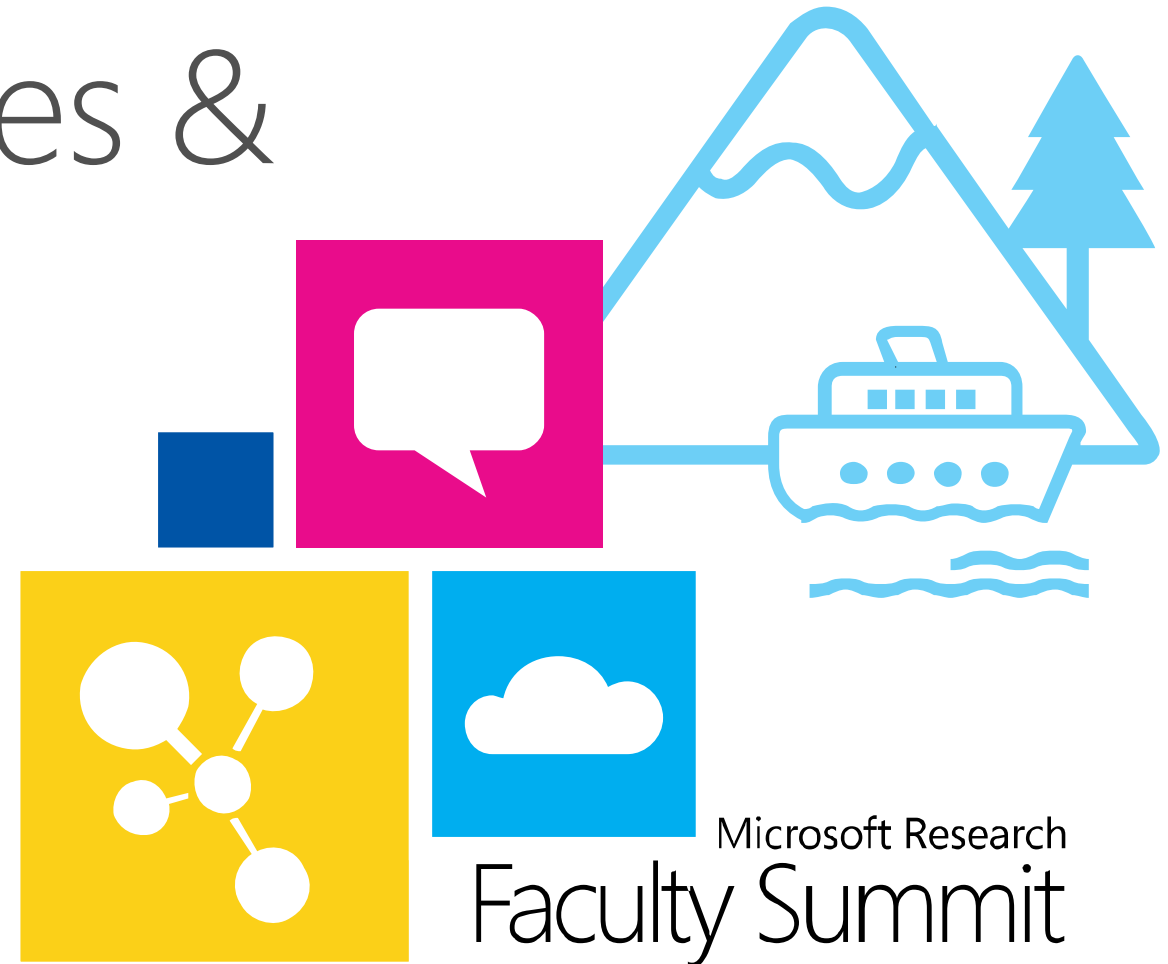


Microsoft Research  
Faculty  
Summit  
**2013**



# Nonreactive Measures & Crisis Informatics

Eytan Adar  
Assistant Professor  
University of Michigan



# The art of measurement

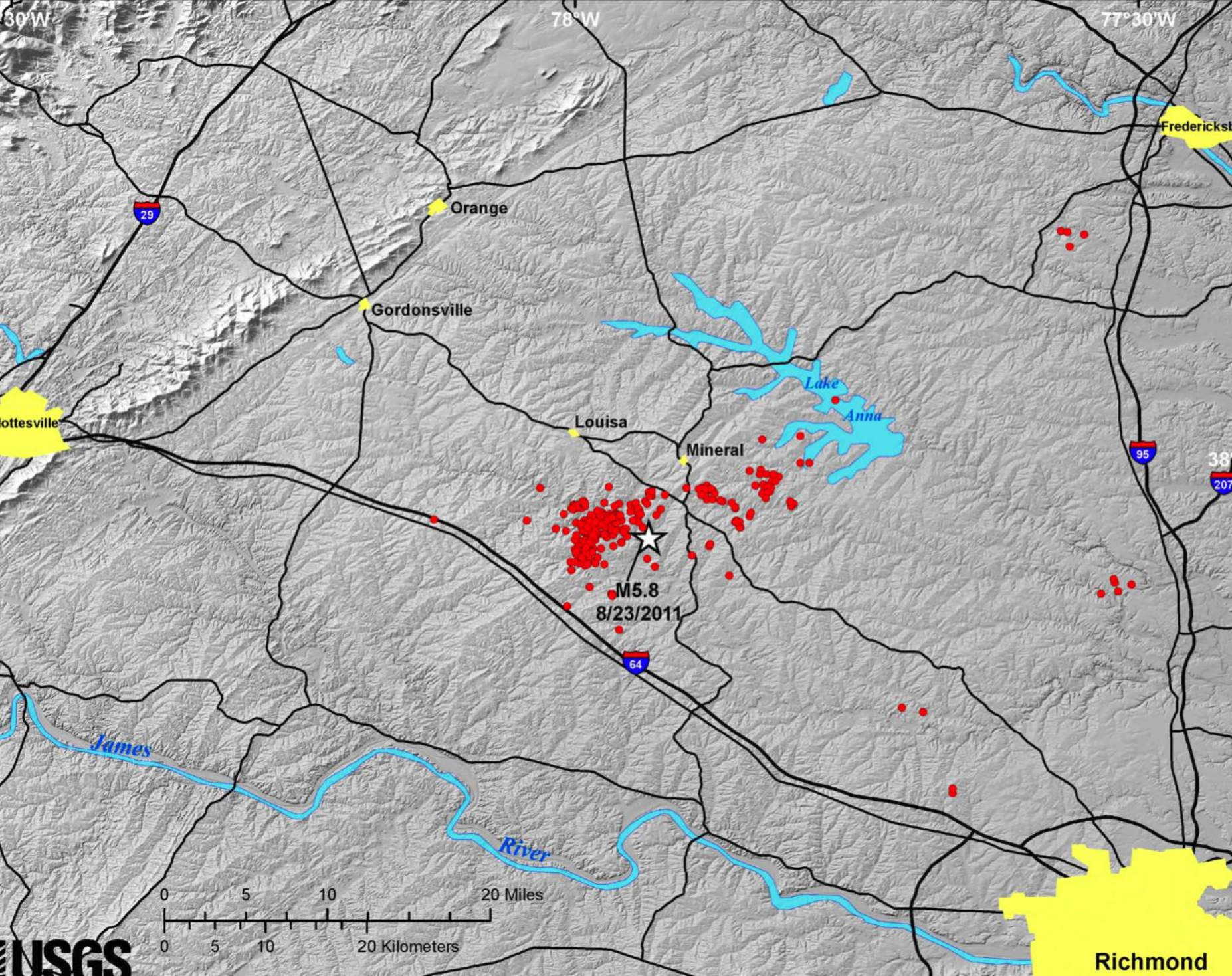
- Direct
  - Surveys
  - Questionnaires
  - Interviews
- Indirect
  - Non-reactive/unobtrusive



# Non-reactive measures

- Measuring without asking
- Using observed behavior
  - Accretion and Erosion
- Tied to what we actually want to observe
  
- Example: can you feel the earthquake?





Tue., August 23, 2011  
01:51:04 PM (EST)

# Earthquake Hazards Program

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EARTHQUAKES HAZARDS LEARN PREPARE MONITORING RESEARCH

## Did You Feel It?

- Home
- Archives
- Background
- Comment
- FAQ
- Disclaimer

## Did You Feel It?



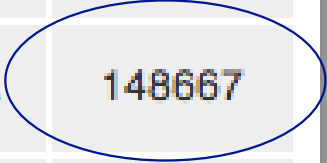
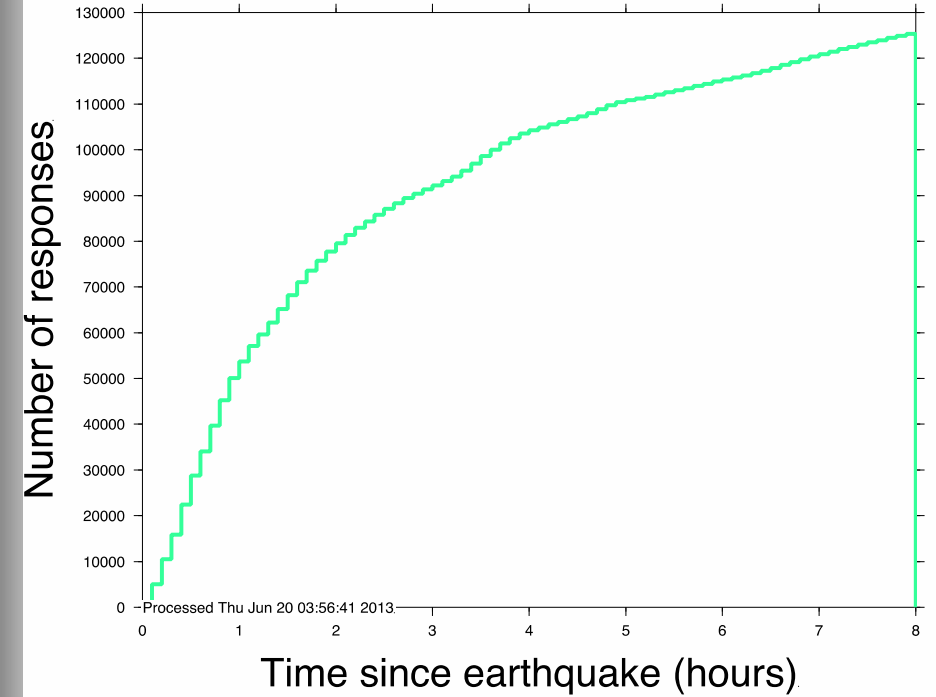
Report Unknown Event

