

For all questions, briefly explain complications or assumptions as necessary so I know what you are thinking.

1. A fellow geologist proposes that a large stack of Late Cretaceous volcanic rocks in Montana's fold and thrust belt have been rotated around a vertical axis during emplacement of the thrust sheets. You recognize that paleomagnetism is the best (probably only) way to test the hypothesis:

a. What laboratory treatment might be required for your paleomagnetic samples and why?

b. Of what importance is paleosecular variation for this experiment and how does it affect your sampling?

c. Some of the volcanic flows are folded. How does this help your investigation?

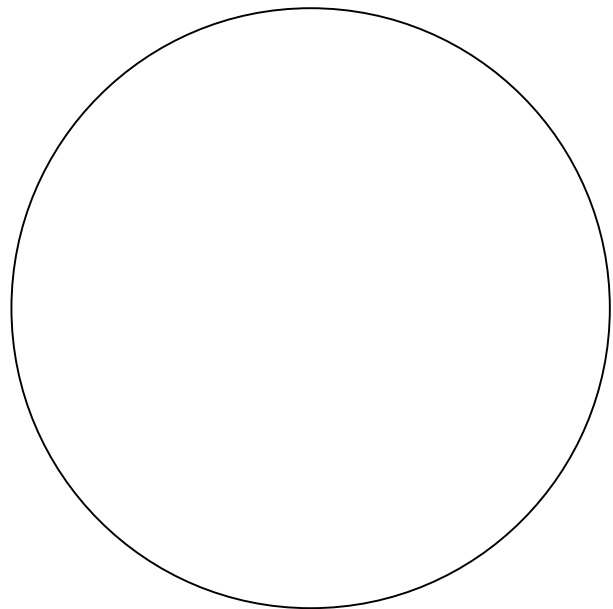
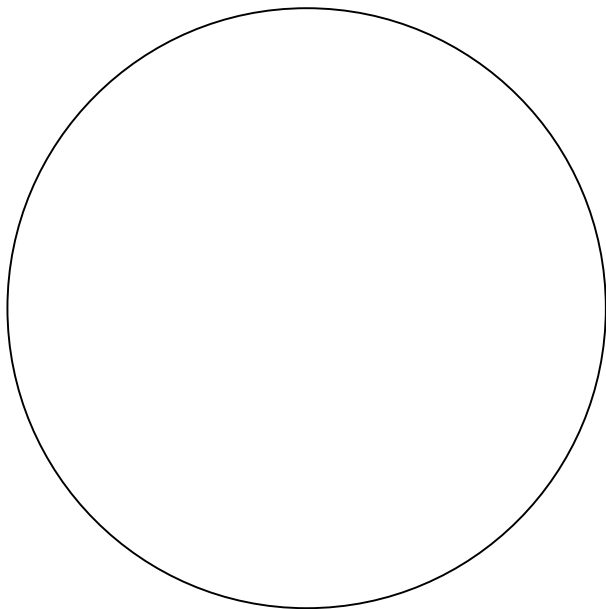
d. When you eventually obtain good paleomagnetic directions from the flows, what do you do with them to test the hypothesis that the rocks are rotated?

2 Suppose you're working on a small continent on the equator, at longitude 90° West. Your paleomagnetic measurements yield the results in the table. Assume the geocentric axial dipole hypothesis holds. Fill in the blank column with the angle from the site to the pole at time of magnetization:

AGE	Average Declination	Average Inclination	Angular distance to north magnetic pole
Ordovician	90° West	63°	
Devonian	90° West	0°	
Mississippian	120° West	0°	
Permian	150° West	0°	
Triassic	Due South	0°	

a. Plot the apparent polar wander path on the diagram and label the diagram carefully so I know precisely what you mean; explain as necessary.

Extra diagram, just in case...



b. What does the apparent polar wander path tell you about the tectonic history of the continent? Be accurate yet brief.

c. Clearly label and mark on the diagram any Euler poles you can derive from the data given.

3. Below are three models for a radially symmetric planet. The cores and mantle are solid with constant velocities.

A. Explain how T-delta diagrams would allow you to determine which model was most accurate for the planet; how do the T-delta diagrams differ?. Sketch in the most important, representative rays in the planet and on a T-Delta diagram (label them).

B. For the cases with a core, explain how you would determine the radius of the core.

