# “Rebirth” of Macroseismic Intensity

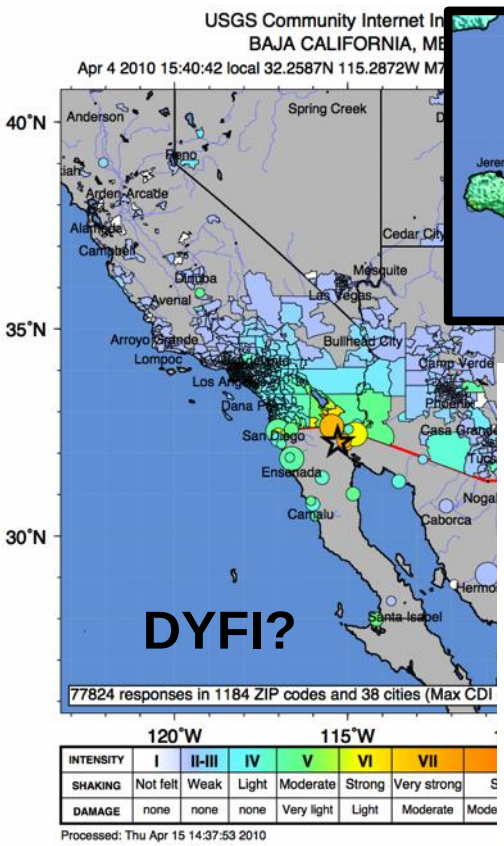
Earthquake intensities have been historically vital for characterizing historic earthquakes, for loss estimation, & for communicating risk.

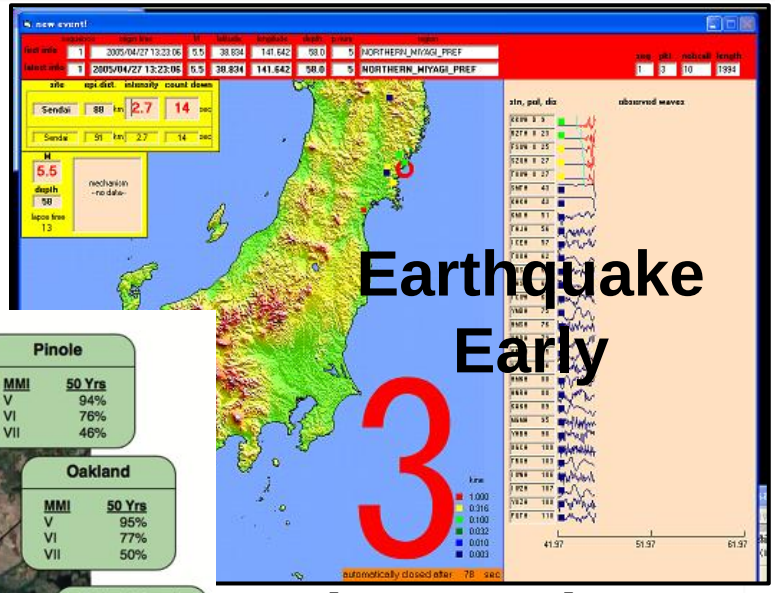
“Did You Feel It?”, ShakeMap, & other systems have recently brought back macroseismic intensity to public attention & use in the U.S.

# For ShakeMap: Peak Ground Motion to/from MMI

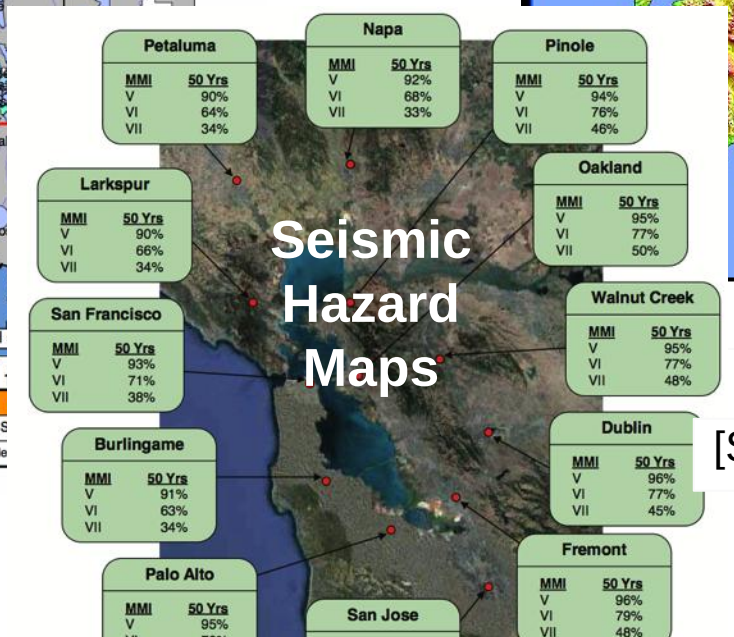
| PERCEIVED SHAKING | Not felt | Weak | Light | Moderate | Strong | Very strong | Severe | Violent | Extreme |
|---|---|---|---|---|---|---|---|---|---|
| POTENTIAL DAMAGE | none | none | none | Very light | Light | Moderate | Moderate/Heavy | Heavy | Very Heavy |
| PEAK ACC.(%g) | <.17 | .17-1.4 | 1.4-3.9 | 3.9-9.2 | 9.2-18 | 18-34 | 34-65 | 65-124 | >124 |
| PEAK VEL.(cm/s) | <0.1 | 0.1-1.1 | 1.1-3.4 | 3.4-8.1 | 8.1-16 | 16-31 | 31-60 | 60-116 | >116 |
| INSTRUMENTAL INTENSITY | I | II-III | IV | V | VI | VII | VIII | IX | X+ |

[Wald et al, 1999, Earthquake Spectra]



