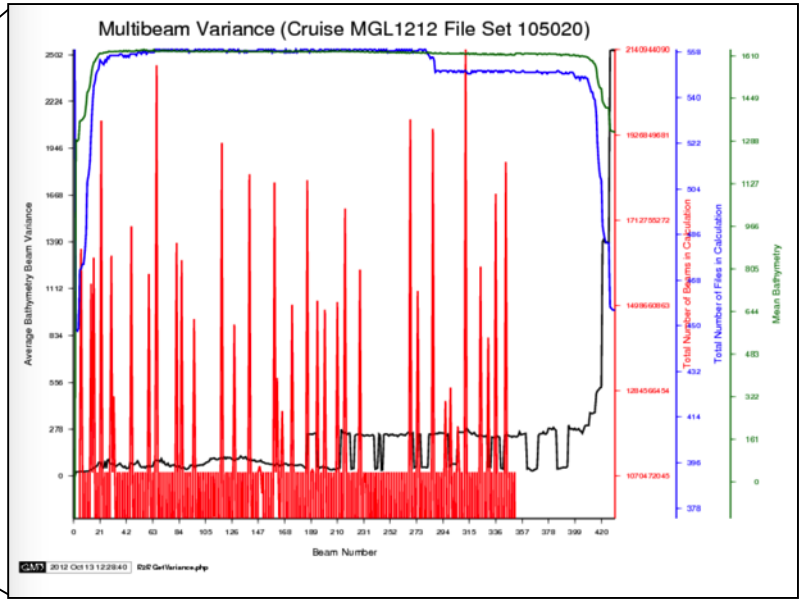


Rolling Deck to Repository (R2R)

- Data Set Quality Rating
- percent pings valid altitude
- percent pings valid water depth
- percent files all valid sonar draft
- percent files with bathymetry
- has surface sound velocity

Total number of raw swath files: 572

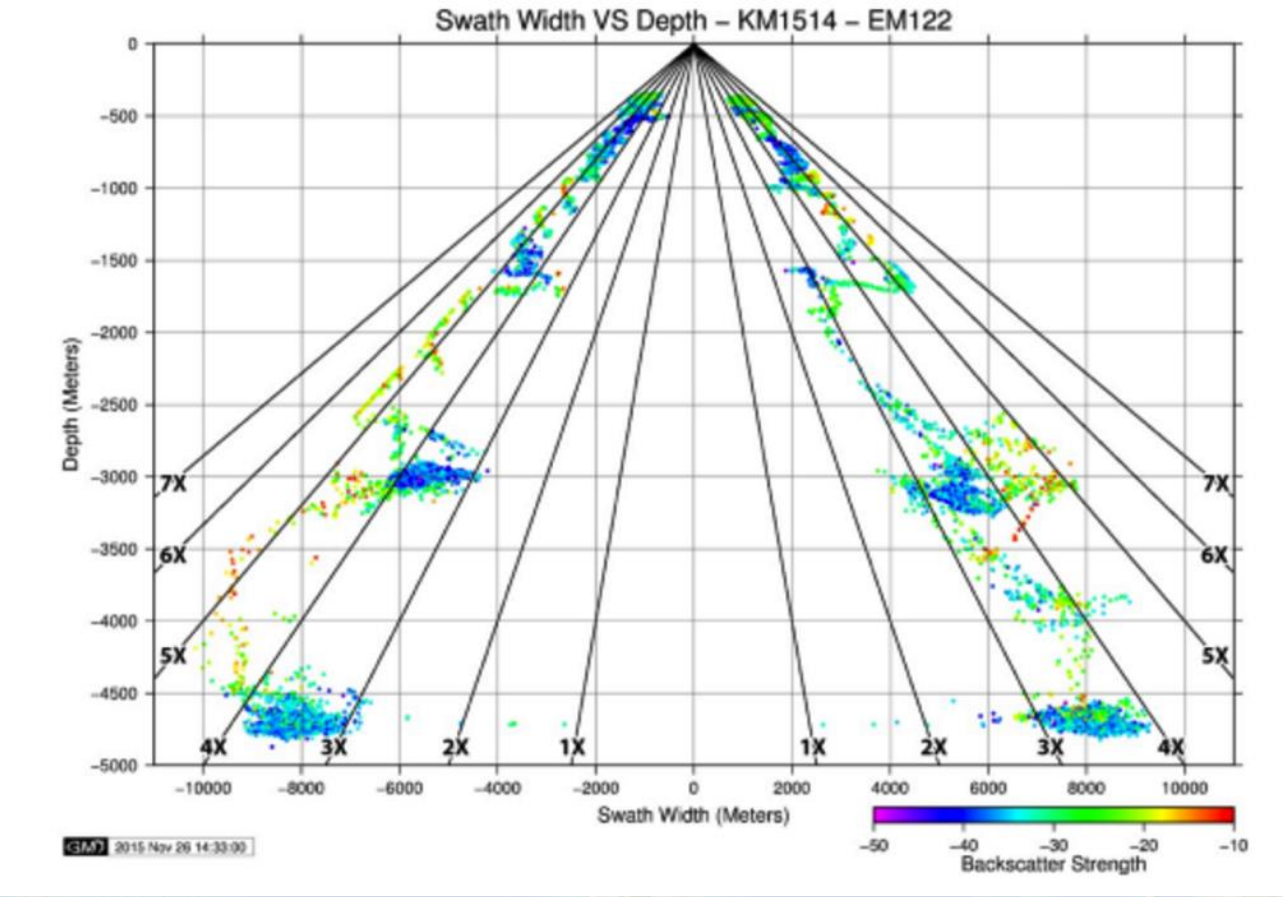
View R2R QA Dashboard for MGL1212
View R2R QA Certificate (XML)
Download Raw Swath Files



