

OpenRadiation: a collaborative project for radioactivity measurements in the environment by the public



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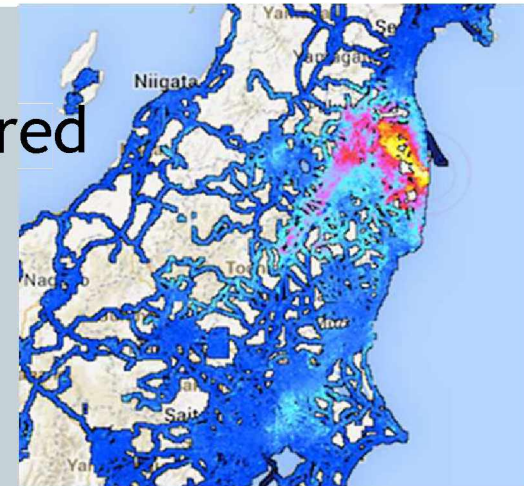
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IRPA 15

Topic 2 "Dosimetry and Measurement of radiation dose - Occupational and Environmental monitoring and modelling"

Context

- After the Fukushima accident, dosimetric applications dedicated to the public appeared to realise geo-localised measurements of radioactivity in the environment
- In April 2013, after testing the existing applications, IRSN with partners decided to develop a dosimetry application and a website

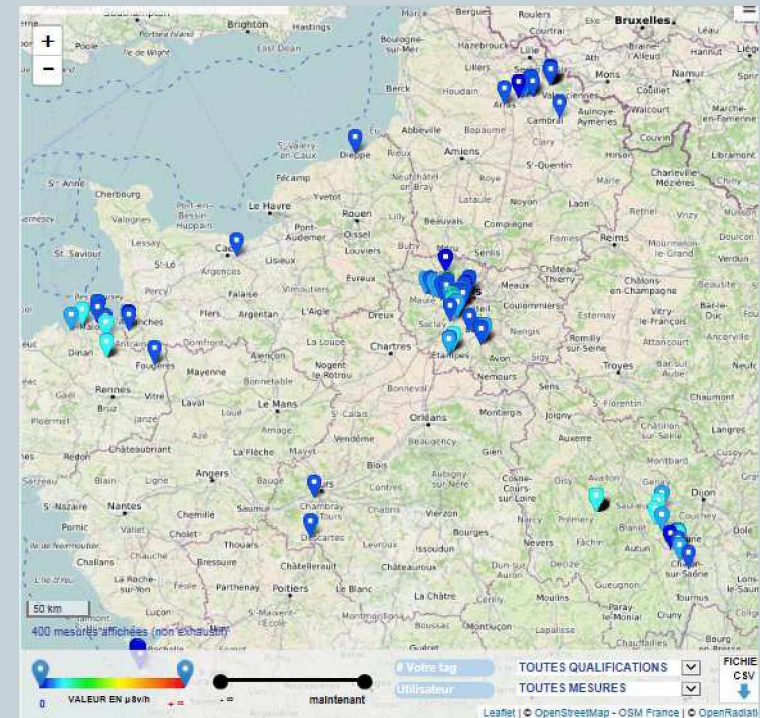


From Safecast

➡ **Citizen science project** to bring to life in a normal situation and useful in emergency situation with the objective of putting the **measurer and measurement at the center** of the project (*specific functionalities, ergonomics, measurement quality, etc.*)

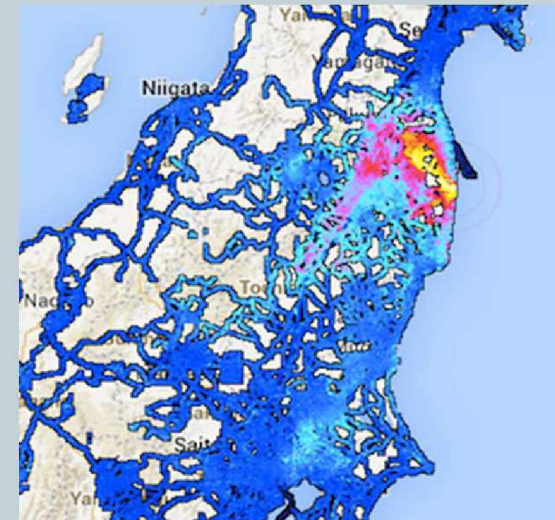
What interest in “normal” situation?

- Give the opportunity to the public to get to grips with radioactivity measurements in the frame of a collaborative project
- Use such a project for pedagogical and E&T purposes for students, high school students...
- Get data robust enough in complement to the radioactive background reference values
- Contribute to the watch function by detecting unusual situations



What interest for emergency situations?

