University of Szeged
Dep. of Climatology and Landscape Ecology

Comparison of two different Local Climate Zone mapping methods

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Aims and Objectives

Local Climate Zones is useful basis for modeling and store metadata of measurements

Mapping of LCZs

Several methods are available

Raster based Bechtel method

- Few input data
- Free softwer
- Easy to use method

GIS based Lelovics-Gál method

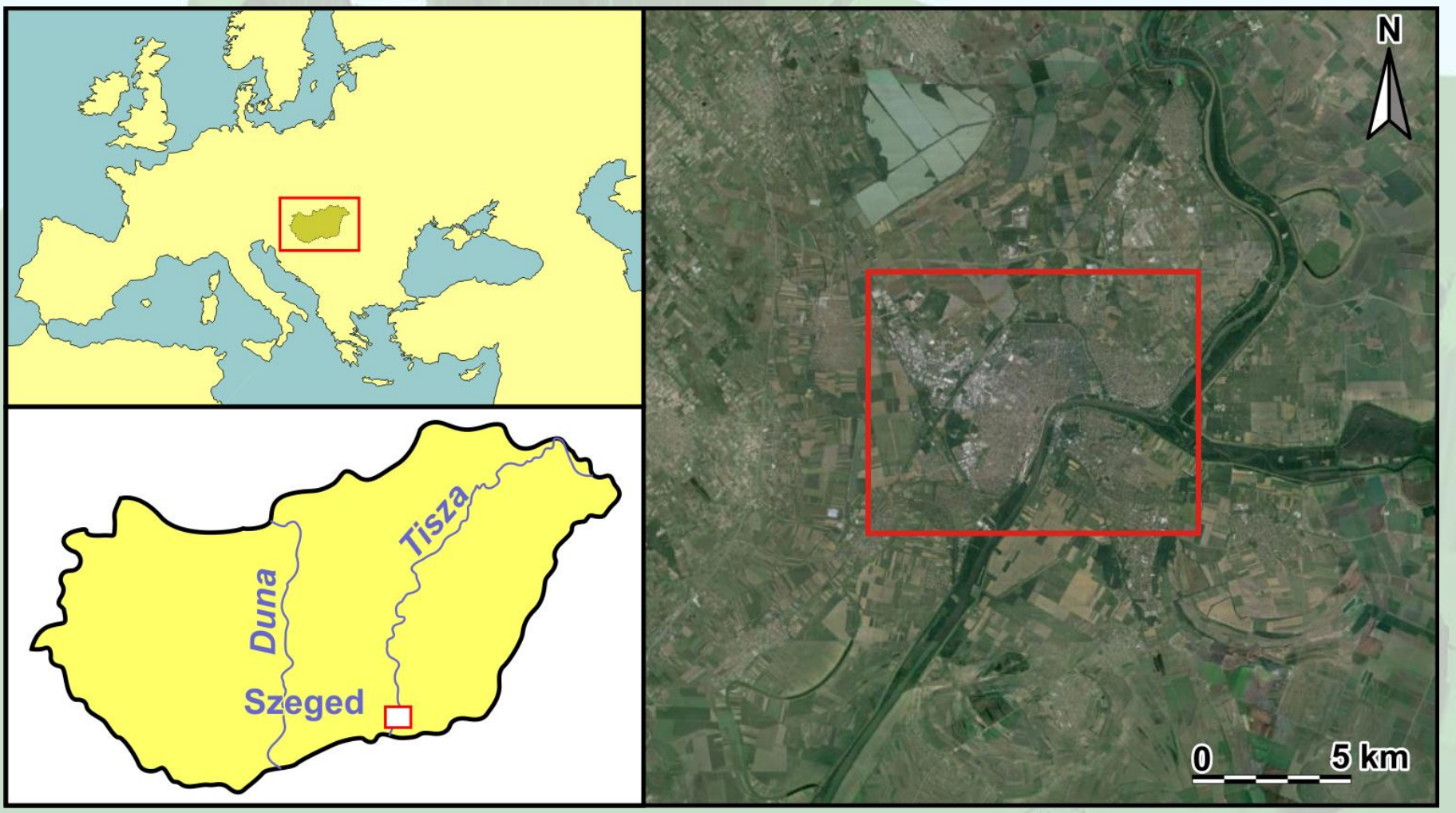
- Almost all of the LCZ data used
- Building-block sized classification
- Object based post classification

Combined method?

