

EUROGEO WORKSHOP 2023



In Situ Data in the Evoland Project

Steffen Fritz (IIASA)



BOLZANO 2-4 OCTOBER 2023



eurac
research





What is In-Situ data?

Non-Satellite data, Reference data?

 <p>OBSERVATIONS</p>	Environmental measurements from measuring stations, weather balloons, sensors aboard airplanes, ships, floats, moorings, radars, river gauges, air quality sensors, etc.
 <p>SPATIAL DATA</p>	Topographic maps (natural land surface and man-made features), hydrography, transport networks and land cover, digital elevation models, aerial imagery, etc.

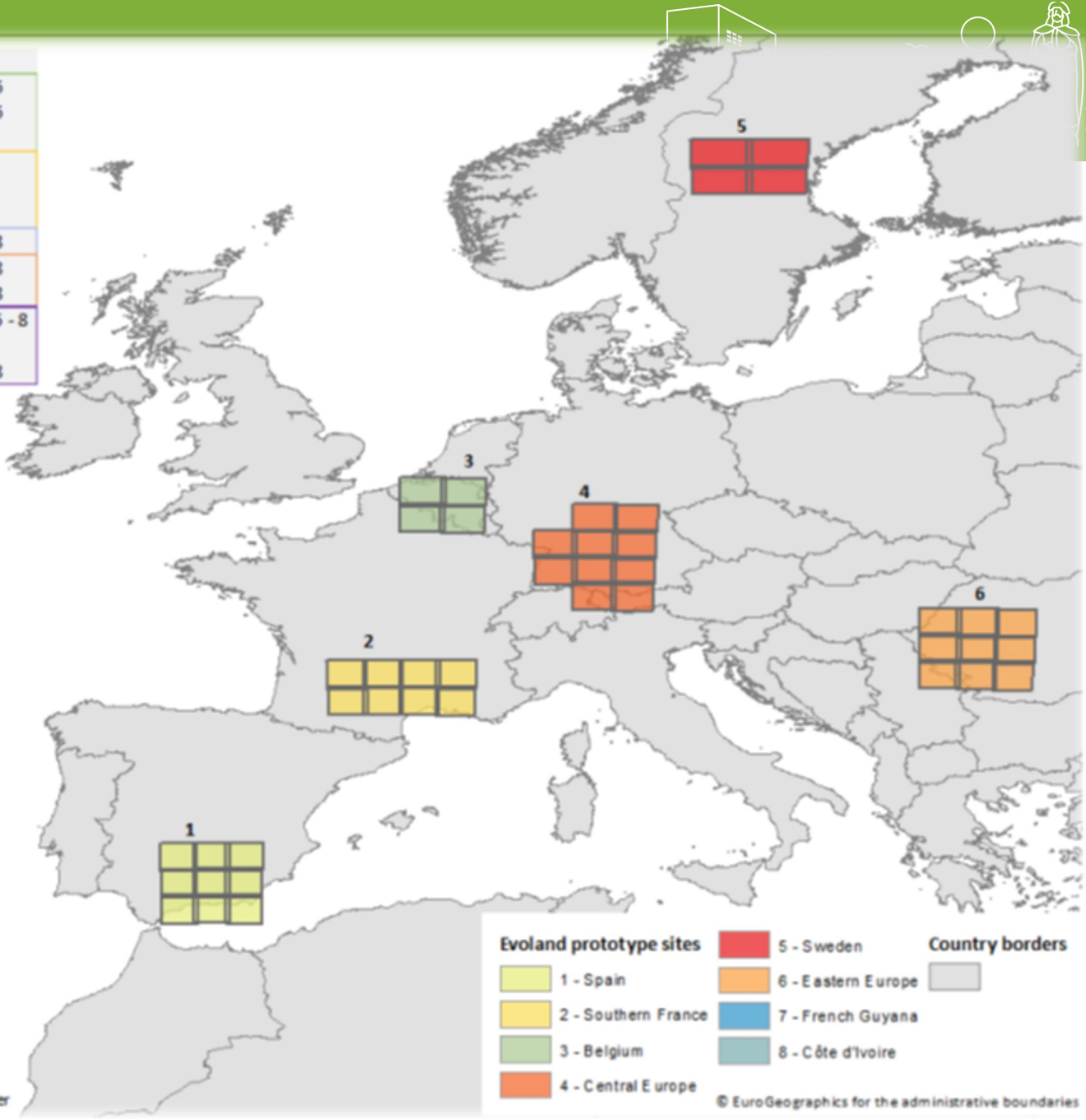
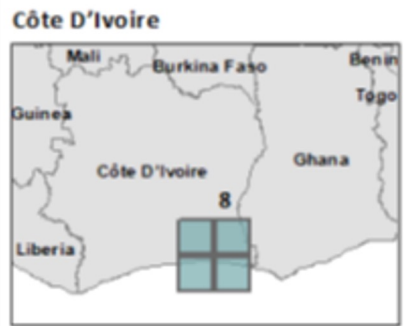
.....and economic, environmental and social information. The picture is not static; **the scope of in situ data is also widening, thanks to a growing number of non-satellite observation platforms and the emergence of crowdsourcing.** The development of technologies involving integrated devices – **the Internet of Things** - is likely to **involve the deployment of new sensors**, adding to the data that can be used by Copernicus.



