

1. Local Climate Zones

2. Basic features of the map comparison

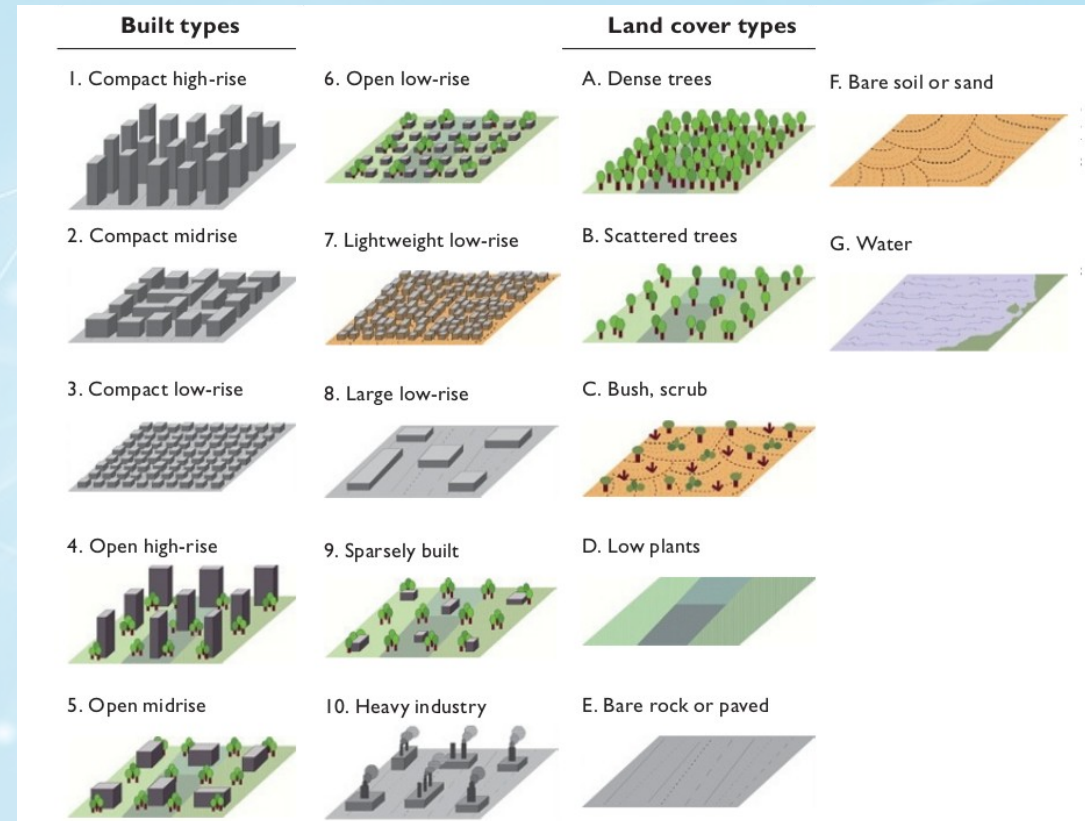
3. An example

4. Class grouping feature

1. Local Climate Zones

(Stewartt & Oke 2012)

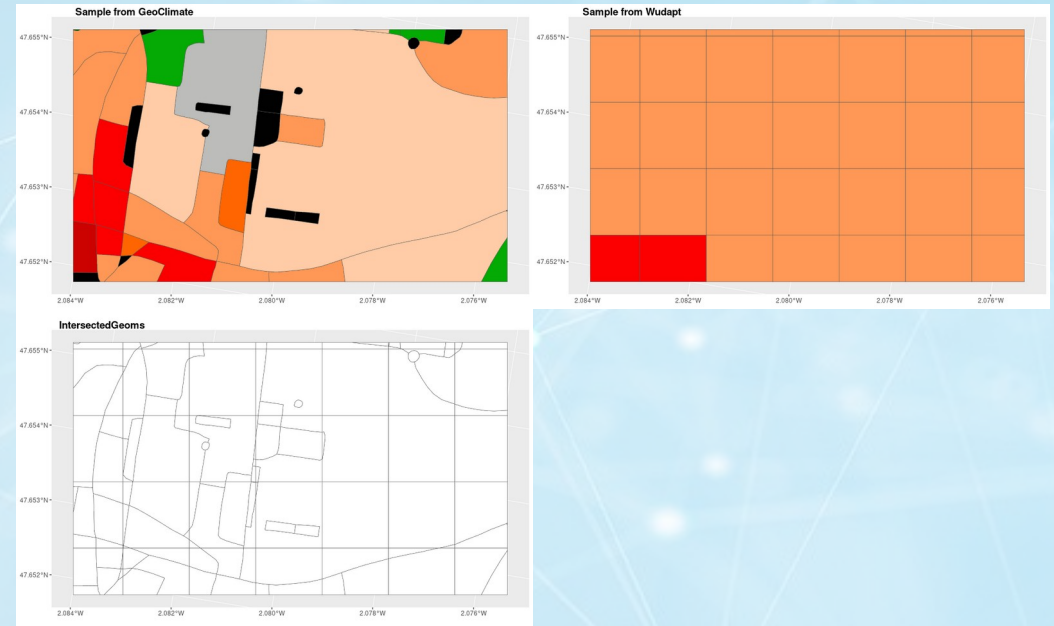
- Segmentation of territory according to land-use and urban canopy parameters
- 10 urban types and 7 land cover types
- Relevant in order to summarize the local climate characteristics of a zone based on geographical features



Several workflows according to data-sources and classification algorithms :
No ground truth
=> Need a tool to simply compare and analyse 2 maps

