Crowd-driven tools for the calibration and validation of Earth Observation products

Presenter: Olha Danylo

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EO Open Science 2017 Conference
Session: Open Data & Tools

Motivation

- Improving the quality of EO-based Land Use & Land Cover products
- Uncovering the potential of citizen science and crowdsourcing at the intersection of LULC & EO
- Lowering cost and extending in-situ data collection methods
- Innovating calibration/validation approaches within processing chain of environmental monitoring

Crowd-driven process

- LULC mapping has a conventional top-down approach
- It is possible to involve citizens and interested experts to crowdsource the needed information using a more participatory approach
- In EO domain, we can engage stakeholders (within and outside the scientific community) in various tasks, including satellite image interpretation and online interactive mapping

Crowd-driven tools

1

Geo-Wiki Engagement Platform

2

LACO-Wiki Validation Platform

3

Picture Pile

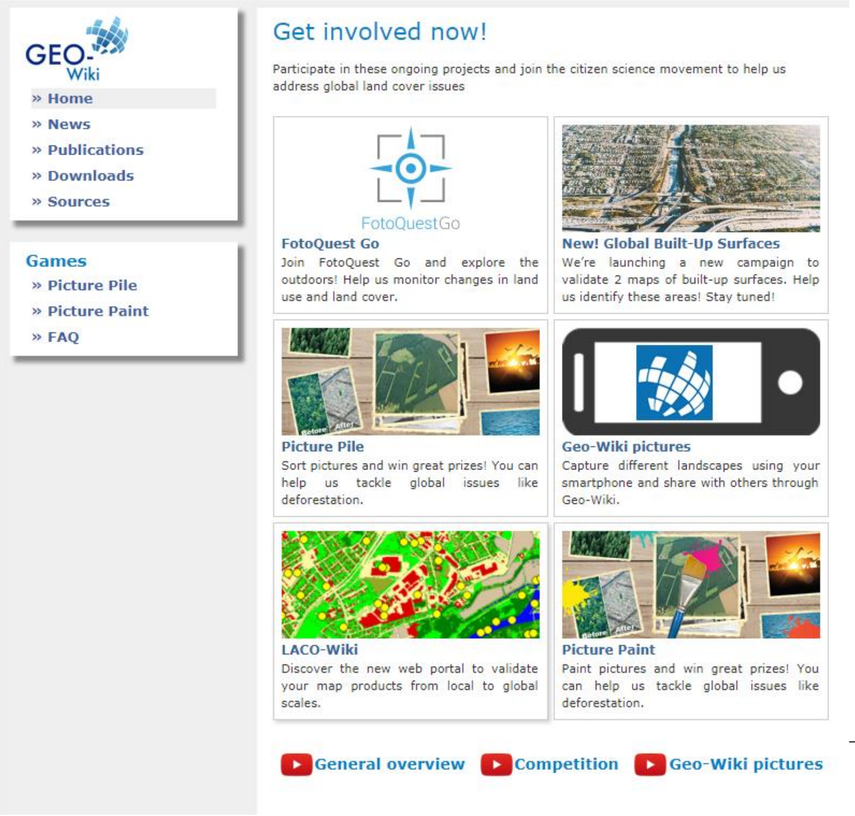
4

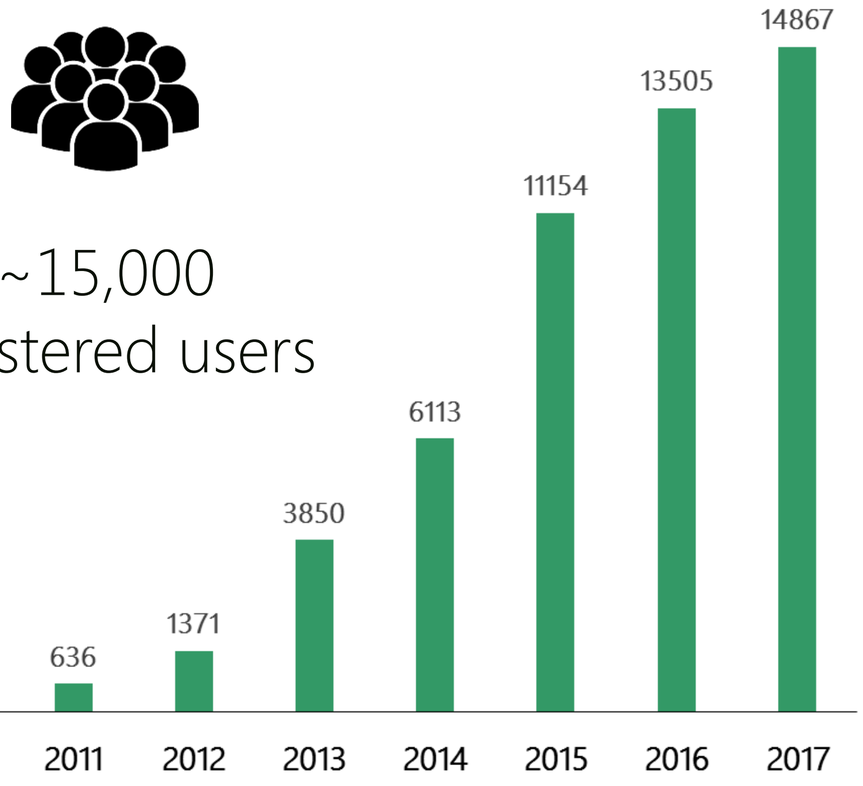
FotoQuest Go

1 Geo-Wiki Engagement Platform

Geo-Wiki is an open platform that provides citizens with the means to engage in environmental monitoring by providing feedback on existing spatial information overlaid on satellite imagery or by contributing entirely new data.

geo-wiki.org





1 Geo-Wiki Engagement Platform

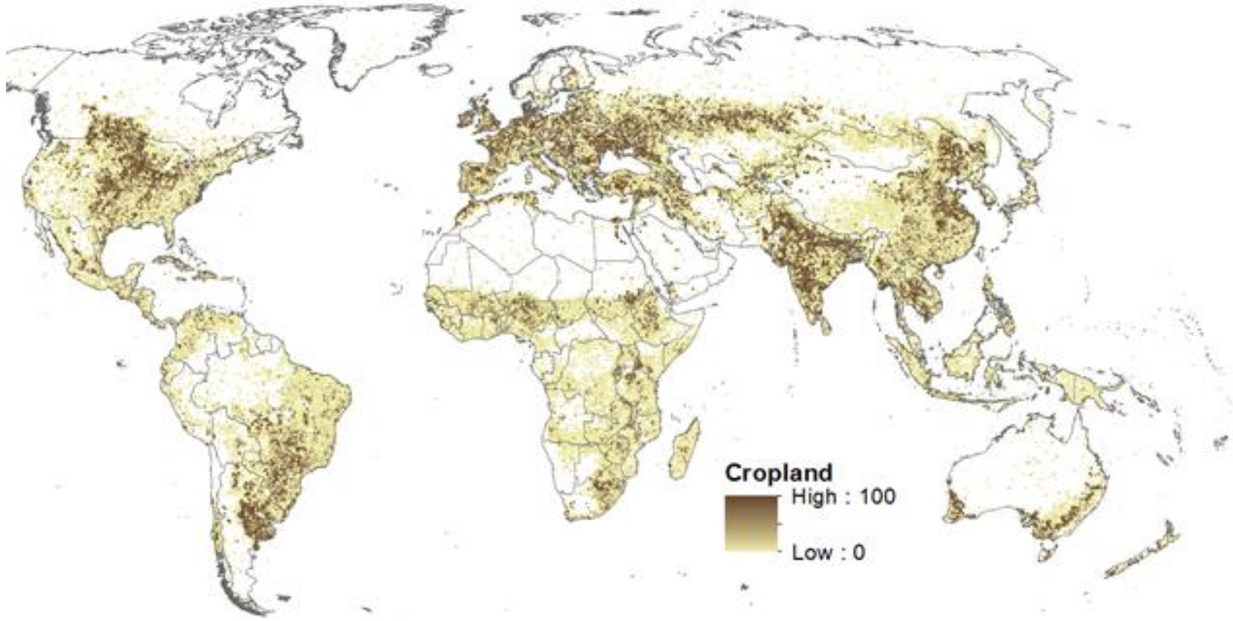
Series of crowdsourcing campaigns since 2011

2016

Global Cropland Validation → 36,000 points
Global Field Size → 130,000 points

Fritz et al., (2017) A global dataset of crowdsourced land cover and land use reference data. Scientific Data 4: p 170075.