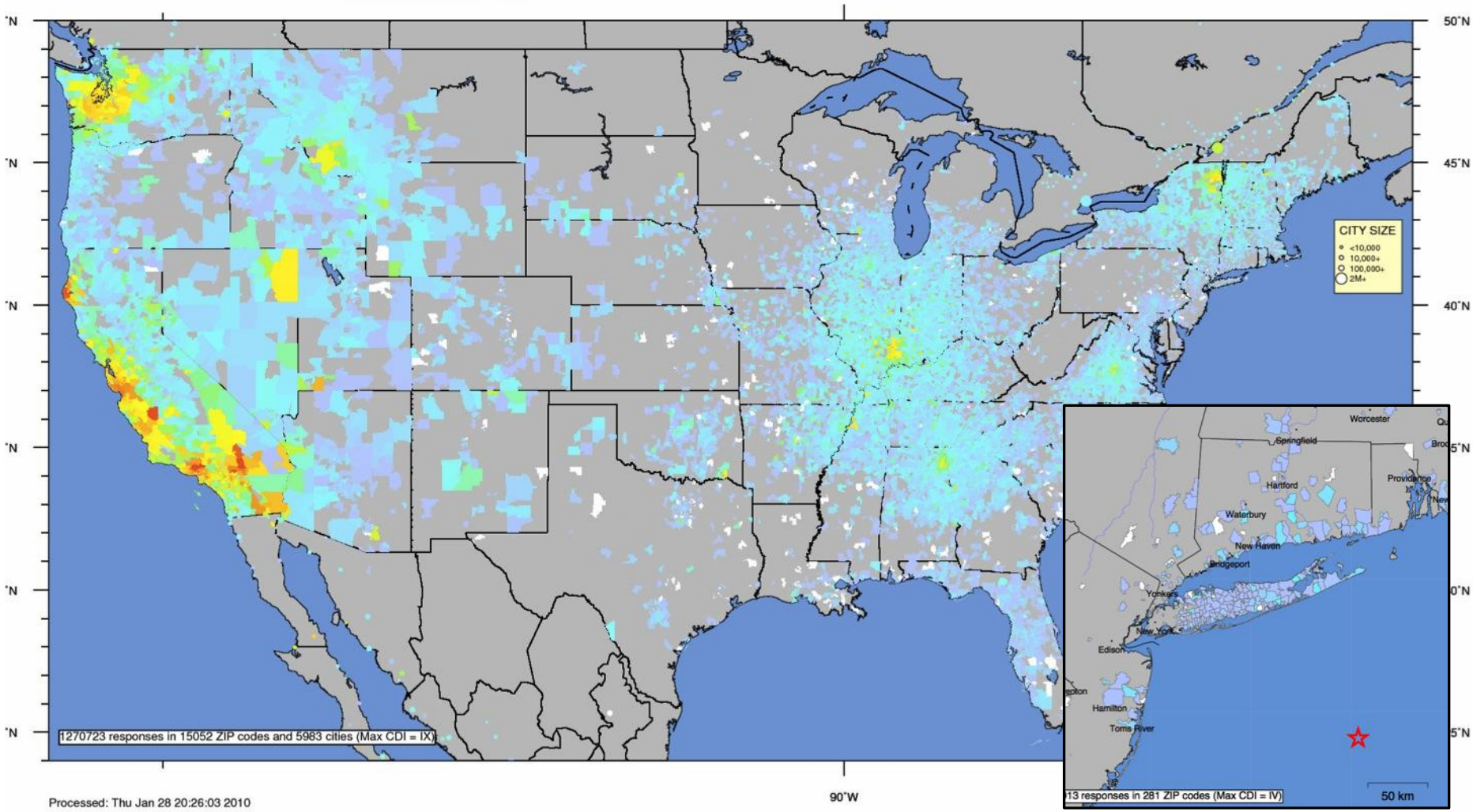



[JMA, Japan]



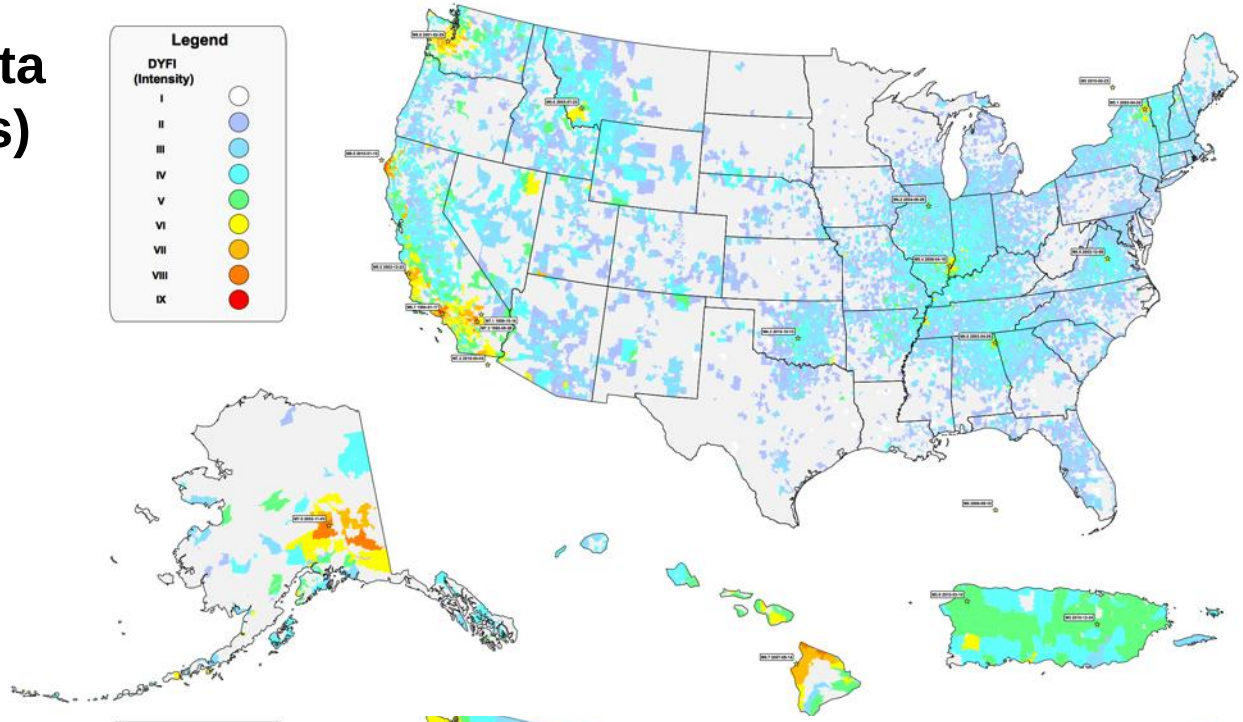

[Seeman et al (2010)]