EvoLand

- **Harmonisation and further integration of the products across components** (local/pan-European/global) is envisaged in the programme as well as a more efficient workflow by further **automation, modularity of the software and data products, and the increased use of Artificial Intelligence (AI) to provide real and near real time data processing**, to respond to emerging European policy needs.
- **EvoLand** will develop and test methods which are both new and innovative and roll out **11 candidate prototypes in support** of the evolution of the Copernicus Land Monitoring Service. It will integrate novel Earth Observation, in-situ data and the latest Machine Learning techniques to continuously monitor the status, dynamics and biomass of the land surface. The project focuses on five key thematic domains: **agriculture, forest, water, urban, and general land cover**.

Prototype	Sites
Continuous Forest Monitoring	1 - 4 - 5 - 6
Forest Disturbance	1 - 4 - 5 - 6
Forest Biomass	1 - 5 - 7
Cover Crop Type mapping	3 - 4 - 6
Crop/Grass GPP	3 - 4 - 6
Small Landscape Features	1 - 3 - 6
Water Bodies	1 - 3 - 5 - 8
Automated Urban Land Use	2 - 3 - 4 - 8
Imperviousness Continuous monitoring	2 - 3 - 4 - 8
Continuous LSC mapping	2 - 3 - 4 - 5 - 8
Continuous LSC mapping (CLC+)	1 - 4 - 6
On demand Land Cover	3 - 4 - 7 - 8





Evoland

Coordinated by



Partners





Objective

- Evaluate and further develop innovative data fusion, continuous monitoring, Artificial Intelligence and biomass mapping approaches, and make use of novel EO and in-situ data to improve existing and develop novel products and services for the pan-European and Global CLMS components

Tasks

- T2.1: Novel EO Data Integration
- T2.2: Novel In-Situ and Training Data

Deliverables

- D1.3 EO and in-situ data requirements report
- D2.7 Existing and novel in-situ and training
- datasets



Existing and novel in-situ and training datasets

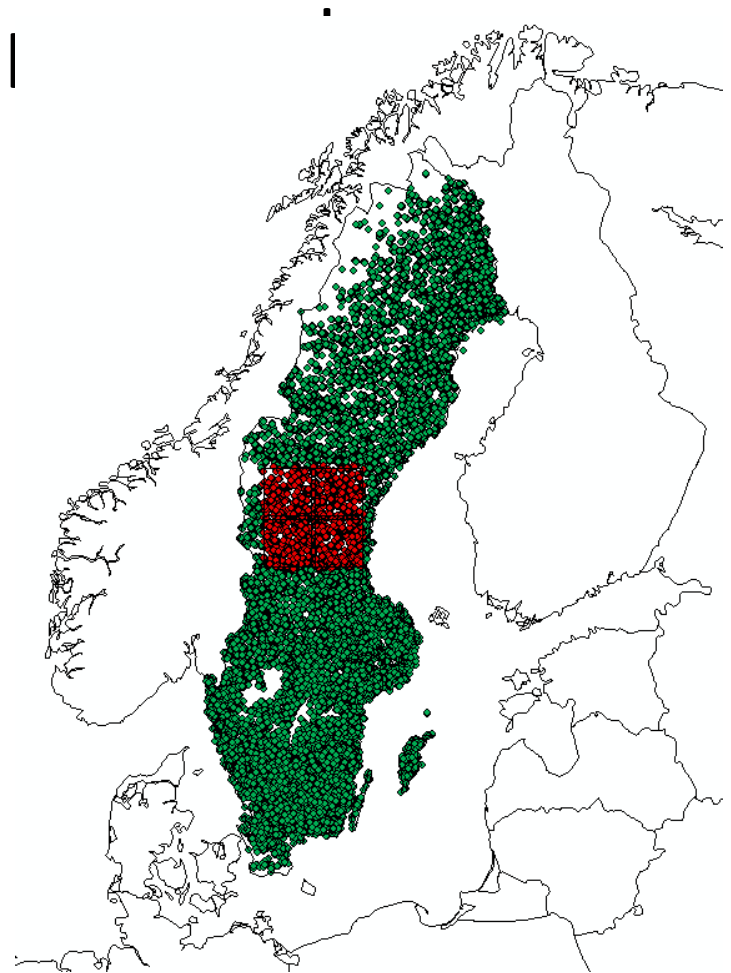
- Available now to the Consortium
 - Land-Use/Cover Area frame Survey (LUCAS)
 - Land Parcel Information System (LPIS)
 - EuroCrops
 - Some National Forest Inventories
 - GEO-trees forest plots for French Guiana
 - TropiSAR (French Guiana)
 - LIDAR (Sweden case study)
 - Open Street Map
 - Fluxdata GPP



