SAFECAST: Effective use of internet and social media in third-party environmental radiation monitoring after the Fukushima Dai-ichi NPP disaster.

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What is SAFECAST?

(a 3-minute video by independent filmmaker Adrian Storey)

http://vimeo.com/69002438

Organization:

- International, ad-hoc volunteer network

- Non-heirarchical (but with "centers of gravity")

- Includes radiation experts, hardware designers, software designers, academics, tinkerers, hackers, entrepreneurs, housewives, drivers, students, etc.

- "Brain Trust" : Leaders in their fields

Devices:

(Shown: bGeigie Nano)

- 7th-generation mobile detector

- Rugged

- Arduino-based

- GPS and data-logging

- 2" (5cm) pancake sensor

- OLED display

- Bluetooth and WiFi capable

- Open-source, open hardware, open data

- Designed to be sold as a kit, anyone can build it and upload data

Deployment:

Automobile

Bicycle

Hand-carry

Aerial drone
(under development)

Mapping:

- Focus on clarity and usability

- Visualizations allow overview as well as granular detailed view, with timestamps

- Not realtime yet, but frequently updated

- Online "Geosense" map (MIT Media Lab)

- iOS application (free)

- No copyright on anything! (Creative Commons CC0 license) Anyone can download the data, and we encourage independent efforts based on our dataset.
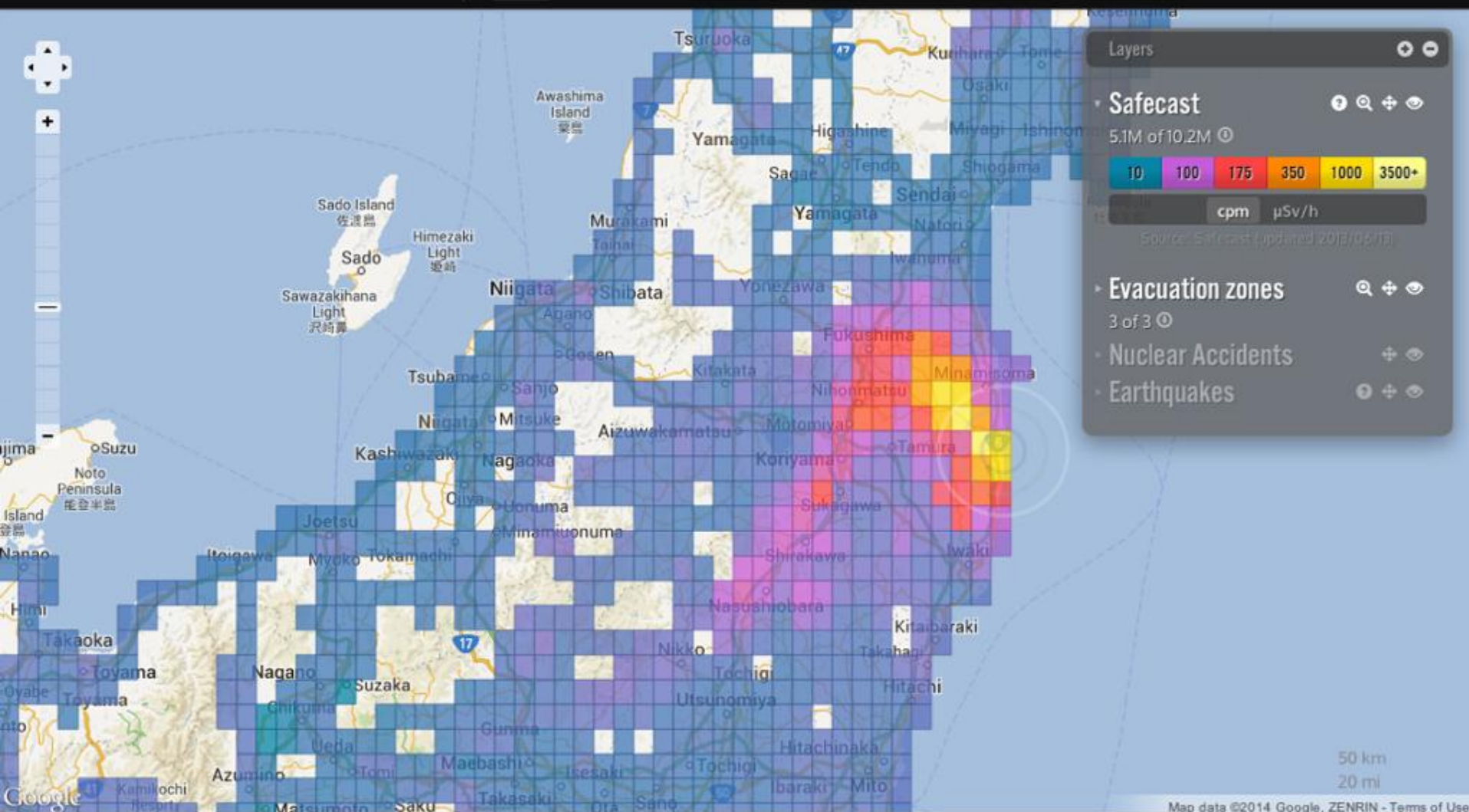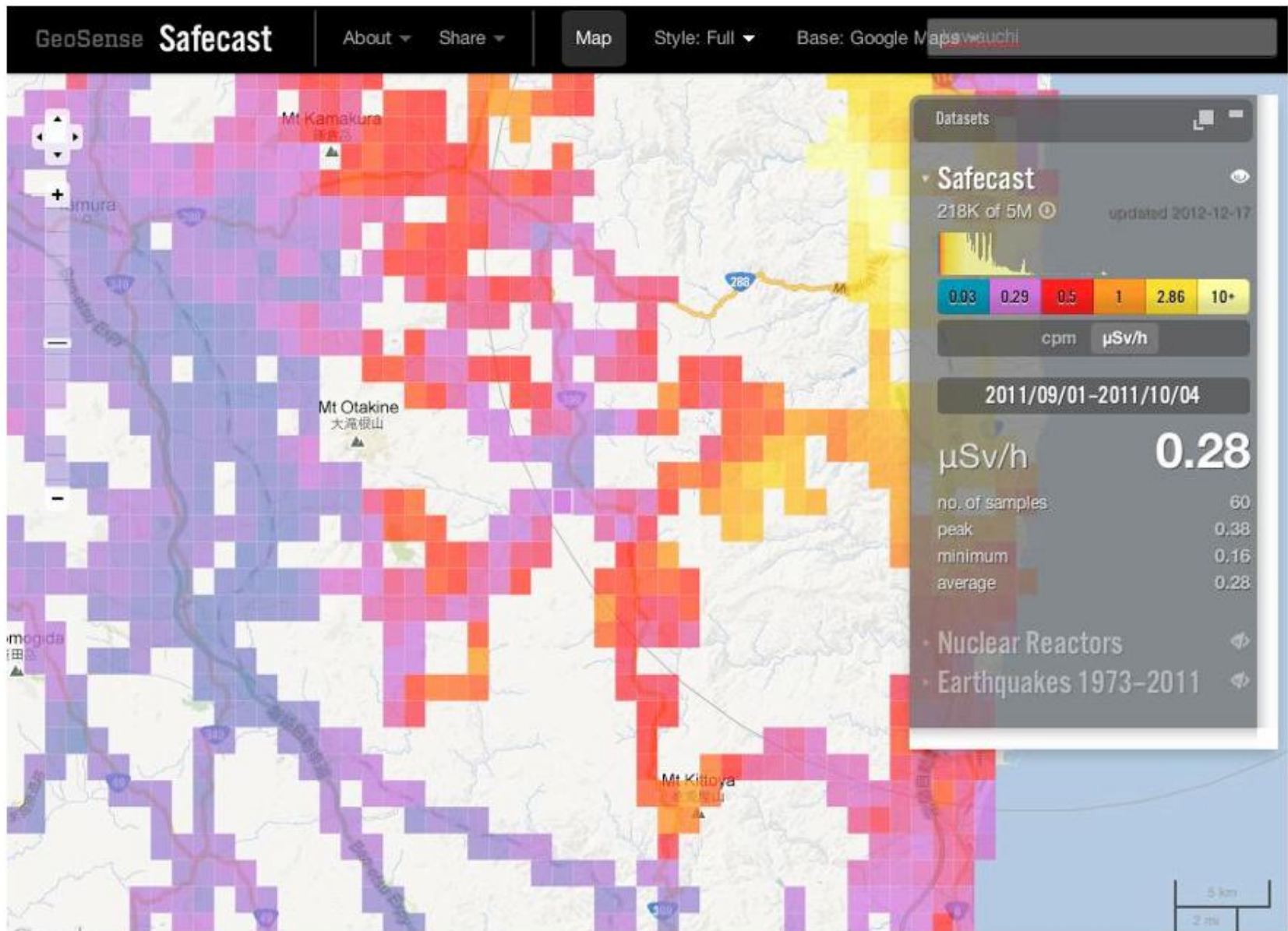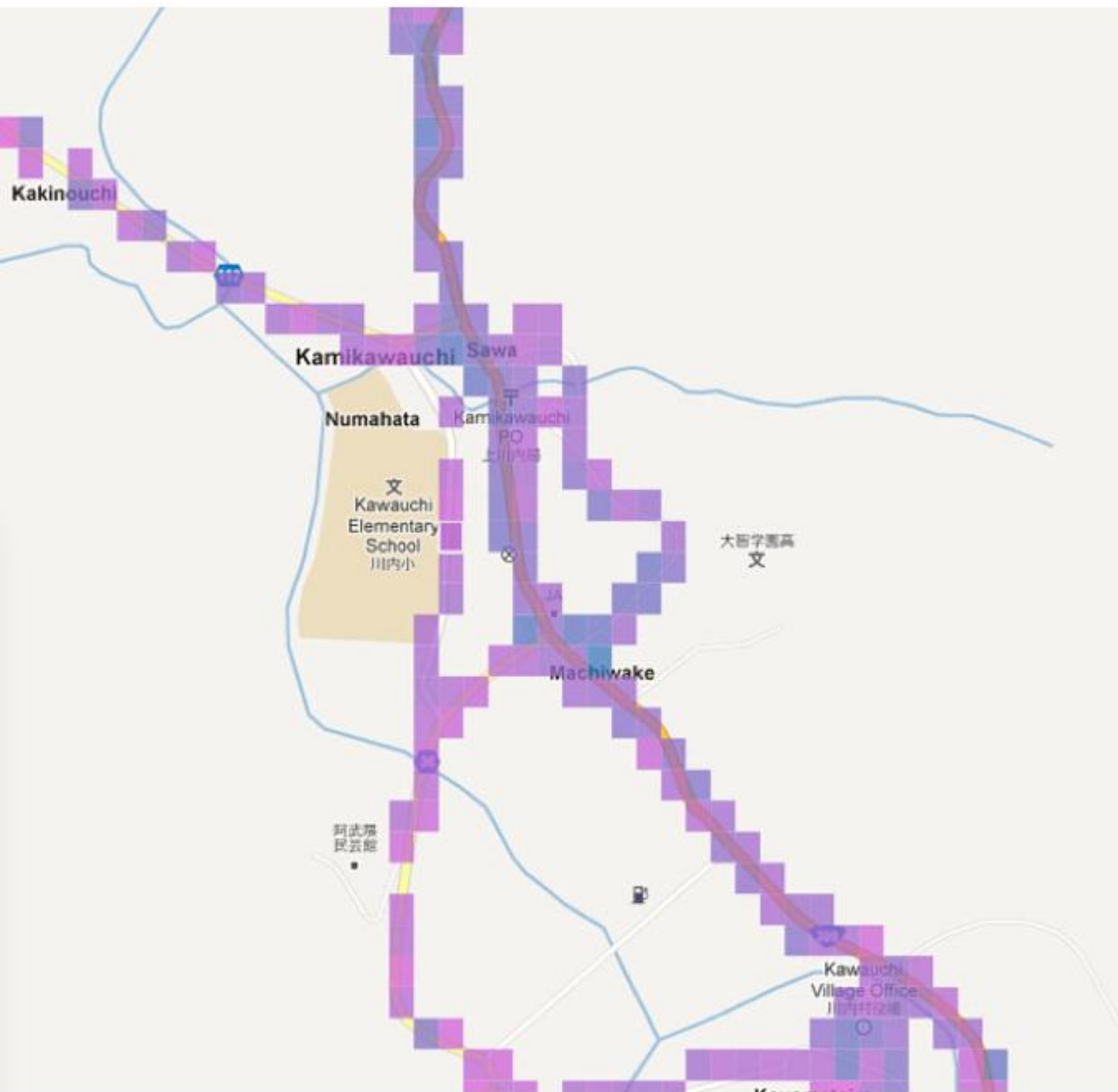
SAFECAST WEB GEOSENSE MAP

