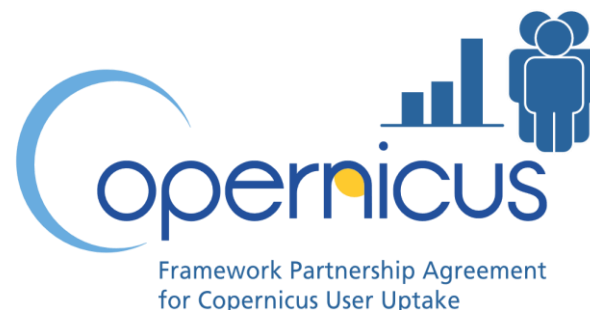




System for automatic land use change detection

Marcin Kluczek, Katarzyna Goch,
Katarzyna Dąbrowska-Zielińska,
Maciej Bartold

Institute of Geodesy and Cartography
Remote Sensing Centre



Land cover data

Copernicus Climate Change Services:
Global:

The United Nations Food and Agriculture Organization's (UN FAO) Land Cover Classification System (LCCS) at 300 m resolution. Land cover classification gridded maps are provided for the period 1992-2020, yearly.

Copernicus Land Monitoring Service:
Global

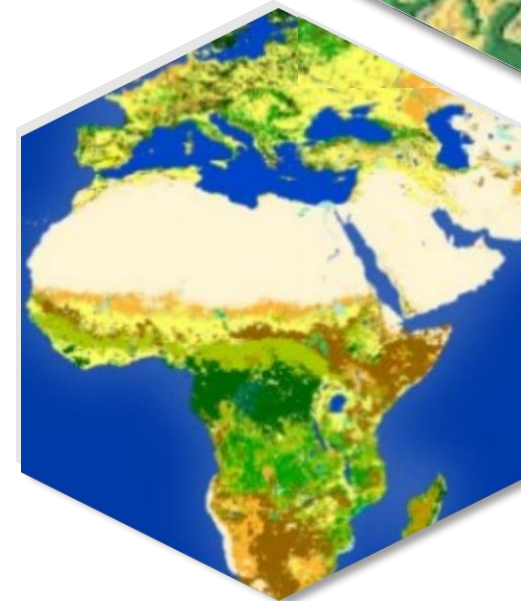
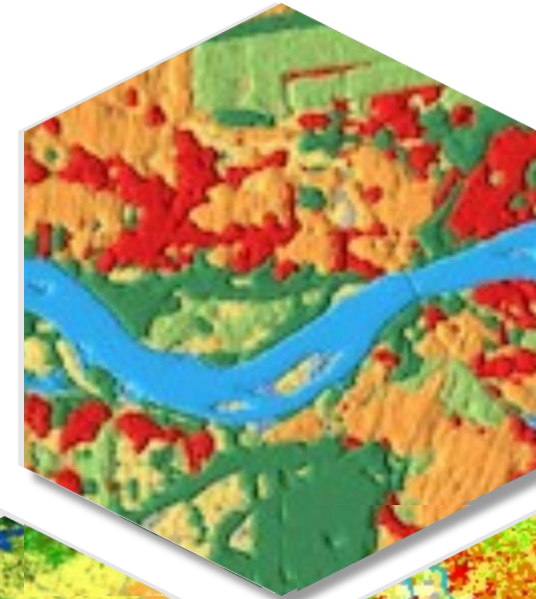
The Copernicus Global Land Service (CGLS) Dynamic Land Cover map at 100 m resolution, provided for the period 2015-2019, yearly.

Pan-European:

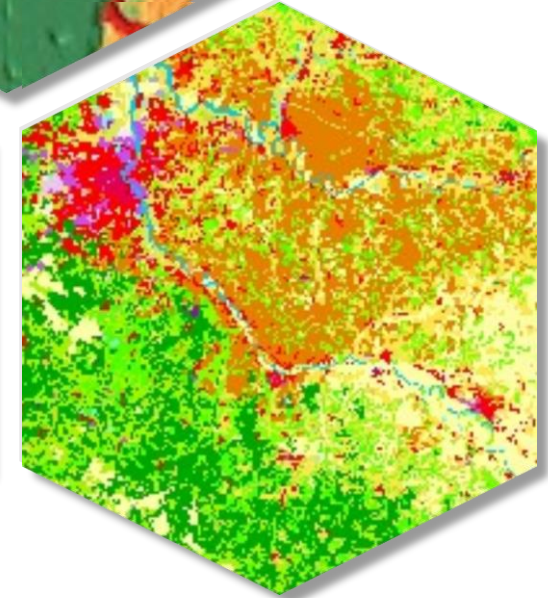
The CORINE Land Cover (CLC) vector inventory produced in 2000, 2006, 2012, and 2018

Land cover changes in European countries in 2000-2018

Google Dynamic World



ESA CCI



Corine Land Cover

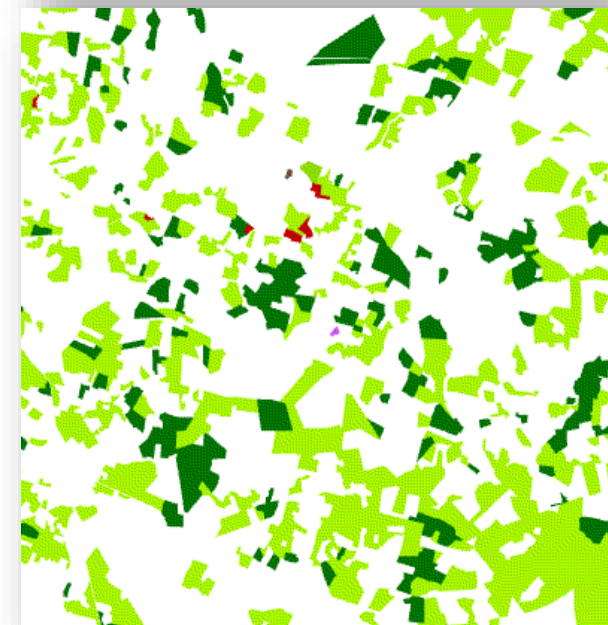
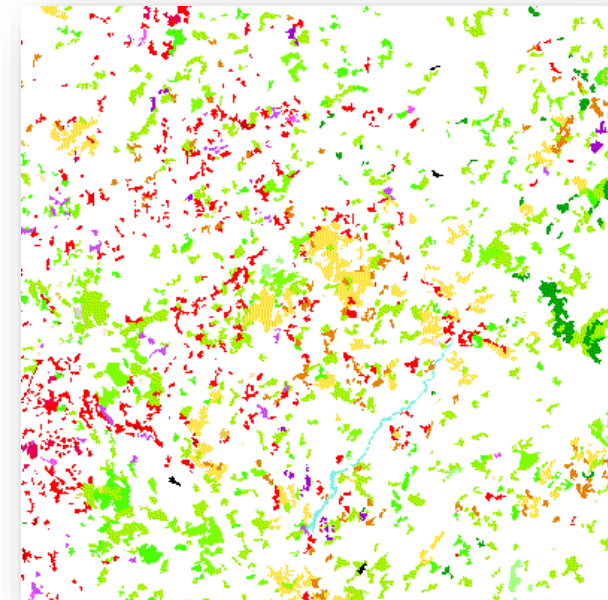
Land cover changes

Corine land cover change editions (100 m):

