

Citizen Science in the EO*GI Sector

Linda See

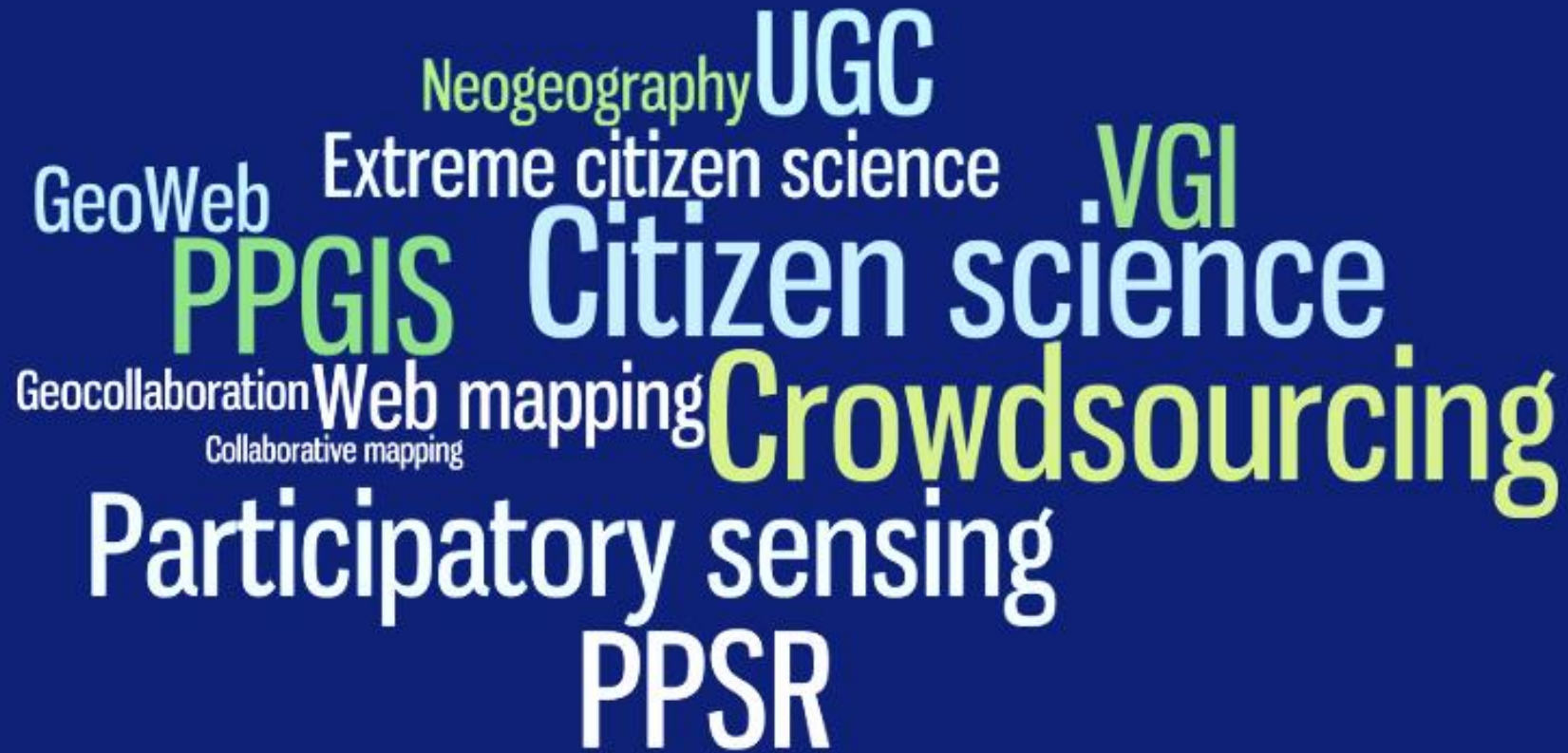
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Citizen Science in EO*GI Sectors

Strategic Objective 5 in the Sectoral Skills Strategy

- Encourage **citizens' engagement**, **citizens' science practices** and **hands-on activities** enhancing the inclusion/ recognition of EO*GI applications' value in everyday aspects of life

A word cloud on a dark blue background. The words are in various sizes and colors (white, light blue, and light green). The most prominent words are 'Crowdsourcing' (large, light green), 'Citizen science' (large, light blue), 'PPGIS' (medium, light green), and 'Participatory sensing' (large, white). Other words include 'UGC', 'VGI', 'Web mapping', 'Collaborative mapping', 'Geocollaboration', 'Extreme citizen science', 'Neogeography', 'GeoWeb', and 'PPSR'.

