

Activity 2.4

Investigating plate motion

In this section, you will measure the rate at which new lithosphere has formed along the Mid-Atlantic Ridge over the past 140 million years. Then, you will examine how this rate changed as the Atlantic Ocean opened.

Rate of spreading



To calculate the whole-spreading rate, you need to know the total width of new lithosphere formed and the time it took to create it.

my = million years

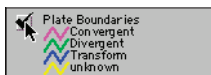
$$\text{whole-spreading rate} = \frac{\text{total width of new lithosphere (km)}}{\text{time required to create new lithosphere (my)}}$$

An easy way to do this is to measure the *half-spreading rate*—the width of new lithosphere created on one side of the spreading ridge—and double it.

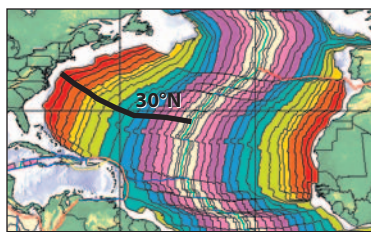
Measuring new lithosphere

- ▶ Launch the ArcView GIS application, then locate and open the **dynamic.apr** project file.
- ▶ From the list of views, open the **Changing plates** view.
- ▶ To determine the width of new lithosphere created in the North Atlantic Ocean during each 20-million year time interval:
 - Turn on the **Latitude/Longitude** and **Plate Boundaries** themes.
 - Using the Zoom In tool , zoom in to the North Atlantic Ocean (around 30° N latitude) between North America and Africa. (See locator map at left).
 - Using the Measure tool , click on one side of an interval, drag across to the other side of that interval, and double-click. For the 0–20 million year interval (lightest), measure from either edge of the interval to the Mid-Atlantic Ridge (thick line), as shown below. You should measure parallel to the transform faults, as shown in the illustration below.

To turn a theme on or off, click its checkbox in the Table of Contents.



Locator map



Path for measuring the spreading rate of the Mid-Atlantic Ridge in the North Atlantic Ocean.

Measuring the first seafloor age interval

