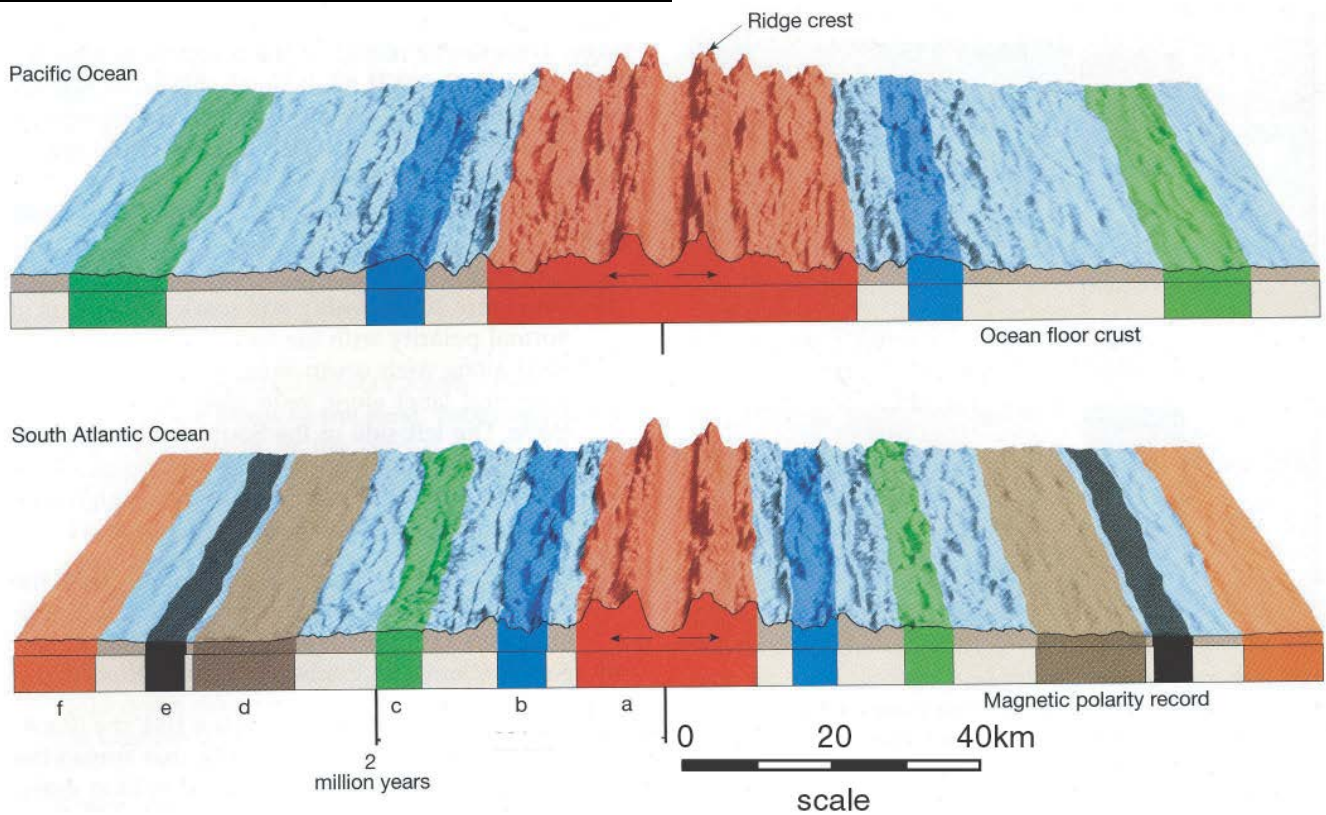


Name _____ Spreading Rate Problem

SHOW ALL CALCULATIONS!-Circle your final answer



The magnetic stripes are color coded such that the red/blue/green “stripes” represent crust of the same age for both the Pacific and South Atlantic oceans. Scale is same for both oceans. Assume the rate for each ocean has remained constant over time.

