

osmlanduse.org

OpenStreetMap for Earth Observation (OSM4EO)
land use application and benchmark 24.11.2020

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SEIT 1386



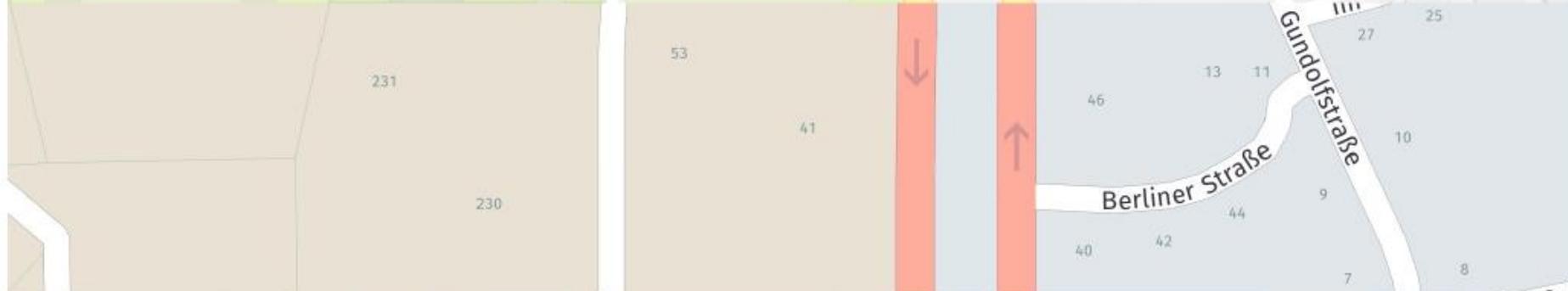
HEIDELBERG INSTITUTE
FOR GEOINFORMATION
TECHNOLOGY



OSM
© OpenStreetMap contributors



Bing
© OpenStreetMap contributors
© HERE



HERE
© 2020 HERE, Deutschland



Google Maps
© 2020 Geobasis-DE/BKG
(© 2009), Google

OSM query

 Entity Filter

 Area of Interest

 Timerange and resolution

 OSM type (node, way, relation)

 Thematic selection

 Custom filter

 Grouping

 By timestamp / boundary / tag / key

 Transformation  Access to all properties (geom, tags, metadata)

 Result Filter

 Optional, e.g. cleanup

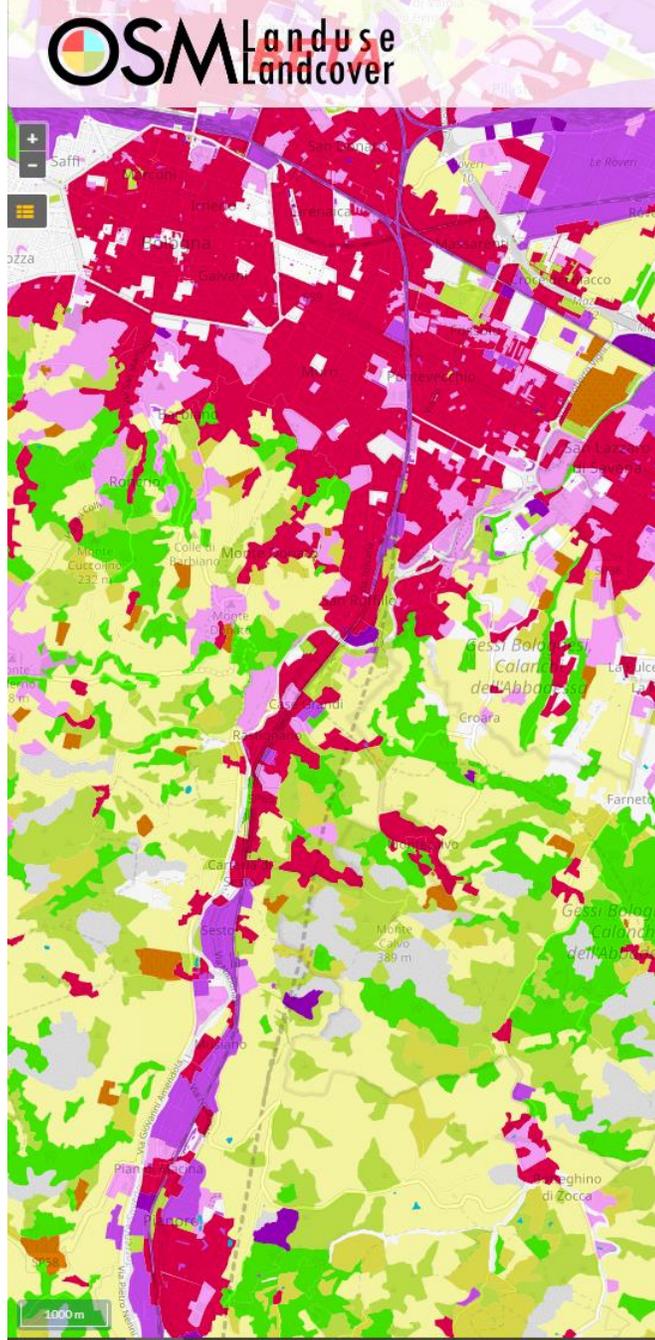
 Aggregation

 Count, average, sum, count unique, etc.

OSM key value pair (tag) to annotation/label

Table 1
Legend harmonization between OSM tags and Corine Land Cover (CLC) classes, level two legend.

Class	CLC Class	CLC Class Name	Corresponding OSM tag
1	1.1	Urban fabric	residential
2	1.2	Industrial, commercial and transport units	industrial, commercial, retail, harbour, port, railway, lock, marina
3	1.3	Mine, dump and construction sites	quarry, construction, landfill, brownfield
4	1.4	Artificial non-agricultural vegetated areas	stadium, recreation_ground, golf_course, sports_center, common, allotments, pl cemetery, park, zoo, track, garden
5	2.1	Arable land	greenhose_horticulture, greenhouse, farmland, farm, farmyard
6	2.2	Permanent crops	vineyard, orchard
7	2.3	Pastures	meadow
8	2.4	Heterogeneous agricultural areas	
9	3.1	Forests	forest, wood
10	3.2	Shrub and/or herbaceous vegetation associations	grass, greenfield, scrub, heath, grassland
11	3.3	Open spaces with little or no vegetation	fell, sand, scree, beach, mud, glacier, rock, cliff
12	4.1	Inland wetlands	march, wetland
13	4.2	Coastal wetlands	salt_pond, tidal
14	5.0	Water bodies	water, riverbank, reservoir, basin, dock, canal, pond



- 1.1 Urban fabric
- 1.2 Industrial, commercial and transport units
- 1.3 Mine, dump and construction sites
- 1.4 Artificial, non-agricultural vegetated areas
- 2.0 Agricultural areas
- 2.1 Arable land
- 2.2 Permanent crops
- 2.4 Heterogeneous agricultural areas
- 3.1 Forest
- 3.2 Shrub and/or herbaceous vegetation associations
- 3.3 Open spaces with little or no vegetation
- 4.0 Wetlands
- 5.0 Water bodies