View Archives

Found 10 matching results Events - Last 24 Hours

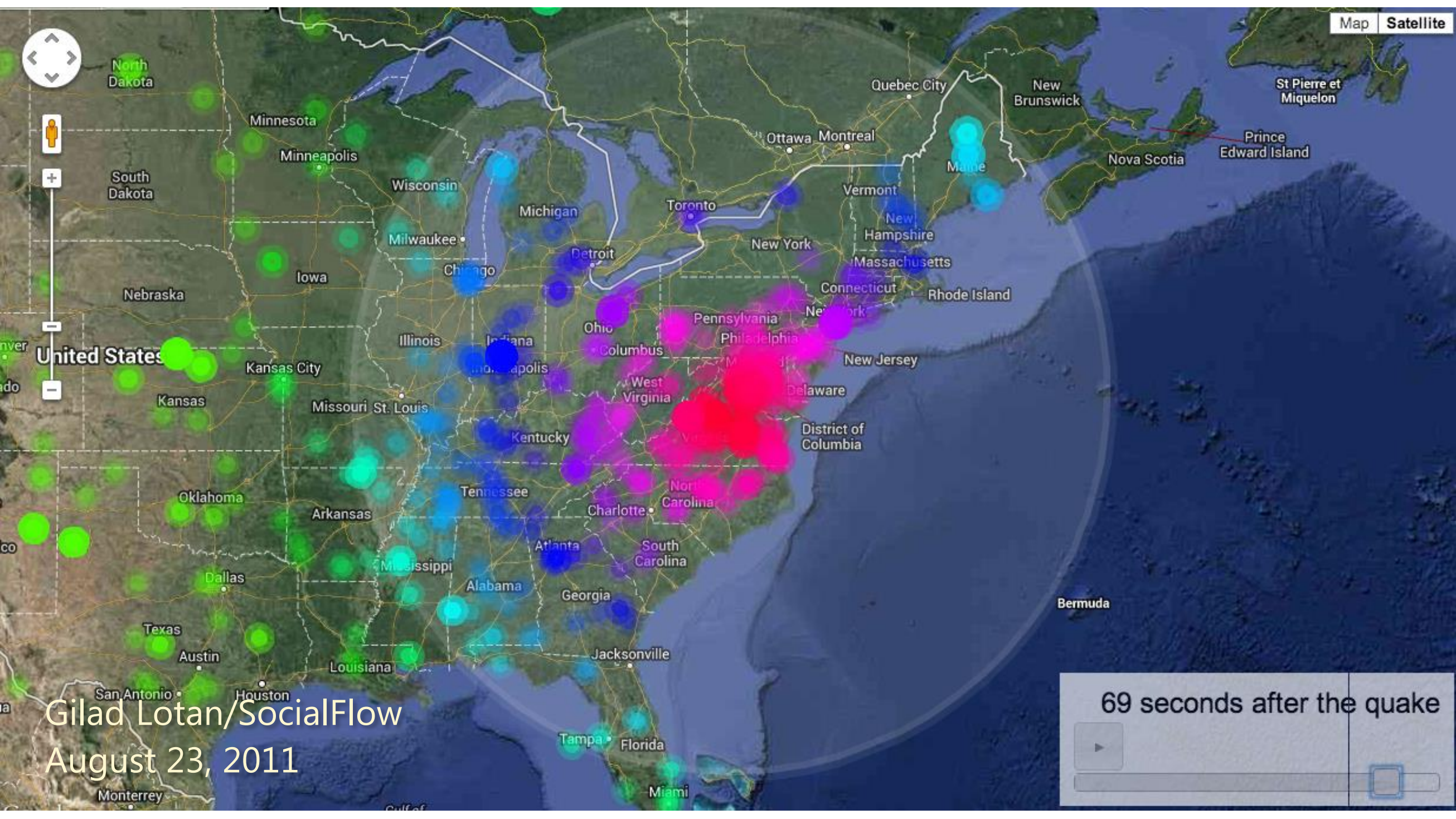
MMI	Mag	Location	Event Time	Event ID	Response
II	1.5	SOUTHERN CALIFORNIA 35.05°N -118.33°W 0Km Deep	2013-07-12 17:39:14 UTC 2013-07-12 10:39:14 LOCAL	CI11333714	1
II	4.8	NORTHERN CALIFORNIA 1.23°N 120.50°E 44Km Deep	2011-08-24 03:01:51 LOCAL	USC0005IML	1
VII	2.8	VIRGINIA 37.93°N -77.94°W 0Km Deep	2011-08-23 18:46:50 UTC 2011-08-23 14:46:50 LOCAL	SE082311B	3549
VII	5.8	VIRGINIA 37.94°N -77.93°W 6Km Deep	2011-08-23 17:51:04 UTC 2011-08-23 13:51:04 LOCAL	SE082311A	148667
III	0.4	NORTHERN CALIFORNIA	2011-08-23 15:47:51 UTC	NC71604795	4
II	3.4	NORTHERN ALASKA 65.09°N -148.77°W 14Km Deep	2013-07-12 07:59:16 UTC 2013-07-11 23:59:16 LOCAL	AK10757414	17
II	1.9	SOUTHERN CALIFORNIA 32.91°N -118.28°W 8Km Deep	2013-07-12 07:57:23 UTC 2013-07-12 00:57:23 LOCAL	CI11333554	2

Responses vs. Time Plot (ID se082311a)



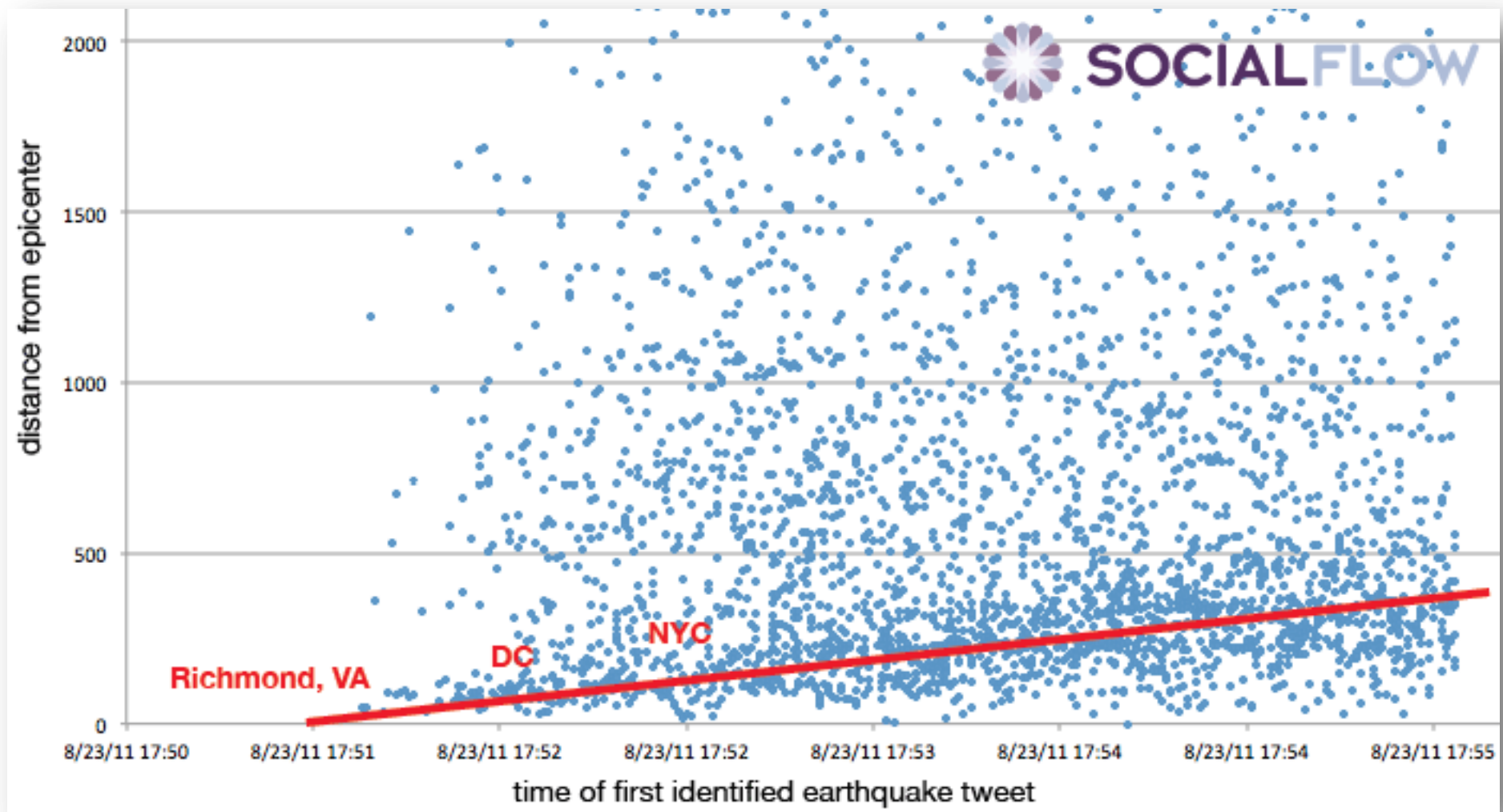


United States



Gilad Lotan/SocialFlow  
August 23, 2011

69 seconds after the quake



<http://blog.socialflow.com/post/7120244132/all-shook-up-mapping-earthquake-news-on-twitter-from-virginia-to-maine>



# The idea of non-reactivity\*

- History in 3 minutes of examples...