GeoWeb Extreme citizen science UGC
Neogeography VGI
PPGIS Citizen science
Geocollaboration Web mapping Crowdsourcing
Collaborative mapping
Participatory sensing
PPSR

Citizen Science and EO*GI

- Lack of reference data, e.g., for training algorithms, validation of products, for monitoring (environmental data, SDGs, perceptual data, etc.)
- Types of tasks that can engage citizens:
 - Visual interpretation of imagery
 - Very high-resolution satellite imagery, e.g., Google Maps, Microsoft Bing
 - High resolution satellite imagery, e.g., Planet, Sentinel
 - Drone and aerial imagery
 - Geo-tagged photographs, Street View imagery
 - In situ data collection
 - Via mobile phone, e.g., land cover/land use, species and habitats, thermal comfort
 - Via low costs sensors, e.g., air pollution, temperature, wearables
 - Stakeholders in co-creation of solutions/Living Labs/building DIY kits
- Raised awareness (e.g., of Copernicus) / empowered citizens

Example 1: Geo-Wiki for Image Interpretation

Validate the landcover of the polygons:
[Show instructions](#)

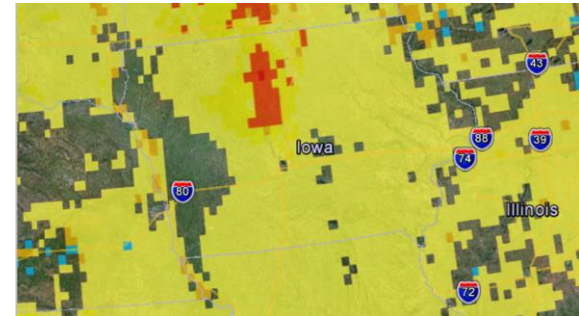
	good	not sure	bad
MODIS:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
GlobCover:	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
GLC-2000:	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Problems choosing the right LandCover?
 View your profile and choose simple validation method.

Confidence: **Sure**

Provide picture URLs (ending with .jpg/.png) if available:
[show](#)

More information about validation:
 Google Image Date:
 I used Google Earth high resolution to validate [show help](#)

