Enhancing earthquake early warning in the Pacific Northwest

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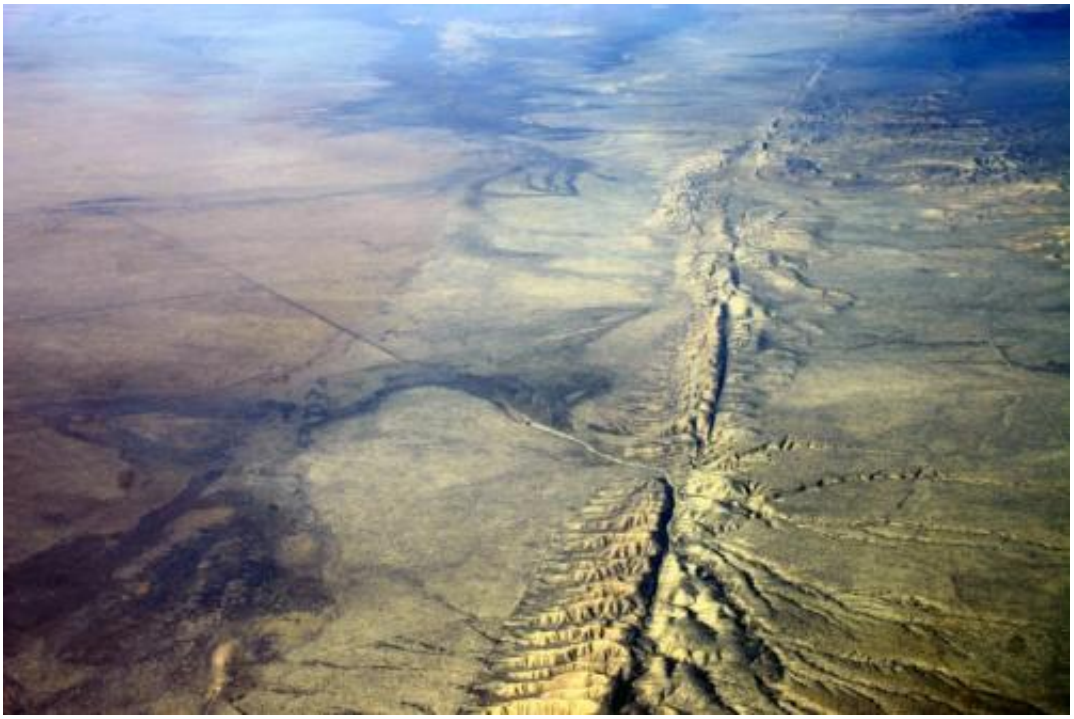

Aerial photo of the San Andreas Fault in the Carrizo Plain, northwest of Los Angeles. Credit: Wikipedia.

Earthquake Early Warning (EEW) systems depend on speed and accuracy in delivering seismic monitoring data to areas at risk from a quake or volcanic eruption. Paul Bodin of the University of Washington and colleagues have been testing models of EEW systems within the Pacific Northwest Seismic Network (PNSN) in Washington State and

Oregon to learn more about what factors could be improved to provide the most timely warnings for their region. For instance, what's priorities are important for getting a speedy warning to those at risk: the placement of seismic monitoring stations, or the number of stations, or the speed at which data can be transmitted between stations and notification centers?

Bodin and colleagues will present their research today at the annual meeting of the Seismological Society of America (SSA) as part of a series of technical presentations focusing on progress toward the practical use of an EEW system on the West Coast of the United States.

Using data and algorithms from the U.S. Geological Survey's ShakeAlert system, the researchers say that the easiest, fastest and least expensive improvements to the PNSN would be to improve the speed of transmission between stations and reduce the length of time it takes for a warning to go out—in some cases by an extra five seconds. For large-scale earthquakes, the scientists' modeling suggests that a warning relying on a four-station detection network usually provides the most warning time, but that having a single station at the site at risk (such as a city) gives the longest lead time for a warning if the at-risk site is very close to the earthquake source. In terms of station coverage, Bodin also notes that more monitoring stations are needed in urban areas, most critically in and near Portland, Oregon.

Bodin noted that coastal monitoring stations are a critical part of a PNSN EEW system, since the Cascadia Subduction Zone off the coast has the potential to produce a megathrust fault earthquake similar to the 2011 Tohuko-Oki earthquake in Japan. These stations could be located offshore, but a number of coastal stations with high-speed data transmission could also significantly improve warning times for such a quake.

The PNSN is testing its EEW system now with about 20 private

businesses and government agencies, to learn more about kinds of improvements and information might be useful for a future, fully operational EEW system.

Provided by Seismological Society of America