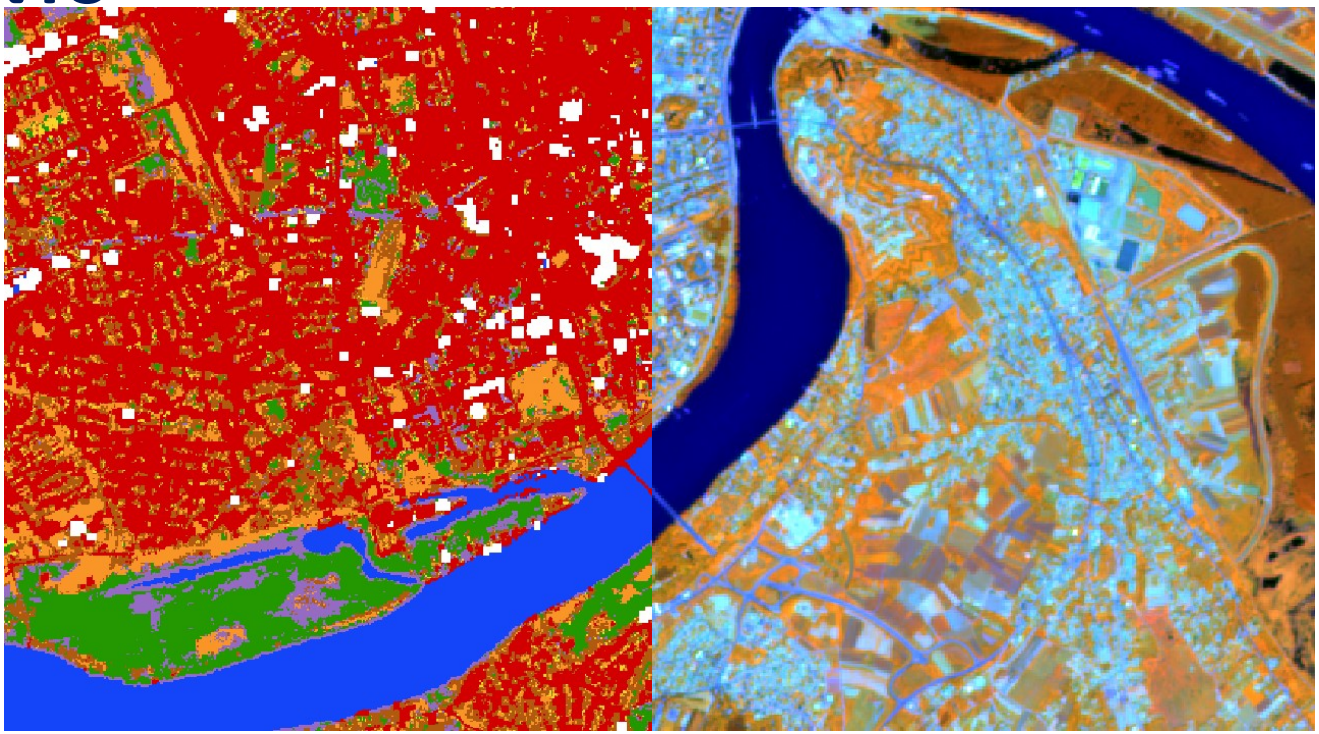
SCERIN FG3 activity:

DATABASE OF LAND COVER REFERENCE POINTS



Ewa Gromny *egromny@cbk.waw.pl*

Stanisław Lewiński *stlewinski@cbk.waw.pl*

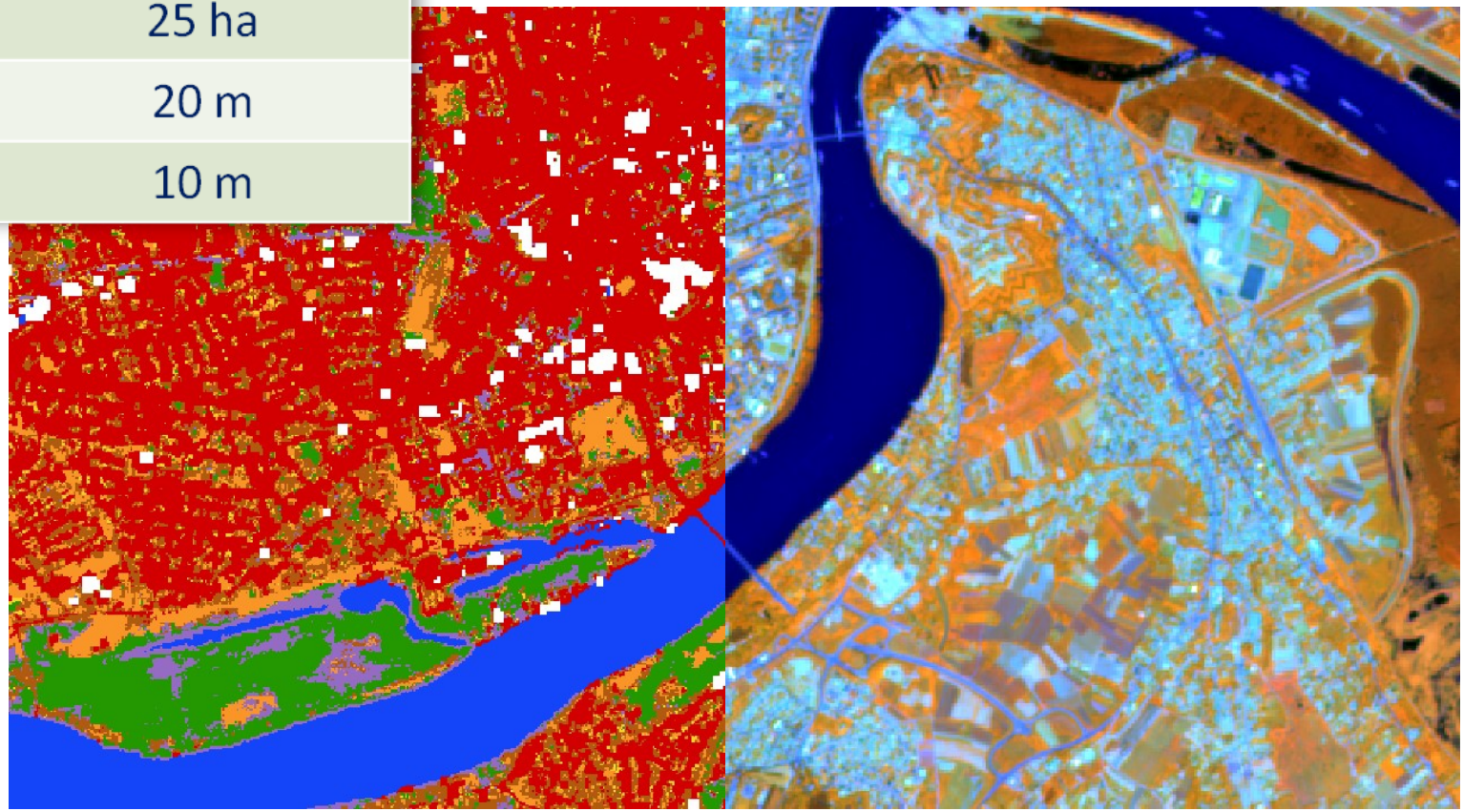
Earth Observation Department
Space Research Centre of the Polish Academy of Sciences