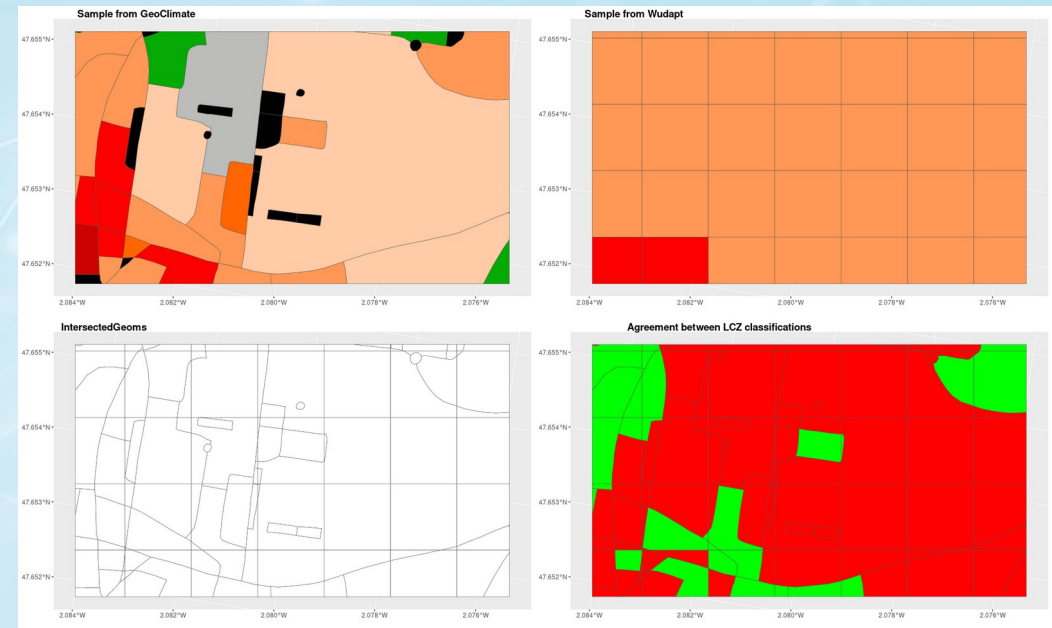
2. Basic features of the map comparison

- **Intersect spatial units (geometries) of the 2 maps**



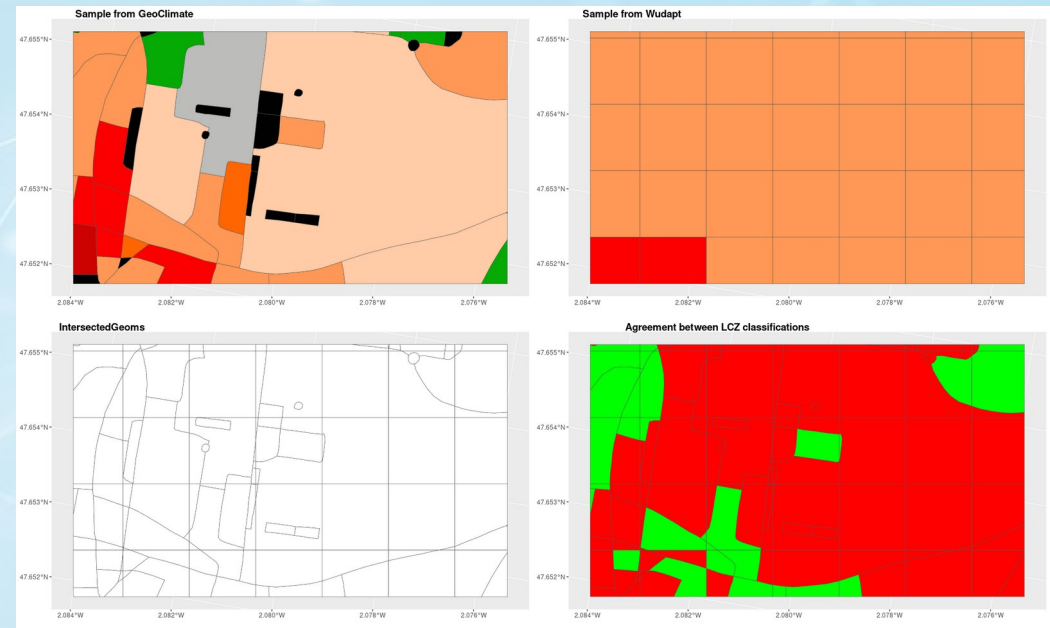
2. Basic features of the map comparison

- **Intersect spatial units (geometries)** of the 2 maps
- **Check if they agree** for every intersected unit