Method

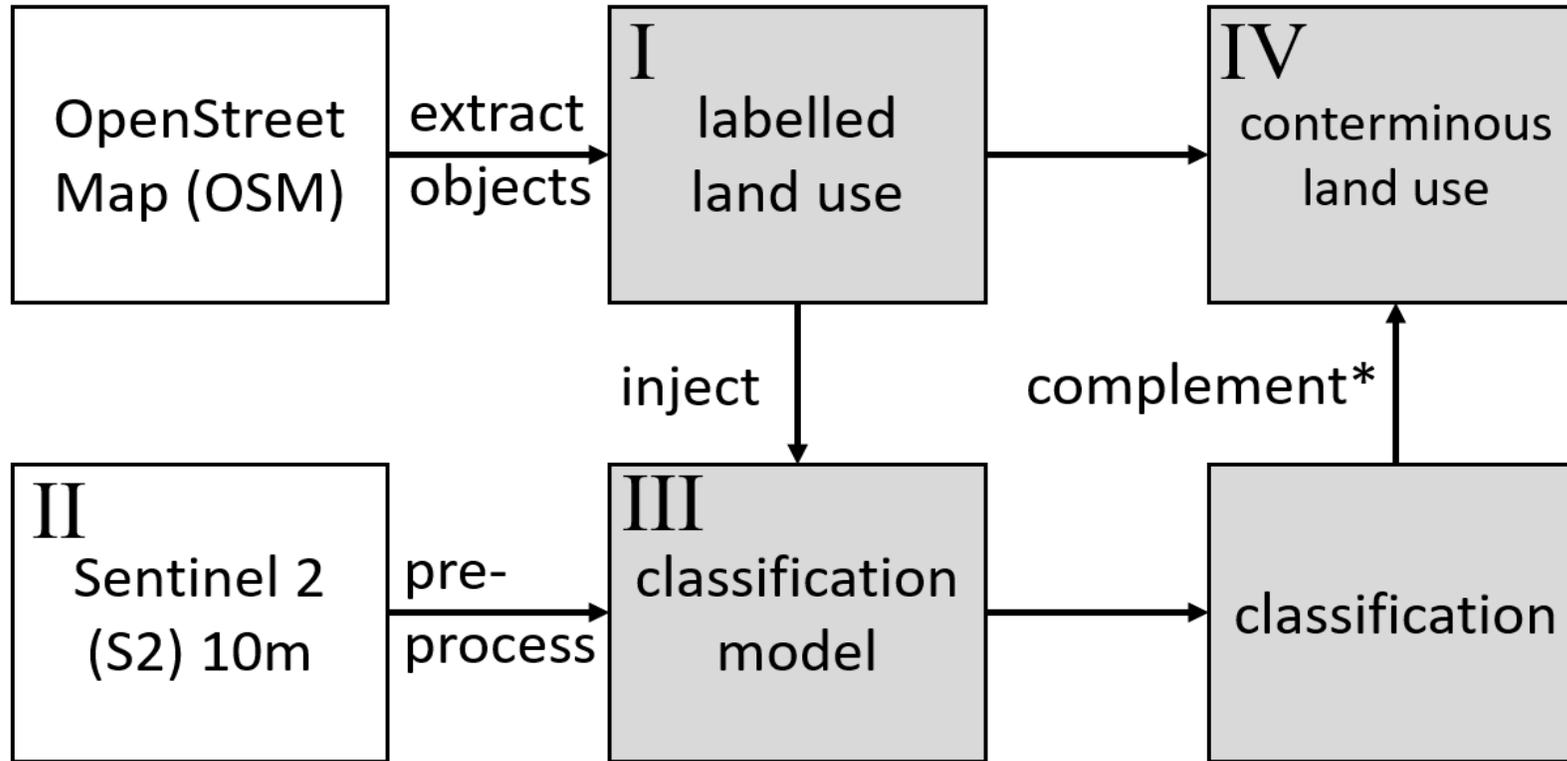


Figure: research design for map production where roman letters I – IV show order and flow of events, grey boxes indicate data and models available within the paper’s repository; *classification was used when labelled land use was absent; OSM data can be retrieved through OSM API, pre-processed S2 data through FAO’s sepal.io



