

Tremors shove Washington state west, offer clues to next big earthquake

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Thousands of tiny tremors over the past few months have moved parts of Washington state and Vancouver Island westward. It's a near-annual event that backs expectations by some scientists that a big earthquake may hit the Seattle area harder than their previous models suggested.

The recent wave of activity began in May and appears to be dying off now, according to University of Washington earth sciences professor Ken Creager. It's a process, known as episodic tremor and slip, thought to increase stress on locked faults—areas where tectonic plates cannot move past each other. Earthquakes occur when the pressure on locked zones reaches the breaking point and the plates snap past each other.

Scientists believe an episode of tremors could someday trigger a so-called megaquake on the offshore [fault](#) called the Cascadia Subduction Zone. The 700-mile-long fault runs from Vancouver Island to northern California, and could unleash earthquakes of up to magnitude 9.0. It's one of the biggest of faults in the U.S.

While older models suggest that the locked zone is mostly shallow and offshore, the location of these tremors indicates that in a big [earthquake](#), layers of rock jerking past each other may take place closer to Seattle than previously thought.

"That increases the risk that it could be closer to the population centers, which means stronger shaking in the Puget Sound cities," Creager said.

Also unknown is the timing of the next big earthquake.

The Pacific Northwest last had a megaquake about 300 years ago. Scientists widely expect the region to experience a similar event every 500 years on average.

"It could happen anytime in the next few hundred years but it could be tomorrow," Creager said.

Most of the year, the offshore Juan de Fuca plate pushes against the North American plate and moves parts of Washington and Vancouver Island to the east. Then, about every 14 months, a series of tremors slides the North American plate back a few millimeters. This year's tremors moved the eastern portion of the Olympic Peninsula and southern Vancouver Island about 5 millimeters.

"It looks like a sawtooth pattern," Creager said. "You're going east slowly for a year, and you go back west for a few weeks."

Canadian seismologist John Cassidy said that episodic tremor and slip is helpful for understanding the process of subduction, when one plate goes under another.

"It helps us understand where the fault zone is locked, and where it's storing energy for a future earthquake," Cassidy said. Calculations about the strength and type of shaking are folded into building codes, he said.

Although these tremors have likely been occurring for hundreds of years, the process of episodic tremor and slip was discovered only in the early 2000s and much more research has to be done, Cassidy said.

The slower nature of these tremors allows scientists to better understand ruptures, which are much harder to study in the seconds-long duration of

most earthquakes.

"You can study these ruptures in detail in a way that you can't with a regular earthquake," Creager said. "There's a lot of mystery left."

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