Statistics Poland

Remote Sensing in Official Statistics

X Ogólnopolska Konferencja Naukowa
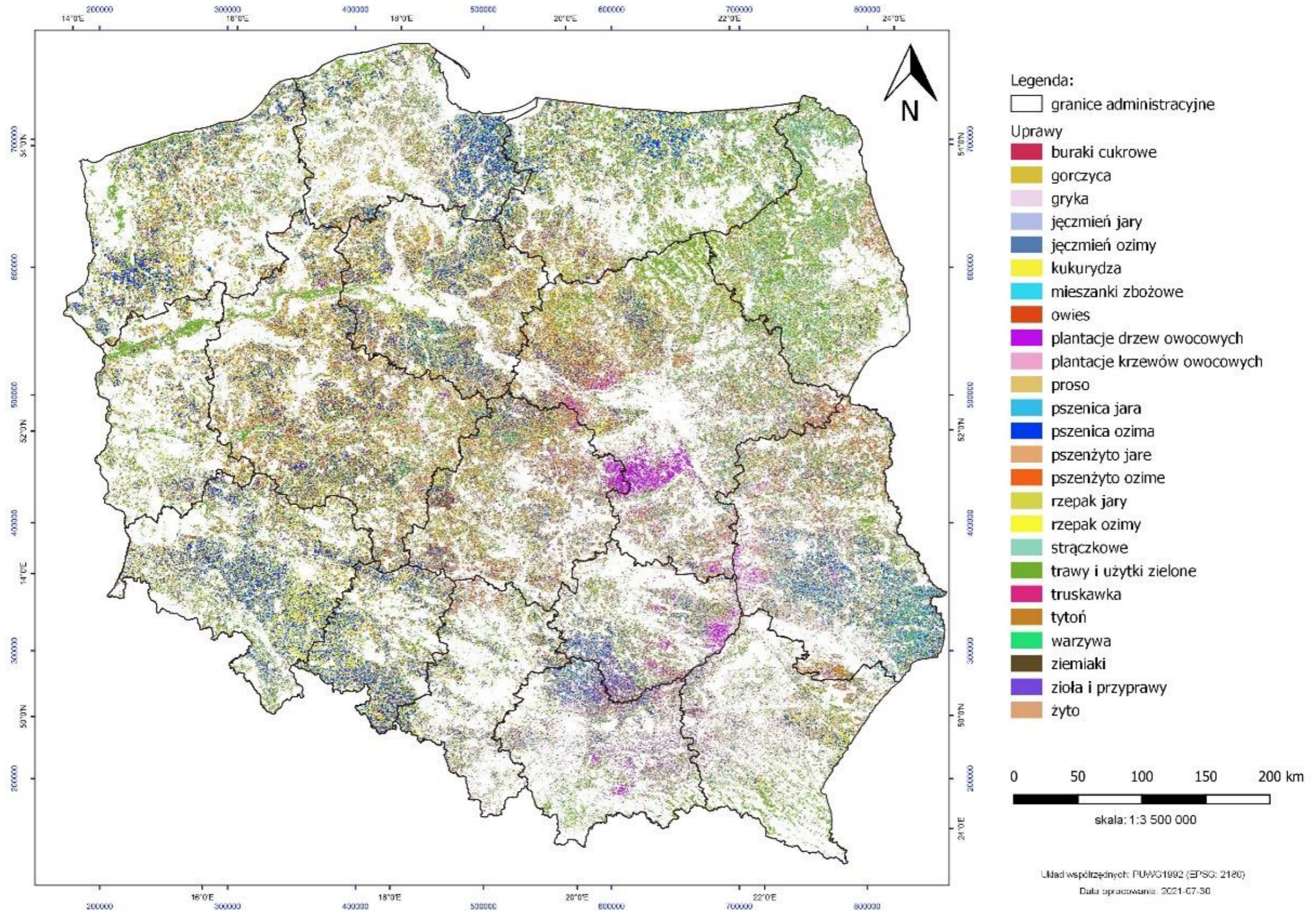im. Profesora Zbigniewa Czerwińskiego
Matematyka i informatyka na usługach ekonomii