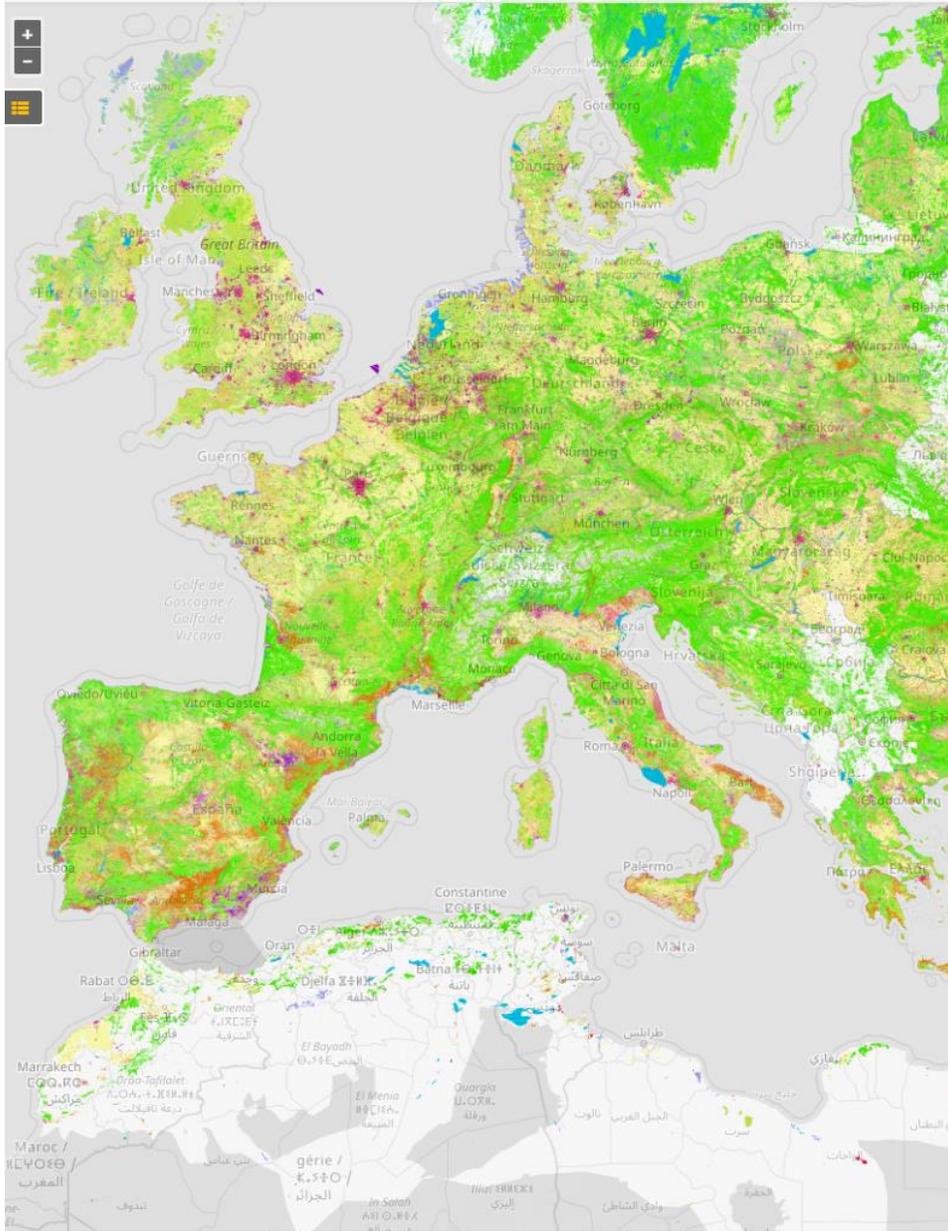
osmlanduse.org

api.ohsome.org # Heidelberg OSM api, flexible

<https://sepal.io> # FAO Remote Sensing data portal

<https://github.com/pytorch/pytorch> # community
deep learning model

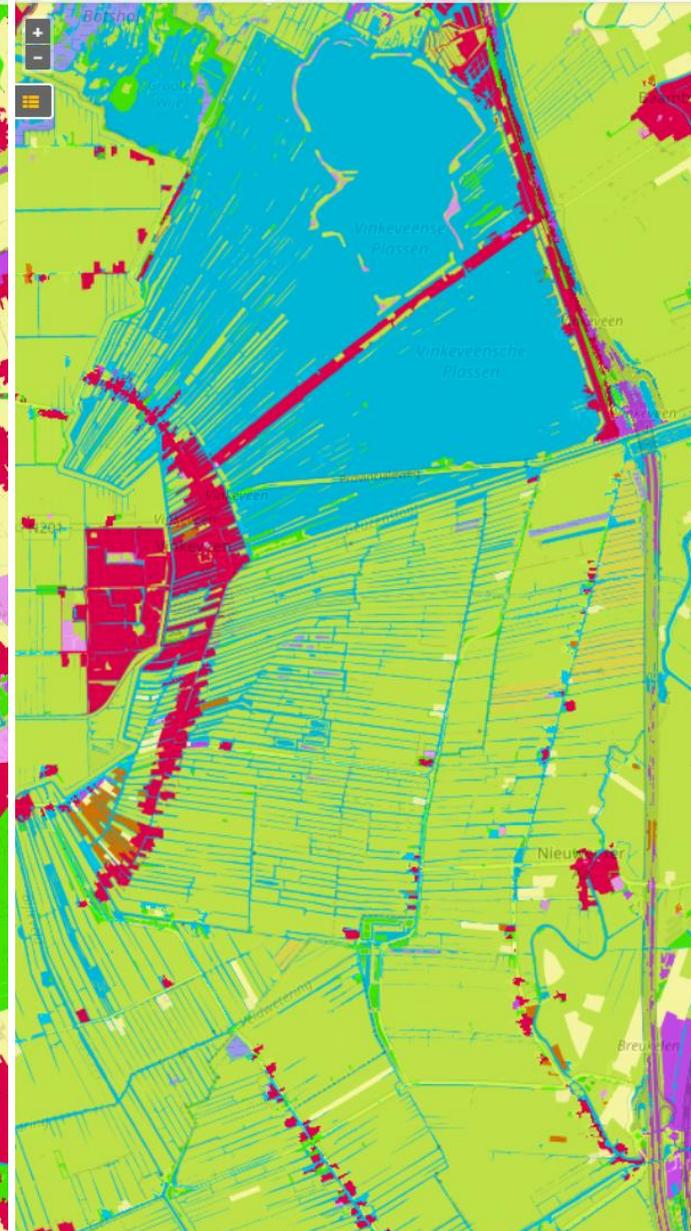
OSM Landuse Landcover European Union

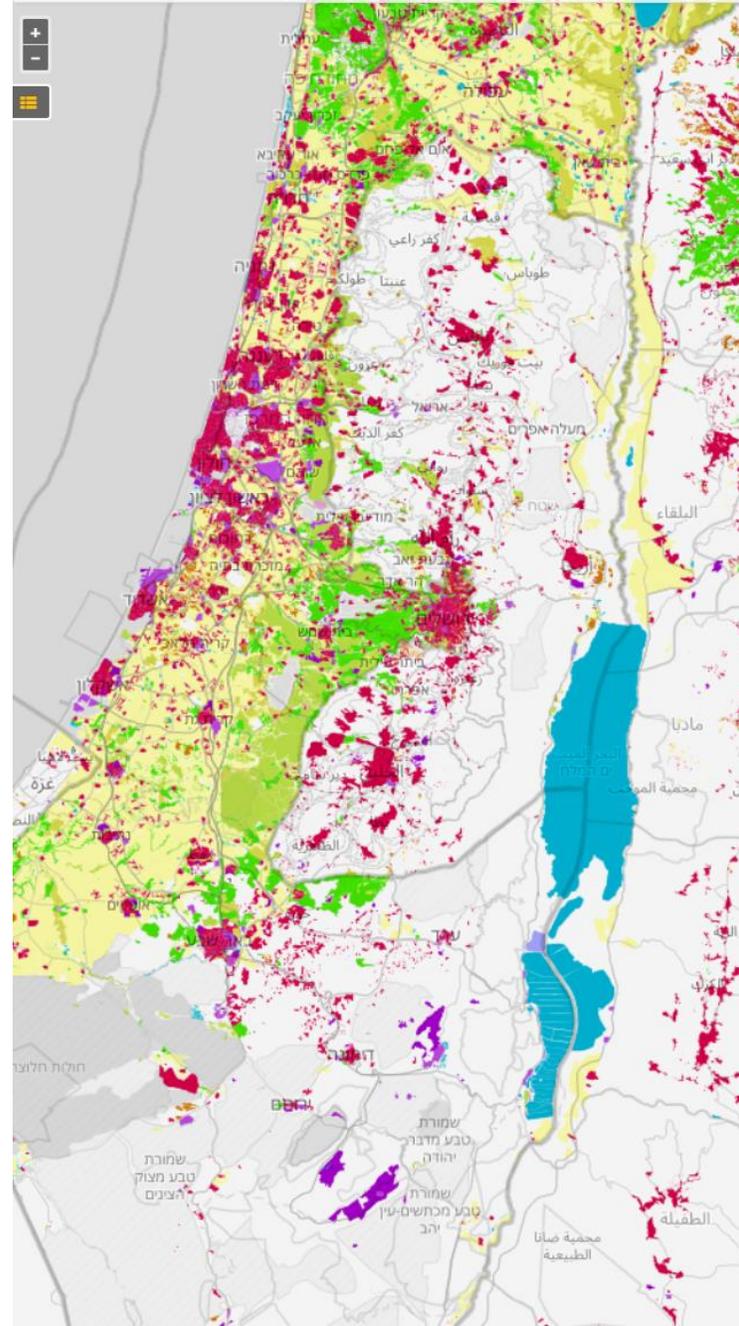
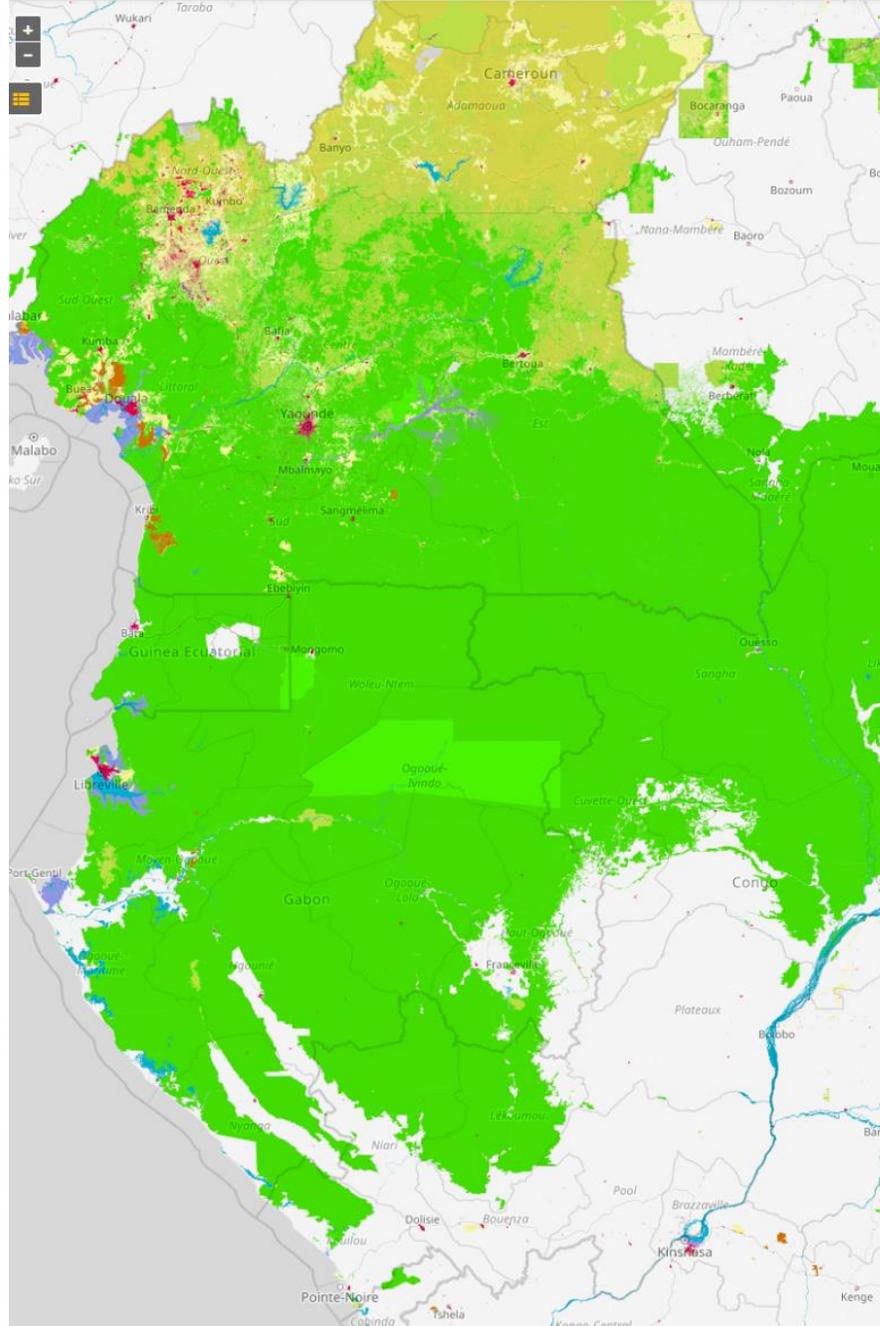
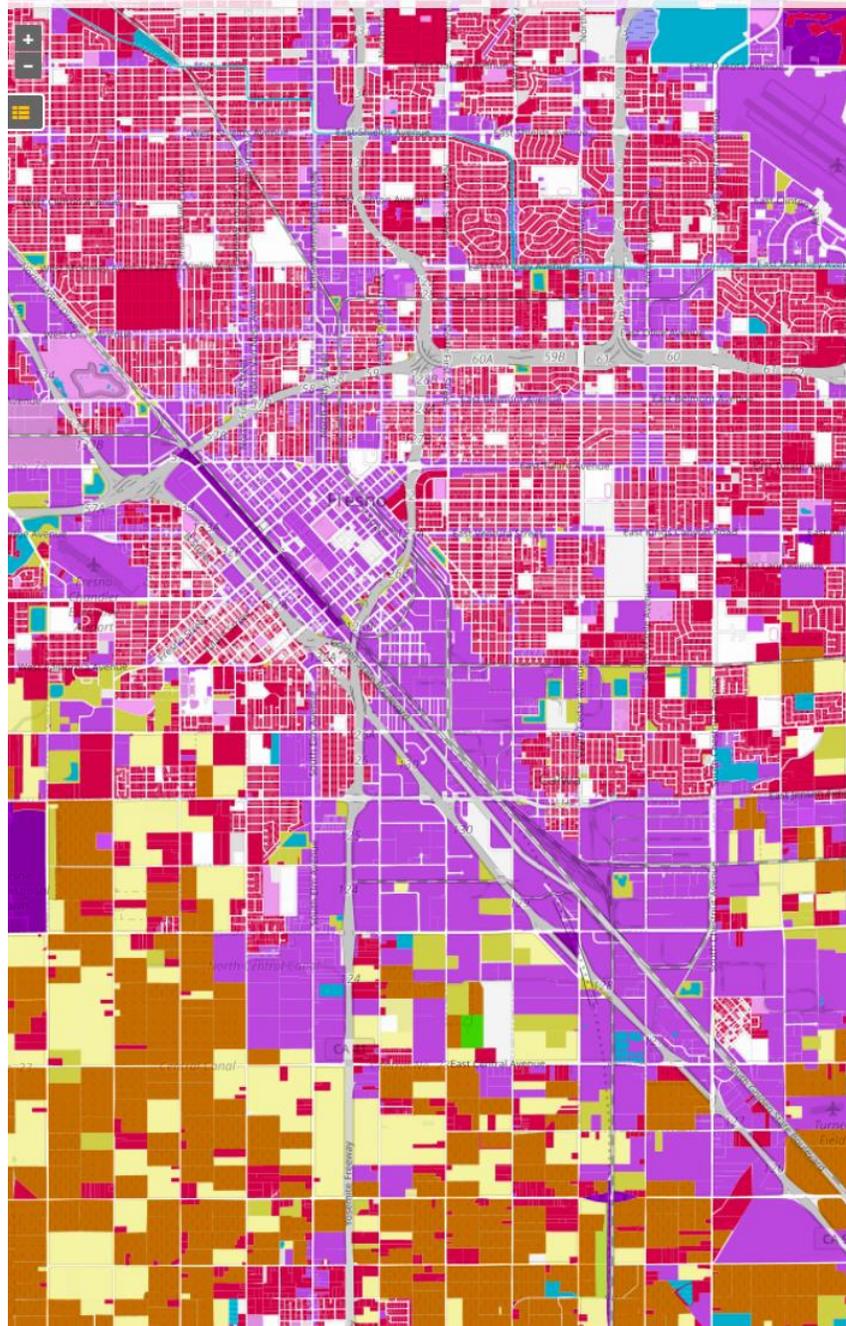


