EUROGEO WORKSHOP 2023

LAND COVER CLASSIFICATION OF POLAND
PERFORMED EVERY YEAR BASED ON SENTINEL-2

Stanisław Lewiński
stlewinski@cbk.waw.pl

Marek Ruciński, Szymon Sala, Cezary Wojtkowski, Ewa Gromny,
Małgorzata Jenerowicz-Sanikowska, Michał Krupiński

BOLZANO 2-4 OCTOBER 2023

S2GLC – Sentinel-2 Global Land Cover

Phase I: 2016 – 2018
Phase II: extension 2018/2019

CBK PAN

IABG (Industrieanlagen Betriebsgesellschaft mbH)

EOXPLORE

University of Jena

Time series of Sentinel-2 images → **Random Forest classification** ← **Training points**

300x300m

Classification is performed „tile by tile"

Random Forest classification →
- LC class,
- prediction score

↓

Counting for each pixel:
- No. of occurrences of each class
- SUM of preduction score of each class

↓

AGGREGATION

↓

POST-PROCESSING

↓

The final classification

Training
- based on existing LR databases
- random selection of points, separately for each tile and classification
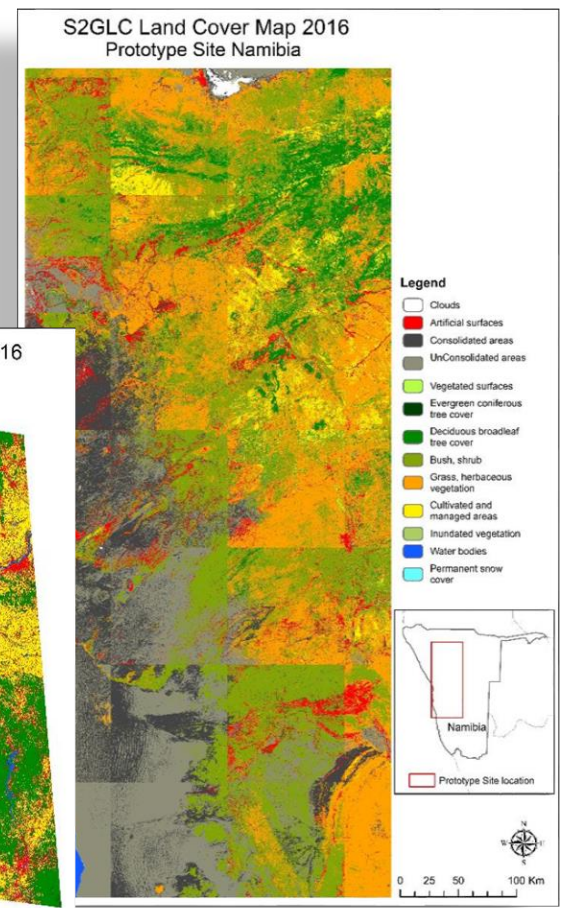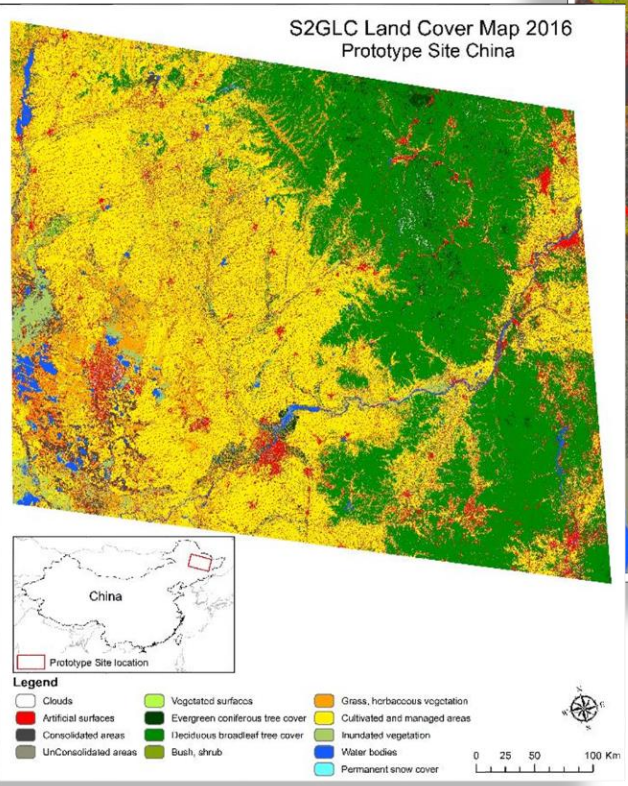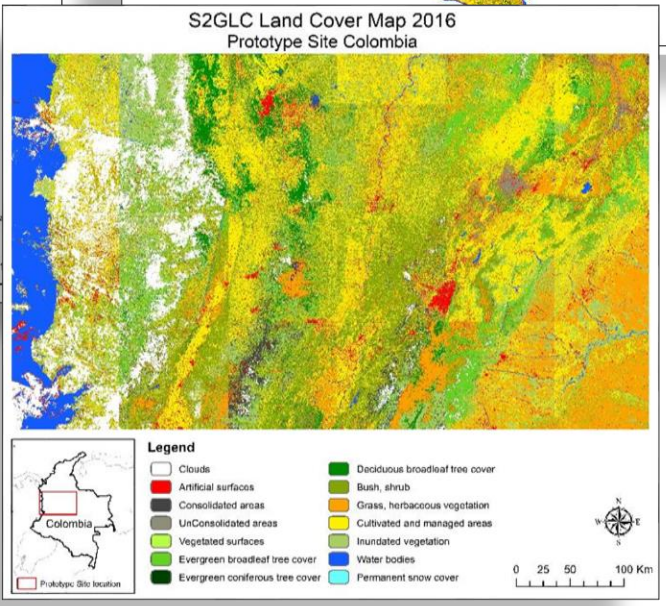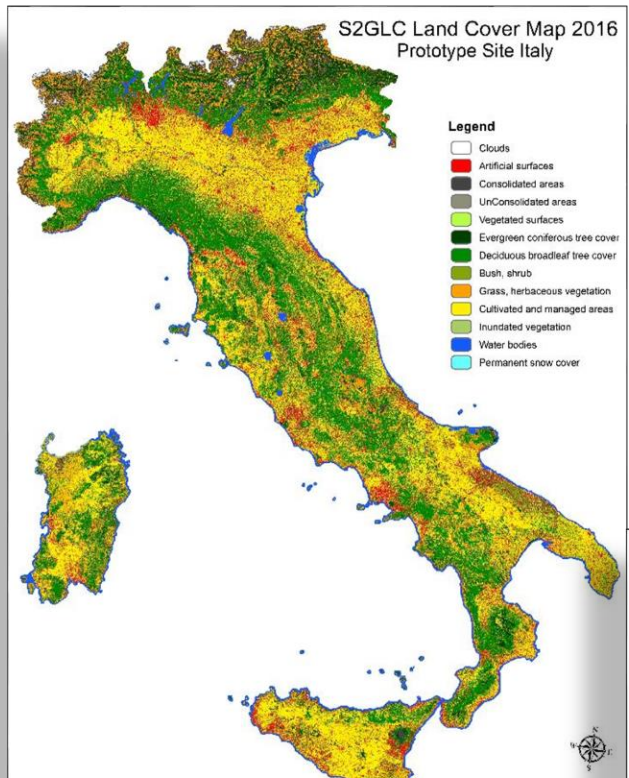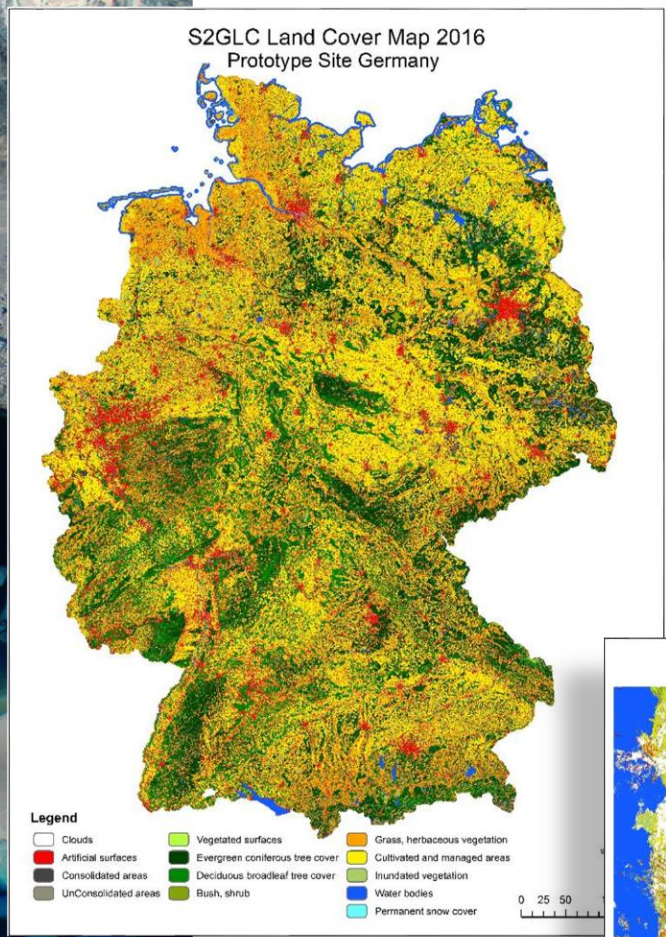
Classification
- pixel-based classification, Random Forest
- Aggregation of single classifications
- Post-processing

