

# Learning from citizen science

Open science as civic action

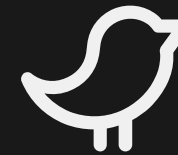
**Pen-Yuan Hsing**

co-founder

**MammalWeb.org**

**Open Science & Societal Impact**

14:10 UTC+3, 20 April 2022



#OpenScience  
#CitizenScience  
#OSSI22  
@MammalWeb



**BY**

**SA**



**citizen science**

wildlife monitoring



**Durham UK**





motion-sensing  
**camera traps**







2014-11-11 12:50:31 AM M 3/3

8°C



HC500 HYPERFIRE





R20

09-14-2018

06:03:24

1/5

44F

by Roland Ascroft [CC BY-SA 4.0](https://creativecommons.org/licenses/by-sa/4.0/)





6°C



05/24/2018

10:05AM

2 9



ir name: LG + MD  
s name: Botanics

ployment (example)

irt date: 2015 - 05 - 19  
irt time: 13 : 45  
ld date: 2015 - 06 - 13  
ld time: 19 : 20

ployment 1

date:  
ime:

Mammal/Web camera trap deployment record  
Camera number: 16  
Camera height:  
Lock number: 16  
Deployment 4

start date:  
start time:  
end date:  
end time:

Deployment 5

start date:  
start time:  
end date:  
end time:

Deployment 6

start date:  
start time:  
end date:  
end time:

Deployment 7

date:  
ime:



Mammal Web


HOME ABOUT SPOTTER TRAPPER PROJECTS NEWS DISCOVER LEARN LOGOUT

English (United Kingdom)

## What do you see in this sequence?

Nothing Human Location Next Sequence

8:46 PM M 2/3 12°C



RECONYX

Common (UK)	Mammals (UK)
Birds (UK)	
American mink	Roe deer
Badger	Small rodent (unknown species)
Brown (European) hare	Stoat
Brown rat	Vole (unknown species)
Domestic cat	Wood mouse
Domestic dog	Blackbird (Eurasian)
Fallow deer	Carriion crow
Grey squirrel	Dunnoek
Hedgehog (Western)	Great Tit
Horse	Jackdaw (Eurasian)
Livestock	Jay (Eurasian)
Muntjac	Maggpie (Eurasian)
Otter	Pheasant (common)
Pine marten	Redwing
Rabbit	Robin (European)
Red deer	Song Thrush
Red fox	Unidentified bird
Red squirrel	Woodpigeon
Don't Know	Other