S2GLC - SENTINEL-2 GLOBAL LAND COVER

Characteristics of the project:

- An approach for global land cover classification on Sentinel-2 data
  - Automatic (working globally)
  - 10 m
  - Multitemporal images

Database	Resolution/MMU
CLC	25 ha
High Resolution Layers	20 m
S-2 NDWI	10 m



Comparison of training data source

S2GLC

- ❑Automatic approach
- ❑Based on existing databases
- ❑Without any intervention of an operator

Manual reference database

- ❑Reference database will be ready for Sentinel-2 and Landsat classification
- ❑Reference samples will be selected by SCERIN partners – local experts
- ❑Geographical range will depend on partners: at least one S-2 tile per country
- ❑Data collection – visual interpretation of S-2 data,
- ❑Points can be collected with support of existing databases eg. CORINE LC, LUCAS, HR layers, local databases …

… all samples should be checked.

Milestones

No	Milestone	Responsibility	Comments
1	Definition of classification legend	CBK PAN	S2GLC Extension – Legend for Europe
2	Selection of study areas	ALL	At least one Sentinel-2 tile (110x110km) per country
3	Rules of data collection	ALL	Set of rules established by participants
4	Collection of multi-temporal Sentinel-2 images	CBK PAN	About 10 - 20 images per one study area
5	**Collection of training samples**	**ALL**	**Following defined rules (No 3)**
6	Classification I	CBK PAN	Training performed automatically based on existing databases
7	**Classification II**	**CBK PAN**	**Training performed based on SCERIN data**
8	Validation of classifications	?	TBD
9	Comments to classification results and summary	ALL	Results, comparison of quality in regards to the costs of preparing manual training database
10	Preparation of research paper	ALL	

Rules for reference data collection:

- ✓ **Visual interpretation**
- ✓ **LC classes according to the established legend**
- ✓ Data type: polygons or points
- ✓ Training data should allow for selection of about 1000 points per class
- ✓ Cleaning/improving existing databases
- ✓ Auxiliary data: existing LC databases, CLC, High Resolution Layers
- ✓ Internal validation of data quality

Action plan

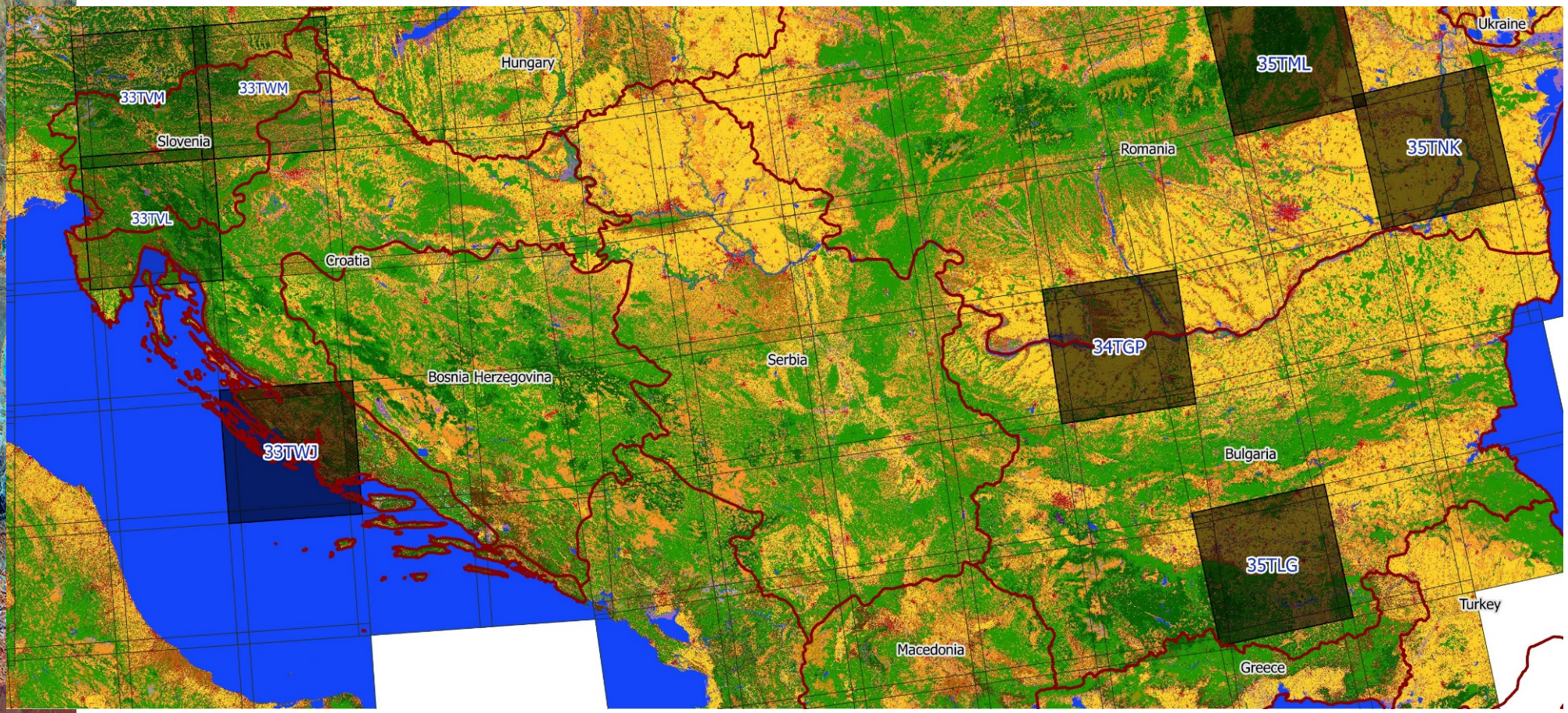
I	II	III	IV	V	VI SCERIN-7
Skype Meeting	Prparation of reference data by SCERIN partners (recording the time)			Classification and evaluation of the results	Presenting innitial resultts and discussing further steps

