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BSSA Tip Sheet for April 2010

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Monitoring in Southern California (1932 – 2008)

The long history of earthquake monitoring by the Southern California Seismic Network (SCSN) is documented in this report, detailing the evolving sensitivity of the network over time. The SCSN has been very influential in the development of seismology, including the development of seismic networks, the Wood-Anderson seismometer, and the Richter scale. Much of this research was published in BSSA. This report serves as a guide for users of the catalogue.

The SCSN's roots are in the first seismographic stations installed in the late 1920s. By 1932, instrumental reliability and station timing were considered good enough to begin cataloging local earthquakes in southern California. This report summarizes the changes in the methods used to catalogue earthquakes and increased completeness of the record as technology and the field of seismology developed over the 77-year period.

“Earthquake Monitoring in Southern California for Seventy-Seven Years (1932 – 2008),” Kate Hutton, California Institute of Technology, katehutton@gmail.com

Moderate Earthquake Ground-Motion Validation in the San Francisco Bay Area

University of California, Berkeley researchers examine the predictive capability of current models to estimate ground shaking during large earthquakes in the San Francisco Bay Area. The latest USGS working group (UCERF2) reported that the Bay Area faces a 63% probability of an M6.7 or larger earthquake over the next 30 years (2003-2032). Predicting the strong ground shaking of future earthquakes is



an important component in the assessment of earthquake hazard and in reducing and preventing destructive damage.

Researchers performed 3D ground motion simulations for 10 recent small to moderate earthquakes (Mw 4.1 – 5.4) in the San Francisco Bay Area to evaluate two versions of the USGS 3D velocity model and found that it is suitable for the simulation of peak ground velocity to assess strong shaking hazard of future large earthquakes.

“Moderate Earthquake Ground-Motion Validation in the San Francisco Bay Area,” Ahyi Kim, Douglas Dreger, Shawn Larsen of University of California, Berkeley; Contact: Ahyi Kim at ahyi@seismo.berkeley.edu

Triggering Effect of M 4-5 Earthquakes on the Earthquake Cycle of Repeating Events at Parkfield

How do moderate events influence earthquake cycles of nearby characteristically repeating micro-earthquakes? The authors of this study found evidence that the five [M 4-5] events that occurred at Parkfield during 1993-1998 triggered small, nearby repeating earthquakes that were approaching critical conditions for rupture. A characteristically repeating earthquake sequence (RES) is a group of events with nearly identical waveforms, locations, and magnitudes and thus represents the recurring rupture of the same patch of fault. A high percentage of repeating events that occurred subsequent to the *M* 4-5 events within a distance of 5 km happened within a small fraction of their own average recurrence interval. The *M* 4-5 events also shortened the RES earthquake cycles spanning or immediately following their occurrence. Only events that are relatively late in their respective earthquake cycle get triggered. Understanding how earthquake interactions work may be useful for forecasts of larger earthquakes.

“Triggering Effect of M 4-5 Earthquakes on the Earthquake Cycle of Repeating Events at Parkfield,” by **Kate Huihsuan Chen, national Taiwan Normal University**; Roland Burgmann, and Robert M. Nadeau, University of California, Berkeley; Contact Kate Chen at katepili@gmail.com

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