Automation
- almost complete
- software prepared by CBK PAN

Phase I: 2016 – 2018

LC CLASSIFICATION – EUROPE 2017

Legend
- Clouds
- Artificial surfaces and constructions
- Cultivated areas
- Vineyards
- Broadleaf tree cover
- Coniferous tree cover
- Herbaceous vegetation
- Moors and Heathland
- Sclerophyllous vegetation
- Marshes
- Peatbogs
- Natural material surfaces
- Permanent snow cover
- Water bodies

0 1000 2000 3000 4000 km

Phase II: extension 2018/2019

CLASIFICATION
 815 Setinel-2 tiles,
 15 000 images

VALIDATION
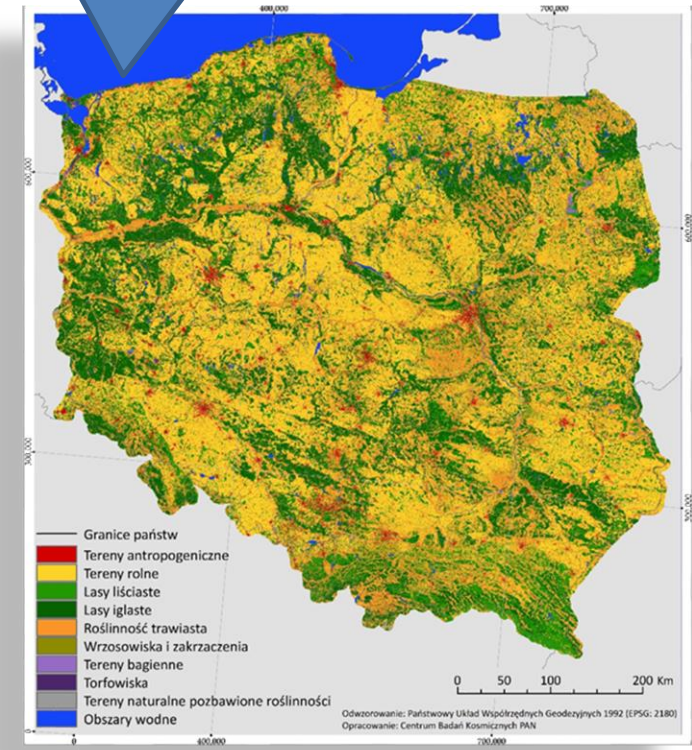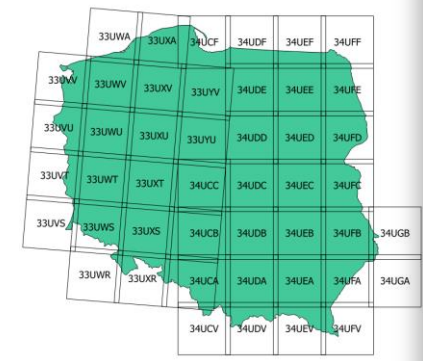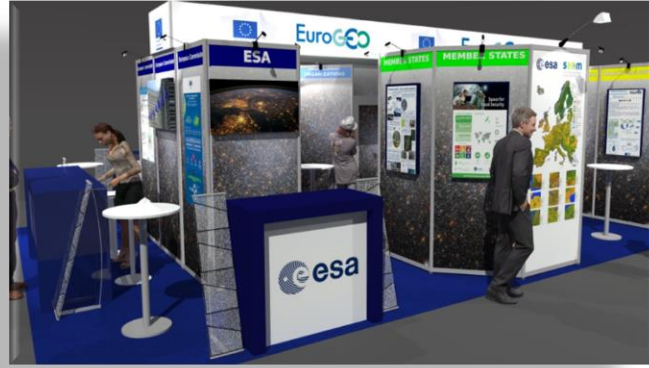 51 926 points
 spread randomly over 55 tiles

