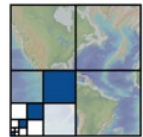


Global Multi-Resolution Topography (GMRT)

Vicki Ferrini, PhD

Lamont-Doherty Earth Observatory of Columbia University



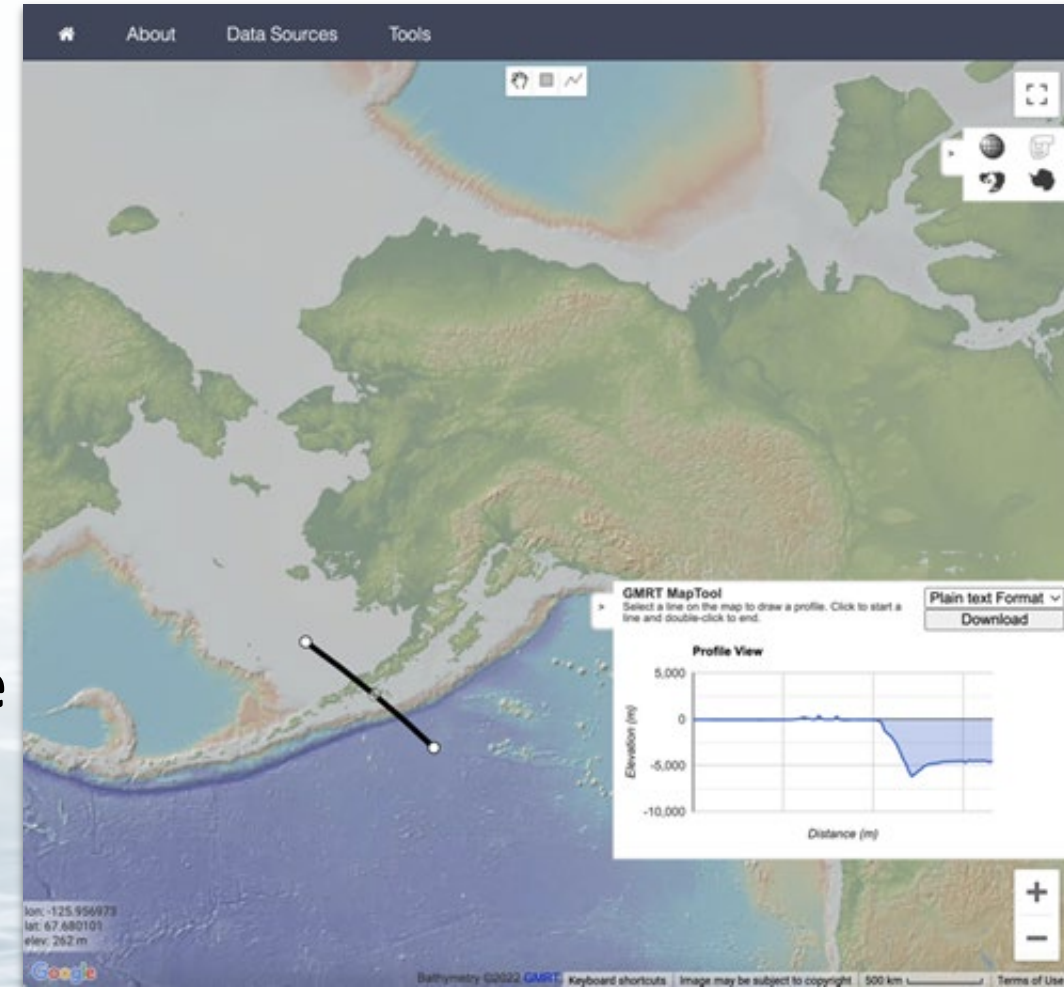


GMRT is...

- a Global Multi-Resolution Topography **data synthesis**
- an **infrastructure for delivering elevation data** as grids, images, profiles and points at user-defined locations/elevations & full access to source data
- a **tiling scheme** for efficiently storing and delivering multi-resolution data, maintained simultaneously in 3 projections
- a **scalable methodology** for QA/QC'ing multibeam sonar data that is very well-suited for integrating multibeam data acquired during transits