1) How do you predict the spreading rates compare for these two oceans? (answer before you calculate)
 (“X” your choice below)

_____ Both are spreading the same rate _____ Pacific is spreading faster _____ S. Atlantic is spreading faster

2) Calculate the spreading rate for the South Atlantic (how fast is each side moving from the ridge?-1/2 spreading rate)
 A) in kilometers per million years:

B) in centimeters per year:

2) Calculate the spreading rate for the Pacific (how fast is each side moving from the ridge?-1/2 spreading rate)

A) in kilometers per million years:

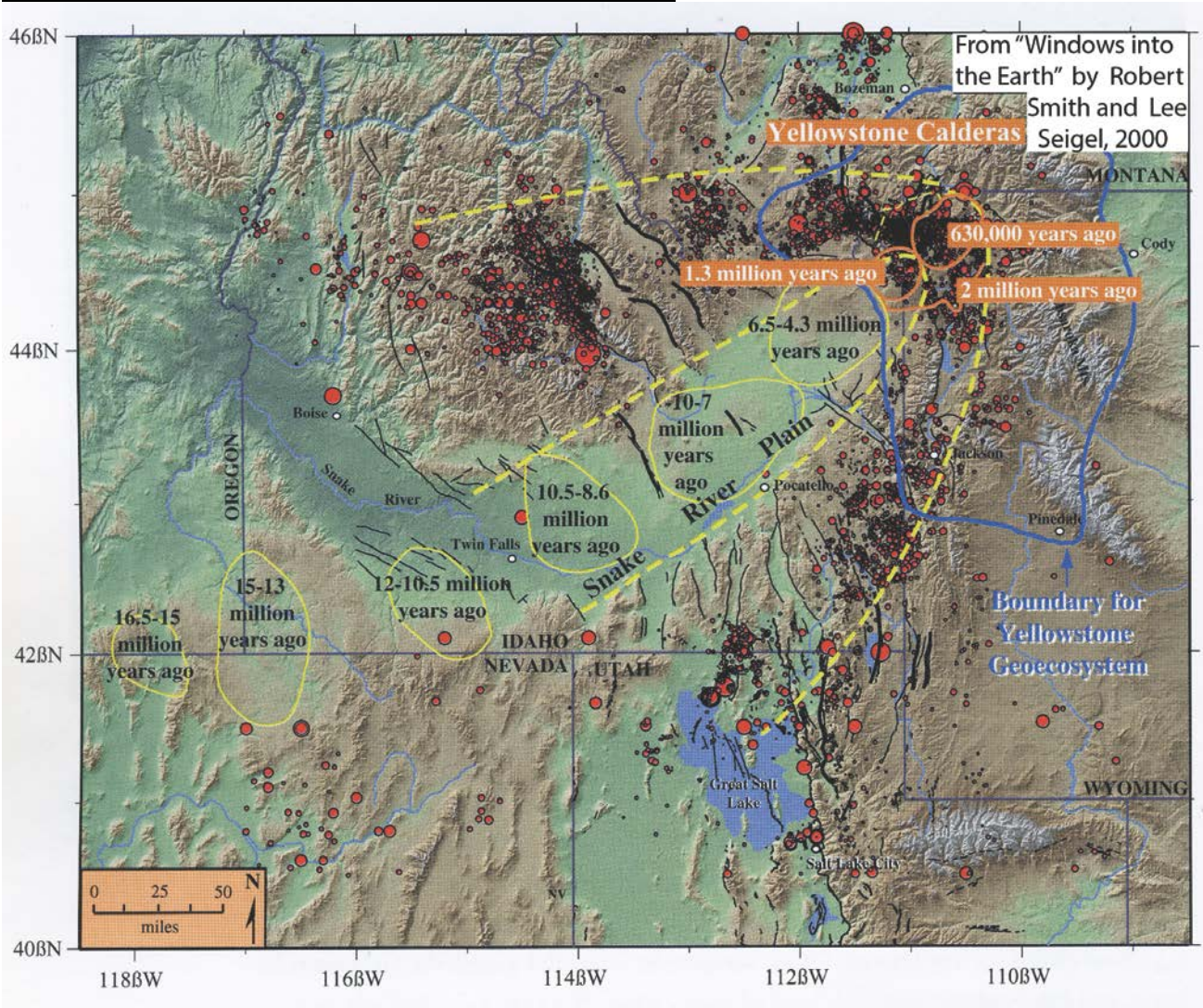
B) in centimeters per year:

C) in miles per year: (note: 1 kilometer = 0.622 miles)

Was your estimate in Question #1 correct?