- Keep the advantages of both of the methods

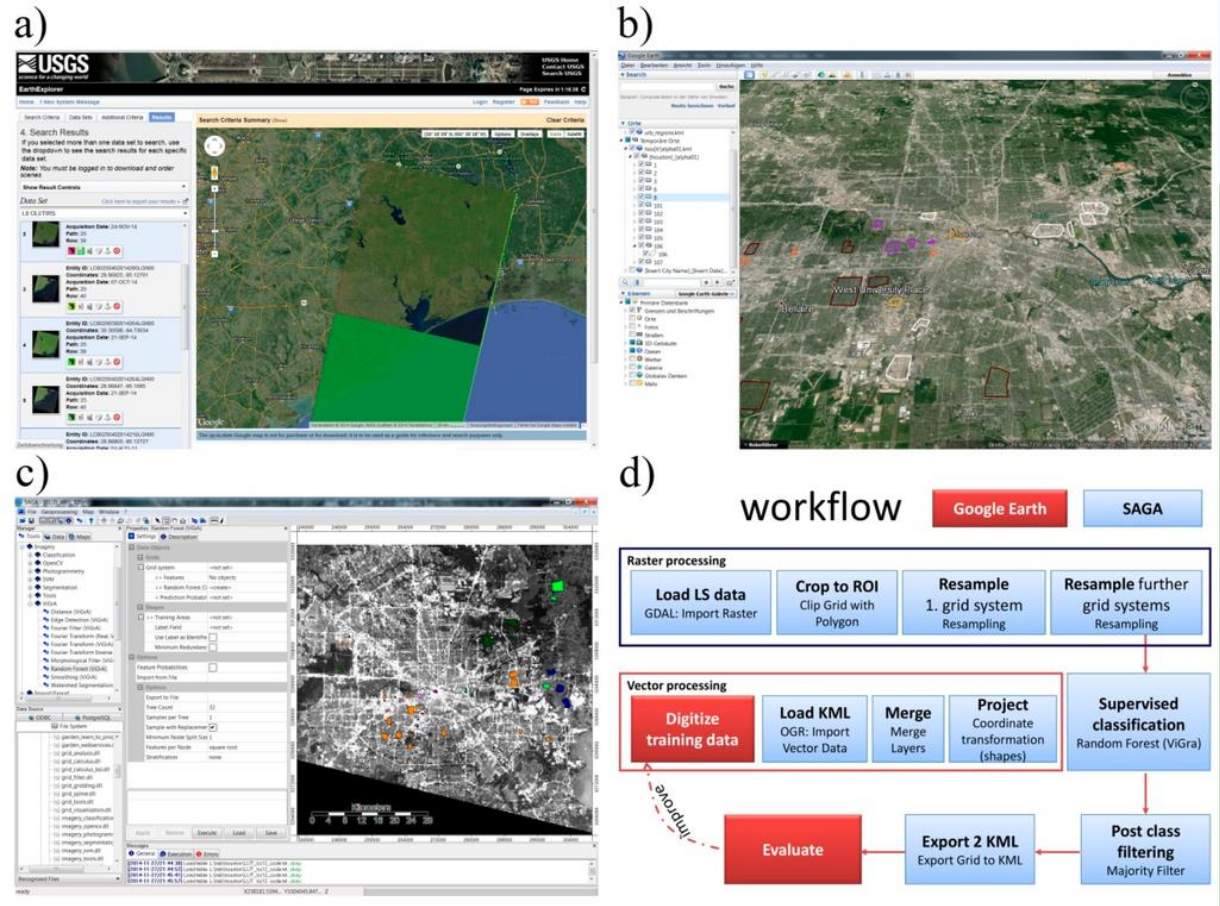
Study Area

Szeged, Hungary
Medium sized (160 000 inhabitants)
Urban geometry database is available (3D building, SVF, etc.)



