Activity on Earthquakes

1. Determine the location of the earthquake recorded in the following seismograms.
2. Determine when the earthquake occurred.

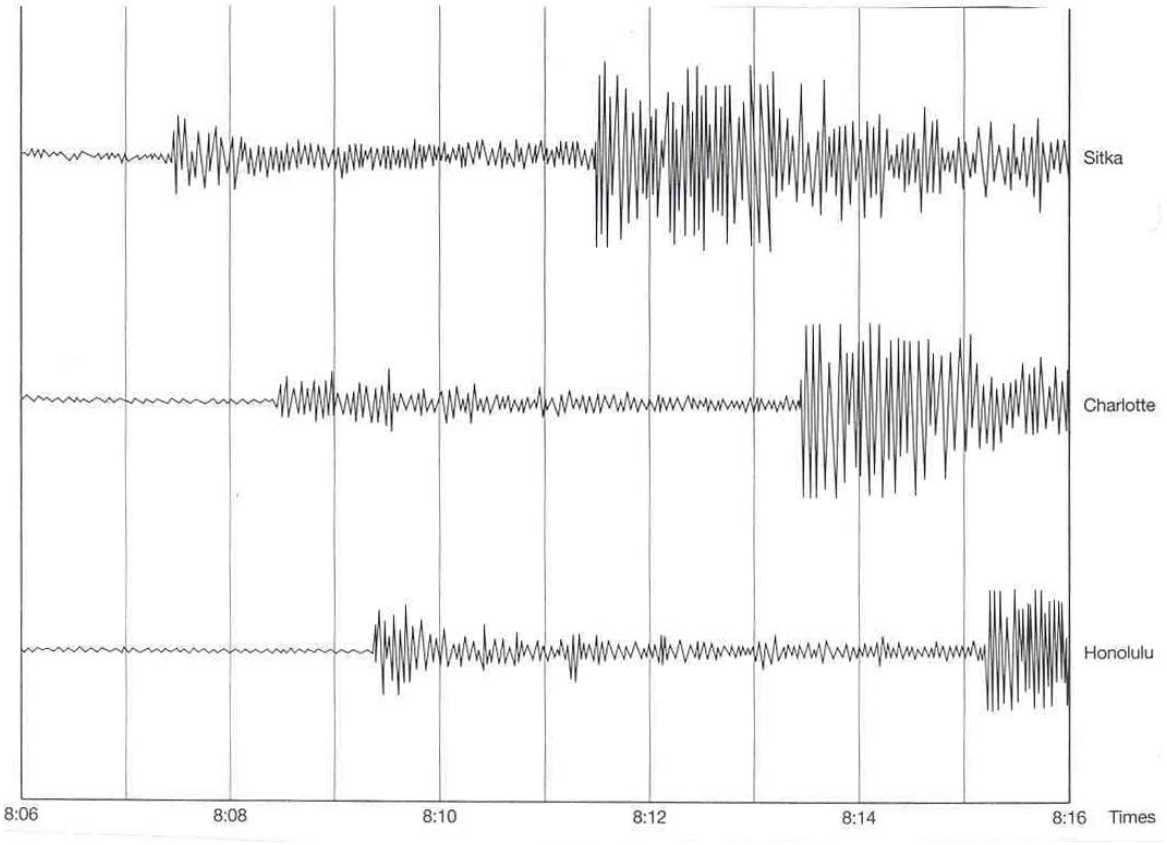
Using travel-time curves and seismograms to determine earthquake distance

Travel-time curves indicate how long it takes a specific type of seismic wave to travel a distance measured on the Earth's surface. The difference between the S-wave arrival time and the P-wave arrival time determines how far away the earthquake occurred. You can determine exact distance by using the seismogram and the travel time curve. Follow these steps:

1. Lay a strip of paper along the time axis of the seismogram. Mark a dot where the P wave first appears and then one where the S wave first appears. Move the first dot to a specific, known time on the time axis, and approximate the total time difference between the two dots.
2. Lay a strip of paper along the time axis of the travel-time curve. Mark a dot at t=0; Mark a second dot when t = the time that you determined in step 1.
3. Keeping the strip of paper vertical, place the bottom dot on the P curve. Move the strip across the travel-time curve, keeping the bottom dot always on the P curve, and keeping the strip vertical. When the top dot intersects the top S curve (the bottom dot still on the P curve), stop. Drop a vertical line down to the x-axis and determine the distance. This is the distance of the earthquake!

