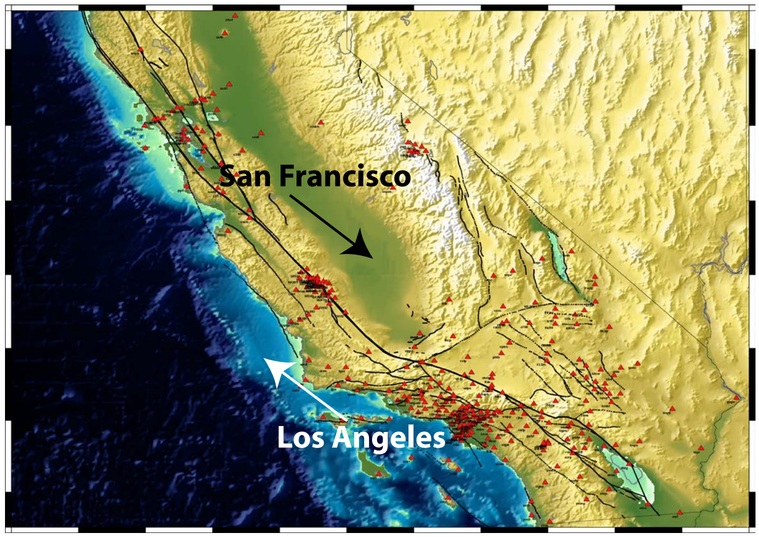
Activity: How Long Will It Take for Los Angeles and San Francisco to meet?

Some day in the distant future, the movement of the Pacific plate along the San Andreas Fault will eventually lead to Los Angeles and eastern San Francisco to meet up and become neighbors. Just how long is that going to take, really?



#1. We can figure this out by looking at two different GPS stations, one on each side of the San Andreas.

Station #1 (west of San Andreas)

Station Name ________________

North Velocity (V_N) _____________ mm/yr

East Velocity (V_E) ______________ mm/yr

Station #2 (east of San Andreas)

Station Name ________________

North Velocity (V_N) _____________ mm/yr

East Velocity (V_E) _____________ mm/yr

#2. Now we need to determine the relative motion (or velocity) of the two stations. To do this, we use the difference between the north velocity and the east velocity at the two stations, combined with the equation below.

Relative velocity: $V^2 = (\Delta V_N)^2 + (\Delta V_E)^2$

ΔV_N ________________ mm/yr

ΔV_E ________________ mm/yr

Relative Velocity ________________ mm/yr

#3. Now we need to know the distance from Los Angeles to San Francisco. This distance is about 500 km. Using this distance the the velocity of the two GPS stations, calculate how many years the two cities will meet! (don't forget to check your units!)

$$\text{velocity} = \frac{\text{distance}}{\text{time}}$$

Time = ________________ years