

2018 M7.9 Offshore Kodiak Earthquake: Points to Ponder

Fault geometry is a primary driver of tsunami potential

- The offshore Kodiak earthquake did not generate a significant tsunami because it occurred on a strike-slip fault. Faults with vertical displacements (thrusts or normal) have much higher potential for generating tsunamis than faults with horizontal (strike-slip) displacements.
- Strike-slip faults are still capable of generating damaging tsunamis due to submarine landslides or extreme topography of the sea floor. The 1994 M7.1 earthquake in the Philippines occurred on a strike-slip fault and generated a tsunami that killed 70 people.

It takes time to determine an earthquake source type

- The National Earthquake Information Center (NEIC) routinely determines earthquake source type for large earthquakes based on global seismic data. It took more than one hour to analyze this event.
- Emergency managers must expect and plan for the worst to keep people safe, hence err on the side of caution with tsunami warning and evacuation. It is better to be safe than sorry.

Alaska's earthquake response chain has weak links

- A University of Alaska Fairbanks power outage and subsequent loss of web connectivity delayed the Alaska Earthquake Center's (AEC) response by an hour.
- The National Tsunami Warning Center's notifications were authoritative because the event occurred offshore and they have capacity to evaluate tsunami potential without AEC input. Had the event been land-based, emergency operations would have been severely impacted without the critical data and response activities of the AEC.

Emerging technology, improved warning, and community response will save lives

- This event demonstrated the power of timely notification, siren activation, and evacuation in the path of a potential tsunami. More than 15 Alaska coastal communities were evacuated.
- New alerts incorporating cell phone technologies are still being refined.
- There is an enhanced awareness of the need for preparedness, and a general appreciation for improved systems that reduce potential loss of life.

About the Earthquake

Date and Time: January 23, 2018, 12:31:42 am

Location: N 56.046°, W 149.073° (Gulf of Alaska, 170 miles southeast of Kodiak)

Area of Effect: Strong shaking felt from Kodiak to Kenai; light to moderate shaking felt throughout southcentral Alaska, parts of interior and southeast Alaska, and in Whitehorse, Canada

Fatalities: 0

Damage: Walls were cracked in the Kodiak city fire station, and there was a small oil spill at the Nikiski refinery.

Tsunami: Tsunami warnings were sent out within 4–6 minutes of the earthquake via ~7 different means. More than 15 Alaska communities were evacuated. Small tsunami waves began impacting Kodiak and Sitka approximately 90 minutes after the earthquake. Wave heights of approximately 6 inches were reported in Kodiak and less than 6 inches in southeast Alaska and the Aleutians.