Dominik A. Rozkrut

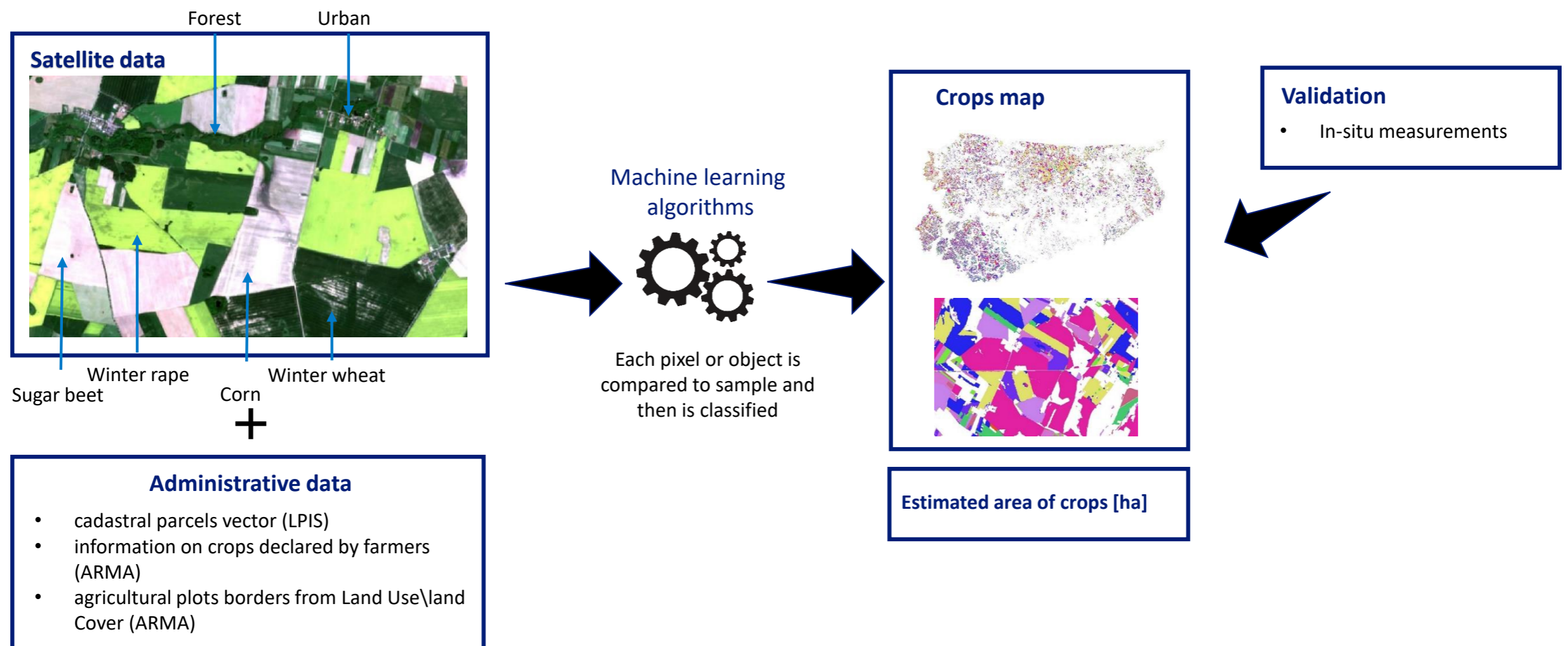# Satmirol project (GOSPOSTRATEG)

- Identification improvement and monitoring
  of agricultural crops

- Enhancement of methods to assess the impact
  of extreme events on crop conditions

- Time span

  - 2019 – 2021

- Participants

  - Statistics Poland,
    Space Research Centre of Polish Academies of Sciences (CBK)
    Institute of Geodesy and Cartography

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Crop estimates, 2021

Syst
tyfik
zwa
klas
dzia
dzie

Legenda:
- granice administracyjne

Uprawy
- buraki cukrowe
- gorczyca
- gryka
- jęczmień jary
- jęczmień ozimy
- kukurydza
- mieszanki zbożowe
- owies
- plantacje drzew owocowych
- plantacje krzewów owocowych
- proso
- pszenica jara
- pszenica ozima
- pszenżyto jare
- pszenżyto ozime
- rzepak jary
- rzepak ozimy
- strączkowe
- trawy i użytki zielone
- truskawka
- tytoń
- warzywa
- ziemiaki
- zioła i przyprawy
- żyto