\*AKA unobtrusive measures, social sensing, etc.



How scary is the story?



How popular is a piece at a museum?



# Who do I advertise to?

- "Z" Frank of Chicago, 1962 (Webb et al.)

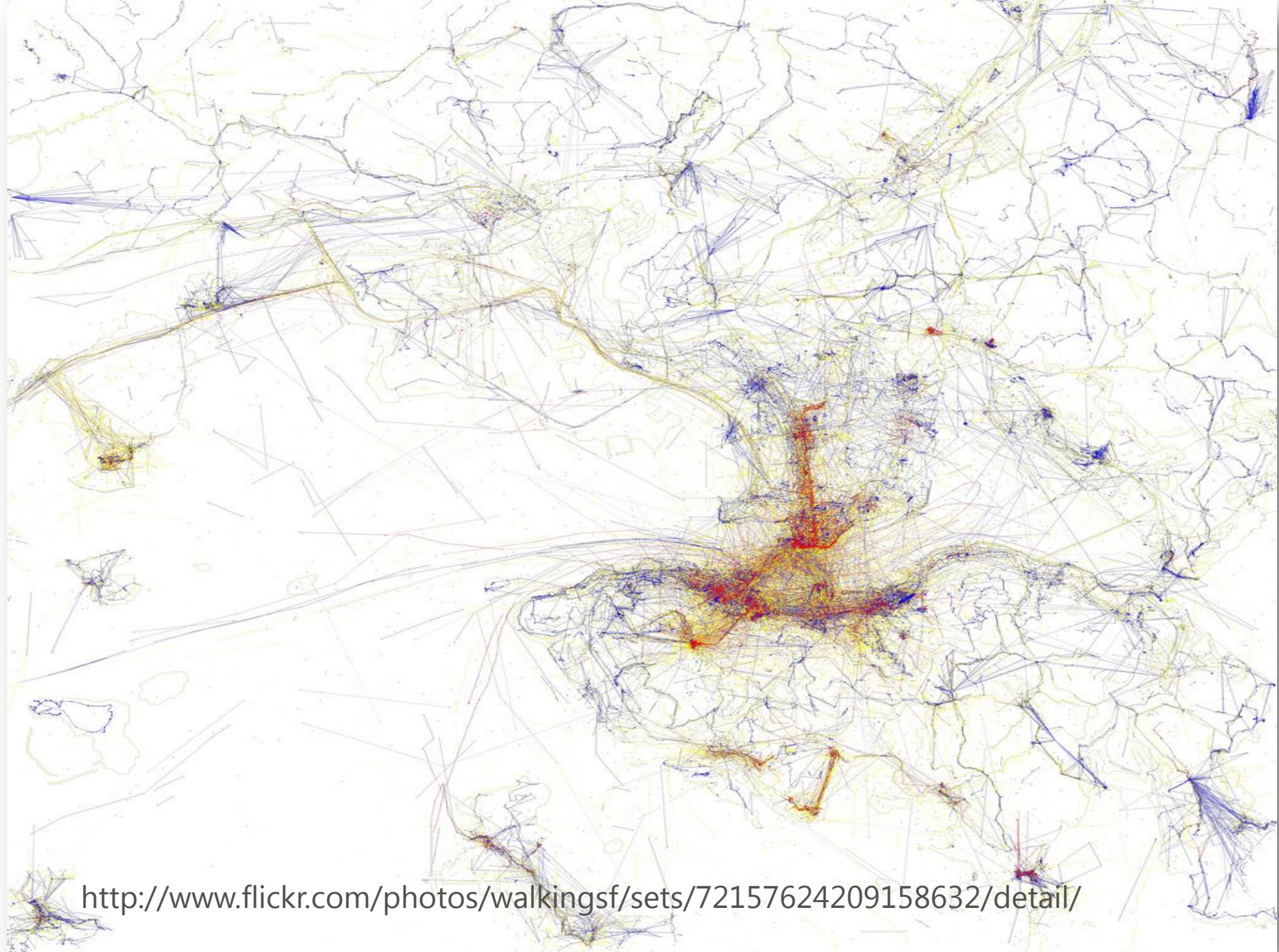


# What do people consume?

- Garbage Project
  - (Rathje, 1975)
- Assessing citywide drug levels (1999-)



Where  
do  
tourists  
go?



<http://www.flickr.com/photos/walkingsf/sets/72157624209158632/detail/>

# Where's the traffic?



## **Real Traffic Data**, At The Speed of Business.

Each second, Metro Traffic Engine collects and aggregates millions of GPS and mobile phone locations, creates road speeds, then paints a LIVE picture of traffic conditions in your area.

# How's Walmart doing?





Ok, but...



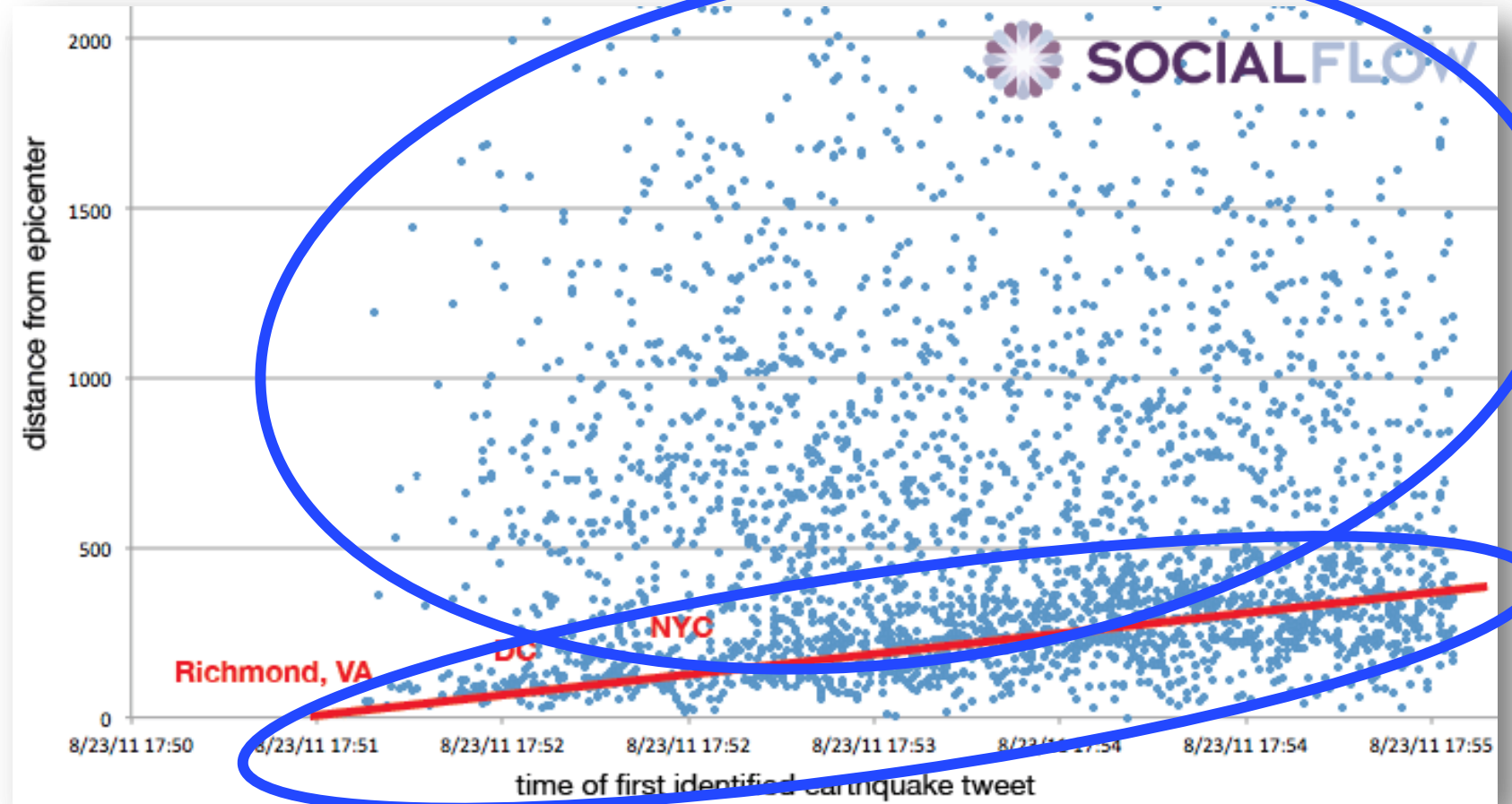
# Bias?

- Population bias
- People who have phones/power
- People read the news
- Incentives to tweet
  - Highest benefit in being first
  - More generally → many social signals are preformed (not simply side-effect)
- Etc. etc.