# One Decade: 1999-2009

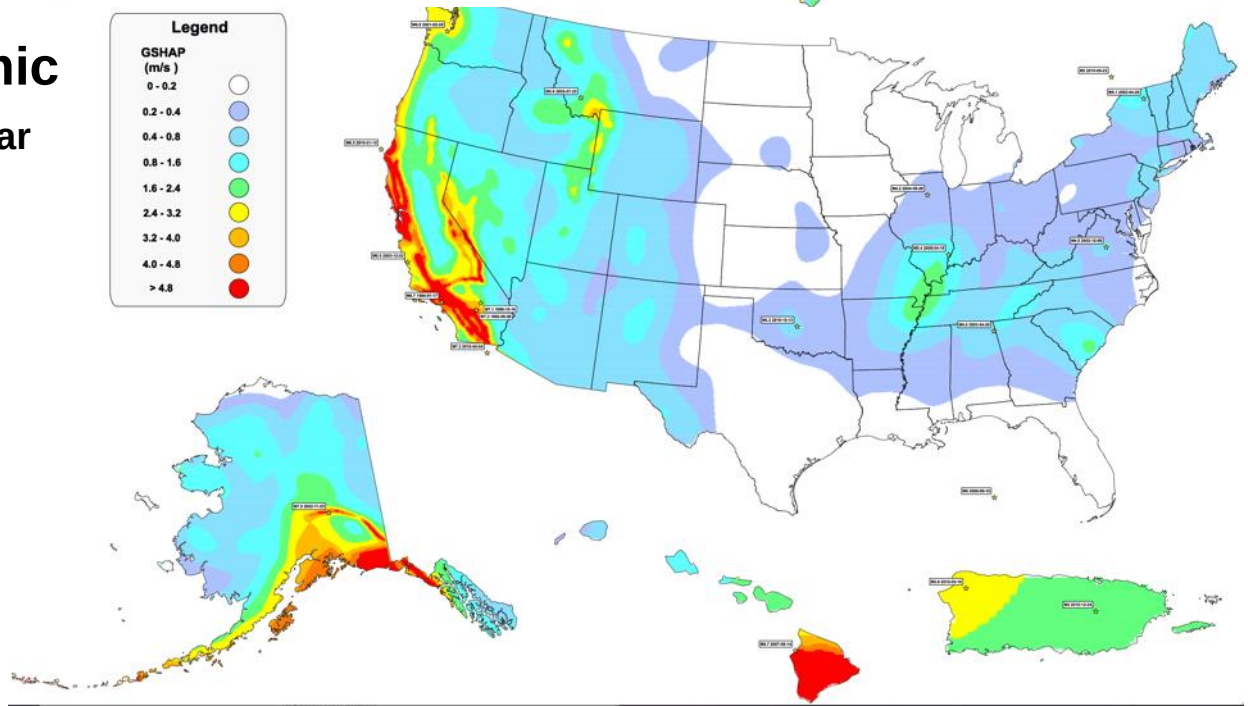



**>1.6 Million Responses in 15,052 ZIP codes and 5983 Cities**

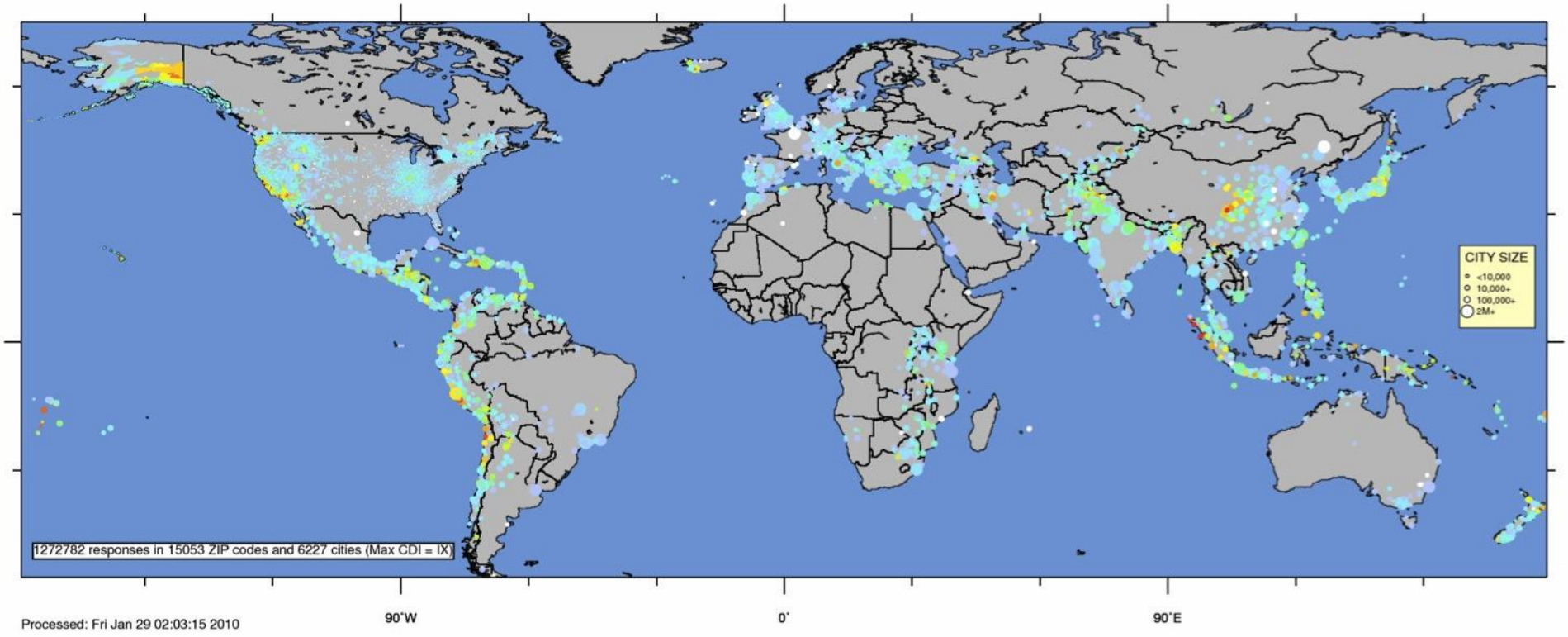
**Ten Years of DYFI Data (~2 *million* responses)**