0   50   100   150   200 km

skala: 1:3 500 000

Układ współrzędnych: PUWG1992 (EPSG: 2180)
Data opracowania: 2021-07-30
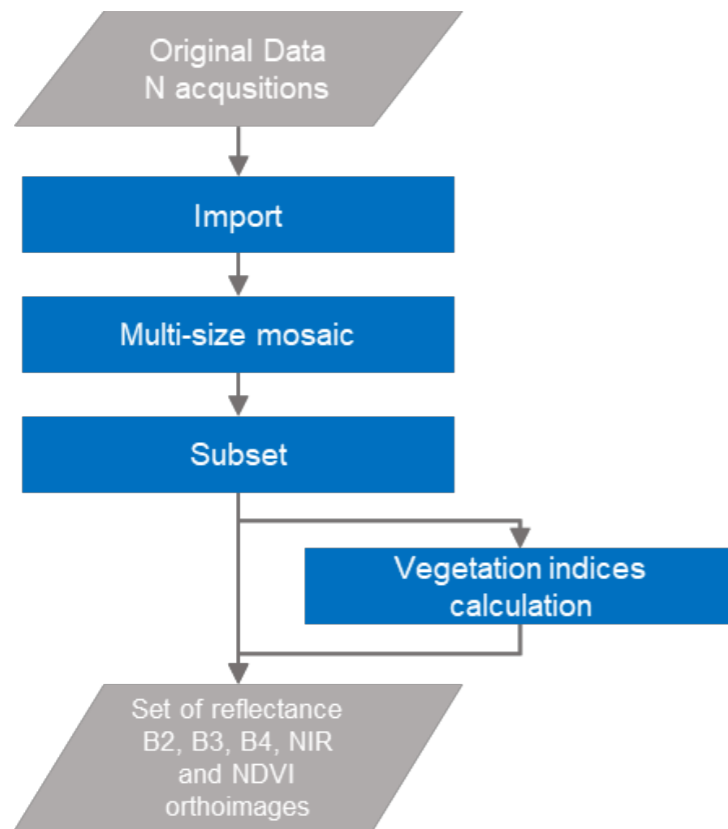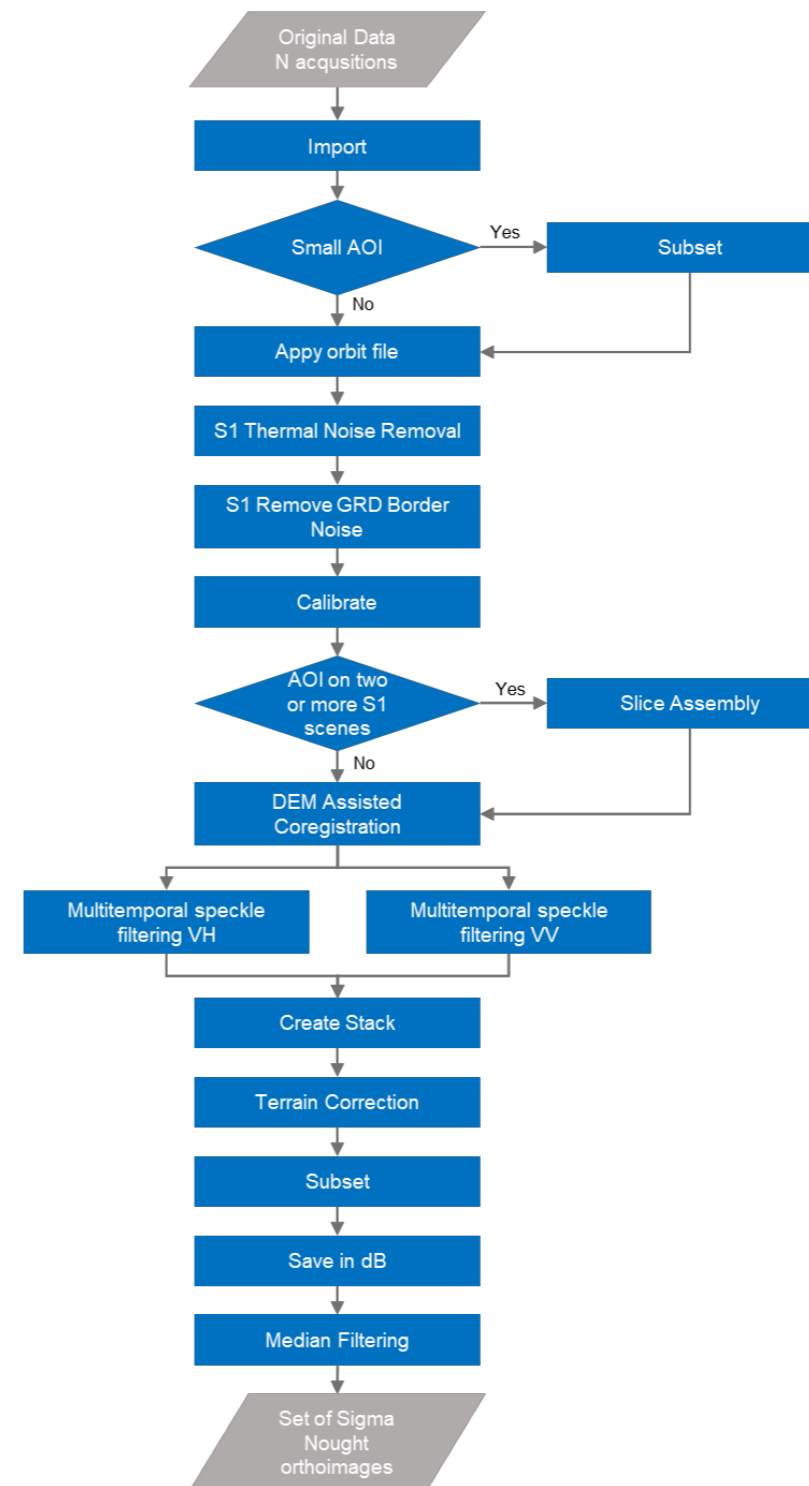
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Case study

