Global Multi-Resolution Topography Update

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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 km² (~ 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

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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 km²

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
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