ElarmS across California: Current realtime performance and future outlook

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The ElarmS methodology integrates continuous seismic data from a regional seismic network to provided an assessment of future ground shaking every second. P-wave arrival times are used to detect and locate earthquakes, the P-wave amplitude and frequency content provide an estimate of the magnitude, and the affected area and peak ground shaking is then predicted. The methodology is currently being tested as part of the real-time seismic system in California leveraging the resources of the California Integrated Seismic Network and the Advanced National Seismic System. A total of 603 velocity and acceleration sensors at 383 sites provided by the regional networks operated by UC Berkeley, the US Geological Survey and Caltech in northern and southern California stream waveform data into ElarmS. Waveform processing modules at three network processing centers at UC Berkeley, USGS Menlo Park and USGS/Caltech reduced the waveforms to a few parameters. These parameters are then collected and processed at UC Berkeley to provide a single statewide prediction of future ground shaking that is updated every second. The system successfully detected the Mw 5.4 Alum Rock earthquake in northern California for which it generated an accurate hazard prediction before peak shaking began in San Francisco. It also detected the Mw 5.4 Chino Hills earthquake in southern California. The median system latency is currently 11.8 sec; the median waveform data latency is 6.5 sec. More information on the real-time implementation is available in Allen et al. *Geophys. Res. Lett.* **36** L00B08, doi:10.1029/2008GL036766, 2009.