Done primarily by volunteers at MIT Media Lab. Provides intuitive overview, allows drilling down to detailed level. Covers Japan as well as other parts of the world.
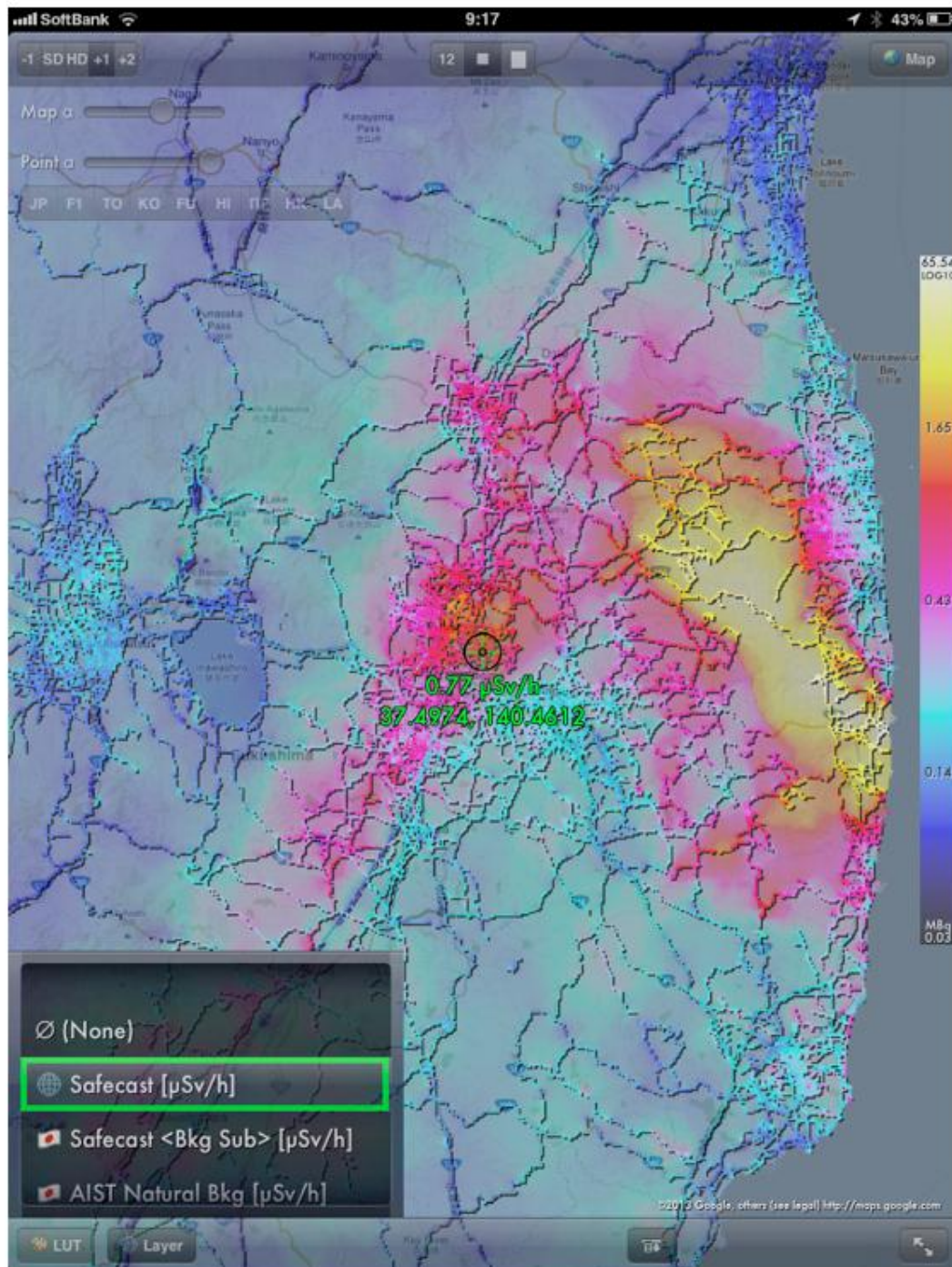http://blog.safecast.org/maps/