GMRT: Goals

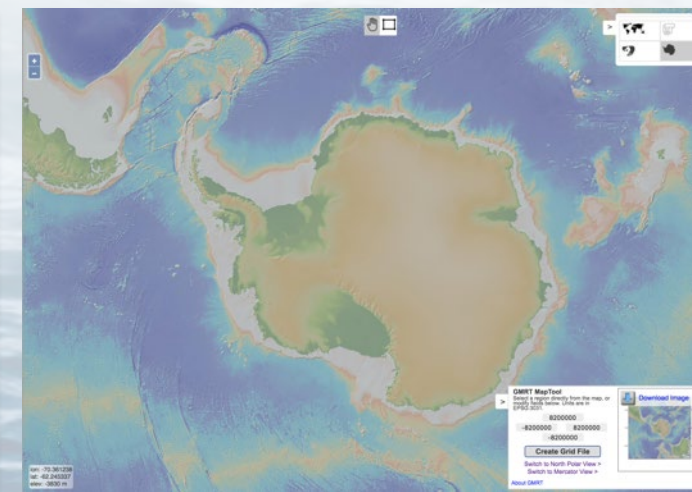
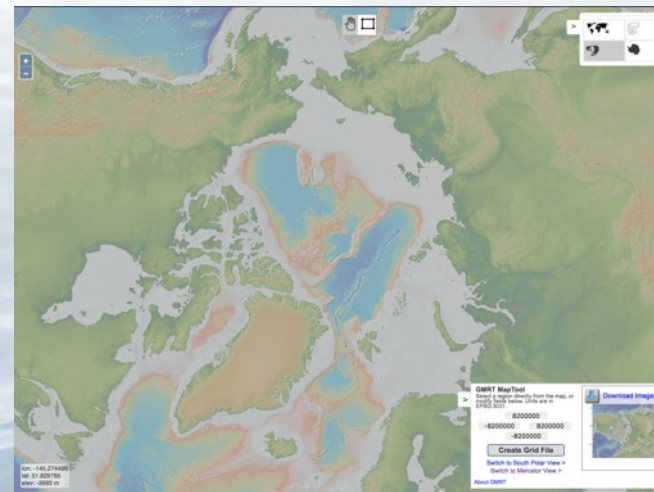
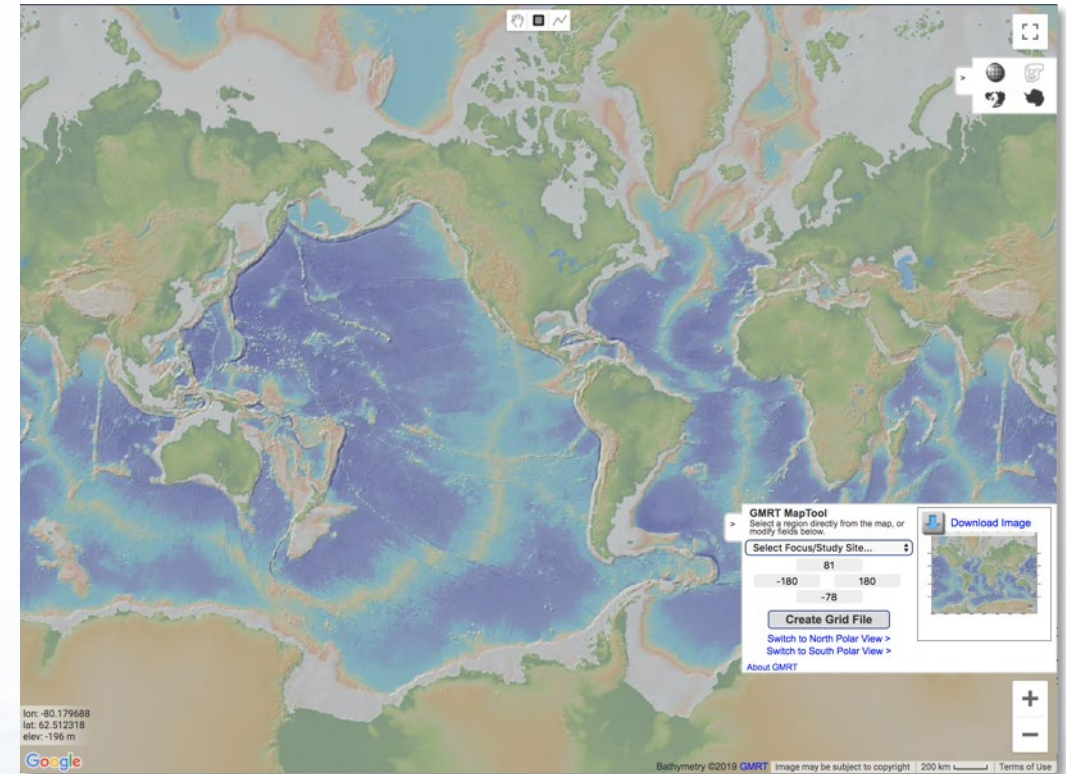
- Provide users with access to **seamlessly integrated bathymetry** and land elevation data at the best resolution available for a particular area of interest
- Support broad **accessibility** by **specialists and non-specialists** alike through multiple user interfaces, services, and output formats
- Continuously **expand bathymetry coverage** by integrating new data and highlighting data gaps
- Strive for scalability and efficiency in all aspects of data stewardship continuum





