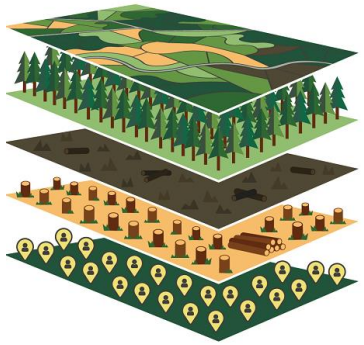
RSF Russian Science Foundation

SMART URBAN NATURE

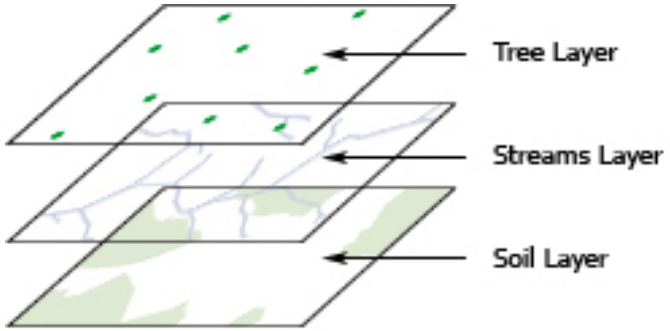
GIS group report

Board meeting, June 24, 2020

SMART
URBAN
NATURE



remote
sensing



vector

data
management

SMART URBAN NATURE

WORK PACKAGES

WP5 Regions

GIS

WORK PACKAGES

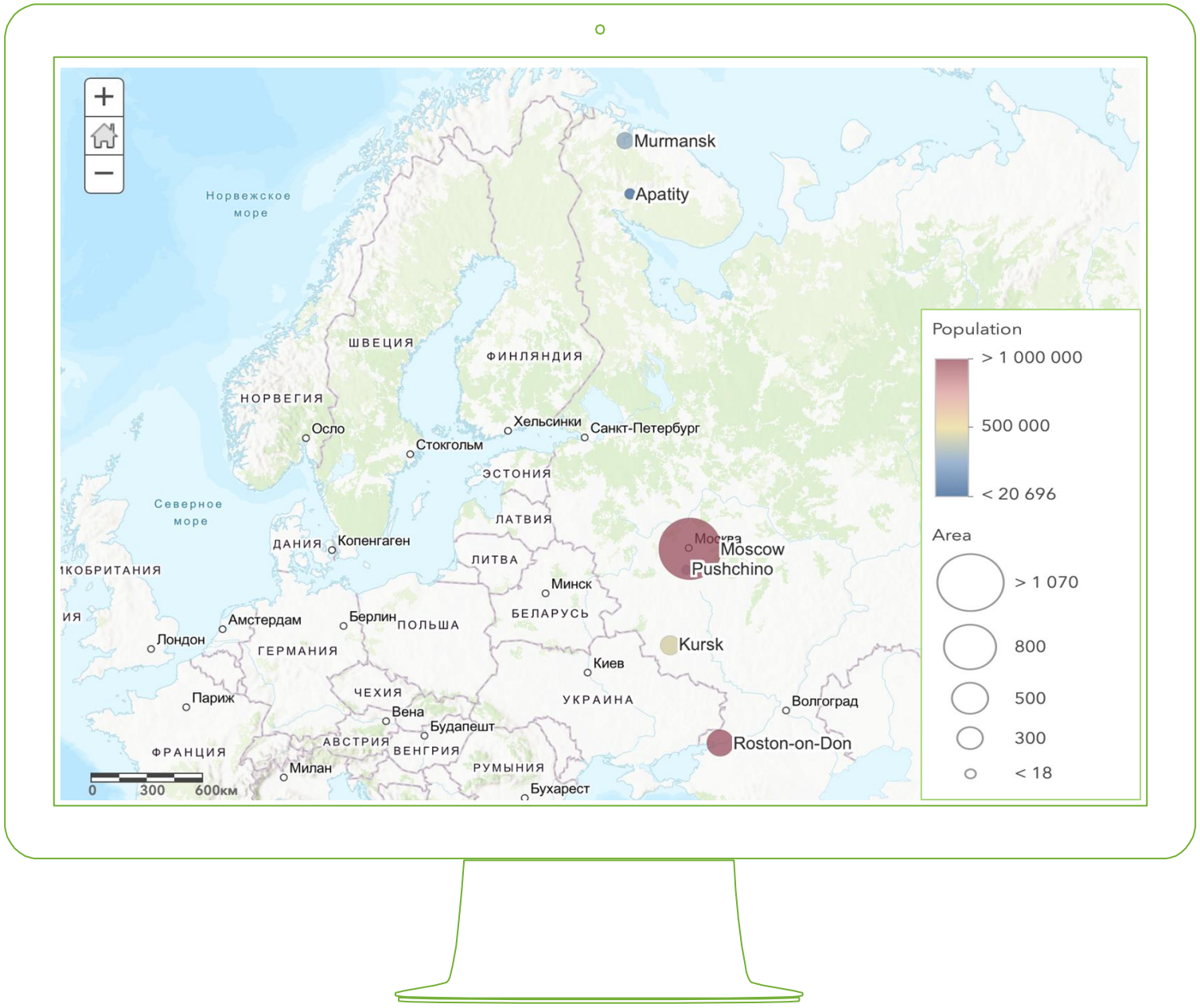
