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## Did You Feel It?

August 24, 2011 | [Anne Fredrickson](#)

It may come as little surprise that  
staffers at CHF love data. That's  
why I spent the morning playing –

USGS Community Internet Intensity Map  
VIRGINIA

Aug 23 2011 01:51:04 PM local 37.996N 77.933W M5.8 Depth: 6 km ID:se082311a



#### Blogroll

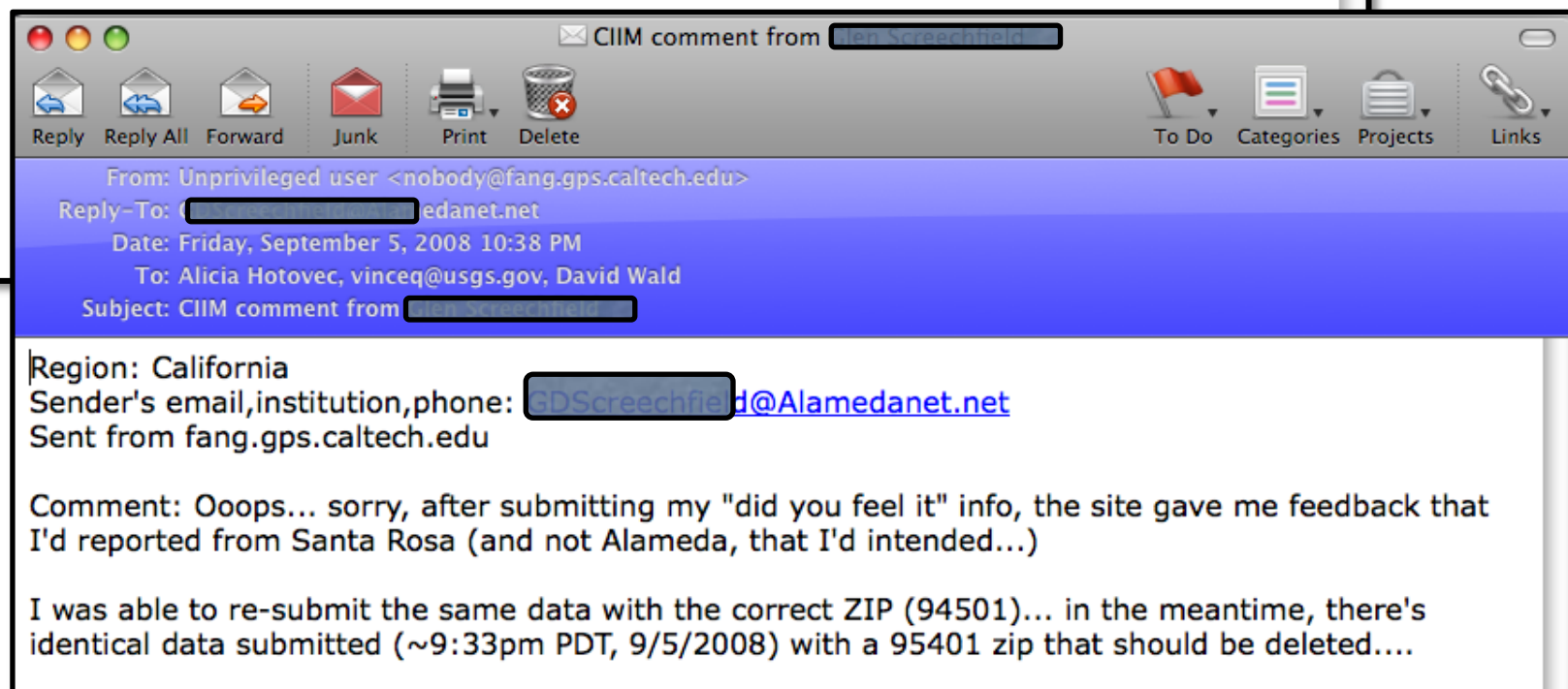
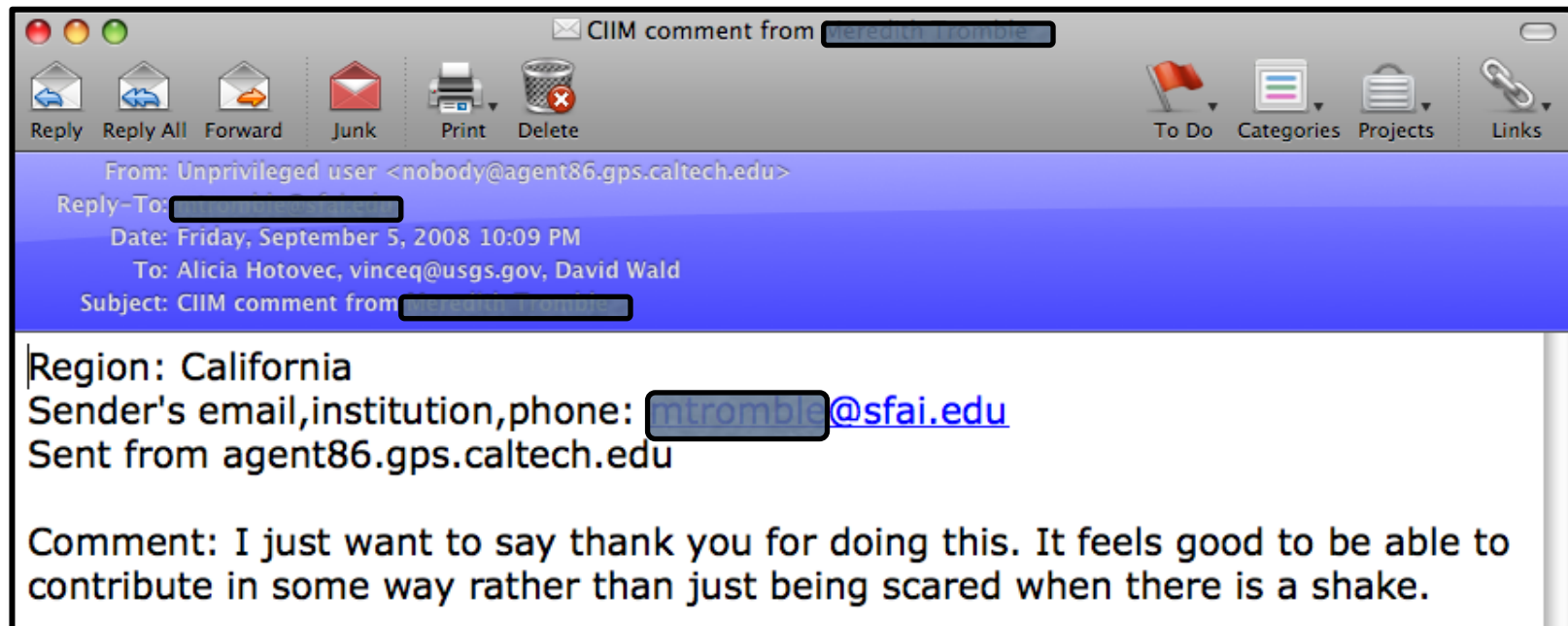
[A Chemist's  
Laboratory  
Notebook](#)

