An integrated in-situ data collection and curation system to enable rapid EO-based service development

Laurent Tits
VITO remote sensing

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The context

- H2020 E-shape project: “To strengthen global agricultural monitoring making use of Copernicus data and infrastructure”
- GEOGLAM: Group on Earth Observations Global Agricultural Monitoring Initiative

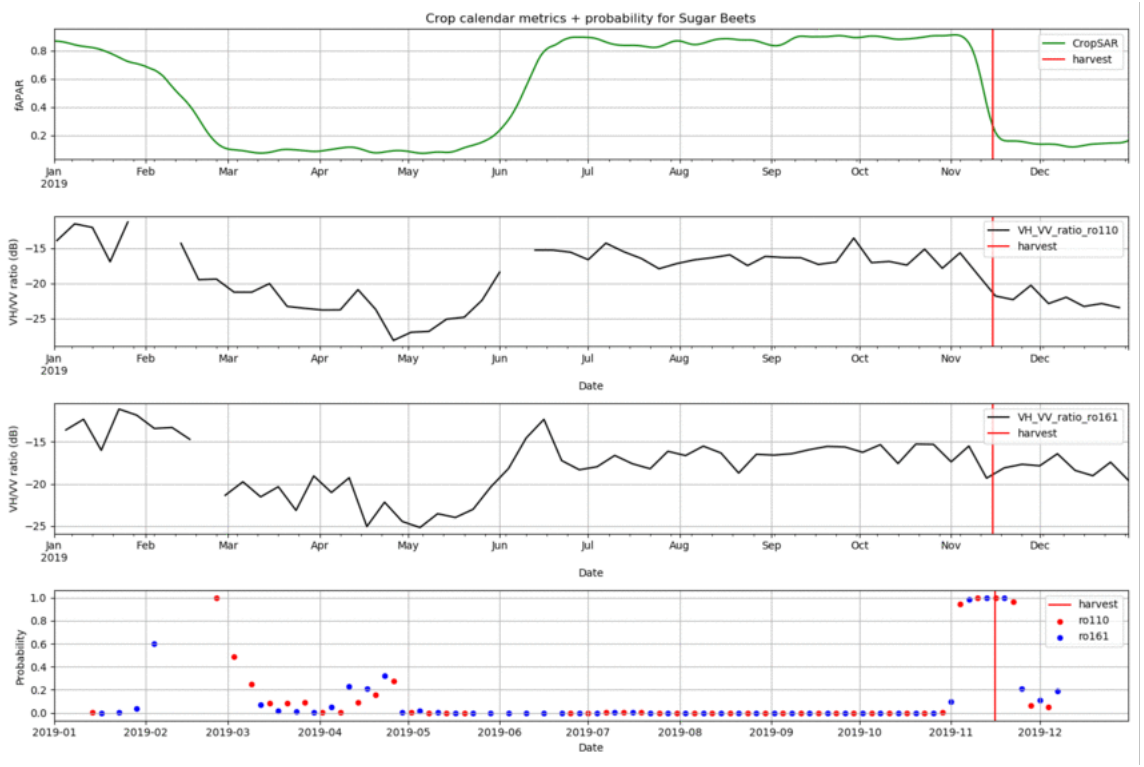
→ Focus on the global availability of the monitoring service