Name _____ Plate Rate Problem: Yellowstone

SHOW ALL CALCULATIONS!-Circle your final answer



The above map shows the "trail" of the hotspot responsible for the volcanism in Yellowstone National Park. Each yellow/orange "circle" represents the outline of the caldera each eruption made. Assume the hotspot was beneath the center of the caldera during each eruption. **(use oldest age for each caldera)**

1) Based on the ages for the calderas, what direction is the North American Plate moving? (circle one below)

W NW N NE E SE S SW

2) Considering the oldest and the youngest caldera, what is the average rate the North American plate is moving?

A) in miles per thousand years (Ka)?

B) in km per million years? (note: 1 kilometer = 0.62 miles)

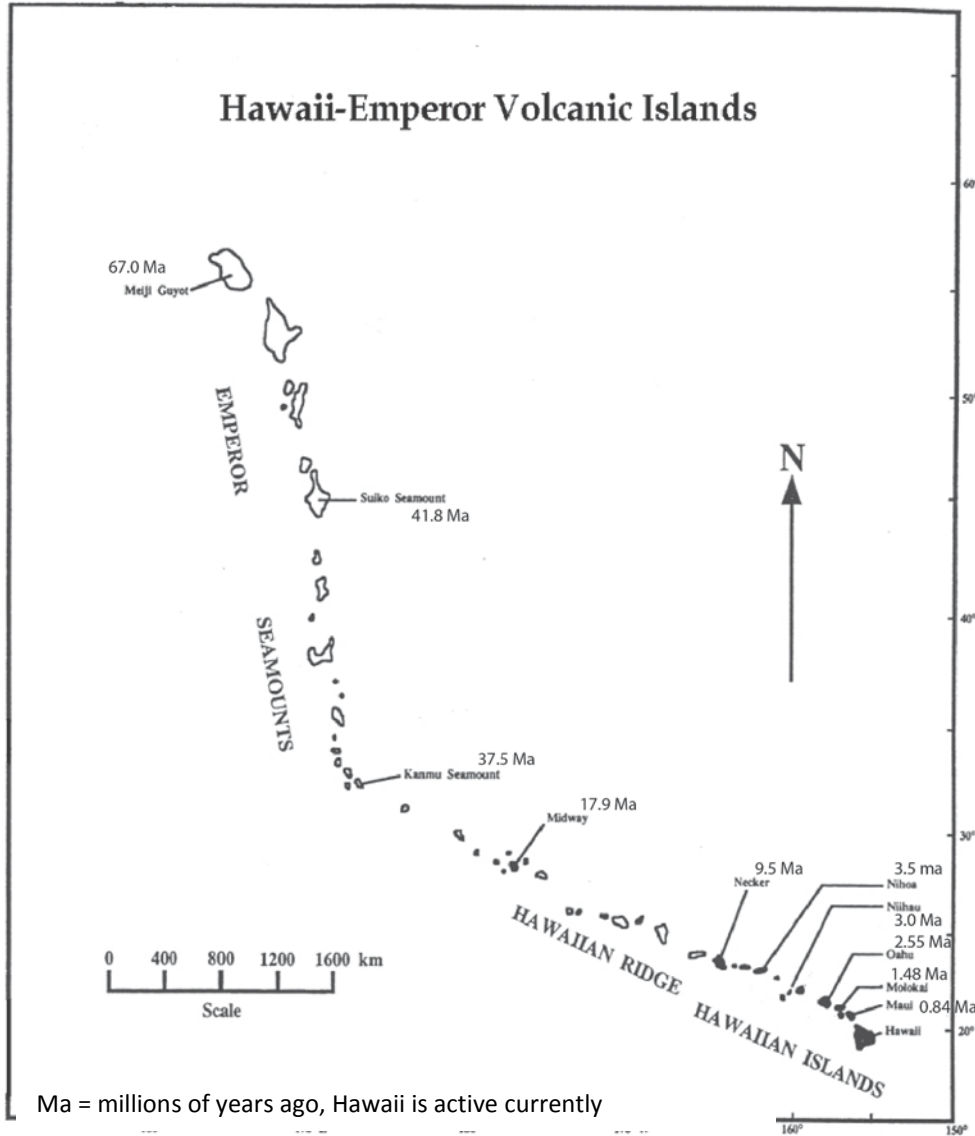
C) in cm per year?

3) Based on the time spacing between the last three eruptions, when do you predict the next eruption should occur?