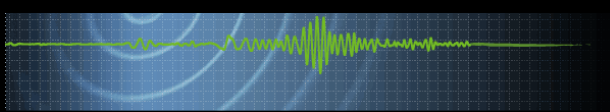
[Adventures in  
Ethics and Science](#)

[ChemBark](#)

[Chemical Forums](#)

That's why I like the "**Did You Feel It?**" feature of USGS, which asks users to submit their experiences of the event. It echoes the question of every evacuee on the street – the need to confirm the extraordinary – and provides large, immediate quantities of data in an earthquake's aftermath. It's a nice, if limited, example of **citizen science** – a movement in informal science education for non-specialized volunteers to participate in substantive research. Before anyone raises the issue of citizen science vs. crowd sourcing, let me just tell you: I don't care. I've translated my excitement, fright, and wonder into a little data point for USGS, and it makes me want to do more. And don't worry, if you didn't feel the trembling yesterday, the project still wants to hear from you. (Did you feel it? ...No.)





# Some USGS uses of Social Media during initial earthquake response...

- **Event detection:**

TED – Twitter Earthquake Detector

- **Broadcast alerts:**

Twitter, Facebook

Primary: web & Eq. Notification Service (txt & email)

RSS Feeds

- **Communicate Information:**

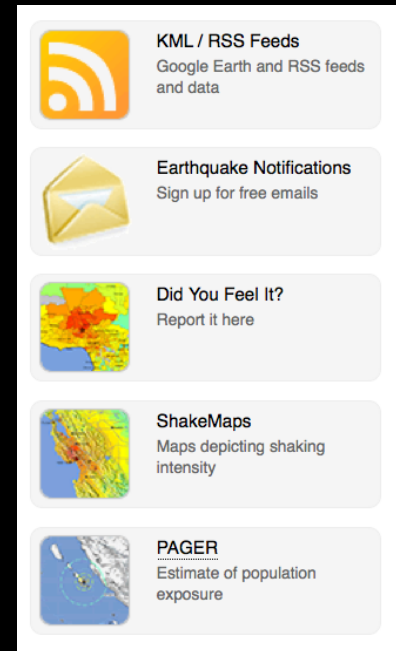
Twitter, Facebook

Primary: still web

- **Event characterization:**

DYFI? (web, smart phone)

Inexpensive seismometers



A screenshot of the USGS Earthquake Notification Service interface. It features five interactive buttons arranged vertically. Each button contains an icon on the left and text on the right. The buttons are: 1. 'KML / RSS Feeds' with an orange RSS icon, text 'Google Earth and RSS feeds and data'. 2. 'Earthquake Notifications' with a yellow envelope icon, text 'Sign up for free emails'. 3. 'Did You Feel It?' with a map icon, text 'Report it here'. 4. 'ShakeMaps' with a map icon, text 'Maps depicting shaking intensity'. 5. 'PAGER' with a map icon, text 'Estimate of population exposure'.

- KML / RSS Feeds**  
Google Earth and RSS feeds and data
- Earthquake Notifications**  
Sign up for free emails
- Did You Feel It?**  
Report it here
- ShakeMaps**  
Maps depicting shaking intensity
- PAGER**  
Estimate of population exposure





# M4.1 SE of San Francisco



Courtesy of Paul Earle, USGS

### Summary:

REGION: CALIFORNIA

MAG: 4.1

Location: 37.477, -121.797 (9 km)

Tweets/min (10 min before): 0.0

Tweets/min (10 min after): 296.3

Search radius: 81.85 km

### Top tweet locations:

1200 :: San Francisco

371 :: San Jose

220 :: Silicon Valley

135 :: San Francisco Bay Area

89 :: Mountain View

84 :: Palo Alto

67 :: Sunnyvale

### Tweet text:

->Hey! Little earthquake! :: San Francisco or thereabouts :: (+00:00:31)

->EARTHQUAKE!!!! :: iPhone: 37.573524,-122.071747 :: (+00:00:31)

->Holy craaaaaaaaap! Earthquake!!!!!!!!!!!! :: San Jose :: (+00:00:31)

->Earthquake jolt! :: iPhone: 37.393875,-122.077629 :: (+00:00:31)

->EARTHQUAKE!!!!!!!!!!!! :: SF Bay Area :: (+00:00:31)

->Earthquake?????? :: Stanford :: (+00:00:31)

->Earthquake! :: Bay Area, Ca :: (+00:00:31)

->earthquake!! :: Mountain View, CA :: (+00:00:32)

->I just felt an earthquake! :: santa clara, california :: (+00:00:32)

->F\*ck! Earthquake! :: Fremont, CA :: (+00:00:32)

->was that another earthquake? or are my neighbors fighting? :: San Jose :: (+00:00:32)

->Earthquake :: San Francisco, CA :: (+00:00:32)