The agricultural monitoring

- EAV: Crop calendars
  - Harvest
  - Emergence
  - Mowing
- On-demand services

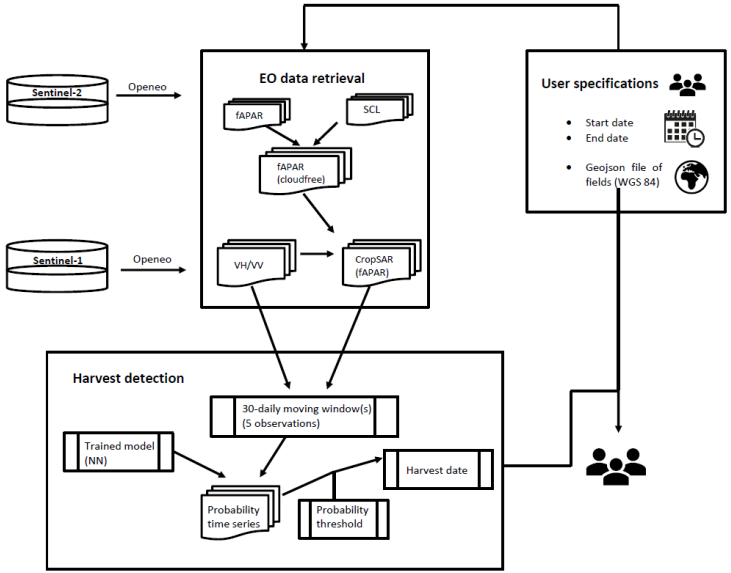
The agricultural monitoring

Harvest detection



The global component

- On-demand service → how to use cloud infrastructure?



Benchmarking exercise

Data availability (Global coverage?)
Ease of ordering
Ease of service integration
Ease of use
Processing speed & cost
…

→ Differences
→ What is still needed?

The global component

- From locally trained to globally applicable?
- In situ/reference data requirements!

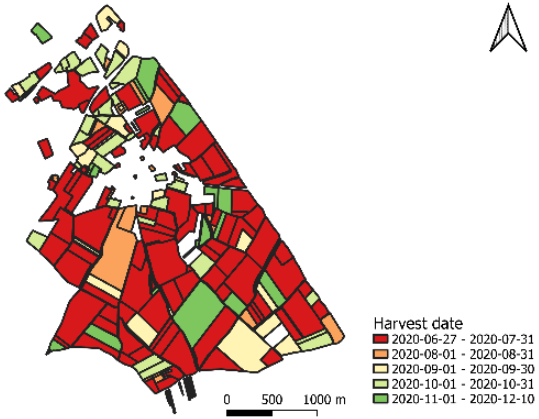
- What is already available?
- How can we collect more data?
- How to manage/organize the data?

Available In situ

- Inventoried open in-situ reference data
  - Limited sources (German phenology network, project/studies published in data journals/repositories)
  - Data use restrictions
- FAIRified existing open data and stored in AGROSTAC
- Curation is tedious process
  - Poor metadata
  - Data quality (unclear label descriptions, ..)
  - Fit for purpose (too old, too coarse)
- Clear need for more data acquired in standardized manner

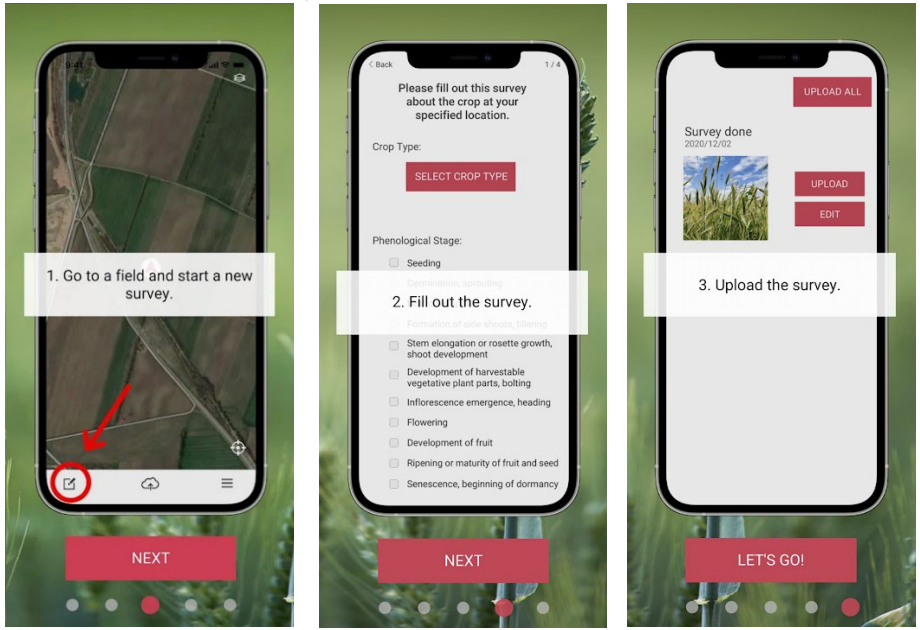
The integrated in-situ data collection and curation approach