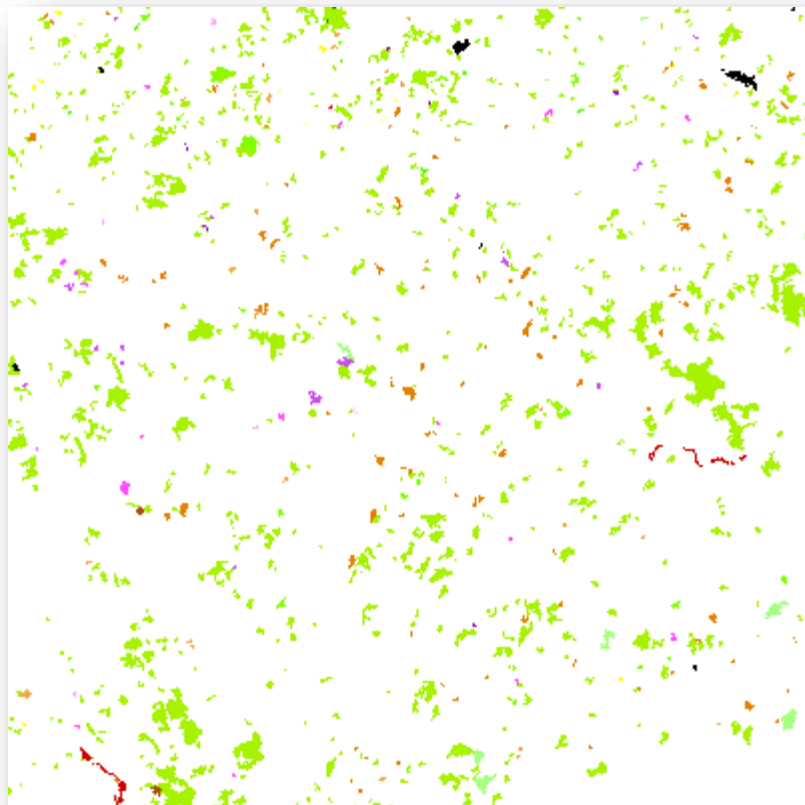
1990-2000 2000-2006 2006-2012 2012-2018

Other CLMS products:

- N2K Land Cover/Land Use Change (6-yearly)
- Grassland Change (20 m, 3-yearly)
- Dominant Leaf Type Change (20 m, 3-yearly)
- Riparian Zones Land Cover/Land Use Change (6-yearly)
- Tree Cover Change Mask Change (20 m, 3-yearly)
- Imperviousness Classified Change (20 m, 3-yearly)
- Land Cover Change Hot Spots globally
- Urban Atlas Land Cover/Land Use Change (6-yearly)
- Coastal Zones Land Cover/Land Use 2018 (6-yearly)



Types of land cover changes considered in the application



Deurbanisation



Afforestation



Urbanisation



Natural to agricultural areas



Proposed application: novelty

Satellite input:

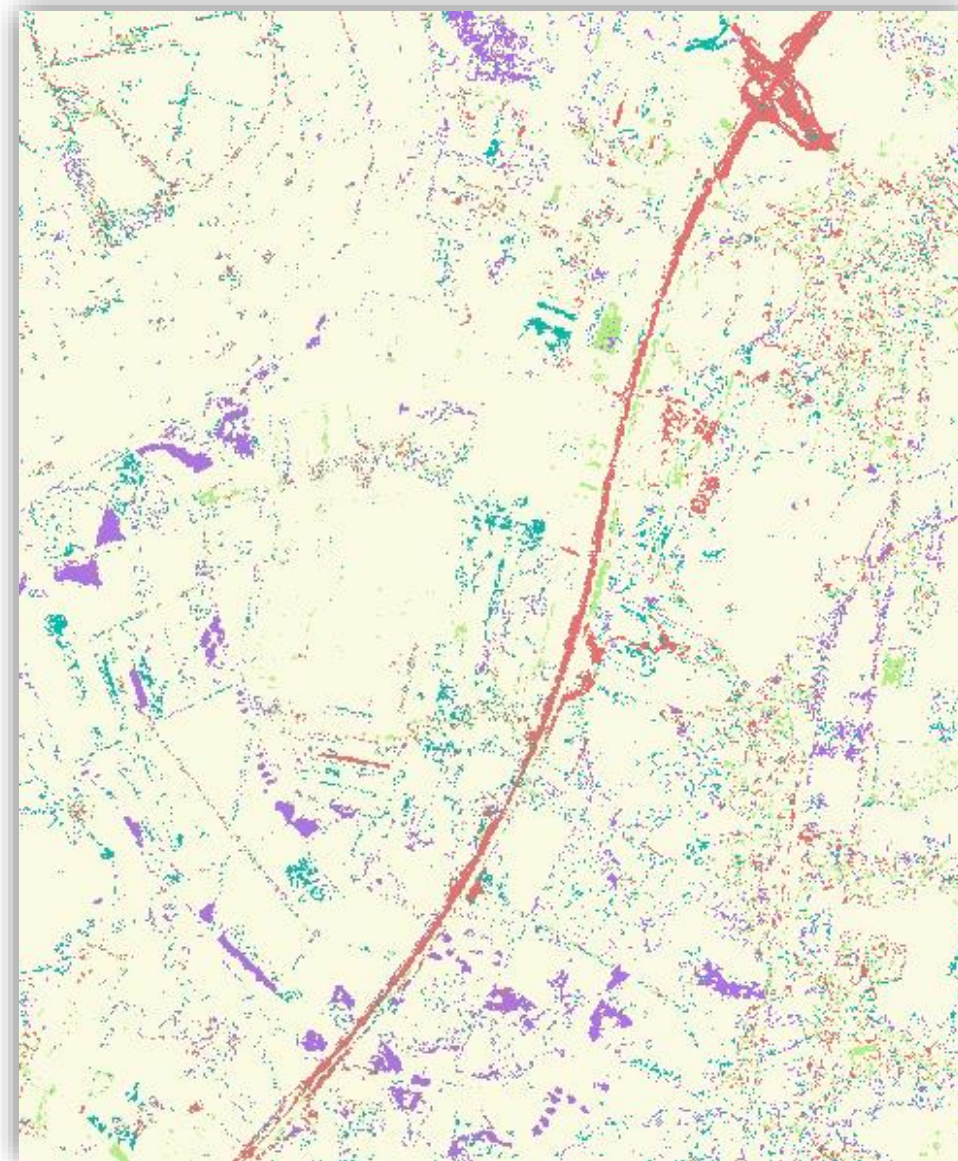
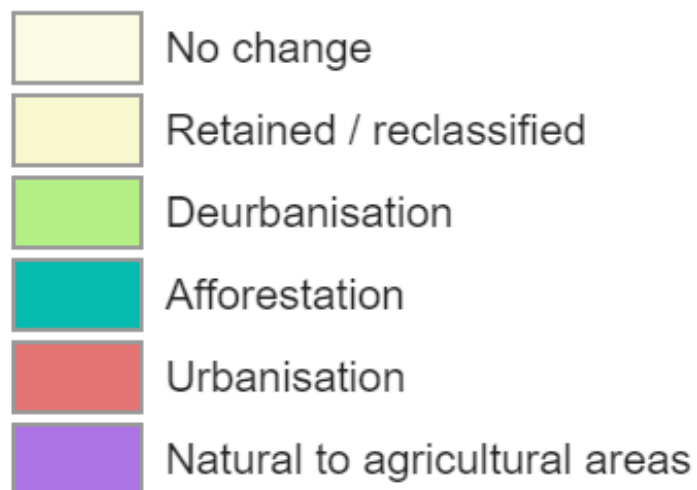
Sentinel-1 SAR GR

