

Anchorage faces daily rumbling more than a month after quake

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Traffic moves through downtown Anchorage, Alaska. The city has been hit by aftershocks after an earthquake struck on November 30, 2018. Photo by: Bloomberg photo/David Ryder

A major earthquake struck Anchorage, Alaska, on November 30, 2018. The initial jarring was destructive, and now, more than a month later, daily jolts continue.

Earthquakes start below the Earth's surface. They happen when two blocks of the Earth, called tectonic plates, suddenly slip past each other. The surface where they slip is called the fault.

The November earthquake in Alaska had a magnitude of 7.0. Scientists determine the magnitude by measuring and recording the force of earthquakes, and how long they last, using seismographs or seismometers. "Minor" earthquakes start at a magnitude of 3, while those measuring 8 or higher are considered "great."

Hundreds Of Aftershocks

Since the main quake in Alaska, about 350 aftershocks of magnitude 3 or greater have been registered on seismometers. Some, including five 5.0 or worse quakes, have been large enough to cause additional damage. The aftershocks have slowly been winding down. However, a magnitude 5.0 tremor hit on January 1 and a magnitude 4.2 on January 2. Those show that Alaskans are far from safe yet.

That raises the question: How long will the earthquakes continue? We can turn to a little bit of seismology for the answer.

After a quake, swarms of aftershocks go on for weeks or even months. The bigger the main earthquake, the stronger and more frequent the aftershocks. The occurrence of aftershocks drops off as time progresses, per a relationship known as Omori's Law. By fitting an equation to the number of observed aftershocks, scientists can extend trends into the future.

Likewise, it's possible to forecast the intensity of the aftershocks. That comes through the Gutenberg-Richter equation. It breaks down the percentage of aftershocks that reach different levels of strength. It's like a pyramid. As you climb in magnitude, each level gets more narrow.

Not Ending Anytime Soon

Looking ahead, the U.S. Geological Survey (USGS) estimates that anywhere between 22 and 120 additional magnitude 3 or higher quakes might be felt in the next year.

Barbara Romanowicz is the former director of the Berkeley Seismological Laboratory and a professor at the University of California at Berkeley. She expects Anchorage's rumbling won't end anytime soon. "Lots of small non-damaging earthquakes — magnitude 3.0 or greater — are very likely to continue," she said by email.

Most are expected soon. In the next week, earthquake models suggest about one magnitude 3 or greater earthquake should occur every couple days. An average of one should reach magnitude 4 every 10 days.

Numbers should fall back a bit by the end of January. However, even then there's no real end in sight.

There's an outside chance of a more dangerous magnitude 5 quake happening within the month. The chances of this taking place are no more than 30 percent. Those odds climb ever so slightly to 41 percent during all of 2019 per USGS's numbers.

Strong Jolt Startled Residents

Five earthquakes topping magnitude 5.0 did already follow. All came within the first 24 hours after the "big quake," in addition to the magnitude 5.0 aftershock on January 1. The strongest, a 5.7, jounced Anchorage six minutes after the main shock. The new earthquake startled residents just leaving their places of safe refuge. There shouldn't be any aftershocks stronger than this, based on an observation called Bath's Law. It says that the difference in magnitude of the biggest aftershock and the main quake in any earthquake should be about 1.1 or 1.2.

Quakes should start to wind down by the start of spring. While earthquake models don't do as well in this time range, it's a safe bet that only a few occasional shakes will continue past then. May should have only a third the number of aftershocks as January.

The USGS released a statement on the cause of the earthquake. "It occurred in the Alaska-Aleutian subduction zone on a fault within the subducting Pacific slab," it wrote. The Alaska quake did not stem from movement along the nearby meeting point of the Pacific and North American plates.

However, there is one concern. The 7.0 may not be the main shock, but rather a foreshock coming before a larger earthquake. However, the odds are low. Romanowicz warns that "while another large earthquake is improbable in the near future, it could still happen." It's impossible to know for sure that the 7.0 was the main shock, and not a precursor to a larger slip along the fault.

Quiz

1 Read the section "Not Ending Anytime Soon."

Which detail from the section suggests that Alaska might experience some more significant damage from earthquakes in the future?

- (A) She expects Anchorage's rumbling won't end anytime soon.
- (B) "Lots of small non-damaging earthquakes — magnitude 3.0 or greater — are very likely to continue," she said by email.
- (C) Numbers should fall back a bit by the end of January. However, even then there's no real end in sight.
- (D) There's an outside chance of a more dangerous magnitude 5 quake happening within the month.

2 Which sentence from the article shows the MAIN problem that Alaska might face?

- (A) The occurrence of aftershocks drops off as time progresses, per a relationship known as Omori's Law.
- (B) It says that the difference in magnitude of the biggest aftershock and the main quake in any earthquake should be about 1.1 or 1.2.
- (C) "It occurred in the Alaska-Aleutian subduction zone on a fault within the subducting Pacific slab," it wrote.
- (D) Romanowicz warns that "while another large earthquake is improbable in the near future, it could still happen."

3 Read the following selection from the section "Hundreds Of Aftershocks."

After a quake, swarms of aftershocks go on for weeks or even months. The bigger the main earthquake, the stronger and more frequent the aftershocks.

HOW does this detail develop the article's central idea?

- (A) It suggests that smaller earthquakes do not have any aftershocks.
- (B) It contrasts how long earthquakes last with how long aftershocks last.
- (C) It explains the relationship between earthquakes and aftershocks.
- (D) It reveals what causes both earthquakes and aftershocks.

- 4 Which detail from the article would be MOST important to include in a summary of the article?
- (A) Since the main quake in Alaska, about 350 aftershocks of magnitude 3 or greater have been registered on seismometers.
 - (B) Barbara Romanowicz is the former director of the Berkeley Seismological Laboratory and a professor at the University of California at Berkeley.
 - (C) The strongest, a 5.7, jounced Anchorage six minutes after the main shock. The new earthquake startled residents just leaving their places of safe refuge.
 - (D) The Alaska quake did not stem from movement along the nearby meeting point of the Pacific and North American plates.