# Noise?

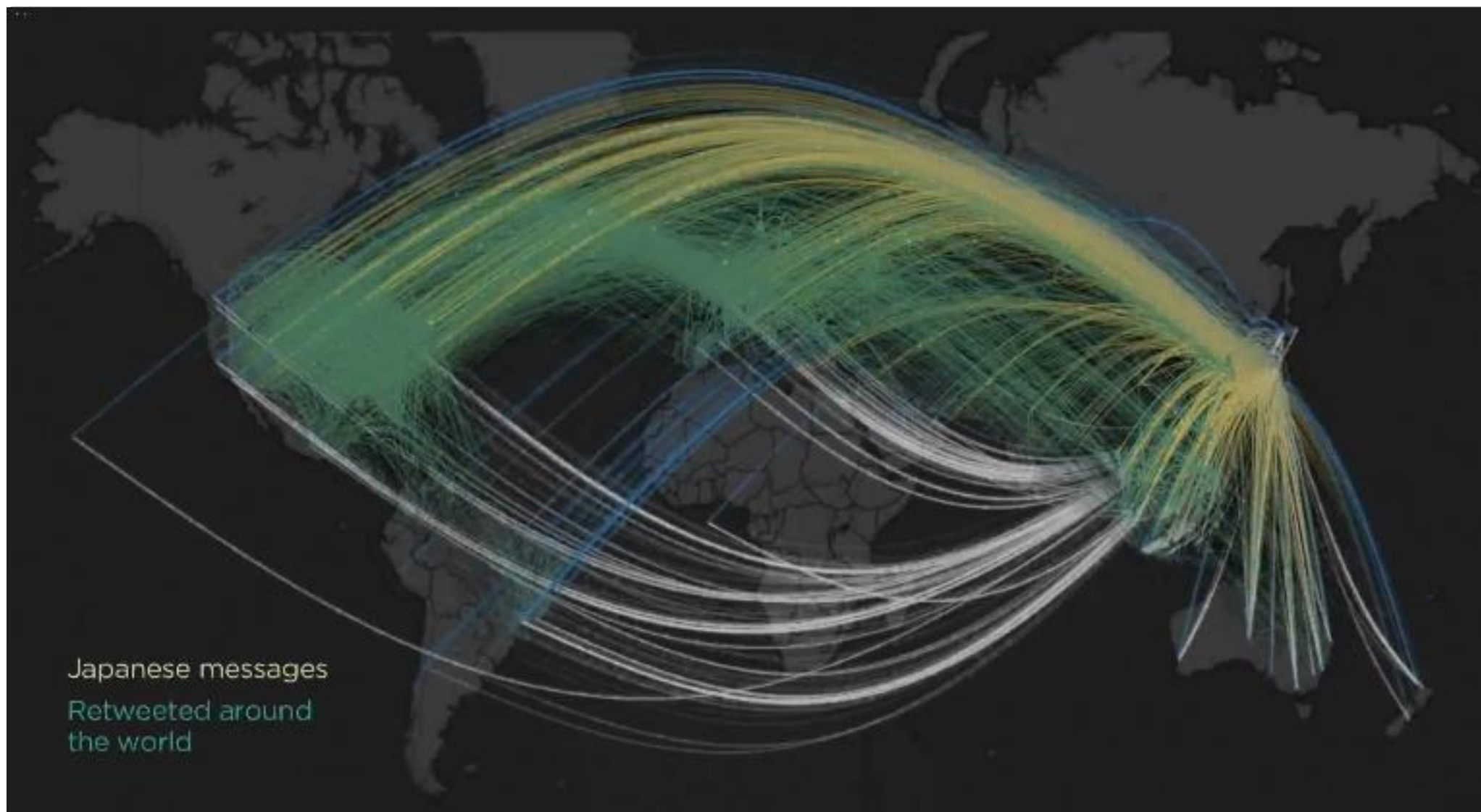
- Ecology
- Everything is signal
- What are you measuring?



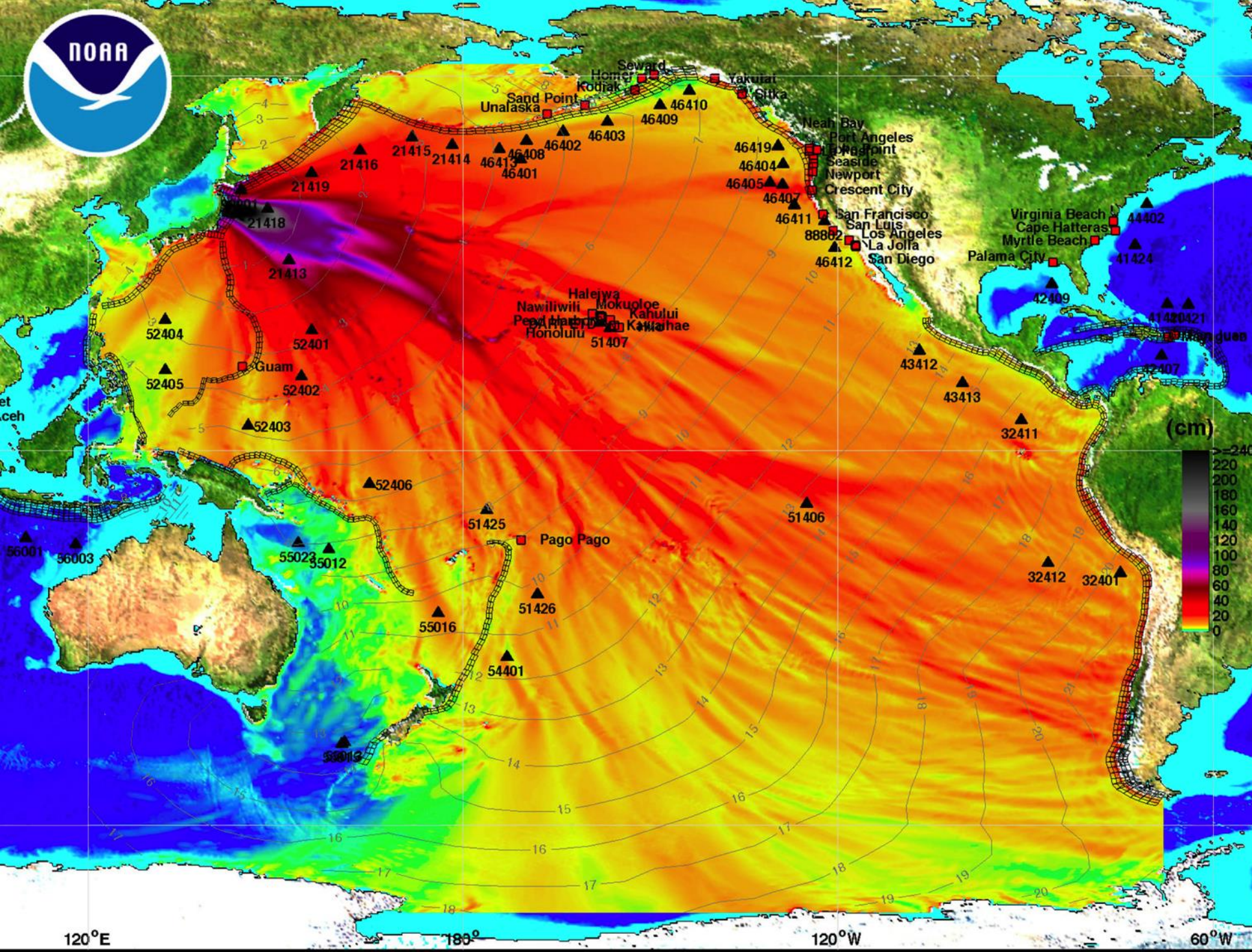
#Japan

March 11, 2011

# Individuals + Friends + Family



<http://www.youtube.com/watch?v=SybWjN9pKQk>



Tsunami Levels

Complete coverage on

# Japan tsunami

FOLLOW THIS TOPIC 

# TSUNAMI QUAKE DISASTER



## Nuclear crisis explained

Workers in Japan are struggling to contain the crisis at the Fukushima Daiichi nuclear power plant, which was badly damaged by a devastating earthquake and tsunami on March 11.

How do reactors work, what's causing the problems and what's being done to get it under control?

[EXPLORE THE INTERACTIVE](#)

- [Map: Nuclear plants, aftershocks, more](#)
- [Timeline: How the nuclear crisis unfolded](#)