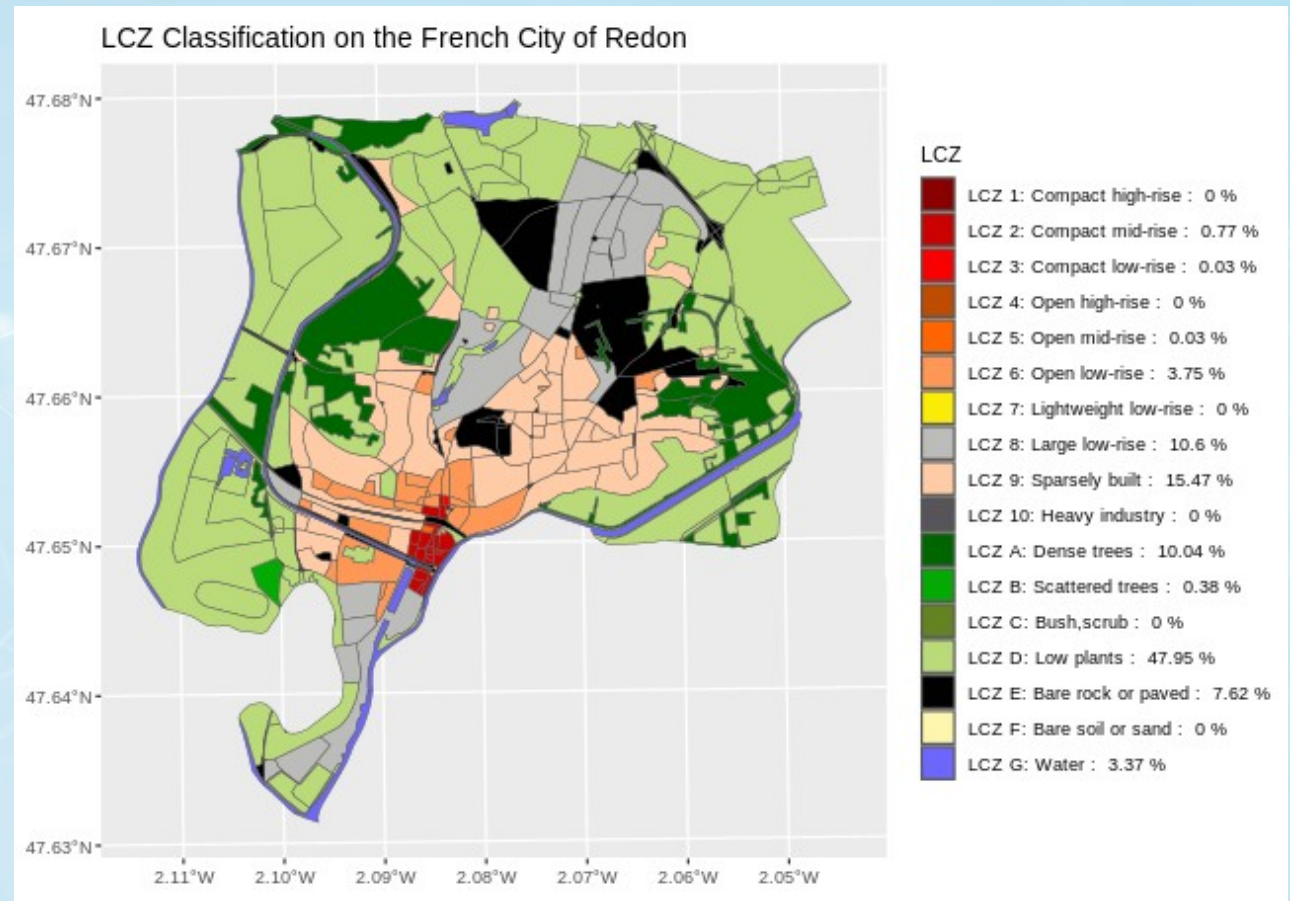
2. Basic features of the map comparison

- **Intersect spatial units (geometries)** of the 2 maps
- **Check if they agree** for every intersected unit
- Estimate the **strength of the general agreement** (Cohen's Kappa)
- Explore **how levels of one classification break up into the levels of the second (confusion matrix)**



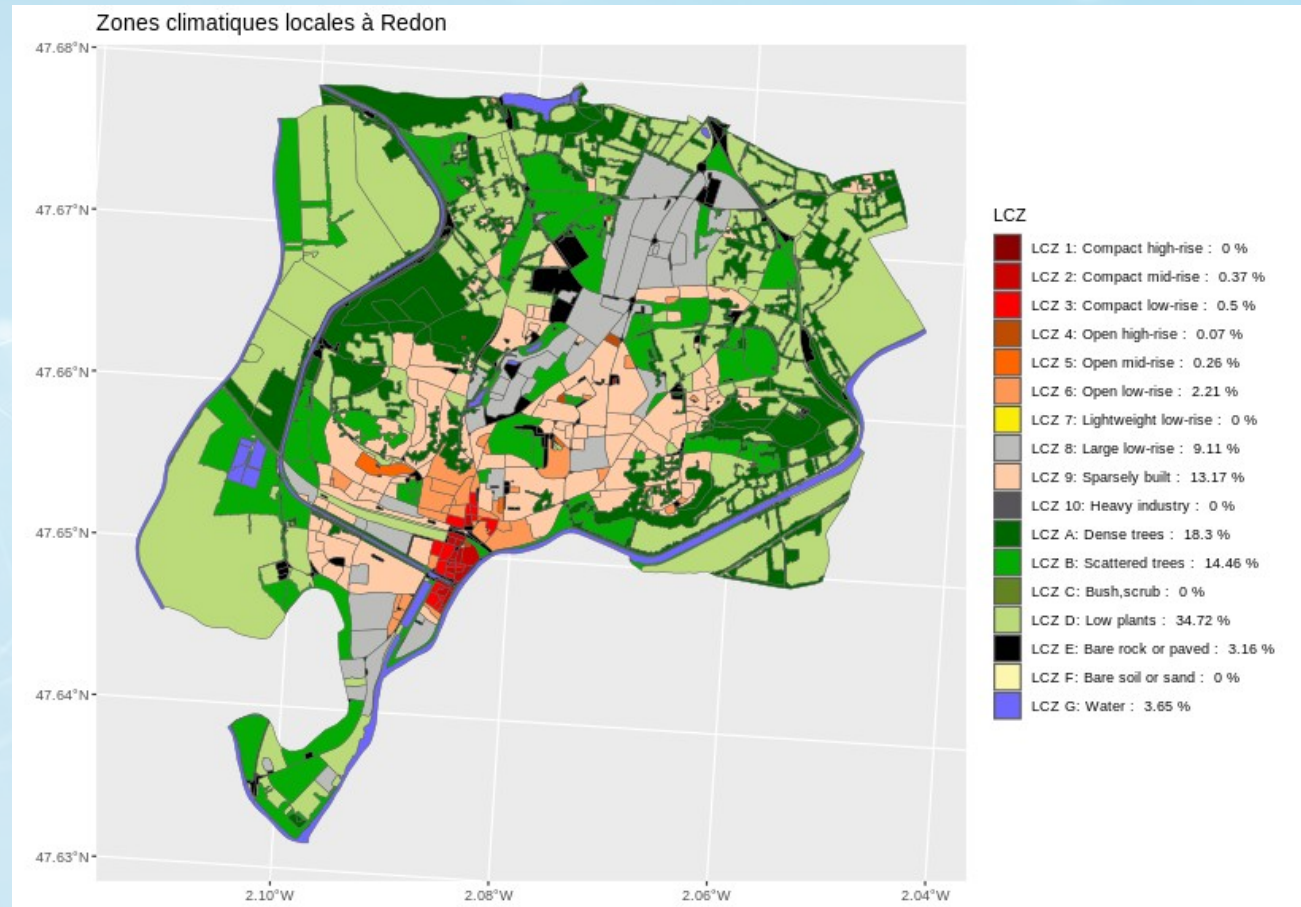
3. An example (1)