Satellite image based (Bechtel) method

The method was presented in the second presentation of this session



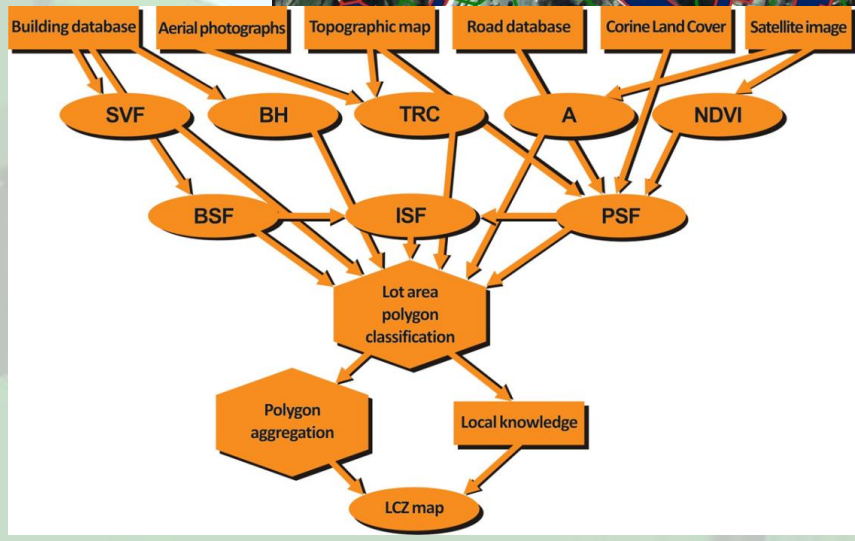
10 Landsat image
Classification using 100m resolution

GIS based (Lelovics-Gál) method

It based on Lot area polygons

For each block basic parameters are calculated:

SVF – sky view factor
BH – building height
TRC – roughness class
A – albedo
NDVI – normalized vegetation index
BSF – building surface fr.
ISF – impervious surface fr.
PSF – pervious surface fr.