GMRT: Overview

- Multi-resolution tiled synthesis
 - Topography and bathymetry
- Comprehensive metadata
 - Full attribution to sources & access to source data
- Simultaneously maintained in 3 projections
- Data accessible in multiple formats
 - Grids, Images, Points, Profiles
- Multiple tools/interfaces:
 - GMRT MapTool Web App
 - GeoMapApp Desktop App
 - GMRT Web Services



GMRT Grid Composer

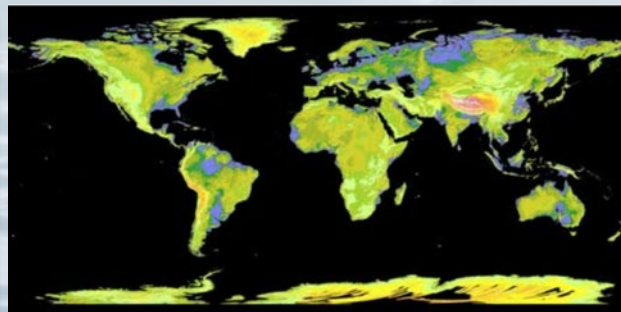
- Maintain input raster data at native resolution
- Curate four discrete tiled elevation components
 - update components independently and on different schedules
- Raster data merged on-the-fly to create custom products for users

Custom grids delivered to users (netCDF, GeoTiff, ArcAscii)

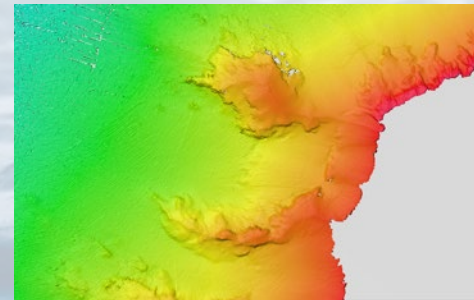
GEBCO 2014 (~1 km)



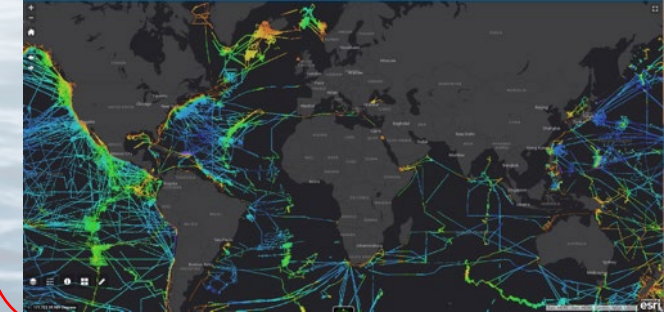
Topography (10-30 m)