Global Cropland Validation

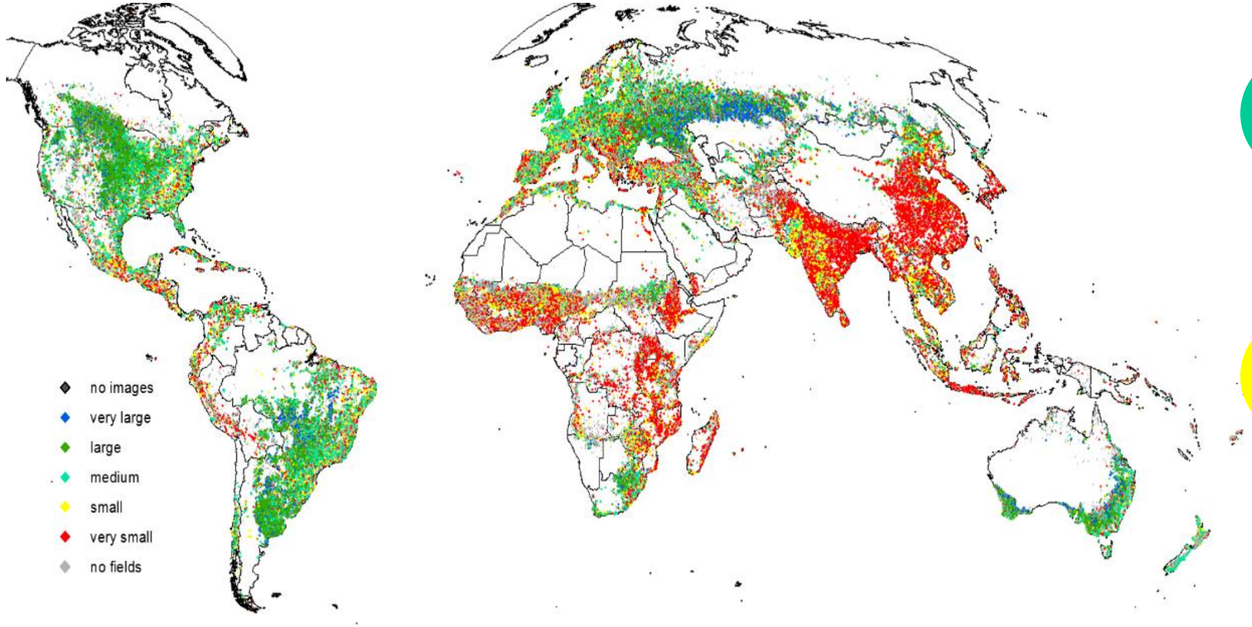


80
volunteers

144K
validations

Laso Bayas et al., (2017) A global reference database of crowdsourced cropland data collected using the Geo-Wiki platform. Scientific Data (in press)