Swedish National Forest Inve

There are 4775 NFI plots for the EvoLand test area. Besides of geolocation, there are several parameters critical for validation of the remote sensing data:

- Plot area (154 m²)
- Year of measurements (2007-2021)
- Mean canopy height, m
- Stand age, years;
- Stand density (0-1);
- Growing stock volume, m³/ha for major tree species (Scots pine, Lodgepole pine, spruce, birch, other deciduous)





GEO-trees forest plots for French Guiana

- Global in-situ forest biomass database to support Earth Observation
- Well curated biomass plot data in a unified format, that is aggregated from tree level data consistently across different networks.
- IIASA NoDES is responsible for the data storage and access to the data.

The screenshot shows the DATA.GEO-TREES website interface. At the top, there is a navigation menu with links: MAP, ABOUT, NEWS, CONTRIBUTE, DATA PACKAGE, RESOURCES, CODE OF CONDUCT, and CONTACTS. The main content area is split into two parts. On the left is a satellite map of a forest area in French Guiana, with several blue square markers representing forest plots. A label 'Crique Verlot' is visible on the map. On the right is a 'PLOT INFORMATION' panel for plot PAR-16 (82). The panel lists the following details:

- PAR-16 (82)**
- French Guiana
- Network: TmFO
- Institutions: CIRAD
- Link: <https://paracou.cirad.fr>
- Pls: Geraldine Derroire, Bruno Héroult
- Sub-plot area: 0.25 ha; Plot area: 25 ha
- Biomass Processing Protocol: RepFOS_15Feb19_TropiSAR.pdf
- Established: 1991
- Census: 2010
- Measurements:
 - AGB Chave: 287 t/ha
 - AGB Feldpausch: 316 t/ha
 - AGB Local HD: 275 t/ha
 - Basal Area: 22.7 m²/ha
 - H Lorey Local: 24.7 m
 - H Lorey Chave: 26.4 m
 - H Lorey Feldpausch: 28.4 m
 - H Max Local: 33.8 m
 - H Max Chave: 39.2 m

<https://data.geo-trees.org/>



CORDA

- <https://corda.eea.europa.eu/SitePages/About.aspx>
- CORDA (Copernicus Reference Data Access) is a single-entry point node to the relevant national and regional geospatial reference data. This node provides an index of URLs to the relevant for Copernicus services and digitally available national and regional reference data and services across Europe and is restricted to access by Copernicus Services providers only.
- Data from EEA-38 countries (EEA-32 countries and six cooperating countries) for Copernicus Services which address six main thematic areas.
 - Land Monitoring
 - Marine Monitoring
 - Atmosphere Monitoring
 - Emergency Management
 - Security
 - Climate Change



Table 11: CORDA INSPIRE theme "Land Cover"

