

Earthquake Engineering Research Institute

EERI

*A Multidisciplinary Association of
Earthquake Professionals Dedicated
to Reducing Earthquake Losses*



EERI's Learning from Earthquakes Program

Critical to EERI's mission, to reduce earthquake Losses

- **Multidisciplinary** program dedicated to
 - Capturing perishable data
 - Learning as much as possible from each event
 - Incorporating those lessons into research and practice

Reconnaissance and Dissemination

- Field reconnaissance after each major earthquake -- not systematic damage data collection
- Dissemination of lessons:
 - Report in the *EERI Newsletter*
 - Expanded reports produced for web
 - Technical Briefing videotaped and uploaded to EERI Web site



Contributions

- Unique multidisciplinary program
- NSF funding (1973) broadened reach of post earthquake investigation to all disciplines
- Lessons have led to changes in siting, design and construction, building codes, emergency management procedures, training and education and have stimulated research in all related fields



Recent earthquake investigations

- L'Aquila Earthquake (April 2009)
- Wenchuan, China (May 2008)
- Southern Sumatra (September 2007)
- Pisco, Peru (August 2007)
- Niigata-Chuetsu Oki, Japan (July 2007)
- Big Island of Hawaii (October 2006)
- Kashmir, Pakistan (October 2005)
- Great Sumatra Earthquakes and Tsunami (December 2004)
- Niigata, Japan (October 2004)
- Bam, Iran (January 2004)
- San Simeon, California (December 2003)

Over 115 earthquake reconnaissance missions since 1973

GEER Workshop, May 18/19, 2009



LFE Training and Education

EERI is committed to:

- Involving as many researchers and professionals as possible in opportunities for field research.
- Unique teams for each event -- exposes more members to earthquake damage – Results in greater likelihood that lessons from the field will make their way into research and practice.

The Downside

- Harder to incorporate new technologies into field investigation
- Team members struggle with
 - PDAs,
 - GPS
 - Uploading digital images

Coordination

Bringing together groups and organizations to collaborate in field investigations and share information and observations

L'Aquila Earthquake

GEER

EEFIT

PEER

Italian colleagues

TCLEE

private firms

ATC

others



LFE Program Website

Learning from Earthquakes Main Page - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://www.eeri.org/lfe.html>

EERI Earthquake Engineering Research Institute

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Recent Reconnaissance
Introduction to LFE
Reconnaissance Forms
Team Member Application
Earthquake Field Guide
On-Line Training
Related Information
Virtual Clearinghouse

Learning from Earthquakes

This program is funded by the U.S. National Science Foundation, under grant #CMS-0131895

Do you want to learn more about the Learning from Earthquakes Program? [Start here.](#)

For information on countries and regions, as well as their historical earthquake events, either click on a continent of the world or choose from the list below.

[Algeria](#) | [Argentina](#) | [Armenia](#) | [Australia](#) | [Bolivia](#) | [Bulgaria](#) | [Canada](#)
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Visit the EERI Learning From Earthquakes Page at:
<http://www.eeri.org/site/projects/learning-from-earthquakes>

GEER Workshop, May 18/19, 2009



New Technologies

Google Maps

Clearinghouse website

L'Aquila Earthquake website/blog



Choose an Event **-- ALL EVENTS --** Select

You can also download the data for this event to use in Google Earth by [clicking here](#).

This map has limitations when displaying a large number of points in the same latitude/longitude area, but if you use Google Earth, you can view all the points.