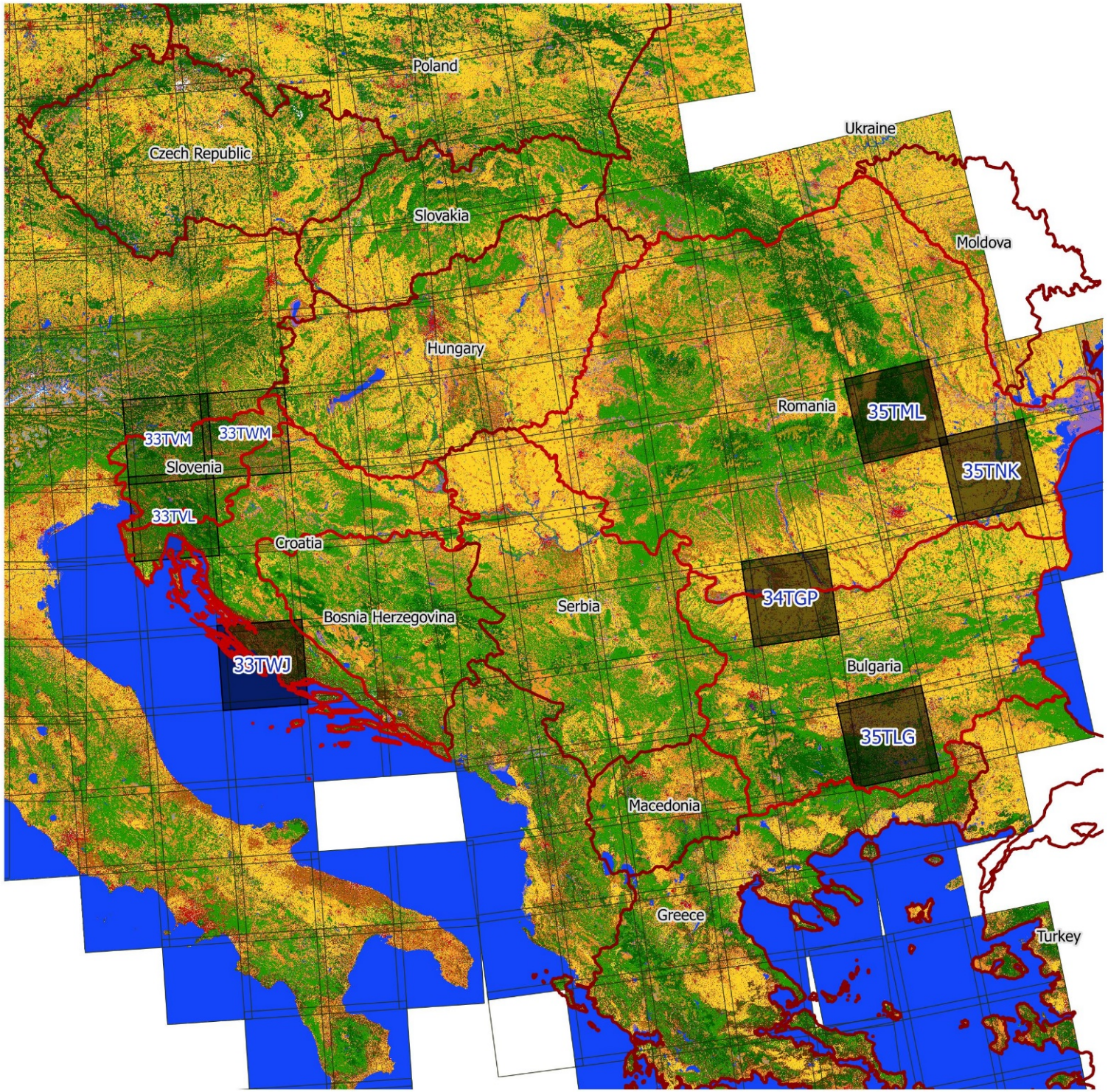
S2GLC Extension - Legend for Europe

Legend S2GLC Extension		
Level 1	**Level 2**	**Level 3**
1. Non-Vegetated surfaces	**1.1.** Artificial surfaces and constructions	**1.1.1.** Artificial surfaces and constructions
	1. 2. Natural material surfaces	**1. 2.1.** Natural material surfaces
2. Vegetated surfaces	**2.1.** Tree cover	**2.1.1.** Broadleaf tree cover
		2.1.2. Coniferous tree cover
	2.2. Low vegetation	**2.2.1.** Herbaceous vegetation
		2.2.2. Moors and Heathland
		2.2.3. Sclerophyllous vegetation
3. Cultivated and managed areas	**3.1.** Cultivated and managed areas	**3.1.1.** Cultivated areas
		3.1.2. Vineyards
4. Wetlands	**4.1.** Wetlands	**4.1.1.** Marshes
		4.1.2. Peatbogs
5. Water bodies	**5.1.** Water bodies	**5.1.1.** Water bodies
6. Permanent snow covered surfaces	**6.1.** Permanent snow covered surfaces	**6.1.1.** Permanent snow covered surfaces
7. Unclassified surfaces	**7.1.** Surfaces permanently covered by clouds	**7.1.1.** Surfaces permanently covered by clouds