Country	Dataset	Authority
Austria	INVEKOS (Integrated Administration and Inspection System) Agricultural parcels 2022	Federal Research and Training Center for Forests, Natural Hazards and Landscape (Austria)
Austria	INVEKOS (Integrated Administration and Inspection System) Farmers' Block 2022	Federal Research and Training Center for Forests, Natural Hazards and Landscape (Austria)
Austria	INVEKOS (Integrated Administration and Inspection System) Agricultural parcels 2022	Federal Research and Training Center for Forests, Natural Hazards and Landscape (Austria)
Austria	INVEKOS (Integrated Administration and Inspection System) Farmers' Block 2022	Federal Research and Training Center for Forests, Natural Hazards and Landscape (Austria)
Austria	Tree species composition	Federal Research and Training Center for Forests, Natural Hazards and Landscape (Austria)
Belgium	Forest map of Flanders	Agency for Nature and Forests of Flanders(ANB) (Belgium)
Belgium	Forest map of Flanders	Agency for Nature and Forests of Flanders(ANB) (Belgium)

Belgium	Land Cover 2001 of Flanders	Flanders Information Agency (Belgium)
Belgium	Land Cover 2001 of Flanders	Flanders Information Agency (Belgium)
Belgium	INSPIRE Topographic Map	National Geographic Institute of Belgium (NGI) / (IGN) (Belgium)
Belgium	Top10Vector - Soil cover and vegetation	National Geographic Institute of Belgium (NGI) / (IGN) (Belgium)
Belgium	Top50Vector	National Geographic Institute of Belgium (NGI) / (IGN) (Belgium)
France	Forests	National Institute of Geographic and Forest Information (IGN) (France)
Germany	ATKIS Basis Digital Landscape Model of Hessen	Hessian State Agency for Land Management and Geo-Information (HLBG) (Germany)
Germany	Digital Topographic Map 1: 500.000 of Bavaria	Bavarian State Office for Digitizing, Broadband and Survey (LDBV) (Germany)
Germany	Presentation graphic 1:10000 of Hessen	Hessian State Agency for Land Management and Geo-Information (HLBG) (Germany)
Germany	Presentation graphic 1:100000	Hessian State Agency for Land Management
	of Hessen	and Geo-Information (HLBG) (Germany)
Germany	Presentation graphic 1:25000 of Hessen	Hessian State Agency for Land Management and Geo-Information (HLBG) (Germany)





Geo-Wiki campaign interface: Example

Drivers of tropical forest loss (dropdown)

Homepage user1 Logout

Transparency slider for the overlay (e.g. reported tree loss)

Rapid zoom out

(Change base maps to compare)

Switch between pointer NDVI and Sentinel time-series tools

Additional campaign tools, including Exporting the location to visualize it in Google Earth, seeing driver classification examples, and contacting Geo-Wiki experts and other participants in the campaign

Campaign statistics and leaderboard

Campaign steps to be completed

Submission

STEP 1: Please select the predominant tree loss driver visible inside the tree loss pixels in the blue box

- Subsistence agriculture
- Commercial agriculture
- Commercial oil palm or other palm plantations
- Pasture
- Managed forest/forestry
- Roads/trails/buildings
- Mining and crude oil extraction
- Wildfire (disturbance)
- Other natural disturbances/No tree-loss driver

STEP 2: Please select all other tree loss drivers visible inside the tree loss pixels in the blue box

- Agriculture/Pasture
- Managed forest/forestry
- Roads/trails/buildings
- Natural disturbances
- No other tree loss driver visible

STEP 3: Can you see roads, trails or buildings in the blue box

Yes No

Comment:

Submit Skip

current sample point: 1738151
Your validations: 239
Your quality score: 0
lat/lon: -8.454860239/28.62698737
classified points: 295/5000