Multibeam Advisory Committee (MAC)

MAC Resources

Code-Sharing: Swath Coverage Analysis



UNDER CONSTRUCTION

Integration with GEBCO

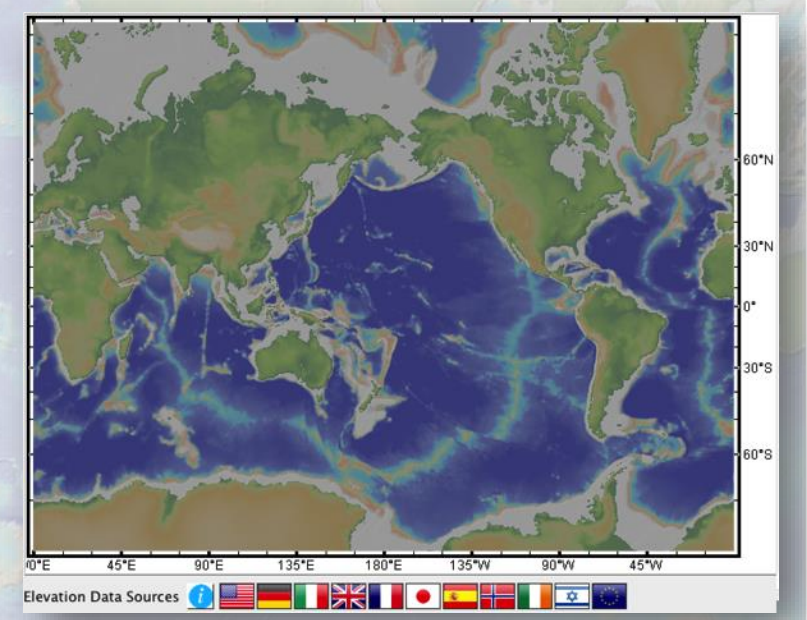
- 2011
  - Gridded swath content [GMRTv2.0] supplied to GEBCO
- 2014
  - GEBCO_2014 release
- 2015
  - GEBCO_2014 integrated into GMRT basemap
- 2016
  - IBCSO integrated into GMRT SP basemap
  - Gridded swath content [GMRTv3.2] supplied to GEBCO
  - Processed swath files supplied for Indian Ocean Regional Compilation
  - IBCAO integrated into GMRT NP basemap

Broadening Access

- Disseminate gridded processed swath content
  - Google Ocean Basemap
    - 2011 & 2015
    - Google Earth Tour (400K views)
  - ESRI Ocean Basemap
    - *Release Pending*
    - *Story Map*
  - NOAA ECS request
- Increasing use of Web Services

Next Steps…

- GMRT v3.3 Release [Oct/Nov 2016]
  - NP basemap update
  - NP Web Services
- GMRT MapTool - Open Source
- Swath Coverage Analysis
- Test GMRT in the cloud
  - Costs & Performance ?
- GEBCO-HighRes [2017]



http://gmrt.marine-geo.org