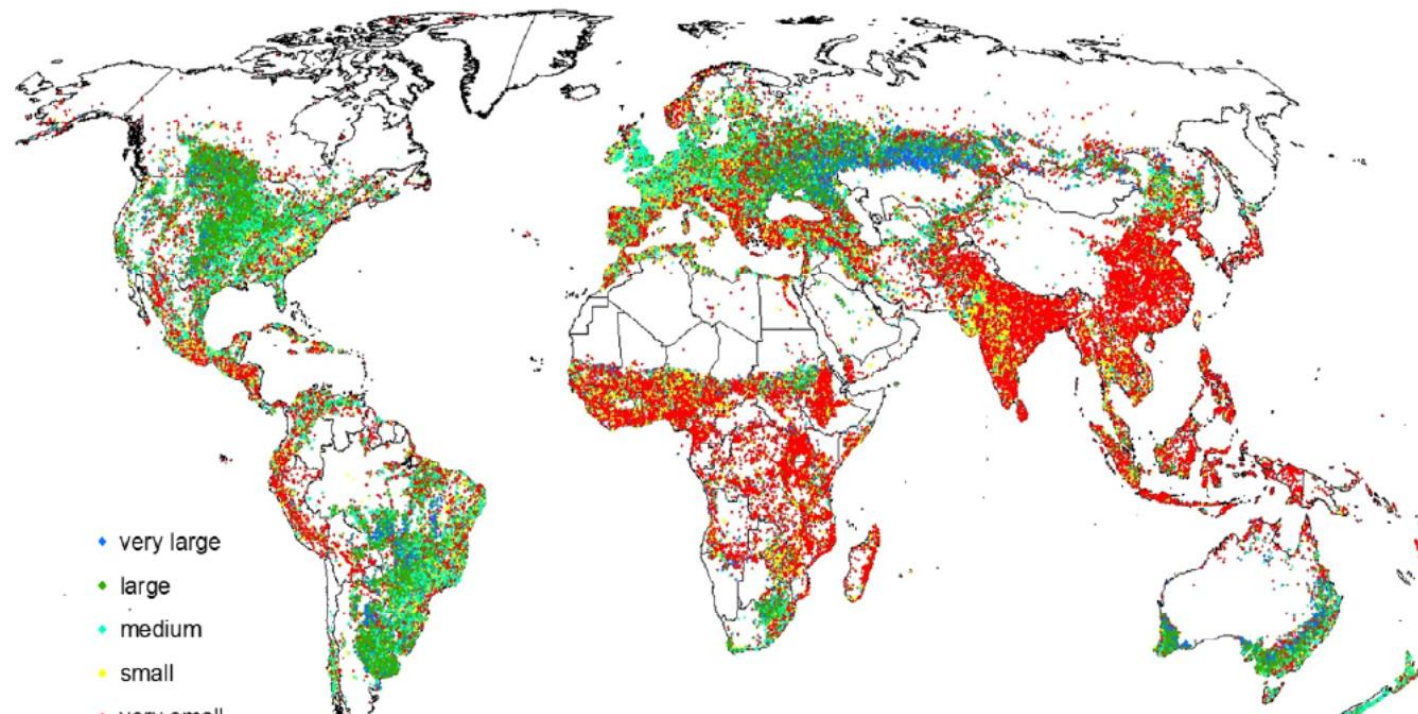


Example from the Global Field Size Campaign

130
participants

390 K+ **4 weeks**
observations

110 K+ unique
locations validated at
least 5 times each



- very large
- large
- medium
- small
- very small

What sizes are the fields intersecting with the red box?

If there is more than one field size, indicate which category is dominant.

Very large (>100 ha)	dominant
Large (>16 ha)	dominant
Medium (2.56 ha -16 ha)	dominant
Small (0.64 ha - 2.56 ha)	dominant
Very small (<0.64ha)	dominant
No fields	



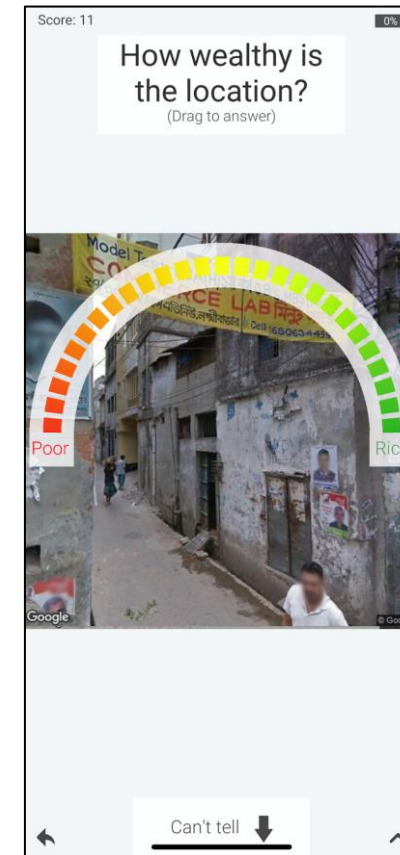
- Data published here:
<https://pure.iiasa.ac.at/id/eprint/15526/>
- Paper published in Global Change Biology journal:
<https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.14492>

Paper on Geo-Wiki campaigns:

<https://iopscience.iop.org/article/10.1088/1748-9326/ac6ad7/meta>

Example 2: Picture Pile

- Rapid image classification
- Single or pairs of images (for change detection)
- Wilderness, deforestation, building damage assessment
- Yes/no/maybe mechanic
- Yes/No/Maybe mechanic modified for categorical and continuous variable data collection
- Picture Pile Platform



Paper on Picture Pile:
<https://www.sciencedirect.com/science/article/pii/S1462901121003208>

Example 3: FotoQuest Go for In Situ Data Collection

FotoQuest Go

Visit the points indicated on the map and help us monitor how land is being used in Austria!

You can earn 1 EUR for each point you visit!

Next

Select a point to start your quest!

Tobias Sturn 7.00€

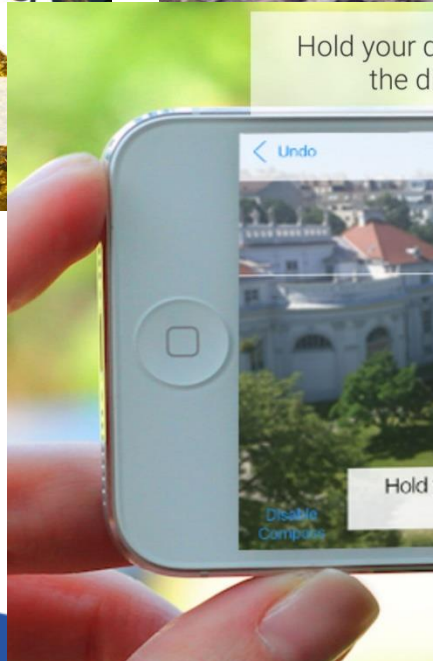
Move 90 m closer to the target...

Tobias Sturn 7.00€

Great, you are very close. Ignore your GPS location now and just use the map as guidance to get as close to the point as possible.