For each polygon the most likely and the second most likely LCZ class assigned

The size of lot area polygon below the size of an LCZ

Polygon aggregation

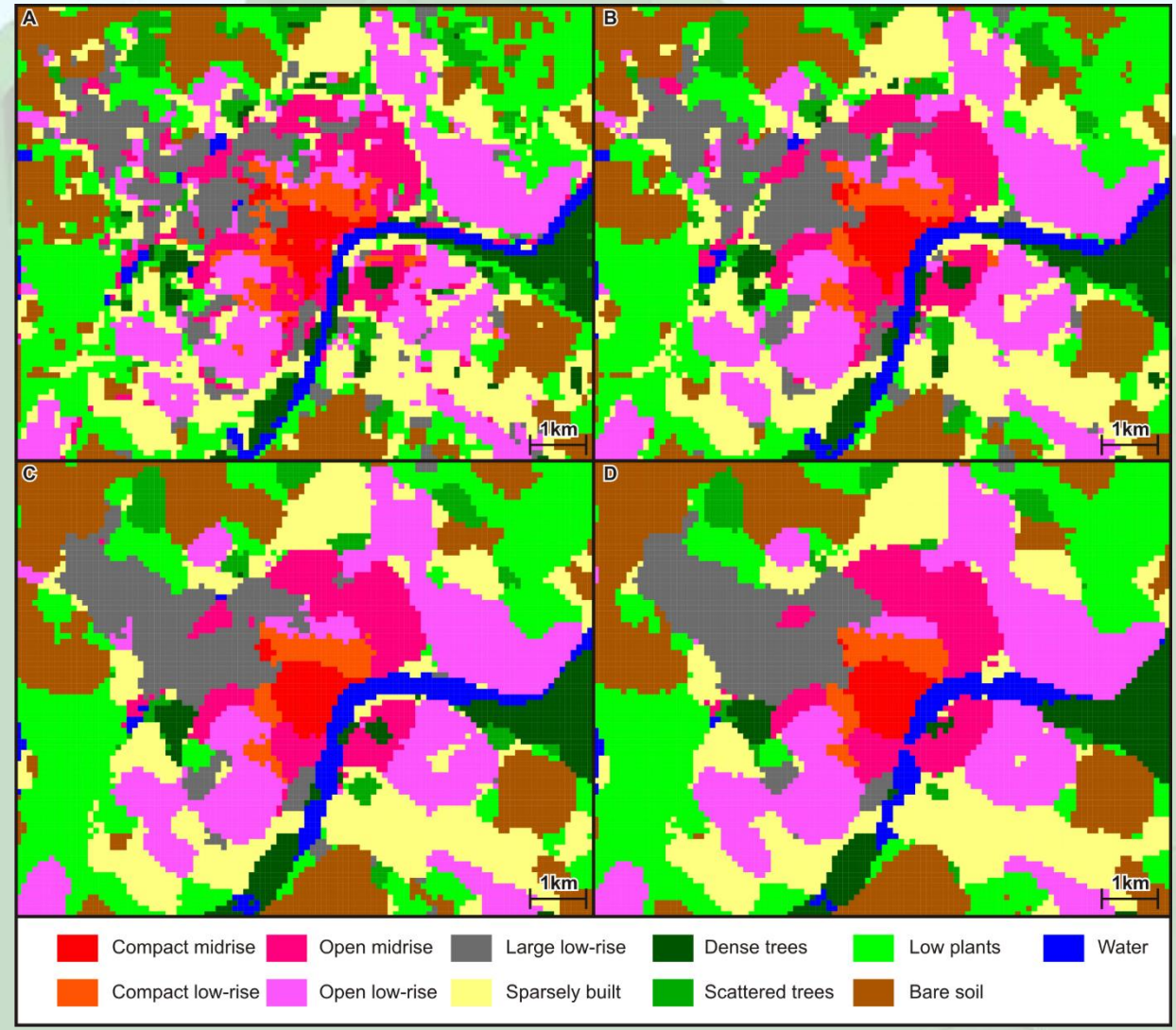
- LCZ classes (most likely, and second most likely)
- Spatial data (neighbors, size)