OSM Landuse Landcover Brussels



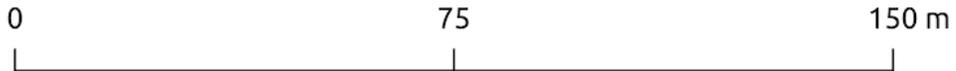
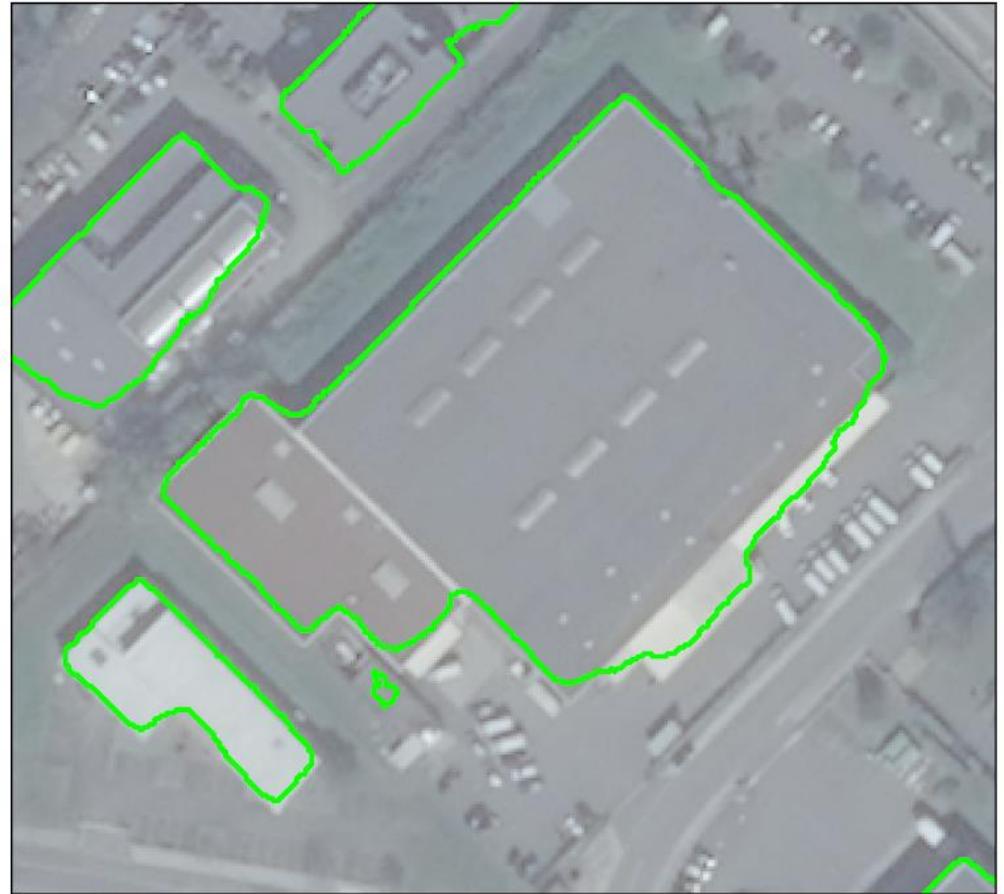
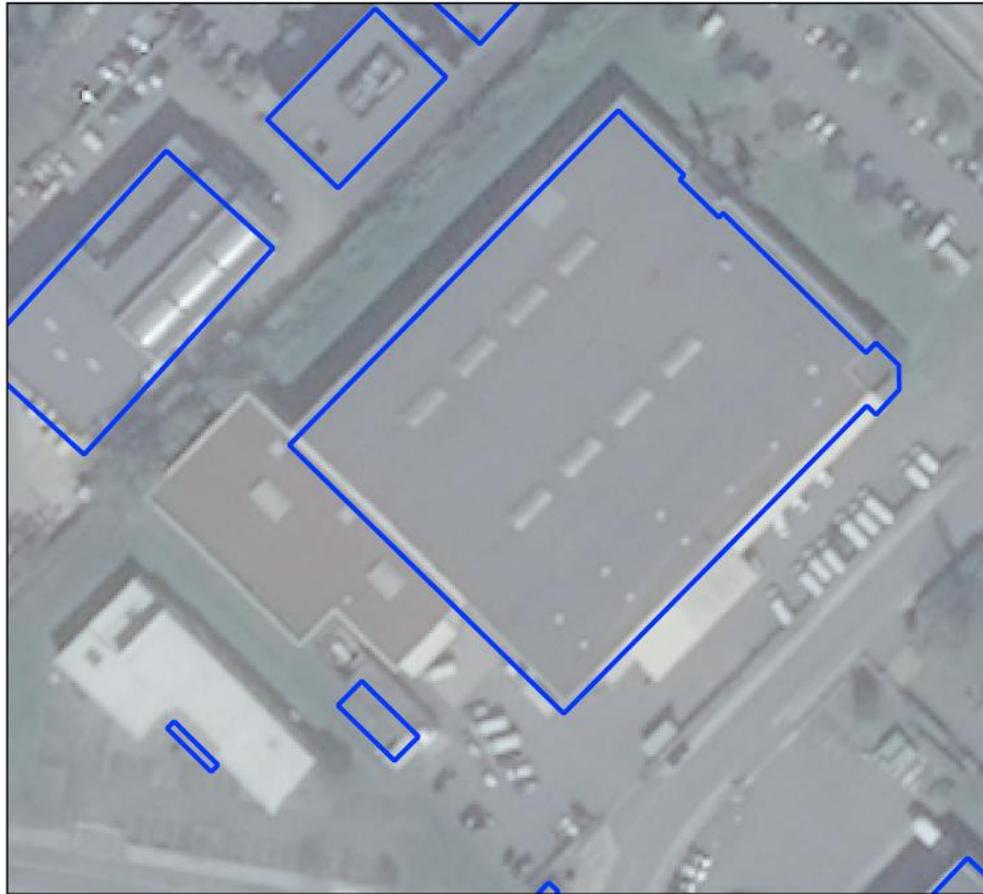
OSM Landuse Landcover Utrecht