Tobias Sturn 1.00€

Paper on FotoQuest Go:
<https://www.mdpi.com/2073-445X/9/11/446>



What is the land cover at the target point?

Water
(Rivers, ice, lakes, ...)

Bare land
(Rocks, sand, tilled, ...)

Built-up
(Artificial, roads, buildings, ...)

Vegetated
(Trees, pastures, crops, bushes, ...)

What is the land cover at the target point?

Mostly trees

Mostly grass/pastures

Cropland
(Including vineyards)

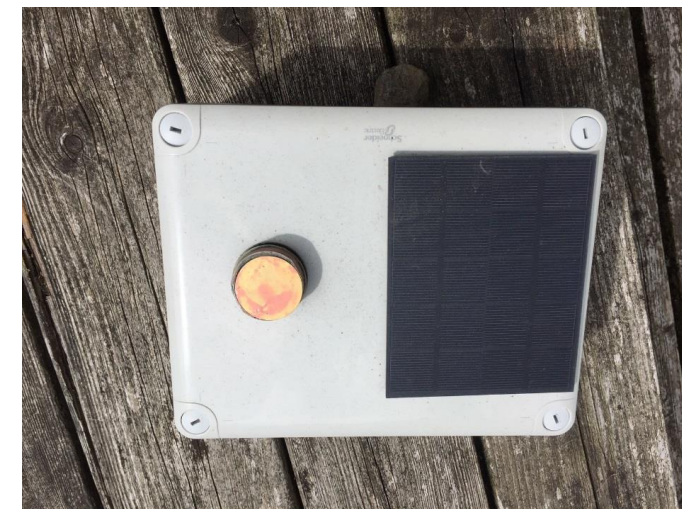
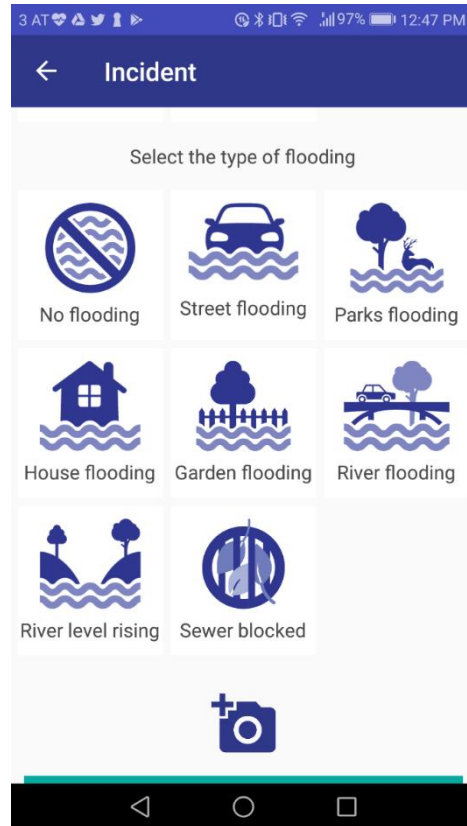
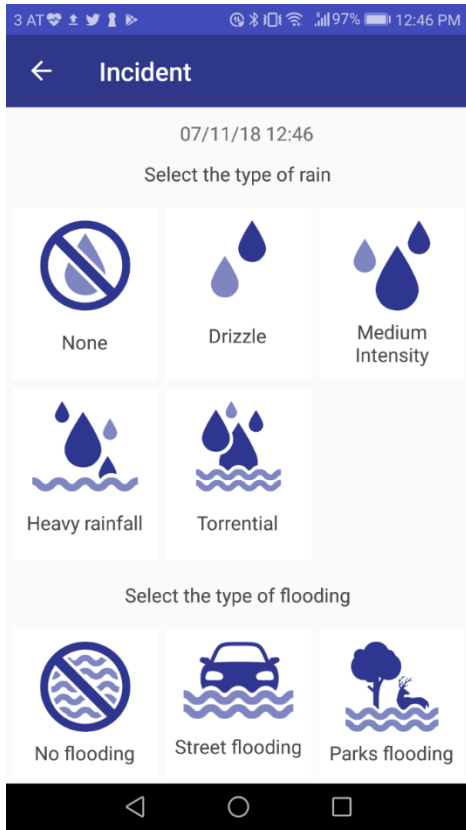
Mostly shrubs/bushes

How is the land used at the point?

