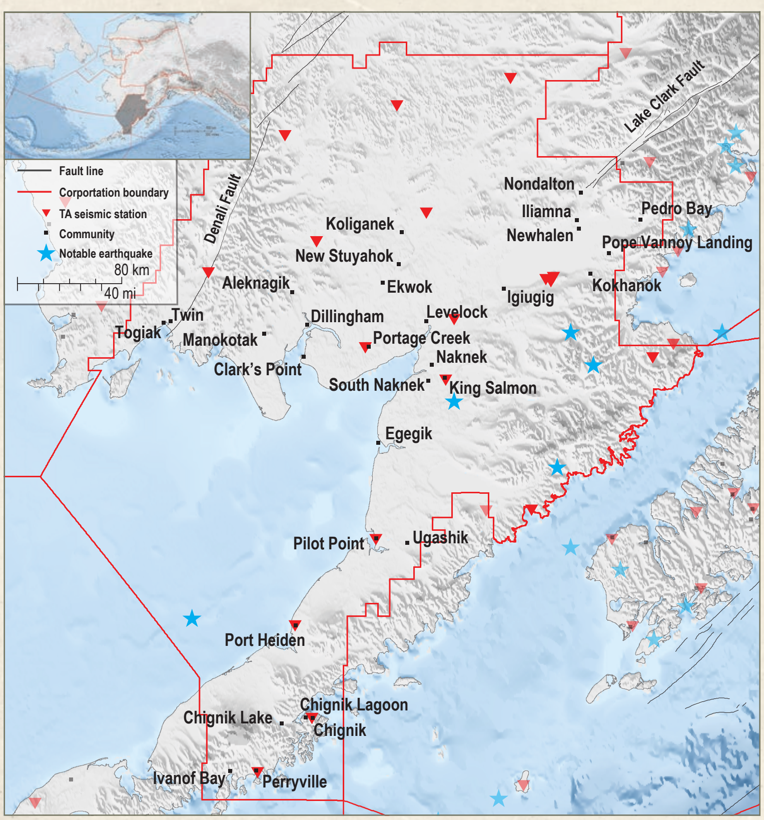
AVO photo by M. Tilman

EarthScope in the Bristol Bay Region

The 31 communities within the Bristol Bay Native Corporation region, southwest Alaska, experience more than 500 earthquakes per year. The earthquakes occur down to depths of about 130 miles. Most of these earthquakes go unnoticed, but occasionally larger events are felt. Since 1900, five earthquakes have occurred with magnitudes greater than 6.0. The largest event within the region was a magnitude 6.7 earthquake on May 13, 1910. Events with magnitude greater than 6.0 and other noteworthy events are shown on the map.

EarthScope plans to install 16 Transportable Array temporary stations during the project's 5-year deployment. The proposed stations are shown with red triangles. The Aleutian Megathrust is responsible for most of the seismicity in the region. This seismicity is driven by the subduction of the Pacific plate beneath Alaska. There is also seismicity associated with the stresses caused by the collision of the Yakutat block, a remnant piece of tectonic plate, to the east. Additionally, there are more than 40 volcanoes, 10 of which are seismically monitored in the region.



AVO photo by M. Yount

"31 communities within the Bristol Bay region experience more than 500 earthquakes per year"

Top 15 Earthquakes Worldwide:

1) M9.5 Chile, 1960
2) M9.2 Prince William Sound, Alaska, 1964
3) M9.1 Northern Sumatra,Indonesia, 2004
4) M9.0 Honshu, Japan, 2011
5) M9.0 Kamchatka, 1952
6) M8.8 Maule, Chile, 2010
7) M8.8 Ecuador, 1906
8) M8.7 Rat Islands, Alaska, 1965
9) M8.6 Northern Sumatra, Indonesia, 2005
10) M8.6 Assam - Tibet, 1950
11) M8.6 Northern Sumatra, Indonesia, 2012
12) M8.6 Andreanof Islands, Alaska, 1957
13) M8.5 Southern Sumatra, Indonesia, 2007
14) M8.5 Banda Sea, Indonesia, 1938
15) M8.5 Kamchatka, 1923

