

A step forward for citizen-led measurements of radioactivity?

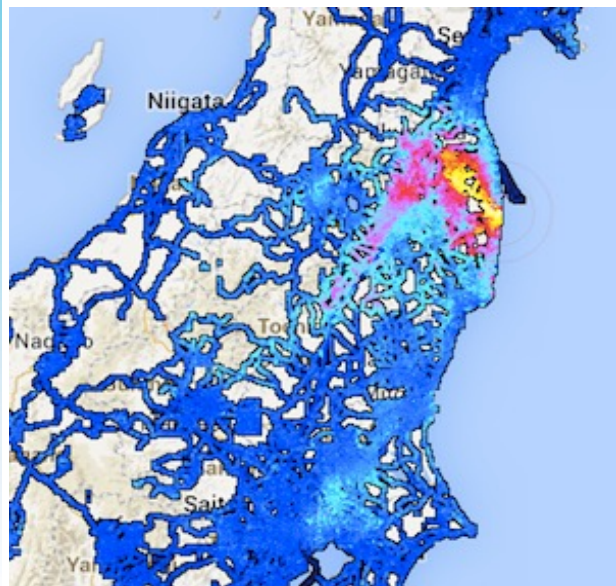
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The origins of radioactivity measurements by citizen

- Radioactivity measurements by citizen were first tested in settlements close to the exclusion zone to promote a practical radiation protection culture (CEPN report # 286)
- A “revival” of citizen measurements after the Fukushima accident due to a lack of confidence in authorities



© CEPN, 2005



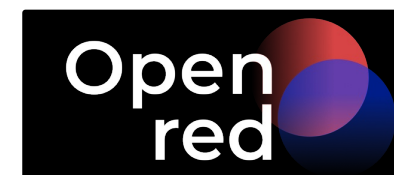
Safecast 2012

- New tools emerged: interactive mapping and social media communication, favouring rise-up of these initiatives and resulting in a large sharing of results
- Main drivers: loss of confidence in authorities and wish to understand the prevailing situation.
- In such a context, citizen measurement of radioactivity appears as a tool for adversarial debates between the population and experts.
- However, main aims remain 1- enabling everyone to assess its own risks and 2- Providing real time data from the field.

Current situation in Europe

- Four existing networks in Europe: CzechRad (2015), OpenRadiation (France, 2017), TDRM (Germany, 2019), and OpenRed (Spain, 2023), in addition to the Safecast international network (Japan, 2012).
- Except for TDRM, all other networks have numerous similarities: general organization, detection method, result mapping, activities and communication, etc...
- And they face the same challenges:
 - Absence of radiological issue in normal situation apart from naturally occurring radionuclides and legacy sites
 - Difficulties in maintaining interest of the public
 - Educational activities are the main supporting activity of these networks
 - Limited possibilities of funding
 - But need to be ready in case of nuclear or radiological emergency

How to make these network sustainable?



A seminar at the European level

- First motivation: making all the European citizen networks gathering and exchanging
- Second motivation: making European Commission and several nuclear safety authorities aware of these networks
- And making all these people discussing together
- Two main topics:
 - Discussing ways to support the long-term sustainability of citizen networks of radioactivity measurements
 - Discussing ways to integrate citizen data into decision making-process

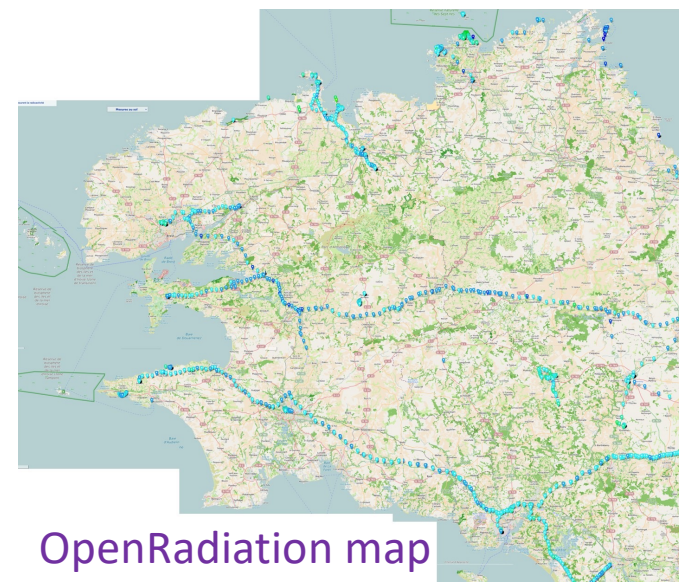
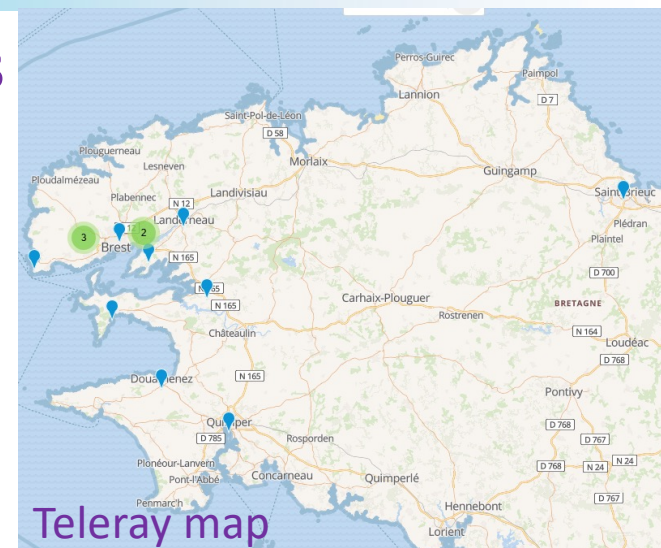