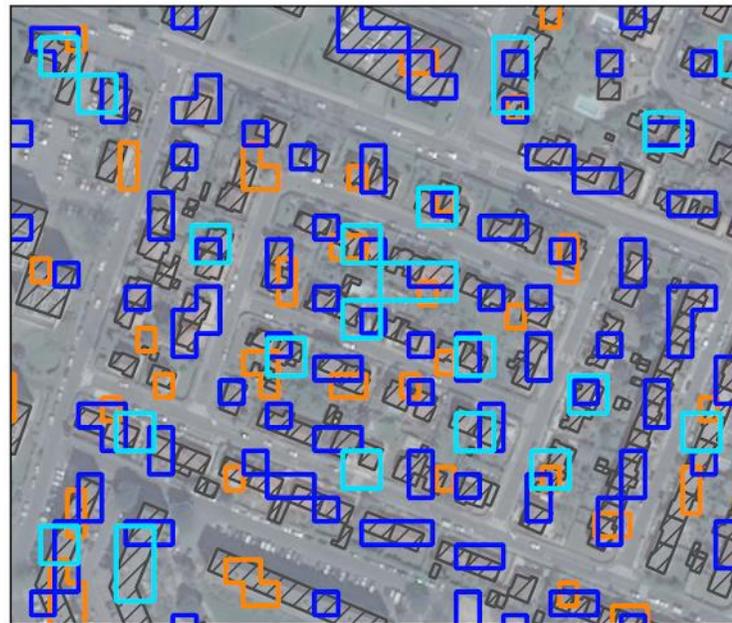
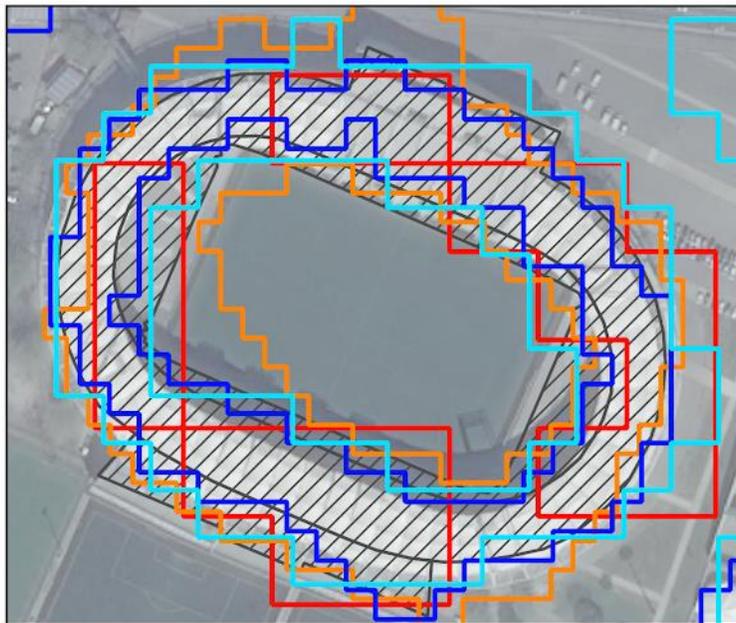


OSM footprint

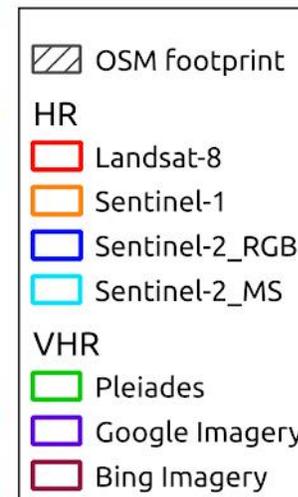
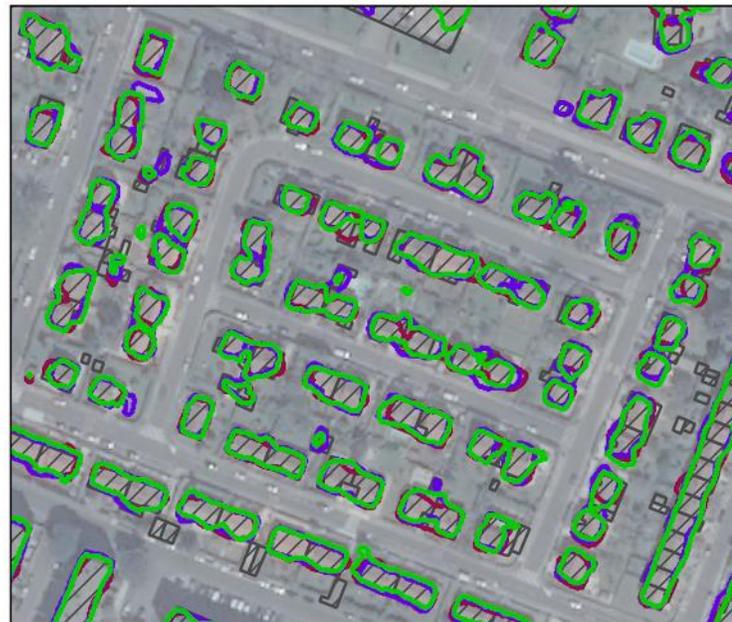
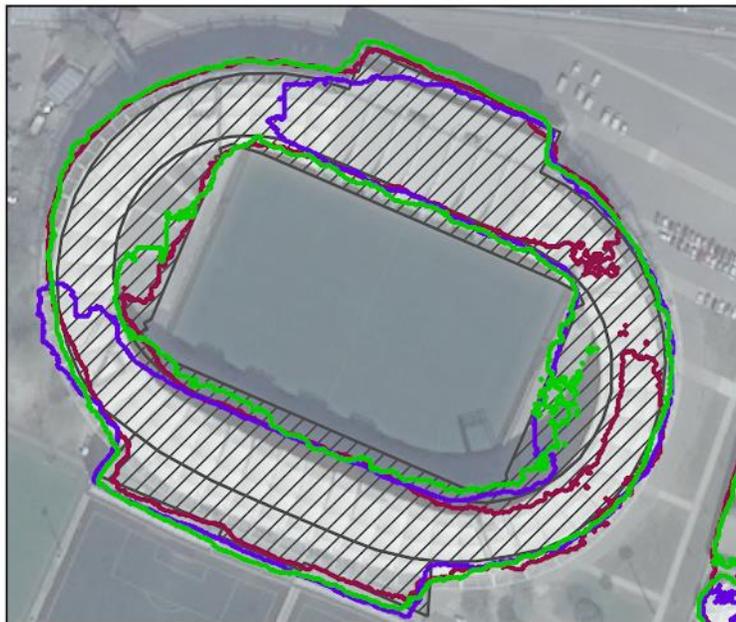
predicted footprint