AGROSTAC



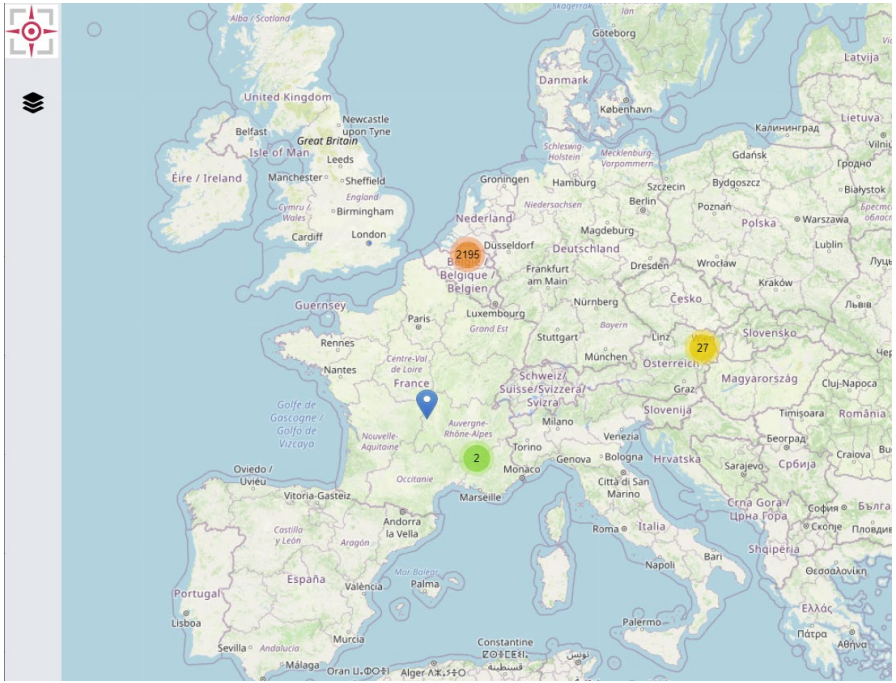
The in-situ data collection

- **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!



The in-situ data collection

- **cropobserve.org**
- Contains links to mobile application (cross-platform), map and data
- API-based data access



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The in-situ data collection

Rank	UserName	Total Surveys Uploaded	Total Images Uploaded
1	[redacted]	851	1795
2		838	1788
3		128	131
4		90	96
5		56	37
6		46	51
7		41	45
8		31	61
9		27	51
10		22	18

The integrated in-situ data collection and curation approach

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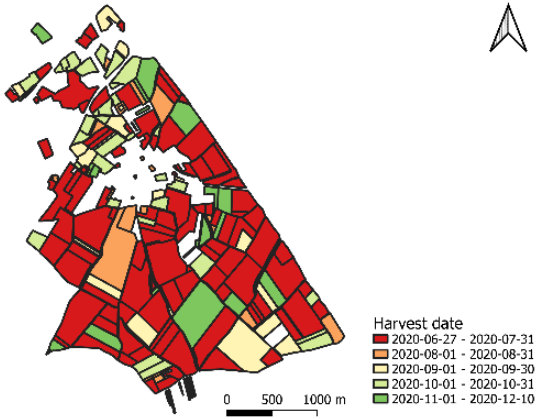
Quality control



The in-situ data curation

- Quality control:
  - Thematic
  - Spatial
  - Temporal
- Meta data completeness
- Still work in progress → part of GEOGLAM in-situ working group

The in-situ data curation

- **Agrostac -** agrostac.org

- collecting and harmonizing georeferenced open data around key agronomy observations
- Offer data in a **FAIR** manner