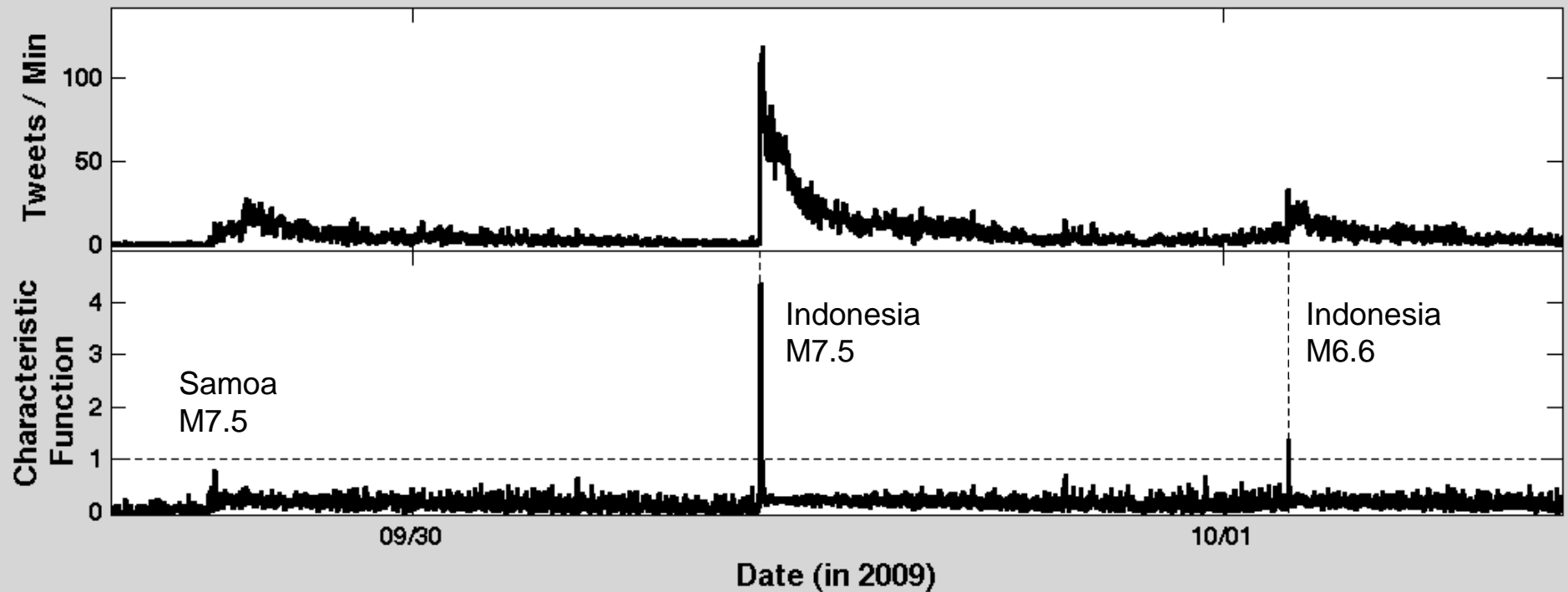
->Was that an earthquake I just felt? :: San Francisco, CA, USA :: (+00:00:32)

->just felt an earthquake, still kinda feeling it... :: iPhone: 37.518,-121.986 :: (+00:00:32)

->holy shit, earthquake. :: San Jose, CA :: (+00:00:32)

# Event Detector

$$C(t) = STA/(m*LTA+b)$$



# USGS twitter alerts (in development)



**notedalerts** notedalerts

4-to-4.9 quake SOUTHERN GREECE Jul-3 08:49 UTC, 3 earthquake-tweets/min, <http://on.doi.gov/iWKWNh>

🔒 6 hours ago



**notedalerts** notedalerts

4-to-4.9 quake NEAR EAST COAST OF HONSHU, JAPAN Jul-3 07:48 UTC, 8 quake-tweets/min, <http://on.doi.gov/IX2acm>

🔒 7 hours ago



**notedalerts** notedalerts

5-to-5.9 quake NEAR COAST OF NICARAGUA Jul-3 06:34 UTC, 50 temblor-tweets/min, <http://on.doi.gov/kXgQ8L>

🔒 9 hours ago



FEMA

Craig Fugate  
ADMINISTRATOR

FEMA's mission is to sup-  
port our citizens and first  
responders to ensure t  
as a nation we work tog  
to build, sustain, and  
improve our capability  
prepare for, protect aga  
respond to, recover fro  
and mitigate all hazar

