

Massive data contributions from the National Land Survey of Finland to the OpenStreetMap Database

Internship work overview

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Introduction



Ukrainian soldiers take part in a training exercise some 10 kilometers away from the border with Russia and Belarus in the northern Ukrainian region of Chernihiv on Feb. 2 2023. (source: The Harvard Gazette website)

What massive contributions
from the NLS has been done
to OSM in history?

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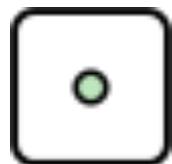


Geometry-level modified NLS buildings

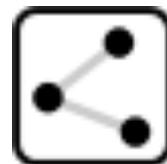


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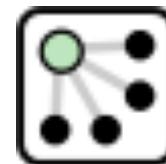
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Node



Way



Relation

+



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NLS source tag value typology

```
"source" ILIKE '%mml%' OR
"source" ILIKE '%nls%' OR
"source" ILIKE '%maanmittauslaitos%' OR
"source" ILIKE '%national land survey of finland%' OR
"source" ILIKE '%finnish geospatial research institute%' OR
"source" ILIKE '%fgi%' OR
"source" ILIKE '%Paikkatietokeskus%' OR
"source" ILIKE '%lmv%' OR
"source" ILIKE '%Lantmäteriverket%' OR
"source" ILIKE '%Geodatacentralen%'
```

Identifying NLS-related data among other OSM data



NLS-related data proportions

Sources / Type of features	Points (49,353 features)	Lines (85 features)	Multipolygons (502,786 features)	All features (total)
NLS	2.6% (1,305 features)	2.4% (2 features)	23.6% (118,810 features)	21.8%
Other	35.1% (17,300 features)	68.2% (58 features)	27.6% (138,453 features)	28.2%
No source	62.3% (30,748 features)	29.4% (25 features)	48.8% (245,523 features)	50 %

Table 5 — Source key values proportions for the “buildings” dataset (552,224 features)

Sources / Type of features	Points (105,452 features)	Lines (468,982 features)	Multipolygons (4,214 features)	All features (total)
NLS	4.5% (4,692 features)	11.1% (51,861 features)	4.8% (201 features)	9.8%
Other	48.5% (51,168 features)	47.1% (221,146 features)	55.4% (2,335 features)	47.5%
No source	47% (49,592 features)	41.8% (195,975 features)	39.8% (1,678 features)	42.7%

Table 6 — Source key values proportions for the “roads” dataset (578,648 features)

Identifying NLS-related data among other OSM data



Source tag spelling on NLS-related buildings

	source character varying	occurrences numeric
1	MML	37229
2	MML/NLS	17648
3	aerial imagery;MML background map	12734
4	MML2017	10322
5	MML Orthophoto	8739
6	MML Topographic Map	8601
7	NLS.fi	4649
8	MML2016	4335
9	MML_2012	2524
10	local knowledge, aerial, MML	2010
11	aerial imagery;MML Ortophoto	1937
12	mml2018/helsingin karttopalvelu.	1925
13	Mapbox Satellite / National Land Survey of Finland	1788
14	MML2018	1261
15	NLSF	1151
16	MML2019/Helsingin kiinteistökartta	1121
17	MML Background Map	959
18	Addresses: MML/DVV.fi; aerial imagery; map imagery;	945
19	MML Background Map; MML Orthophoto; MML Topographic Map	799
20	MML Orthophoto; MML INSPIRE Buildings Maastotietokanta (WMS)	690

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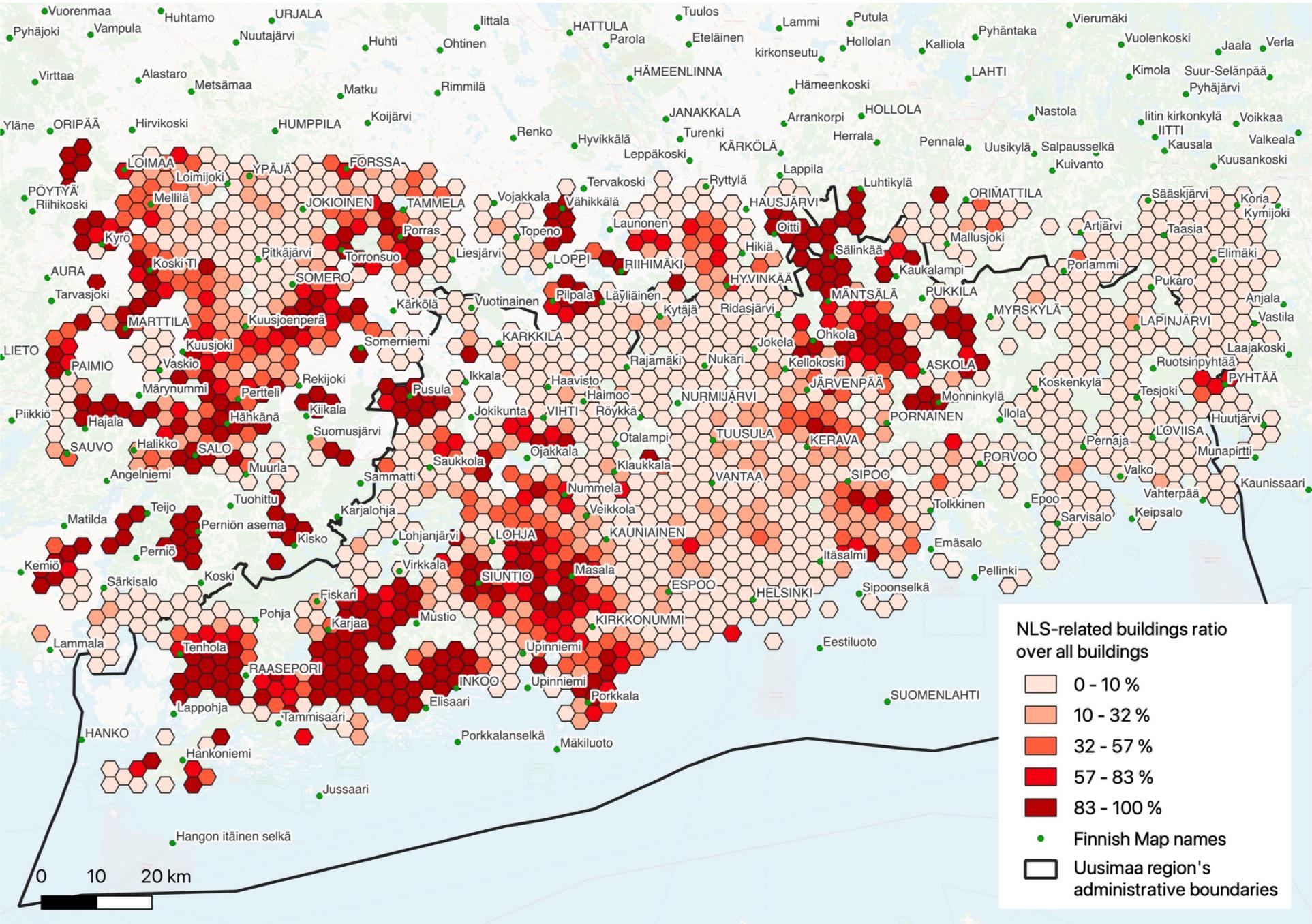
NLS massive data contributions