Map Satellite Hybrid

- Legend**
- G Geoscience
 - e Geotechnical Engineering
 - n Non-engineered Structures
 - s Engineered Structures
 - l Industrial Facilities
 - L Lifelines
 - t Tsunami Impacts
 - t Transportation Structures
 - n Nonstructural Elements
 - s Societal Impacts
 - e Emergency Response
 - R Recovery & Rebuilding
 - O Other

Google Maps—
 Basic interface
 Photos for several
 events (&
 exercise)

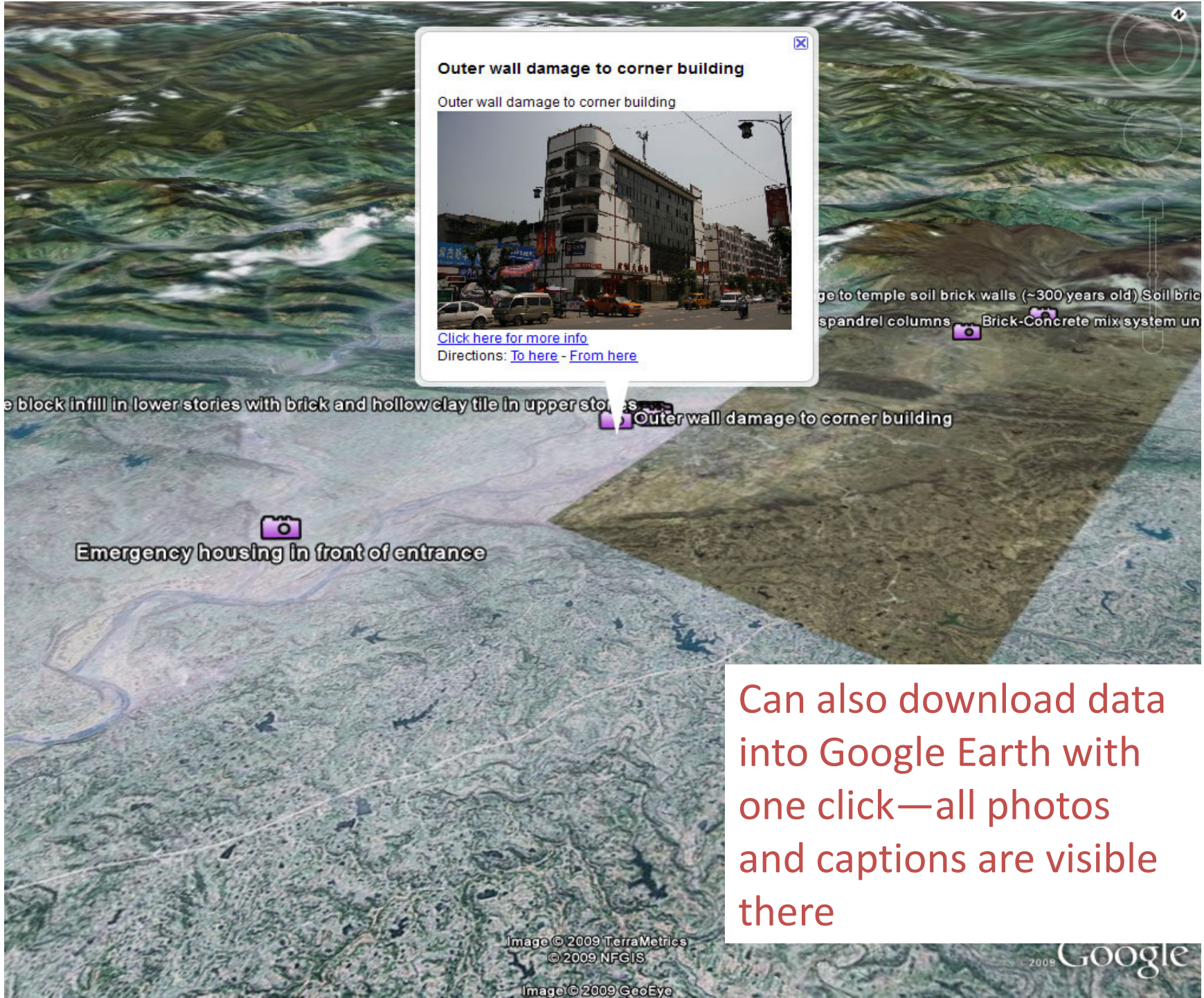
**Zoom in,
 click on
 pinpoint,
 view photo**

Severity

Collapse Severe Moderate Light N/A

This map developed under EERI's Learning from Earthquakes Program, with funding support from the U.S. National Science Foundation, grant #CMS-0131895.