www.fema.gov

- CraigatFEMA** Craig Fugate  
If you have a disaster plan & supplies, follow the track & be ready if #Hurricane #Irene comes your way, if not, ready.gov  
24 Aug
- CraigatFEMA** Craig Fugate  
@khawe if you have a disaster plan & supplies, follow the track & be ready if #Irene comes your way, if not, http:// www.ready.gov  
24 Aug
- CraigatFEMA** Craig Fugate  
#Hurricane #Irene, Cat 3, Interests from the Carolinas through New England should monitor the progress of Irene. hurricanes.gov  
24 Aug
- CraigatFEMA** Craig Fugate  
Interests in Eastern North Carolina and the Mid-Atlantic States should monitor the progress of #Hurricanes #Irene hurricanes.gov  
24 Aug
- CraigatFEMA** Craig Fugate  
Irene is a Category 3 Hurricane, could become a Category 4 Hurricane by Thursday. hurricanes.gov http://m.fema.gov  
24 Aug
- CraigatFEMA** Craig Fugate  
#Hurricane #Irene is now a Cat 3 Hurricane max sustained winds are 115 mph, minimum central pressure is 957 mb, hurricanes.gov  
24 Aug
- CraigatFEMA** Craig Fugate  
@GregPutnam I will defer to the local emergency managers, they have the best info on when to order an evacuation  
24 Aug
- CraigatFEMA** Craig Fugate  
#Irene continues to strengthen, now a Cat 2 #Hurricane (110 mph winds) moving WNW at 9 mph. hurricanes.gov http://m.fema.gov  
24 Aug
- CraigatFEMA** Craig Fugate  
#earthquakes #hurricanes what's next? Are you Ready? ready.gov http://m.fema.gov  
23 Aug
- CraigatFEMA** Craig Fugate  
#Hurricane #Irene Category 1 Hurricane on the Saffir-Simpson Scale and strengthening is forecast hurricanes.gov  
23 Aug
- CraigatFEMA** Craig Fugate  
#Earthquake preparedness on your mobile, m.fema.gov/earthquakes.htm  
23 Aug
- CraigatFEMA** Craig Fugate  
#Va #earthquake PAGER - M 5.9 - Virginia earthquake.usgs.gov/earthquakes/pa...  
23 Aug
- CraigatFEMA** Craig Fugate  
FEMA is monitoring reports from the #earthquake, cell service is busy in DC, try to stay off your cell phone if it is not an emergency  
23 Aug
- CraigatFEMA** Craig Fugate  
Just felt the earthquake at FEMA, HQ earthquake.usgs.gov/earthquakes/re...  
23 Aug
- CraigatFEMA** Craig Fugate  
@RossWeidner too early to say, but we are watching the track and timing of #Irene  
23 Aug

# Twitter feeds to announce web page content:



**@CraigatFEMA**  
 Craig Fugate ✓

#Va #earthquake PAGER - M 5.9 - Virginia  
earthquake.usgs.gov/earthquakes/pa...

23 Aug via web

☆ Favorite ↻ Retweet ↩ Reply

Retweeted by HlioCampos and 100+ others





# USGS use of Social Media for Communication:

## Facebook & Podcasts

Wall

Info

Friend activity

Events

Comment Policy

Connect with us

Photos

Questions

Discussions

16,390

like this

Likes

See all

U.S. Agency for International Development –

US National Weather Service Honolulu &

Youth in the Great Outdoors!

The White House

U.S. Department of the Interior

Create a Page

facebook

Search

U.S. Geological Survey (USGS)

Like

Government organisation · Reston, Virginia

Wall

U.S. Geological Survey (U... · Everyone (Most recent) ▾

Share: Post

Write something...

U.S. Geological Survey (USGS)

Tonight (Sept 22 at 7pm Pacific time) watch online: "Tracking the Nation's Groundwater Reserves --issues facing current and future water supplies".

**USGS Evening Public Lecture Series**  
online.wr.usgs.gov  
The USGS Evening Public Lecture Series events are free and are intended for a general public audience that may not be familiar with the science being discussed. Our speakers are encouraged to thoroughly explain the subject matter being presented, and to define any words or terms that may be unfamil...

Like · Comment · Share · 2 hours ago

22 people like this.

View 1 share

Write a comment...

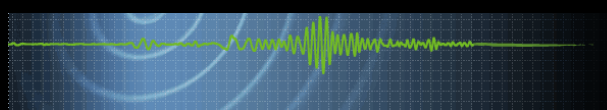
U.S. Geological Survey (USGS)

For those concerned with "planetary alignments" exerting unusual stresses on earth, rest easy. Even the most optimum possible celestial gathering would exert many thousands of times less gravitational influence than the lunar-solar combination. Check the NASA table comparing various bodies' influence to the sun.

**Planet Alignments**  
imagine.gsfc.nasa.gov  
This site is intended for students age 14 and up, and for anyone interested in learning about our universe.

Like · Comment · Share · 10 hours ago

57 people like this.