**USGS National Seismic Hazard Map (2% in 50 Year Probability of Exceedence)**



# 2004-2009

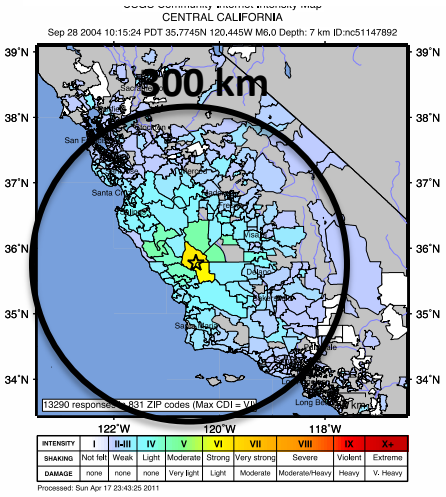



**~200,000 Responses in 5983 Cities (outside US)**

**Did You Feel It?**

## Magnitude 6.0

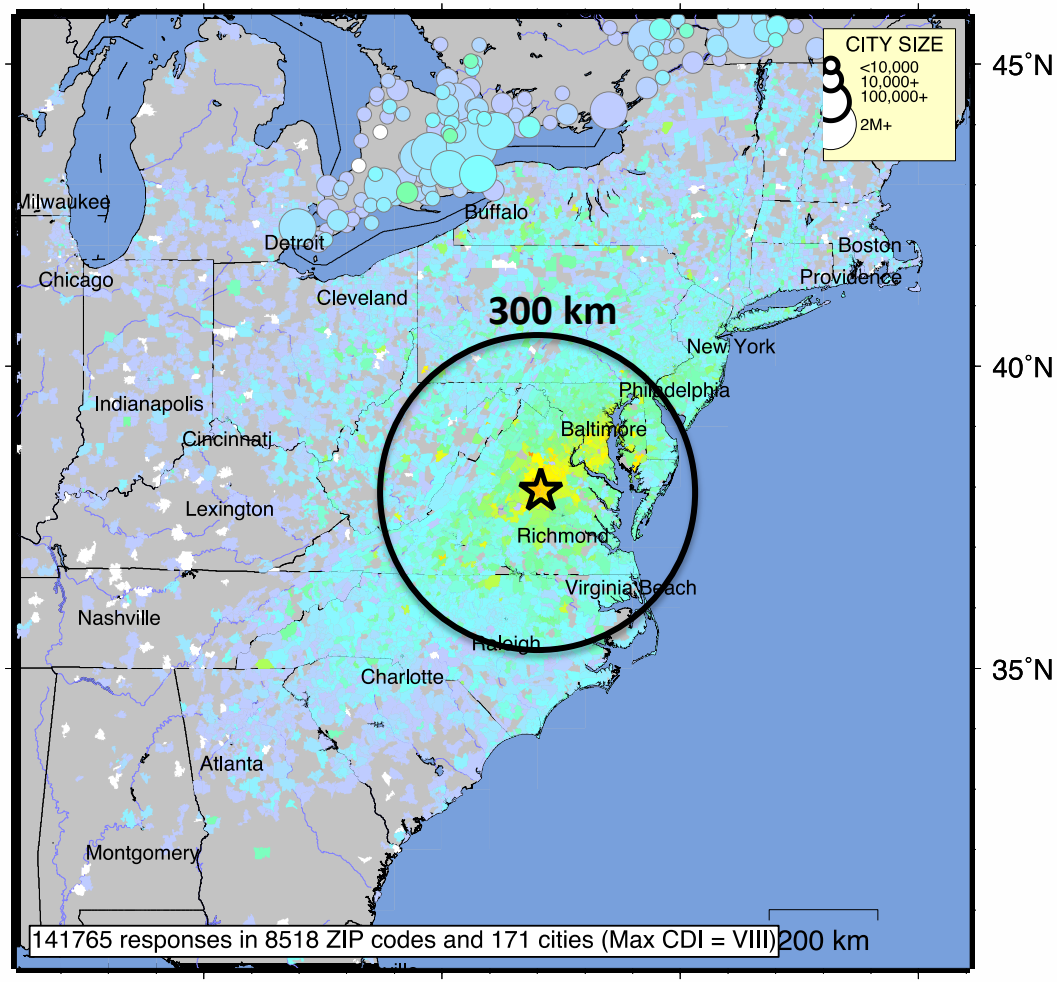
California




## Magnitude 5.8

VIRGINIA

Aug 23 2011 01:51:04 PM local 37.936N 77.933W M5.8 Depth: 6 km ID:se082311a




| INTENSITY | I | II-III | IV | V | VI | VII | VIII | IX | X+ |
|---|---|---|---|---|---|---|---|---|---|
| SHAKING | Not felt | Weak | Light | Moderate | Strong | Very strong | Severe | Violent | Extreme |
| DAMAGE | none | none | none | Very light | Light | Moderate | Moderate/Heavy | Heavy | V. Heavy |

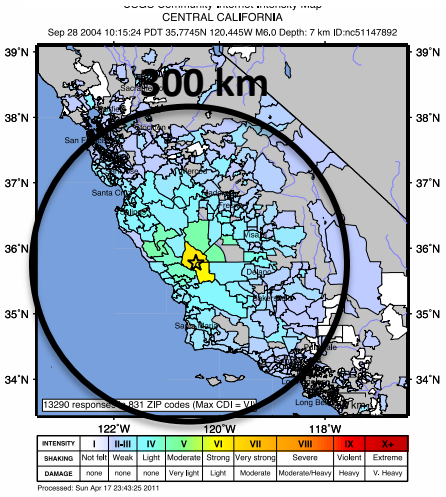
Processed: Fri Sep 2 17:10:30 2011

**[Same Map Scales!]**

**Did You Feel It?**

## Magnitude 6.0

California

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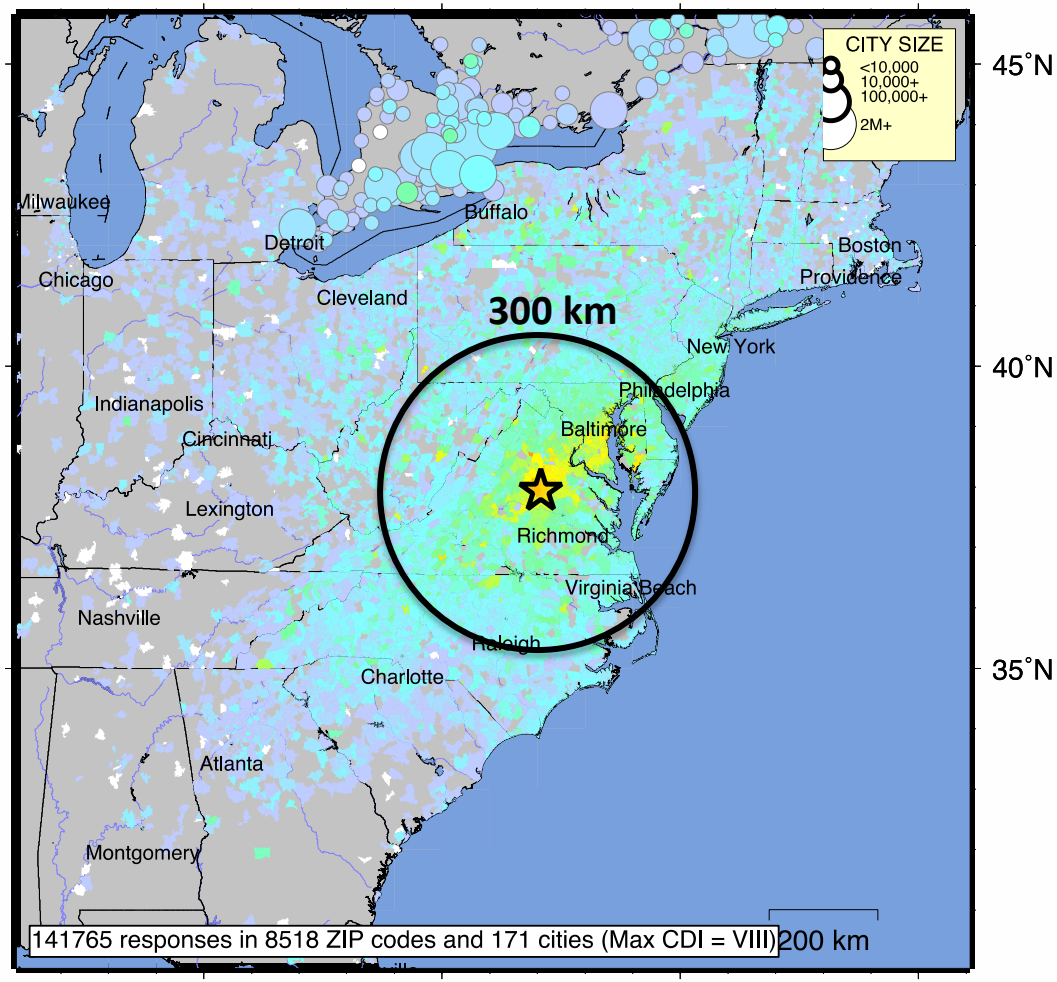


