

Enhancing the user uptake of Land Cover / Land Use information derived from the integration of Copernicus services and national databases „InCoNaDa”

WP3: LC, LU and changes for urban and spatial planning

Potential of HRL-Imperviousness for assessment of biologically active areas

Daria Stosio

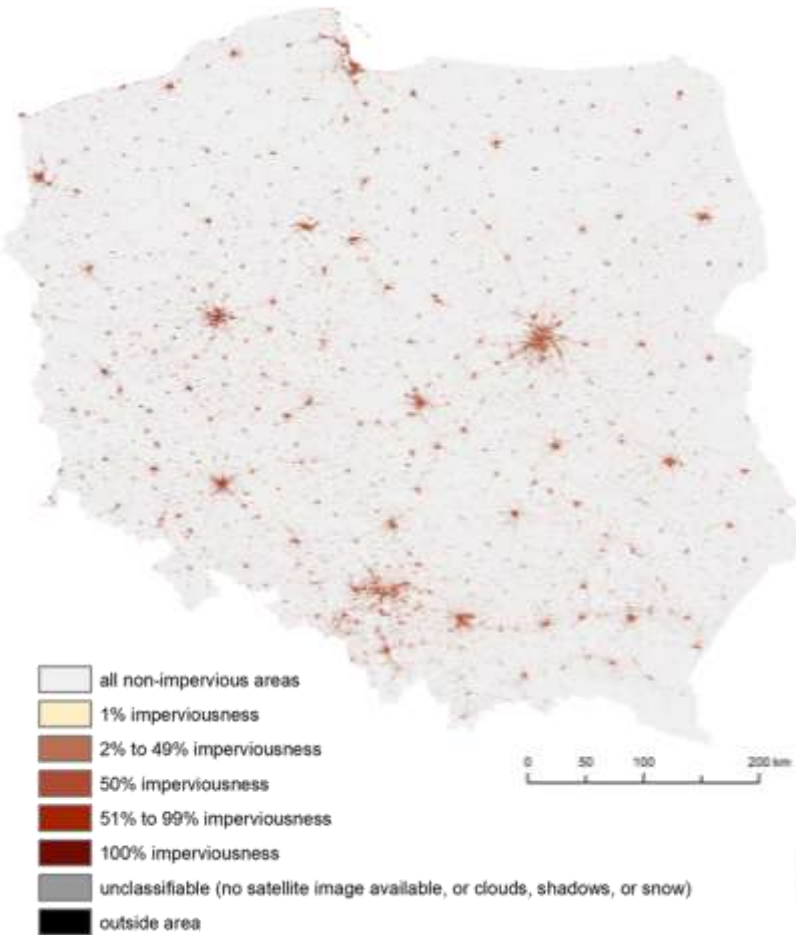
Institute of Geodesy and Cartography
Warsaw University of Technology

Jakub Misiak

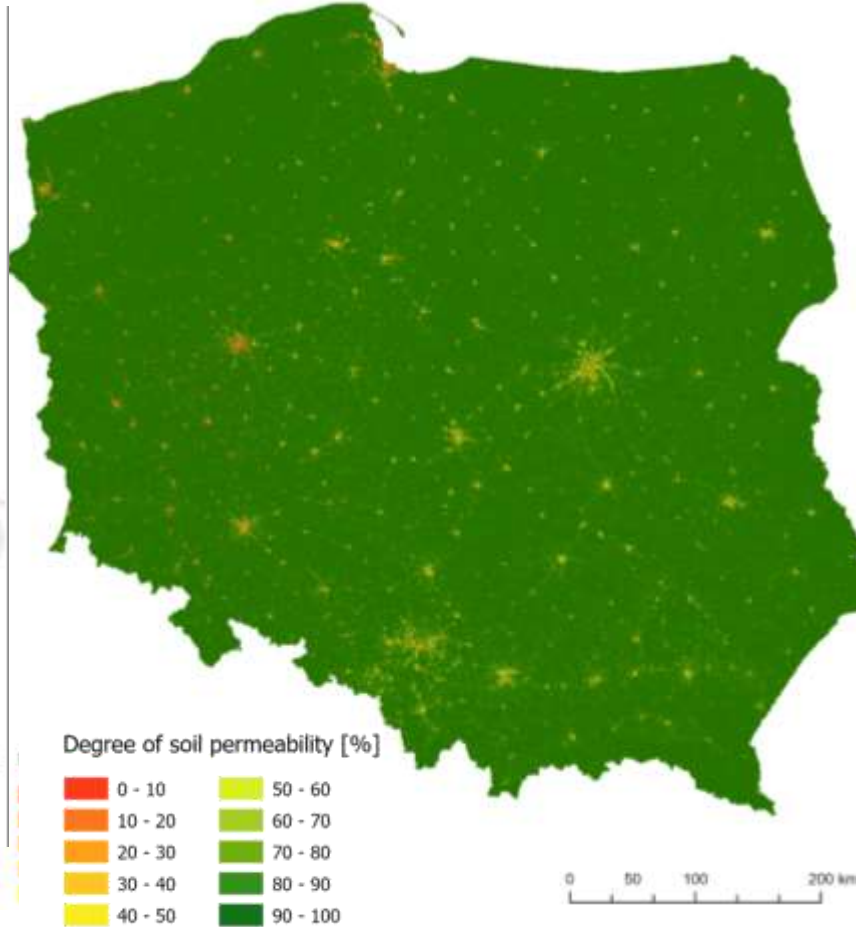
Institute of Architecture and Urban Planning
Interdisciplinary Doctoral School, Lodz University of Technology

