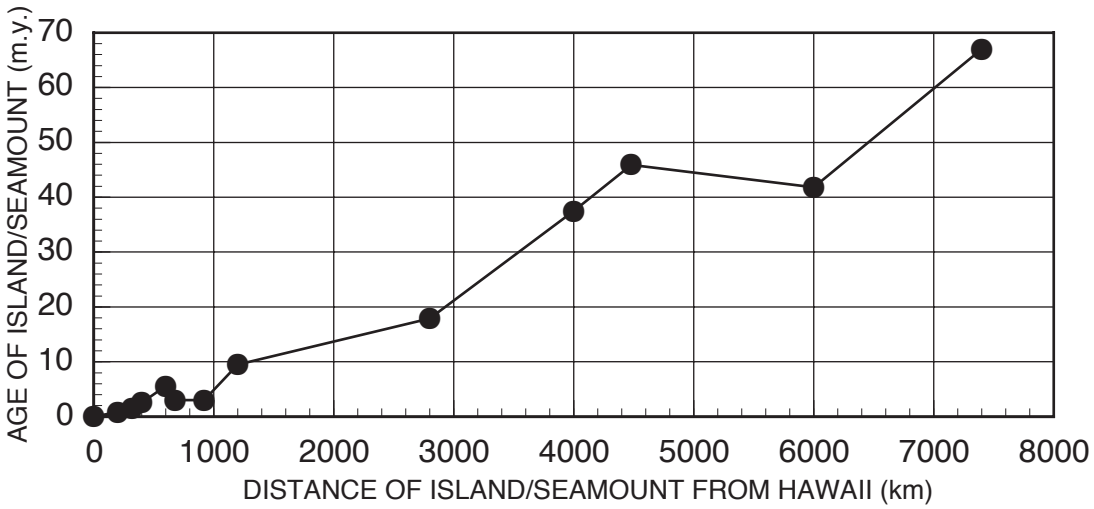
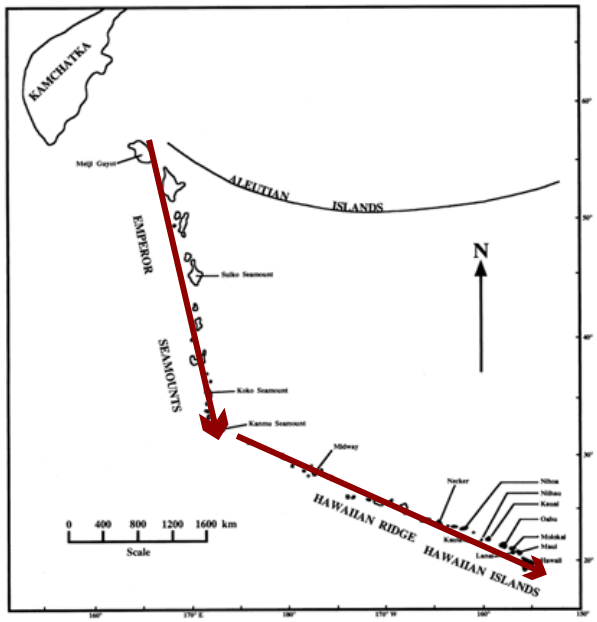
Lab #9 Key - Plate Tectonics



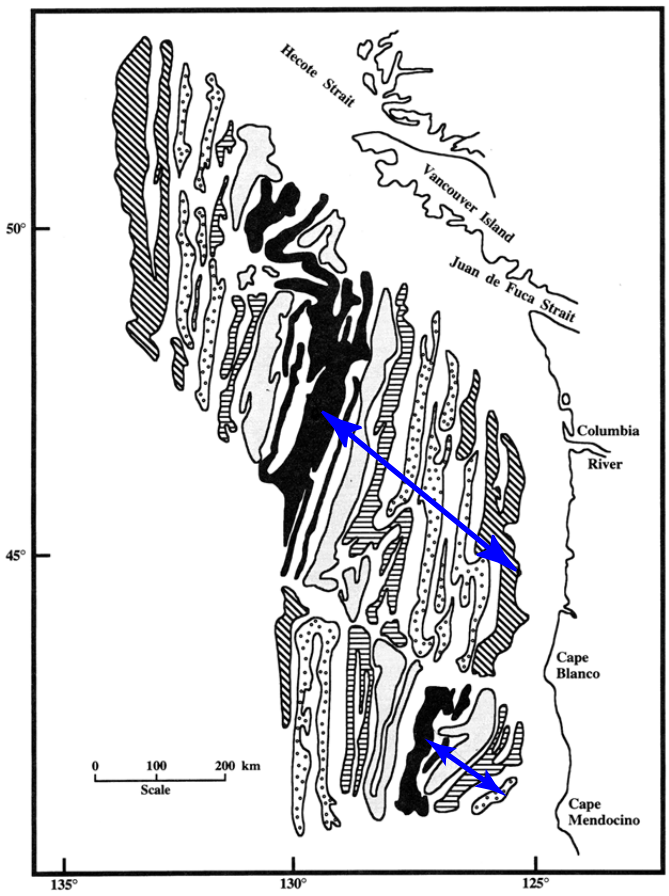
1. $\frac{4{,}000\,\text{km}}{37.5\,\text{m.y.}} \cong 106.67\,\frac{\text{km}}{\text{m.y.}} = 106.67\,\frac{\text{mm}}{\text{yr.}}$