Sentinel-2 MSI Level-1C and Level-2A

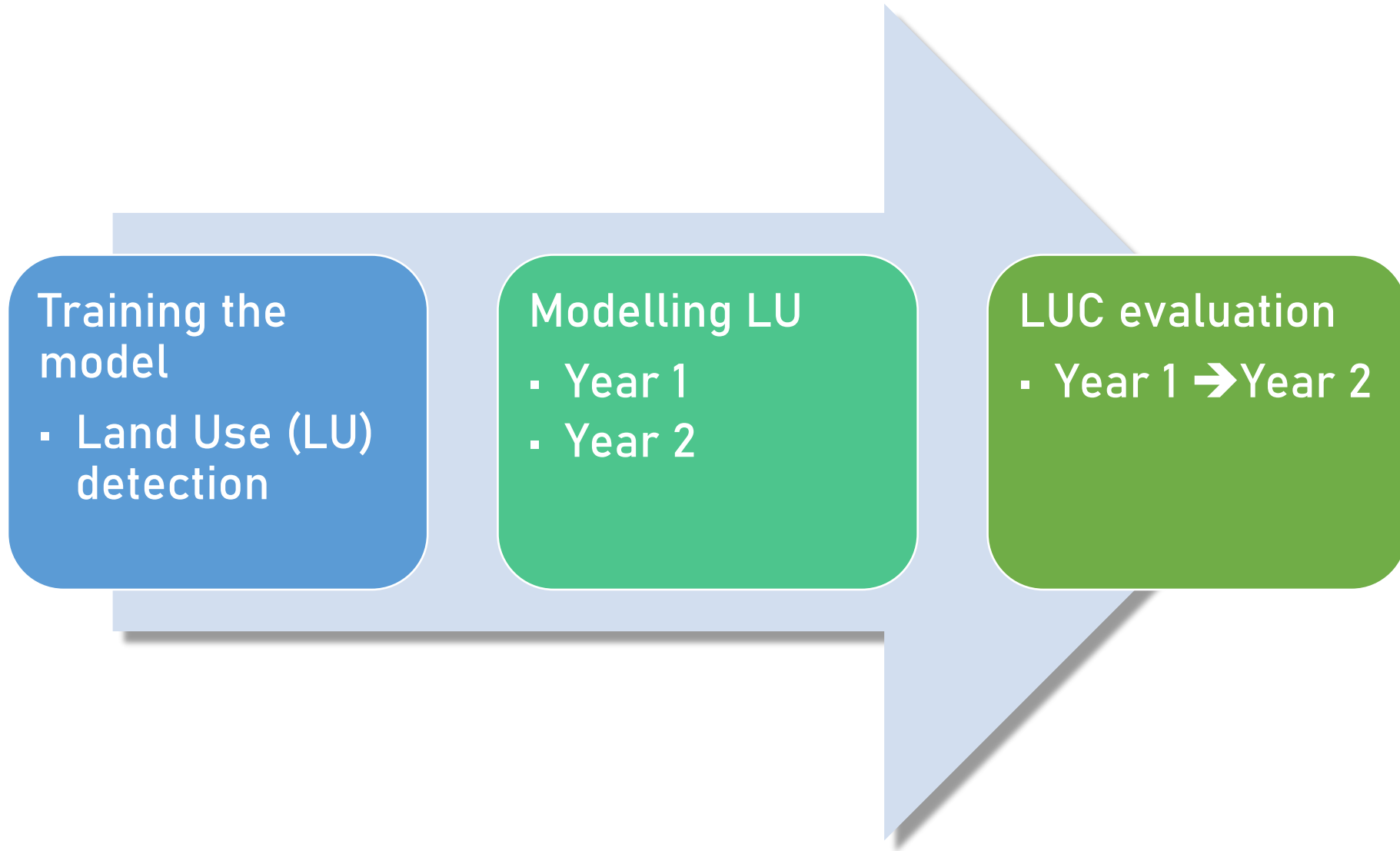
Spatial resolution: 10 m

Temporal resolution: yearly, 2015 (2019) – 2023

Evaluation of Land Use Change:



Application schema: simplified workflow



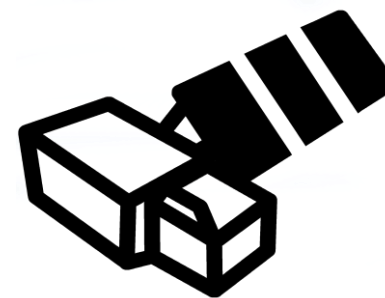
Input dataset

Copernicus data:

- Sentinel-1 GRD
- Sentinel-2 level 1C
- Sentinel-2 level 2A
- Corine Land Cover 2018