WP1 Green Infrastructure

WORK PACKAGES

WP6 Ecosystem services

SMART URBAN NATURE

- soil sealing
- social network data analysis

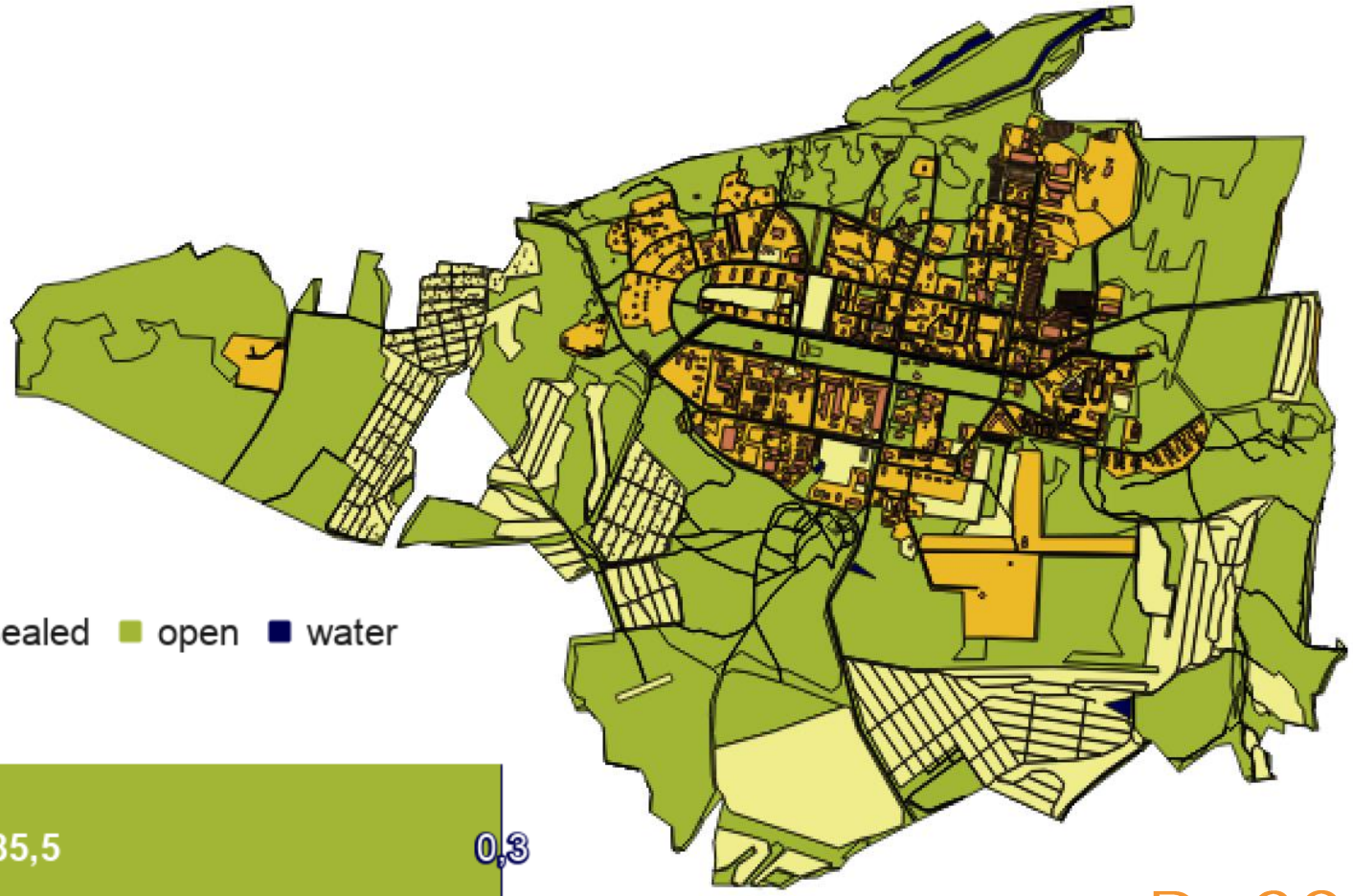


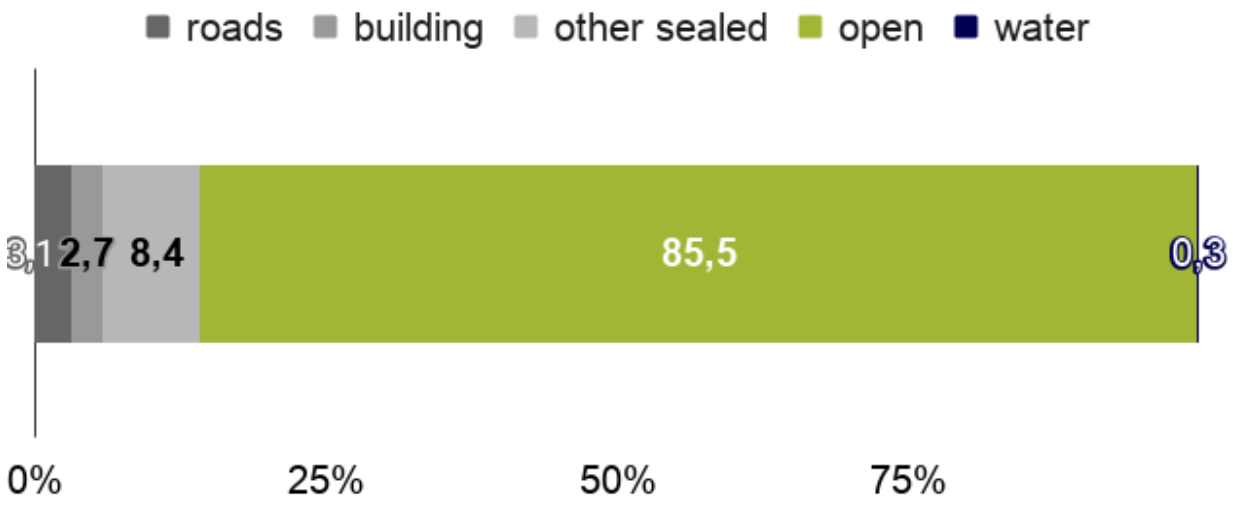
Sealing assessment

- OSM: Pushchino, Apatity, Kursk
- OSM+RS: Murmansk, Rostov-on-Don
- OSM+Raster: Moscow

