

Lab 1 – Seafloor mapping tools and data

Background:

The purpose of this lab is to familiarize you with different types of sea floor mapping data and demonstrate *GeoMapApp*. *GeoMapApp* is an interface to a large collection of scientific survey data collected worldwide. The data can be accessed, overlaid, plotted and saved to create your own maps. During the lab you will run *GeoMapApp* to view various data sets and compare their resolutions, coverage and overall quality. *Geomapp* can be found at the following location, <http://www.geomapp.org/>. Grab it and install it on your computer. It is a small program, and free.

Tasks:

After the short overview, work through the following.

a) FOCUS SITES → RIDGE → MID ATLANTIC → BATHYMETRY → TAG

Look at the different map options, starting with Roman-Sohn. You will see a small map pop up. If you zoom out you will see the (Global Multi-Resolution Topography) GMRT map in the background. This is a combination of ship multibeam bathymetry and background satellite altimetry.

Use the measurement tool in the Contributing Grids box to measure the size (width and height) of the TAG mound (the circular part). Do this for the Roman-Sohn, and again for the Tivey and White data sets. Which map gives you the best estimate? Why? You can look at each data's info box and see the details for the data collection.

b) Turn on PORTALS → MULTIBEAM

This will turn on the actual ship tracks for the ship bathy in the background.

1) Zoom out till you can see the pattern of survey lines. It will look like a lawn mowing pattern. Zoom back in on some ship multibeam lines that are fairly organized, how does the resolution compare to the background altimetry? How wide is a multibeam swath on the seafloor?

2) Find an area where lots of parallel lines were run. Do you see anything funny on the bottom running along parallel with the survey lines? If so, explain what you are seeing.

c) Turn on the following

FOCUS SITES → RIDGE → EAST PACIFIC RISE → BATHYMETRY → Clipperton South and the Fornari ABE 5 meter

FOCUS SITES → RIDGE → EAST PACIFIC RISE → BACKSCATTER → A207

1) Measure the width and depth of the spreading ridge valley using the measuring tool in the Contributing Grids box with each data set. Look at the northern ABE grid, there are two. How accurate do you think your answer is?

2) Measure the swath width of the Clipperton EM300 data transect. What is the beam spacing on the sea floor? You'll need to look at a link below for some details on the EM300.

3) Look closely at the transect. Do you see any artifacts perpendicular to the direction of ship

travel? If so, what could cause them?

4) Use the Opacity slider to compare the side scan backscatter to the underlying bathymetry. What do you see? (do certain things seem to correlate or not)

d) Find an interesting image of the sea floor at TAG and the East Pacific Rise (EPR). Go under FOCUS → RIDGE → EPR → Bottom Photos. Follow a similar menu to the TAG photos. You can pick photos from the list that shows up. Use the little yellow flashlight looking icon to make them appear. You can't save the images, so write a quick note about what you've seen. Can the features in the images be seen in the bathymetry maps? Why or why not?

e) Load up FOCUS SITES → RIDGE → LAU → BATHYMETRY

1) Compare the IMI-30, DSL 120, ABE 1M and EM 120. Which map has higher resolution?

2) Which system (IMI-30, DSL-120, EM 120) has a wider swath? Does this make sense given the frequencies they operate at? (Use the links below for background information)

3) How is a bathymetric (interferometric) side scan, like the DSL 120, different than a convention side scan we discussed in lecture?

4) Take a look at the IMI30 backscatter over top of the IMI30 bathymetry. Does the backscatter help you understand the bathymetry? This may be a better example than the EPR. The opacity slider is useful here.

f) Load up PORTAL -> EARTH QUAKES. Make a plot of the Ring of Fire.

Write up:

Please complete a short write up of your findings for the above tasks. One or two sentences per task will be sufficient. Submit your write up electronically.

Other resources:

You may find the following links useful for the above tasks. Also, feel free to use other sources of information if you find them.

DSL120

<http://www.divediscover.whoi.edu/tools/dsl120.html>

IMI30

<http://www.soest.hawaii.edu/hmrg/imi30/index.php>

Bathymetric sidescan

<http://www.nauticalcharts.noaa.gov/csdl/PDBS.html>

<http://www.oceanicimaging.com/interferometric.html>

Kongsberg EM300

<http://www.whoi.edu/instruments/viewInstrument.do?id=15267>

ABE and JASON

<http://www.whoi.edu/page.do?pid=8421>

<http://www.whoi.edu/page.do?pid=8458>