- Local Climate Zone for the city of Redon
- From OpenStreetMap (OSM) data
- Using GeoClimate workflow



3. An example (2)

- Same city (Redon)
- Same algorithm (GeoClimate)
- Different data source : data From the french national geographic institute database (BD TOPO)

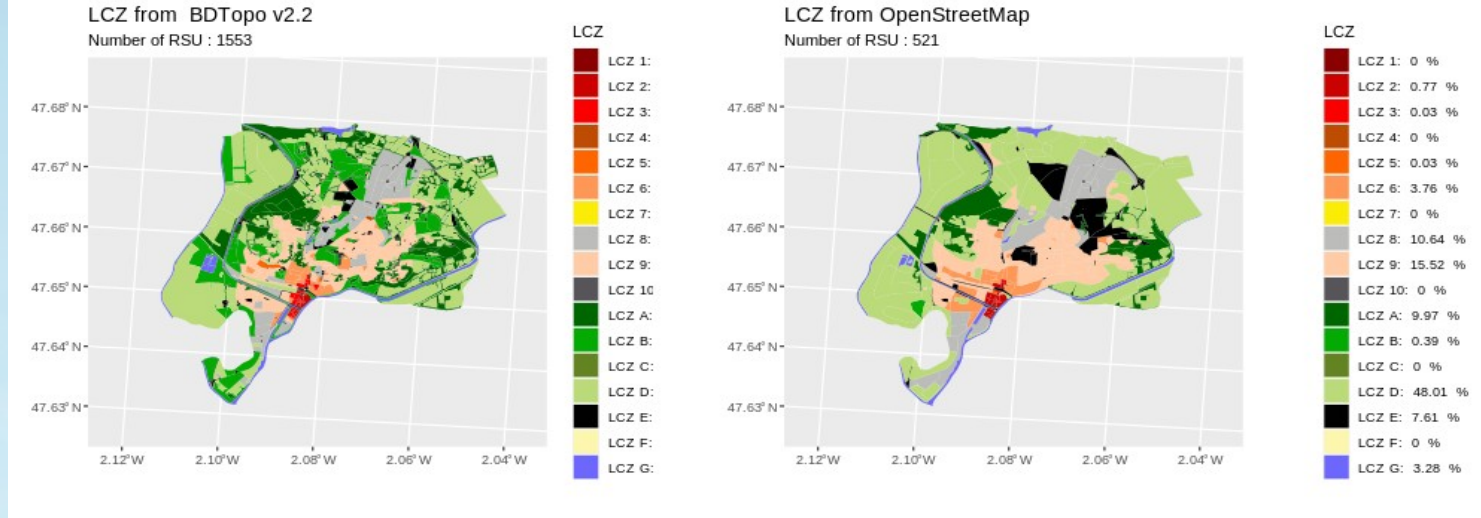


**How do they compare ? Where do they agree ?
Disagree ? And How ?**

Comparison

3. An example (3)

- Fewer spatial units with OSM

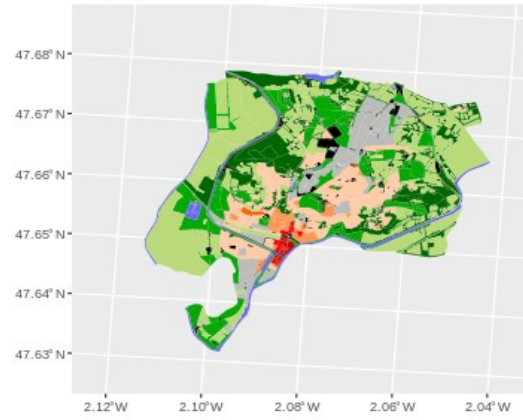


Comparison

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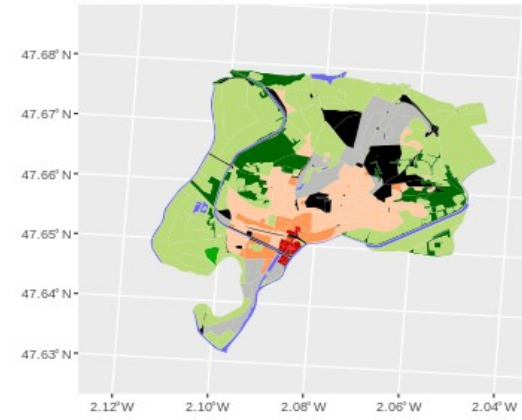
LCZ from BDTopo v2.2
Number of RSU : 1553



LCZ

LCZ 1:	Dark Red
LCZ 2:	Red
LCZ 3:	Orange-Red
LCZ 4:	Orange
LCZ 5:	Light Orange
LCZ 6:	Yellow-Orange
LCZ 7:	Yellow
LCZ 8:	Light Green
LCZ 9:	Green
LCZ 10:	Dark Green
LCZ A:	Light Green
LCZ B:	Green
LCZ C:	Dark Green
LCZ D:	Light Green
LCZ E:	Black
LCZ F:	Yellow
LCZ G:	Blue