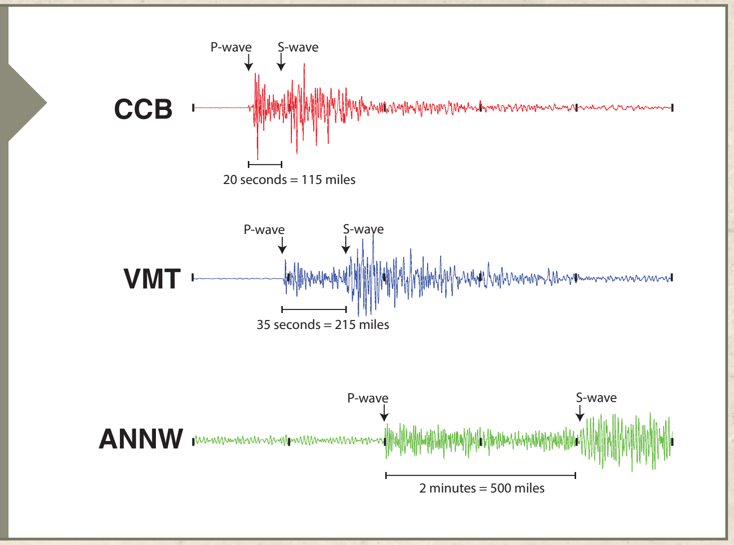
EarthScope stations can help us understand Alaska

How parts of Alaska behave are still somewhat unknown. Scientists use earthquakes and the energy waves they produce to get an idea of what is happening below our feet. More stations spread across Alaska will increase our understanding of unmonitored parts of the state. Earthquakes can be located in two steps. Two waves of energy are released when an earthquake occurs. The P-wave, or primary wave, behaves like a pulse. The S-wave, or shear or secondary wave, behaves like a snake with the energy vibrating from side to side, or up and down, as the wave moves forward traveling slower and arriving later. Since these waves travel at different speeds and arrive at a seismic station at different times, the time difference between the two arrivals can be measured.

Step 1.

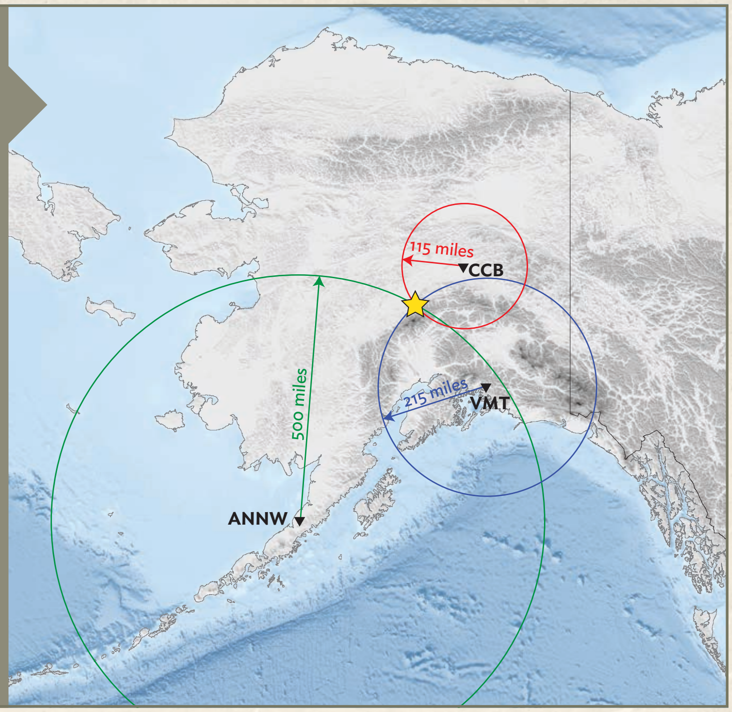
Seismologists measure the time between P- and S-wave arrivals. From numerous observations, scientists know the relationship between the S-P time and the distance between an earthquake and the station recording it. They convert this time difference into a distance for each station that recorded the earthquake.

Waveforms from a magnitude 5.4 earthquake in central Alaska. CCB is the Clear Creek Butte station. VMT is a station in Valdez. ANNW is a station on Aniakchak Volcano.



Step 2.

Once the distance is calculated for three stations, the earthquake's location can be calculated. A circle centered on each station is drawn with the circle's radius equal to the distance the station is from the earthquake. The point where all three circles intersect is the location of the earthquake. If a fourth station is used and the circles become spheres, a depth can be calculated in the same process. Seismologists use computers to get the most accurate earthquake location possible by analyzing data from all stations that recorded the event. To locate the station nearest you, view waveforms at that station or view waveforms from located earthquakes visit rev.seis.sc.edu.



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