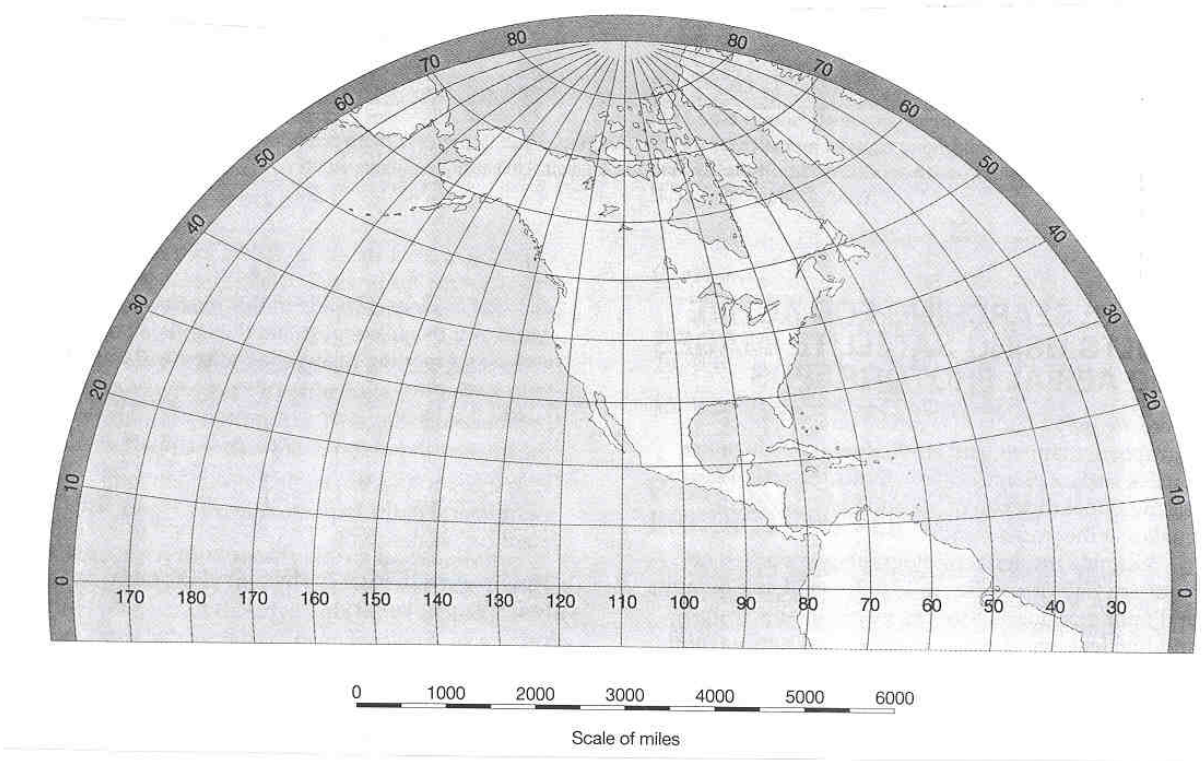
Determining earthquake location

1. For three different earthquake recording stations (seismographs), determine distance to the same earthquake.
2. On a world map, for each station, draw a circle around the station, where radius is the measured distance.
3. Where the three circles intersect, there lies the earthquake epicenter!