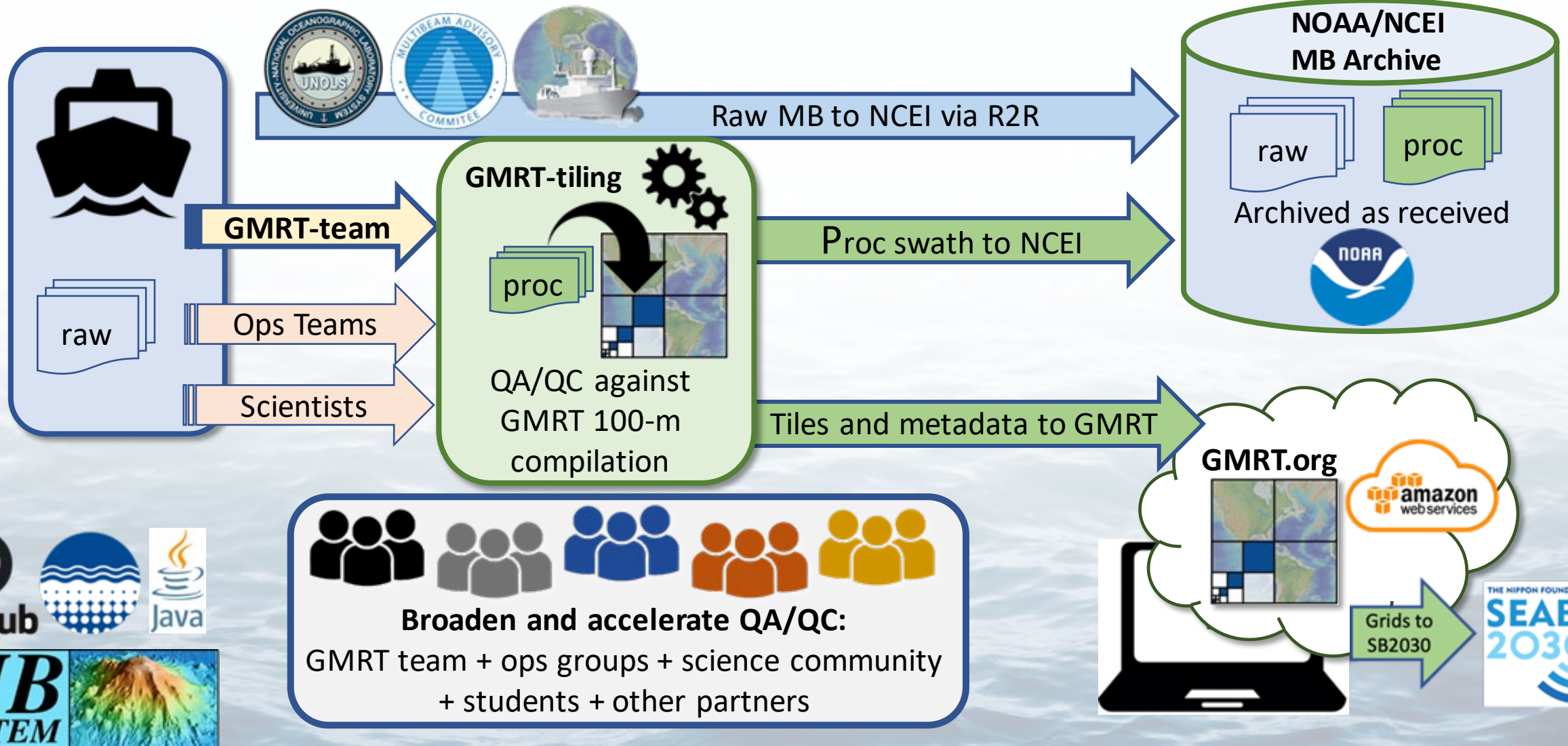
Contributed Grids
(1 to 100s of m)



GMRT-MBS
Multibeam Synthesis (100m)



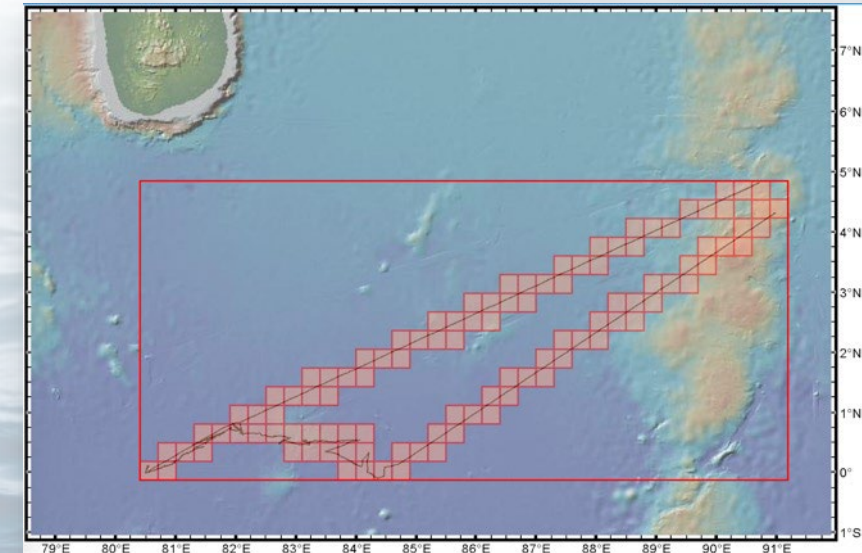
GMRT: Distributable Data Processing and Curation





