

Earthquake early warning in the United States and beyond

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The ShakeAlert earthquake early warning (EEW) system is now delivering alerts up and down the west-coast of the United States (California, Oregon and Washington). The warnings are being used by targeted groups including transportation, schools, hospitals and other infrastructure operators. Alerts are also available to the public in some regions through smartphone apps, and there is an expectation that they will be more widely available in the coming months. The system is operated by the US Geological Survey in cooperation with UC Berkeley, Caltech, the University of Oregon and the University of Washington.

The ShakeAlerts are currently generated by seismic-only algorithms, specifically the EPIC point-source algorithm and the FINDER finite-source algorithm. A great deal of research effort is underway to determine the accuracy and reliability of the current system, and to determine what additional information could be provided by new algorithms. In particular, the use of geodetic observations to improve magnitude estimates and estimate fault finiteness for the largest events is being explored, as is the addition of the PLUM ground motion model approach.

Looking beyond traditional seismic and geodetic networks, the use of smartphones to detect earthquakes and characterize their likely impact for EEW is also being explored. The MyShake global smartphone seismic network is currently recording ground shaking using the 40,000 Android phones that have the app installed. More than 800 earthquakes around the globe have been detected, and research is underway to use these detections to generate alerts and also to improve the quality of alerts from traditional networks.

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