biologically active surface ratio = soft landscaped area ratio – defined as area with surface arranged in a way which ensures natural plant vegetation and rainfall retention as well as 50% of terraces and flat roofs with such surface and other surfaces ensuring natural plant vegetation of the surface of at least 10m² as well as surface water on this area

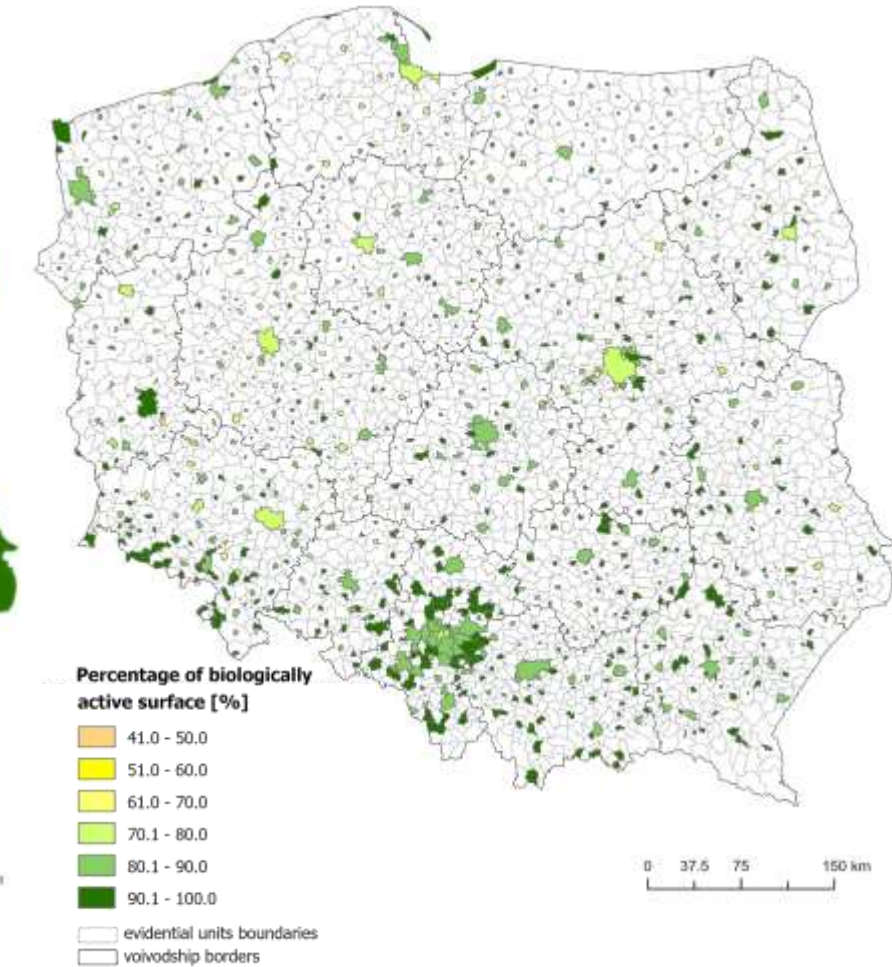
Regulation of the Minister of Infrastructure as of 12.04.2002
on technical conditions which buildings and their location should comply with (Dz.U.15.1422 as amended)