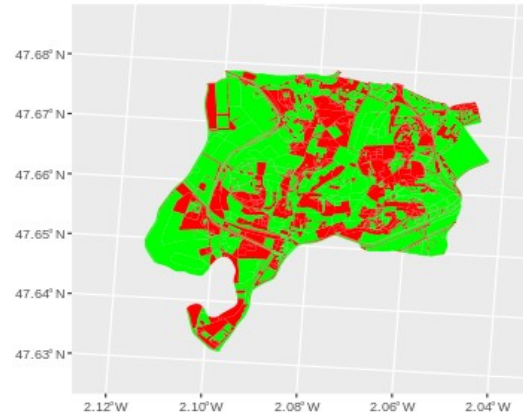
LCZ from OpenStreetMap
Number of RSU : 521



LCZ

LCZ 1:	0 %
LCZ 2:	0.77 %
LCZ 3:	0.03 %
LCZ 4:	0 %
LCZ 5:	0.03 %
LCZ 6:	3.76 %
LCZ 7:	0 %
LCZ 8:	10.64 %
LCZ 9:	15.52 %
LCZ 10:	0 %
LCZ A:	9.97 %
LCZ B:	0.39 %
LCZ C:	0 %
LCZ D:	48.01 %
LCZ E:	7.61 %
LCZ F:	0 %
LCZ G:	3.28 %

Agreement between classifications
Number of intersected geoms : 4336



The two cl
61.75 % of

FALSE	Red
TRUE	Green

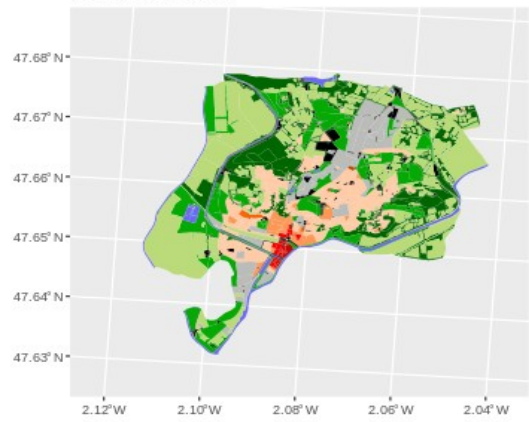
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- Fewer spatial units with OSM

LCZ from BDTopo v2.2

Number of RSU : 1553

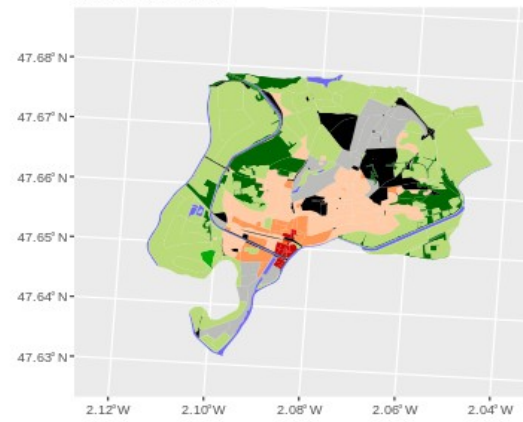


LCZ

- LCZ 1:
- LCZ 2:
- LCZ 3:
- LCZ 4:
- LCZ 5:
- LCZ 6:
- LCZ 7:
- LCZ 8:
- LCZ 9:
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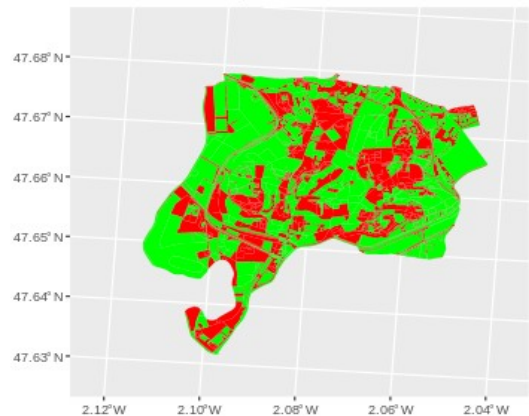


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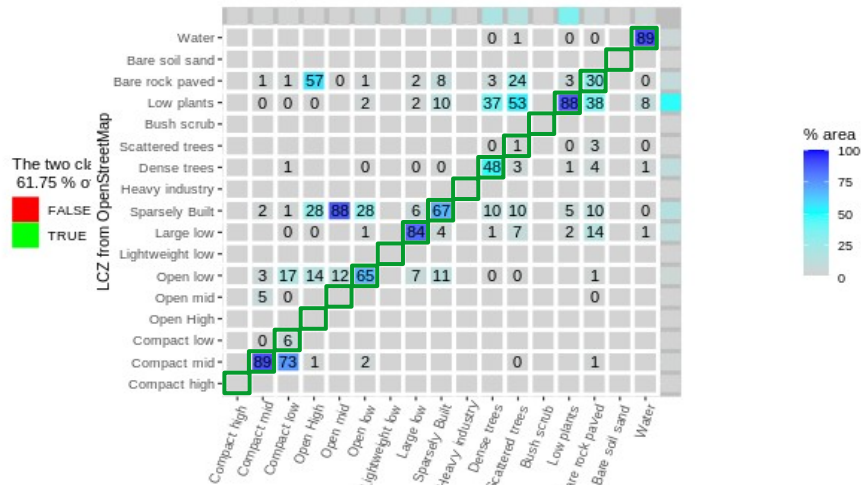
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Repartition of BDTopo v2.2 LCZs into LCZs of OpenStreetMap