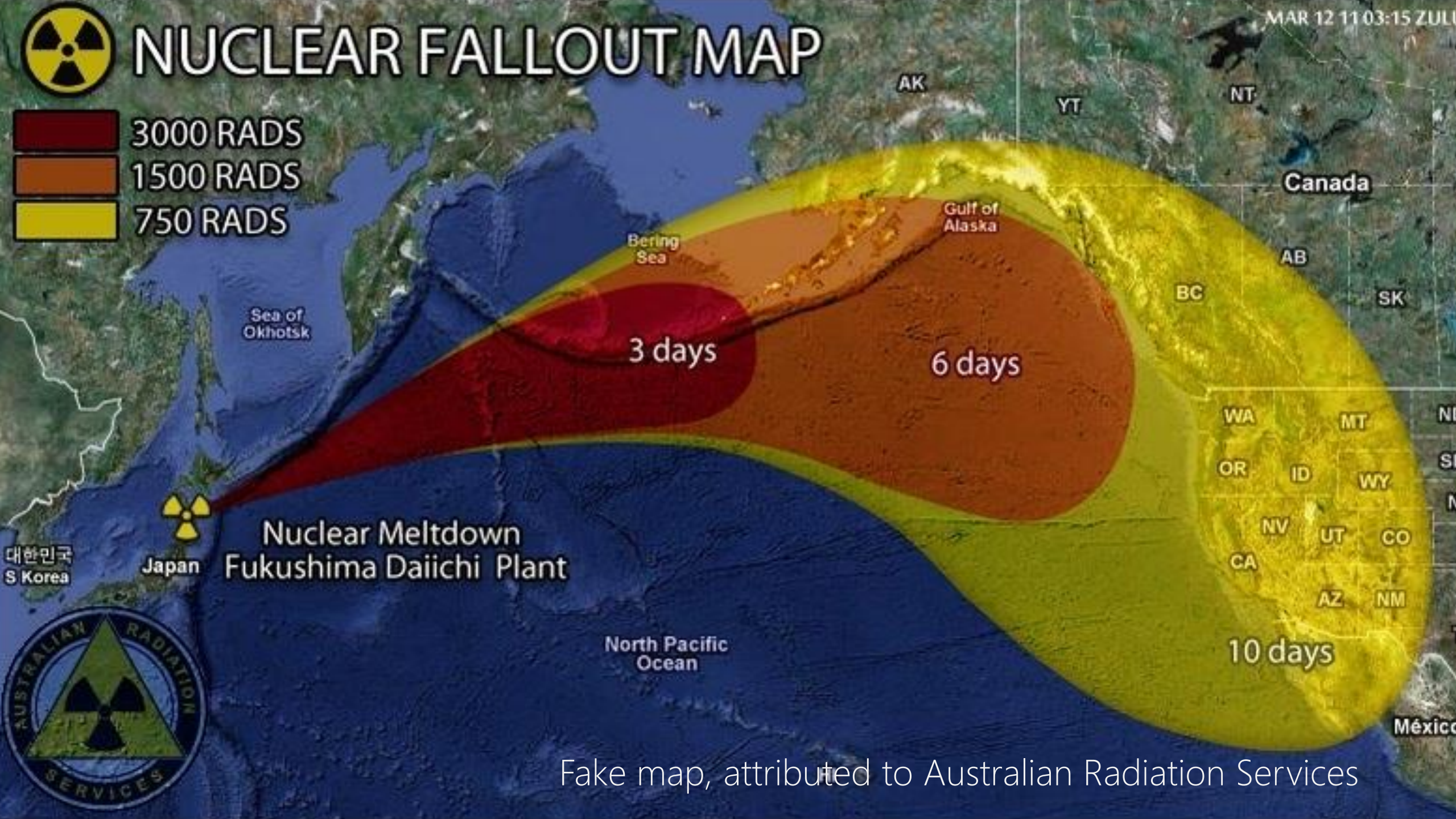
CNN



# NUCLEAR FALLOUT MAP

MAR 12 11:03:15 ZULU

-  3000 RADS
-  1500 RADS
-  750 RADS

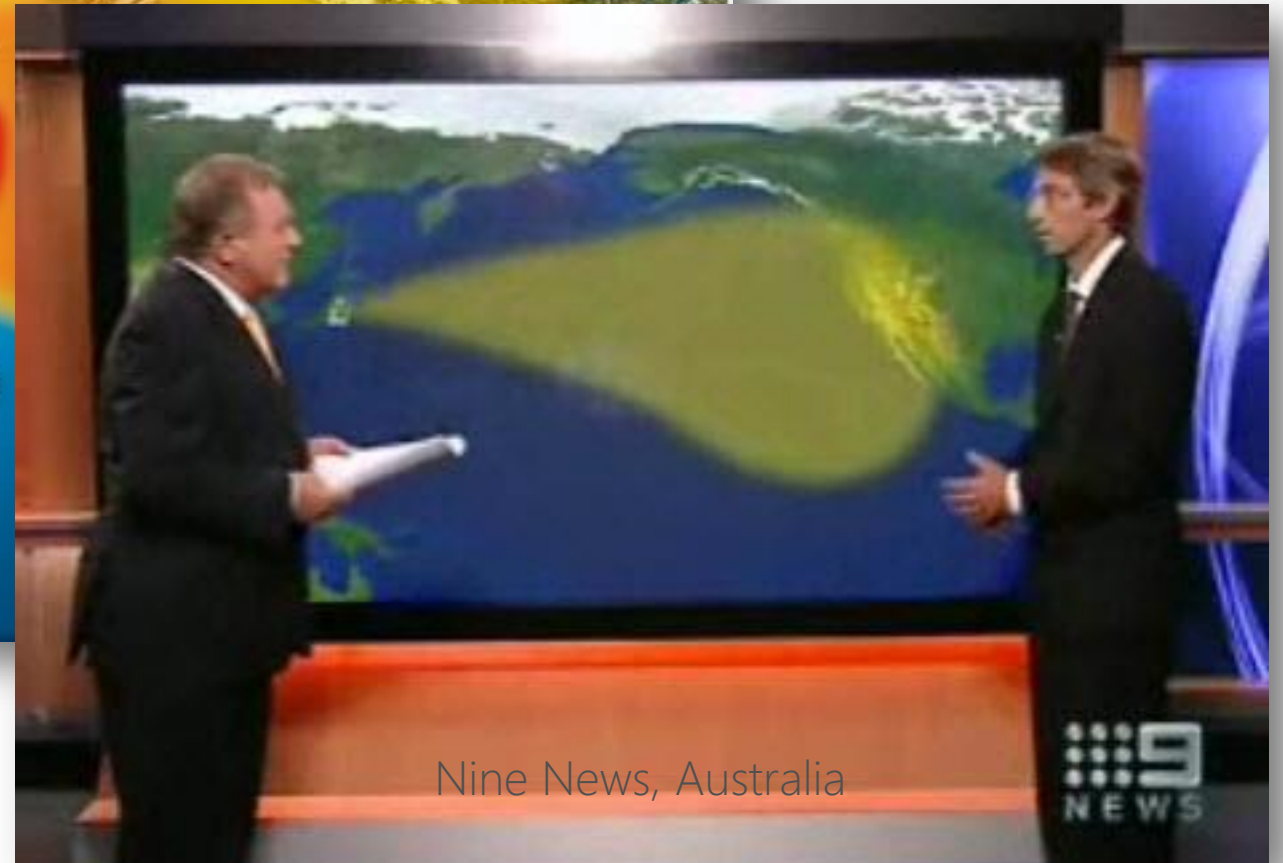


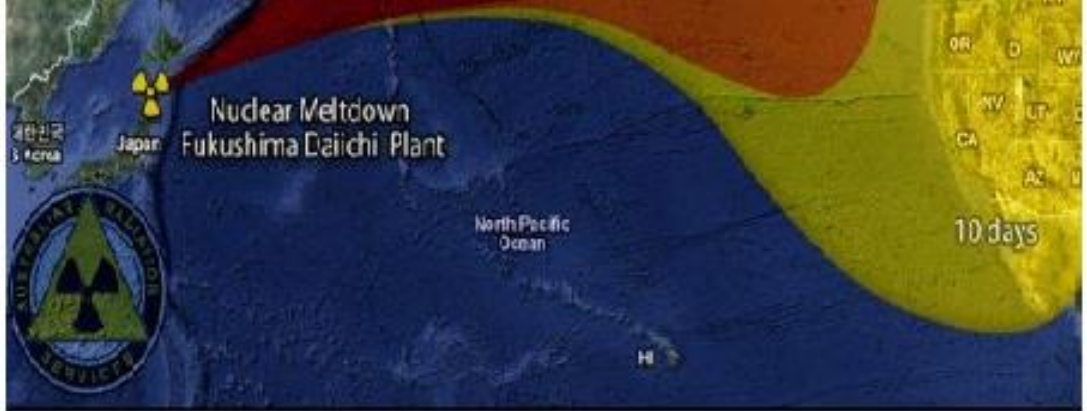
대한민국  
S Korea



Fake map, attributed to Australian Radiation Services







### Solutions to nuclear contamination spread from Japan:

Daily regime should include the following:

1. Shot of Organic Apple Cider Vinegar – helps to maintain optimal Alkalinity/Acidity balance in body
2. 1/2 teaspoon of Sodium Bicarbonate (Organic Baking Soda) – Cancer fighter, also protects Thyroid function
3. Seaweed/Kelp – Excellent natural sources of iodine (provides the body its optimal proportional levels, always preferable to supplements), also add Himalayan Salt to list – contains 78 trace minerals including iodine
4. Kale & Cilantro – excellent natural sources for chelation of heavy metal toxicity etc, also recommended Curcumin

Weekly regime should include the following:

1. Potassium Iodine (65 mg – 130 mg) – monitor body's response to levels added. 130 mg/week should be sufficient for those living in the Pacific Northwest coastal regions. but again, more supplemental boosting may be necessary as radiation fallout levels from Japan fluctuate/increase. A cautionary note, too much iodine taken into the body at once may trigger an over-abundance of free radicals – which it turn leads to Thyroid disfunction (Hyper/Hypothyroidism). Always best to get your iodine from a natural sources, mainly because the body can therefore process absorption proportionally/appropriately without the risk of tipping the scales & triggering more free radical action.

[Home](#) > [Press Centre](#) > [Press Releases](#) >[Greenpeace Response to Growing Troubles at Fukushima Nuclear Reactors](#)

# Greenpeace Response to Growing Troubles at Fukushima Nuclear Reactors

## Crisis at Fukushima I/Daiichi and Fukushima II/Daini Plants

Press release - March 13, 2011

**Tokyo, 13 March, 2011 – Reacting to ongoing reports of cooling problems and the continuing release of radioactive materials from the Fukushima I/Daiichi and Fukushima II/Daini Plants, Jan Beranek, Head of Greenpeace International’s Nuclear Campaign said:**

“Our thoughts remain with the Japanese people, who in the aftermath of the earthquake and tsunami are now faced with a dreadful situation, where instead of being able to plough all resources into rescue and relief efforts, the government is dealing with a crisis caused by the inherent and inescapable risks of nuclear power.”

“Despite government statements, the crisis at Fukushima continues to be a race against time, and is clearly not under control. We hope a worst-case scenario will be avoided, and that authorities continue to take urgent steps to protect to people against the irradiation, while contamination apparently continues to be released into the atmosphere.”