Leaderboard

Google Imagery ©2020 CNES / Airbus, Maxar Technologies Terms of Use



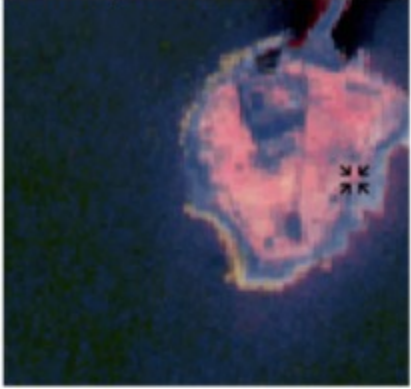
New Evoland Geo-wiki tool

The screenshot displays the Evoland Geo-wiki tool interface. At the top, there are navigation links for "Home", "Map", and "Projects", along with a "Logout" button. The main map area shows a satellite view of a coastal town with a segmentation overlay in red, green, and blue. On the left, a sidebar lists data layers: "WorldCover", "NDVI Composites (90th, 50th an...", "True color composite (Red, Gree...", and "SAR VV and VH bands as well as...". On the right, a "Segmentation" control panel includes a search bar, a list of selected bands (NDVI 90th Percentile, NDVI 50th Percentile, NDVI 10th Percentile, Green band, Blue band, Red band), a "No of cluster" input set to 3, a "Cluster / Re-Cluster" button, a "Cluster Images" section with a "Select cluster image" dropdown set to "Raster 1", a "Select label" dropdown set to "Permanent water bodies", and a "Preview" section with an "Image Opacity" slider and a "Preview" button.



WorldCover

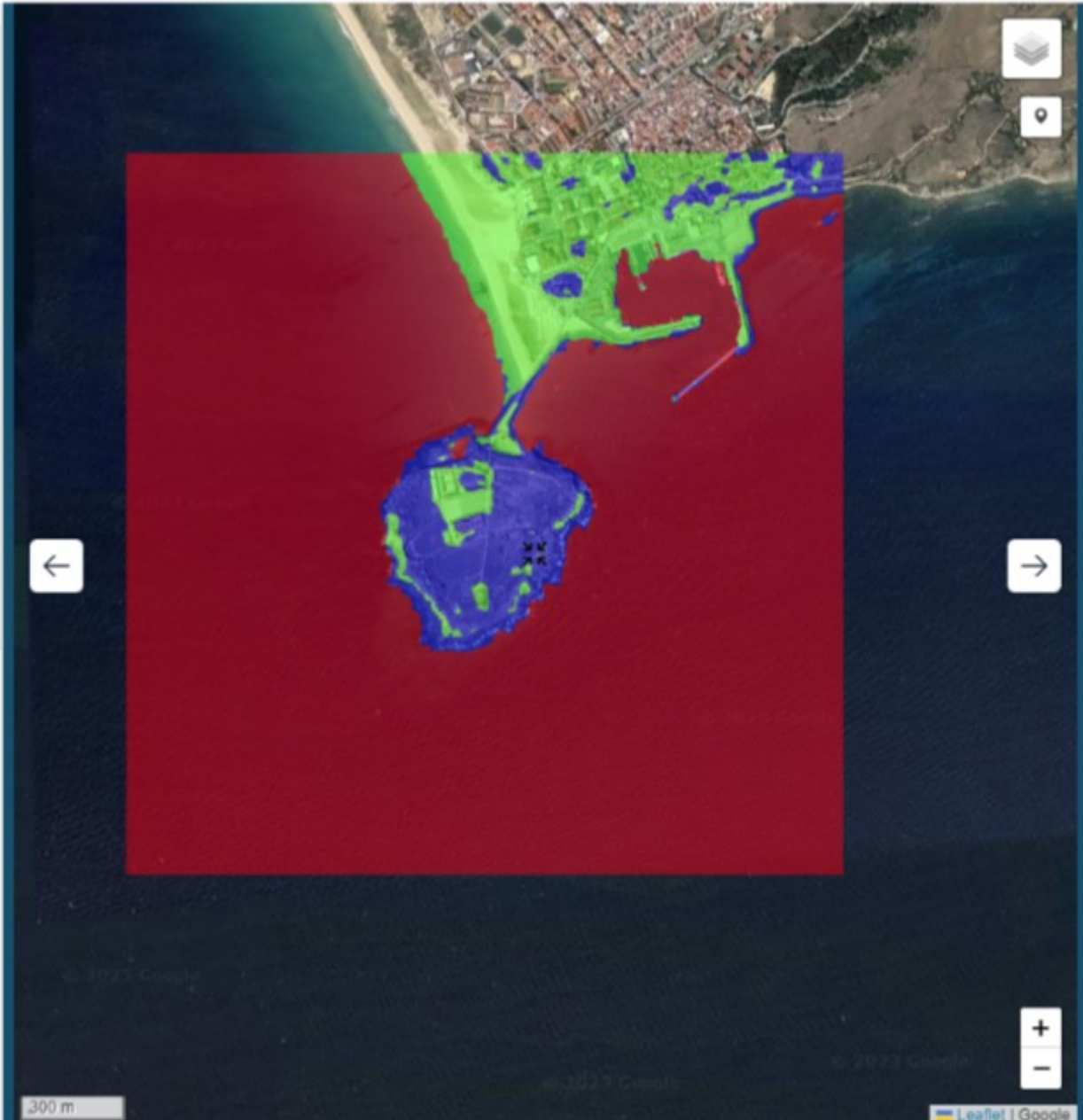
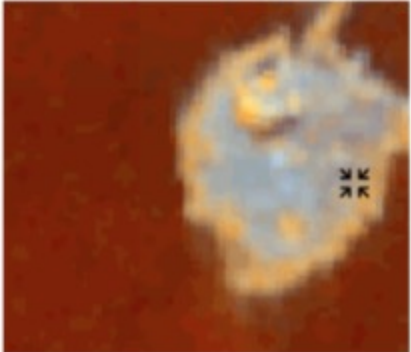
NDVI Composites (90th, 50th an... X