[Download points from this event into Google Earth](#)
[Reset map to world view](#)
maps.google.com



Outer wall damage to corner building

Outer wall damage to corner building



[Click here for more info](#)
Directions: [To here](#) - [From here](#)

ge to temple soil brick walls (~300 years old) Soil brick
spandrel columns Brick-Concrete mix system un

e block infill in lower stories with brick and hollow clay tile in upper stories

Outer wall damage to corner building

Emergency housing in front of entrance

Can also download data into Google Earth with one click—all photos and captions are visible there

Google Maps

- Users have option of uploading a few photos at a time *OR*
 - Sending in an Excel (csv) file with lat/long and captions—either linked to photos up on web or with photos
- BUT SYSTEM IS AWKWARD
- USC students working on improving interface and upload process



California Earthquake Clearinghouse



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WELCOME

The California Post-Earthquake Clearinghouse

(Clearinghouse) will provide a location, real or virtual, after a damaging earthquake, where engineers, geologists, seismologists, sociologists, economists, and other professionals who arrive in the affected area can become part of a larger, temporary organization (the Clearinghouse) to facilitate the gathering of information, maximize its availability, and better use the talents of those present. These experts have a wide range of knowledge and experience, and their observations in the field can add substantially to the information available to officials managing response and recovery operations.



This website provides information on the history and purpose of the California Clearinghouse, the member organizations, recommendations for field investigation equipment, safety guidelines, and basic information on how to contribute to the clearinghouse after a California earthquake. Members of the Clearinghouse can also log in here.

EERI created Clearinghouse blog to post observations AND photos

TO POST AN OBSERVATION

Once you are [registered](#), you can [log in](#) and post an observation by selecting the "Write a New Post" button from your Dashboard screen. (To get to this page, click [Site Admin](#) under Join the Discussion, bottom right of this screen.) Select your category. You can also comment on observations that are already here by clicking on the word Leave a Comment on the top right of a posting. See [instructions for writing a post](#).

To view or post photos of this event, [click here](#)

BASIC CLEARINGHOUSE INFORMATION

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 - SAFETY IN THE FIELD
 - HOW TO CONTRIBUTE
- GOLDEN GUARDIAN EXERCISE PDPOC EXERCISE

Browse > [Home](#) / Archive by category 'Golden Guardian Exercise'

Golden Guardian Exercise—M7.8 Southern San Andreas

December 11, 2008 by [admin](#) ([Edit](#))

[Leave a Comment](#)

Filed under [Golden Guardian Exercise](#)

On November 13th, 2008, state and federal agencies rehearsed procedures for a large earthquake in southern California. In the event of a large earthquake, the California Clearinghouse would play a major role in collecting field observations from the scientific and technical community and sharing those observations with response agencies. The location of the physical clearinghouse would be posted on this site. For this Golden Guardian exercise, the Clearinghouse used this site as a "virtual" clearinghouse.



As part of this exercise this website collected such observations and shared them among clearinghouse members. To view the observation or to comment on one that has already been posted, you must be registered. You can register by clicking on a link in the lower right, under Join the Discussion.

For instructions on how to post an observation, read instructions at the top right menu.

[TO VIEW OBSERVATIONS, CLICK HERE](#)

Tags:

Used in Golden Guardian exercise

TO POST AN OBSERVATION

Once you are [registered](#), you can [log in](#) and post an observation by selecting the "Write a New Post" button from your Dashboard screen. (To get to this page, click [Site Admin](#) under Join the Discussion, bottom right of this screen.) Select your category. You can also comment on observations that are already here by clicking on the word [Leave a Comment](#) on the top right of a posting. See [instructions for writing a post](#).