GEOSENSE : Continuous zoom allows a user to see the range of levels in a town at a single glance...

...or in more detail (Kawauchi Elem. School area)

Safecast iOS app:

- Free

- Full-featured

- Easy-to-use

- Customizable

- DOE, background, other data sets displayed as "layers"
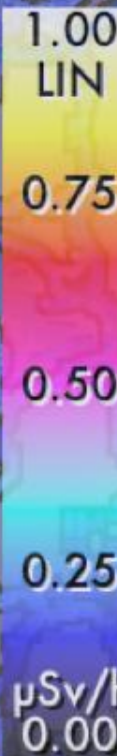
(Android version in development)

SAFECAST DATASET GROWTH:

Feb 2014:
Over 15,000,000 discrete locations

Safecast Street-by-Street

14:21

1.00
LIN

0.75

0.50

0.25

μSv/h
0.00

Shown: Koriyama

Info: Mem warning (66.7 MB)

Layer

Safecast Street-by-Street

The Street-by-Street program emerged from outreach by Japanese Safecast volunteers who live in Fukushima. Speaking to local government officials, they realized that many municipalities would like to provide more detailed contamination maps for their citizens, but were constrained from doing so by budgetary and regulatory decisions made at higher levels of government, and had neither the funds nor expertise to do it independently. Pro-bono lawyers helped us find a legal solution which allowed Safecast to offer the service for free with manpower provided by postal workers.