Percentage inferior to 0.5 are rounded to 0

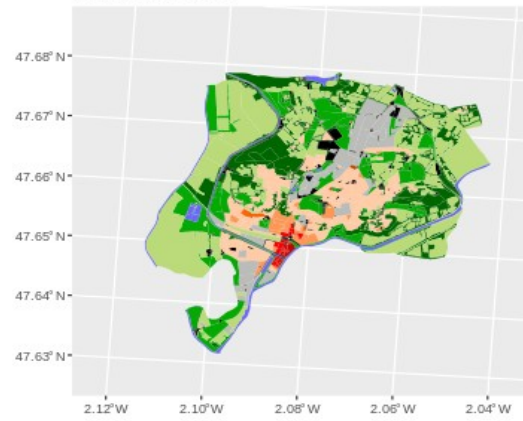


Comparison

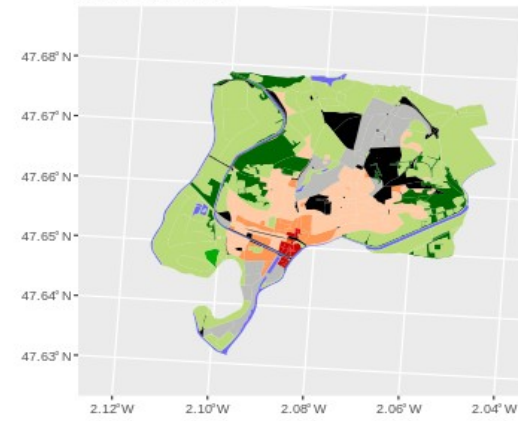
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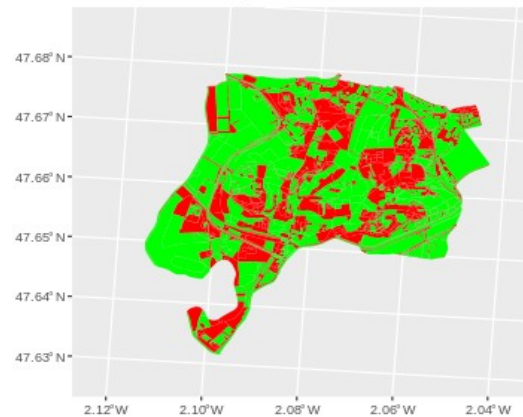
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LCZ from OpenStreetMap
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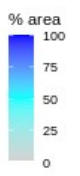
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The two cl
61.75 % of
FALSE
TRUE

Repartition of BDTopo v2.2 LCZs into LCZs of OpenStreetMap
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Water									0	1	0	0	89	
Bare soil sand														
Bare rock paved	1	1	57	0	1	2	8	3	24	3	30	0		
Low plants	0	0	0	2	2	10	37	53	88	38	8			
Bush scrub														
Scattered trees								0	1	0	3	0		
Dense trees														
Heavy industry														
Sparsely Built														
Large low	2	1	28	88	28	6	67	10	10	5	10	0		
Lightweight low														
Open low	3	17	14	12	65	7	11	0	0	1	0			
Open mid	5	0												
Open High														
Compact low														
Compact mid														
Compact high														
Compact high														
Compact mid														
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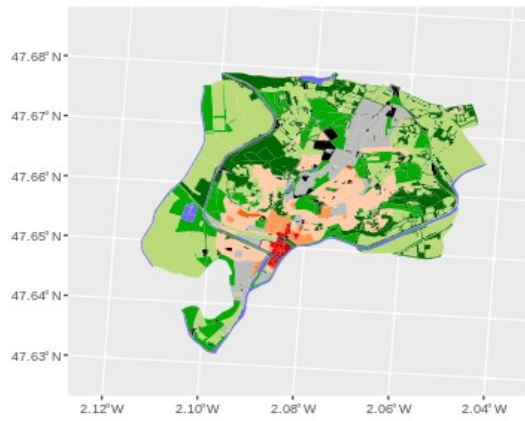
Comparison

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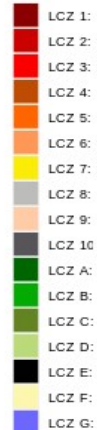
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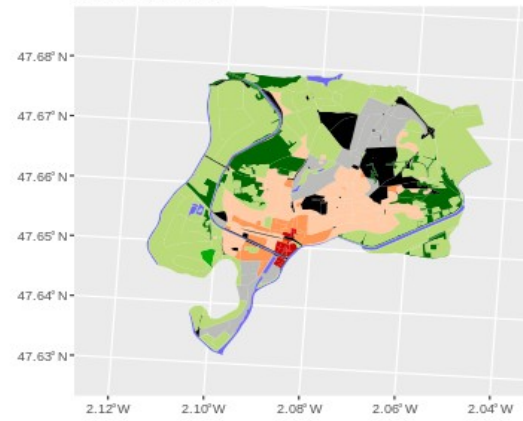


LCZ

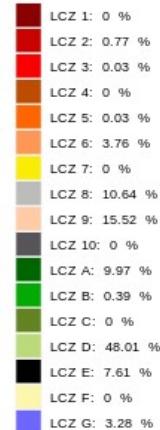


LCZ from OpenStreetMap

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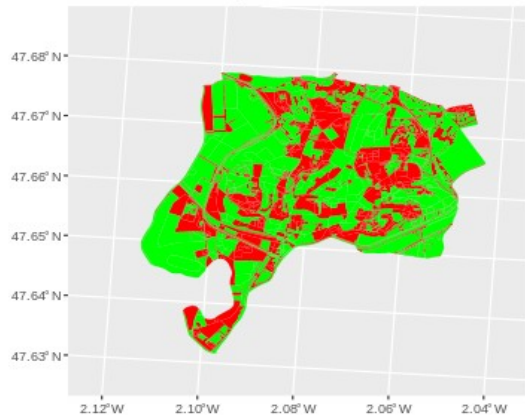