OA:
   13 LC classes: **86.1%**
   10 LC classes: **89.0%**

combined classes :
  ⎡ vineyards
  ⎣ cultivated and managed areas

  ⎡ moors and Heathland
  ⎣ herbaceous vegetation

  ⎡ marshes
  ⎣ peatbogs

S2GLC – Sentinel-2 Global Land Cover

Legend
- Clouds
- Artificial surfaces and constructions
- Cultivated areas
- Vineyards
- Broadleaf tree cover
- Coniferous tree cover
- Herbaceous vegetation
- Moors and Heathland
- Sclerophyllous vegetation
- Marshes
- Peatbogs
- Natural material surfaces
- Permanent snow cover
- Water bodies

GEO WEEK 2019
MINISTERIAL SUMMIT

P O L S A
Polska Agencja Kosmiczna

Granice państw
Tereny antropogeniczne
Tereny rolne
Lasy liściaste
Lasy iglaste
Roślinność trawiasta
Wrzosowiska i zakrzaczenia
Tereny bagienne
Torfowiska
Tereny naturalne pozbawione roślinności
Obszary wodne

Odwzorowanie: Państwowy Układ Współrzędnych Geodezyjnych 1992 [EPSG: 2180]
Opracowanie: Centrum Badań Kosmicznych PAN

https://s2glc.cbk.waw.pl/

geoportal.gov.pl

LAND COVER CLASSIFICATION OF POLAND USING S2GLC APPROACH

| 2019 | 2020 | 2021 | 2022 | 2023 in progres |

classification is performed every year since 2019,
a unique set of data illustrating land cover throughout the country is available free of charge
(hundreds of thousands of downloads).

Year	**2019**	**2020**	**2021**	**2022**	**2023**
Validation points	10 597	11 860	13 080	17701	In progres
OverAll accuracy	**87.2 %**	**79.9 %**	**84.3 %**	**85.6%**	in progres

examples of land cover classification

construction of an expressway

2019　　　　　　　2020　　　　　　　2021　　　　　　　2022

examples of land cover classification
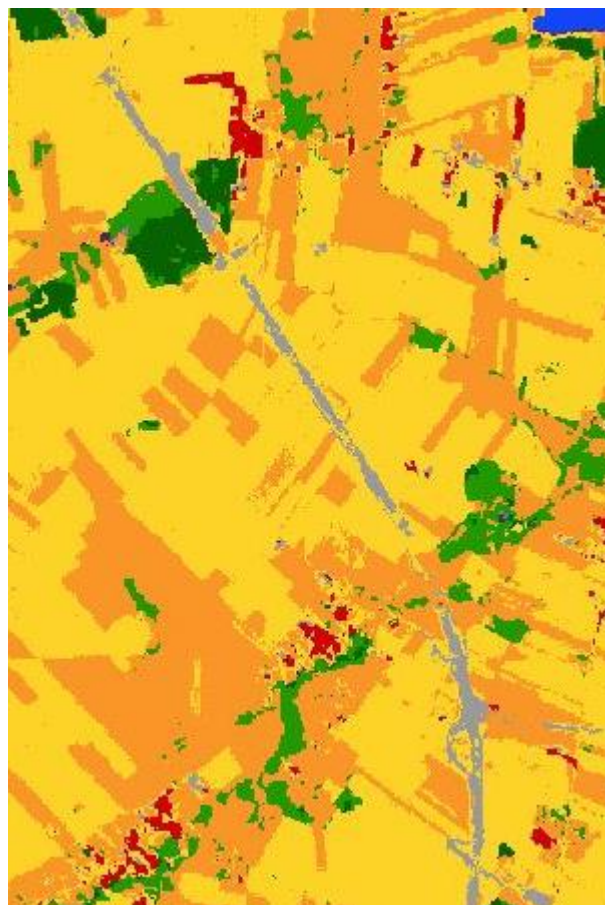
diging the Vistula spit