OSM – Open Street Map
RS – remote sensing

OSM-based: Pushchino

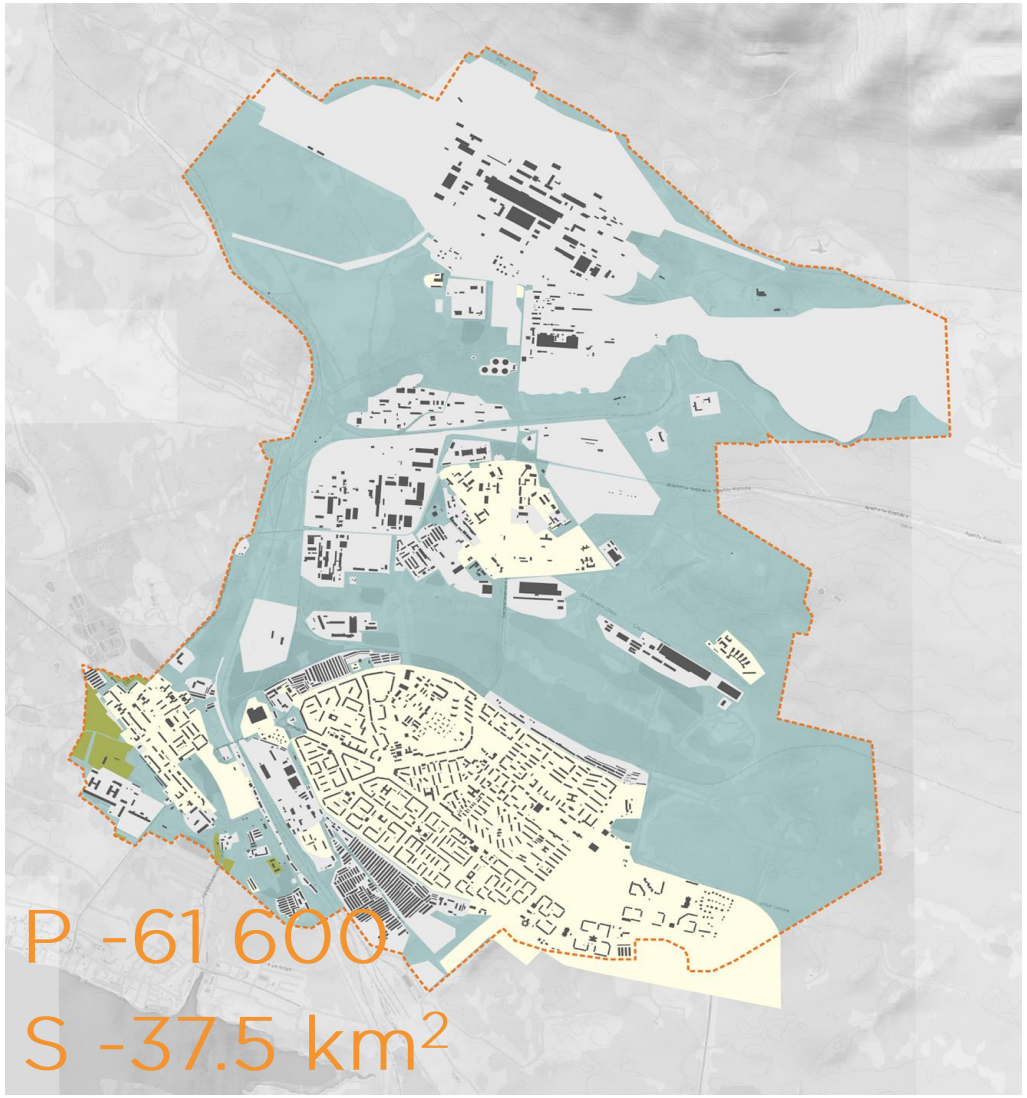


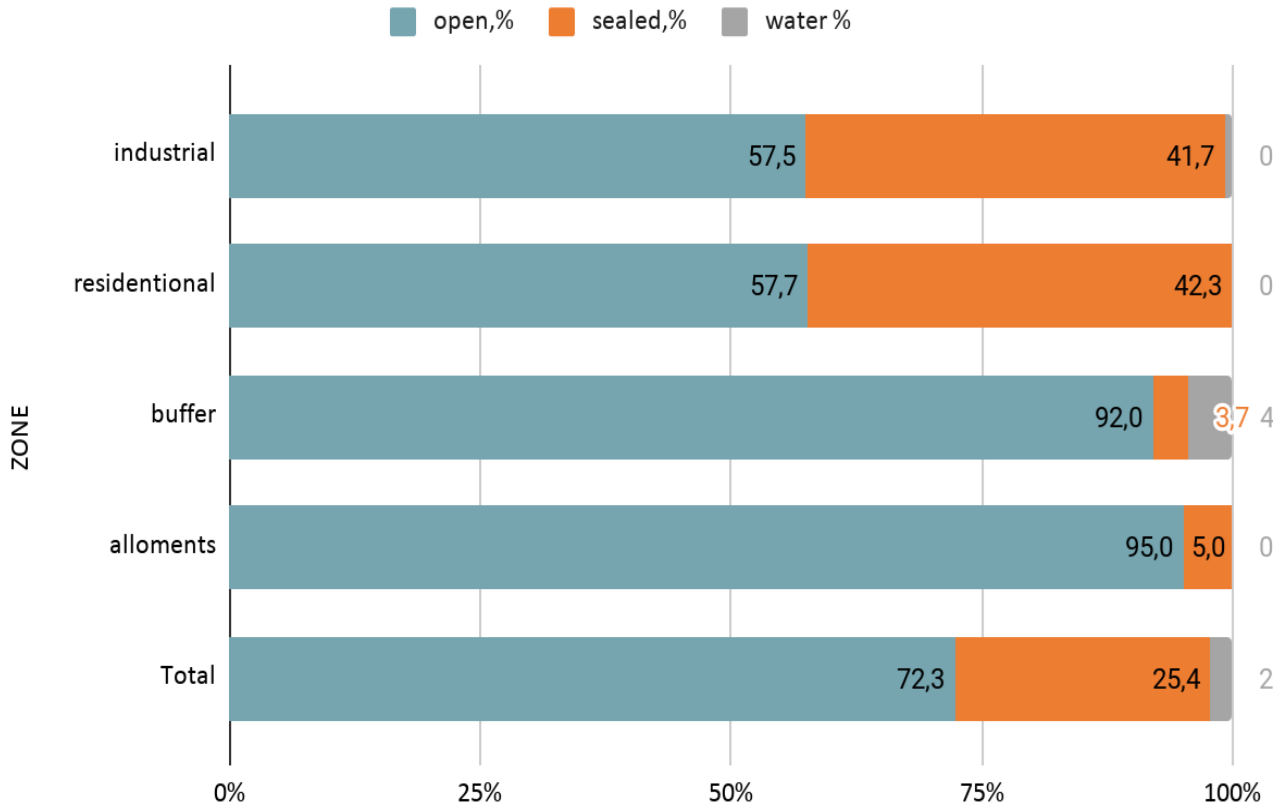


P -20,696

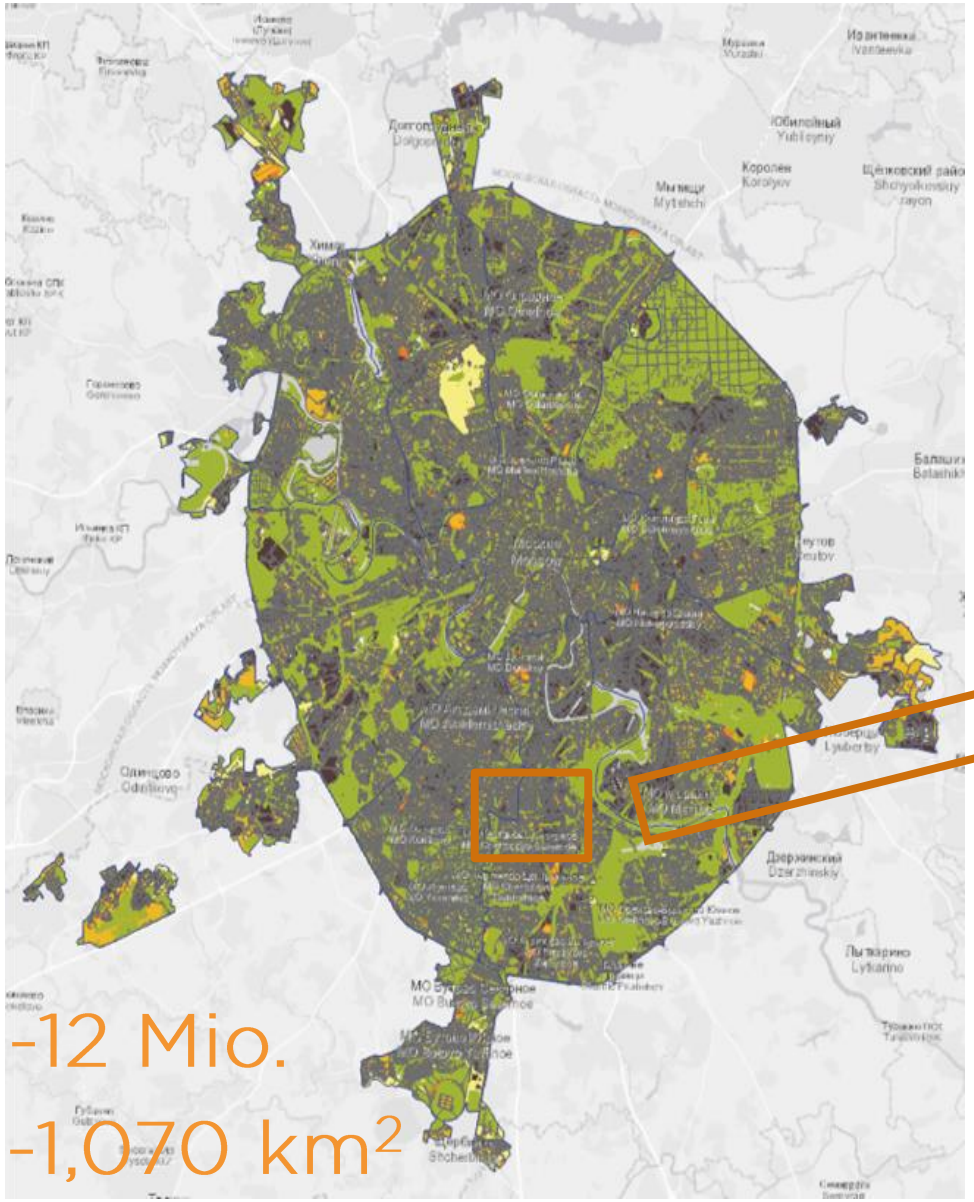
S -18.23 km^2

OSM-based: Apatity