- Get data in “real time” contributing to the management of emergency situations (*decision making, in complement to classical measurements and dispersion models...*)
- Anticipate the collection of data coming from the public as well as their treatment and use
- Provide an opportunity to the public to contribute to the crisis management by providing data



From Safecast

What are the challenges?



Operate the system on a sustainable basis in peaceful time and useful in case of emergency situations

“Normal” situation

- Set up sustainable system used by the public
- Get data robust enough to be used for scientific purposes
- Manage alerts in case of abnormal measurements
- Operate a collaborative website

Emergency situation

- Get data robust enough to contribute to the management of emergency situations (*decision making...*)
- Communicate with the public
- Operate the website in “crisis” mode

An open partnership



Associations, academic partnerships, public representative



*Institute for Radiological
Protection and Nuclear Safety*



*Association involved in
citizen science for young
people*



*Fab Lab of
Sorbonne University*



*Association involved in
E&T for crisis management*



*National Association
of Local Committees
for Information*

...to be enlarge in the future

The *OpenRadiation* project



A collaborative project open source & open data to measure the radioactivity in the environment using connected dosimetric applications on smartphones

A website

- Collect and centralise data from various systems/dosimeters
- Provide dose rate maps with raw and “filtered” data
- Create dedicated areas for projects and information exchange

A dosimetric application

- Use a connected dosimeter using Bluetooth or USB (GM...)
- Develop a smartphone application to collect and transmit data

The website: www.openradiation.org

...available since
October 2017

open radiation

Les citoyens mesurent la radioactivité

LE PROJET

LA CARTE DES MESURES

TOUT SAVOIR

LA COMMUNAUTÉ

LES MISSIONS

Inscrivez-vous, pour comprendre et participer à l'open data de la radioactivité.

S'INSCRIRE

Nom d'utilisateur

Mot de passe

SE CONNECTER

Mot de passe oublié ?

SE PROCURER UN CAPTEUR

TÉLÉCHARGER L'APPLICATION

NEWS

13/10/2017 La Fête de la Science continue...

05/10/2017 Science en Direct

04/10/2017 C'est la Fête à la Cité des Sciences !

23/08/2017 OpenRadiation... bientôt accessible !

50 km

400 mesures affichées (non exhaustives)

VALEUR EN $\mu\text{Sv/h}$

maintenant

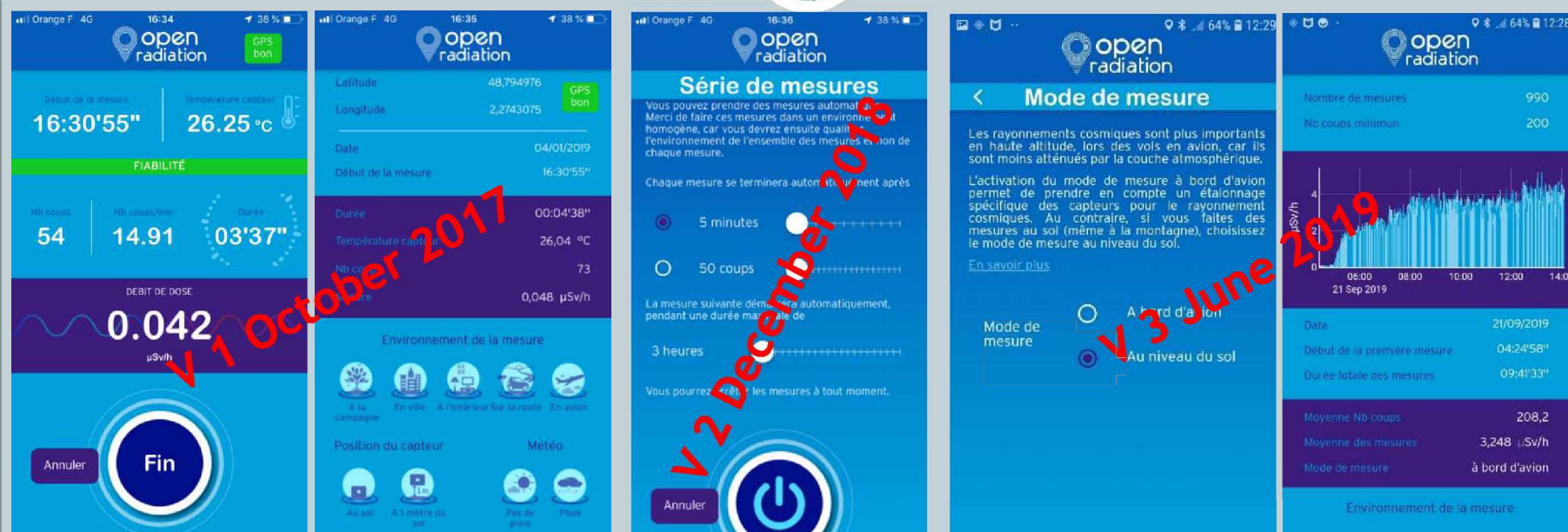
TOUTES QUALIFICATIONS

TOUTES MESURES

FICHER CSV

Leaflet | OpenStreetMap - OSM France | OpenRadiation

The smartphone application



Measurement

Meta data

Mode
"series of
measurements"