Classification restarts if a size of an LCZ area do not reach 0.25 km^2

Results

Raster based method

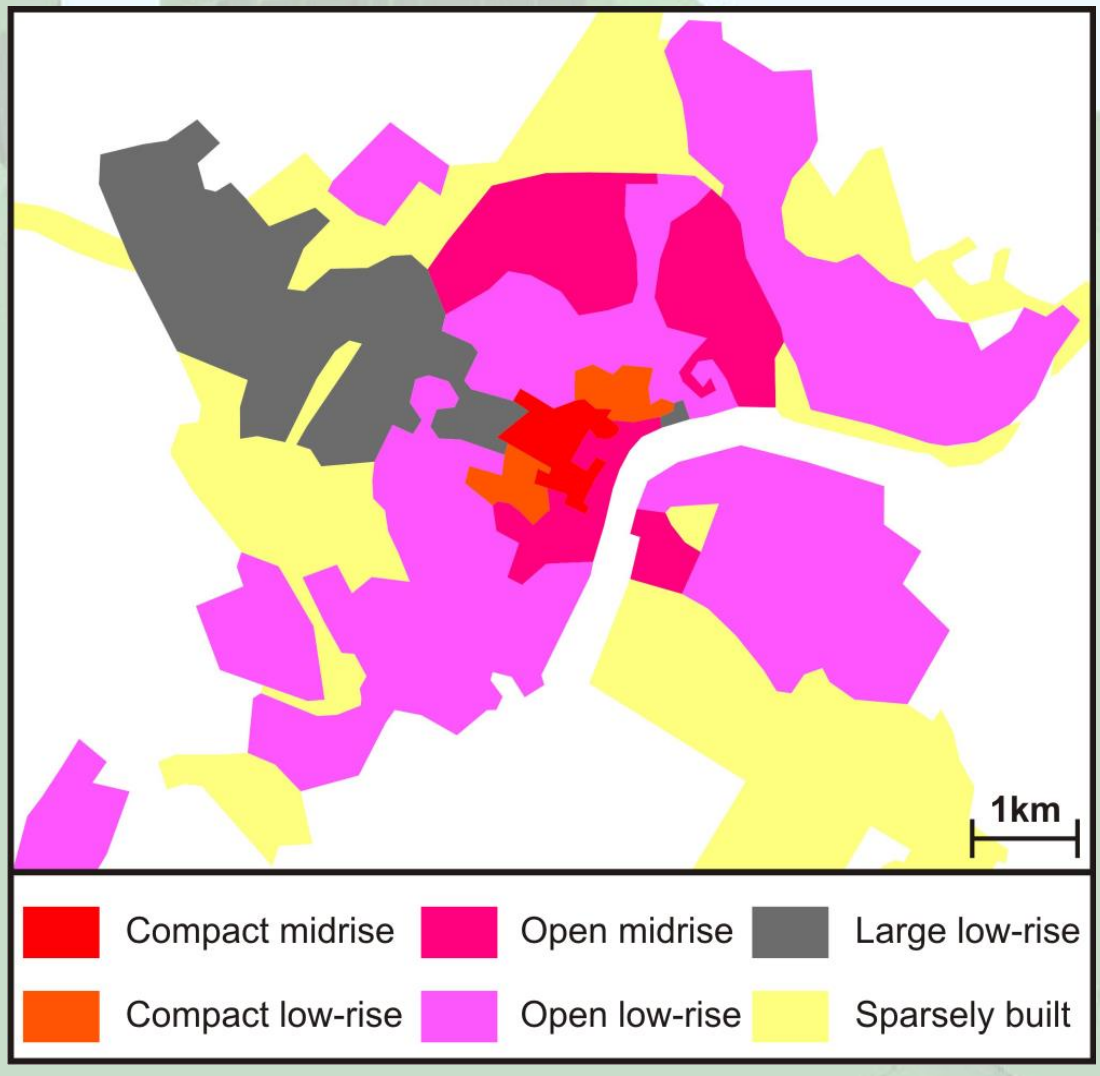
1, 2, 3, 4 pixel sized post classification filter



Results

GIS-method

Only urban area and LCZ classes



Results

Main differences between the two methods

A: Raster based: open low-rise, GIS: large low-rise
B: Raster based: large low-rise, GIS: open midrise
C: Raster based: compact midrise (over 2px filter), GIS: open midrise
D: Raster based: open midrise (over 2px filter), GIS: open low-rise