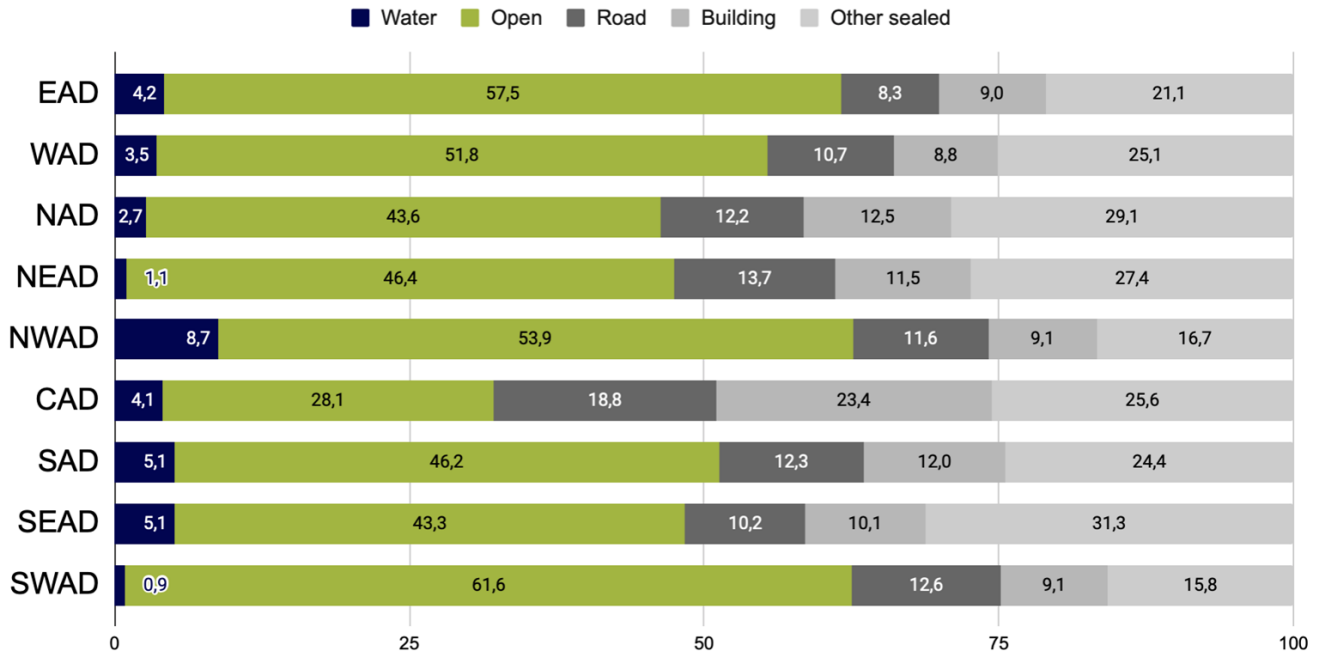


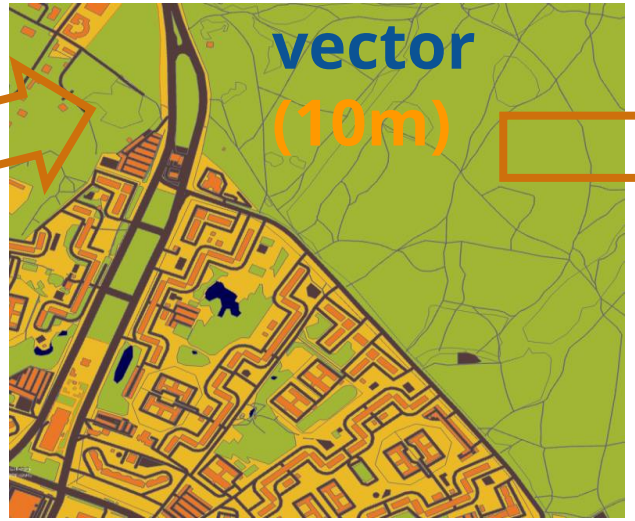
OSM-based: Moscow

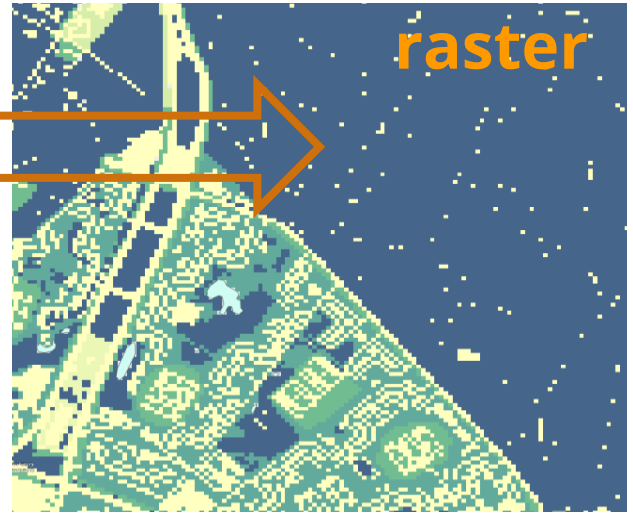


P ~12 Mio.

S ~1,070 km²



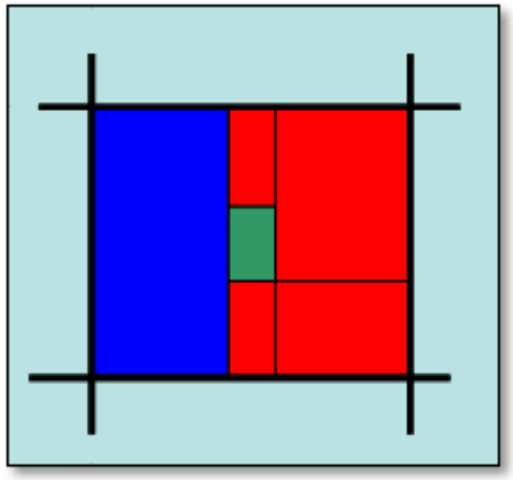


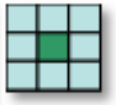


OSM-based: Moscow

ArcMap ArcGIS Pro

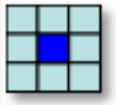
Polygon to raster tool



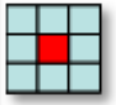


CELL CENTER

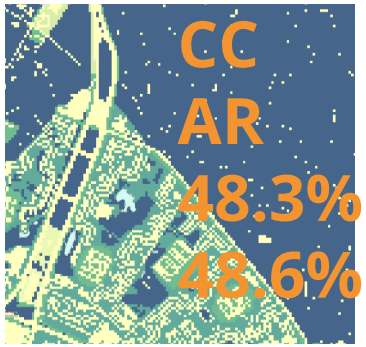
FID	Attribute
1	Blue
2	Red
3	Green
4	Red