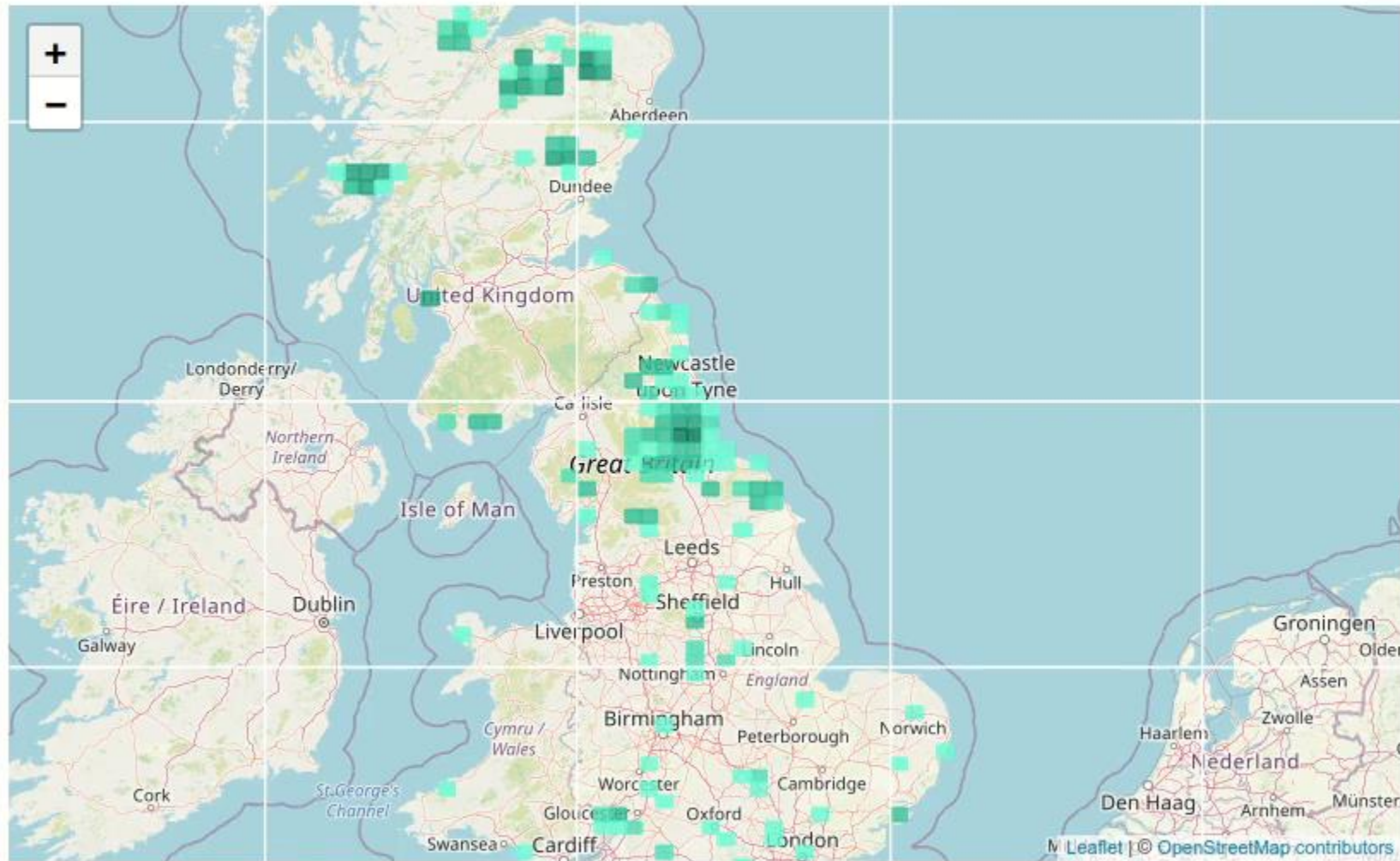


# interactive visualisations

English (United Kingdom)

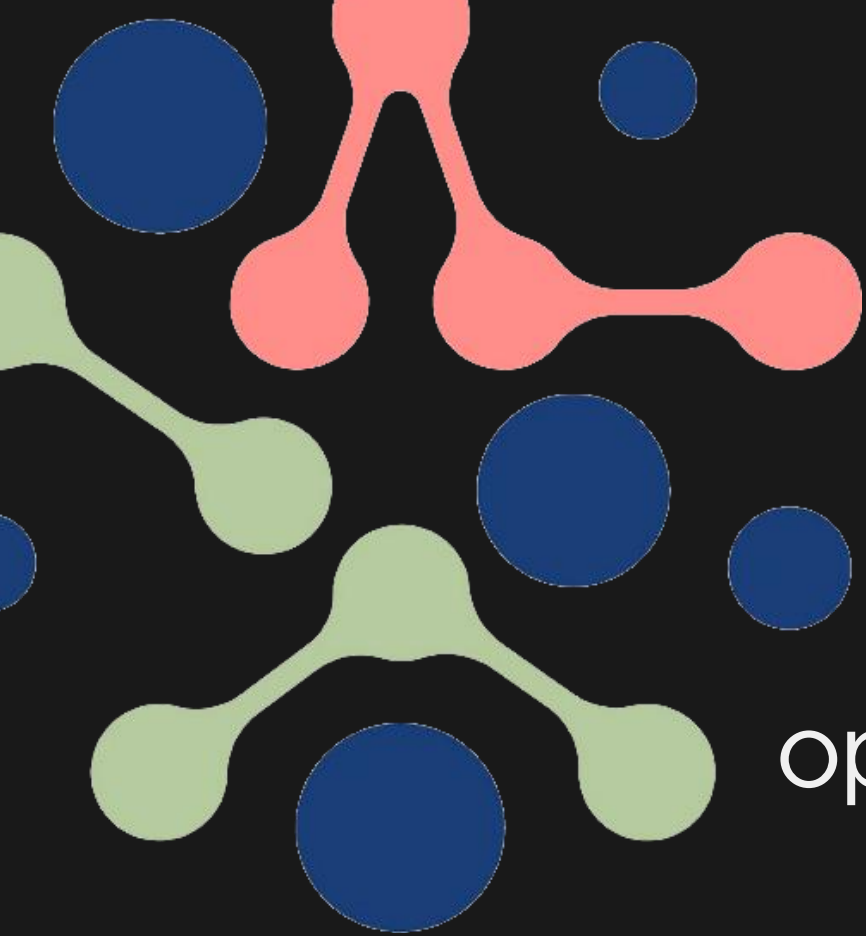
Select species...

Show sightings of selected species



Please note, the displayed data are based on submitted classifications and have not been checked for accuracy.





open science short course on

**EU-Citizen.science**



# British Ecological Society **Guide to Reproducible Code**



**DIN** SPEC 3105



**STARDIT**



# OPEN! NEXT

transforming  
**open source**  
collaboration



# GOSH

Gathering for Open  
Science Hardware

<https://openhardware.science/>



what is  
**open science?**



if you ask 10 people what  
**open science** means...

GLOBAL

---

CITIZEN  
SCIENCE

---

PARTNERSHIP



United Nations  
Educational, Scientific and  
Cultural Organization

UNESCO

# Recommendation on Open Science

ratified in November 2021



- (ii) developing an enabling policy environment for open science;
- (iii) investing in open science infrastructures and services;
- (iv) investing in human resources, training, education, digital literacy and capacity building for open science;
- (v) fostering a culture of open science and aligning incentives for open science;
- (vi) promoting innovative approaches for open science at different stages of the scientific process;
- (vii) promoting international and multi-stakeholder cooperation in the context of open science and with view to reducing digital, technological and knowledge gaps.