LCZ



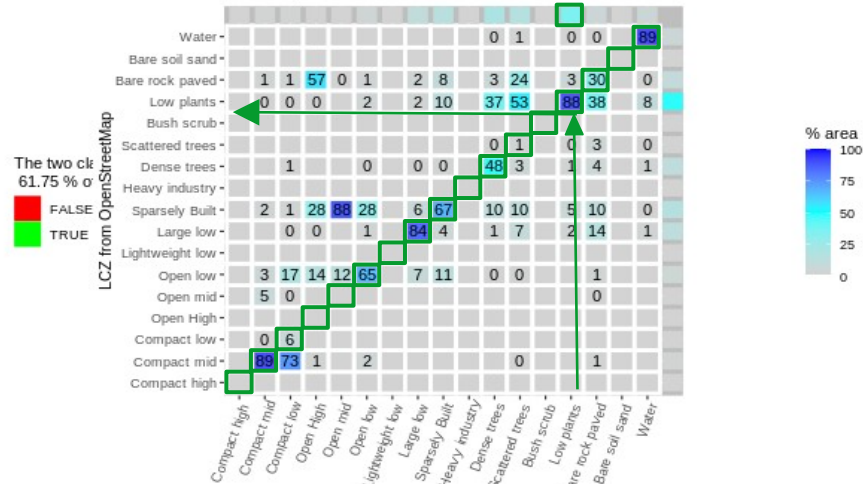
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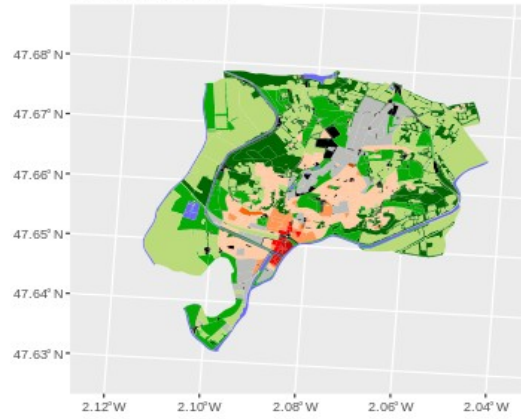


Comparison

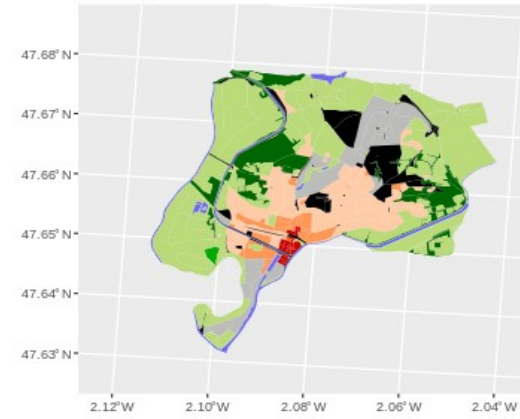
3. An example (3)

- Fewer spatial units with OSM
- Open Mid-rise with BD TOPO classified as Sparsely built with OpenStreetMap
- Compact Low with BD TOPO classified as Compact mid-rise with OSM

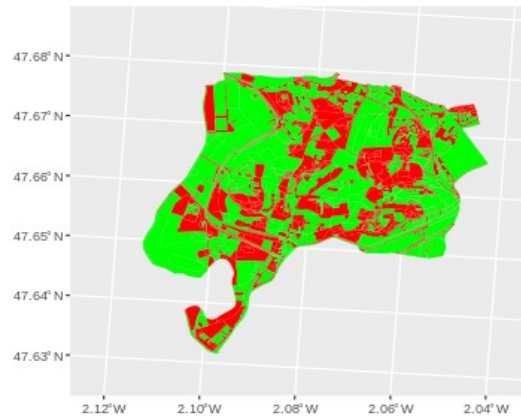
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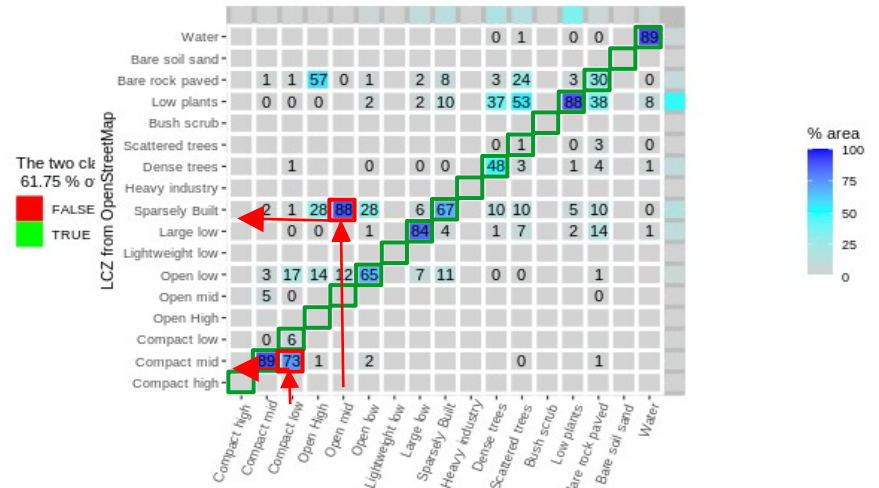
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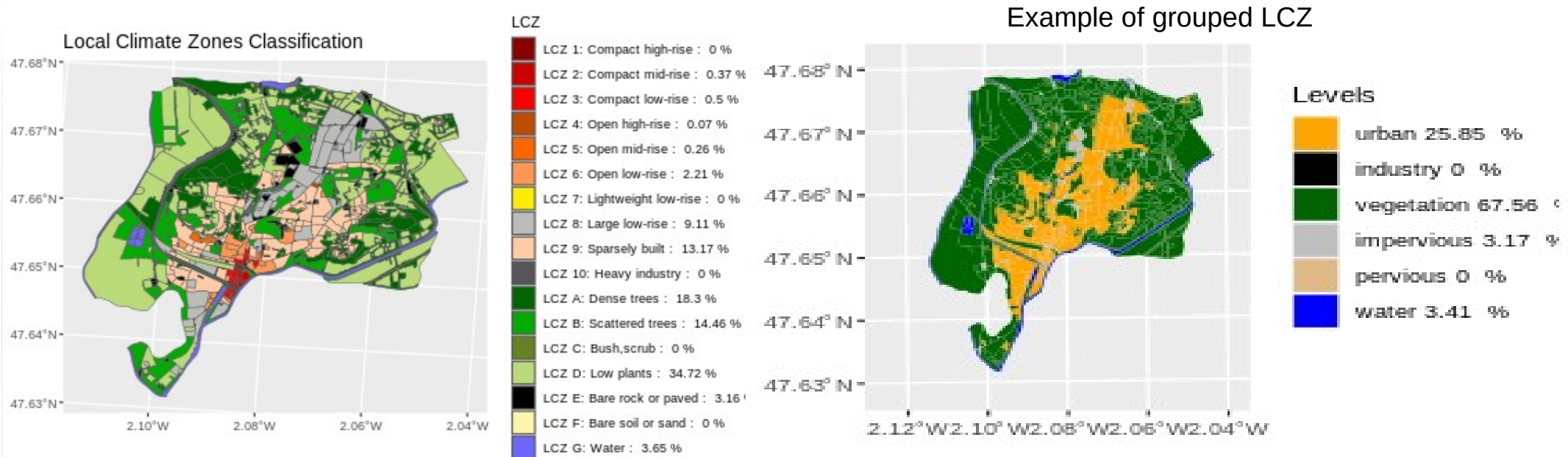