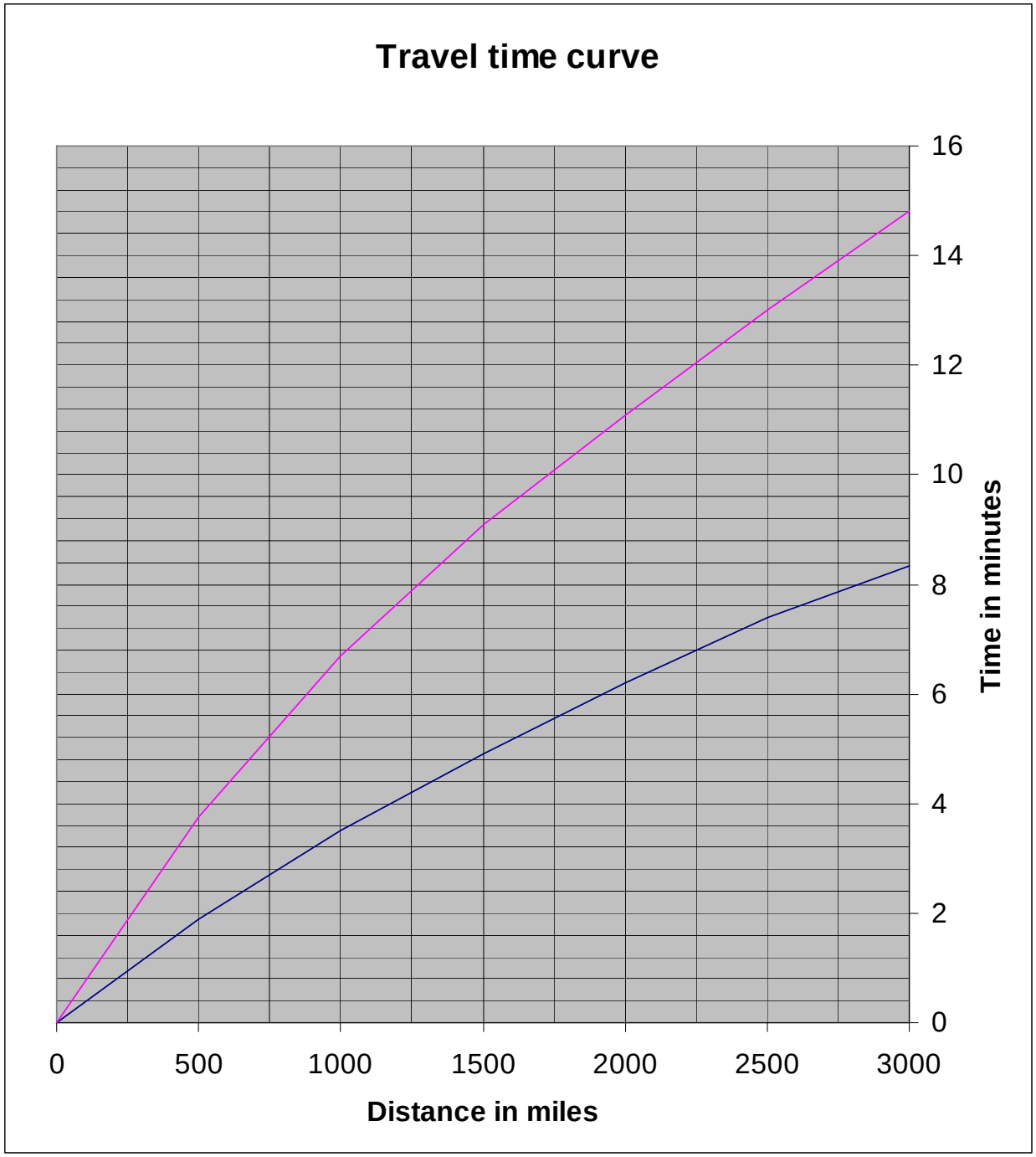


Determining when earthquake occurred:

4. Pick one wave (P or S) at one station. Use the clock on the seismogram to determine when that wave arrived at that station.
5. Based on how far away that station is from the earthquake, use the time-travel curve to determine how long it takes that wave you picked to travel that distance.
6. Subtract the travel time from the arrival time to get the departure time.



Sitka: 57N, 135W
Charlotte: 35N, 81W
Honolulu: 21N, 158W



P-Wave curve on bottom; S-Wave curve on top.