- Goal→ use Sentinel 1 and Sentinel-2 satellites for agricultural crops mapping and area estimates in Northern Europe conditions.
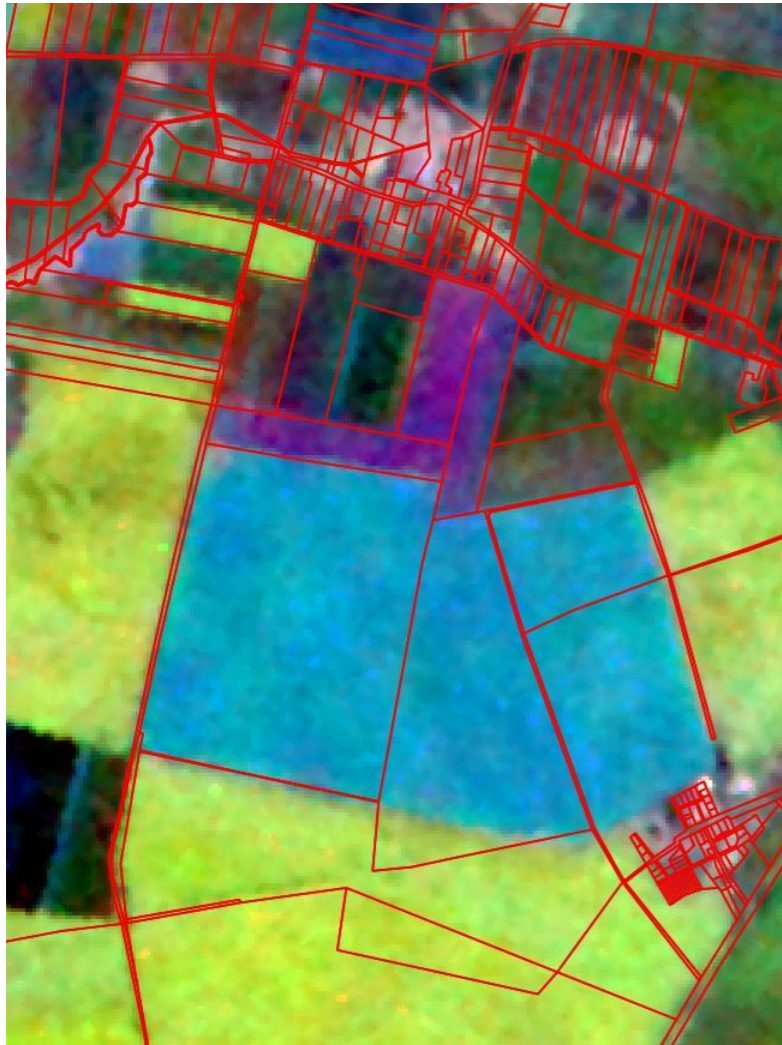
Satellite data

Forest Urban

Sugar beet   Winter rape   Corn   Winter wheat

+

Administrative data

- cadastral parcels vector (LPIS)
- information on crops declared by farmers (ARMA)
- agricultural plots borders from Land Use\land Cover (ARMA)

Machine learning algorithms

Each pixel or object is compared to sample and then is classified

Crops map

Estimated area of crops [ha]