Our only condition was that all the data be made openly available through our database.

Safecast volunteers and Koriyama City officials

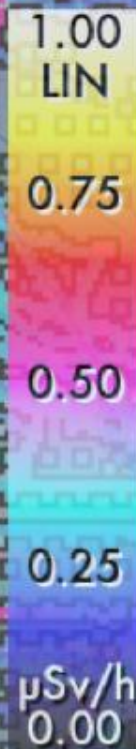Ten bGeigies were delivered to Koriyama City

They were mounted on postal delivery vehicles, which cover every street in town over the course of normal daily activity.
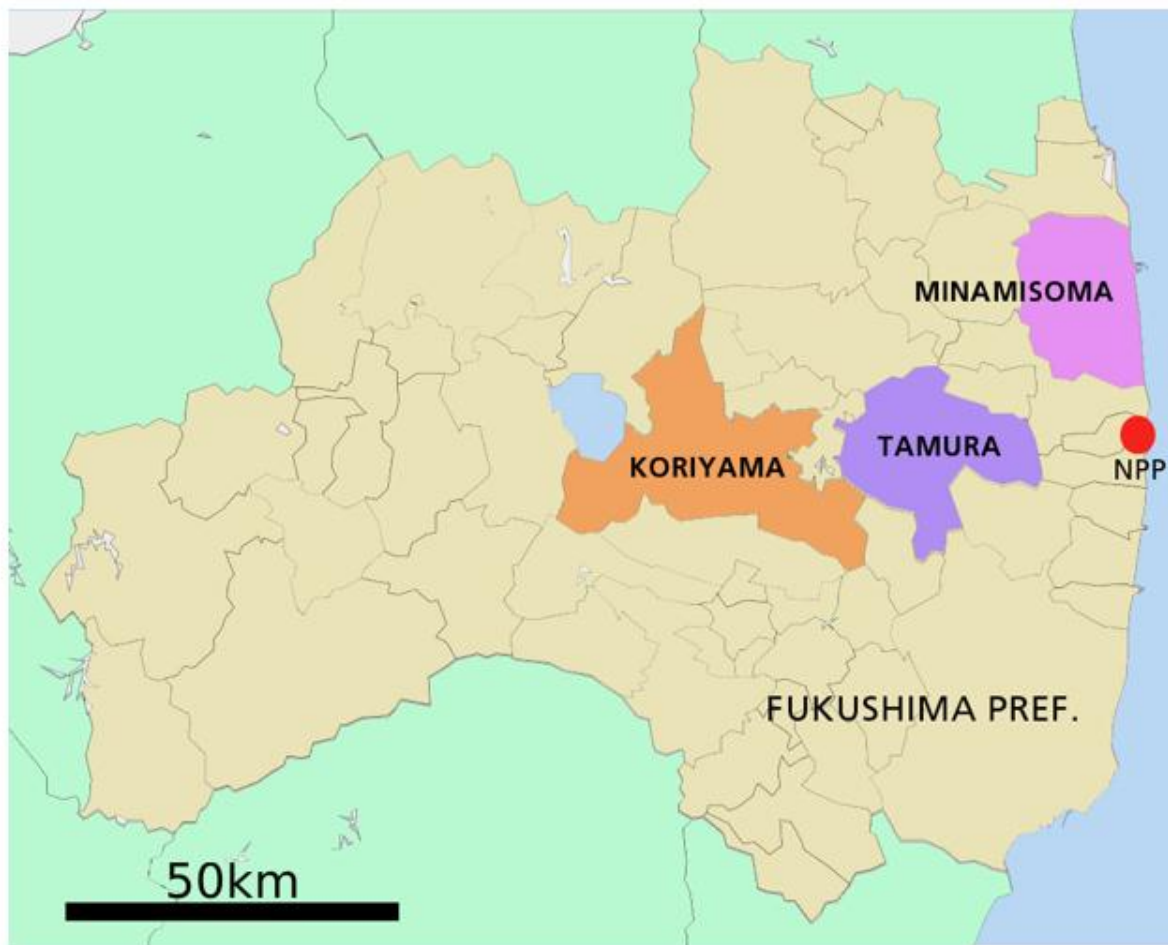
Safecast Street-by-Street

Shown: Koriyama detail - 100m grid

Info: Mem warning (66.7 MB)