Findings and proposals: sustainability

- Sustainability must be considered at multiple levels: citizen engagement, data quality and preservation and project continuation
- Maintaining engagement and interest is made through various mechanisms: gamification, community building, communication. In communication, need to insist on the usefulness of these citizen data.
- Measurement data are collected and stored in various ways, with different protocols and associated metadata. The independence of each of these network is essential, but coordination between them is also essential, especially when considering that national radiation protection authorities ask for robust frameworks and validated protocols.
- **Main proposal:** creation of a working group within the European Citizen Science Association (ECSA) for coordination, harmonization and information exchanges purposes.

Findings and proposals: links with policy makers

- The complementarity between citizen data and surveillance network data is fully recognised by decision-makers
 - Availability of large datasets
 - A different distribution of measurement results: living places vs. nuclear plants
 - May capture local situations possibly overlooked by expert networks.
- Therefore, citizen participation brings legitimacy and knowledge to the policy-making table.
- Thus, regulators should be prepared to integrate citizen input, either for environmental monitoring or in emergency.
- **Main proposal:** Strengthen and promote an inclusive dialogue between citizen networks, experts and decision-makers, a necessary condition to reach consensus.

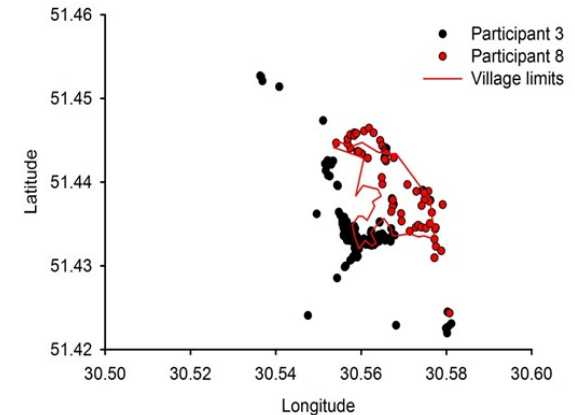


So what? Constraints on Citizen measurements

- Radiation measurements inherently carry a political dimension, tied to health and environmental concerns
- As a result, debates about the quality of citizen measurements are permanent, rooted in several criticisms: measurement quality, reporting quality.
- However, due to this legitimacy of citizen-led measurements, this induce a collective responsibility by citizen to earn credibility through:
 - Quality measurement tools and protocols
 - Adaptability in data collection and use
 - Careful communication and framing to limit risks of misinformation and fake news
 - Coordination and integration

The landscape is progressively changing...

- Some scientific studies already included citizen measurement data:
 - TERRITORIES: citizen measurements at the edge of the Chernobyl exclusion zone (2017-2019)
 - COSMIC ON AIR: citizen measurements in airplane to hunt solar flares (since 2017)
 - A more recent study is attempting at working on the radiological exposome using citizen data: The CORALE study within the CONSTANCE cohort
 - And some of these new studies are funded by the European Commission
- The integration of citizen data into scientific studies is also a way to sustain these citizen networks and to demonstrate their usefulness.



How to apply these recommendations?

- The Fukushima accident demonstrated that regulators and decision-makers can no longer dismiss citizen data. How to cope with that?



- Citizen must accept that their measurements and reports must improve in quality. On the other hand, decision makers and experts must accept to use citizen data in their expertise and decision. Need for exchanges
- Orion project (Euramet funded) will enhance cooperation between citizen, experts and decision-makers and will provide recommendations to both sides

- Decision-makers and scientists must be prepared to use these citizen-led results despite their inherent uncertainties. An ongoing European project, CITHARA, dedicated to the development of automated, AI-based tools to make citizen data useful for decision maker



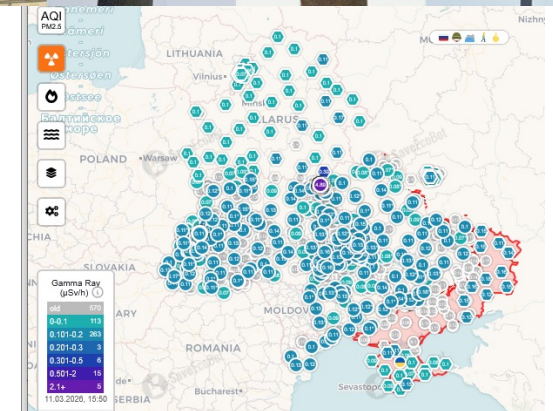
- And the planned ECSA WG to coordinate actions from citizen networks.

A success story: SaveEcoBot

- In a difficult situation, SaveDnipro developed autonomous radiation sensors
- Based on the Safecast b-Geigy detector
- Distributed across the country
- Provides a real-time map for ambient dose rate

The first citizen-led monitoring network certified

“(the authorities) understand that our Radnote network is providing crucial surge capacity and enhancing the resiliency of radiation monitoring in wartime Ukraine, meanwhile establishing a new paradigm for citizen participation in emergency response.”



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