Participants and selected S-2 tiles

No.	Participant	Country	S-2 Tile
1.	Mateo Gašparović	Croatia	**33TWJ**
2.	Lachezar Filchev	Bulgaria	**35TLG**
3.	Mihai Daniel Nita	Romania	35TML
4.	Tatjana Veljanovski	Slovenia	33TVM or 33TVL or 33TWM
5.	Anisoara Irimescu	Romania	**34TGP and 35TNK**





Land Cover Map

S2GLC Extension - Europe

Classification of Sentinel-2 data from year 2017

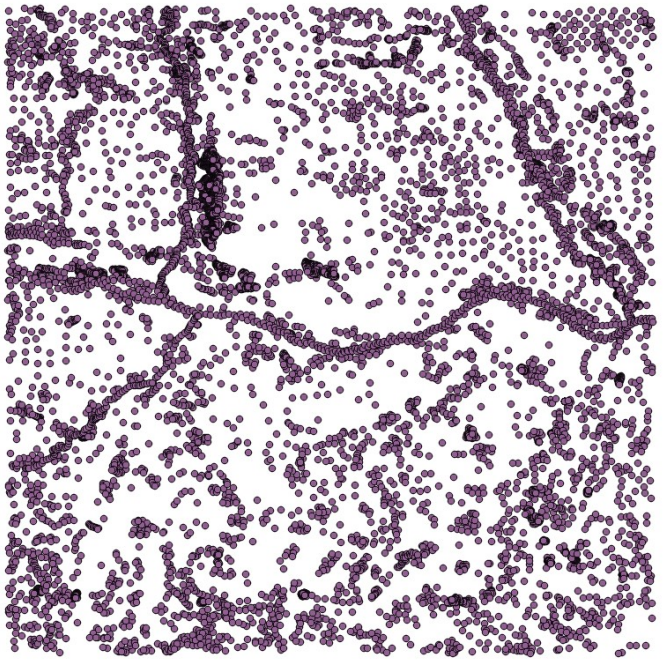
100 0 100 200 300 km

Legend

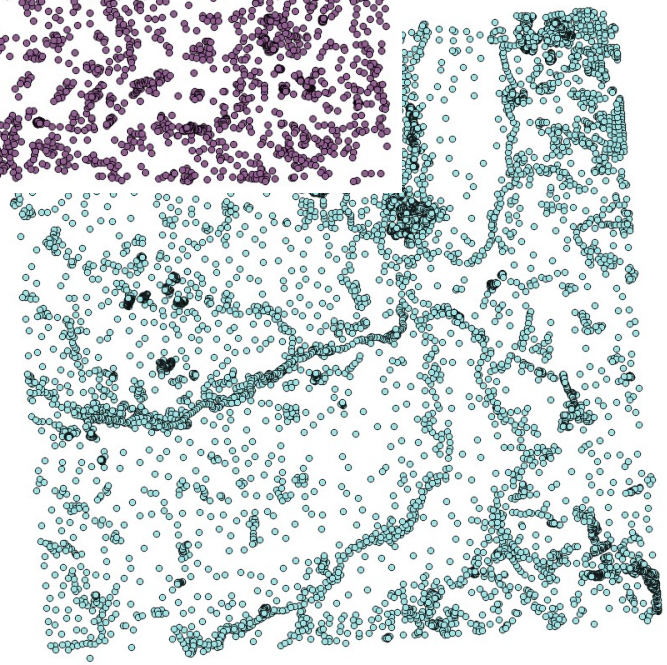
- SCERIN countries
- SCERIN declared countries
- Declared S-2 tiles
- Possible S-2 tiles for Slovenia
- S-2 tiles
- Clouds
- Artificial surfaces and constructions
- Cultivated areas
- Vineyards
- Broadleaf tree cover
- Coniferous tree cover
- Herbaceous vegetation
- Moors and Heathland
- Sclerophyllous vegetation
- Marshes
- Peatbogs
- Natural material surfaces
- Permanent snow covered surfaces
- Water bodies