Validation

- In-situ measurements

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Satellite data preparation

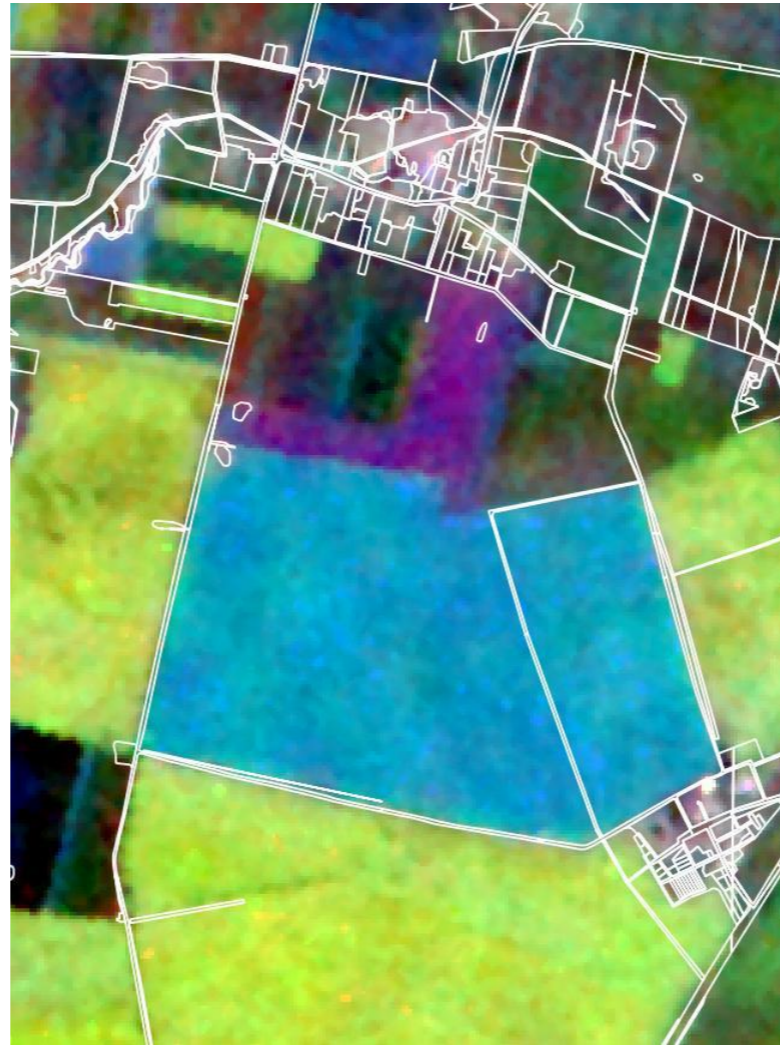Pre-processing scheme of Sentinel-2 data

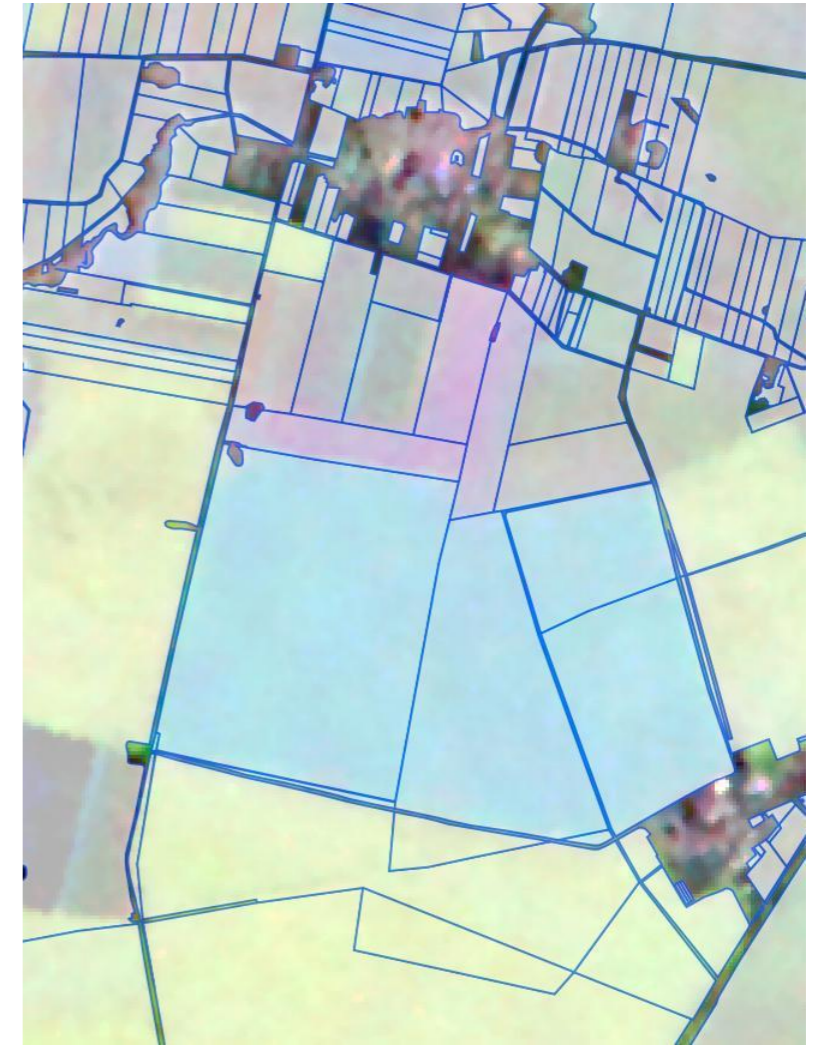Pre-processing scheme of Sentinel-1 data

Administrative geodata preparation

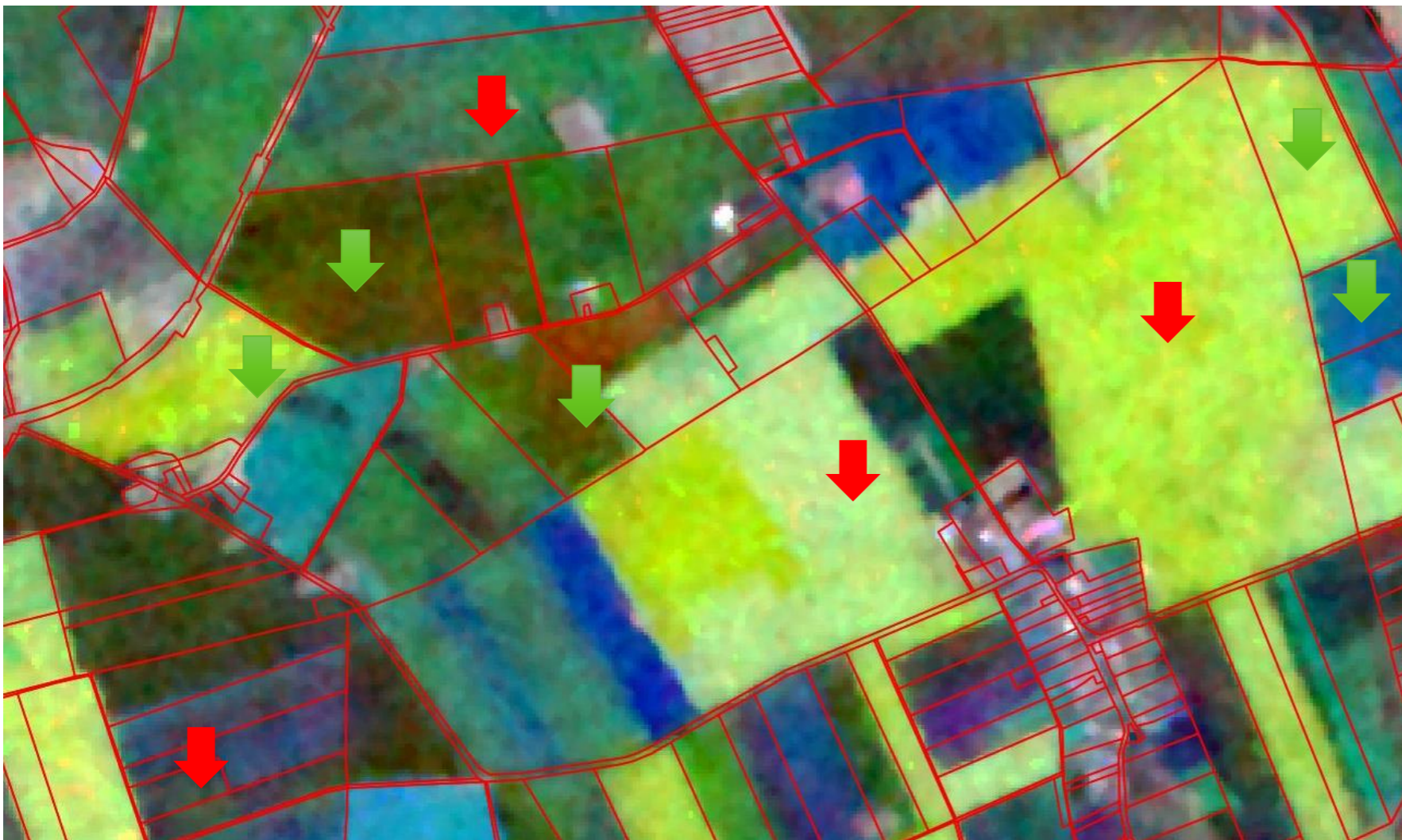- Task → exclude non agri area

Cadastral parcels (LPIS)

Land Use and Land Cover (ARMA)

Joined cadastral parcels & Land Use and Land Cover

