

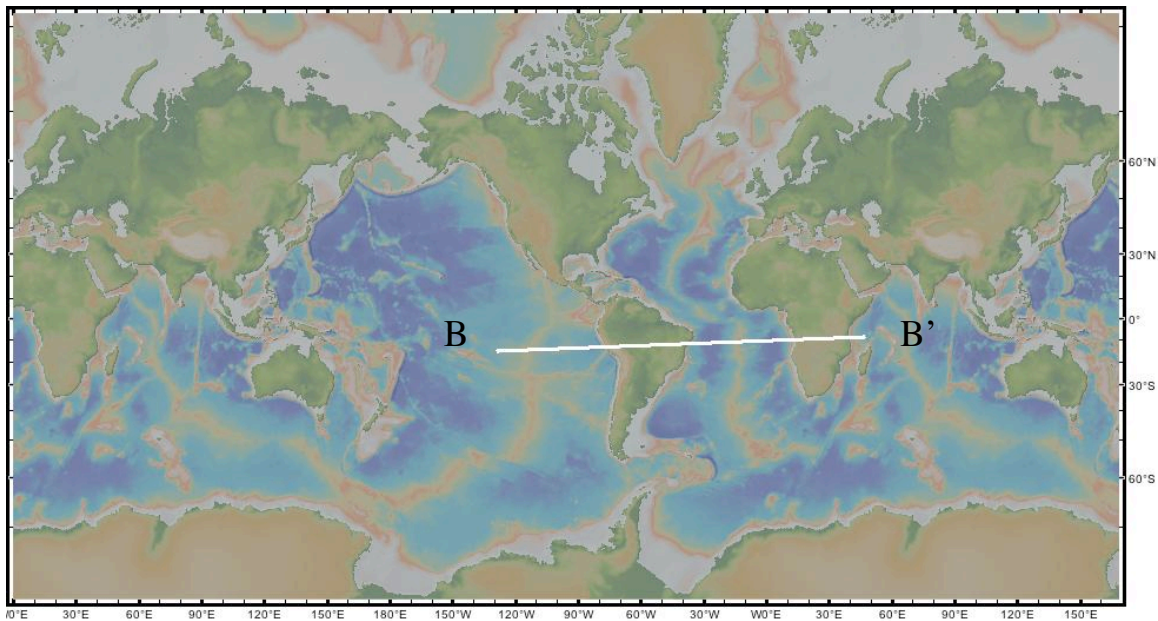
PROFILING EARTH'S SURFACE USING GEOMAPAPP

PURPOSE

- To relate large-scale features on Earth's surface to lithospheric plates, the underlying asthenosphere, earthquakes, and volcanoes.
- To introduce GeoMapApp, an easy-to-use mapping program focused on marine geology and geophysics.

OVERVIEW

First, follow the directions given below to draw a cross section showing elevation along the line (B-B') using GeoMapApp. After printing out your cross section, add the characteristics specified in (1-5).

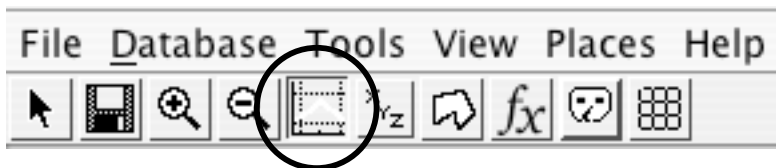


INSTRUCTIONS

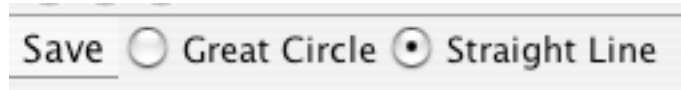
Download GeoMapApp onto your computer or laptop. Go to <http://www.marine-geo.org/> and follow the instructions for downloading.

After downloading the program, double-click on the GeoMapApp.jar icon to run the program.

Inside GeoMapApp, click on the Distance/Profile tool at the top of the screen:



You may need to patiently wait while GeoMapApp opens the profiling tool. When the program is ready, refer to the world map pictured in this exercise. To draw the B-B' line in GeoMapApp, place your cursor in the appropriate location on the Pacific Plate. Click on the mouse as you drag the cursor over just north of Madagascar. When you first do this, the line might be drawn as a great circle. In the profile tool, click the box specifying that you would like to draw the cross section along a straight line:



Next, save the profile to your computer and then print it out.

Using a pencil, add the following characteristics to your topographic profile. For some of these, you will need to refer to outside sources such as your textbook. For others, you may discover tools or databases within GeoMapApp to help you.

- 1) Sketch how the depth to the crust/mantle boundary (Moho) changes along the length of the cross section.
- 2) Sketch how the depth to the lithosphere/asthenosphere boundary changes along the length of the cross section.
- 3) Put a series of X's within the cross-section to represent zones where significant earthquake activity might be expected to occur. Be sure to place the X's at the appropriate depths.
- 4) Put Δ 's on the surface of the cross-section to illustrate where you would expect volcanic activity to occur.
- 5) Identify and label the positions of the following features on the cross-section:
 - a. Plate boundaries and their types (e.g., label the East Pacific Rise and indicate that it is a mid-ocean ridge)
 - b. Lithospheric plates and their names
 - c. Continental margins and their types (passive or active)

REFERENCES

This exercise was developed as a MARGINS Mini-Lesson by Laura Reiser Wetzel, Department of Marine Science at Eckerd College, St. Petersburg, Florida. It is adapted from question 2-2 on p. 39 of *Whole Earth Geophysics: An Introductory Textbook for Geologists and Geophysicists* by Robert J. Lillie, Prentice-Hall Inc., Upper Saddle River, New Jersey, 1999.