2019 | 2020 | 2021

examples of land cover classification
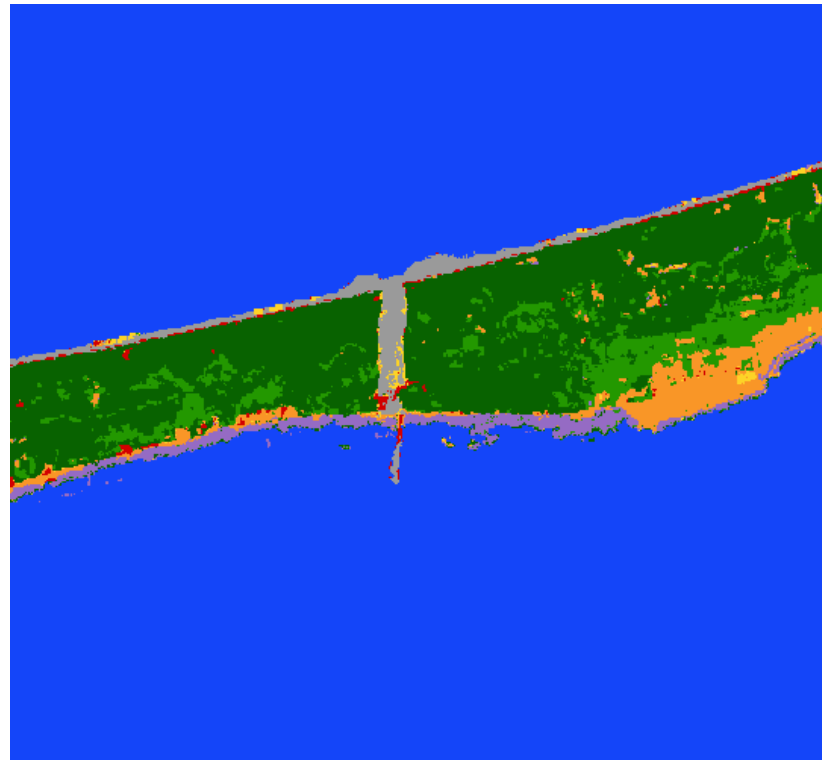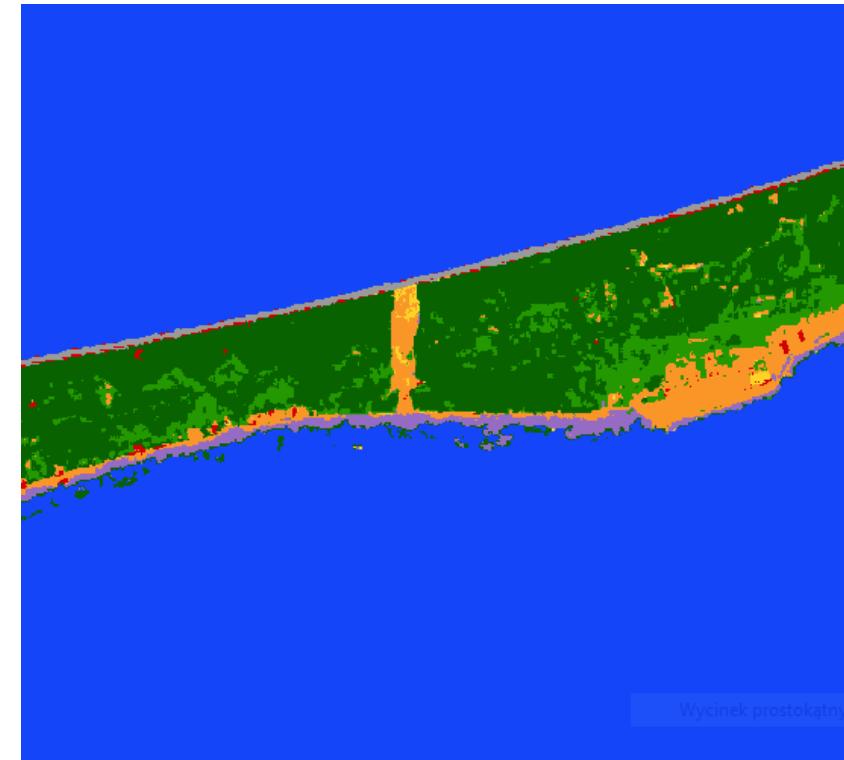