“...practices for reproducibility, transparency, sharing and collaboration resulting from the increased opening of scientific contents, tools and processes...”

processes and phenomena occurring in nature and society.

5. Building on the essential principles of academic freedom, research integrity and scientific excellence, open science sets a new paradigm that integrates into the scientific enterprise practices for reproducibility, transparency, sharing and collaboration resulting from the increased opening of scientific contents, tools and processes.

6. For the purpose of this Recommendation, **open science** is defined as an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community. It comprises all scientific disciplines and aspects of scholarly practices, including basic and applied sciences, natural and social sciences and the humanities, and it builds on the following

**4 freedoms to** use  
study  
modify  
share



science  
vs  
alchemy





Cory Doctorow\*

Alchemists kept what  
...and each of them  
learned in the hardest  
way possible that drinking  
mercury was a bad idea.





good discernence

vs

opinion ~~discernence~~



why is open science  
**important?**



**open science**

enablers' ~~to~~ ~~provide~~ **time** ~~information~~

~~to~~ ~~address~~ ~~issues!~~

urgent global issues



reproducibility

accountability

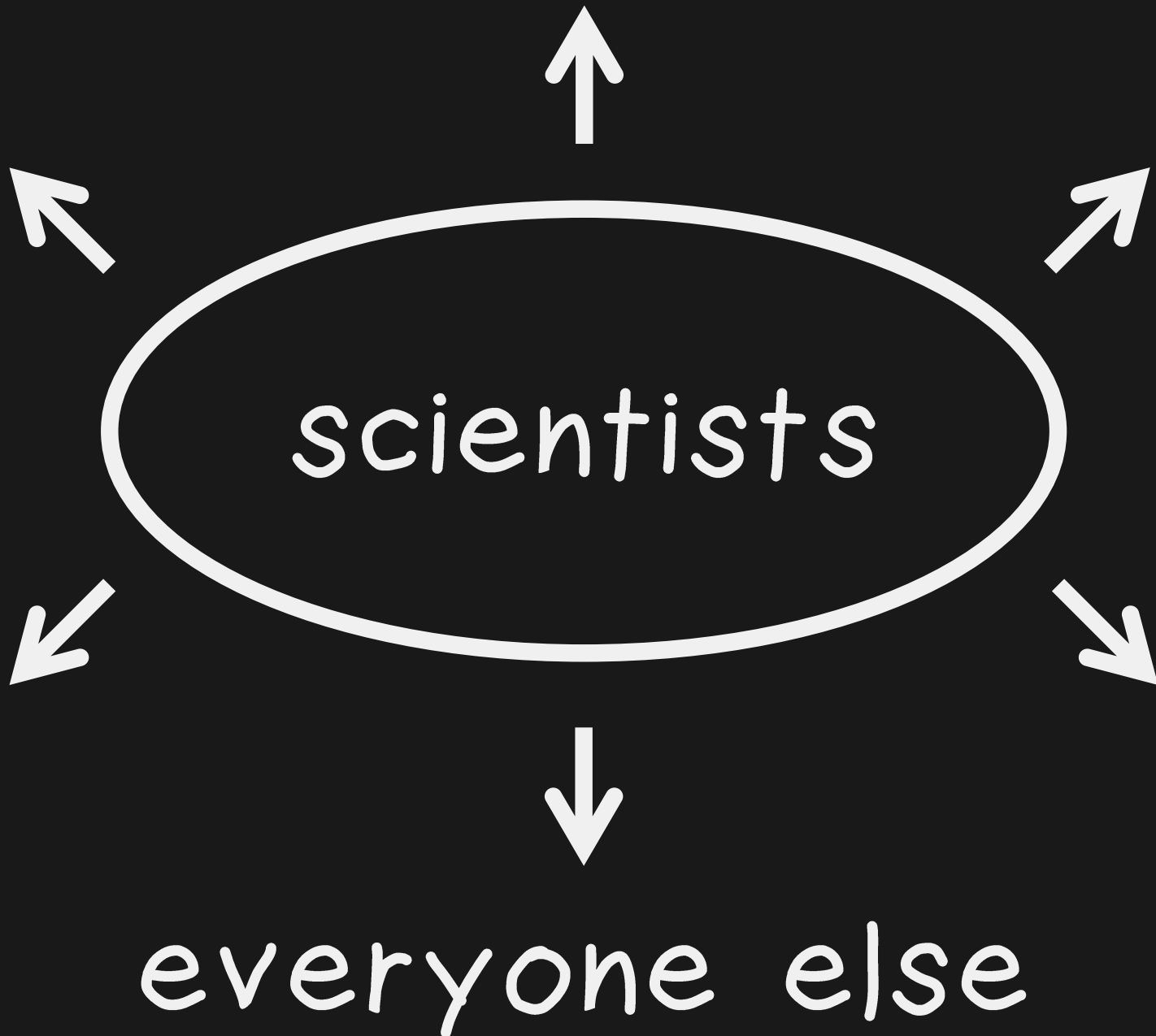
transparency

trust

education

engagement





**citizen science**

as science engagement

# authority-driven citizen science

**Ottinger, G. (2017)**

[Reconstructing or reproducing? Scientific authority and models of change in two traditions of citizen science](#)