- Via viewer, or API-based

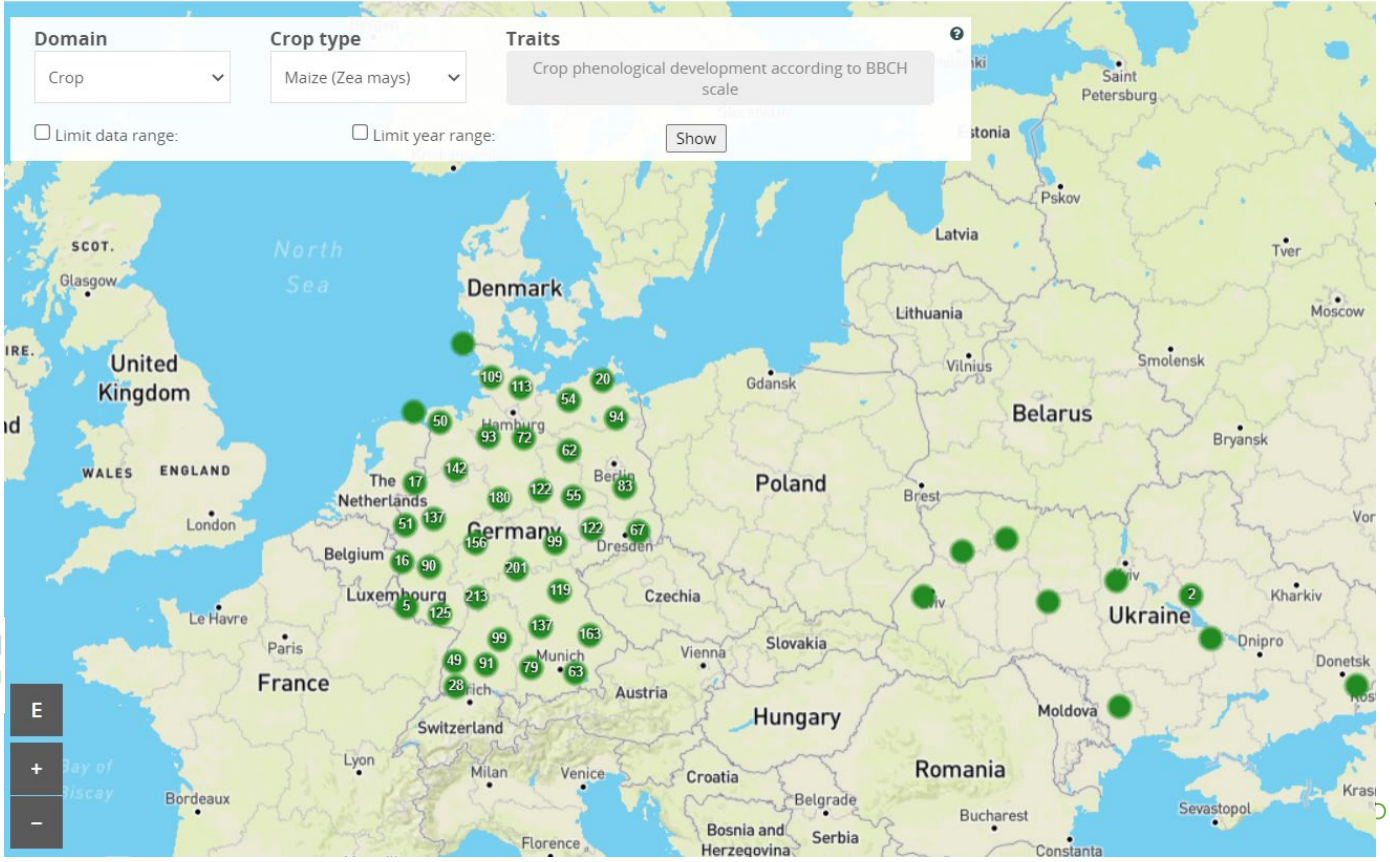
Available In situ

NEXTGEOSS European Data Hub and Platform e-shape

e-shape

Spatial Temporal Attribute Catalogue for Agronomy

Locations with phenology data on maize



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The integrated in-situ data collection and curation approach

e-shape

Automatic push

Quality control

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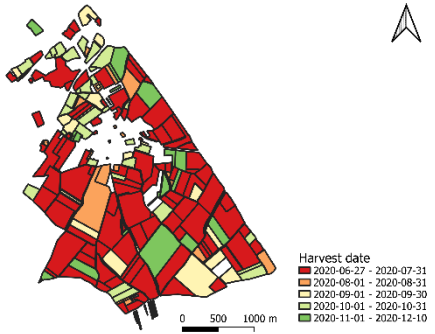
Automatic extraction



