ANSWER **ANSWER** **ANSWER**

Round: 2B

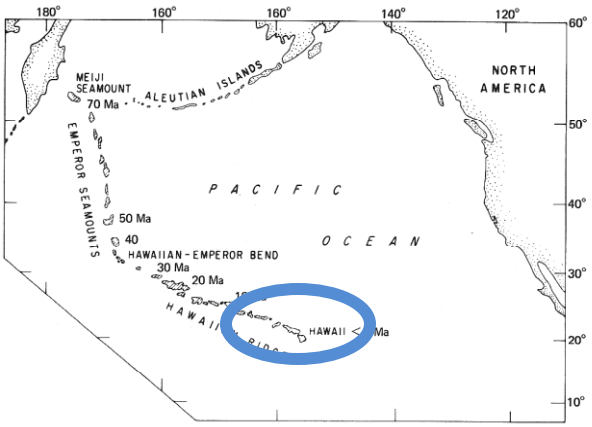


Figure The Hawaiian-Emperor volcanic chain showing ages (Ma) of particular islands or seamounts. (After D. A. Claque and others, 1975)

1. On the figure above, circle the exact location of where you would expect to find active volcanoes today and explain below why you would expect to find them there.

1 pt for correct labeling of the Big Island of Hawaii OR Loihi because this is where land is currently being formed by the volcanic hot spot (2 pts)

2. If the length of the Emperor Seamounts is about 1800 km, what was the average speed AND direction of the Pacific plate from 70 to 40 million years ago?

Speed: $\frac{1800\times10^{3}\,\mathrm{m}}{30\times10^{6}\,\mathrm{yr}}=6\mathrm{cm/yr}$ *(2 pts) (Also accept: 0.06 m/yr OR 6x10^{-5} km/yr)*

Direction: North (North-North-West) (2 pts)

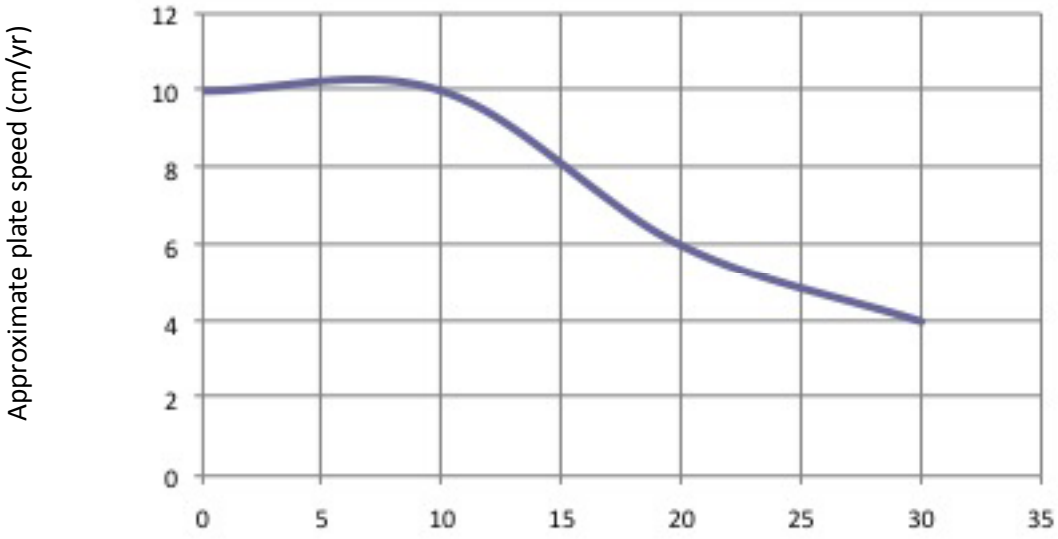
3. If the distance from the Big Island of Hawaii (age < 2 million years) to Necker (age about 10 million years) is about 1000 km, what was the average speed AND direction of the Pacific plate from 10 million years ago to present?

Speed: $\frac{1000\times10^{3}\,m}{10\times10^{6}\,yr}=10cm/yr$ *(2 pts) (Also accept: 0.1 m/yr OR 1x10^{-4} km/yr)*

Direction: North-West (2 pts)

4. On the axes below, graph the approximate speed of the Pacific plate over the past 30 million years.

If students show that the speed is ~10 cm/year, having increased from ~ 5 cm/yr by 30 Ma, students get all 3 pts.



5. Unlike the Hawaiian Islands, there are many active and recent volcanoes along the entire stretch of the Aleutian Island arc. What type of zone or geologic feature is most likely found there? How do you know?

The Aleutian Island arc is formed at a subduction zone (2 pts); this is the other common formation for island arcs besides hot spots, and because there are many active volcanoes along the arc, the Aleutian Islands are not formed by a hot spot (2 pts). At this location, the Pacific plate is being subducted under the North American plate.

6. Why would you expect earthquakes near the Aleutian Island arc to be deeper than the earthquakes near Hawaii?

Because the Aleutians are at where one plate is sinking/subducting (1 pt) underneath another, we expect earthquakes in this region to have deep foci (1 pt)