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Maps of the Northridge, California, Earthquake Setting, Effects, and Deformation: A 3-Slide Set

By

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This set contains three 35-mm slides that portray the setting (*slide 1*), effects (*slide 2*), and deformation (*slide 3*) associated with the January 17, 1994, Northridge, California, Earthquake.

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Note: These slides are intended for both public and professional audiences. An additional teaching/demonstration tool is available from the U.S. Geological Survey: Alpha, T. R., and R. S. Stein, The Northridge, California, Earthquake of January 1994: A computer animation and paper model, *U.S. Geol. Surv. Open-File Rep. 94-214*, 30 pp (1.2 MB Hypercard stack for Macintosh computers), 1994.

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Map Base. The digitally shaded relief was produced from the USGS 1:250,000 scale Digital Elevation Models (DEM) from the Los Angeles East and Los Angeles West quadrangles. Roads are from the USGS Digital Line Graph (DLG) files for the Los Angeles 1:100,000 scale metric quadrangle. Active Faults are from Charles W. Jennings, 1975, Fault Map of California, *California Division of Mines and Geology*. Active Folds are from R. S. Stein and R. S. Yeats, 1989, Hidden Earthquakes, *Scientific American*, 260 (6), pp. 48-57. Faults and folds believed to be active during the past million years are depicted.

Setting of the 1994 M=6.7 Northridge, California, Earthquake Sources and Credits:

- Aftershocks are from James J. Mori (U.S.G.S., Pasadena) and Egill Hauksson (Caltech), *in preparation*.
- 1971 Surface Rupture corresponds to faulting associated with the 9 February 1971 M=6.7 San Fernando earthquake, from Charles W. Jennings (1975), Fault Map of California.
- Fractured Ground from Daniel J. Ponti (U.S.G.S., Menlo Park), *in preparation*.
- Blind thrust fault location inferred from Kenneth W. Hudnut (U.S.G.S., Pasadena), Mark H. Murray (U.S.G.S., Menlo Park), Andrea Donnellan (JPL, Pasadena), Yehuda Bock and Yanjie Feng (U.C.S.D.), Zheng-Kang Shen (U.C.L.A.), Bradford H. Hager, Thomas Herring, and Robert W. King (M.I.T.), *in preparation*. Upper (teethed) edge of fault lies at a depth of 6 km from the ground surface; lower edge lies at 12 km depth. A mean fault slip of 3.5 m is inferred from ground surface displacements.

Effects of the 1994 M=6.7 Northridge, California, Earthquake Sources and Credits:

- Mainshock from James J. Mori (U.S.G.S., Pasadena) and Egill Hauksson (Caltech) *in preparation*.
- Fractured Ground from Daniel J. Ponti (U.S.G.S., Menlo Park), *in preparation*.
- Strong Shaking (peak horizontal acceleration ≥ 0.4 g, or 40% of the acceleration of gravity) contoured from roughly 50 strong ground motion stations by Carl M. Wentworth, Roger D. Borchardt, Robert K. Mark, and David M. Boore (U.S.G.S., Menlo Park), unpublished map, and *in preparation*. Strong motion recordings from Anthony F. Shakal (C.D.M.G., Sacramento), Mihailo D. Trifunac (U.S.C.), and Ronald L. Procella and others (U.S.G.S., Menlo Park and Pasadena).
- Severely Damaged Buildings are blocks or individual buildings judged unsafe for occupation by inspectors of the Federal Emergency Management Agency, the Governor's Office of Emergency Services, the City and County of Los Angeles, and Ventura County.
- Damaged (minor to major) and Collapsed bridges from Caltrans (California Department of Transportation), Division of Structures, *Post Earthquake Investigation Report*.
- Liquefaction (liquefied ground and sand blows) from John C. Tinsley III (U.S.G.S., Menlo Park), *in preparation*.
- Numerous landslides (several thousand individual landslides, slumps, and debris flows) by Randall W. Jibson (U.S.G.S., Denver), *in preparation*.

Deformation of the 1994 M=6.7 Northridge, California, Earthquake Sources and Credits:

- Mainshock from James J. Mori (U.S.G.S., Pasadena) and Egill Hauksson (Caltech) *in preparation*.
- Blind thrust fault location inferred from Kenneth W. Hudnut (U.S.G.S., Pasadena), Mark H. Murray (U.S.G.S., Menlo Park), Andrea Donnellan (JPL, Pasadena), Yehuda Bock and Yanjie Feng (U.C.S.D.), Zheng-Kang Shen (U.C.L.A.), Bradford H. Hager, Thomas Herring, and Robert W. King (M.I.T.), *in preparation*. Upper (teethed) edge of fault lies at a depth of 6 km from the ground surface; lower edge lies at 12 km depth. A mean fault slip of 3.5 m is inferred from ground surface displacements.
- Modeled uplift and modeled (horizontal) movements are from blind thrust fault slip above.