esa S2GLC CBK PAN

Database for tiles 34TGP and 35TNK - Romania



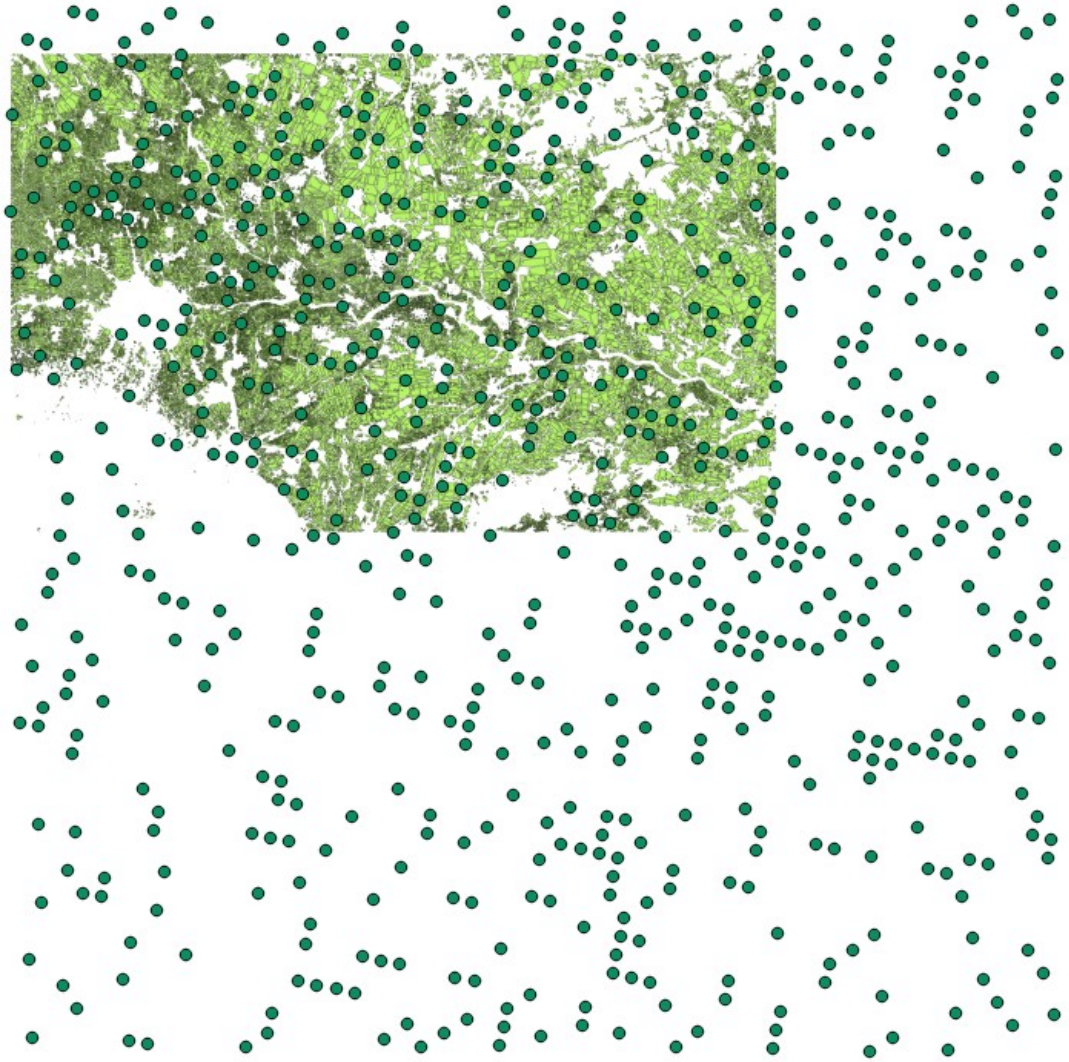
34TGP



35TNK

Number of samples		
LC Class	**34TGP**	**35TNK**
Artificial surfaces and constructions	1256	1000
Natural material surfaces	1023	1000
Broadleaf tree cover	1034	1000
Herbaceous vegetation	2075	1000
Cultivated areas	1000	1000
Vineyards	1001	1000
Marshes	1228	1000
Water bodies	1049	1000
Sum:	**9666**	**8000**

Database for tile 35TLG - Bulgaria



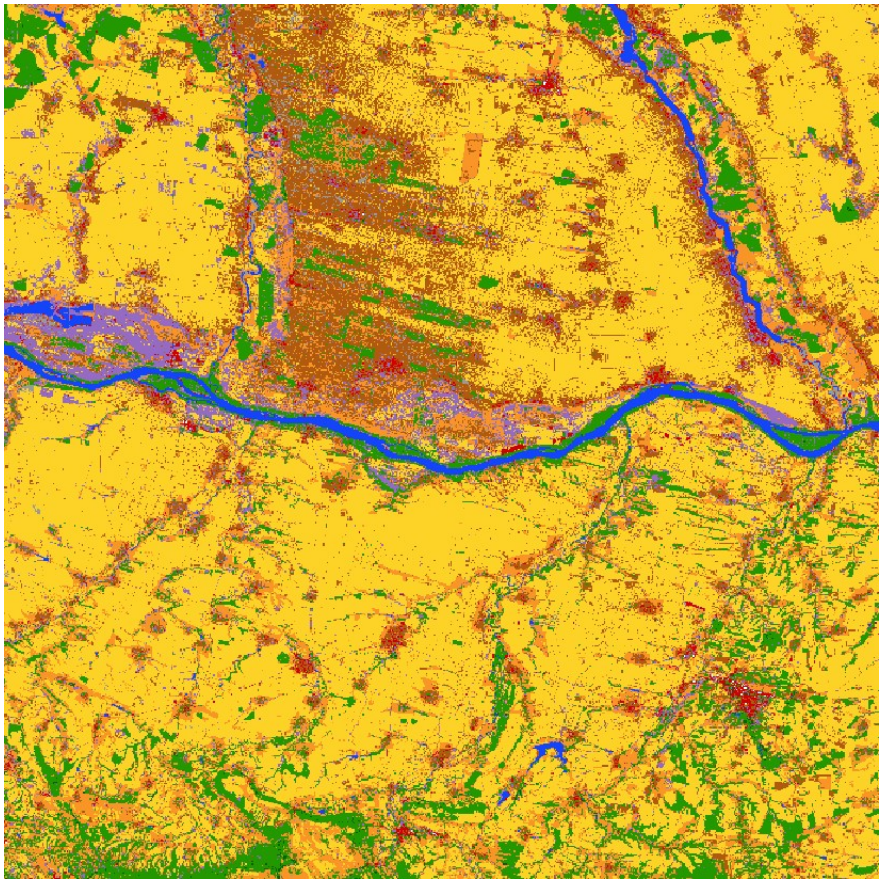
LPIS	65 238 polygons with crop type attribute
LUCAS Survey LU/LC classification	734 points