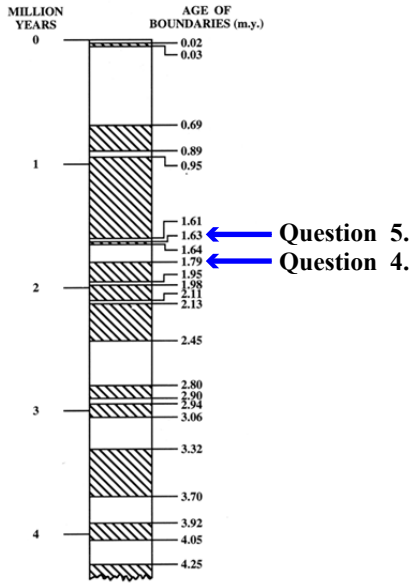
2. $\frac{7{,}400 - 4{,}000\,\text{km}}{67.0 - 37.5\,\text{m.y.}} \cong \frac{3{,}400\,\text{km}}{29.5\,\text{m.y.}} \cong 115.25\,\frac{\text{km}}{\text{m.y.}} = 115.25\,\frac{\text{mm}}{\text{yr.}}$

3.



Bend in the trend of Hawaiian Island-Emperor Seamount Chain, probably caused by a change in the direction of movement of the Pacific Plate.



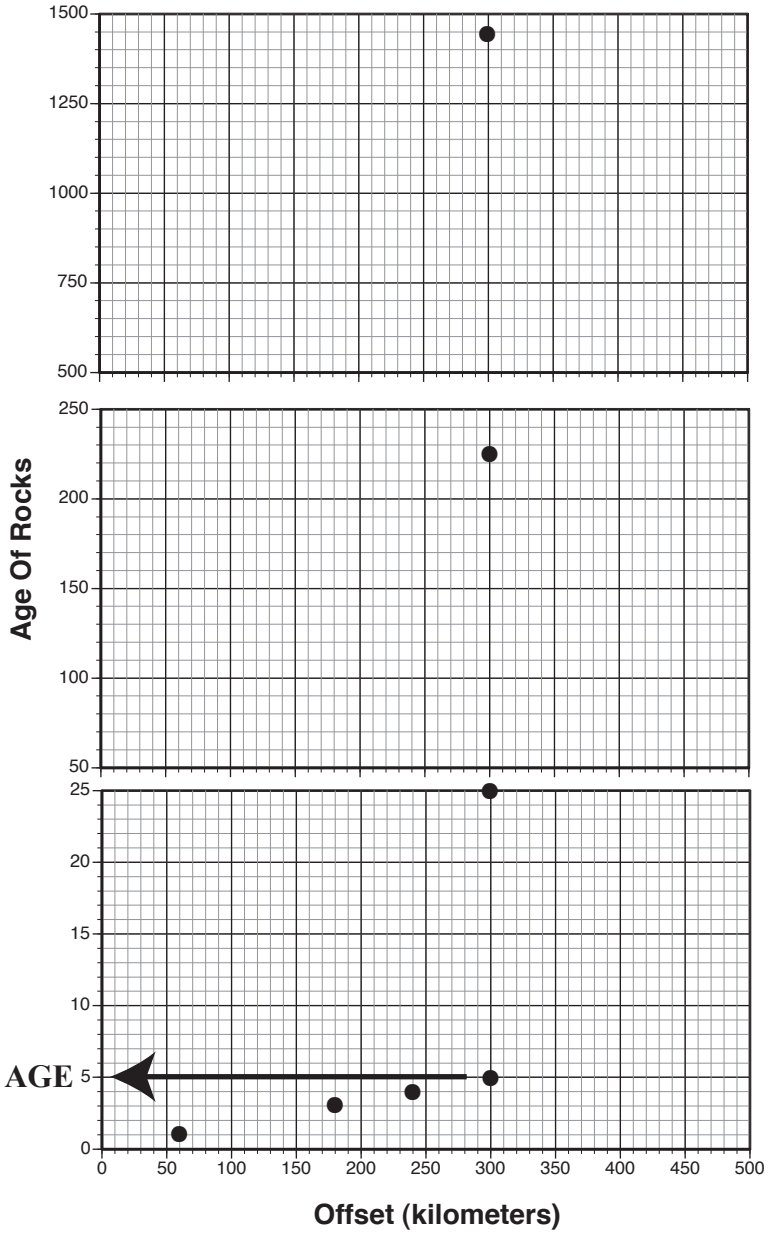


4. In the Northern Portion - distance from ridge to 5th normal = 400 km and age = 1.79 m.y.

$$\frac{400\text{km}}{1.79\text{m.y.}} \cong 224\,\frac{\text{km}}{\text{m.y.}} = 224\,\frac{\text{mm}}{\text{yr.}}$$