BE MINDFUL OF SMALL THINGS

HONESTY IS THE BEST POLICY

Spelling 100%  
Arithmetic 75%  
Tables 100%

"Kevin Grove State School, Teacher and Class, April 1951" by Queensland State Archives [from Flickr](#), public domain

# ZOONIVERSE



CLASSIFY

STORY

SCIENCE



DISCUSS

PROFILE

LANGUAGE



Classify



DECaLS



Invert

Examples

Restart

*Note: Please always classify the galaxy in the centre of the image.*

**SHAPE**

Is the galaxy simply smooth and rounded, with no sign of a disk?



Smooth



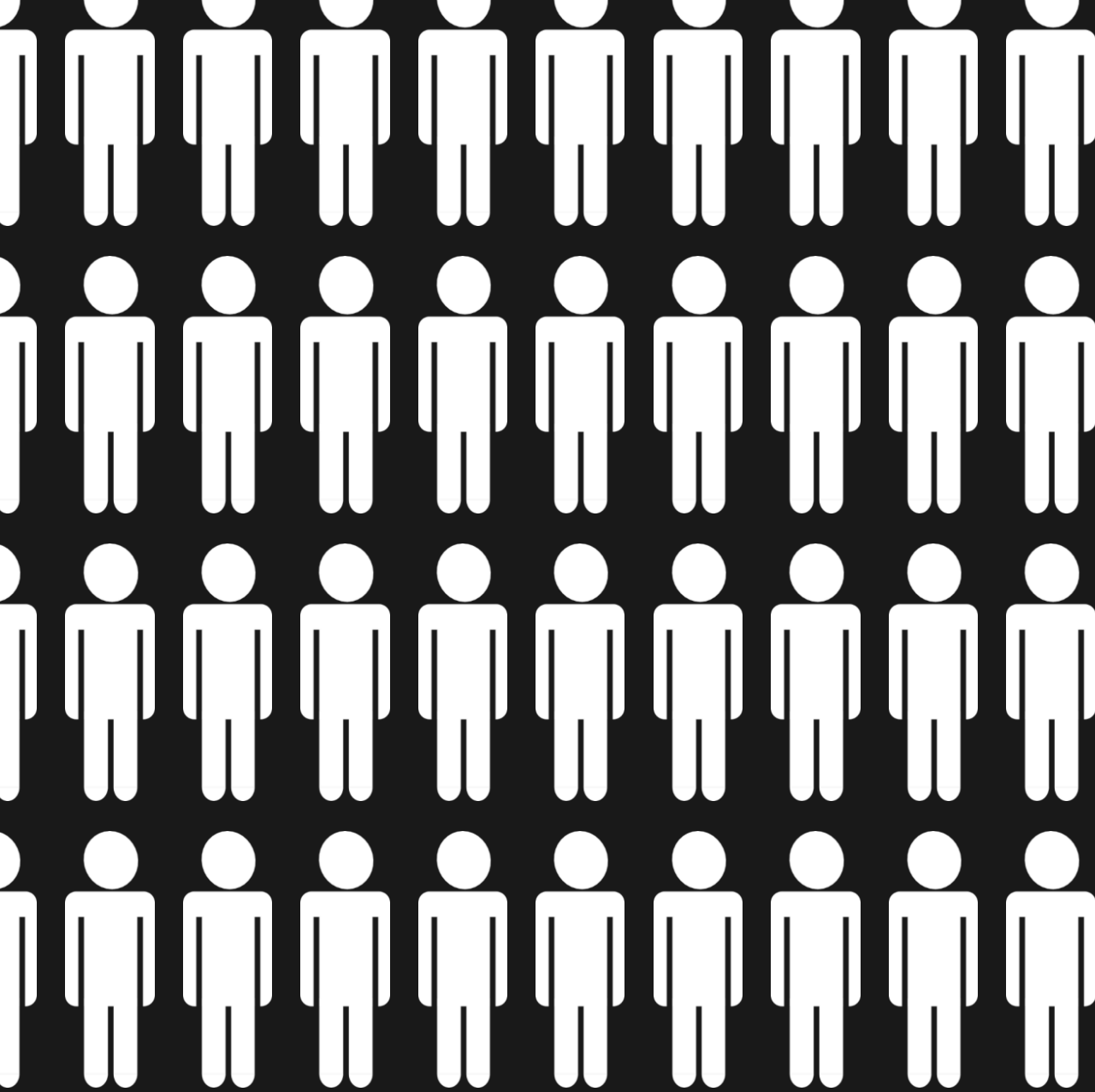
Features or disk



Star or artifact







200+

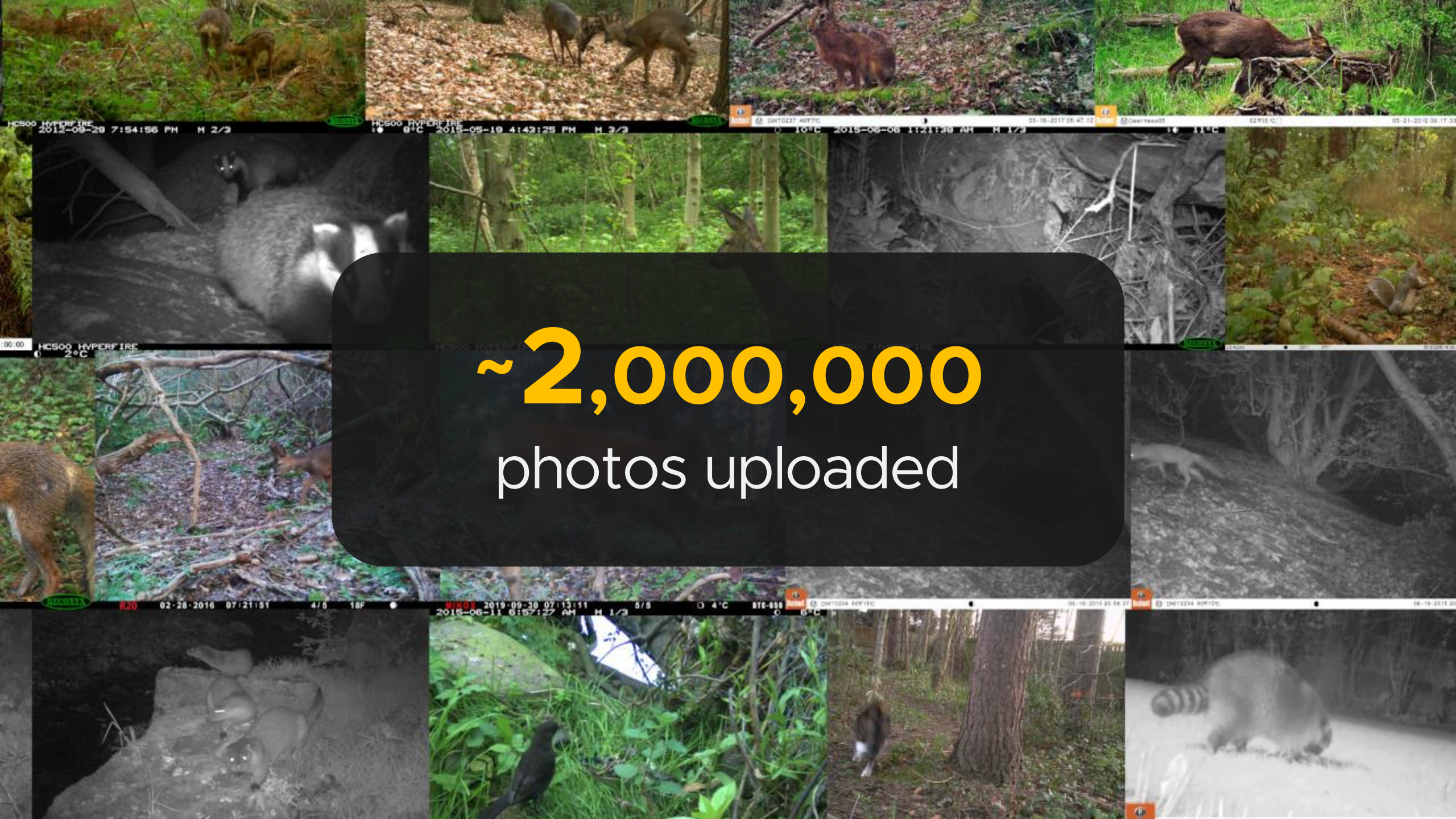
citizen scientists  
since May 2015

# international partners





**300+** years  
of observation time



~2,000,000  
photos uploaded

















# social-movement citizen science

**Ottinger, G. (2017)**

[Reconstructing or reproducing? Scientific authority and models of change in two traditions of citizen science](#)