Mode
"ground and
aircraft"

Available dosimeters with the *OpenRadiation* App

- “Kit” *OpenRadiation* (GM, Bluetooth) 



- Safecast (GM, Bluetooth) 



- Pocket Geiger type 6 (photodiode, USB) 



- Atom tag (GM, Bluetooth) 



- Polismart 2 (GM, Bluetooth) 

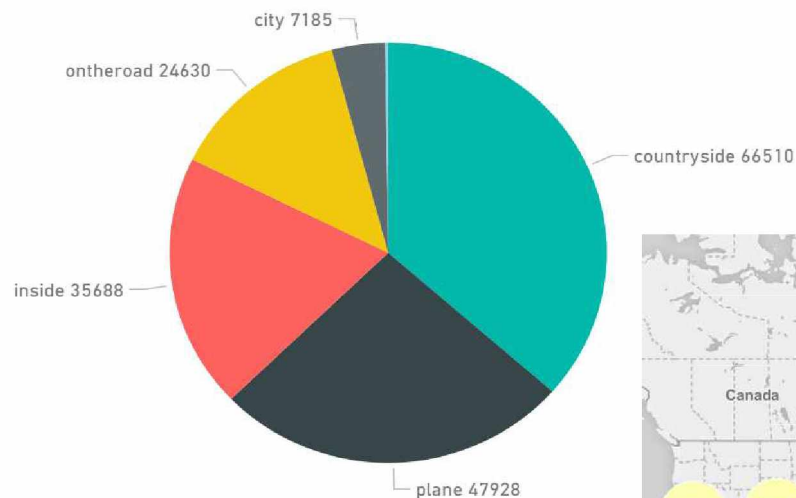


- RiumGM (GM, USB & Bluetooth) 

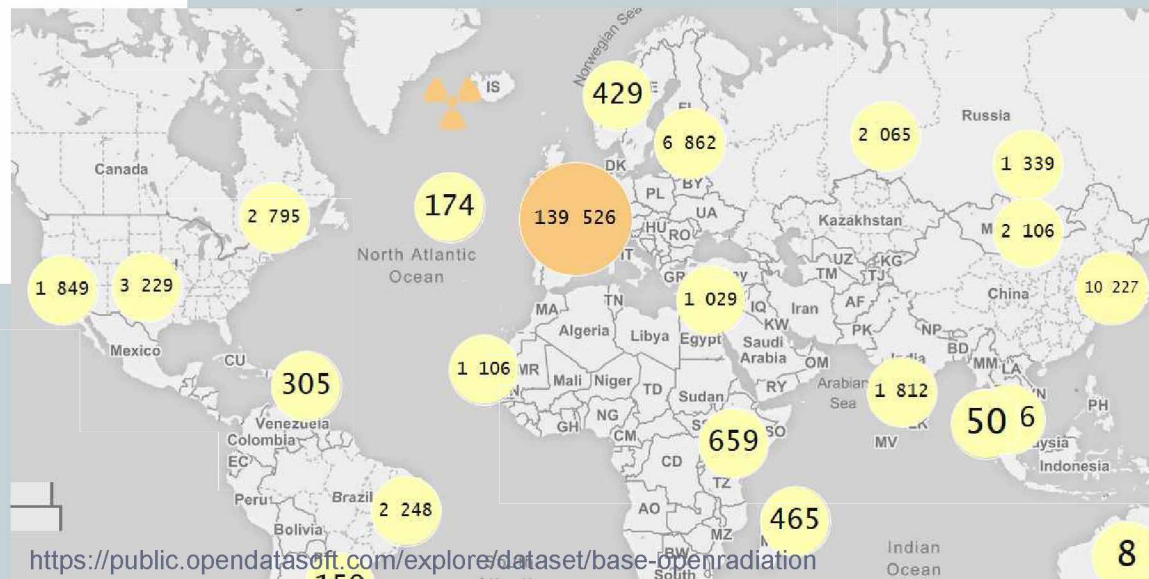


Key numbers...