HRL-Imperviousness 2018 data for Poland

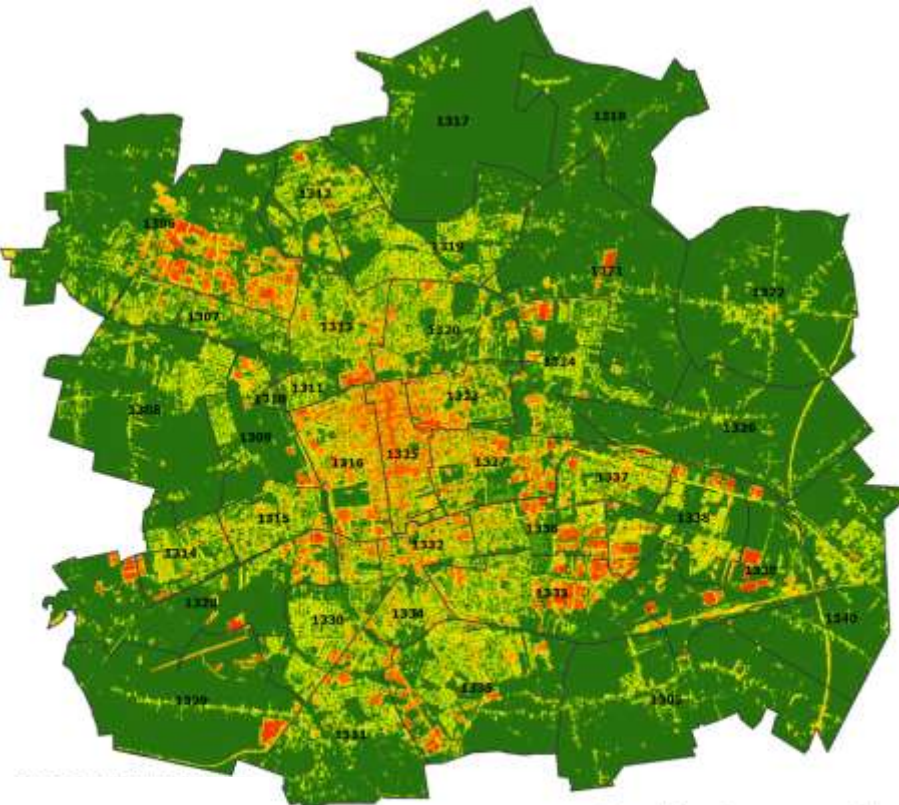


Reversed HRL-Imperviousness data for Poland



Percentage of biologically active surface in urban municipalities and cities in urban-rural municipalities

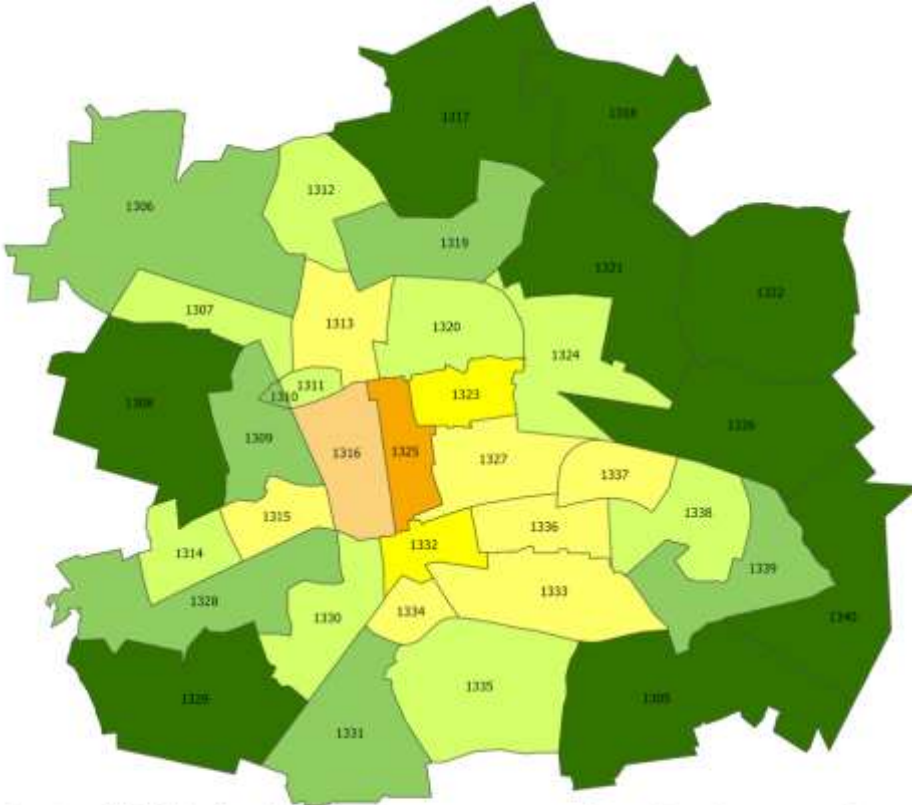
Investigation of biologically active Surface within the Lodz auxiliary units



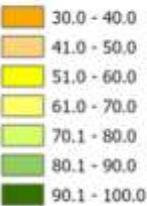
Degree of soil permeability [%]



1329 auxiliary unit code
□ auxiliary unit boundary



Percentage of biologically active surface [%]