SAFECAST 



# Fukushima nuclear disaster

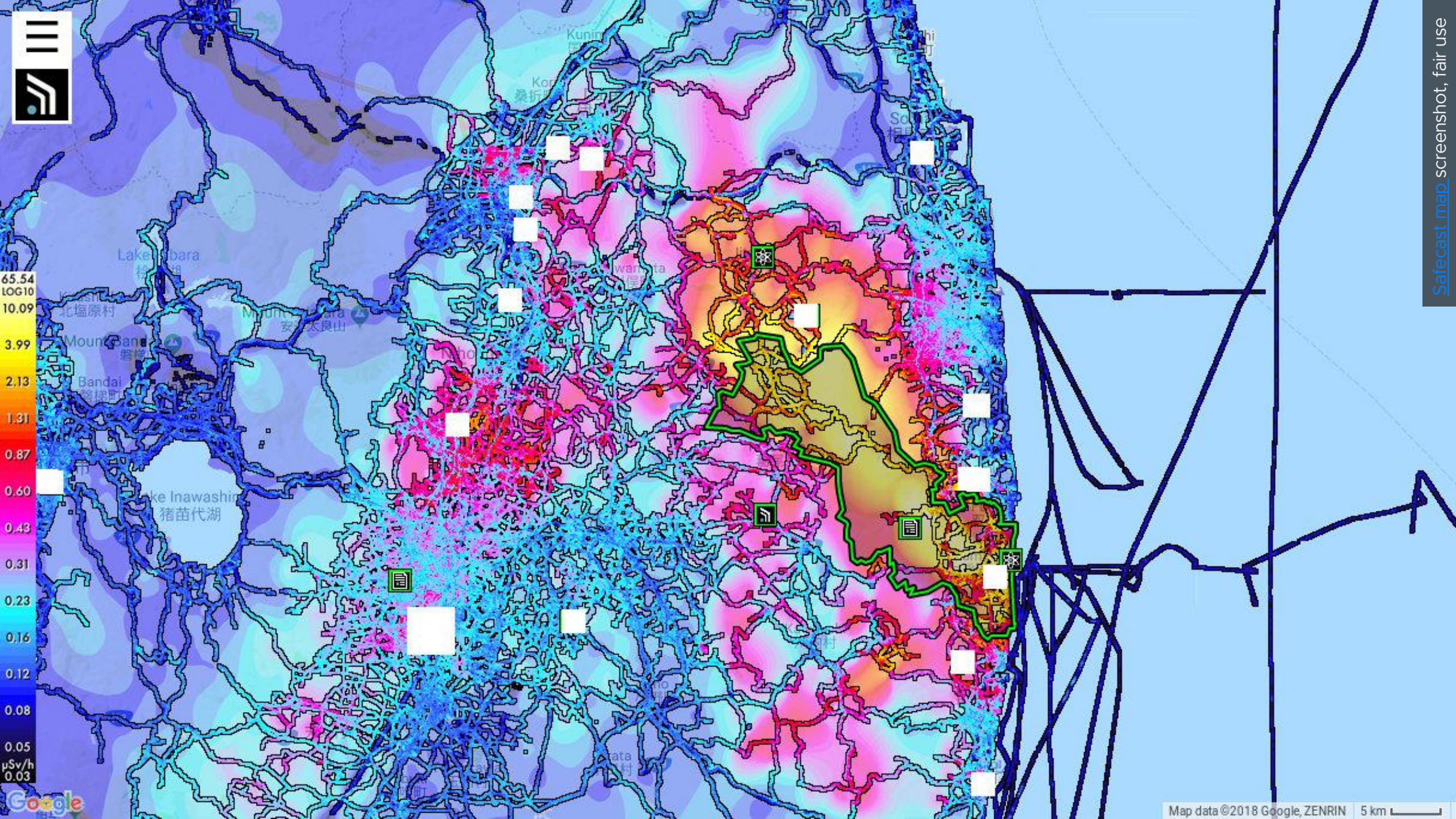






[SAFECAST](#) by Yusuke Kawasaki from Flickr, [CC BY 2.0](#)