Global Field Size



130
volunteers

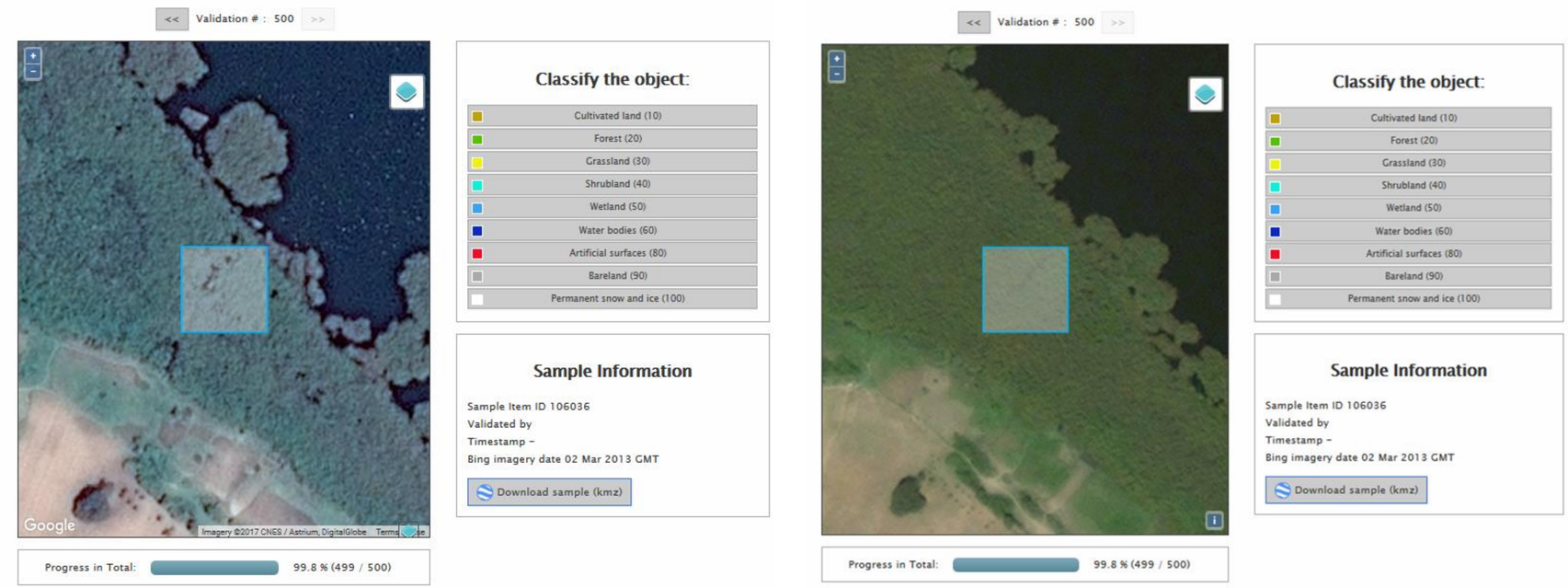
390K
validations

2 LACO-Wiki Validation Platform

laco-wiki.net

European Environment Agency

An open user-driven web interface that provides LC validation methods for map production and validation. Recommended by EEA for validating Copernicus local component datasets (i.e. Urban Atlas)



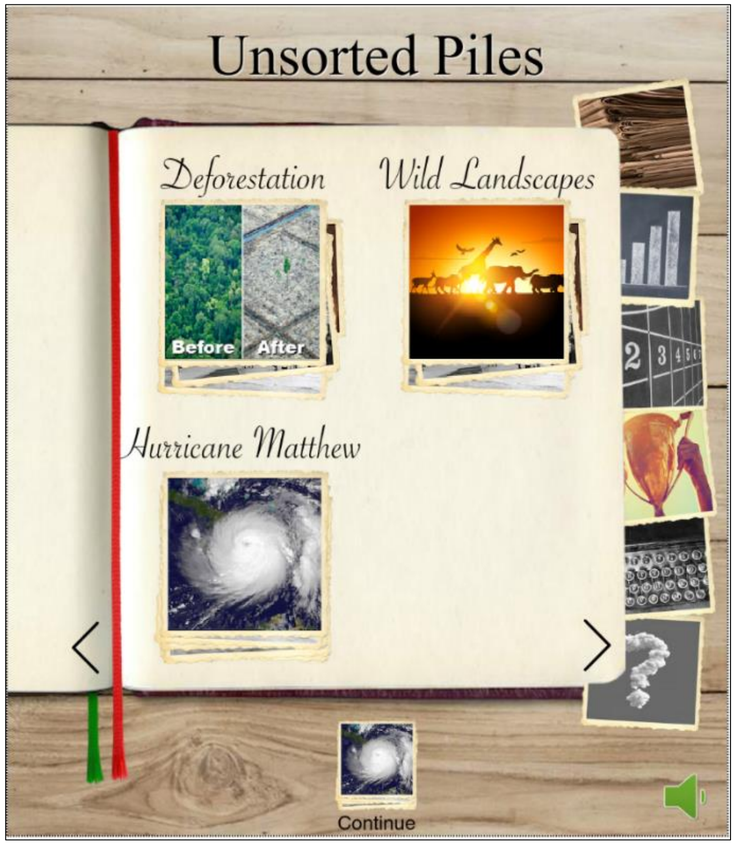
Upload data → Generate samples → Validate samples → Assess Accuracy