1329 auxiliary unit code
□ auxiliary unit boundary

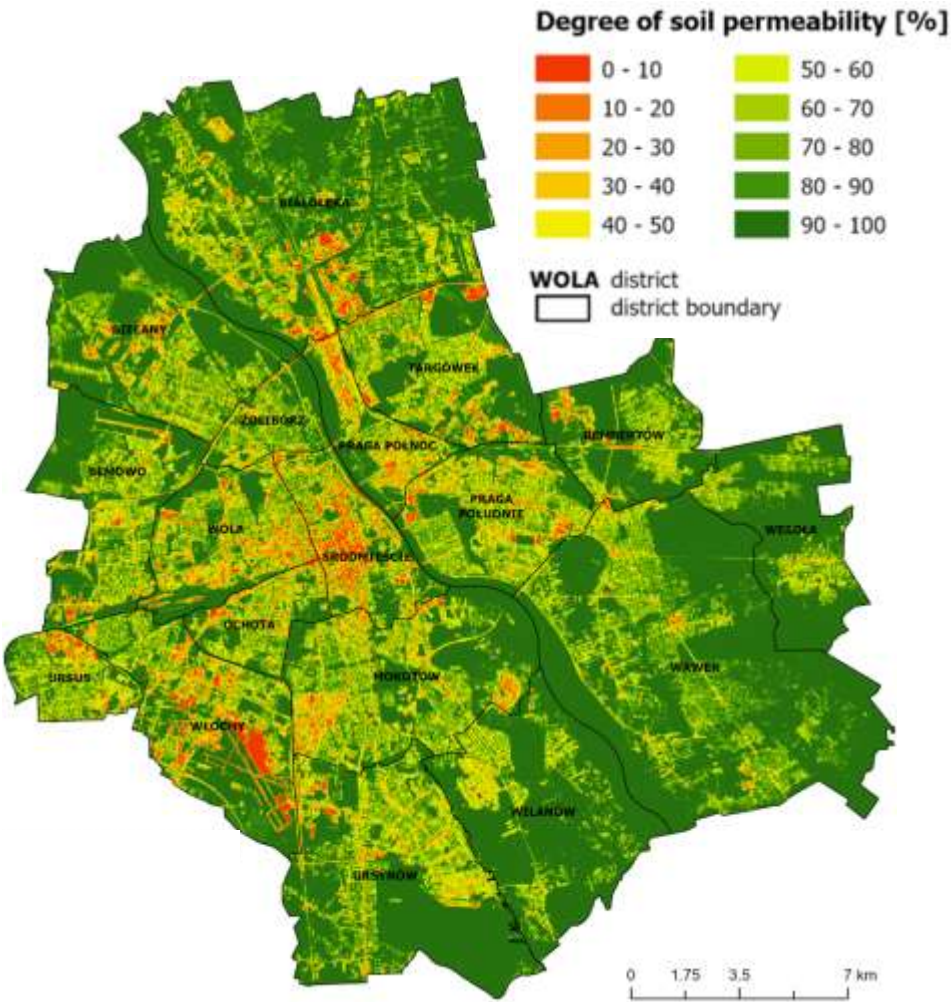


Auxiliary unit	Auxiliary unit code	Percentage of biologically active area [%]
Łagiewniki	1317	98.3
Wzniesień Łódzkich	1318	98.0
Mileszki	1326	95.6
Dolina Łódki	1321	95.4
Wiskitno	1305	95.2
Nowosolna	1322	95.2
Nad Nerem	1329	93.6
Złotno	1308	92.4
Andrzejów	1340	92.1
Lublinek-Pienista	1328	86.4
Ruda	1331	84.4
Zdrowie-Mania	1309	84.1
ŁÓDŹ	-	83.1
nr 33	1339	82.9
im. Józefa Montwiła-Mireckiego	1310	82.4
Bałuty Zachodnie	1306	81.6
Julianów-Marysin-Rogi	1319	80.8
Stoki-Sikawa-Podgórze	1324	79.7
Chojny	1335	78.8
Teofilów Wielkopolska	1307	77.8
Radogoszcz	1312	77.5
Retkinia Zachód-Smulsko	1314	76.2
Bałuty Doły	1320	74.5
Olechów-Janów	1338	73.3
Koziny	1311	73.1
Rokicie	1330	72.2
Chojny Dąbrowa	1333	69.7
Karolew-Retkinia Wschód	1315	68.3
Widzew Wschód	1337	67.6
Piastów-Kurak	1334	66.0
Bałuty-Centrum	1313	64.3
Zarzew	1336	61.2
Stary Widzew	1327	61.1
Górniak	1332	56.3
Śródmieście Wschód	1323	56.0
Stare Polesie	1316	47.9
Katedralna	1325	34.2