4. Class grouping feature (1)

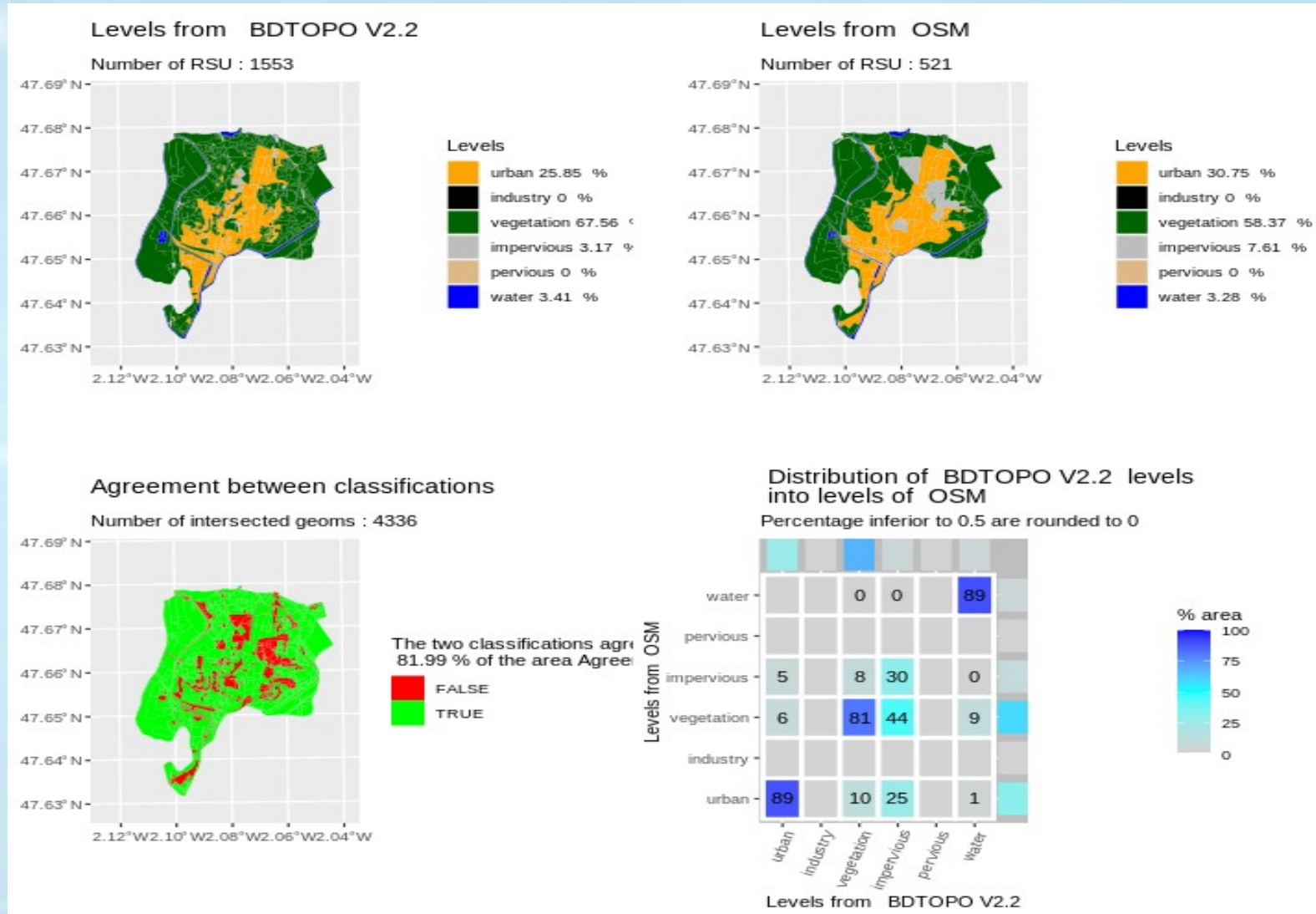
Might be fine to mix up some urban types but not urban with rural types

→ **One may need to regroup types and compare aggregated maps**

→ The package allows grouping and comparing in one go



4. Class grouping feature (2)



Conclusion

- The lczexplore allows to :
 - Import
 - Plot
 - Regroup levels
 - Compare

Local Climate Zone maps.

- It also allows sensitivity analysis when one has a confidence measure for the LCZ types
- It can be used for any areal comparison of categorical variables

```
devtools::install_github("orbisgis/lczexplore", build_vignettes = TRUE)
```