See et al., (2017) LACO-Wiki: A New Online Land Cover Validation Tool Demonstrated Using GlobeLand30 for Kenya. Remote Sensing 9 (7): e754

3 Picture Pile

Mobile application for rapid image assessment and change detection. Designed to be generic and flexible tool customizable to different domains that requires EO data as an input resource.

geo-wiki.org/games/picturepile



Available on the App Store

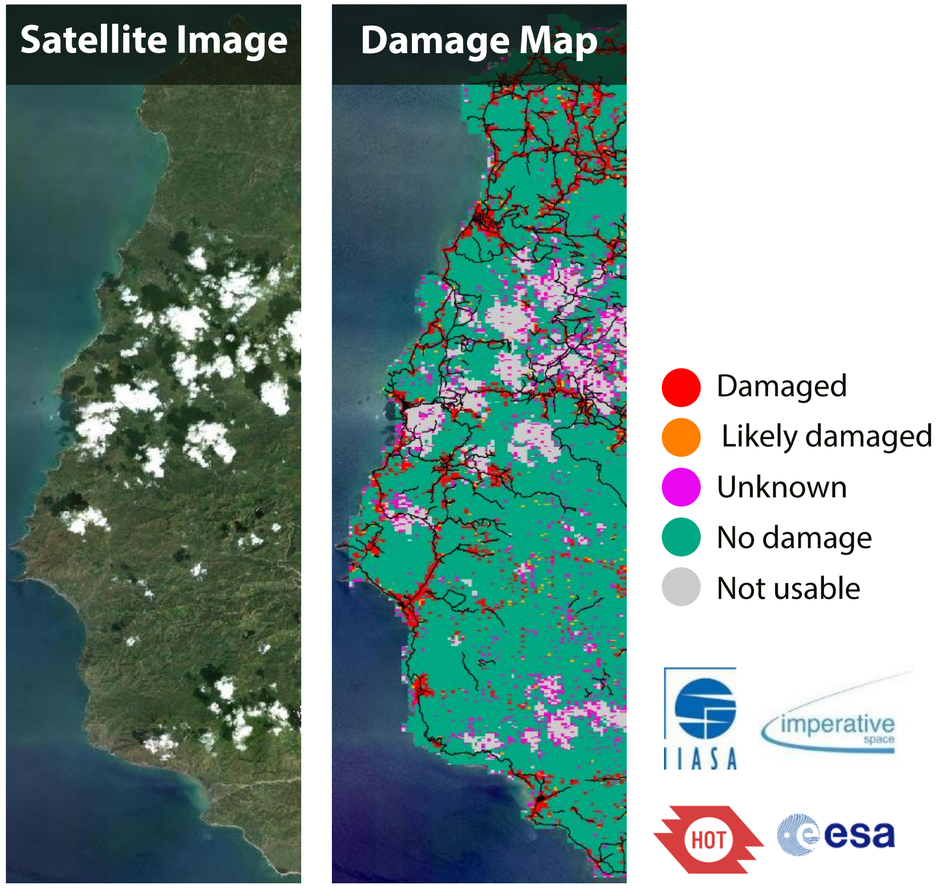
Get it on Google play

3 Picture Pile

Hurricane Matthew
Post-disaster damage mapping

179 volunteers

249K validations

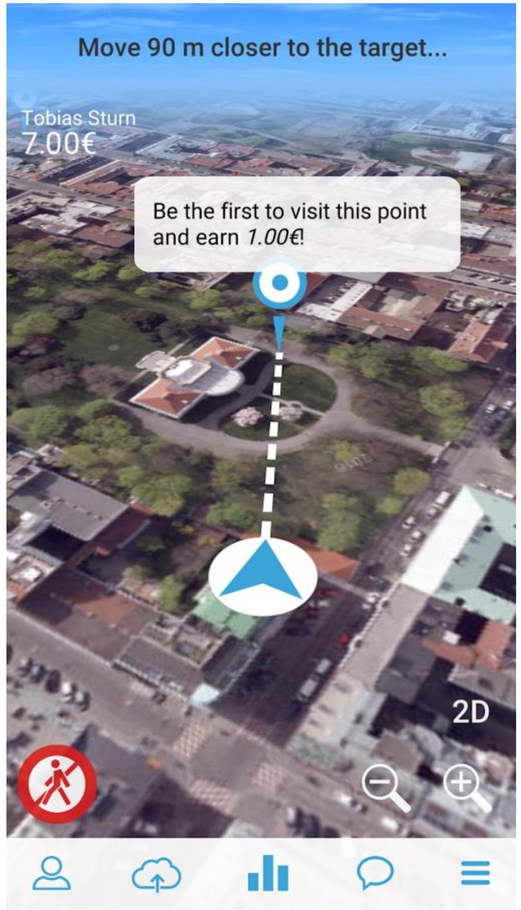


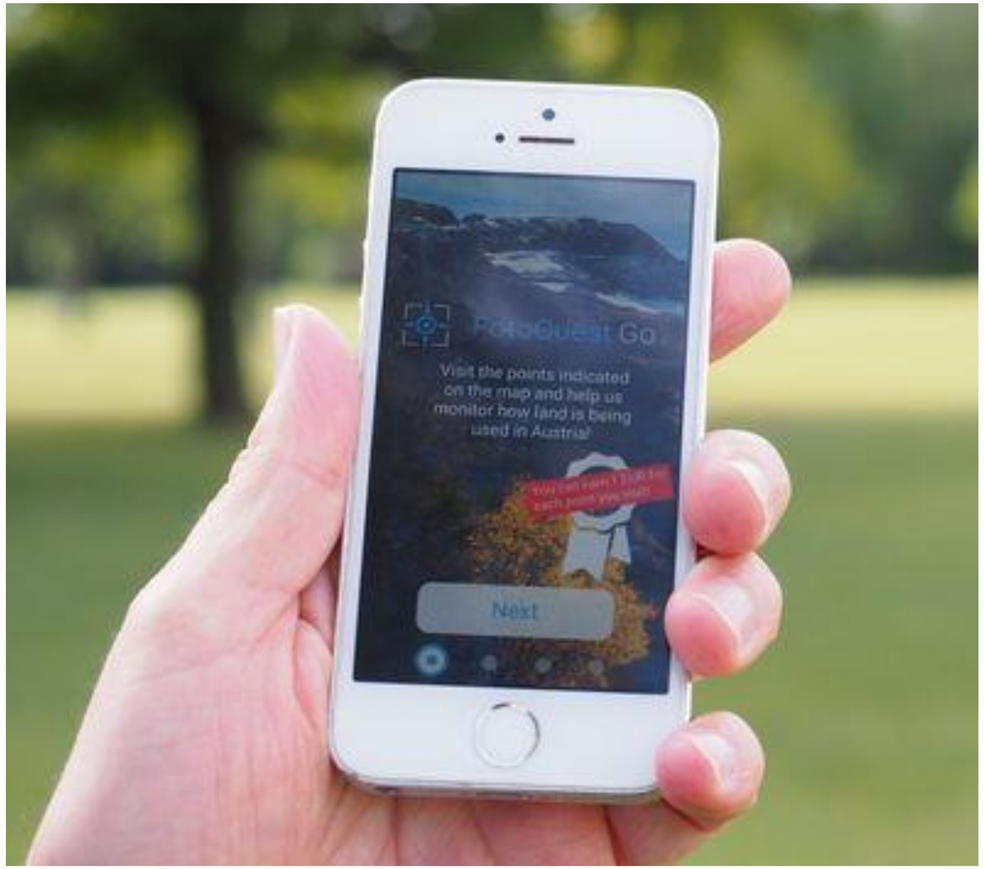
4 FotoQuest GO

Mobile application for in-situ data collection to promote community-based LULC awareness and monitoring.
Campaign just launched in Austria!