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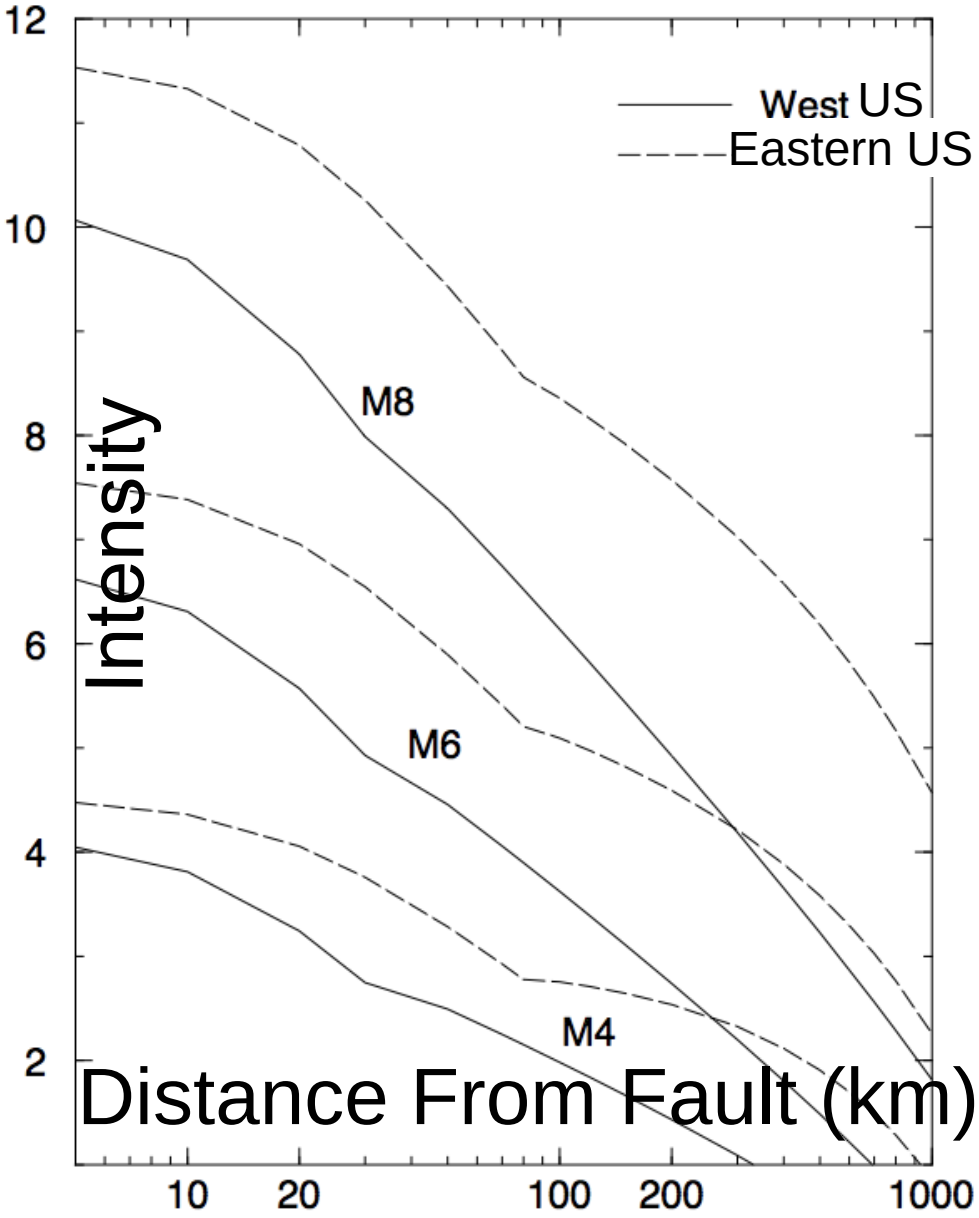
|---|---|---|---|---|---|---|---|---|---|
| SHAKING | Not felt | Weak | Light | Moderate | Strong | Very strong | Severe | Violent | Extreme |
| DAMAGE | none | none | none | Very light | Light | Moderate | Moderate/Heavy | Heavy | V. Heavy |