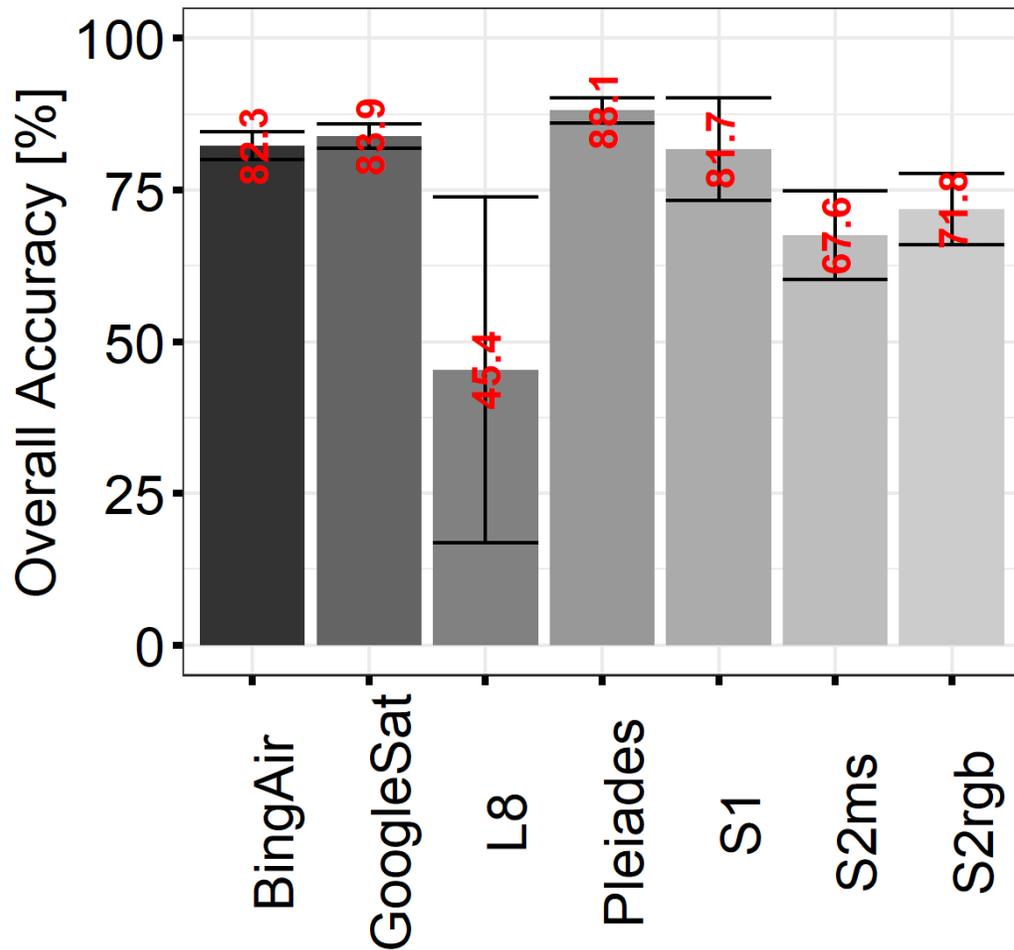
HR



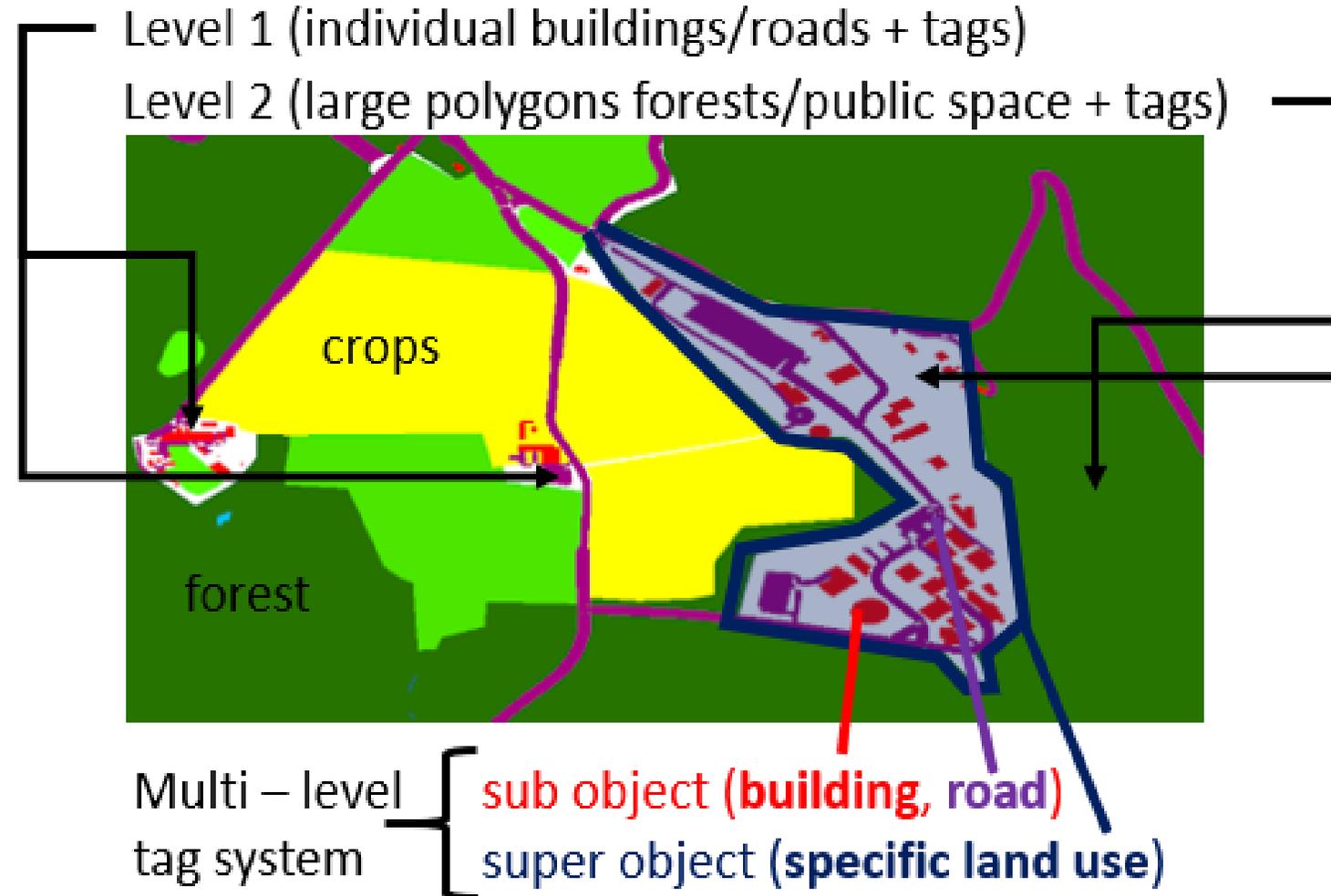
VHR



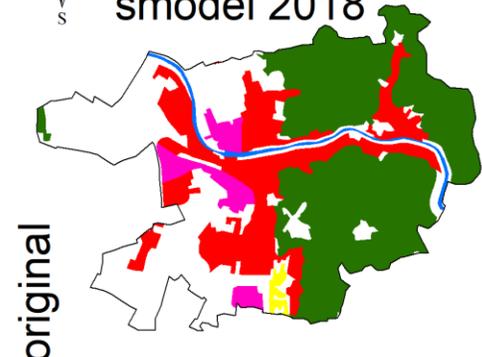
Different sensors



OSM access level



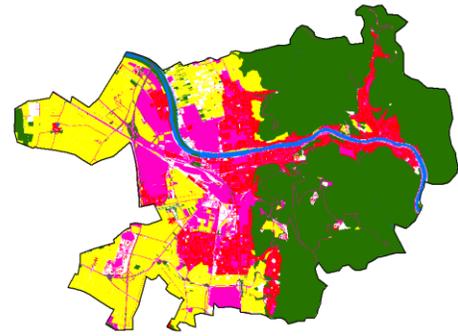
ATKIS digitales
Landschafts-
smodel 2018



original



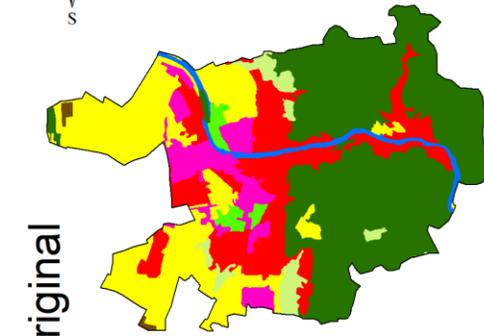
OSMlanduse 2018



difference

- Legend**
- thematic overlap
 - 11 Urban fabric
 - 12 Industrial, comercial and transport units
 - 20 Agricultural areas
 - 30 Forest and seminatural areas
 - 50 Water bodies