Name _____

Plate Rate Problem: Hawaii

SHOW ALL CALCULATIONS! - Circle your final answer

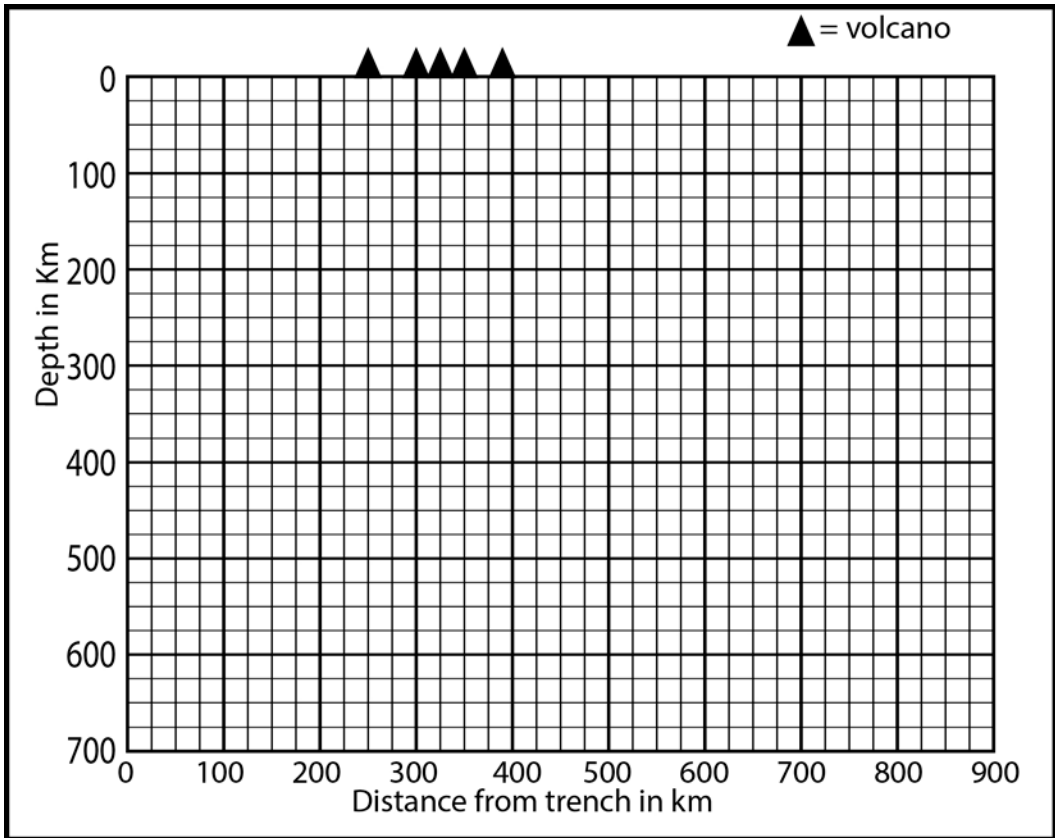


- 1) Look carefully at the islands and seamounts created by the hotspot currently under the Island of Hawaii
 - A) Has the Pacific plate in the area of the Hawaiian Islands been moving in the same direction forever?
 - B) At what time (approximately, in millions of years) did the direction change?
- 2) Prior to the time you determined in 1B:
 - A) What was the plate direction?
 - B) What was the plate rate in Km/million years?
- C) What was the plate rate in cm/year?
- 2) Since the time you determined in 1B (and currently):
 - A) What is the plate direction?
 - B) What is the plate rate in Km/million years?
- C) What is the plate rate in cm/year?

Name _____ **Subduction zone earthquakes**

Below is a table of earthquake data listing the depth to the earthquake focus for each distance from the trench. Plot these depths on the graph below.

location east of trench	Depth to focus	location east of trench	Depth to focus	location east of trench	Depth to focus	location east of trench	Depth to focus
0	20	120	80	410	25	540	30
10	40	200	110	410	110	590	20
20	30	220	30	410	150	640	10
50	60	260	120	450	50	710	30
51	10	300	110	450	150	780	530
55	30	330	40	470	180	800	560
60	20	330	120	500	30	820	610
80	70	390	40	500	160	880	620
100	10	390	140	500	180		



After you have plotted all these earthquakes, sketch where you think the subducting slab might be. Why did you choose this location?

What does the location of the volcanoes tell you about the processes occurring at this location?

Why do you think there are shallow earthquakes as far as approximately 700 km east of the trench?