A Rocky Timescale I

Background

Once a core is brought on deck of the *JOIDES Resolution*, it is cut into manageable sections and labeled for a variety of analyses and descriptions in the laboratory. One group of scientists, the paleomagnetists, study the Earth's history by looking for magnetic (polar) reversals in the layers of the core. Magnetic reversals can be measured in two ways, inclination and declination. Declination is the same as a handheld compass showing 0-360° on a horizontal plane, while inclination, the more important component, measures magnetic dip (angle of magnetization into or out of the Earth's surface). A reversal of the magnetic field is observed as an abrupt change in direction. Paleomagnetists are able to determine the age of layers in the core by recording, analyzing, and comparing the timing of the reversals to those in cores of known ages from around the globe. See "About Paleomagnetism" at *http://www.joilearning.org/schoolofrock/Library.html* for a simple explanation.

Learning Objectives

Students will be able to:

- Explain how a paleomagnetic record is recorded in rock and obtained by scientists.
- Measure and record declination in model cores.
- Identify different styles for data collection.

National Science Education Standards

Standard A: Science as Inquiry - Abilities necessary to do science inquiry

Standard D: Earth and Space Science - Earth's history

Ocean Literacy Essential Principles

1. Earth has one big ocean with many features.
2. The ocean and life in the ocean shape the features of Earth.
7. The ocean is largely unexplored.

Target Age: Grades 5-8 and 9-12

Time: One to two class periods

Materials

1. Each group will need a model core (see below), a ruler, and a compass.
2. Ocean core model ingredients (salt flour dough)
   - 2 ½ cups flour
   - 1 cup salt
   - 1 cup water
   - Food coloring
   - Four small but strong bar magnets per group
3. Large plastic container (to mix dough)

What To Do

1. Ocean core models can be constructed with salt flour dough or commercial clay and bar magnets. The dough and cores can be made ahead of time by mixing the flour, salt, food coloring, and water. It is ok if the food coloring doesn't mix completely, as changes in color can provide a more stratified appearance. Store in an airtight container or plastic bag. This recipe should make enough for five to ten model cores that can be used indefinitely.
2. Mold clay into one core shape (elongated half moon or half cylinder) per lab group. Cores should be as wide as the magnets and 20 to 30 cm long.