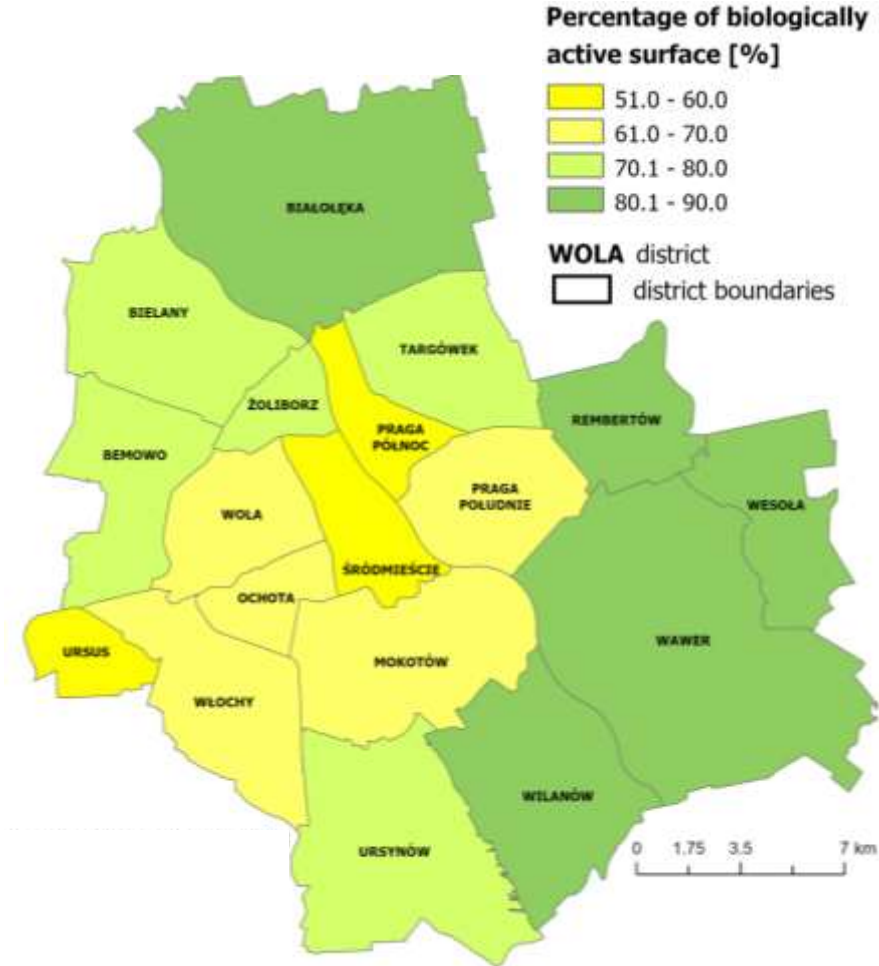
Reversed HRL-Imperviousness data within the Lodz auxiliary units

Percentage of biologically active surface within the Lodz auxiliary units

Investigation of biologically active surface within the Warsaw districts



Reversed HRL-Imperviousness data within the Warsaw districts



Percentage of biologically active surface within the Warsaw districts

District	District code	Percentage of biologically active surface [%]
Wilanów	146516_8	88.2
Wesoła	146515_8	87.8
Wawer	146514_8	87.0
Białołęka	146503_8	80.5
Rembertów	146509_8	80.3
Bielany	146504_8	79.2
Ursynów	146513_8	77.9
WARSZAWA	-	76.0
Bemowo	146502_8	74.6
Żoliborz	146519_8	71.2
Targówek	146511_8	70.2
Mokotów	146505_8	69.1
Włochy	146517_8	64.0
Praga-Południe	146507_8	63.3
Ochota	146506_8	62.1
Wola	146518_8	60.9
Praga-Północ	146508_8	60.0
Ursus	146512_8	59.6
Śródmieście	146510_8	52.9

Classes selected from the BDOT10k database:

From buildings, structures and facilities:

- buildings (code: BUBD)
- high technical buildings (code: BUWT)
- technical tanks (code: BUZT)
- covered swimming pools, open and covered tennis courts (code: BUSP)
- other structures (code: BUIB)

From communication network:

- roadway (code: SKJZ)
- pedestrian and bicycle paths (code: SKRP)

From other object:

- landmarks (code: OIOR)

From land use complexes:

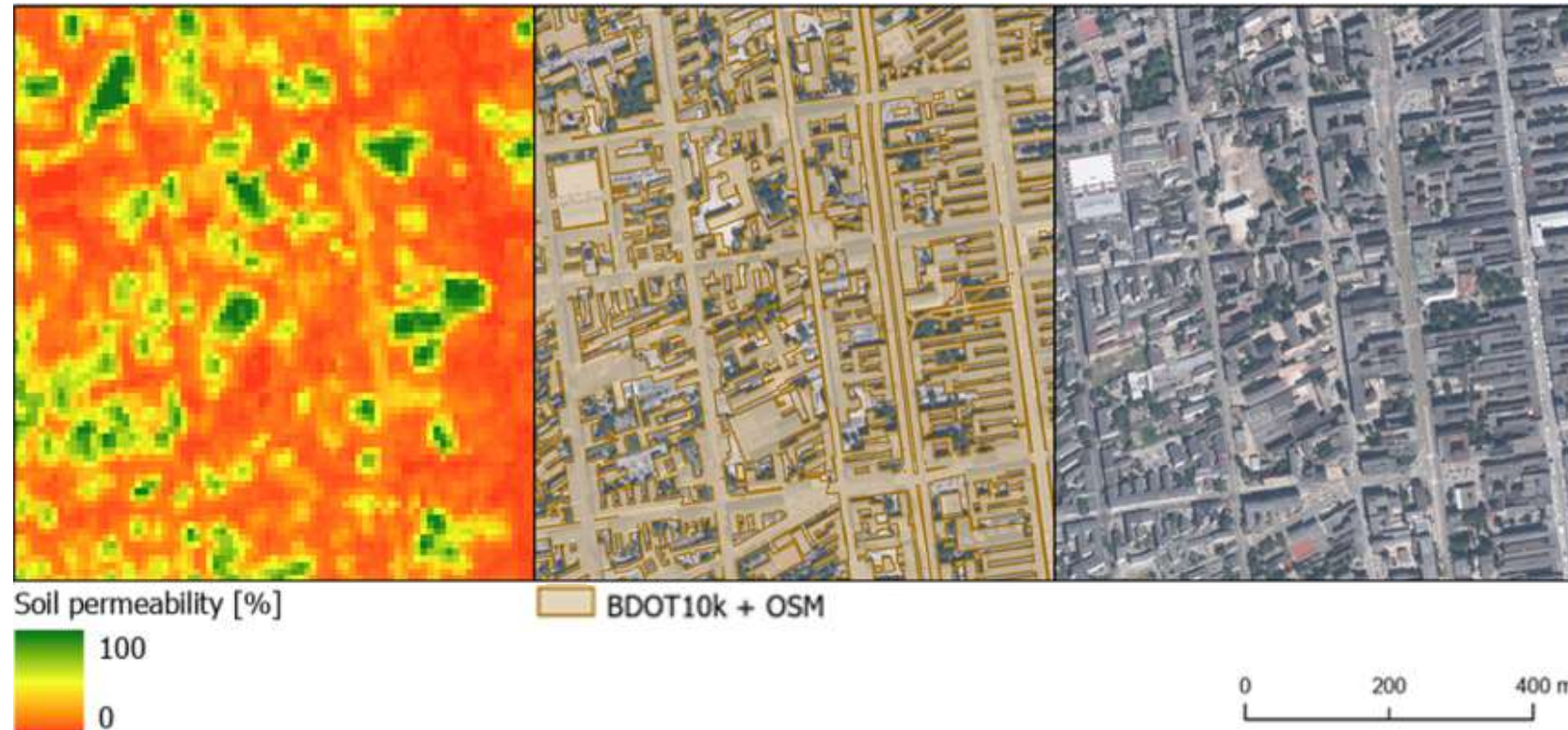
- petrol stations and depots (code: KUKO)

From land cover:

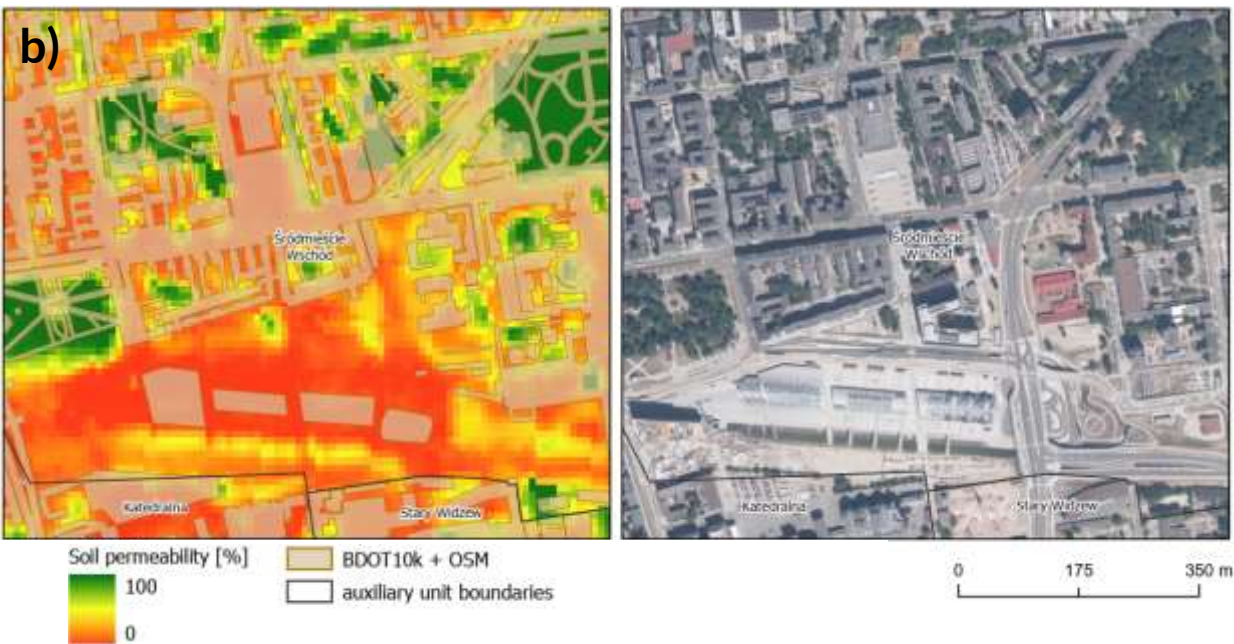
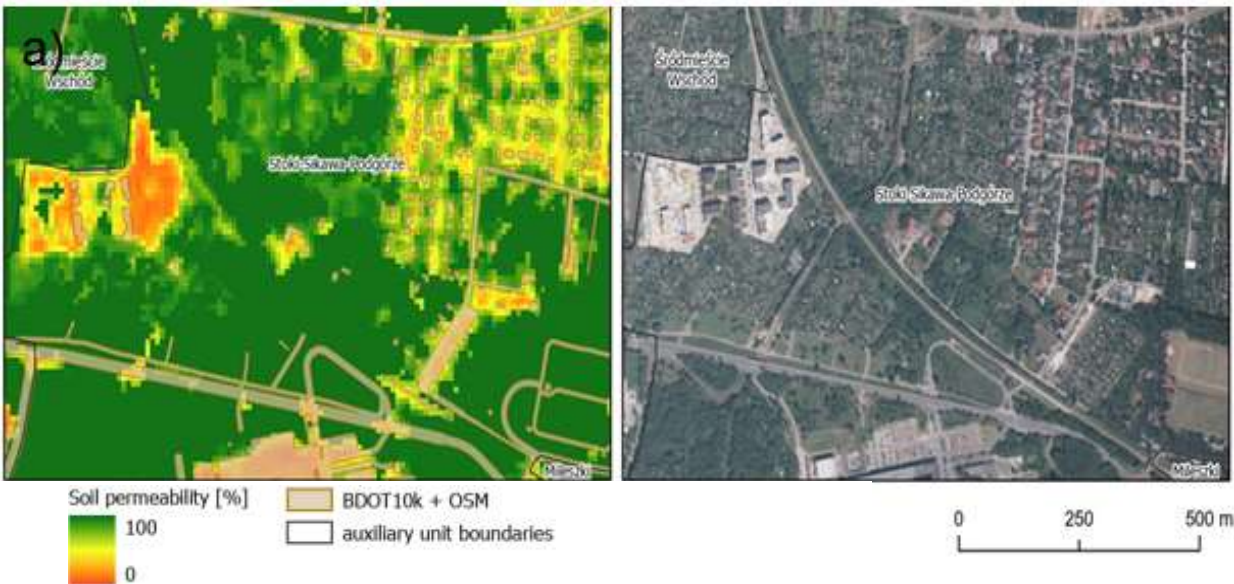
- town squares (code: PTPL)
- area under the airport road (code: PTKM)
- dump sites (code: PTSO)
- other non-built-up areas (code: PTNZ)

Selected layers from the OSM database:

- town squares and parking



Comparison of BAS derived from HRL vs BDOT + OSM



		raster dataset 10 x 10m			vector dataset				
Auxiliary unit	Auxiliary unit code	Biologically active surface HRL-IMD [m2]	Total area HRL-IMD [m2]	Percentage of biologically active surface HRL-IMD[%]	Total area BDOT10k [m2]	Biologically active surface BDOT10k [m2]	Percentage of biologically active surface BDOT10k [%]	Biologically active surface BDOT10k + OSM [m2]	Percentage of biologically active surface BDOT10k + OSM [%]
Andrzejów	1340	11011056	11952000	92.1	11952023.02	11130431.72	93.1	11130050.46	93.1
Bałuty Centrum	1313	3359901	5228300	64.3	5225670.20	2929526.33	56.1	2829750.03	54.2
Bałuty Doły	1320	4999634	6714000	74.5	6716376.55	4361782.39	64.9	4284115.89	63.8
Bałuty Zachodnie	1306	17551364	21512600	81.6	21513630.62	18013051.49	83.7	17961902.72	83.5
Chojny	1335	9476724	12021100	78.8	12020615.18	9319271.78	77.5	9230582.88	76.8
Chojny Dąbrowa	1333	5916092	8489800	69.7	8488666.92	5733208.71	67.5	5642032.51	66.5
Dolina Łódki	1321	13425650	14070800	95.4	14069553.64	13441261.10	95.5	13433268.07	95.5
Górniak	1332	1663705	2952700	56.3	2952661.01	1561317.03	52.9	1508872.67	51.1
im. Józefa Montwiła-Mireckiego	1310	211476	256700	82.4	256624.38	179852.02	70.1	178766.68	69.7
Julianów-Marysin-Rogi	1319	6667614	8257000	80.8	8257451.22	6649516.56	80.5	6643081.81	80.4
Karolew-Retkinia Wschód	1315	2196445	3217400	68.3	3217304.76	1935468.49	60.2	1876405.55	58.3
Katedralna	1325	1241948	3633000	34.2	3633625.64	1583945.85	43.6	1390843.86	38.3
Koziny	1311	782664	1071000	73.1	1071469.06	726836.24	67.8	718219.82	67.0
Lublinek-Pienista	1317	9328806	16817600	86.4	16817421.96	16289518.41	96.9	16280937.31	96.8
Łągowniki	1328	16534424	10796600	98.3	10797949.14	9155276.93	84.8	9119637.36	84.5
Mileszki	1326	11954482	12500000	95.6	12499886.77	11912530.14	95.3	11912530.14	95.3
Nad Nerem	1329	12492846	13343200	93.6	13343008.55	11955970.89	89.6	11943110.32	89.5
Nowosolna	1322	14809150	15552500	95.2	15552144.13	14701098.40	94.5	14685830.19	94.4
nr 33	1339	6615622	7977300	82.9	7977506.52	6729609.11	84.4	6714219.85	84.2
Olechów-Janów	1338	4869245	6642000	73.3	6642083.34	4620602.33	69.6	4551913.10	68.5
Piastów-Kurak	1334	1439447	2180000	66.0	2179882.80	1322038.47	60.6	1288728.04	59.1
Radogoszcz	1312	4539675	5859400	77.5	5860225.66	4220418.95	72.0	4161747.32	71.0
Retkinia Zachód-Smulsko	1314	2875299	3773900	76.2	3775014.16	2742032.93	72.6	2671844.50	70.8
Rokicie	1330	4309701	5965300	72.2	5963931.13	4302870.04	72.1	4272782.53	71.6
Ruda	1331	8487703	10058400	84.4	10060639.40	8287805.15	82.4	8274810.81	82.2
Stare Polesie	1323	2804344	3489300	47.9	3487801.25	1919139.73	55.0	1815843.64	52.1
Stary Widzew	1316	3605482	5856500	61.1	5856396.53	2931284.89	50.1	2751636.20	47.0
Stoki-Sikawa-Podgórze	1327	6388568	5902000	79.7	5901920.51	3484727.13	59.0	3363036.39	57.0
Śródmieście Wschód	1324	1953606	8011300	56.0	8012139.70	6288796.35	78.5	6265825.62	78.2
Teofilów Wielkopolska	1307	3559708	4577200	77.8	4577614.62	3152873.20	68.9	3064483.09	66.9
Widzew Wschód	1337	2430223	3595700	67.6	3595976.86	2102365.22	58.5	2060508.91	57.3
Wiskitno	1305	15888581	16682400	95.2	16682518.72	15849162.64	95.0	15831322.07	94.9
Wzniesień Łódzkich	1318	9255226	9443200	98.0	9443847.43	9099246.36	96.4	9099246.36	96.4
Zarzew	1336	2517189	4111500	61.2	4111283.16	2504554.74	60.9	2442251.23	59.4
Zdrowie Mania	1309	4767922	5671600	84.1	5670685.50	4619857.88	81.5	4580567.25	80.8
Złotno	1308	13542897	14664500	92.4	14664584.89	13575497.44	92.6	13553814.16	92.4



Investigation of
public access to
green urban
areas

Investigation of
mapping changes
in urban and
spatial planning

"By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities"

HRL-IMD and
BDOT10k+OSM

Lodz base-map
(in progress)

errors, deficiencies
and discrepancies

Research on national
and local scale
(country, auxiliary
units/districts, urban
atlas units)

Open, user-friendly InCoNaDa's data platform

HRL + BDOT + OSM



Ortophoto



Impermeable surfaces derived from base-map

Thank you for your attention!

Daria Stosio

daria.stosio@igik.edu.pl

Institute of Geodesy and Cartography
Warsaw University of Technology

Jakub Misiak

jakub.misiak@dokt.p.lodz.pl

Institute of Architecture and Urban Planning
Interdisciplinary Doctoral School, Lodz University of Technology

'The research leading to these results has received funding from the Norway Grants 2014-2021 via the National Center for Research and Development'