- *> 200 000 measurements made by ~150 contributors*
- Various environments ...*



... All over the World

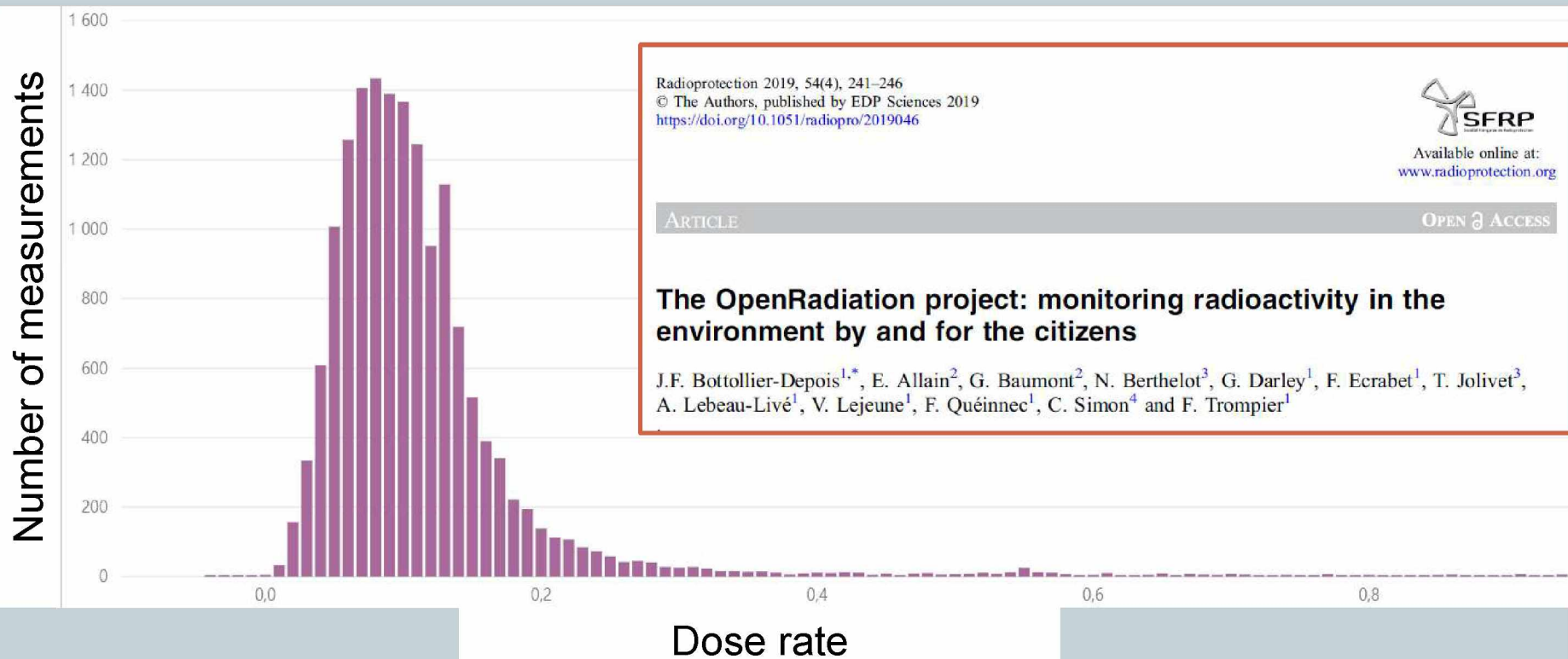


<https://public.opendatasoft.com/explore/dataset/base-openradiation>

... Good data quality



Distribution of measurements at ground level



A user community growing



“Individual” users

- Personal use for with opportunistic approach (*travel, vacation, business travel, etc.*)
- Out of interest/curiosity for radioactivity measurement (*search for the “hot spot”, knowledge of its environment, etc.*)
- ... But no intentional false value despite the absence of a priori filter!

Diverse user communities

- Projects/missions with a specific objective defined (*high schools, research projects, etc.*)
- Pluralistic projects in specific territories (*around nuclear facilities...*)
- Pluralistic projects around a given theme: *COSMIC for on-board measurement and “solar flare hunt”...*

1st User Day in January 2020

Use of data



Open data (License OCD-ODbL) free use

By the public on the site

- Visualization of raw data with possibility to use filters: *time, space, dose rate level, tag, user...*

Intended uses

- Generate a consolidated database for provision of the scientific community
- Manage “abnormal” measurement → “Alert” function
- Geostatistical analysis
- Complementarity with environmental data
- In case of crisis: *support to decision making, calibration of dispersion models*
- Validation of flight-level dosimetric models

Feedback



Users/Partnerships

- 😊 Users growing continuously
- 😞 Need for ongoing actions to maintain motivation and expand community

Site & app

- 😊 Ergonomics of the app and the possibility of real-time measurements
- 😞 Resources required for operation and animation

Valuation and use of data

- 😊 Quality of measurements and associated metadata
- 😞 Openness to other users and uses
- 😞 Specific resources needed for analysis

A motivated dream team!



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Thank you for your attention! ... even at distance