Databases for other tiles

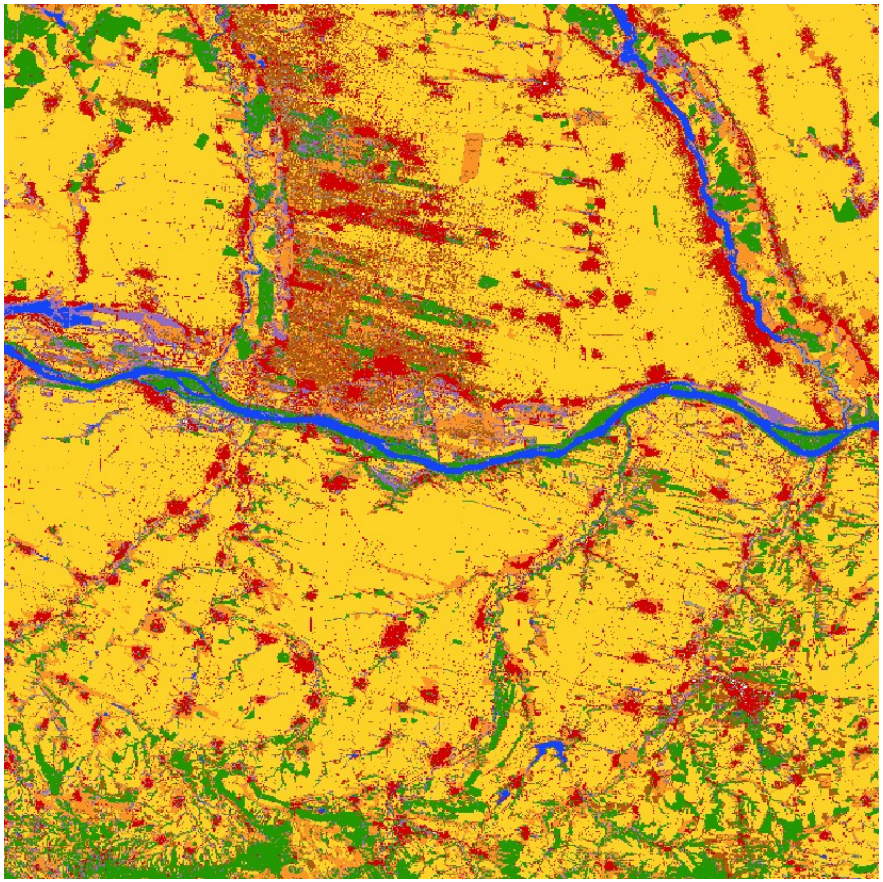
- 33TWJ – Croatia - almost ready
- 35TML – Romania - in progres
- Slovenia - ?

- Any other participants?