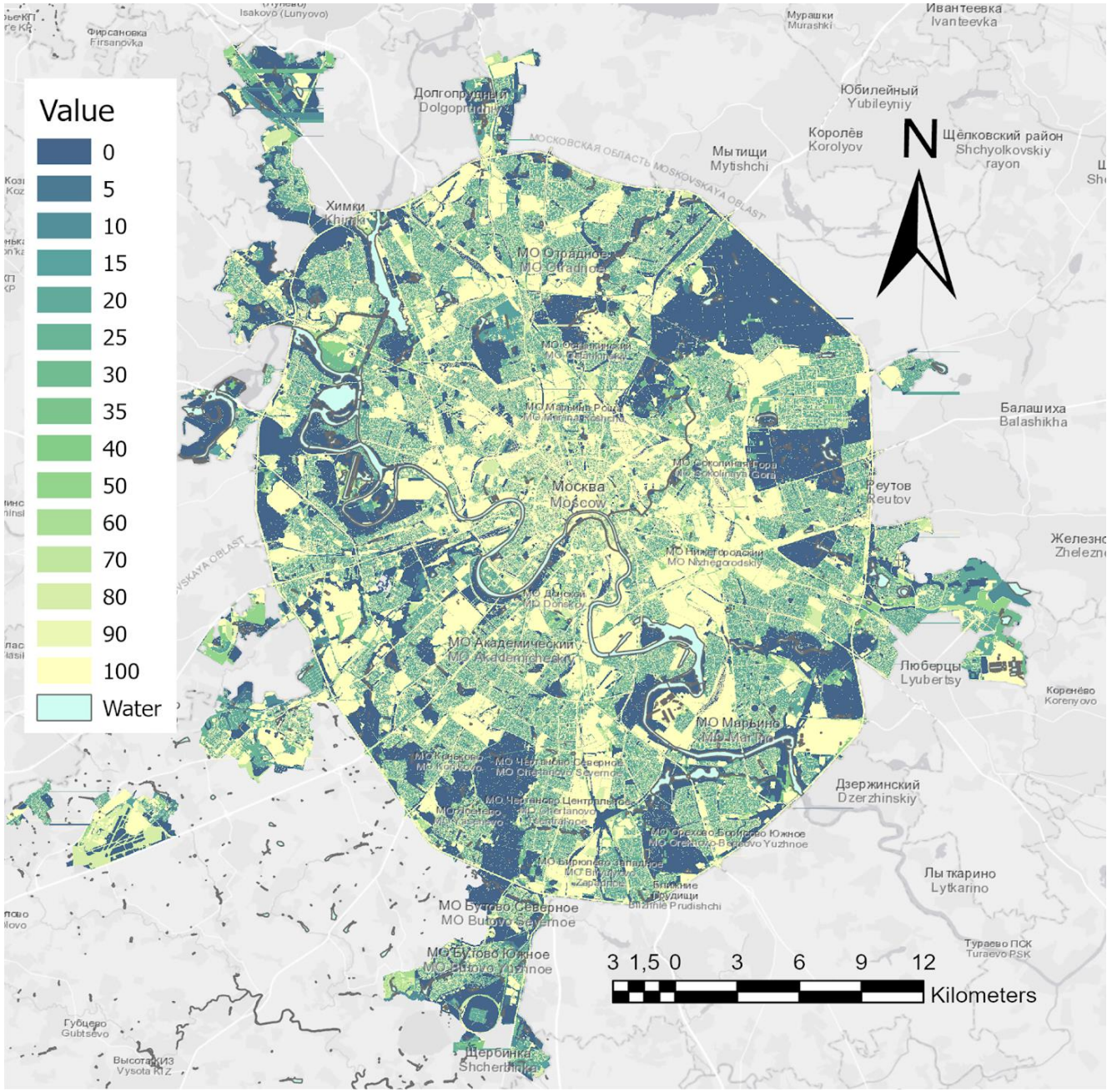


MAXIMUM AR

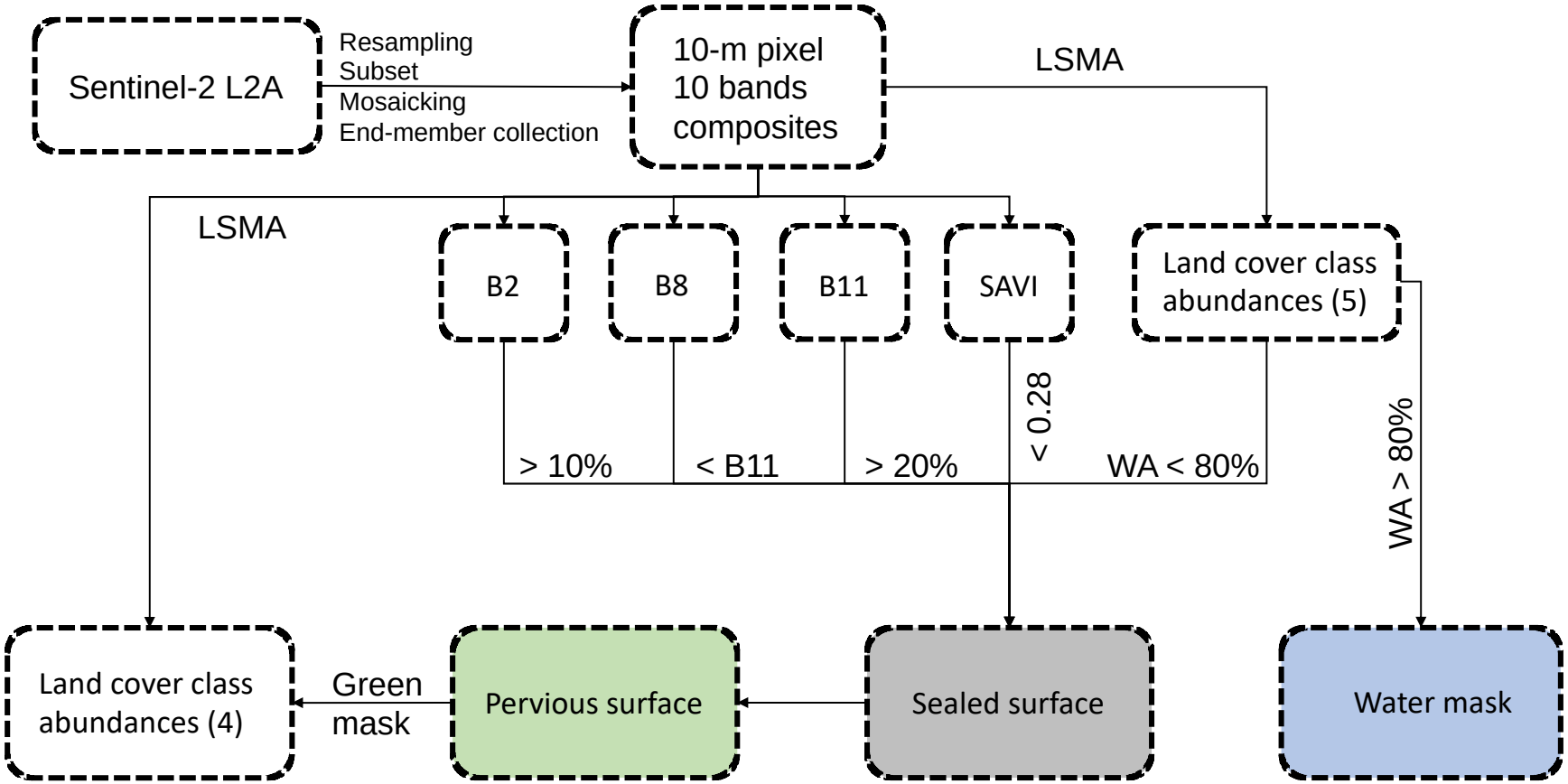


MAXIMUM COMBINED AR



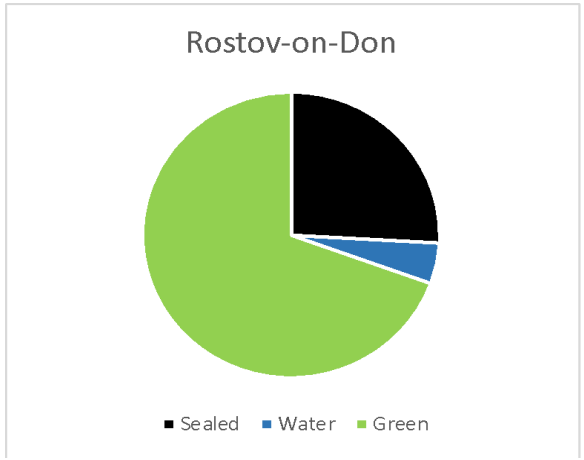


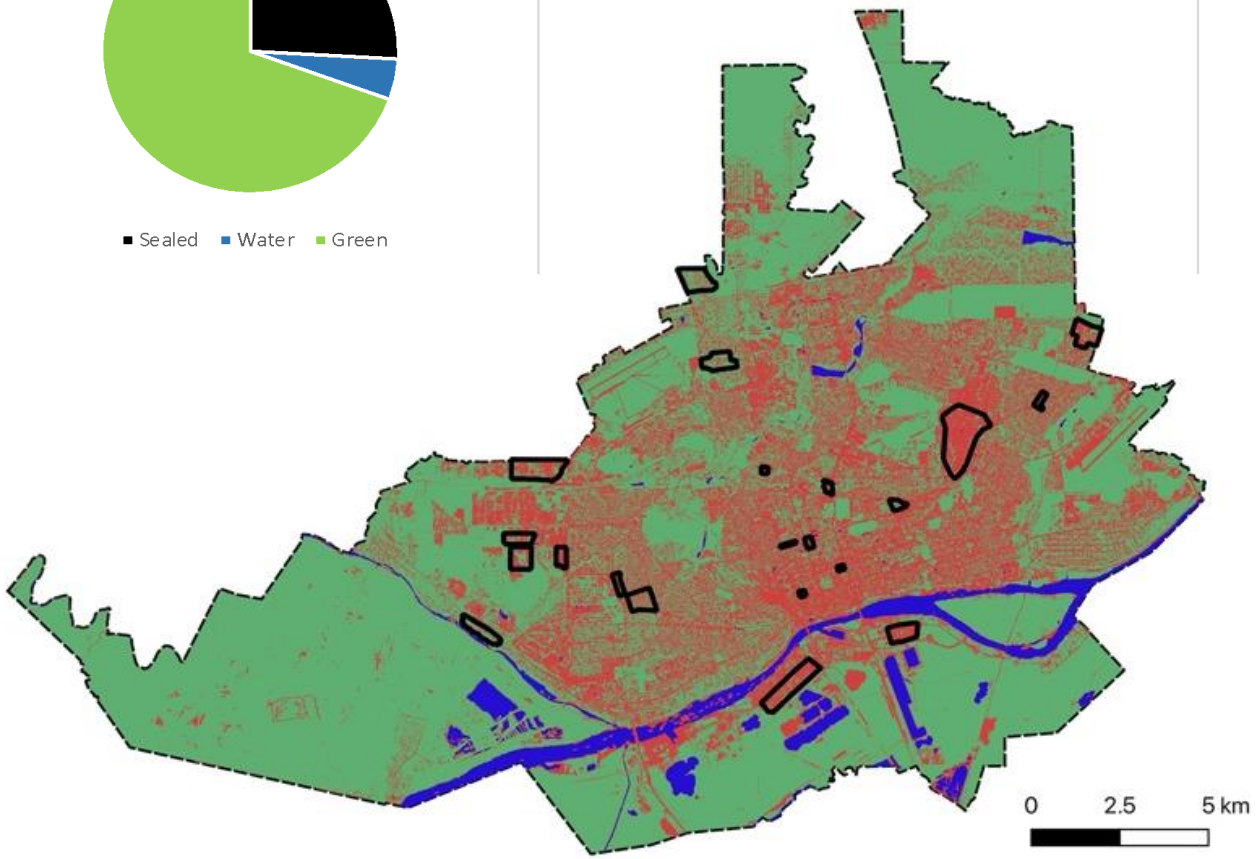
Sentinel-2 data based: workflow



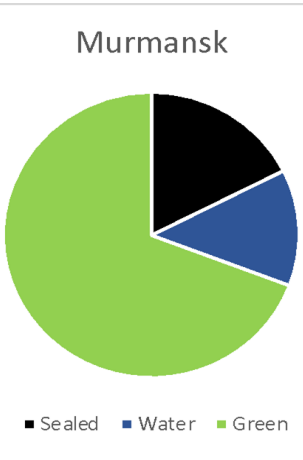