# Other Citizen-aided science: Cheap seismic sensors

QuakeCatcher Network  
(Stanford Univ.)

iShake  
(U.C. Berkeley)

NetQuakes  
(USGS)



The Quake-Catcher Network

The Quake-Catcher Network is a collaborative initiative for developing the world's largest, low-cost strong-motion seismic network by utilizing sensors in and attached to internet-connected computers. With your help, the Quake-Catcher Network can provide better understanding of earthquakes, give early warning to schools, emergency response systems, and others. The



\$



\$\$



**Earthquake Hazards Program**

**EARTHQUAKES      HAZARDS**

**Overview**

**View Data**

**Sign Up**

- Northern California
- Southern California
- Pacific Northwest

**FAQ**

**NetQuakes**

The USGS is trying to achieve a denser and more uniform spacing of seismographs in select urban areas to provide better measurements of ground motion during earthquakes. These measurements improve our ability to make rapid post-earthquake assessments of expected damage and contribute to the continuing development of engineering standards for construction.



\$\$\$



login Tutorial 2 / 3

OUTLINE  
AREA

AFTER

BEFORE



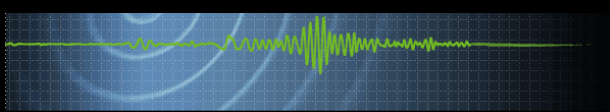
NEW  
MAP



[my maps](#)

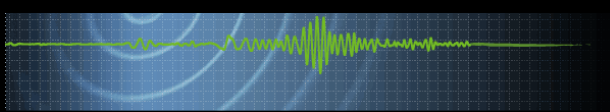
20 m  
50 ft

Imagery ©2011 GeoEye - [Terms of Use](#)  
a crowdsourcing app created by [Tomnod](#)



## Some potential concerns/limitations of Social Media during initial earthquake response...

- Low “Signal-to-noise” ratio
- Privacy and “color” of content
- Curation, Quality Assurance = personnel time



# Some USGS uses of Social Media during initial earthquake response...

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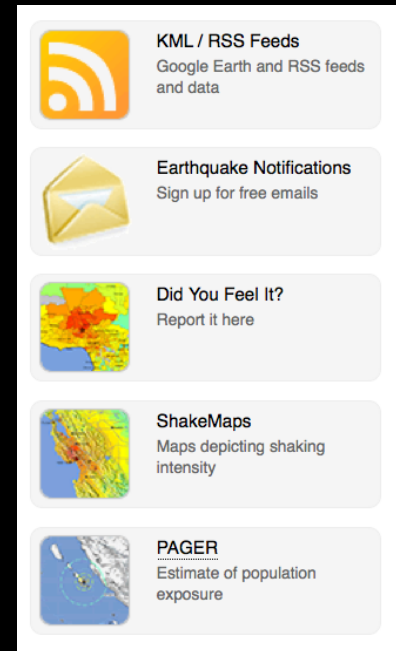
Twitter, Facebook






Primary: still web

- **Event characterization:**

DYFI? (web, smart phone)

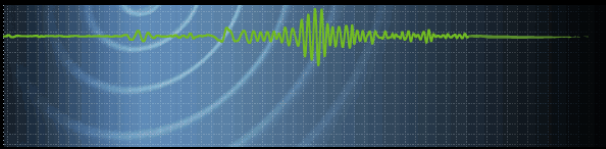
Inexpensive seismometers



-  **KML / RSS Feeds**  
Google Earth and RSS feeds and data
-  **Earthquake Notifications**  
Sign up for free emails
-  **Did You Feel It?**  
Report it here
-  **ShakeMaps**  
Maps depicting shaking intensity
-  **PAGER**  
Estimate of population exposure





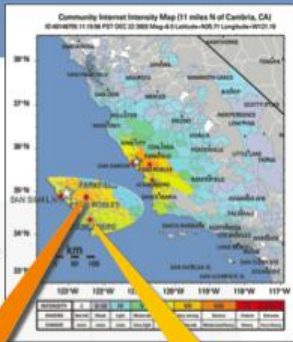


# Thanks!

*wald@usgs.gov*

## Did You Feel It? Citizens Contribute to Earthquake Science

Since the early 1990s, the magnitude and location of an earthquake have been available within minutes on the Internet. Now, as a result of work by the U.S. Geological Survey and with the cooperation of various regional seismic networks, people who experience an earthquake can go online and share information about its effects to help create a map of shaking intensities and damage. Such "Community Internet Intensity Maps" (CIIMs) contribute greatly toward the quick assessment of the scope of an earthquake emergency and provide valuable data for earthquake research.