“Current reports suggest new emerging problems with the cooling of at least two reactors, units one and three, at Fukushima I-Daiichi, both of which apparently suffered some melting of the fuel rods, causing a release of radiation that has been detected outside. Unit three uses so-called MOX fuel that contains plutonium oxide and releases significantly more heat even after the reactor is shut. In

0

Like

28

Tweet

Email

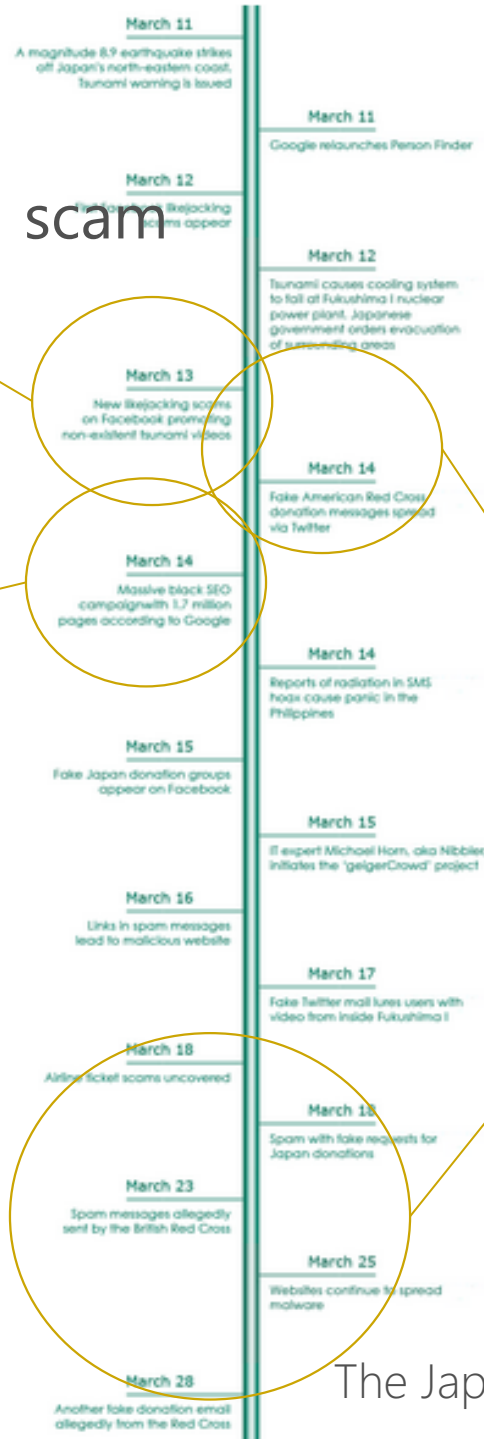
Share

0

+1

Pin it

# 3/13 – Tsunami Video lifejacking scam

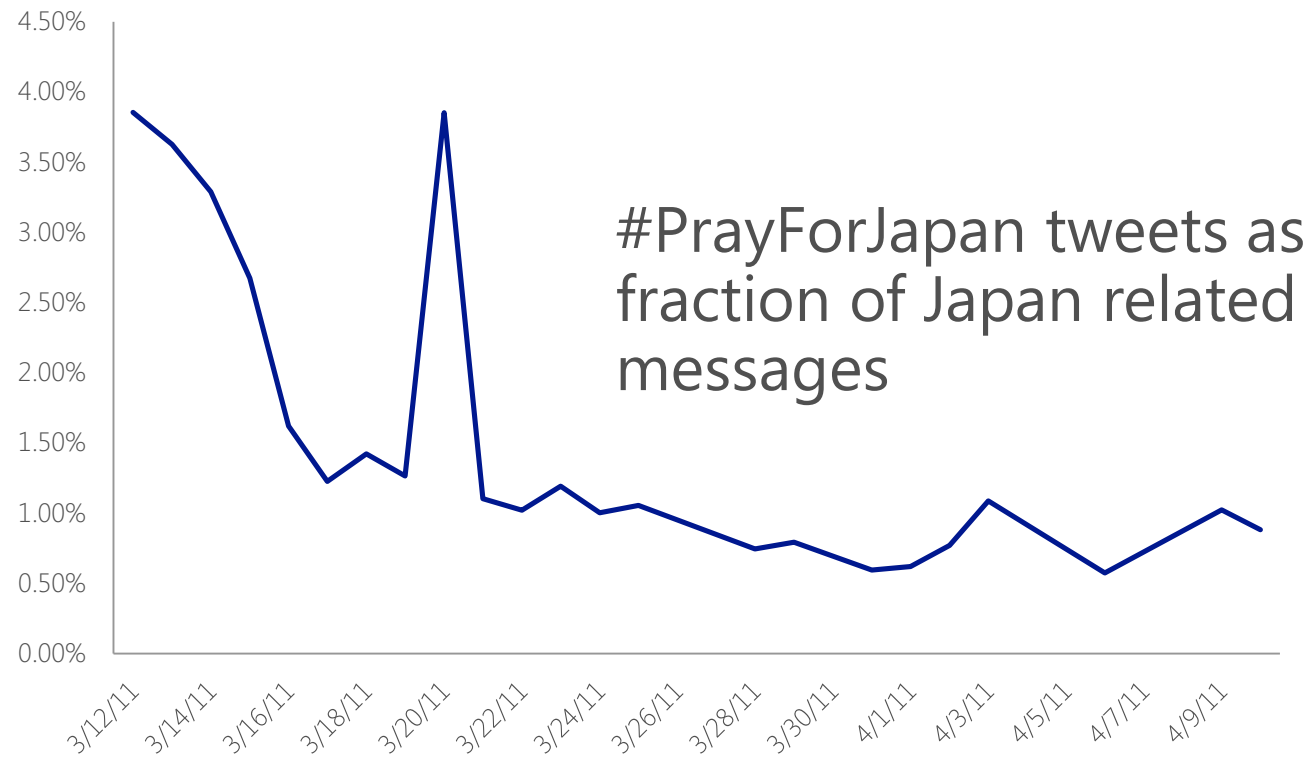


# 3/14 – 1.7M Pages SEO attack

# 3/14+ – Fake donation scams

The Japan crisis – an IT security timeline (SecureList)

# #PrayForJapan



PRAY FOR JAPAN.



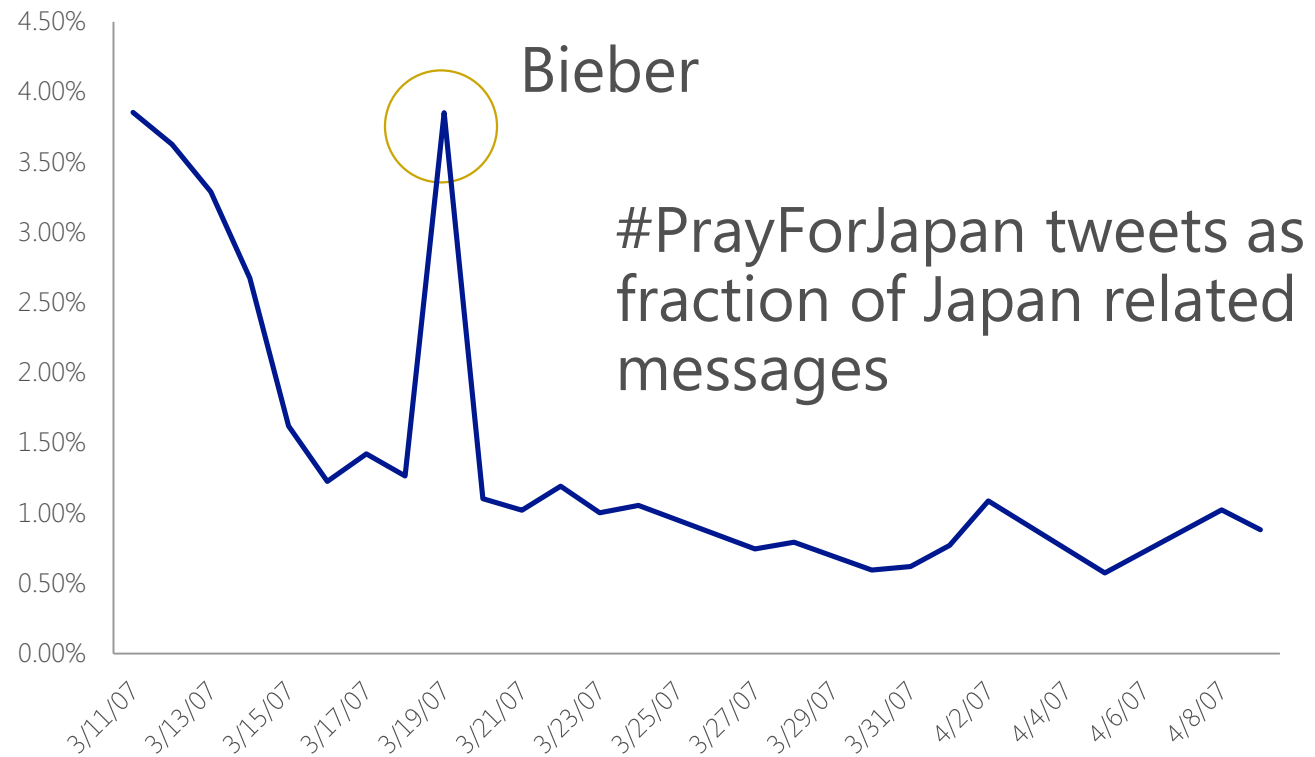
WE PRAY FOR JAPAN 🙏 日本の為に祈りを。🙏



日本の為に祈りを。 = WE PRAY FOR JAPAN



# #PrayForJapan





# Noise is Rare

but not everything is a  
signal for what you are  
measuring

See Webb & Weicke 1983 (Van Maanen, ed.)

# Ethics?

- Sensitive populations
  - Even if they weren't before
- Privacy
- Biased responses



# Solutions

(and a few more problems)