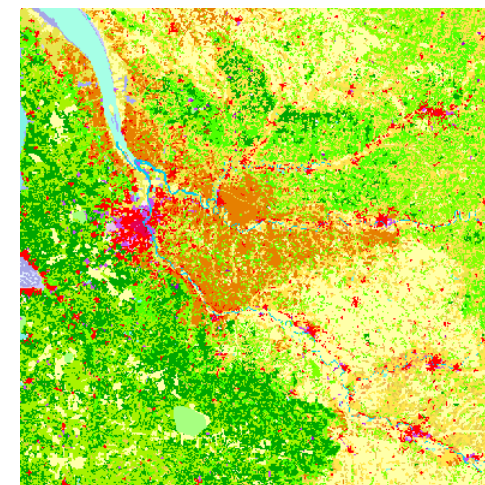
Sentinel-1
GRD



Sentinel-2
Level 1C
Level 2A



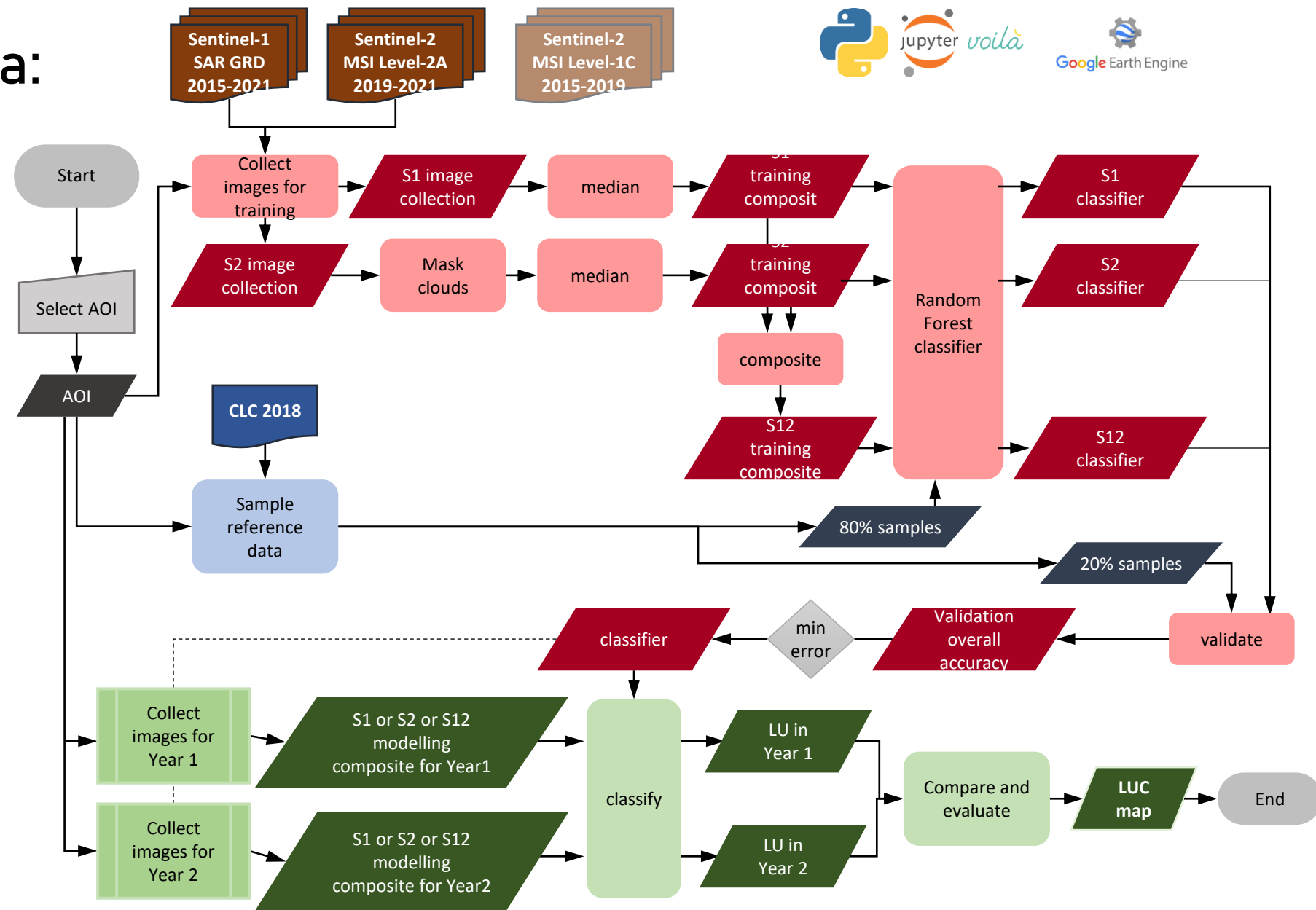
**Corine Land
Cover 2018**



Land Monitoring
Service

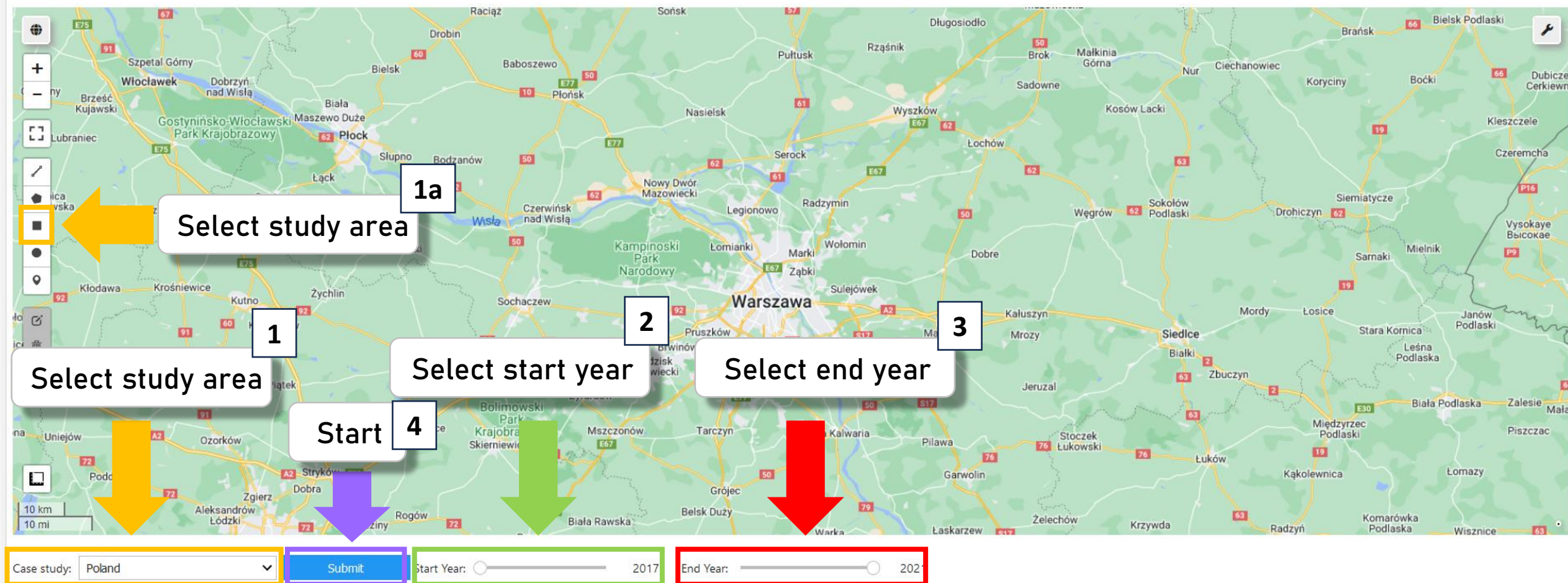


Application schema: main workflow



Application interface

FPCUP: Development of downstream applications supporting Sectoral Information System under Copernicus Climate Change Service



The screenshot displays a web-based application interface for selecting a study area and time period. The main component is a map of Poland, centered on Warsaw. Several annotations are present:

- 1**: A white box with the text "Select study area" and a yellow arrow pointing to the map's left sidebar.
- 1a**: A white box with the text "Select study area" and a yellow arrow pointing to a specific location on the map.
- 2**: A white box with the text "Select start year" and a green arrow pointing to the "Start Year" input field.
- 3**: A white box with the text "Select end year" and a red arrow pointing to the "End Year" input field.
- 4**: A white box with the text "Start" and a purple arrow pointing to the "Start Year" input field.

At the bottom of the interface, there is a row of input fields and buttons:

- A dropdown menu labeled "Case study:" with "Poland" selected.
- A blue "Submit" button.
- A "Start Year:" input field with a slider and the value "2017".
- An "End Year:" input field with a slider and the value "2021".