LSMA – linear spectral mixture analysis
B2, B8, B11 – reflectance of blue, near-infrared and short-wave infrared bands
SAVI - Soil-Adjusted Vegetation Index
WA – water abundance

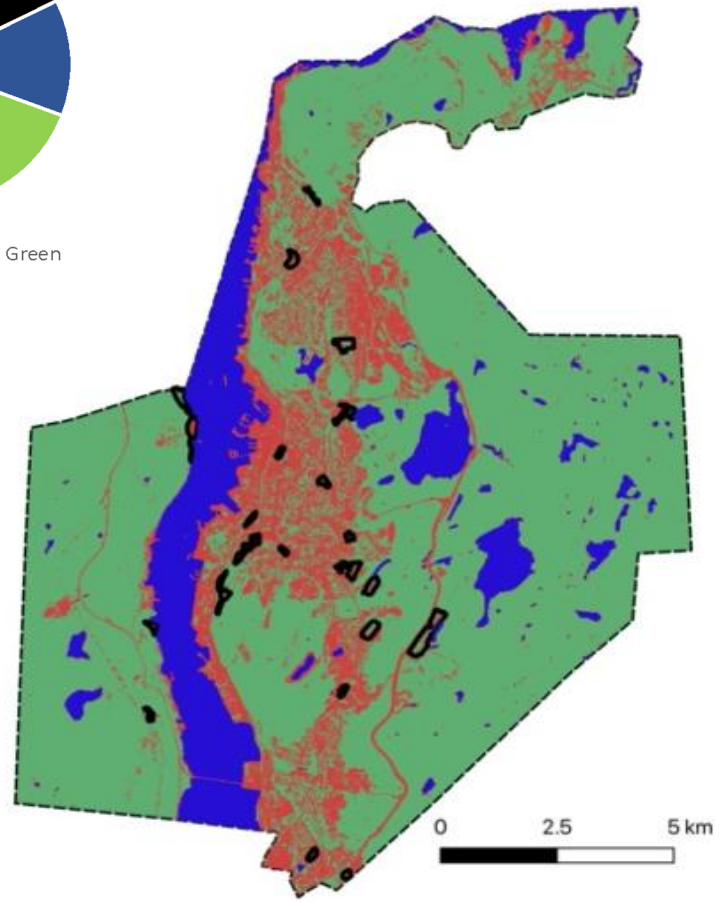
Sentinel-2 data based: Rostov-on-Don & Murmansk