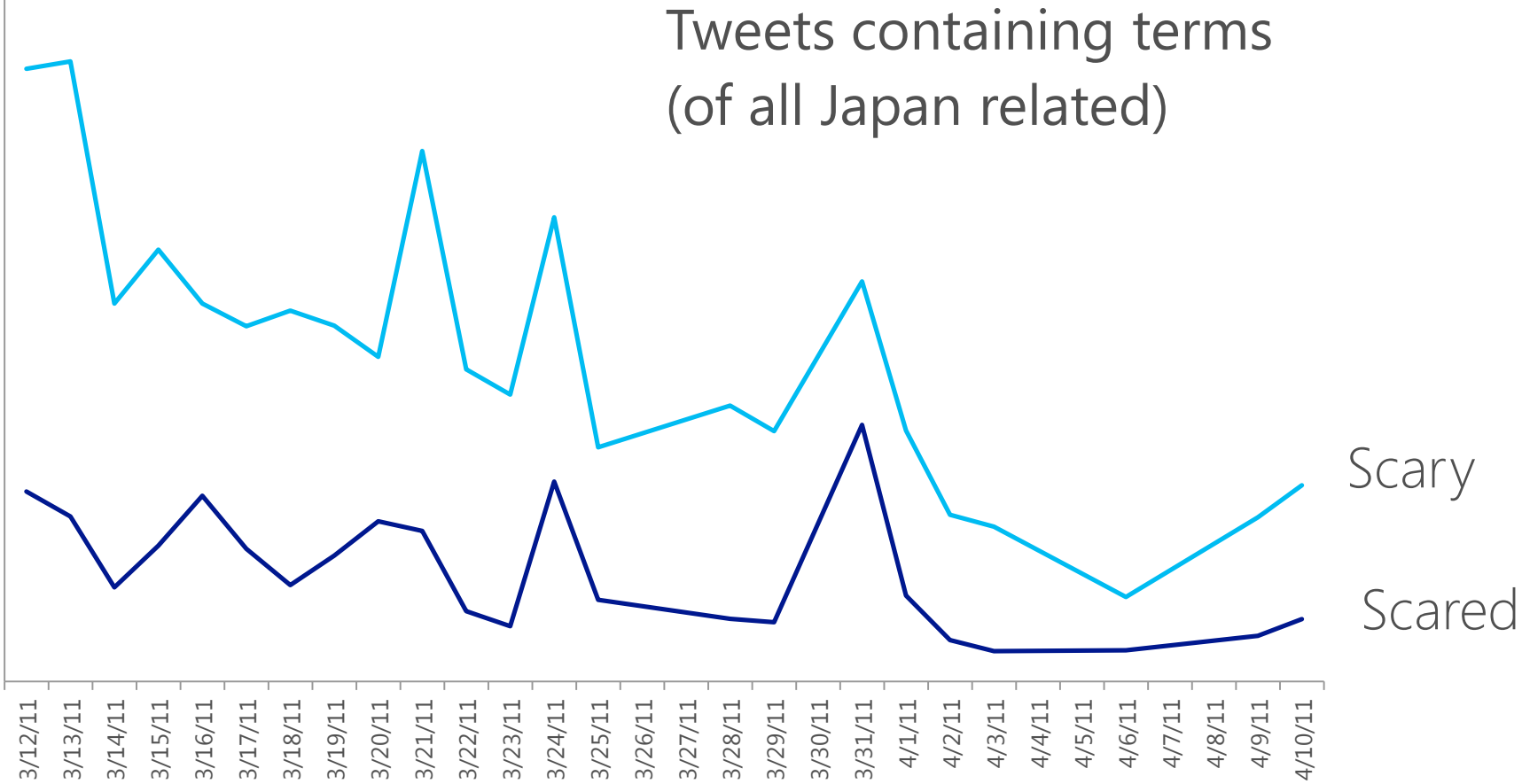


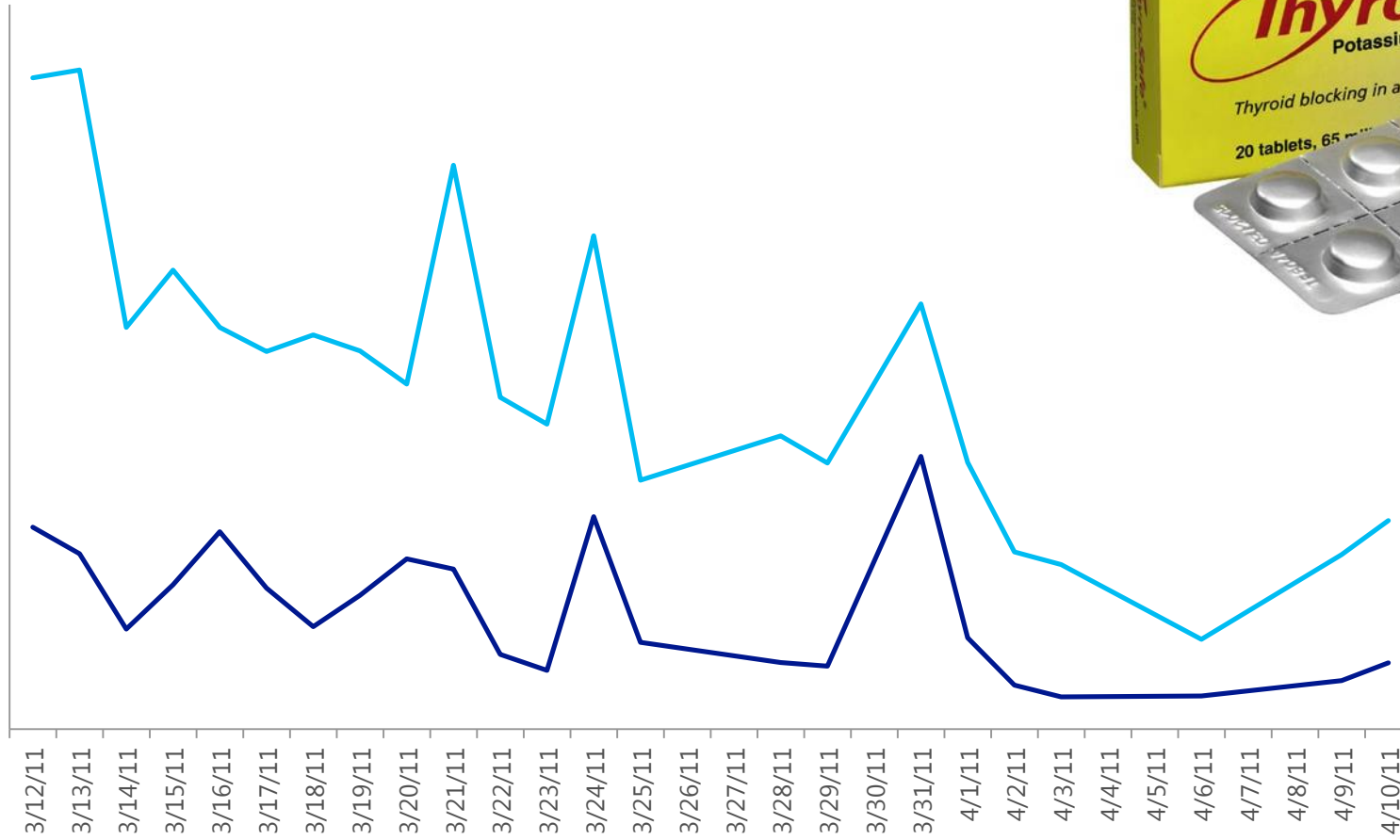
# Multiple of everything

- Multiple indices
- Multiple theories
- Multiple hypotheses
- Multiple instruments



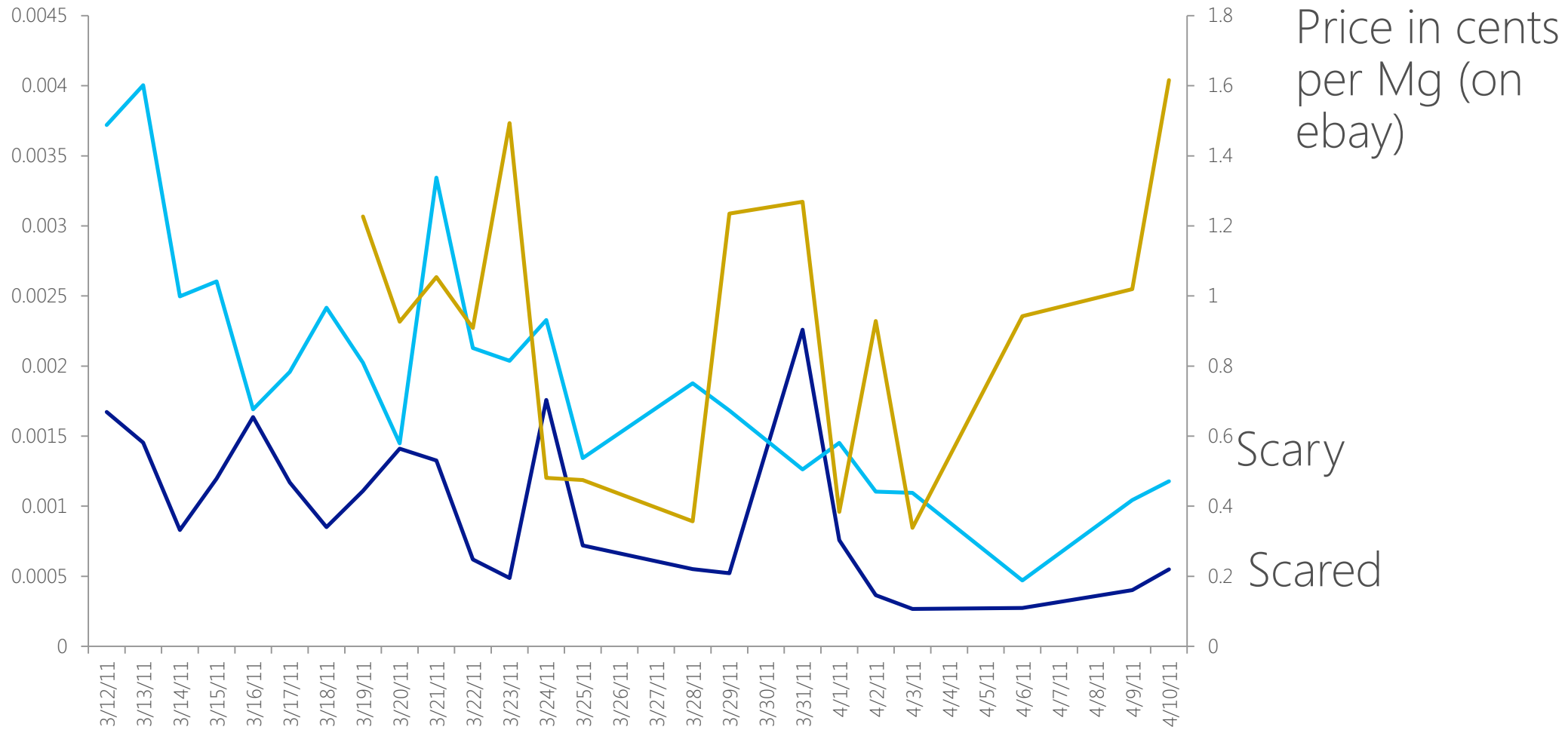
# Tweets containing terms (of all Japan related)





Scary

Scared



Top Stories: Tuesday  
April 12, 2011

How a Fukushima-Level Disaster Would Affect You In NYC, LA or Chicago

Russia's Surprisingly Sane Plan to Build a Floating Nuclear Power Plant

This Thorium Reactor Has the Power of a Norse God

Iran's New Uranium Production Facility: Because the Rest of the World...