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Administrative geodata preparation

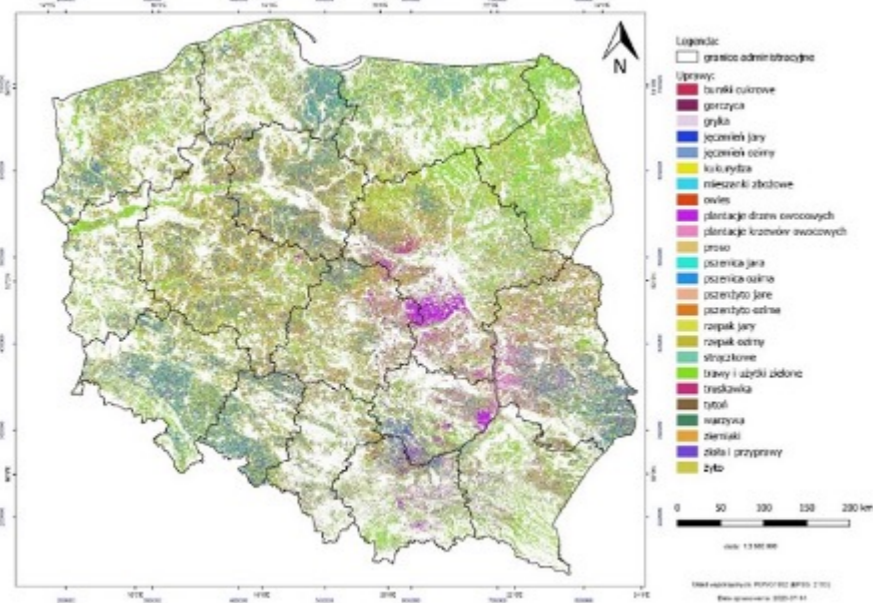- Task → choose representative parcels / samples

Object-based image classification using ML

- First step - segmentation (2 levels)

  - Segmentation within agriculture area based on cadastral parcels (left); Segmentation based of image features (right)

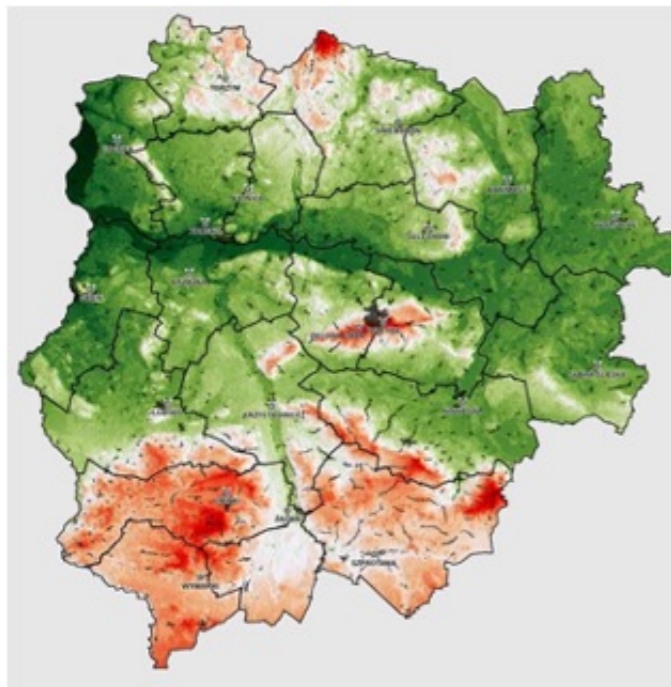- Second step – object-based image classification using ML