CLC 2018



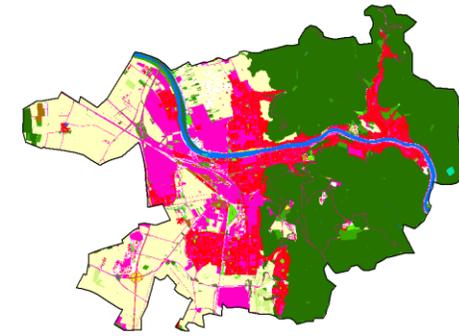
original



difference

- Legend**
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 - 14 Artificial, non-agricultural vegetated areas
 - 20 Agricultural areas
 - 21 Arable land
 - 22 Permanent crops
 - 31 Forest
 - 32 Shrub and/or herbaceous vegetation associations
 - 33 Open spaces with little or no vegetation
 - 50 Water bodies

OSMlanduse 2018

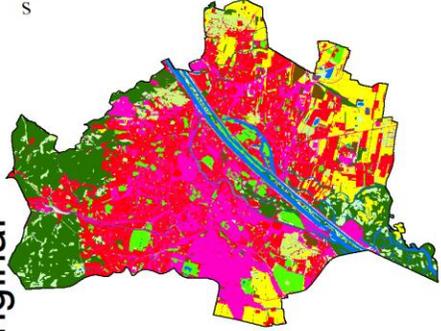


Heidelberg

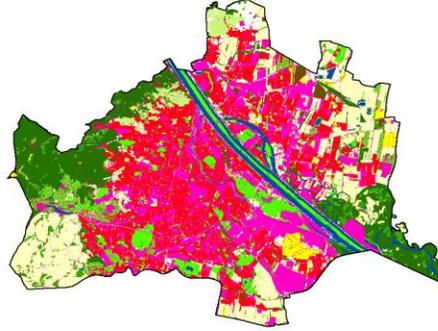


Realnutzung
Wien 2018

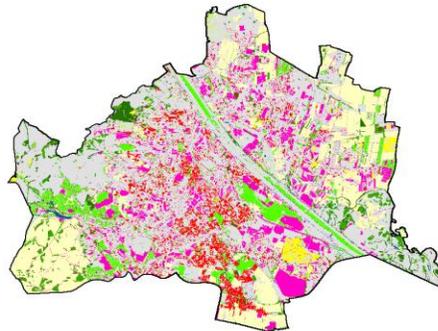
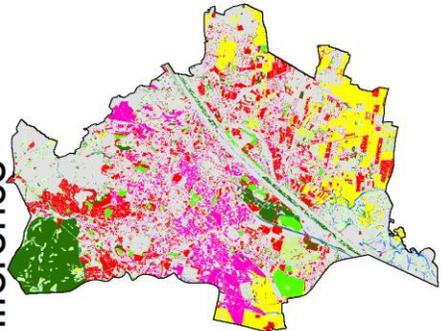
original



OSMlanduse 2018



difference



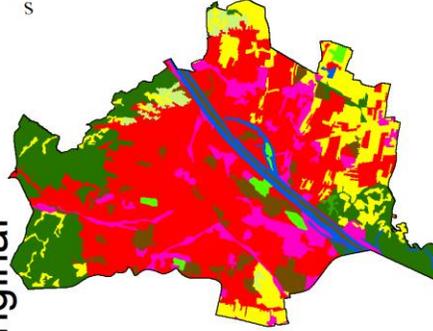
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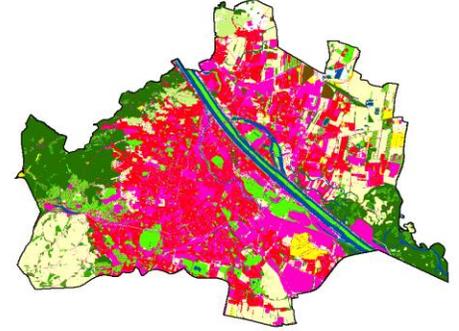


CLC 2018

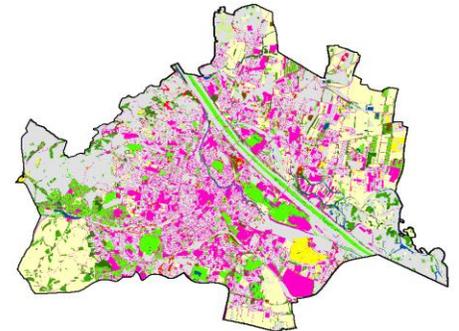
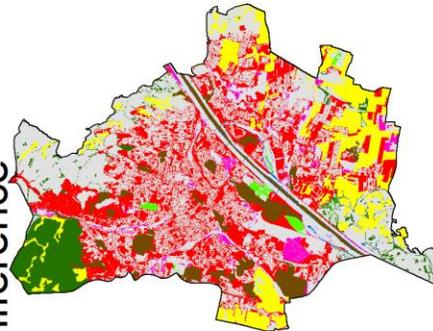
original



OSMlanduse 2018



difference

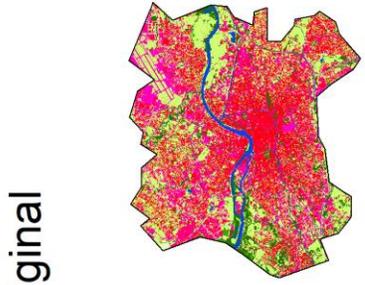


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Vienna

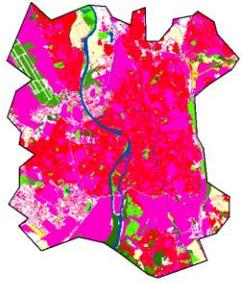
IGN land cover 2018



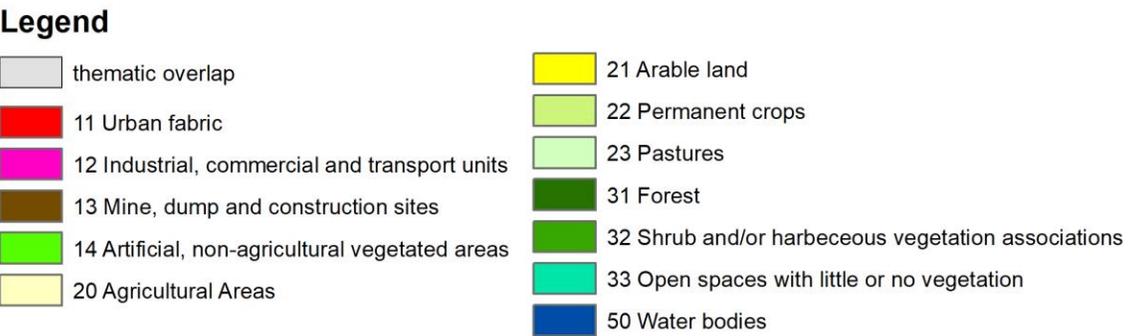
original



OSMlanduse 2018



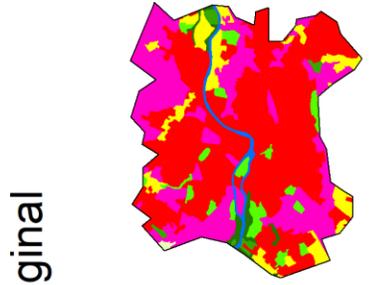
difference



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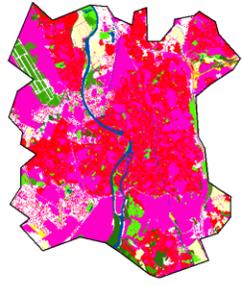
CLC 2018