To view or post photos of this event, [click here](#)

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FIELD EQUIPMENT


SAFETY IN THE FIELD

HOW TO CONTRIBUTE

- [Golden Guardian Exercise](#)
- [Photo log and instructions](#)

Base LiDAR imagery from B4 for highway fault crossings

 November 13, 2008 by [jrarrowsmith](#) (Edit)

 [Leave a Comment](#)

Filed under [Earth Sciences, Lifelines & Transportation Systems](#)

We computed some hillshades for viewing in Google Earth of the major highway crossings along the expected rupture. There are two flavors: one with the images embedded (could put them on a laptop for the field), but they are 10s of Mb. The others are network links for the images so are fast to download, but pull appropriate scale and coverage in as you zoom and pan:

<http://stockdale.sese.asu.edu/B4/>

We can generate more specialized maps if anyone needs them.

These images should span the rupture belt if the geology and geomorphology from past events can tell us about anything in the future.

This is a chance also to practice what it would take to get the LIDAR data ready for mapping and for planning for post event acquisition and analysis.


Ramon Arrowsmith (Arizona State University)

 Tags:

HAZUS Loss Modeling Briefing Points

 November 13, 2008 by [admin](#) (Edit)

Filed under [Social Science Observations](#)

 [Leave a Comment](#)

**Participants able to
post timely
information—and
comment on other
posts**

11/13/08, 15:00, results reviewed by combined FEMA/OES staff, J. Fenton reporting

Coordinated OES HAZUS loss modeling combined with the USGS ShakeMap product indicates the following:


- Approximately 11,000 injuries with about 500 requiring hospital care
- Approximately 500 deaths.
- Over 40,000 people in need of shelter of 91,000 displaced households
- Capital stock losses of over 40,000 million \$. This includes structural, non-structural, contents, and inventory damage.

Although loss modeling has significant uncertainties, these HAZUS estimates include significant improvements to the building inventory information and should be considered the authoritative results. HAZUS and ShakeMap based loss modeling can provide a quick assessment of potential damage and is especially useful in larger earthquakes where communications and observations from the field are limited. For example, economic losses associated with the 1994 Northridge earthquake took almost 3 years to compile.



Four additional maps

 November 14, 2008 by [admin](#) ([Edit](#))
Filed under [Golden Guardian Exercise](#)

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Can embed photos and maps into posts

 Tags:

Landslide at La Canada - Iminent Danger

 November 13, 2008 by [clearinghouse](#) ([Edit](#))
Filed under [Golden Guardian Exercise](#)

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Reported by M. Weigers, CGS; 11/13/08, 1500 hr


Residential area in the La Canada-Flintridge area affected by slope failure.

Location is at 34.1905, -118.2020

Landslide bounded by Flintridge Road and crossed by Robin Hill Rd and Hampstead Road. Extend of failure

Used similar blog structure for first time with L'Aquila Earthquake

Tuesday, May 12, 2009  NEWS FEED  COMMENTS



L'AQUILA, ITALY EARTHQUAKE CLEARINGHOUSE

MAGNITUDE 6.3 ON APRIL 4, 2009

Funded by the U.S. National Science Foundation, under grant #CMMI-0758529




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OBSERVATIONS FROM EERI/PEER TEAM

From EERI/PEER Team: Masonry Damage

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GEER Workshop, May 18/19, 2009



- Posts by category
- Information about teams in the field
- Easy to check most recent observations


Tuesday, May 12, 2009 NEWS FEED COMMENTS



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VIRTUAL DISASTER VIEWER FOR L'AQUILA EARTHQUAKE

The website allows users to view recent photos taken over pre and post event satellite imagery. The map viewer also

NEWS & UPDATES

Sign up to receive breaking news as well as receive other site updates!

GO


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- [Near-real-time estimate of human losses](#)

STRUCTURAL ENGINEERING
GEOTECHNICAL ENGINEERING
SECTIONS
LINKS

Future

- USC students working on new upload and storage procedures
- Will likely continue to use blogs in future events
- Will encourage Clearinghouse website for California events. **But**, need more training on how to upload images, etc.
- EERI & EEFIT have perpetual license for VDV— May explore its use in future events