The M8.2 July 28, 2021 Chignik Earthquake

ASHSC Alaska Seismic Hazards Safety Commission

Date and Time: July 28, 2021, 10:15 pm AKDT

Location: 55.3635°N, 157.8876°W; 21.7 miles deep
(South of Alaska Peninsula, 70 miles south-southeast of Perryville)

Area of Effect: This event was widely felt as strong shaking throughout the Alaska and Kenai Peninsulas. Light to moderate shaking was reported on Kodiak Island, and weak shaking was felt as far away as the Mat-Su Valley in Southcentral Alaska.

Fatalities: 0

Damage: No reports of injuries or damage.

Felt Reports: 229

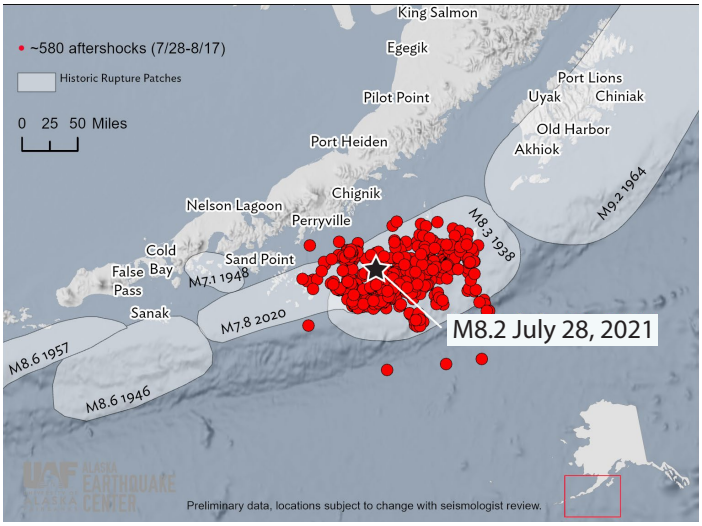
Tsunami: The National Tsunami Warning Center (NTWC) issued a tsunami warning immediately after the event for communities between Samalga Pass and the Hitchinbrook Entrance resulting in several community evacuations (Chignik Bay, Chignik Lagoon, Kodiak City, False Pass, Homer, King Cove, Nelson Lagoon, Old Harbor, Sand Point, Seward, and Unalaska). The warning was reduced to an advisory just over two hours after the event, and all recorded wave heights in the area were under one foot.

Notable Aftershocks: Four minutes after the mainshock, a M6.1 aftershock occurred. On August 14 a M6.9 aftershock shook the same area. Aftershocks will continue for many months.

General

The M8.2 Chignik earthquake occurred southeast of the Alaska Peninsula on the interface between the subducting Pacific and overriding North American tectonic plates. The plate boundary, known as the Alaska-Aleutian megathrust, accommodates about 2.4 in/yr of plate convergence in this area. The megathrust is highly active and can produce devastating tsunamigenic earthquakes. The M8.2 event occurred between the Shumagin Islands to the southwest and Kodiak Island to the northeast and is the largest earthquake in the area (and in the United States) since 1965.

This portion of the plate interface last ruptured in 1938 in a M8.3 megathrust earthquake. The Chignik event is also very close to and appears to have been influenced by the recent M7.8 July 22, 2020 earthquake in the area previously identified as the Shumagin "seismic gap." For more information about the M7.8 Simeonof Island Earthquake and the Shumagin Gap, visit this page.



Aftershocks analyzed by the Alaska Earthquake Center (AEC) constrain the size of the rupture to about 125 x 62 miles. Data analysis by the U.S. Geological Survey confirms that the source mechanism is consistent with rupture along the megathrust fault. The rupture started in the west and propagated towards Kodiak Island causing 8–10 ft of slip on the plate interface.

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STATE OF ALASKA DIVISION OF GEOLOGICAL & GEOPHYSICAL SURVEYS

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Tsunami Warnings

Ever wonder how the National Tsunami Warning Center (NTWC) decides when and where to issue tsunami warnings?

When an earthquake is detected below the Pacific Ocean, the NTWC issues an alert based on the initial, estimated size of the event. This is done before any tsunami is detected by ocean buoy or coastal town in order to provide a warning as quickly as possible.

After an alert is issued, the NTWC works to understand the potential tsunami impact based on continued seismic analysis, water-level measurements, tsunami modeling, and historical tsunami information. Alerts are updated as more information becomes available until the risk has passed or the alerts are canceled.

Estimated Magnitude	Tsunami Alert(s) Issued
Less than M7.0	Information statement released confirming that there is no tsunami risk.
M7.0 to M7.6	Tsunami Warning is issued for locations within 250 km (160 miles).
M7.6 to M7.8	Tsunami Warning is issued for locations within 500 km (310 miles). Tsunami Advisory for locations between 500–1,000 km (310–620 miles).
Greater than M7.8	Tsunami Warning is issue for locations within 3-hour wave travel time. A Tsunami Watch is issued for more distant locations potentially at risk.

(from www.tsunami.gov/images/procChartLargePacific.gif)

A Small Tsunami is Not a False Alarm

Fortunately, the tsunami caused by the Chignik earthquake was smaller than might be expected for an earthquake of this magnitude and the warning was cancelled after a few hours. During such an event, a tsunami warning must happen within minutes, whereas the information about the earthquake mechanism and depth, and whether it triggered any landslides—details that are fundamental to tsunami generation—take much longer to decipher. The depth of this earthquake, about 20 miles, meant that there was not much movement of the seafloor and waves were under a foot high. However, had the earthquake occurred at only 10 miles depth there likely would have been a much larger tsunami.

When a large earthquake occurs but we avoid the danger of a big tsunami, it provides an unparalleled learning opportunity. How did the tsunami behave in each community? How quickly and successfully did your community evacuate? Is there room for improvement? Knowing your tsunami risk before a disaster hits could save your life. Explore the online tool at tsunami.alaska.edu to determine whether your house, workplace, or school is in a potential inundation zone and check with local agencies about evacuation routes and safety procedures. Visit earthquake.alaska.edu/why-small-tsunami-not-false-alarm for more information.

For more information visit: www.tsunami.gov

To sign up for SMS tsunami alerts, visit: www.tsunami.gov/?page=productRetrieval

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