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Remote sensing in Statistics Poland

Agriculture (crop maps, vegetation index harvest forecasts, droughts)
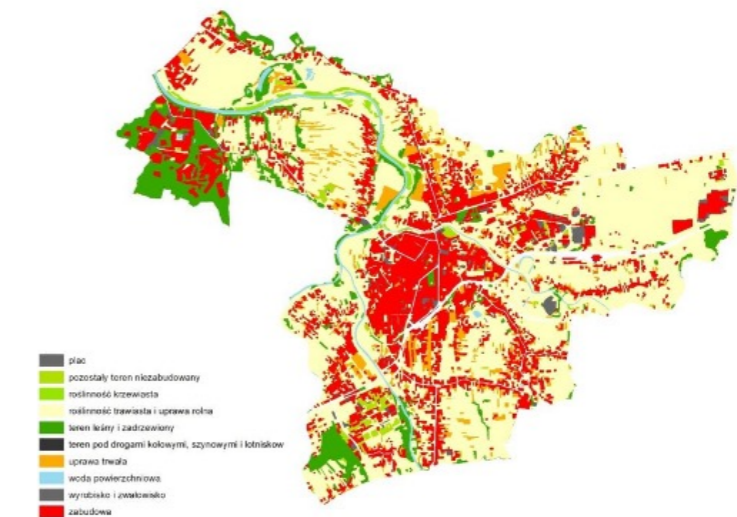

Urban areas (buildings, impervious areas, spatial planning concept)

Forestry (forest cover indicator, species classification, fires, felling, windbreaks)

Environment (air pollution, ground surface temperature, quality of green areas)

Land cover (status quo, changes)

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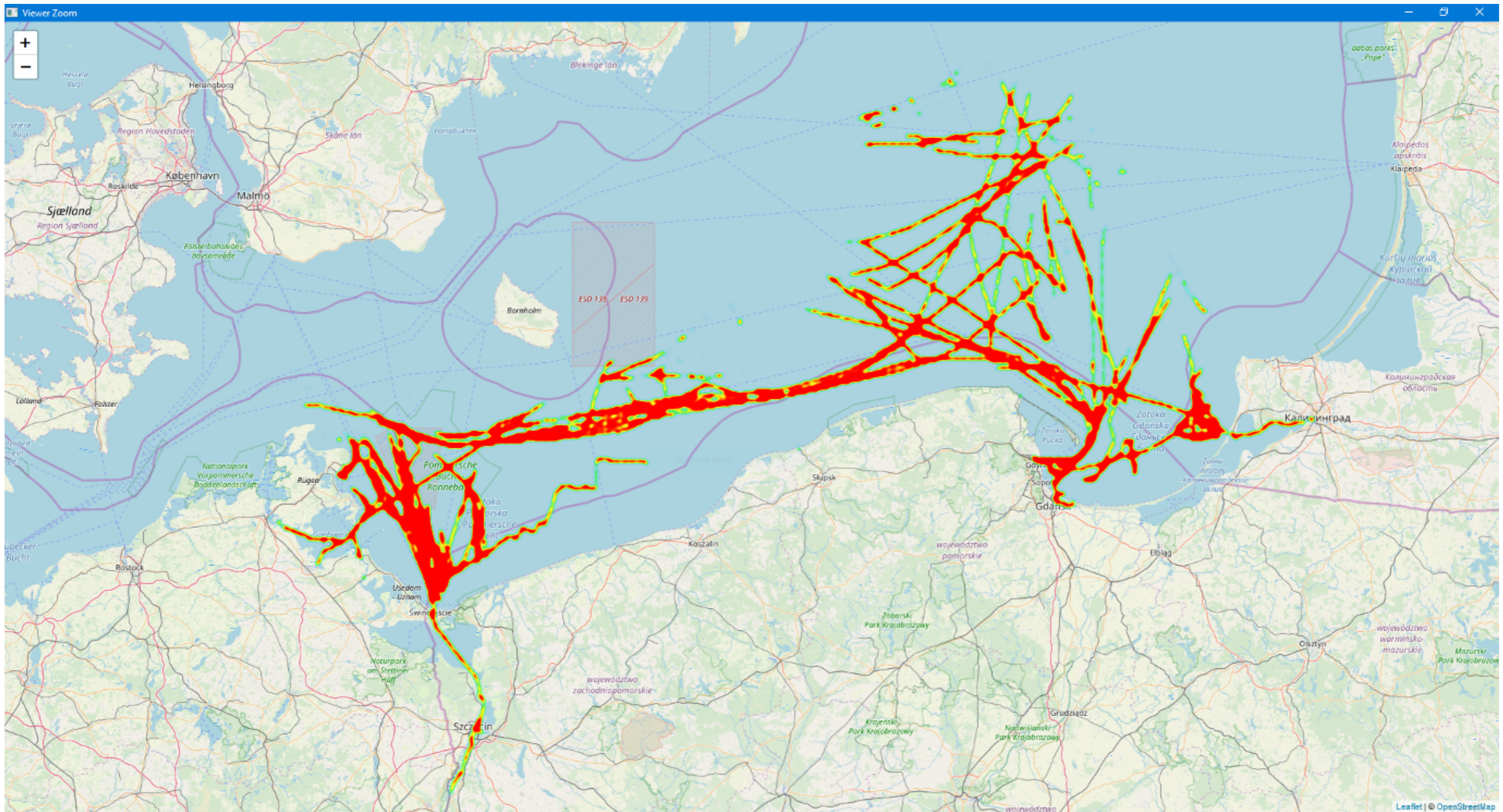
Experimental work - photovoltaics