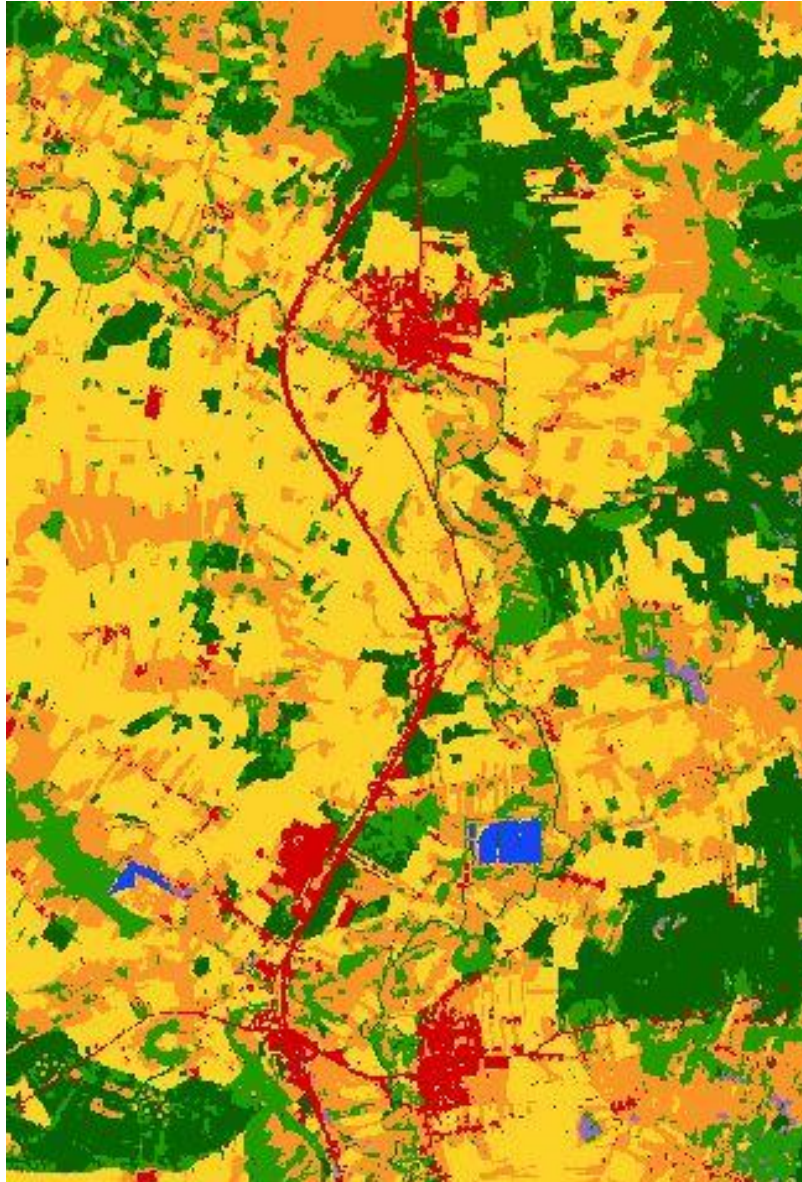
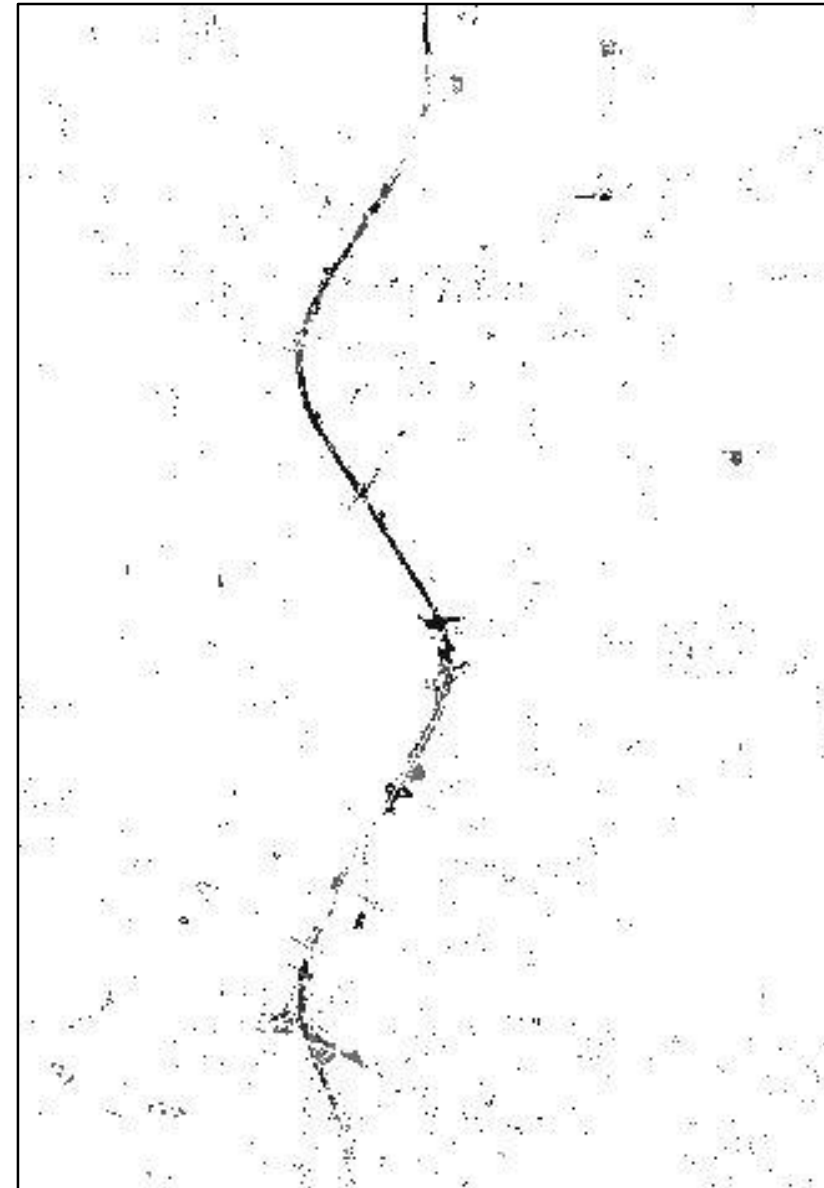## artificial islands in the Szczecin reservoir

