

Tohoku grim reminder of potential for Pacific Northwest megaquake

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Tohoku earthquake is a grim reminder of the potential for another strong-motion mega-earthquake along the Pacific Northwest coast, geophysicist John Anderson of the University of Nevada, Reno told members of the American Association for the Advancement of Science in a lecture at their annual conference in Vancouver, B.C. Sunday.

"The Cascadia fault line, which runs from southern Canada all the way to Northern California, could have much stronger [ground-motions](#) than those observed in Japan," Anderson, a professor of geophysics, said. "The [Tohoku](#) earthquake, while only half the length of Cascadia, is an analog for an earthquake that could happen here in the northwestern United States and southwestern British Columbia."

Both Japan and Cascadia sit above [subduction zones](#) that dip at a low angle beneath the land. One might consider them roughly mirror images, he said.

"In this [mirror image](#), one can see that if the same earthquake occurred in Cascadia, the fault would rupture to a significant distance inland, since the Cascadia trench sits much closer to the coastline than the trench off the coast of Japan, Anderson said. "Some models predict that a Cascadia earthquake will not rupture so far under the land, but if it does, the data from the Tohoku earthquake predict stronger ground motions along our west coast than those seen in Japan. In any case, the ground motions from Tohoku are critical for understanding the [seismic hazard](#) here in Vancouver, and in Seattle, and Portland, and Eureka and

all points in between."

In Cascadia, the last great earthquake occurred on January 26, 1700. Based on the size of the tsunami, the magnitude of that earthquake was about magnitude 9.0.

"Although the average interval is apparently larger, earthquakes of this size in the past may have recurred with intervals of as small as about 300 years. So it would not be a scientific surprise if such an event were to occur in the near future," Anderson said. "If you live in the [Pacific northwest](#), look at the videos of Tohoku as a reminder to be prepared for an earthquake and tsunami."

Anderson, who studies strong ground-motions, spent nine months recently as a visiting research professor at the prestigious Tokyo University, home of one of the world's premier seismology programs. Before coming to the University of Nevada, Reno in 1998, he earned his doctorate in geophysics from Columbia University and has held appointments at the California Institute of Technology, University of Southern California and the University of California at San Diego.

In his presentation at the AAAS conference, about the strong ground motions in the Tohoku earthquake, he discusses the significance of the data, the effects of the source on the nature of the data, the effects of site response, and some discussion of the engineering effects.

"There have of course been other mega-earthquakes, but this is by far the best-recorded," he said. "The Japanese event will undoubtedly stand as the best-recorded megaquake for a long time to come, both because megaquakes are rare and because no place is as well instrumented as the islands of Japan."

For instance, the strong ground motions that could be generated along

Cascadia, unfortunately, might not be observed nearly as thoroughly, since the strong motion instrumentation in most of the Cascadia region is sparse compared to Japan.

Anderson said that in spite of the occasional records with high accelerations, damage to structures from the shaking in Tohoku was reduced by high building standards, and because the ground velocities caused by the [earthquake](#) were not high enough to cause damage even at sites with peak acceleration over 1g.

Provided by University of Nevada, Reno

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