Polish case studies

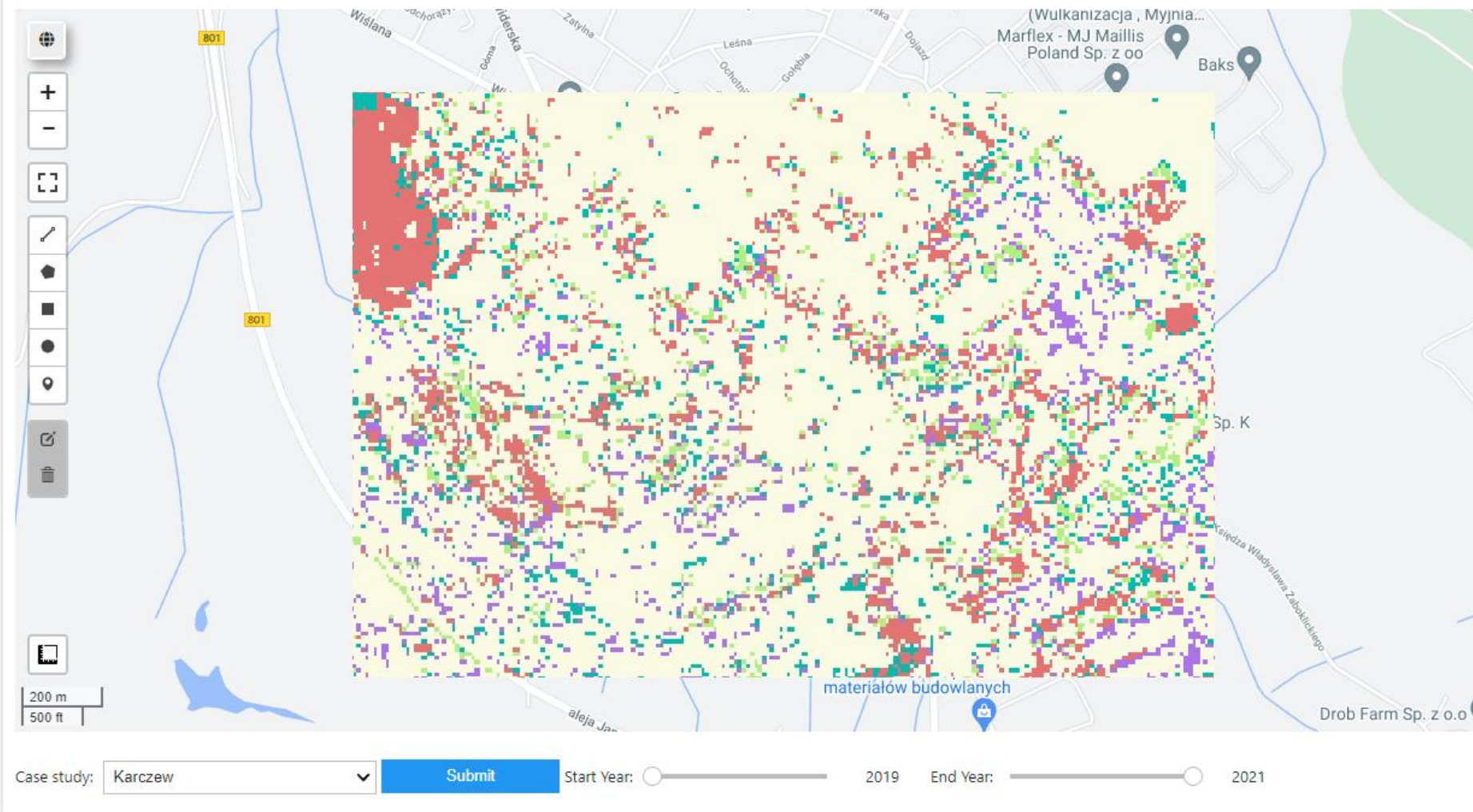
The different types of land cover change:

- Karczew – expansion of housing areas
- Kamieńsk – highway construction
- Białowieża – changes in forest areas, both (afforestation & deforestation)



Polish case study - Karczew

FPCUP: Development of downstream applications supporting Sectoral Information System under Copernicus Climate Change Service



Online Conference on 15th January 2024 - Development of downstream applications supporting the sector information system within the Copernicus Climate Change Service

Polish case study - Białowieża

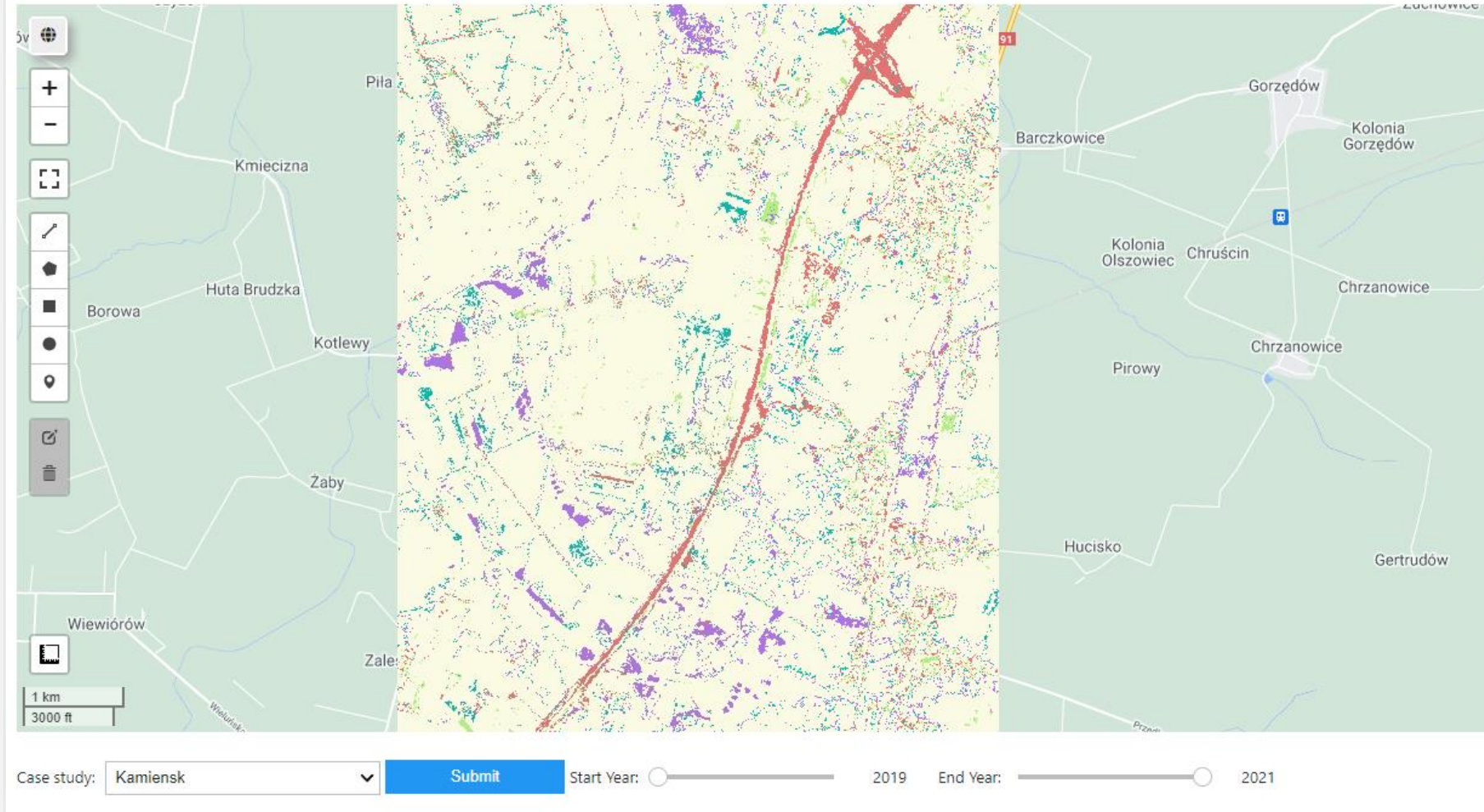
FPCUP: Development of downstream applications supporting Sectoral Information System under Copernicus Climate Change Service



- No change
- Retained / reclassified
- Deurbanisation
- Afforestation
- Urbanisation
- Natural to agricultural areas

Polish case study - Kamieńsk

FPCUP: Development of downstream applications supporting Sectoral Information System under Copernicus Climate Change Service