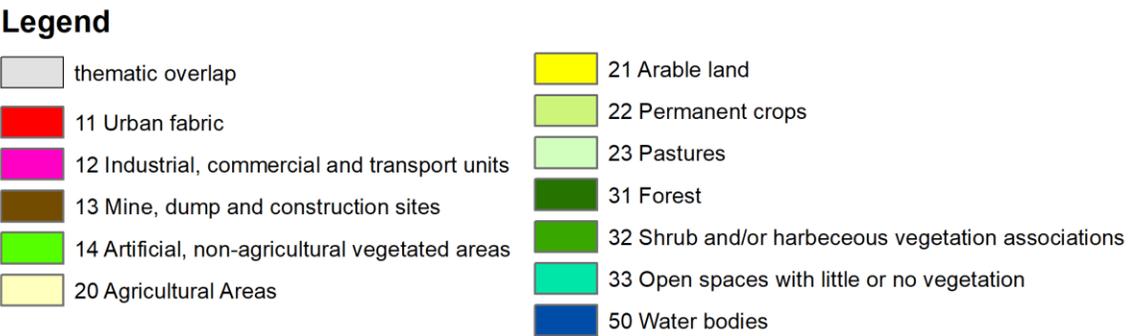
original



OSMlanduse 2018



difference



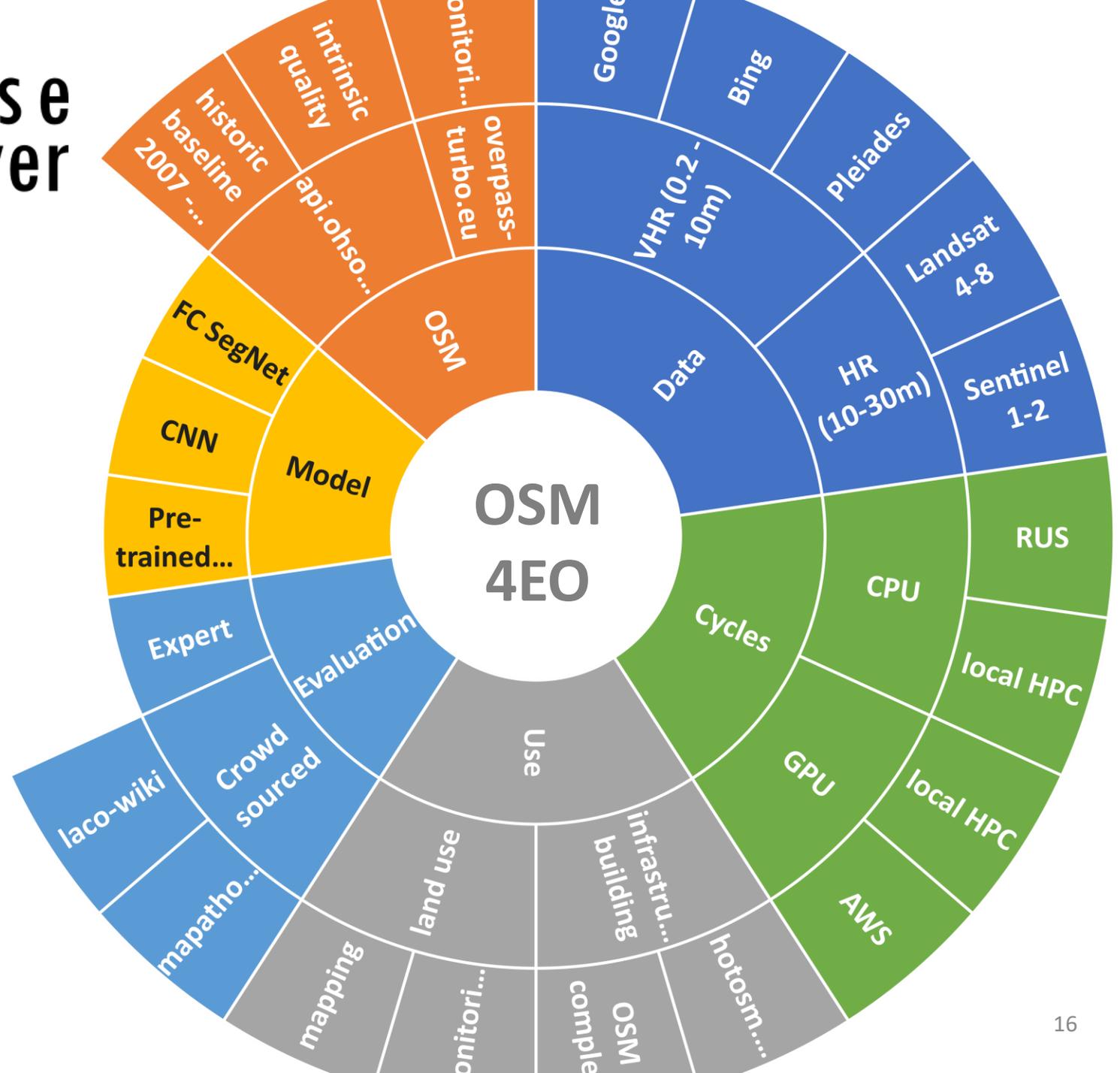
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Toulouse

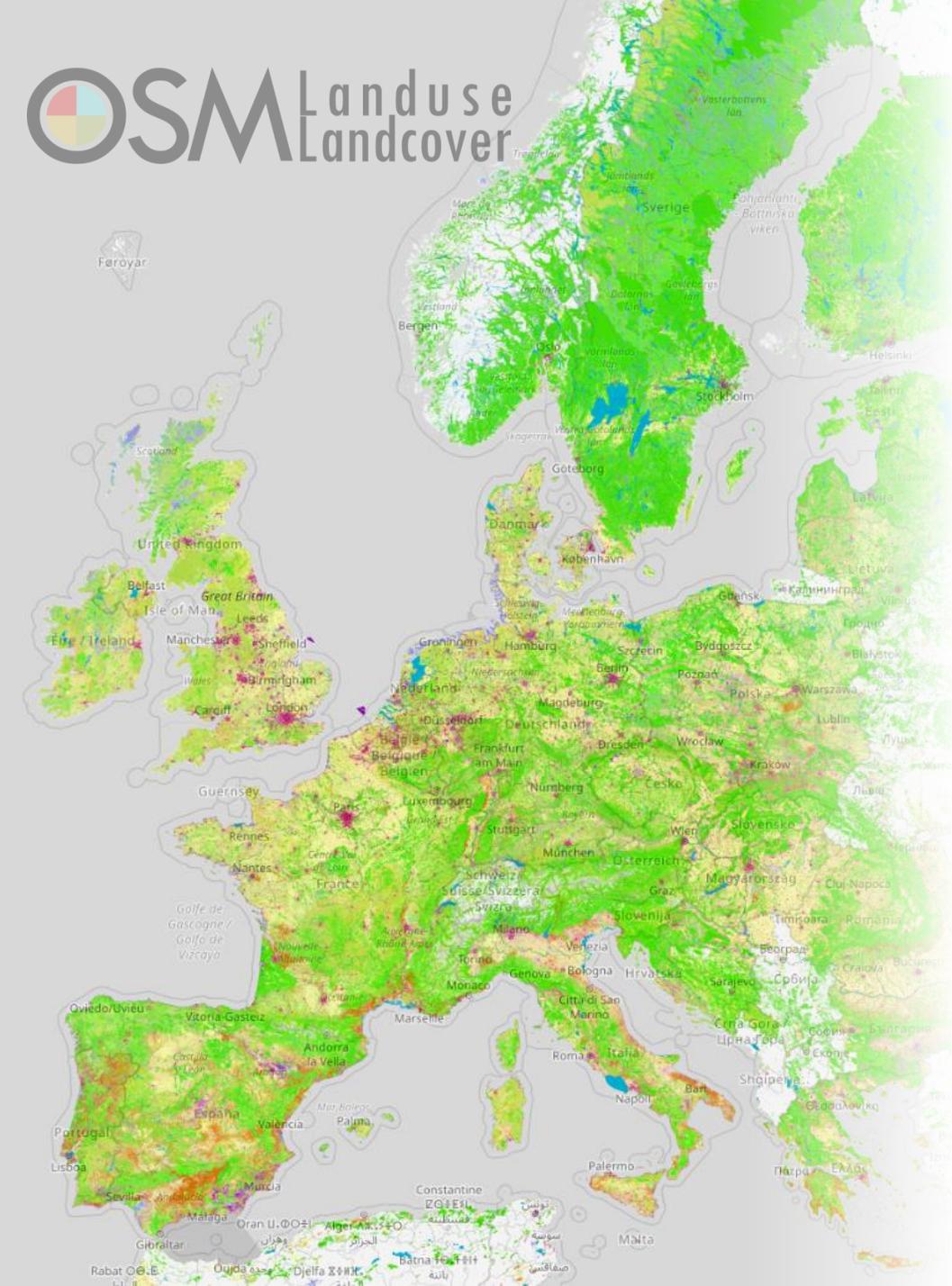
Summary

- OSMlanduse.org is open source fusion of Copernicus and OSM
- Available at different spatial and temporal resolutions
- Suited for land use and urban monitoring

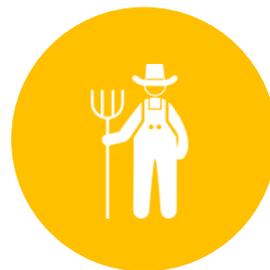




- Integration for different time steps
- Extend for other countries
- Higher spatial and temporal resolution
- Comprehensive comparison



LANDSENSE MAPATHON



[https://landsense.eu/](https://landsense.eu/Mapathon)
Mapathon

14.00 – 15.30 today