Processed: Fri Sep 2 17:10:30 2011

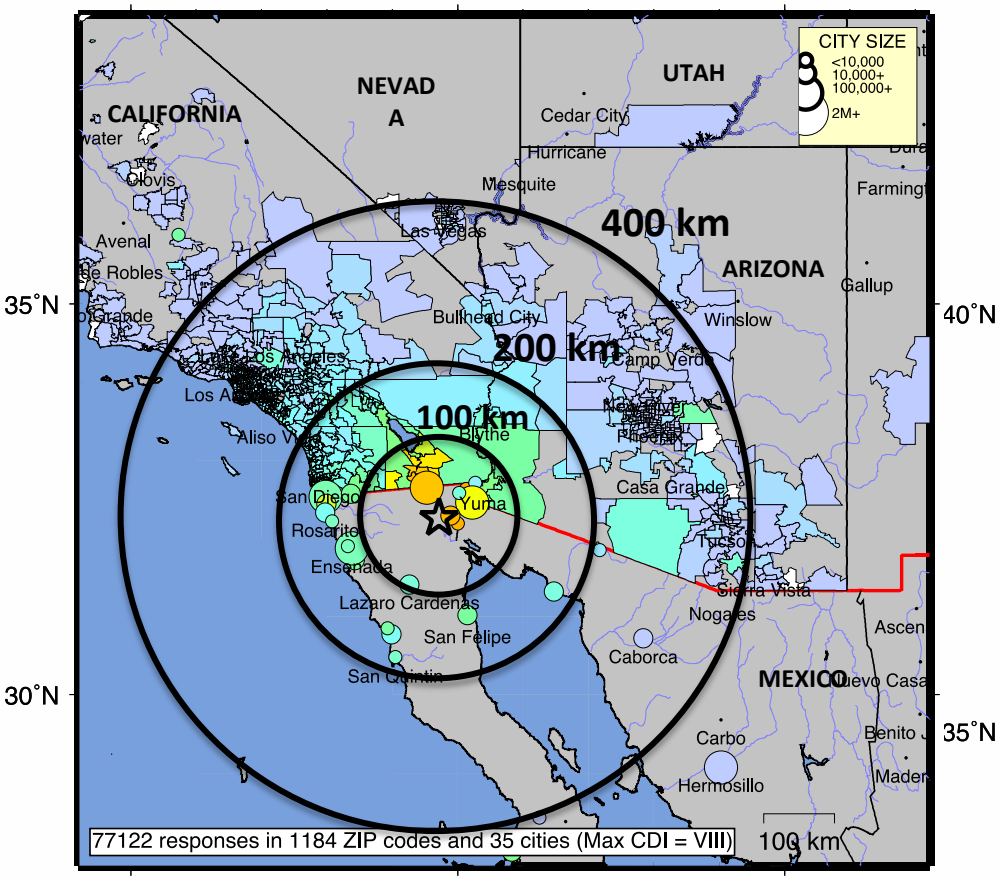
**[Same Map Scales!]**



Atkinson & Wald (2007)

# Magnitude 7.2

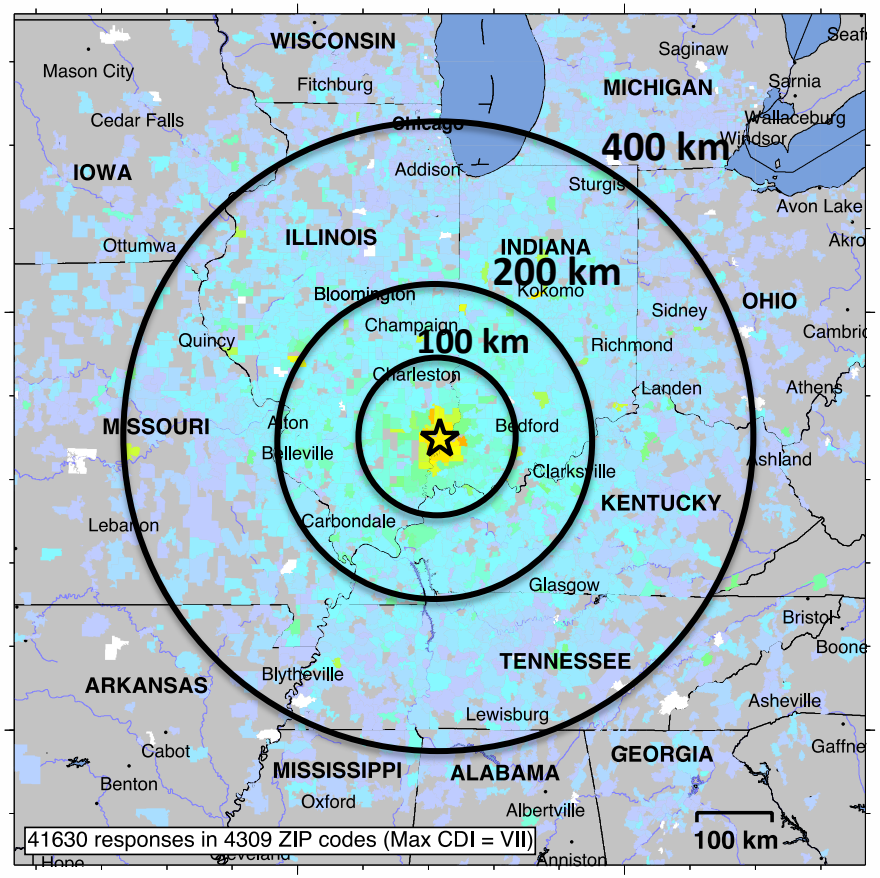
USGS Community Internet Intensity Map
BAJA CALIFORNIA, MEXICO
Apr 4 2010 15:40:42 local 32.2587N 115.2872W M7.2 Depth: 10 km ID:ci14607652




| INTENSITY | I | II-III | IV | V | VI | VII | VIII | IX | X+ |
|---|---|---|---|---|---|---|---|---|---|
| SHAKING | Not felt | Weak | Light | Moderate | Strong | Very strong | Severe | Violent | Extreme |
| DAMAGE | none | none | none | Very light | Light | Moderate | Moderate/Heavy | Heavy | V. Heavy |

# Magnitude 5.2

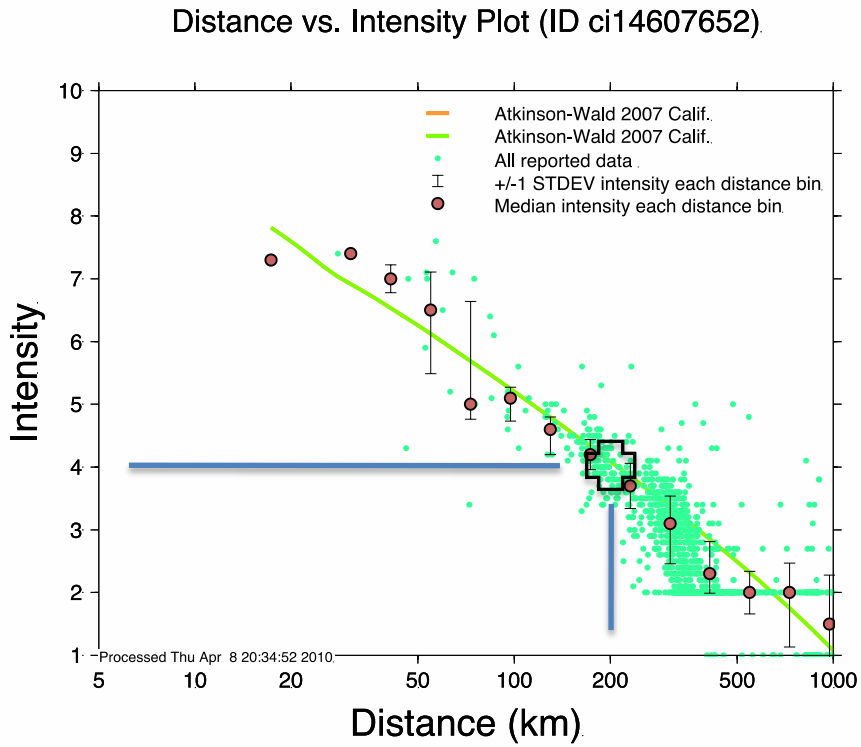
USGS Community Internet Intensity Map
ILLINOIS
Apr 18 2008 04:36:58 CDT 38.4808N 87.8258W M5.2 Depth: 11 km ID:us2008qza6