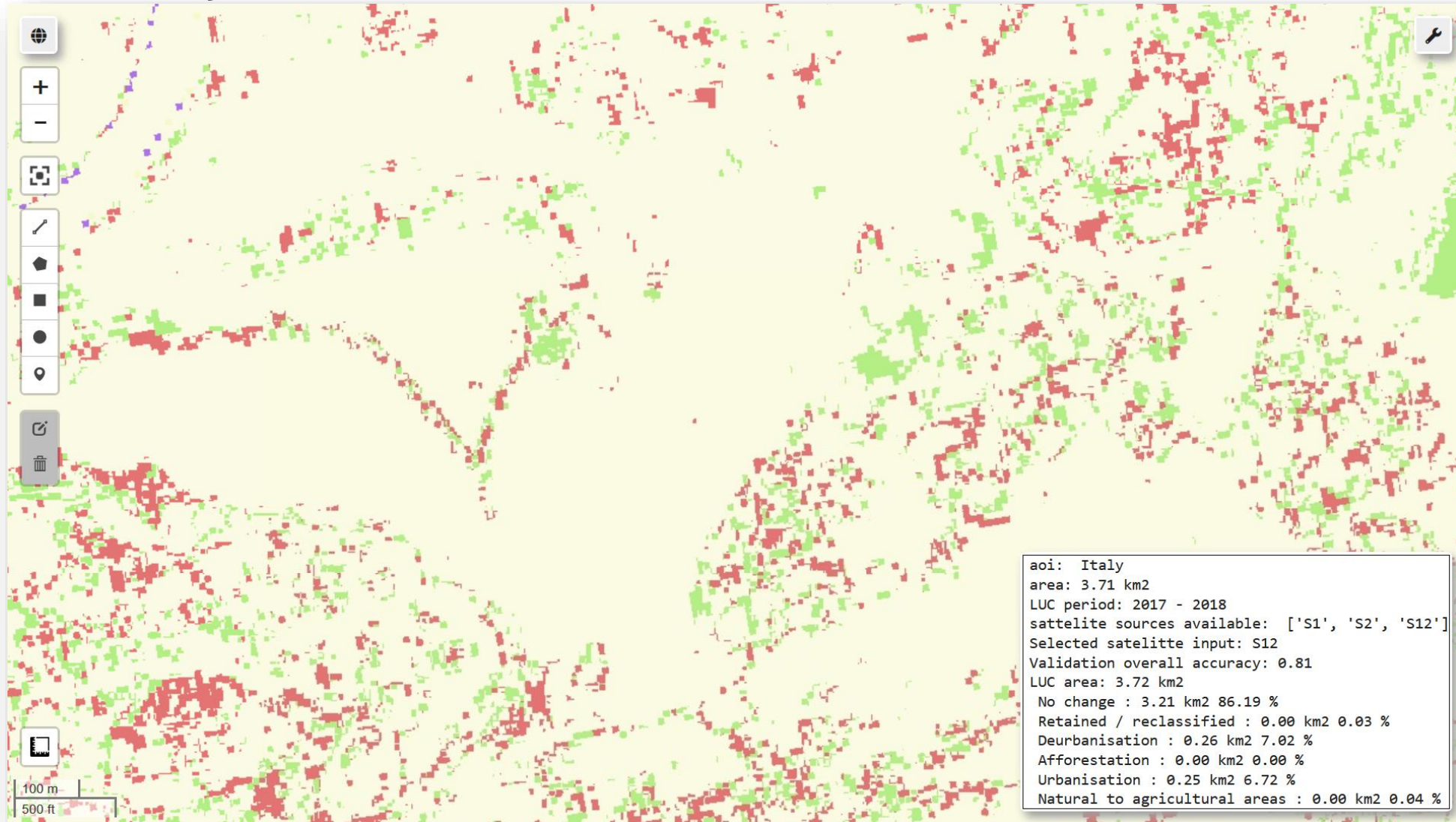
Online Conference on 15th January 2024 - Development of downstream applications supporting the sector information system within the Copernicus Climate Change Service