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Evaluating services

External users: map and delineate cultivation period of cover (KU Leuven and VLM)

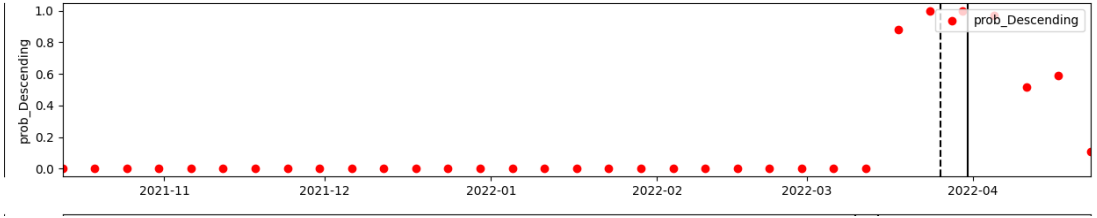
→ How to collect training data? → CropObserve

→ How to delineate cultivation period? → Evaluate EAV-methods on emergence and harvest for cover crops

Evaluating services

2021-12-05

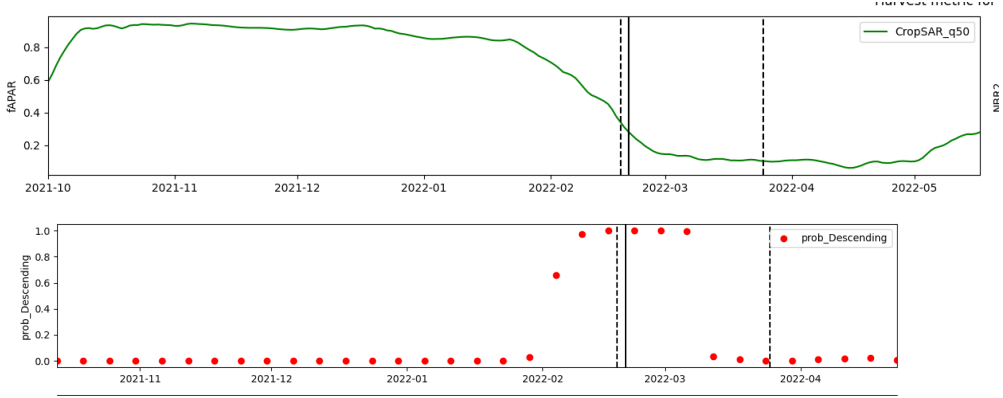
2022-03-26



Evaluating services

2022-02-14 | 2022-03-11 | 2022-03-29 | 2022-04-05



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remotesensing.vito.be

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e-shape

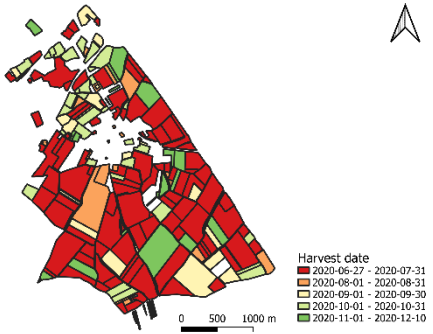
Automatic push

Quality control

AGROSTAC

Automatic extraction

Fit-for-purpose



cropobserve.org

agrostac.org

https://github.com/VITObelgium/E-shape/tree/develop/Pilot1/Notebooks

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THANK YOU

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Laurent.tits@vito.be

Sentinel-2 image Copernicus Sentinel data (2016)