### Then and Now

Not so long ago, the first thing that most people did after feeling an earthquake was to turn on their radio for information. That practice is changing, however. After the 2003 San Simeon earthquake in central California, for example, many people logged onto the Internet, not only to get information, but also to share their own experience of the earthquake. After checking the U.S. Geological Survey (USGS) Web site for the location and magnitude of the earthquake, they went to a Web page called "Did You Feel It?" (at <http://earthquake.usgs.gov/>). They entered their ZIP Code and answered a list of questions such as "Did the earthquake wake you up?" and "Did objects fall off shelves?" In minutes a map began taking shape on the Internet, and in a few hours, with more than 14,000 responses for the central California event, a Community Internet Intensity Map (CIIM) showed where and how strongly the earthquake had been felt and where damage occurred.



Photographs represent effects of the 2003 San Simeon, Calif., earthquake. Following this event, over 18,000 responses to "Did You Feel It?" were shared with the USGS. The earthquake was Intensity VIII in Paso Robles (left) and Intensity VII near Atascadero (right).

### Macroseismic Intensity

Macroscopic intensity describes the strength of shaking from an earthquake at a particular location, as determined from effects that people can readily observe without special instruments or special training. Such macroseismic effects include damage caused by the earthquake and the strength of shaking as perceived by people.

In general, the macroseismic intensity is highest near the earthquake source and decreases with distance from the source. However, a variety of factors—such as the direction in which the earthquake fault ruptures and variations in the soil conditions underlying different sites—may lead to complicated patterns of intensities that vary strongly from place to place.

Since 1931, the USGS has assigned macroscopic intensities to United States earthquakes on the basis of the Modified Mercalli Intensity (MMI) scale. Until recently, most of the macroseismic observations used to assign intensities were collected with questionnaires that were mailed to post offices in the earthquake region. The process of sending the questionnaires by standard mail, waiting for written responses, manually interpreting the responses, and preparing intensity maps could take months. In the late 1990s, the USGS began collecting data and publishing CIIMs on the "Did You Feel It?" Web page.

### Community Internet Intensity Maps

In contrast to the intensity maps prepared from paper-copy questionnaires, CIIMs take advantage of the Internet to generate intensity maps almost instantly. Data are received through questionnaires on the Internet answered by people who experienced the earthquake. The Internet approach reduces the time for preparing and distributing a shaking-intensity map from months to minutes.

**Annals of Geophysics**  
*Special Issue: On the use of the Internet to collect earthquake information and crowdsourcing applications*

USGS "Did You Feel It?" Internet-based Macroseismic Intensity Maps

David J. Wald<sup>1</sup>, Vincent Quitoriano<sup>1</sup>, Bruce Worden<sup>2</sup>, Margaret Hopper, and James W. Dewey<sup>1</sup>

<sup>1</sup> U. S. Geological Survey, National Earthquake Information Center, Golden, Colorado, [wald@usgs.gov](mailto:wald@usgs.gov)  
<sup>2</sup> Synergetics, Inc., 1520 South College Ave., Fort Collins, Colorado, 80524

### ABSTRACT

The U.S. Geological Survey (USGS) "Did You Feel It?" (DYFI) system is an automated system for rapidly collecting macroseismic intensity data from internet users' shaking and reports and generating intensity maps immediately following earthquakes; it has been in use for over a decade (1999-2011). DYFI-based intensity maps made rapidly available in the DYFI system fundamentally depart from more traditional maps made available in the past. These maps are made more quickly, provide more complete coverage and higher resolution, and allow for citizen input and interaction, and allow data collection at rates and quantities never before. These aspects of internet data collection, in turn, allow for data analyses, and ways to communicate with the public, opportunities not possible with traditional approaches. Yet web-based contributions also pose considerable challenges, as refinements to the processing and algorithmic procedures since DYFI was first implemented. We also describe a number of automatic post-processing tools, operations, and research directions, all of which utilize the extensive DYFI intensity data sets created in near-real time. DYFI can be found online at the website [quake.usgs.gov/dyfi/](http://quake.usgs.gov/dyfi/).

Wald et al. (2011)

# iPhone App: “iFeltIt”