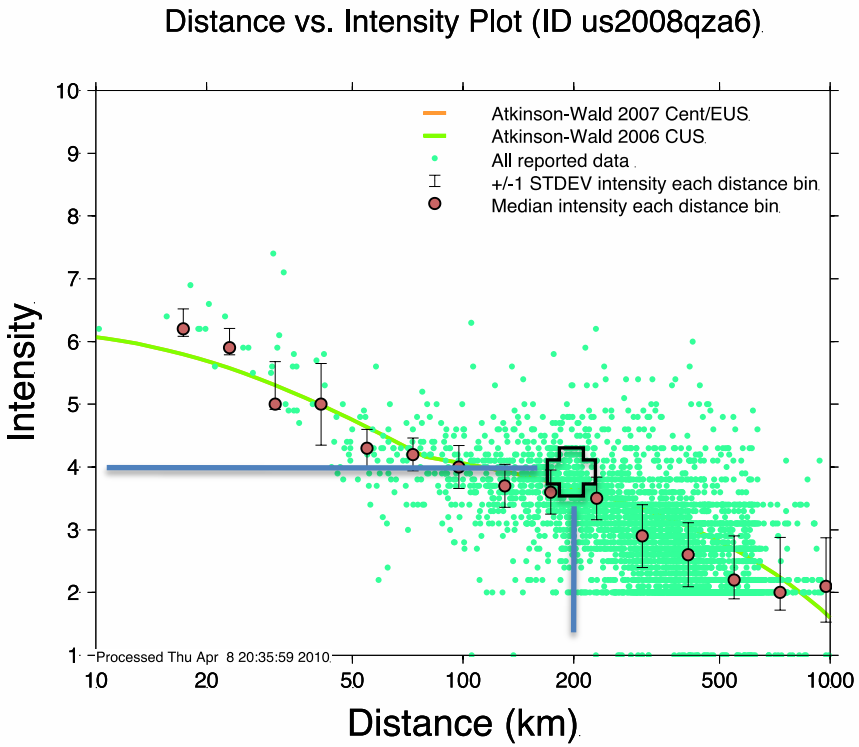

| INTENSITY | I | II-III | IV | V | VI | VII | VIII | IX | X+ |
|---|---|---|---|---|---|---|---|---|---|
| SHAKING | Not felt | Weak | Light | Moderate | Strong | Very strong | Severe | Violent | Extreme |
| DAMAGE | none | none | none | Very light | Light | Moderate | Moderate/Heavy | Heavy | V. Heavy |

(Same Map Scale!)

# Magnitude 7.2



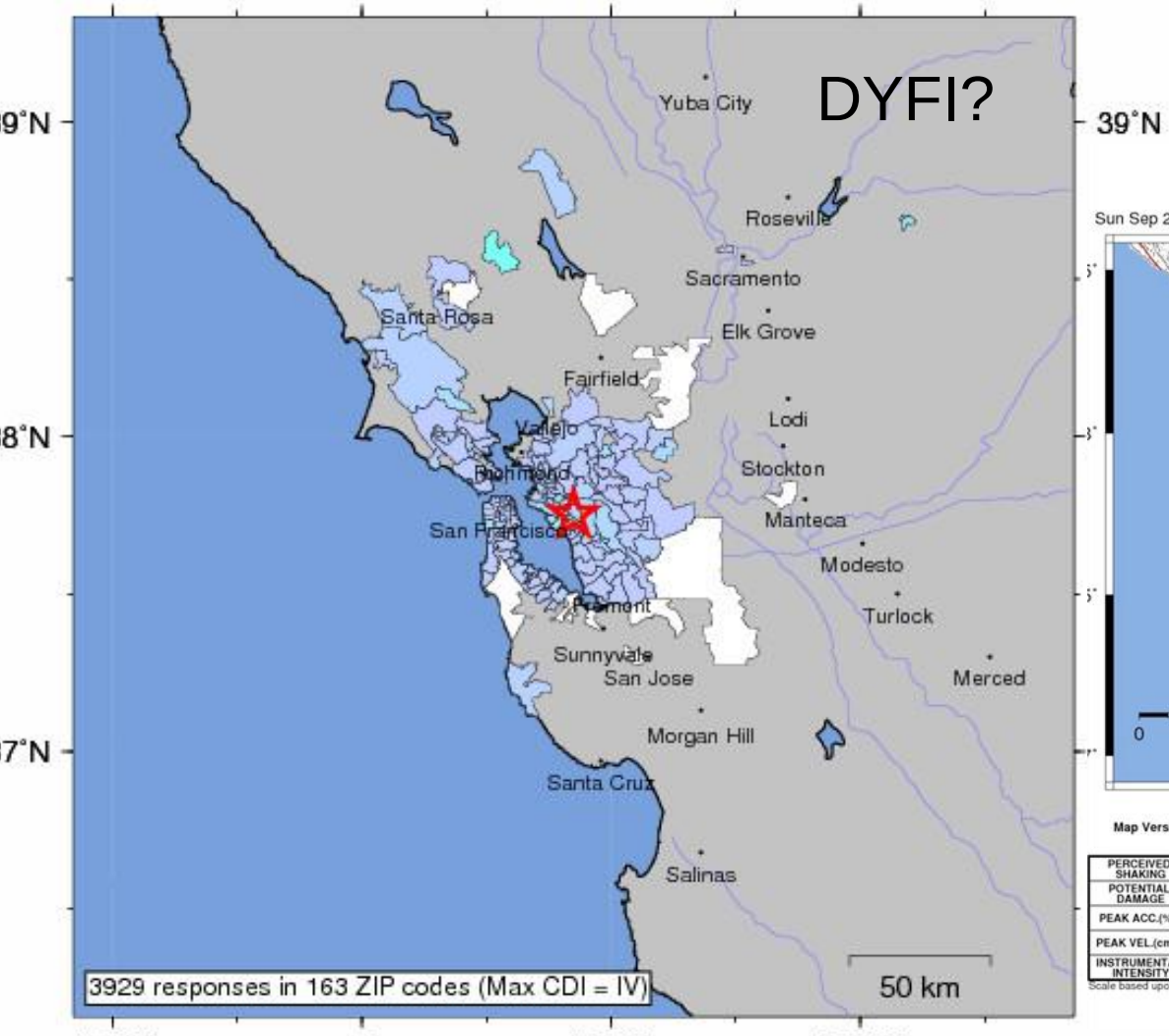

# Magnitude 5.2



USGS Community Internet Intensity Map
SAN FRANCISCO BAY AREA, CALIFORNIA

Sep 25 2011 08:08:09 PM local 37.7507N 122.1505W M3.2 Depth: 7 km ID:nc71653461

DYFI?