Reason for differences are mostly because the post classification filter

Combined method

GIS methods need to many data

Post classification filter of raster based method needs to develop

Raster based method

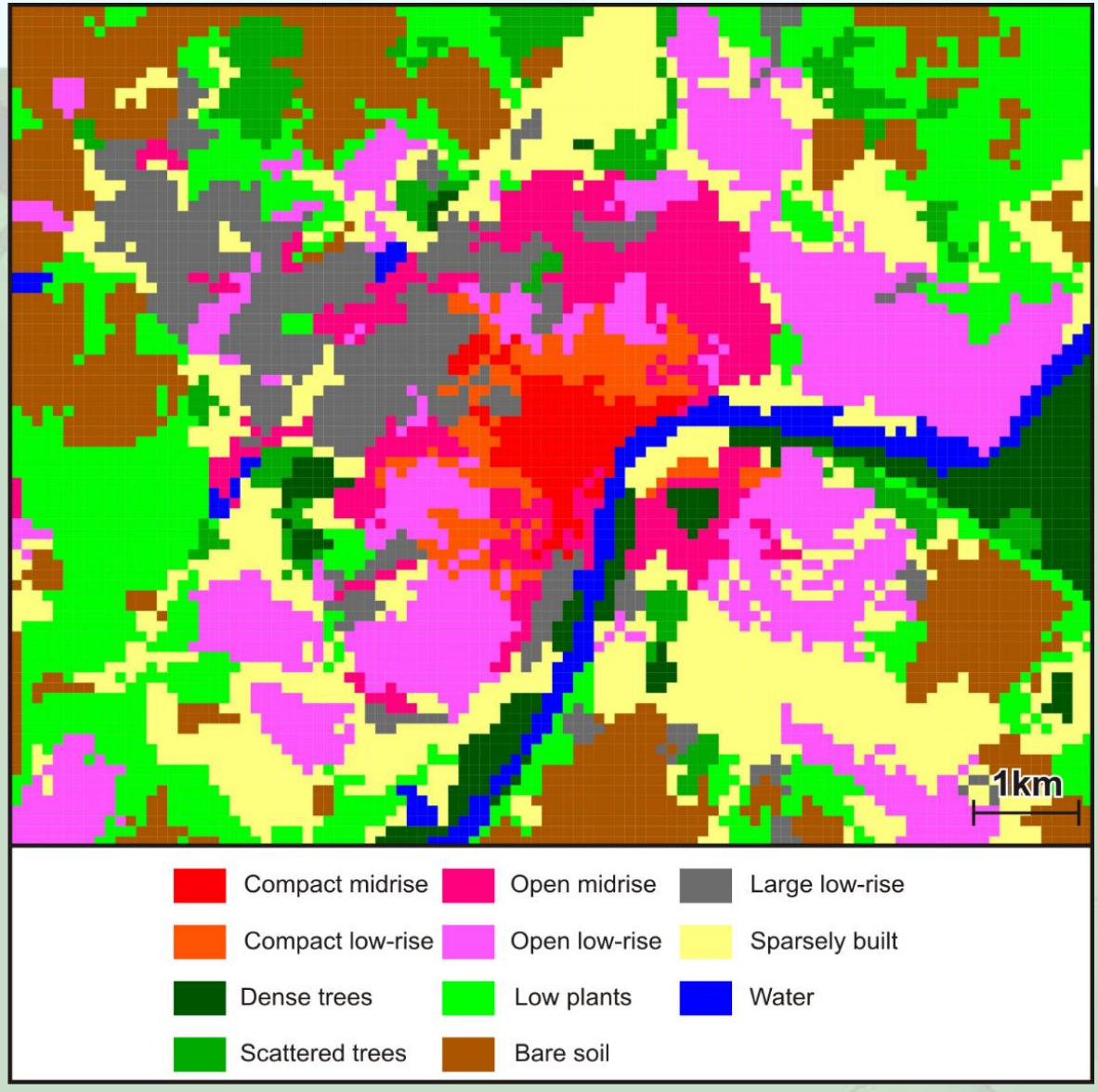
Probabilities for each LCZ class

Based on the probabilities the two most likely LCZ classes selected

Using these input the polygon aggregation is applied from GIS method (JAVA script)

Results

Combined method



Conclusion and outlook

Comparison of methods

The two method produce very similar maps

GIS method can not apply in any places

Post classification filter of raster method may be improved

Combined method

The presented combined method may help to produce better LCZ maps

- it is still only a concept
- it works with limitations

Thank You for Your attention!

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