65.54  
LOG10  
10.09  
3.99  
2.13  
1.31  
0.87  
0.60  
0.43  
0.31  
0.23  
0.16  
0.12  
0.08  
0.05  
µSv/h  
0.03

Google


Map data ©2018 Google, ZENRIN 5 km

Safecast map screenshot, fair use







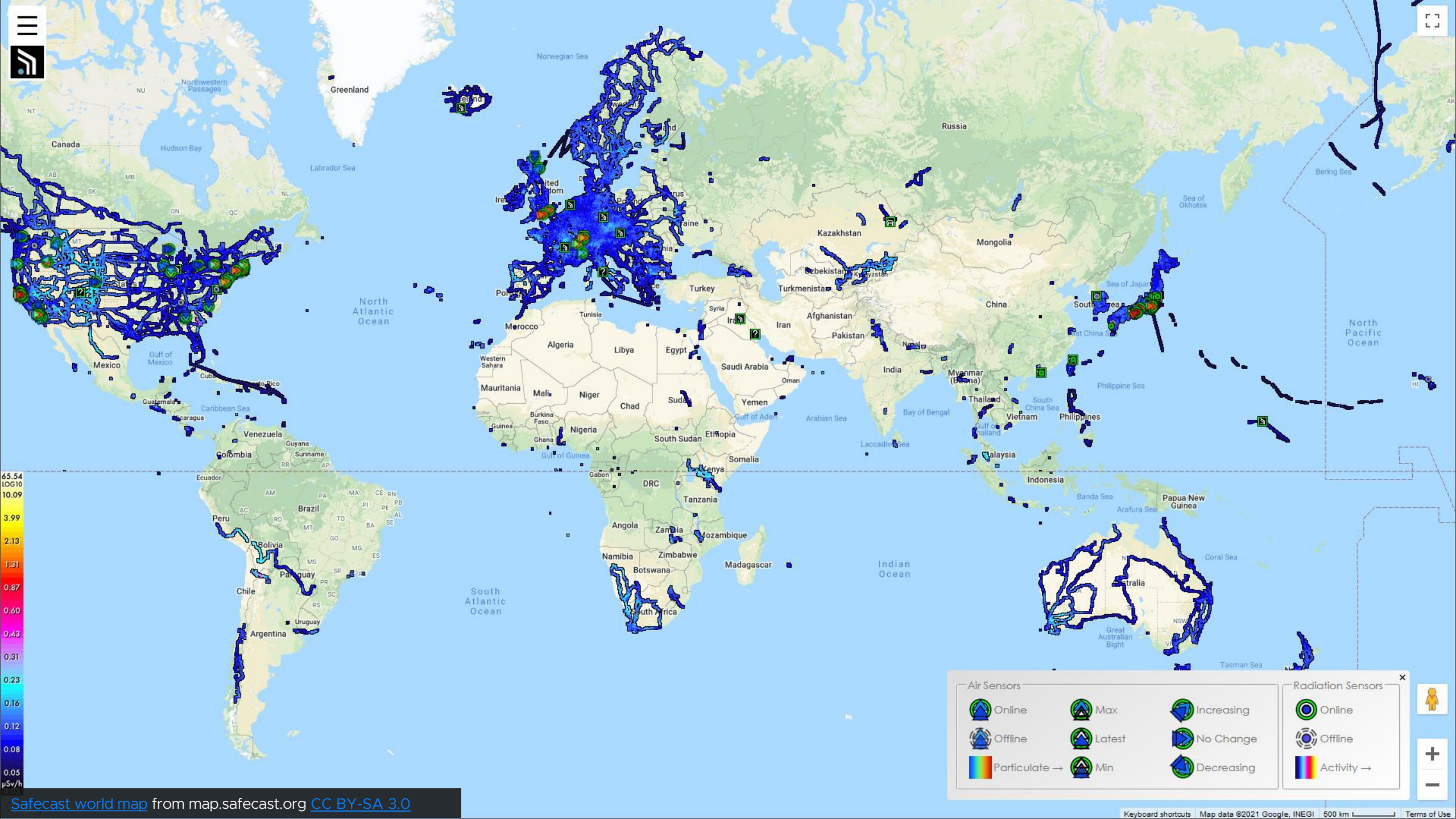


**5,000+**  
citizen scientists

**100+** countries

**170,000,000+**  
measurements!





65.54  
LOG10  
10.09  
3.99  
2.13  
1.31  
0.87  
0.60  
0.43  
0.31  
0.23  
0.16  
0.12  
0.08  
0.05  
pSV/h

Air Sensors			Radiation Sensors	
	Online		Max	
	Offline		Latest	
	Particulate →		Min	
				Activity →



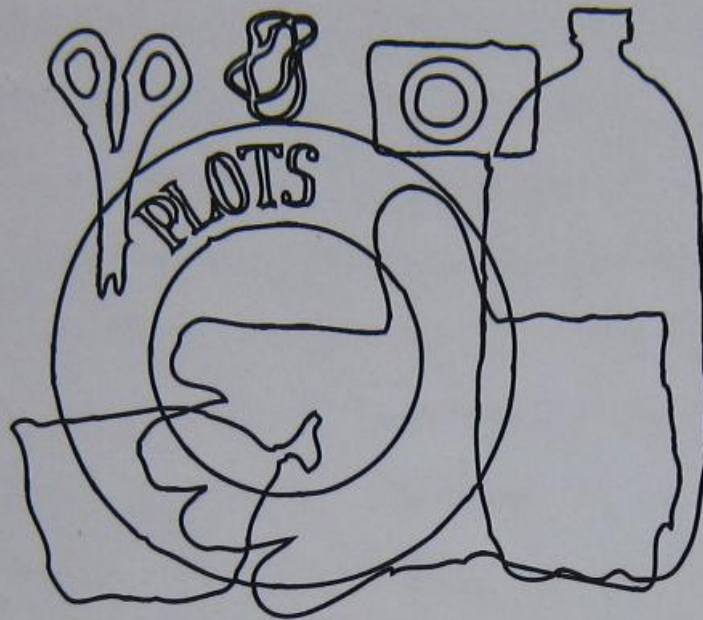




# Deepwater Horizon oil spill







## Public Lab Balloon Mapping Kit

Once assembled, this open source kit -- developed by community researchers from the Public Laboratory for Open Technology and Science -- enables you to collect your own aerial photos from up to 1000 ft. Use it to tell a different story from the "official" map!

<http://publiclaboratory.org/tool/balloon-mapping>

In addition to this kit, you'll need a camera that can do continuous shooting and a soda or juice bottle.