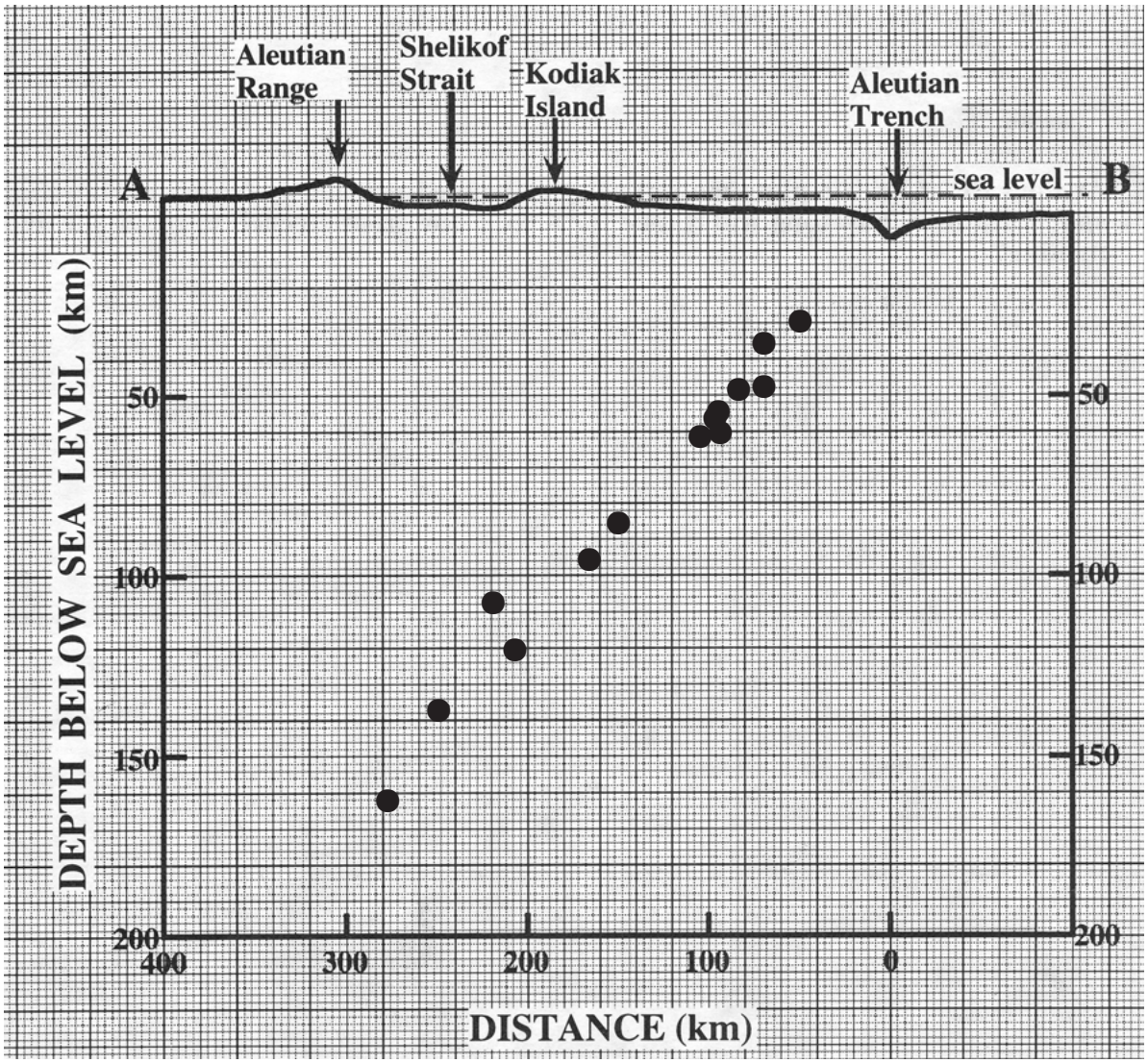
5. In the Southern Portion - distance from ridge to 4th normal = 150 km and age = 1.63 m.y.

$$\frac{150\text{km}}{1.63\text{m.y.}} \cong 92\,\frac{\text{km}}{\text{m.y.}} = 92\,\frac{\text{mm}}{\text{yr.}}$$



6. see plot above (btw, the rate of strike-slip movement is 300km/5m.y. = 60 mm/yr.)

7. The age of the fault is 5 million years because at that time all older rocks, regardless of their age, have moved the same amount (300 kilometers).



8. see the plot above

9. NO, because you can not sample rocks within a subduction zone and without rocks you can not calculate age dates for the rate equation (distance / time).