2020

2021

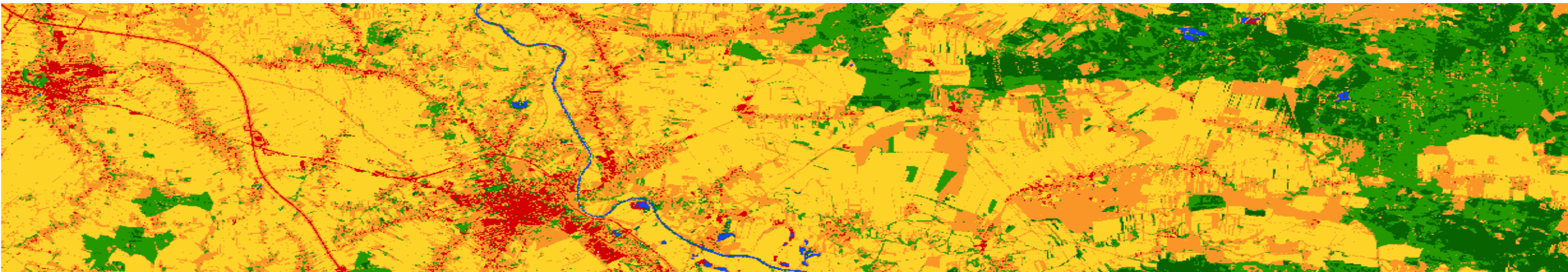# Change Detection dedicated to S2GLC classification approach

2020

2019 – 2020 CD S2GLC

CONCLUSION

- The results of the ESA S2GLC project are put to practical use;
- Land Cover classification of Poland is performed every year;
- Change Detection of LC will be implemented in the coming year.

LAND COVER CLASSIFICATION OF POLAND
PERFORMED EVERY YEAR BASED ON SENTINEL-2

Stanisław Lewiński

stlewinski@cbk.waw.pl

Marek Ruciński, Ewa Gromny, Cezary Wojtkowski, Szymon Sala, Małgorzata Jenerowicz-Sanikowska, Michał Krupiński