Each kit includes:

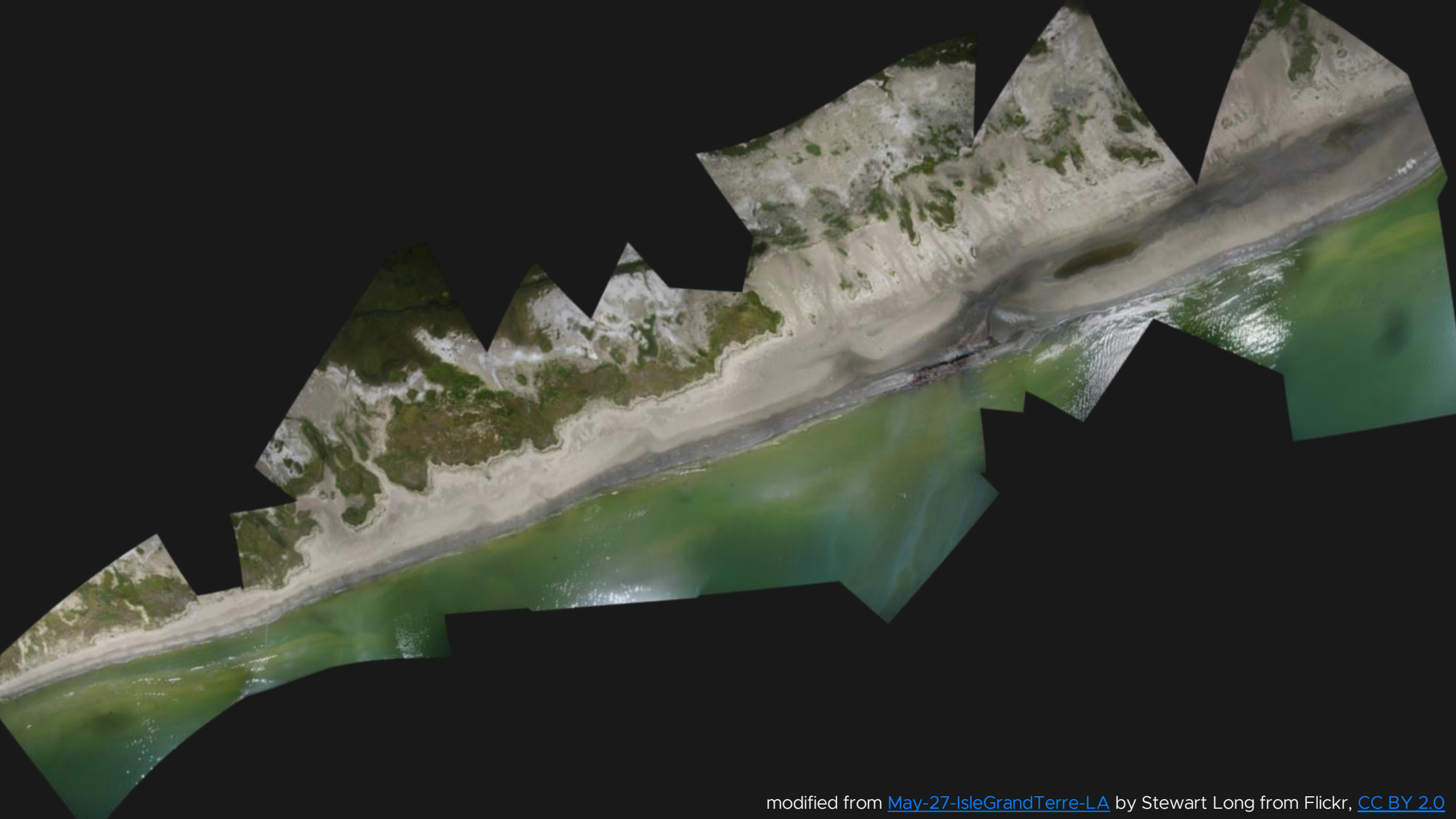
- A 5.5 foot (170cm) reusable balloon made of a latex/chloroprene (neoprene) mix
- 1000 feet (305m) of 110lb test (55 kilo) Dacron line, pre-wound on an 8" hoop winder
- Leather gloves for handling the line.
- Three high-strength (270lb) swivel clips
- Two mini-carabiners for attaching the camera
- Twenty rubber bands for making a camera cradle
- Ten zip ties. for closing the balloon
- One 1" ring. for attaching the balloon to the line

All PLOTS content is open source; CC-BY-SA and CERN OHL 1.1. Join Public Lab now at:  
[PublicLaboratory.org/join](http://PublicLaboratory.org/join)





air balloon mapping photo by Public Lab [from store.public.org](https://store.public.org), [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)





UNITED BULK TERMINAL

Conveyor

Plume

Additional Source?

More residual coal under the water in batture









# Bourj Al Shamali

refugee camp

LEBANON















modified from Bourj Al Shamali Refugee Camp by Claudia Martinez Mansell  
from [Public Lab](#), [CC BY-SA 3.0](#)





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“...dialogue with **other knowledge systems...**  
knowledge holders **beyond the traditional**  
**scientific community**”

processes and phenomena occurring in nature and society.

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**citizen science**

as

**open science**

**open science**  
as  
**civic action**



# thank you

slides published on [Zenodo.org](https://zenodo.org) with DOI: [10.5281/zenodo.6470990](https://doi.org/10.5281/zenodo.6470990)



by **Pen-Yuan Hsing** of **MammalWeb.org**



#OpenScience #CitizenScience  
#OSSI22 @MammalWeb



penyuanhsing {at} posteo [dot] is