True color composite (Red, Gree...



SAR VV and VH bands as well as...



Cluster images

Select cluster image

Raster 1

Select label

Permanent water bodies

Preview

Image Opacity



Preview



Submit

EUROGEO WORKSHOP 2023



Street Imagery Validation

HOME CLASSIFY REVIEW LOGOUT PROFILE

DELINEATE THE FIELD BY DRAWING POLYGON

Rue de la Belle-Thérèse
Braives, Wallonia
View on Google Maps

IDENTIFY THE CROP TYPE HERE
IMAGE DATE: 2020-07

Crop Type and Irrigation
Crop type
Wheat Type Crop
Irrigation type
Unknown

Validation Details
Delineated Polygon: Yes
Panoramaid:
Ph7JJAXib0iICJAXyJshIQ
Street Image Date:
2020-07
Manual Image Date:
01 / 01 / 2020

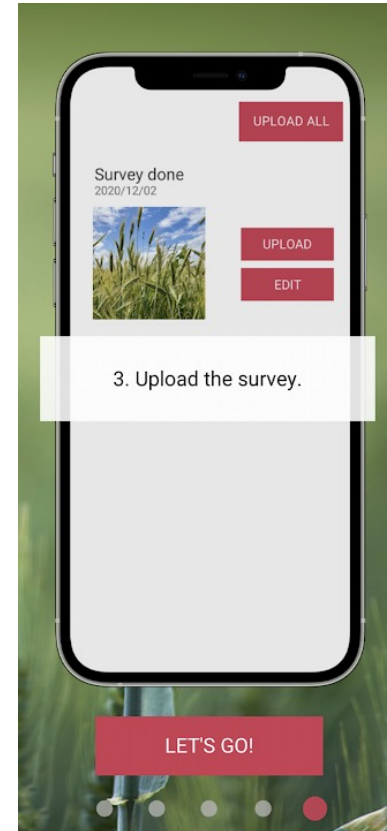
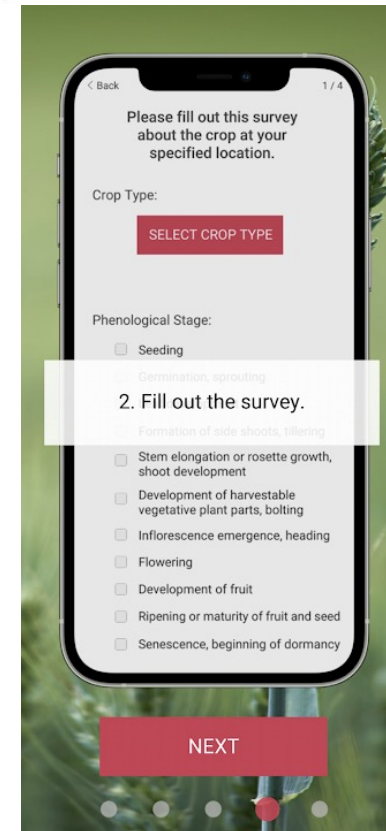
Values To Submit
Delineated Polygon
Ph7JJAXib0iICJAXyJshIQ
Wheat Type Crop
Unknown
2020-07
SUBMIT

Submitted Validation Points
Submission Id SEARCH
Wheat Type Crop :7791
Wheat Type Crop :7790

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- **New app: CropObserve**
- Involve non-experts
 - Basic information:
 - Crop type
 - Phenological stage
 - Damage
 - Management activities
- All data is made open!
- Already > 2000 points
- Alpha release: LPS 2022





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