- Aerial photography use for identification of solar panels and collectors installed on roofs

- Increased interest in RES due to climate change, rising energy prices and the financing possibility from the National Fund for Environmental Protection and Water Management
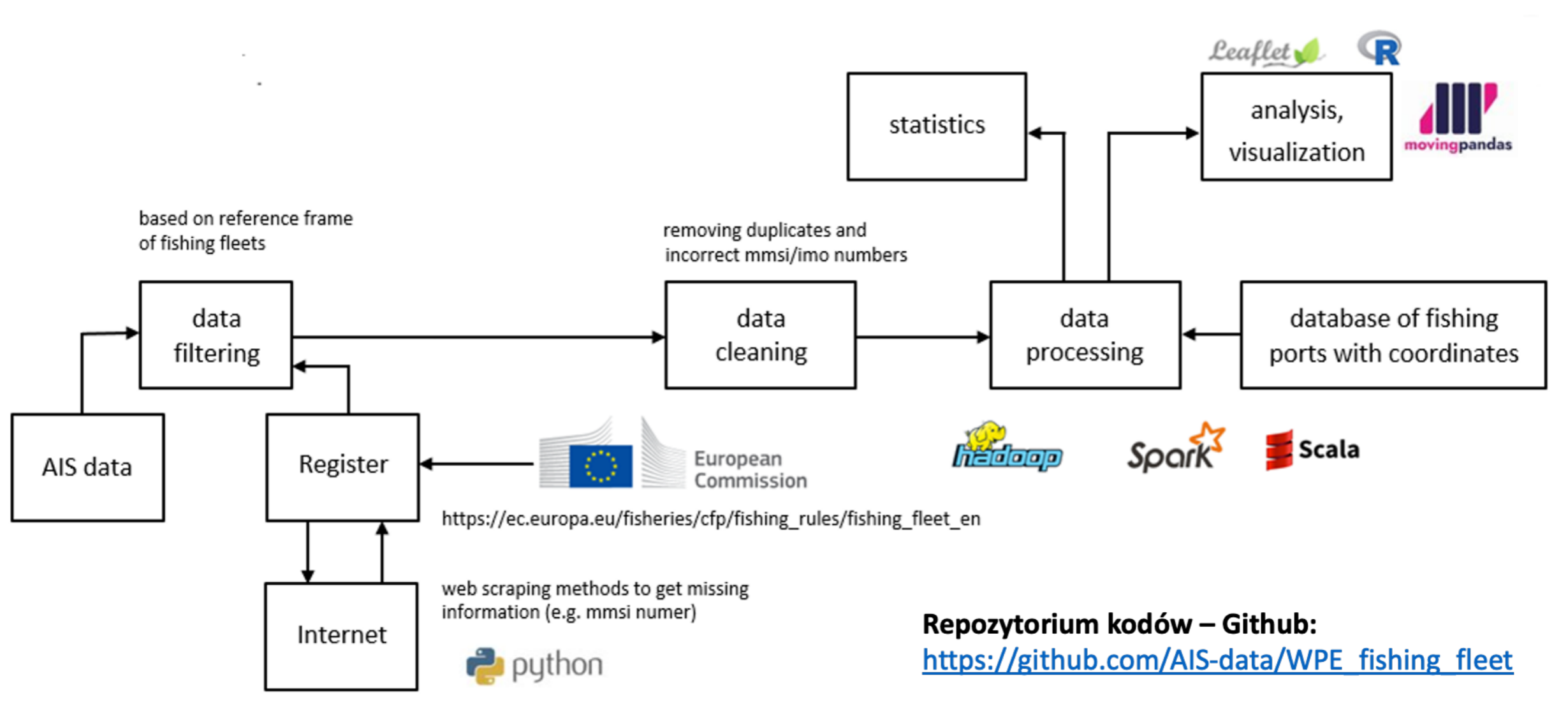
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Advantages of remote sensing

Feature	Remote sensing data	Field data
Costs	✓	✗
Execution speed	✓	✗
Data availability	✓	✓ ✗
Accuracy	✓ ✗	✓ ✗
Labour outlays	✓	✗
Independence from weather conditions	✓ ✗	✗
Digitalization	✓	✗

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AIS

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Fishing fleet statistics workflow

Thank you

for your attention!