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TACOMA, Wash. (AP) - Any parent of a rambunctious youngster can tell you trouble might be afoot when things go quiet in the playroom. Two independent research initiatives indicate there is a comparable situation with the Cascadia earthquake fault zone.

The fault zone expected to generate the next big one lies underwater between 40 and 80 miles offshore of the Pacific Northwest coastline. Earthquake scientists have listening posts along the coast from Vancouver Island to Northern California.

But those onshore seismometers have detected few signs of the grinding and slipping you would expect to see as one tectonic plate dives beneath another, with the exception of the junctions on the north and south ends of what is formally known as the [Cascadia Subduction Zone](#).

It is "a puzzle," according to University of Oregon geophysics professor Doug Toomey.

"What is extraordinary is that all of Cascadia is quiet. It's extraordinarily quiet when you compare it to other subduction zones globally," Toomey said in an interview.

To make sure they're not missing something, researchers have been using ships to drop off and later retrieve ocean bottom seismographs. These record for up to a year right on top of the fault zone.

A joint Japanese-Canadian team dropped instruments offshore of Vancouver Island. A separate team led by Toomey at the University of Oregon is in its fourth year of deployments. Named the Cascadia Initiative, it is rotating among subduction zone segments offshore of Washington, Oregon and Northern California.

Toomey has skimmed the first three years of his results. The Japanese-Canadian team just published theirs online in the Bulletin of the Seismological Society of America.

The bottom line: Even with more sensitive instruments, it's still eerily quiet out there. Which leads the researchers to conclude the dangerous Cascadia fault zone is stuck - or in science-speak, it is fully "locked."

"The lack of interplate seismicity is interpreted to reflect complete healing and locking of the megathrust over three centuries after the previous great earthquake," wrote Koichiro Obana and his co-authors in the BSSA paper.

The evidence pointing to the colliding tectonic plates being completely stuck has serious implications for earthquake risk on land in the Pacific Northwest.

"If there were low levels of offshore seismicity, then we could say some strain is being released by the smaller events," Toomey said. "If it is completely locked, it means it is increasingly storing energy and that has to be released at some point."

Toomey said a big unknown is how much strain has accumulated since the plate boundary seized up, and secondly, how much more strain can build up before the fault rips and unleashes a possible magnitude-9.0 megaquake and tsunami.

Toomey described himself as "very concerned" and said it is "imperative" people in the Northwest continue to prepare for a big earthquake.

Complicating assessment of the seismic hazard is the relatively recent discovery of "slow-slip events" deeper down along the plate boundary - that is, under the land mass of western Oregon, western Washington and southwestern British Columbia. These slow-moving, barely detectable events may relieve or redistribute some of the stress building up in the "locked" portion of the earthquake fault zone.

The last full rip of the Cascadia Subduction Zone happened in January 1700. The exact date and destructive power was determined from buried forests along the Pacific Northwest coast and an "orphan tsunami" that washed ashore in Japan.

Geologists digging in coastal marshes and offshore canyon bottoms have also found evidence of earlier great