1.00
LIN

0.75

0.50

0.25

μSv/h
0.00

Layer

This solution has proven very scalable, and quite inexpensive. To date the towns of Minamisoma, Tamura, and Koriyama have been surveyed through this program (a combined affected population of over 400,000 people). Safecast is confident that every municipality in Fukushima Pref. could be quickly measured in this way.
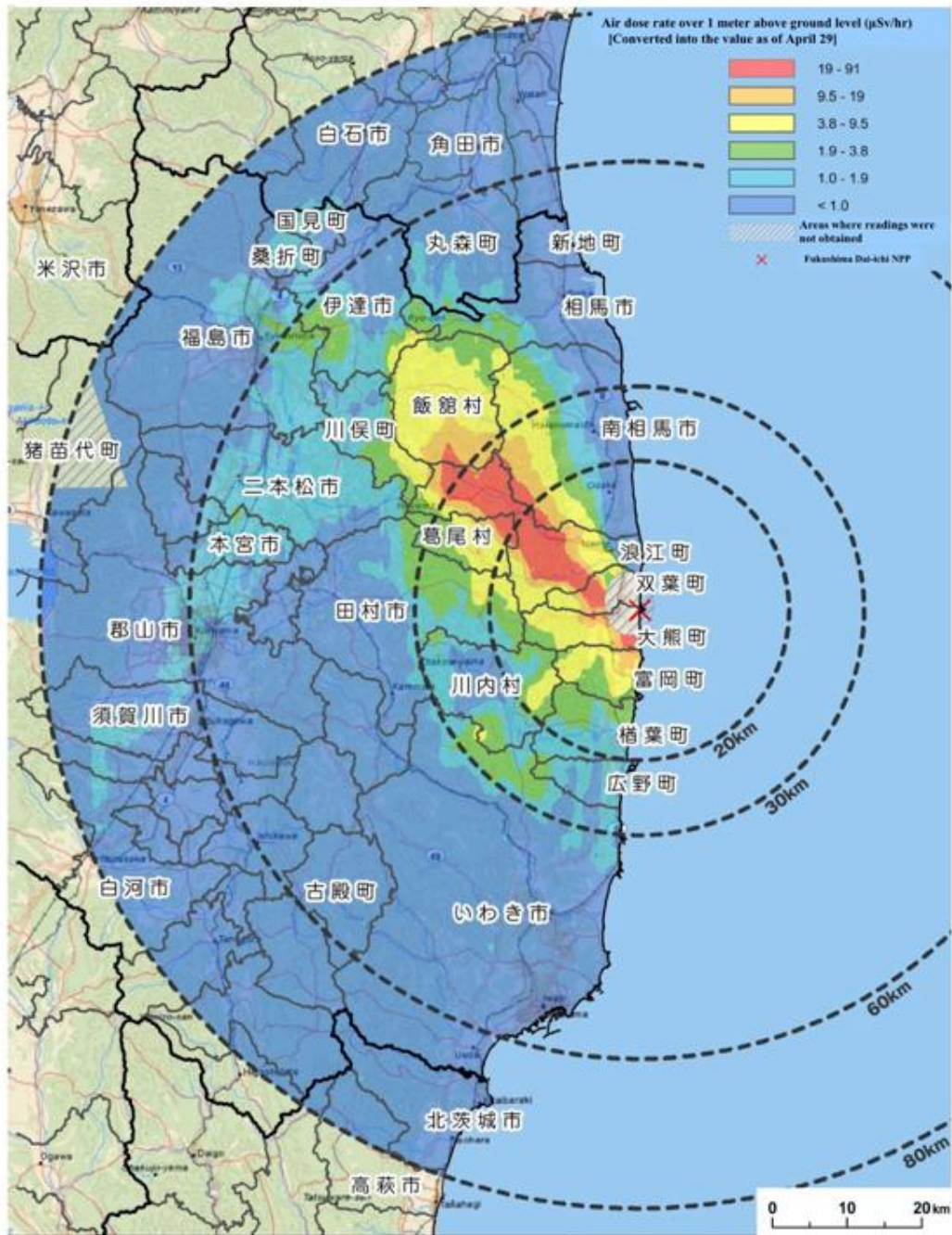
Coverage and ease-of-use

MEXT and other government agencies have publicized quite a lot of radiation risk data, and can probably be said to have exceeded IAEA and other advisory guidelines in terms of its quantity and accessibility. But in fact even almost 3 years later, many citizens are still confused about where to find data about radiation in their area, don't know how it is collected or how frequently, and find it frustrating to try to navigate the online information systems.

We believe the SAFECAST information system improves on official efforts in terms of coverage and ease-of-use.

Results of airborne monitoring by MEXT and DOE
（Readings of air dose monitoring inside 80km zone of Fukushima Dai-ichi NPP ）

Air dose rate over 1 meter above ground level (μSv/hr)
[Converted into the value as of April 29]

- 19 - 91
- 9.5 - 19
- 3.8 - 9.5
- 1.9 - 3.8
- 1.0 - 1.9
- < 1.0
- Areas where readings were not obtained
- × Fukushima Dai-ichi NPP

Official airborne monitoring maps provide an important general overview, but no detail.