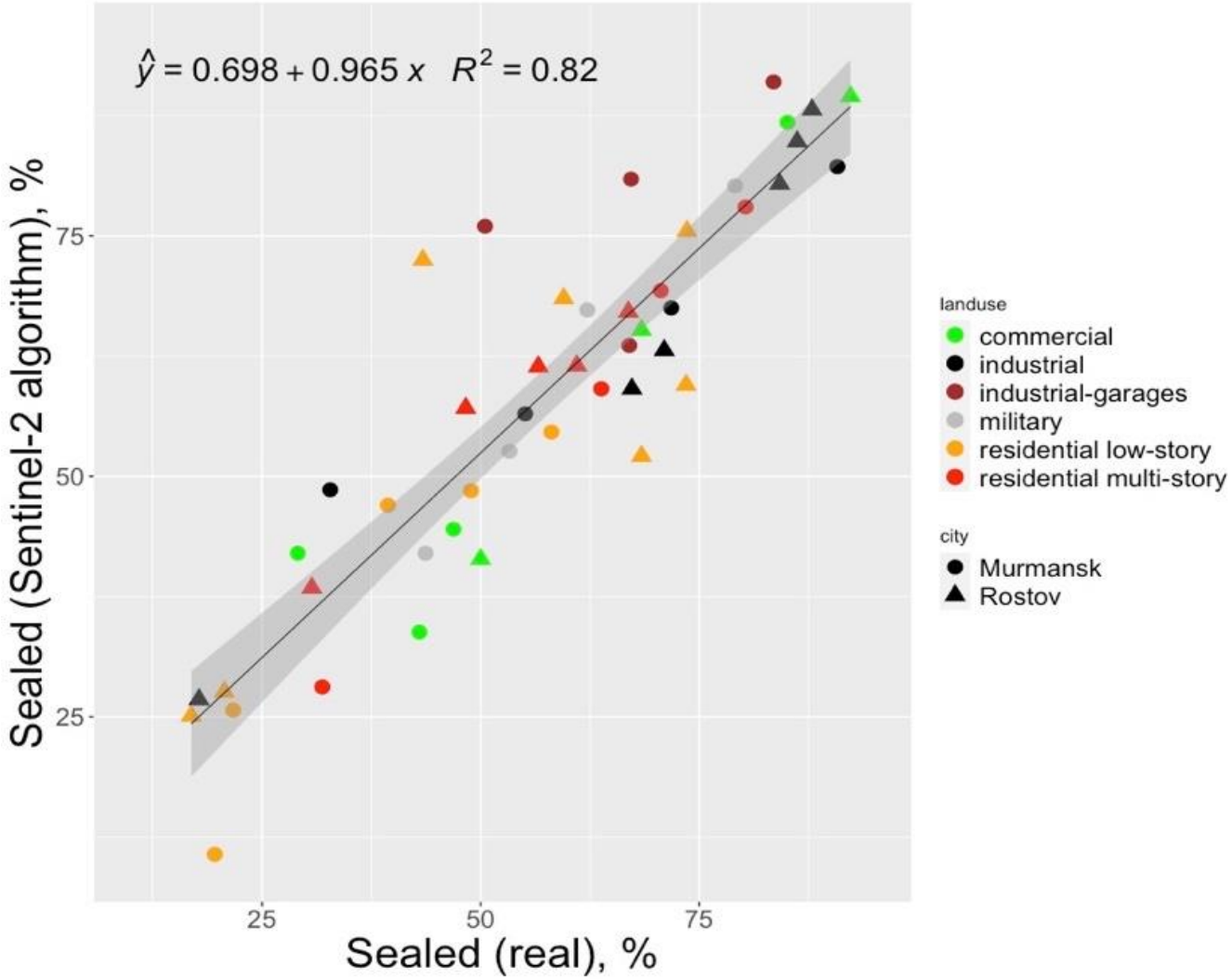
Rostov-on-Don





Murmansk

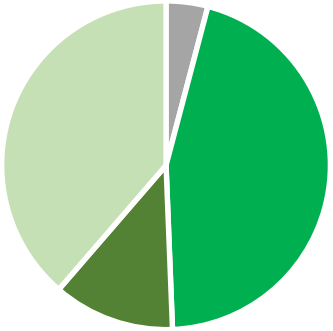
Sentinel-2 data based: quality assessment



Rostov-on-Don, n = 21

Murmansk, n = 25

Sentinel-2 data based: parametrization of the green area



Bare soils · Dense forest · Lawns · Shrublands

Class / sub-class		Area, km² / Proportion, %			
		Rostov-on-Don		Murmansk	
Total		356	100	171	100
Sealed surface		98.1	27.6	29.9	17.5
Water		15.7	4.4	22.5	13.2
Pervious surface	Bare soils	69.9	19.6	4.9	2.9
	Dense forest	52.2	14.7	53.7	31.4
	Shrublands	36.8	10.3	45.9	26.8
	Lawns	83.1	23.4	14.1	8.2

Spectral unmixing algorithm: Keshava & Mustard 2002

Social network data analysis: hashtags / density of posts

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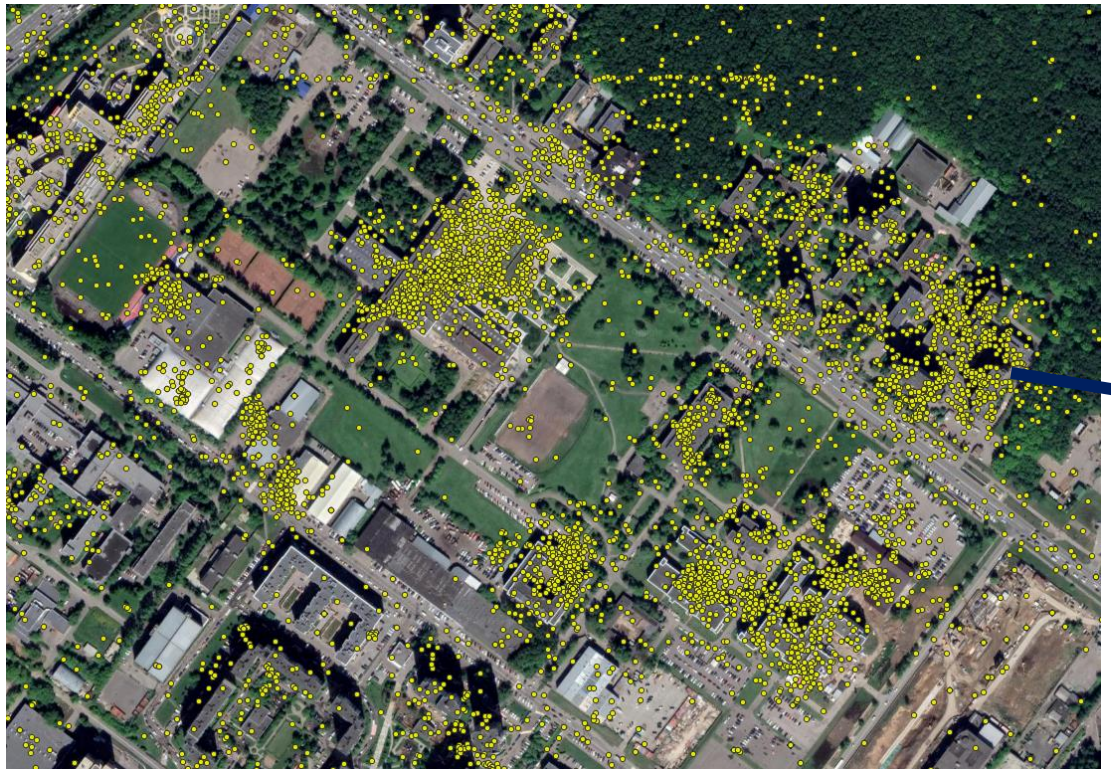
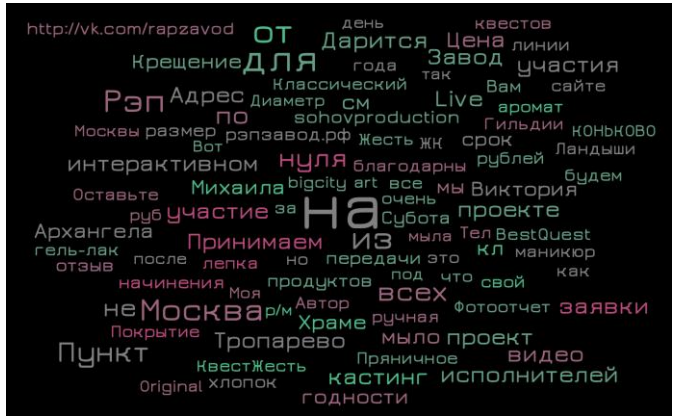


What writes the population in the social media?



QGIS