How Far Can North Korea's Missiles Actually Reach?



JESUS DIAZ

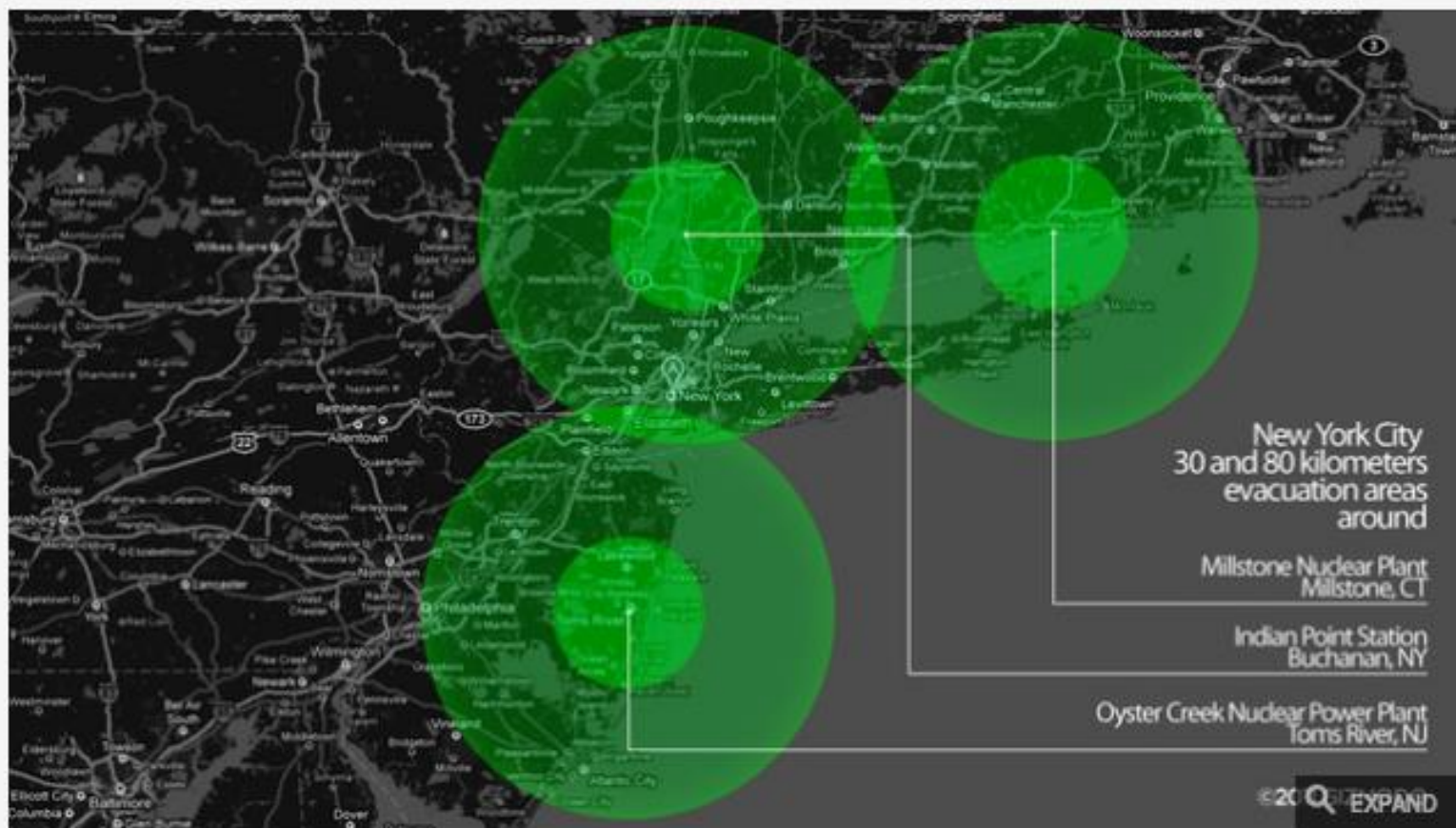
4/12/11 1:00pm

85,944 likes, 236 comments

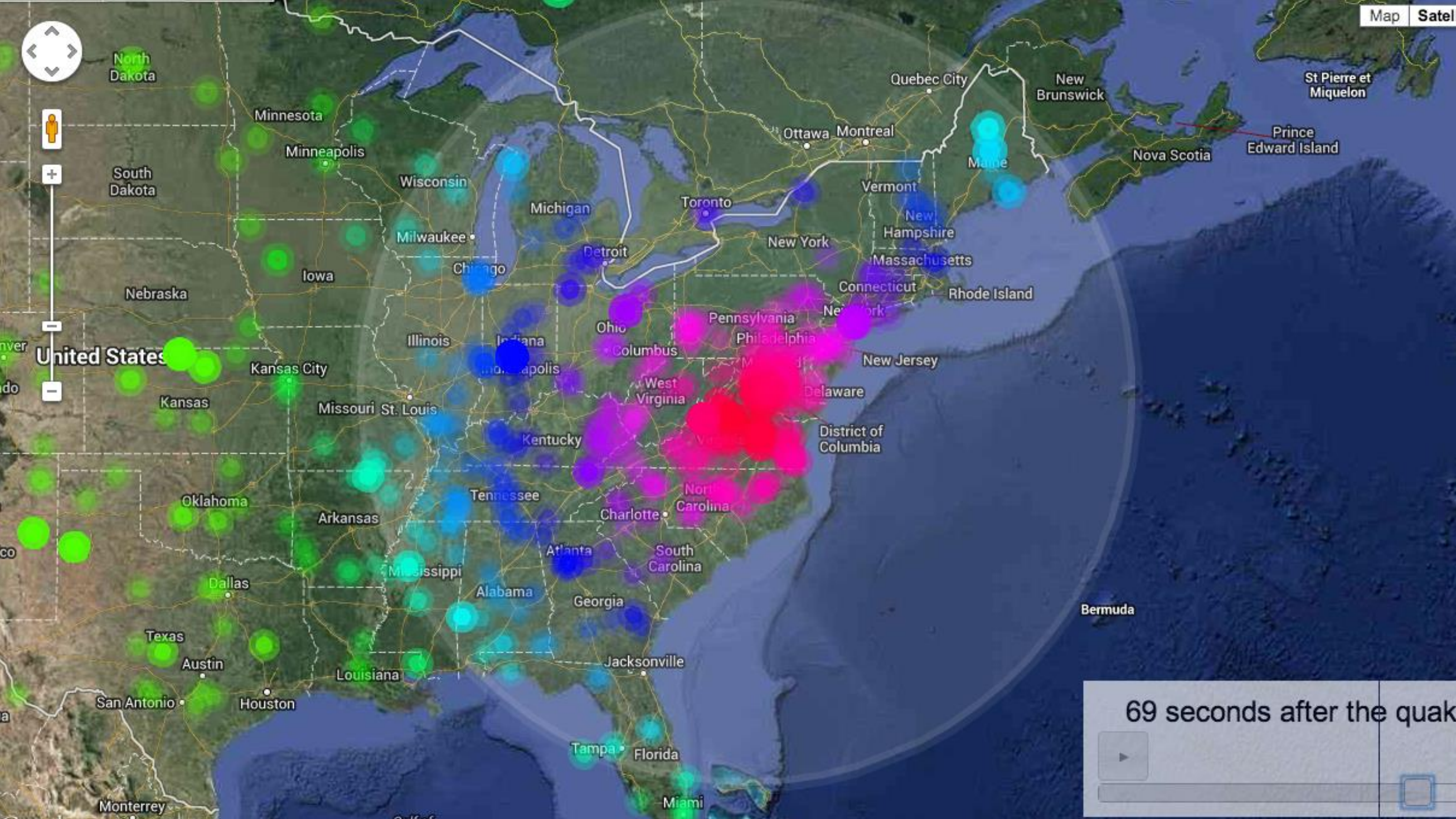
Like 0

NUCLEAR

## How a Fukushima-Level Disaster Would Affect You In New York, LA or Chicago







69 seconds after the quake

# Did You Feel It? — usb000ie5x

Sunday, July 14, 2013 at 20:54:28 UTC

PHILIPPINE ISLANDS REGION

ANN ARBOR ([Change Location](#))

OMB No. 1028-0048

Expires 05/31/2015

## Your situation when the earthquake occurred

Did you feel it :  Yes  No

If you were sleeping, did it wake you?

Physical Situation :

Select the option that best describes your physical situation during the earthquake.

Were you asleep :

Did others feel it :

Your best guess at what others nearby may have felt.

## Your experience of the earthquake

Shaking Strength :

How would you best describe the shaking?

Shaking Duration :

About how many seconds did the shaking last?

Your Reaction :

How would you best describe your reaction?

Your Response :

How did you respond during the shaking?

Stand or Walk :

Was it difficult to stand and/or walk?

## Earthquake Effects

Free-hanging objects :

Did you notice any swinging/swaying of doors or

## Was there any damage to the building?

Check all that apply.

No Damage

# Wishlist to support multiples

- Multiple acquisition systems
  - Data comes/goes quickly
- Multiple/better models
  - Explanatory and Predictive
  - Better explanatory models
  - Adapting/adaptable predictive schemes
- Knowledge/mining systems
  - Support different ways to slice and dice
- Multiple, integrated instruments



# To summarize...

- Non-reactive techniques are critical to understanding/action
  - But as part of a broader toolkit
- Need to leverage years of research on the topic
  - Signal and noise
  - Bias
- Also need to expand techniques to deal with today's data (scale & scope)



Thanks...

Eytan Adar

<http://www.cond.org>

[eadar@umich.edu](mailto:eadar@umich.edu)