Classification results - 34TGP Romania



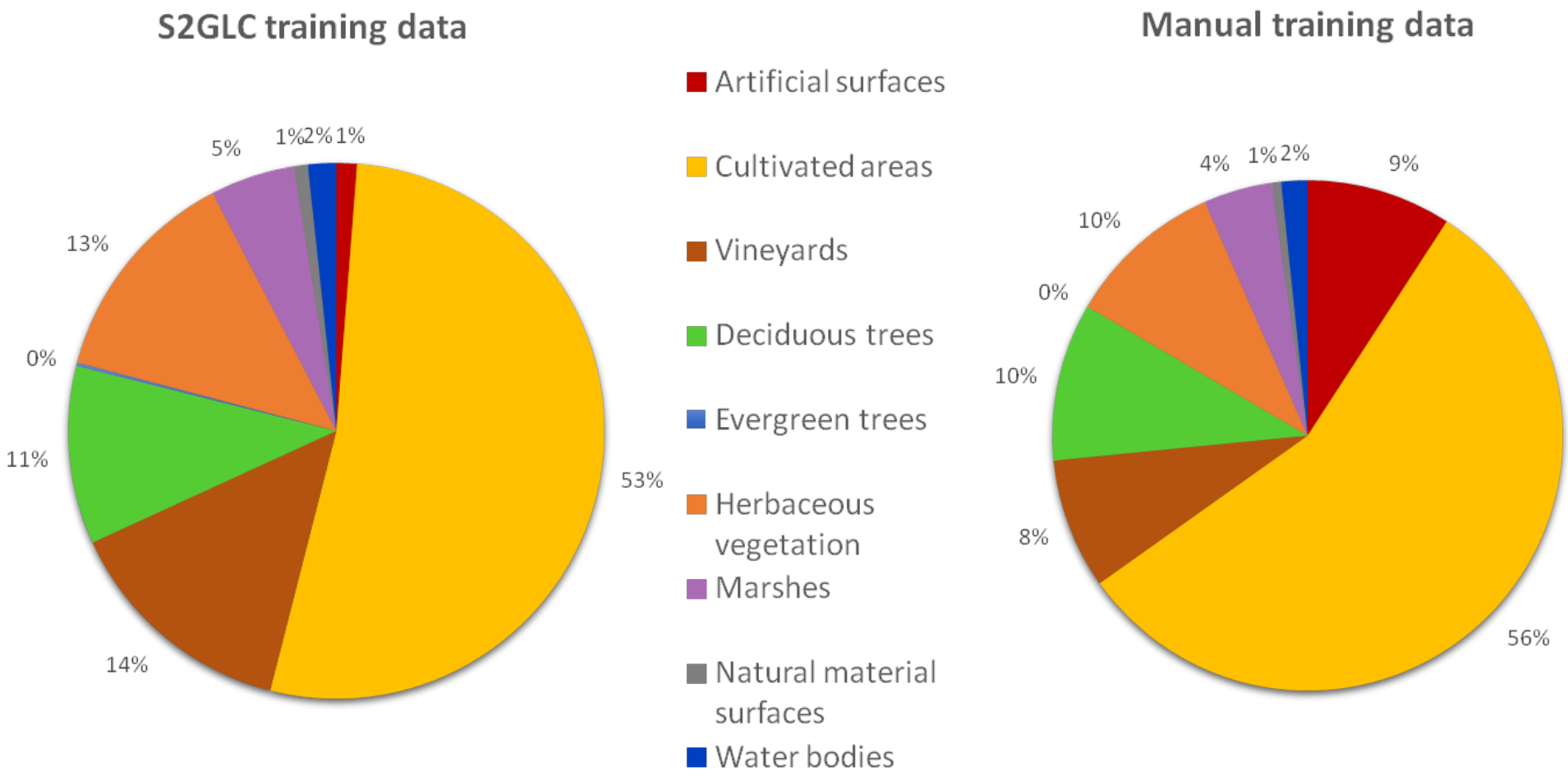
Automatic training data



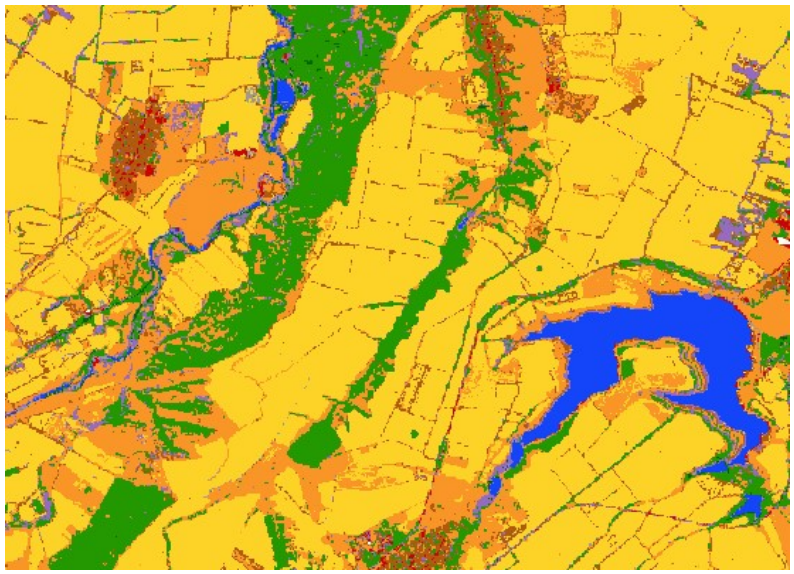
Manual training data

Value	Count	Part of the image [%]
Unchanged pixels	97611966	81%
Changed pixels	22948434	19%