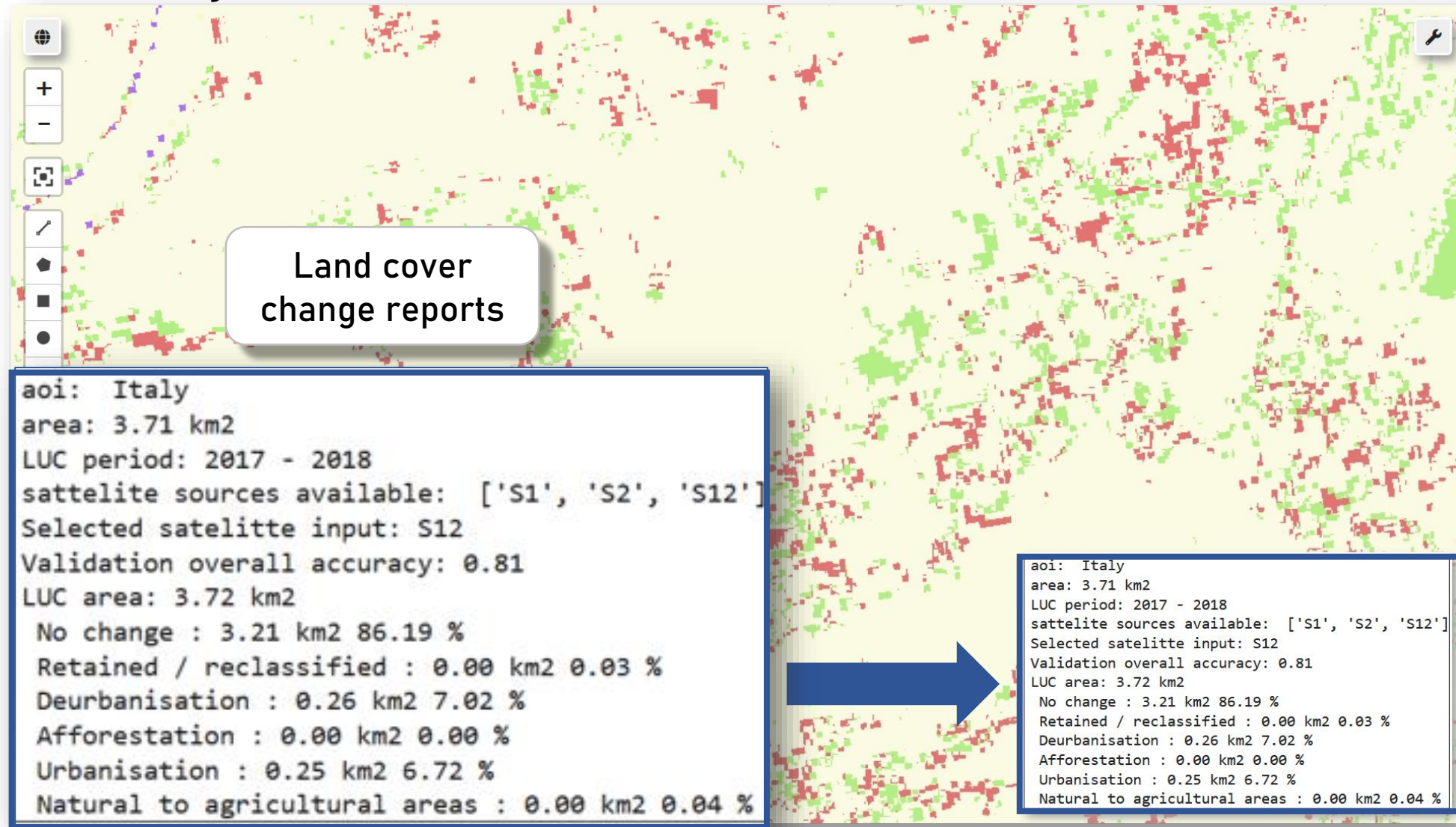
Italy case study



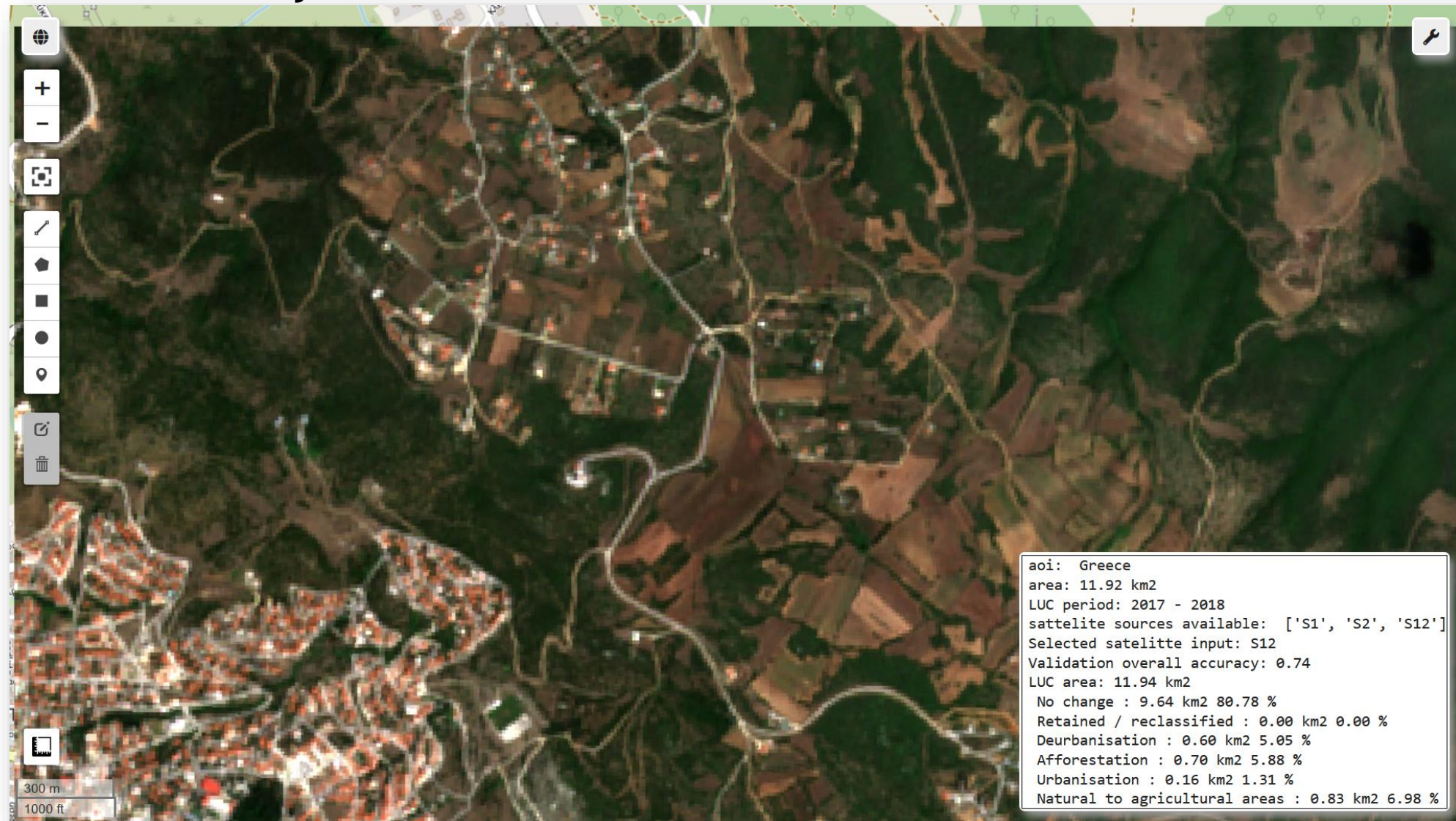
Italy case study



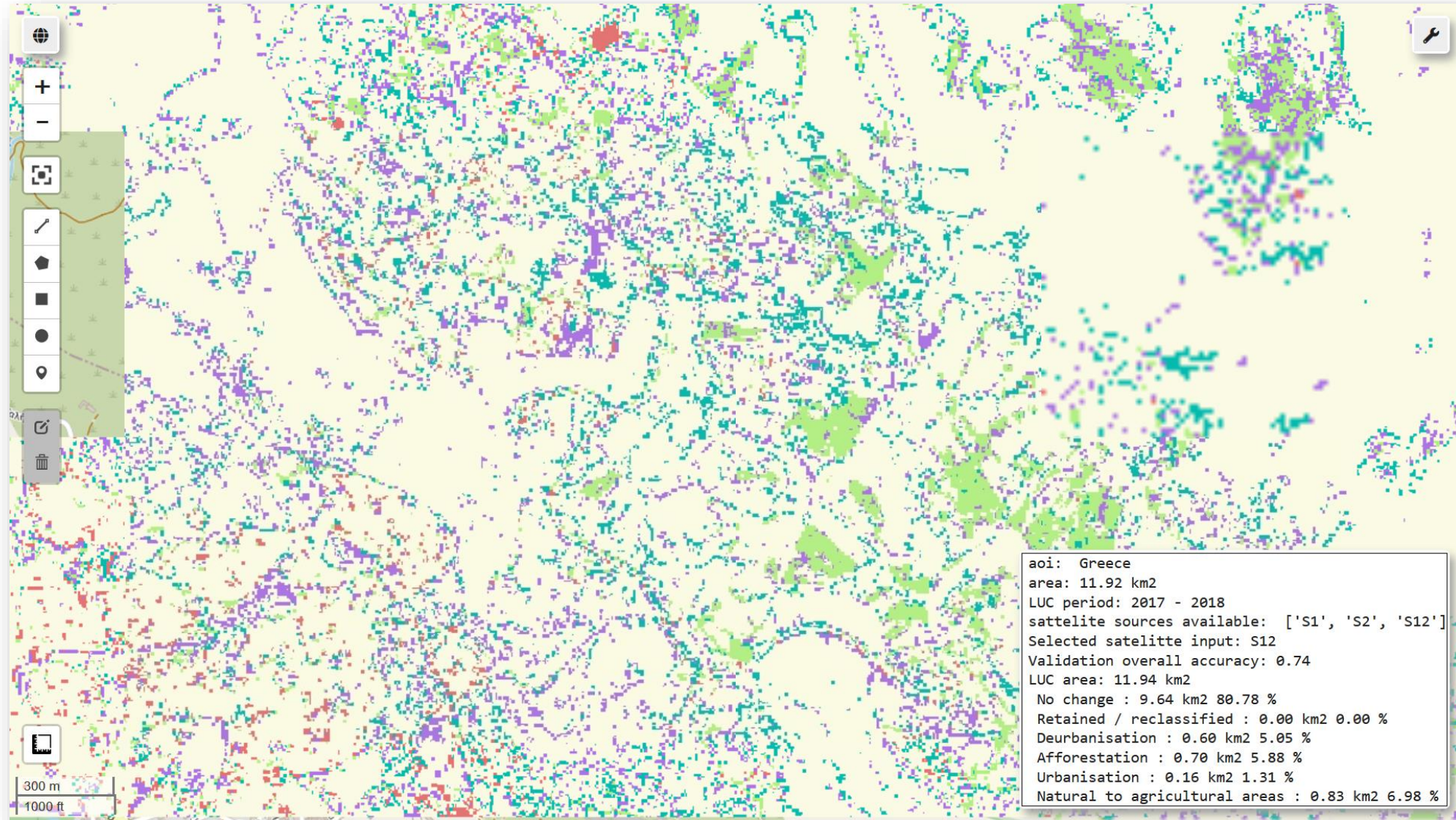
Italy case study



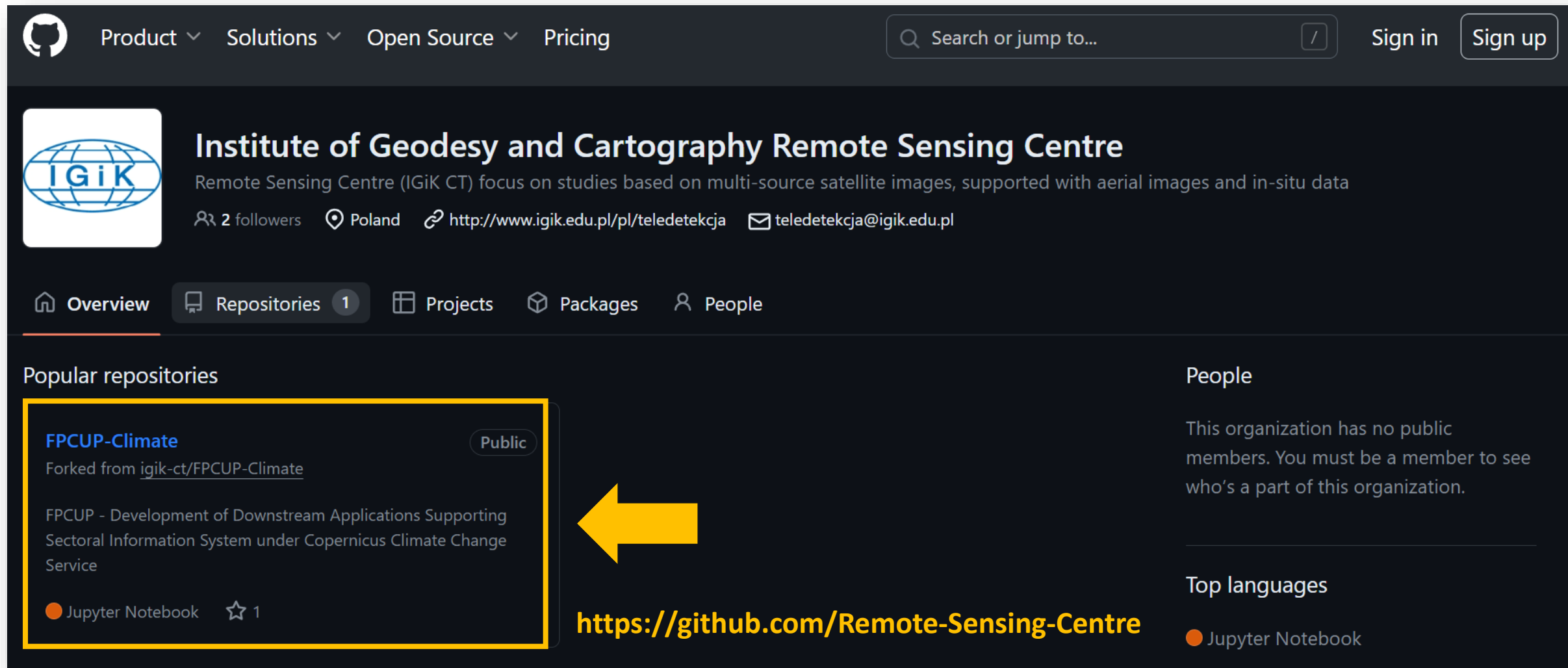
Greece case study



Greece case study




GitHub repository open-access



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 **Institute of Geodesy and Cartography Remote Sensing Centre**
Remote Sensing Centre (IGiK CT) focus on studies based on multi-source satellite images, supported with aerial images and in-situ data
2 followers Poland <http://www.igik.edu.pl/pl/teledetekcja> teledetekcja@igik.edu.pl

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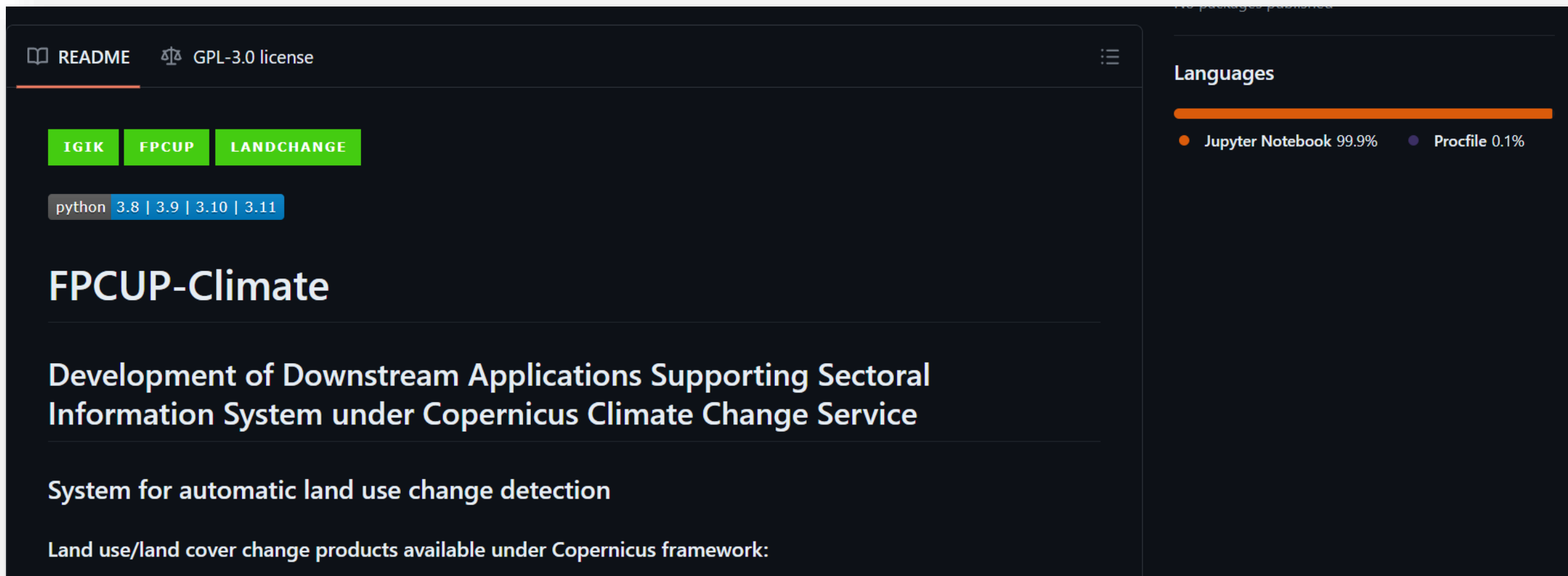
FPCUP-Climate Public
Forked from [igik-ct/FPCUP-Climate](#)
FPCUP - Development of Downstream Applications Supporting Sectoral Information System under Copernicus Climate Change Service
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Top languages
Jupyter Notebook

<https://github.com/Remote-Sensing-Centre>

GitHub repository open-access



Thank you for your attention

Acknowledgments

Design and development of user applications to support the sectoral information system for the Climate Change Service under the Caroline Herschel Programme's partnership framework agreement (acronym: FP CUP Downstream Applications), Contract No. 8-SI2.829837 CONTRACT No. 5206/GRANT KE/2021/2 for the execution of the international co-financed project No. W44/GRANT KE/2021 dated 29.12.2021.

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