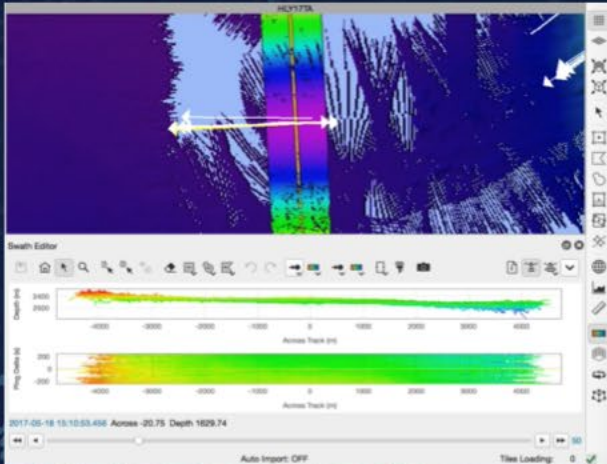
GMRT MBS Data Curation – Strategy & Rationale

- Create clean swath files and review them as rasterized tiles in the context of existing GMRT MB Synthesis
- Grid at best resolution data can support = *at least* 100m resolution
 - Tiled rasters optimize disk space
- Maintain processed source data as compressed swath files that can be re-accessed and re-processed
- Rasters for each cruise blended with tiled rasters from other cruises and then consumed by GMRT grid composer
- Rasters for each cruise are maintained on back-end to facilitate removal/updating and/or custom grid composition

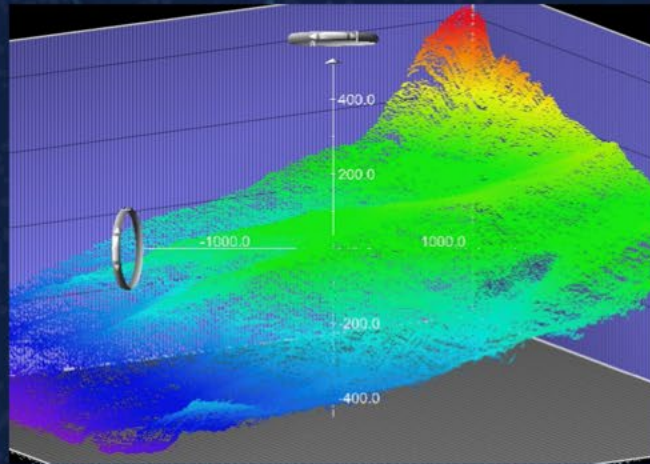


Data Preservation and Accessibility

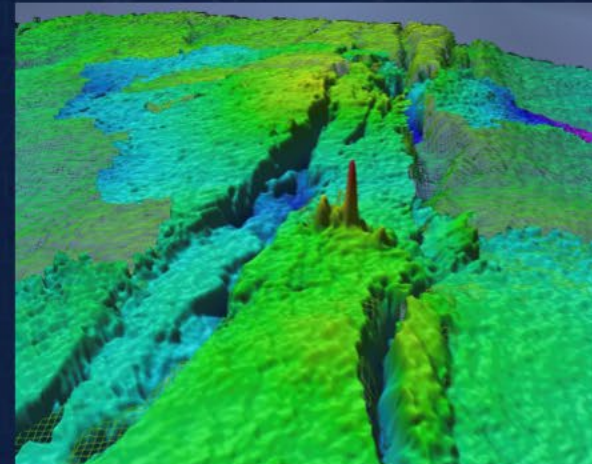
Swath Files



Point Clouds



Grids



Images



**Specialized
tools,
skills,
knowledge**

Increase accessibility

Increase number of software tools/interfaces

**Non-
specialized
tools and
interfaces**



Conclusions

- Data stewardship approach delivers multiple products to ensure ease of access *and* future ready data
 - Easily accessible images and grids
 - Processed swath files (strongly recommend GSF!)
- GMRT data curation focuses on processing swath data from US Academic Fleet (ARF)
- Complements role of NCEI MB archive
 - Source of raw multibeam data (also cataloged within R2R)
 - Destination for processed MB data (also cataloged within MGDS)
- Questions of where to submit/discover data can be addressed through interoperability and collaboration between repositories and synthesis efforts
 - Multiple mechanisms for data discovery are a good thing!