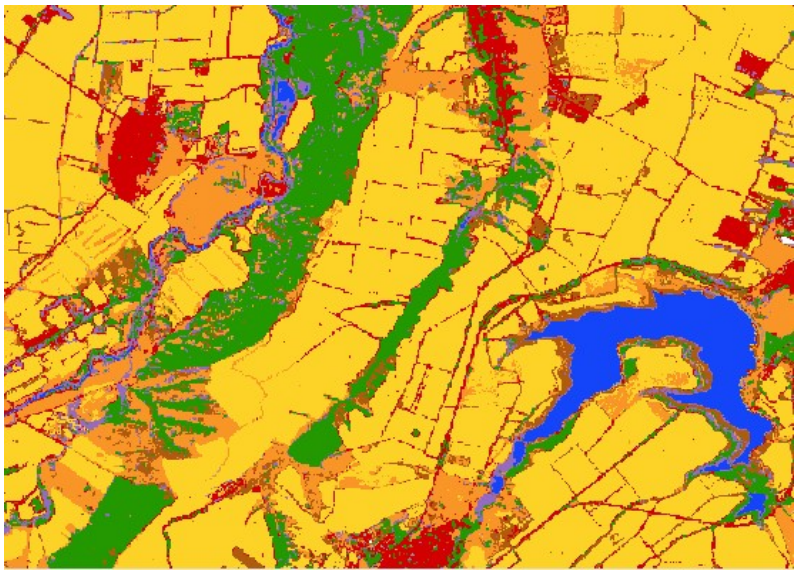
Structure of LC classes



Examples of classification



Automatic training data



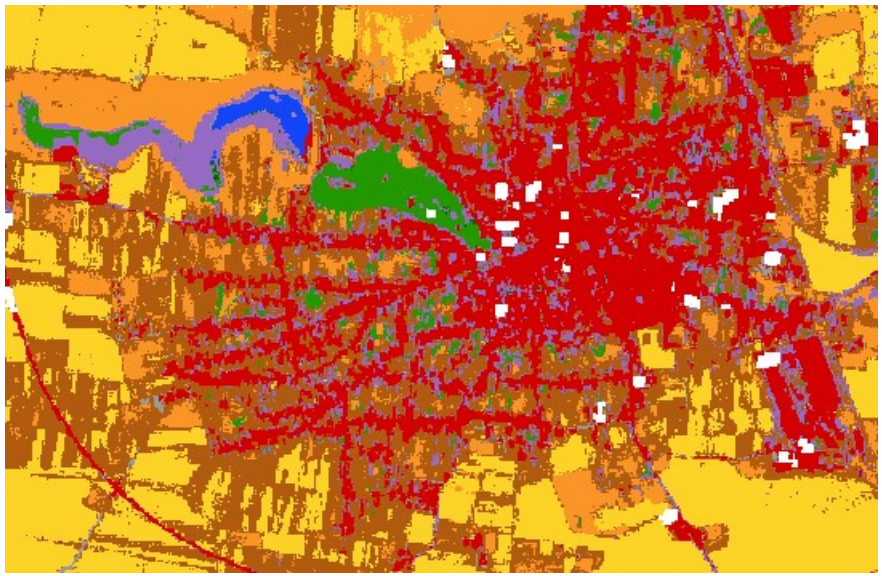
Manual training data

Sentinel-2 image

Bing Aerial image

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

Examples of classification



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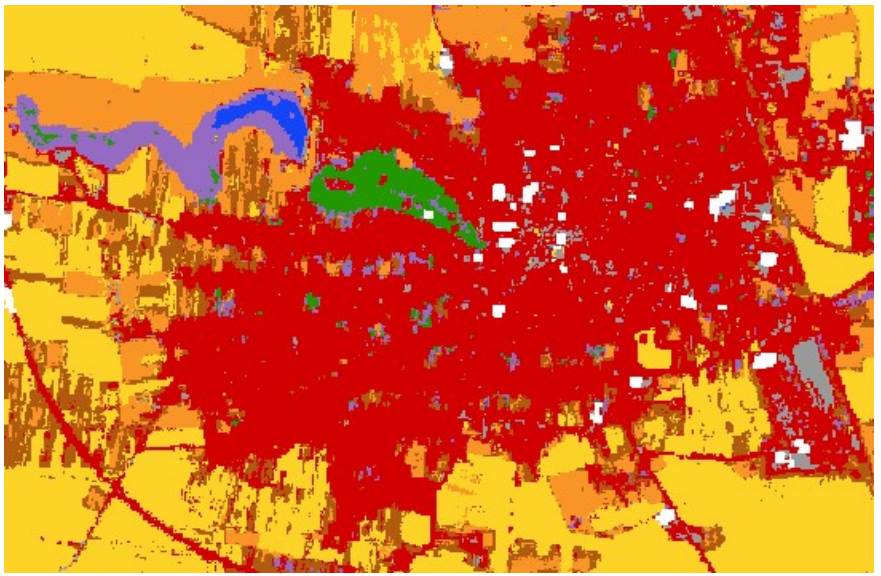
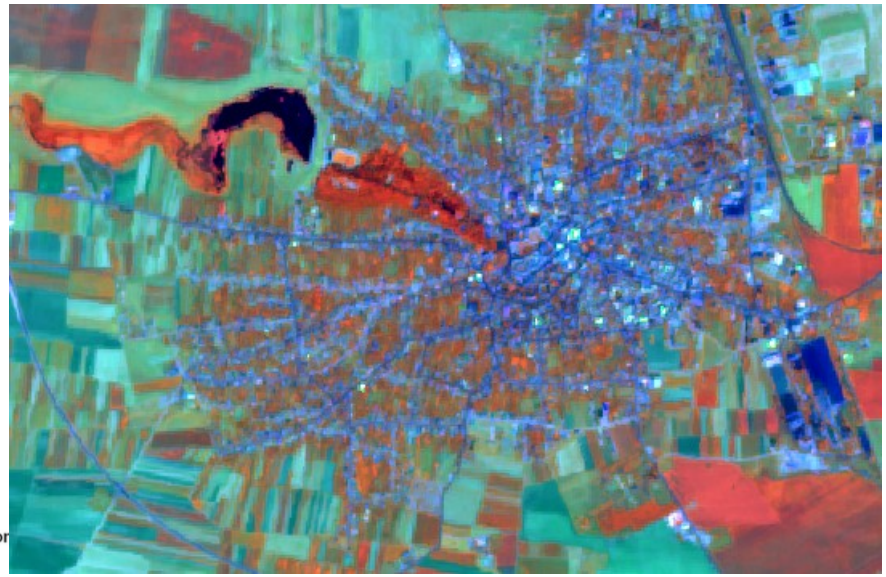


Manual training data



Sentinel-2 image

Bing Aerial image

- Clouds
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- Cultivated areas
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Validation of automatic classification using manual reference data

Conclusion

- **New partners are very welcome ! ☺**

- Discussion about definition of LC classes
- Estimation of Reference data collecting workload

Questions:

- Use of Landsat data?
- Validation data?
- How we can share the data?

The main goal of this initiative is a research paper

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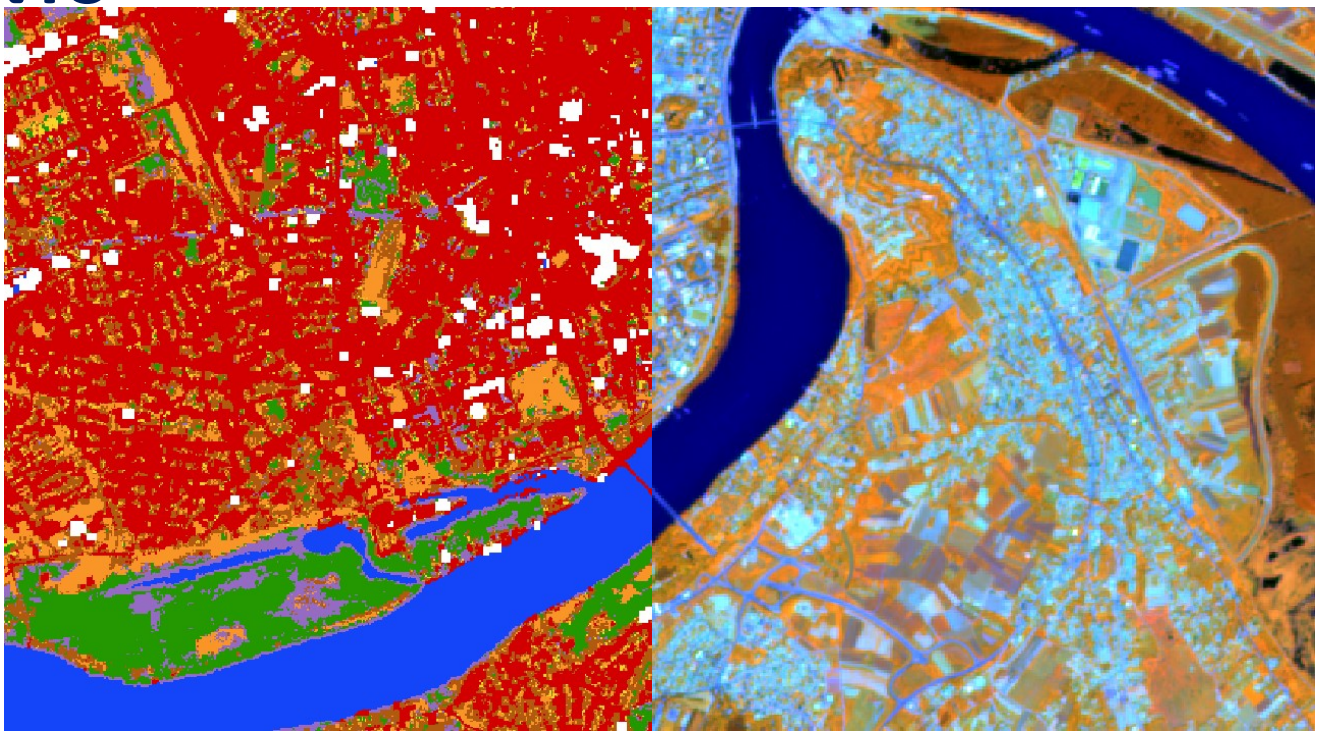

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