MEXT- DOE airborne monitoring map, May 2011

The primary MEXT/NRA web-based radiation map asks users to first find their neighborhood monitoring post in a list of hundreds.

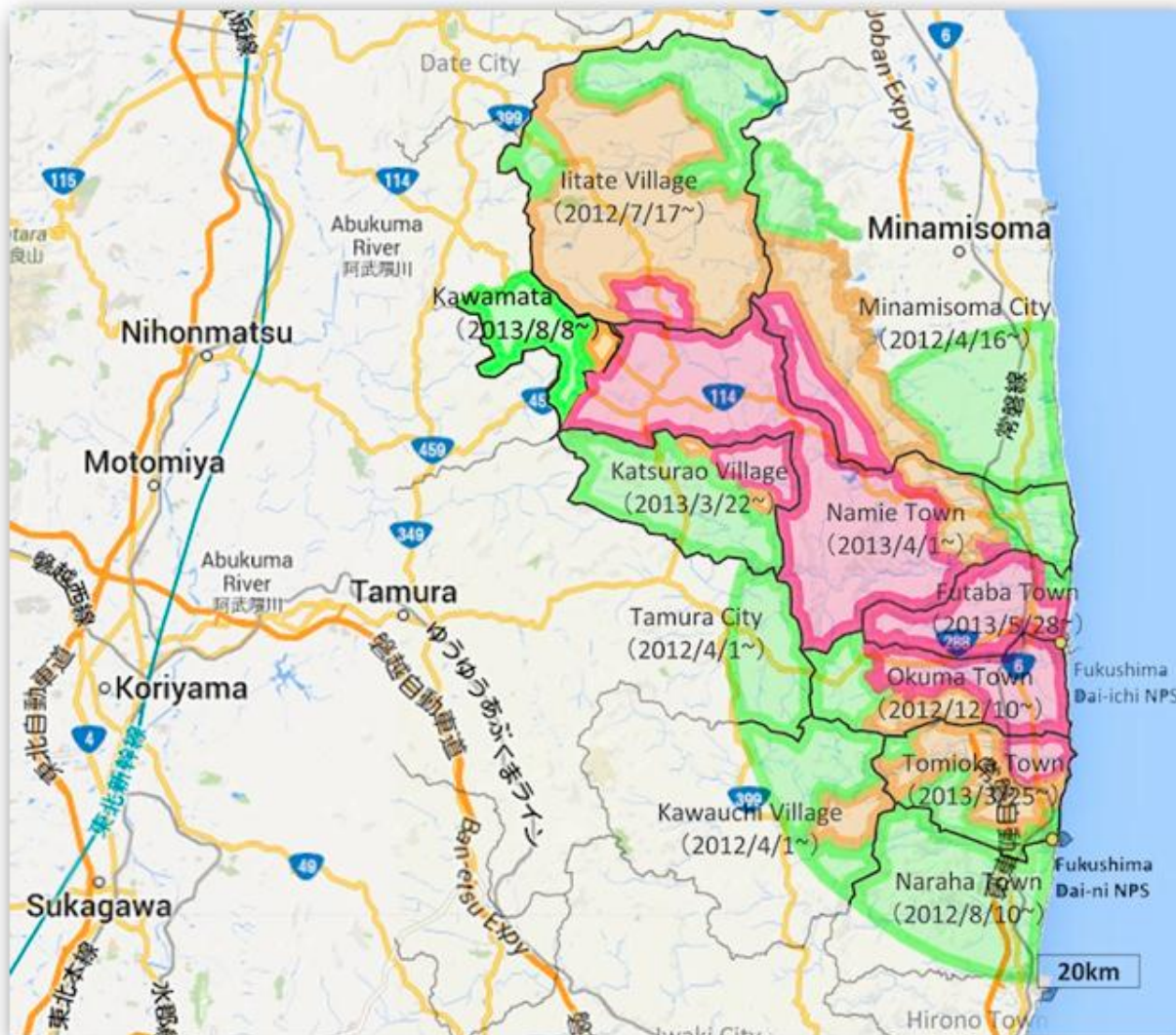At the level of individual towns and neighborhoods, official map detail is sparse.
(Koriyama: 7 data points visible for this neighborhood each representing a single monitoring post)
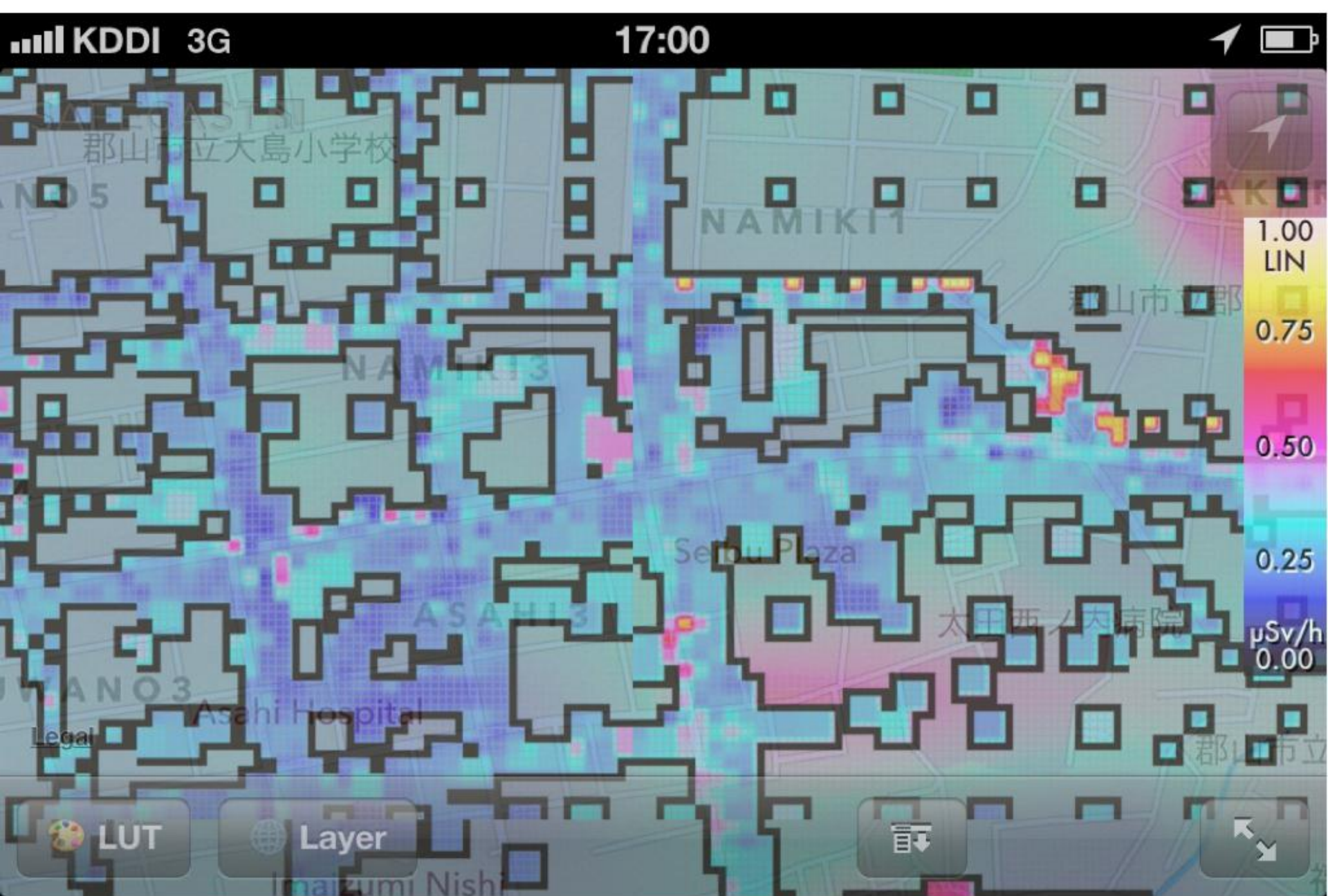
SAFECAST map of the same area: approx. 800 data points

SAFECAST also seeks to address gaps in coverage by providing free online access to maps like this one showing the boundaries of the evacuation zones in relation to roads. No similar map is yet officially available.

CONCLUSION:

This is a genie that won't go back in the bottle.

The rise of citizen science in the digitally-enabled DIY age is an irreversible phenomenon.

The experience of SAFECAST after Fukushima shows that new creative structural relationships between independent third-party groups and government are in fact possible, and can be the best way to serve the information needs of citizens.

CONCLUSION (cont'd):

This is a genie that won't go back in the bottle.

Innumerable groups and individuals worldwide are beginning to wield similar technical and information capabilities, seeking to influence public opinion and gain support for their positions.

Our experience leads us to suggest that the most productive official response will be to streamline the collection and distribution of data of concern to the public, improve transparency, and to formally acknowledge the important role third-parties can play.

SAFECAST

www.safecast.org