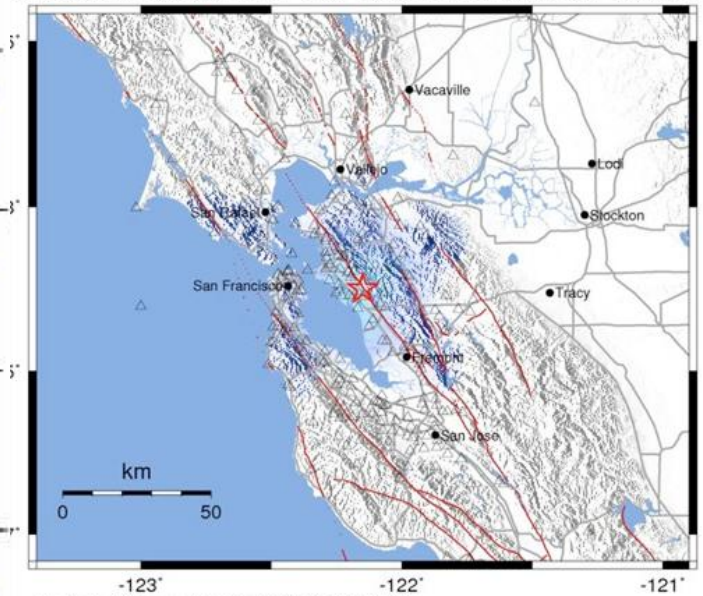

| INTENSITY | I | II-III | IV | V | VI | VII | VIII | IX | X+ |
|---|---|---|---|---|---|---|---|---|---|
| SHAKING | Not felt | Weak | Light | Moderate | Strong | Very strong | Severe | Violent | Extreme |
| DAMAGE | none | none | none | Very light | Light | Moderate | Moderate/Heavy | Heavy | V. Heavy |

Processed: Tue Sep 27 03:42:13 2011

ShakeMap

CISN ShakeMap : 4.5 km (2.8 mi) N of San Leandro, CA

Sun Sep 25, 2011 08:08:09 PM PDT M 3.2 N37.75 W122.15 Depth: 7.9km ID:71653461




Map Version 10 Processed Mon Sep 26, 2011 03:55:23 PM PDT

| PERCEIVED SHAKING | Not felt | Weak | Light | Moderate | Strong | Very strong | Severe | Violent | Extreme |
|---|---|---|---|---|---|---|---|---|---|
| POTENTIAL DAMAGE | none | none | none | Very light | Light | Moderate | Mod./Heavy | Heavy | Very Heavy |
| PEAK ACC.(%g) | <0.1 | 0.5 | 2.4 | 6.7 | 13 | 24 | 44 | 83 | >156 |
| PEAK VEL.(cm/s) | <0.07 | 0.4 | 1.9 | 5.8 | 11 | 22 | 43 | 83 | >160 |
| INSTRUMENTAL INTENSITY | I | II-III | IV | V | VI | VII | VIII | IX | X+ |

Scale based upon Wald, et al.; 1999

EERI EARTHQUAKE SPECTRA

# The Effects of Earthquake Measurement Concepts and Magnitude Anchoring on Individuals' Perceptions of Earthquake Risk

Richard Celsi,[a)] M.EERI, Mary Wolfinbarger,[a)] and David Wald,[b)] M.EERI

- The end of the questionnaire allows space for unlimited first-person accounts.
- We have tens-of-thousands of such responses, many fascinating, ranging from comical to horrific.
- In addition to being catharitic, these earthquake experiences contain valuable data about how people perceive, prepare for,

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CELESTE KATZ
DAILY POLITICS

AUGUST 23, 2011 2:50 PM — 7 COMMENTS

## EARTHQUAKE: Did You Feel It? Updated! Again!

BY CELESTE KATZ

September 23, 2011

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npr — FIND A STATION

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## Did You Feel It?

EVERY DAY IS SCIENCE FRIDAY

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XML podcast (what's this?)

Friday, August 26th, 20

### Did You Feel It?

A relatively rare East Coast earthquak
from Canada to Georgia. Carnegie In

THE BALTIMORE SUN — LIGHT FOR ALL

The Baltimore Sun > Weather > Maryland Weather

« Afternoon haze a product of pollution | Main | 90-plus heat breaking records, triggering alerts »

010

## t was an earthquake

U.S. Representative
Jo Ann Emerson
Proudly Serving Missouri's 8th District

Saturday, April 7, 2007

Weekly Column

## EMERSON RADIO ADDRESS: Did You Feel It?

"If history is any guide, a major earthquake in Southeast Missouri is just a matter of time. Scientists are hard at work measuring and mapping the seismic activity in the New Madrid Seismic Zone, and we can help, too.

A reporting tool called "Did You Feel It?" lets citizens report the earthquakes they experience when the earth moves under their feet. By logging in information about the

USGS Community Internet Intensity Map
POTOMAC-SHENANDOAH REGION
Jul 16 2010 05:04:47 local 39.1668N 77.2517W M3.6 Depth: 5 km ID:us2010yua6

lifehacker

EARTHQUAKE

# Did You Feel It Crowdsources Earthquake Monitoring

Did You Feel It is an earthquake monitoring project from the United States Geological Survey that not only gives you zipcode-by-zipcode data on earthquake reporting but encourages you to participate in monitoring seismic activity.

You can visit Did You Feel It simply to take a

scienceforcitizens.net BETA THE SOURCE FOR SCIENCE Y

Home | Project Finder | Add a Project | Member Blogs | Sci4Cits Blog | Video | Res

## Did You Feel It?

SUBMITTED BY DYFI

WEB ADDRESS http://earthquake.usgs.gov/eqcenter/dyfi/

Sci4Cits Hot Project

Member blog posts about this project

AVG. USER RATING

Share

"Did You Feel It?" provides an opportunity for people who experience an earthquake to share information about its effects to help create a map of shaking intensities and damage. By taking advantage of the vast numbers of Internet users, the project garners a more complete description of what people experienced, the effects of the

Did You Feel It?

Log In or Register

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# Help Geologists Track the August 23rd Earthquake

Enter what you felt during today's earthquake at earthquake.usgs.gov to aid geologists. Steve Mirsky reports

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SCIENCE LIFE

## The Intersection

« Richard Dawkins Takes The Crotchety Old Man Tactic To Communicate Science To Rick Perr
Work?
Liberals Mislead On GOP Cuts To USGS In Wake Of Earthquake, Still Reason For Concern »

## Did you feel the earthquake?