

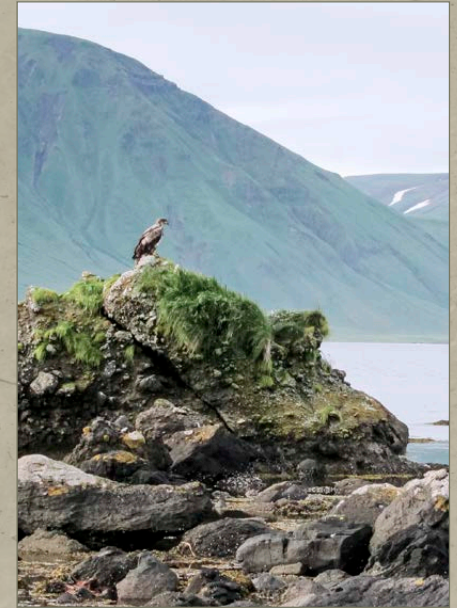
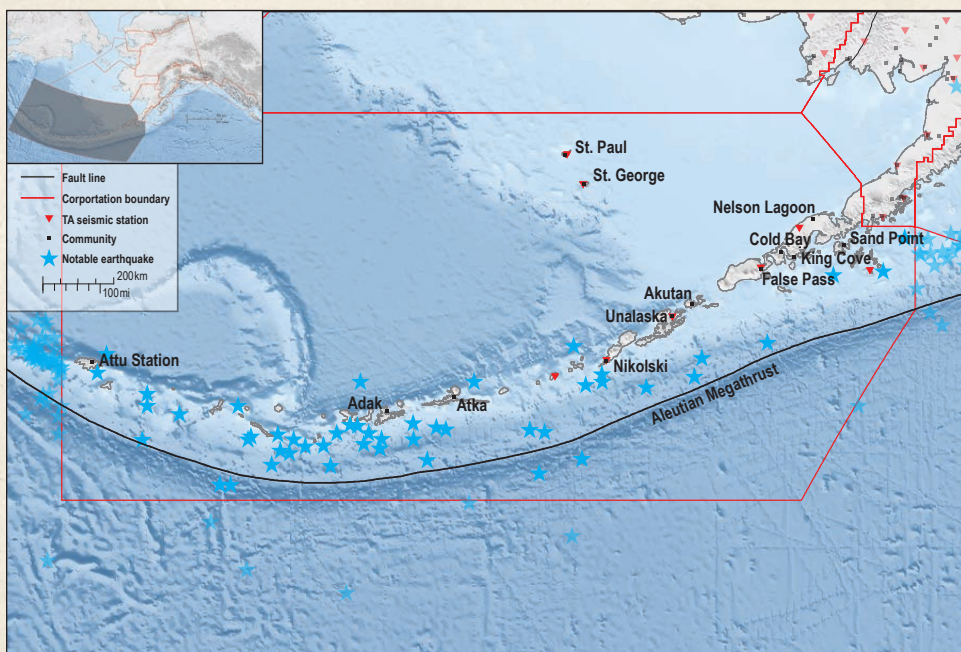


photos courtesy of the Alaska Earthquake Center

EarthScope in the Aleut Corp. Region

The nearly 15 communities within the Aleut Corporation region, southwestern Alaska, experience more than 7,000 earthquakes per year. The earthquakes occur at depths down to 190 miles. Most of these earthquakes go unnoticed, but occasionally larger events are felt. Since 1900, 50 events have been greater than magnitude 7.0. Two of the 15 largest events ever recorded worldwide, have occurred within the Aleut region: the magnitude 8.7 Rat Islands earthquake on Feb. 4, 1965 and the magnitude 8.6 Andreanof Islands earthquake on March 9, 1957. Events with magnitude greater than 7.0 are shown on the map.

EarthScope plans to install eight 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 nearly all the seismicity in the Aleut region. The seismicity is driven by the subduction of the Pacific plate beneath Alaska. Additionally, there are more than 60 volcanoes, 12 of which are seismically monitored in the region.



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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

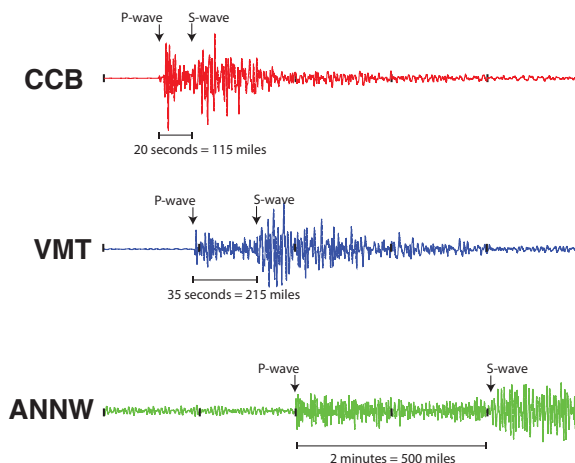
EarthScope stations can help us understand Alaska

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 Aniakhak 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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