FotoQuestGo

http://fotoquest-go.org/





Available on the App Store

Get it on Google play

Cal/Val Potential

- Crowd can power large scale validation projects with quick turnaround
- Leveraging the networks of Citizen Observatories like LandSense, Groundtruth 2.0, GROW and SCENT

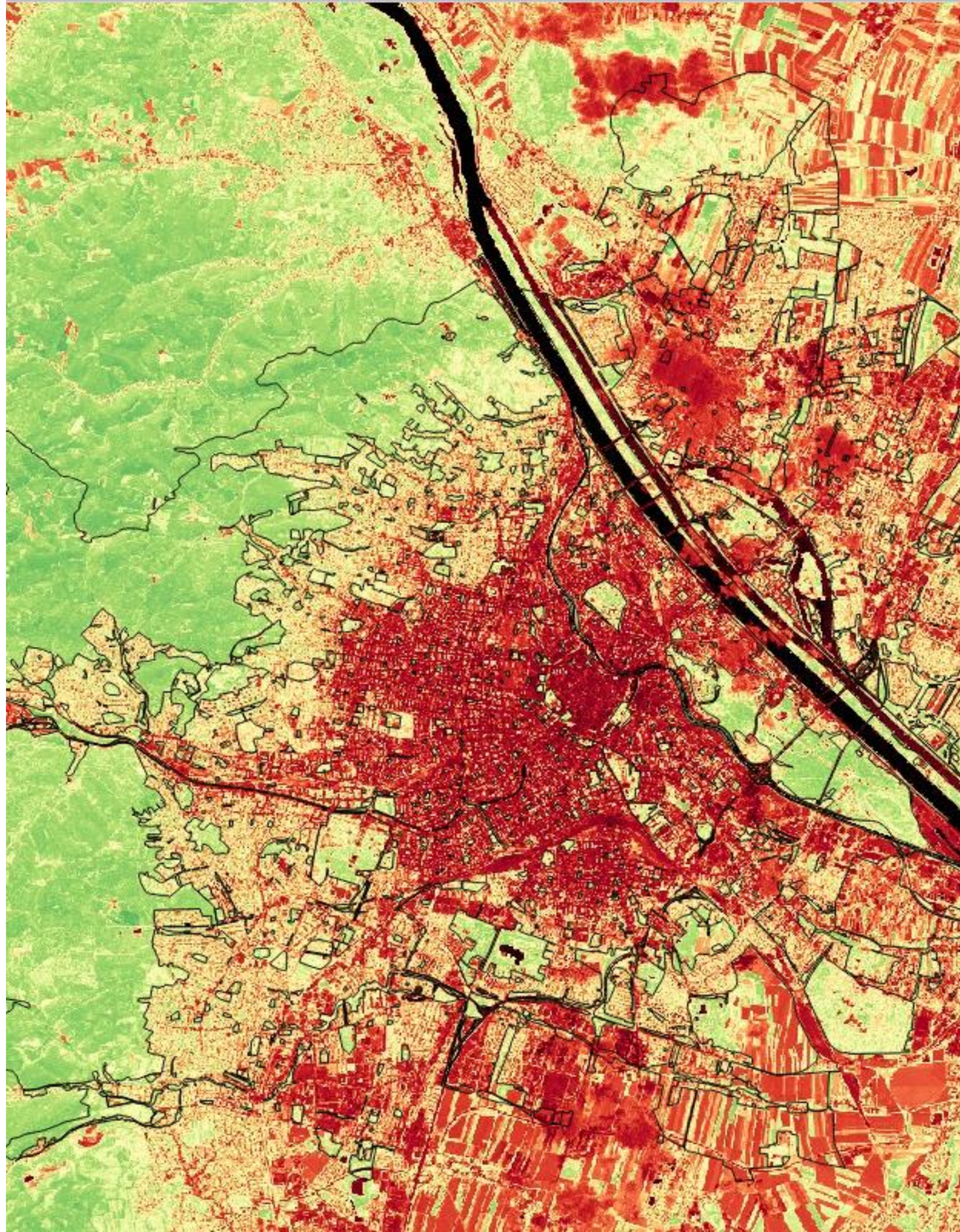
LandSense
A Citizen Observatory and Innovation Marketplace for Land Use and Land Cover Monitoring

groundtruth2.0
Environmental knowledge discovery of human sensed data

GROW OBSERVATORY

scent

- Integration with ESA cal/val toolbox
- Openly accessible cal/val datasets for EO product delivery and updates



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