- Residential
- Amenities (museums, cinema...)
- Recreation, Sport
- Commerce
- Construction
- Transport (Streets, Railroads...)
- Industry and manufacturing
- Agriculture
- Forestry

Next

Example 4: FloodCitiSense Urban Living Lab



Co-design of an early warning system for pluvial flooding with citizens

Types of Skills Required/Gaps

- Programmers (web mapping, app developers, **game developers**, graphic designers)
- Data analysts (Spatial databases and GIS, statistics, AI/machine learning/data fusion/computer vision, **data quality, open data, data standards**)
- Skills in **engagement** (project management, project design, recruitment, sustaining participation, communication/social media savvy, training, storytelling, fundraising, proposal writing)

Bridging the Skills Gaps (from Sectoral Skills Strategy)

- To promote and reach out to 'end-user' communities, and to engage citizens through various events, especially at the local level, on job opportunities, internships and apprenticeships, roadshows (OO51)
- To provide a platform/forum for collecting and testing ideas from 'end-user' communities (OO52)
 - Raise awareness of existing sites/tools/networks, e.g., European Citizen Science Association, <https://eu-citizen.science/>
- To increase efforts to develop skills and stimulate innovation and entrepreneurship, to foster an attractive work environment (OO53)
- Use of dynamic learning environments: sandboxes / Living Labs

Bridging the Skills Gaps

- Embed citizen science into the curriculum at primary/secondary school levels, e.g., GLOBE Observer, Dutch Kadaster, senseBox.de, internships at IIASA
- Embed citizen science into higher level education, e.g., UCL’s MSc in Citizen Science (<https://www.ucl.ac.uk/biosciences/study/masters/msc-citizen-science>), YSSP at IIASA
- Provide more opportunities for involvement, e.g., through hackathons, mapathons, community-based monitoring, public participation

Foundations of Citizen Science



Computational Methods in Biodiversity Research



Designing and Managing Citizen Science



AI for the Environment



Technology for Nature



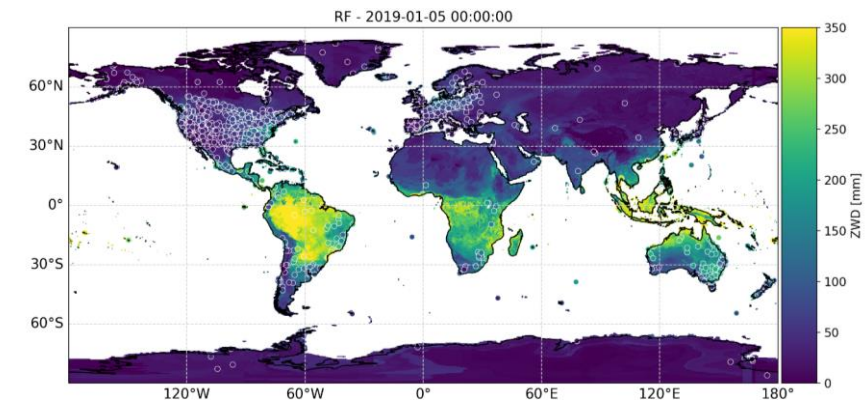
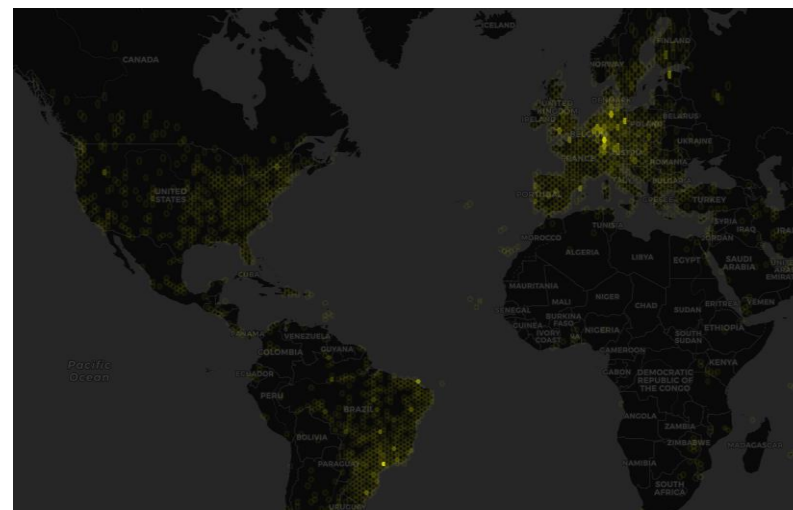
Our latest project: CAMALIOT

<https://www.camaliot.org>

- Collection of raw GNSS data from mobile phones to improve weather forecasting

Types of **skills** in the project:

- Working with GNSS data
- AI/machine learning
- Programming a mobile app
- Web mapping
- Gamification
- Citizen engagement and communication



Thank you! Questions?

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