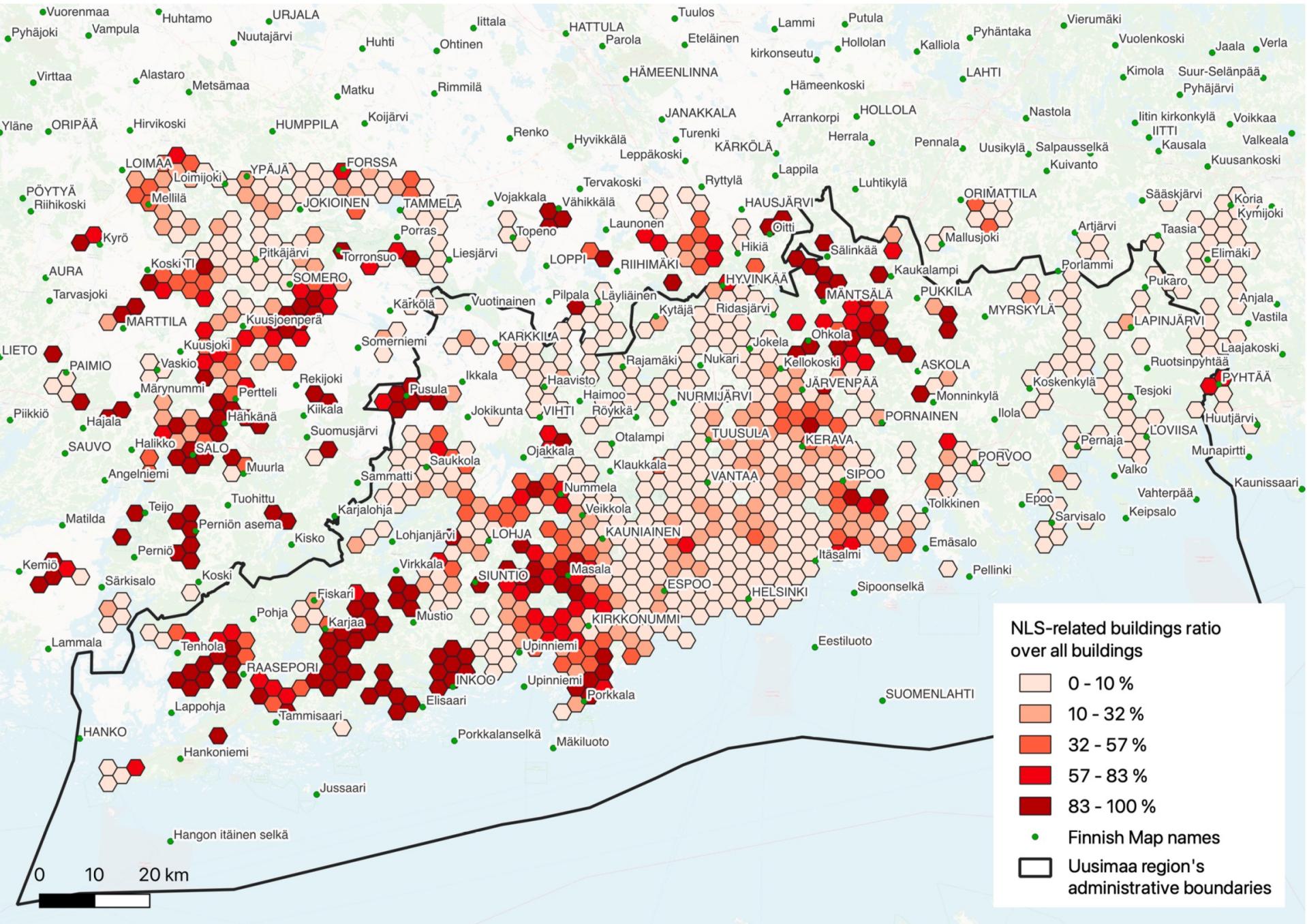
Geometry-level modified NLS buildings



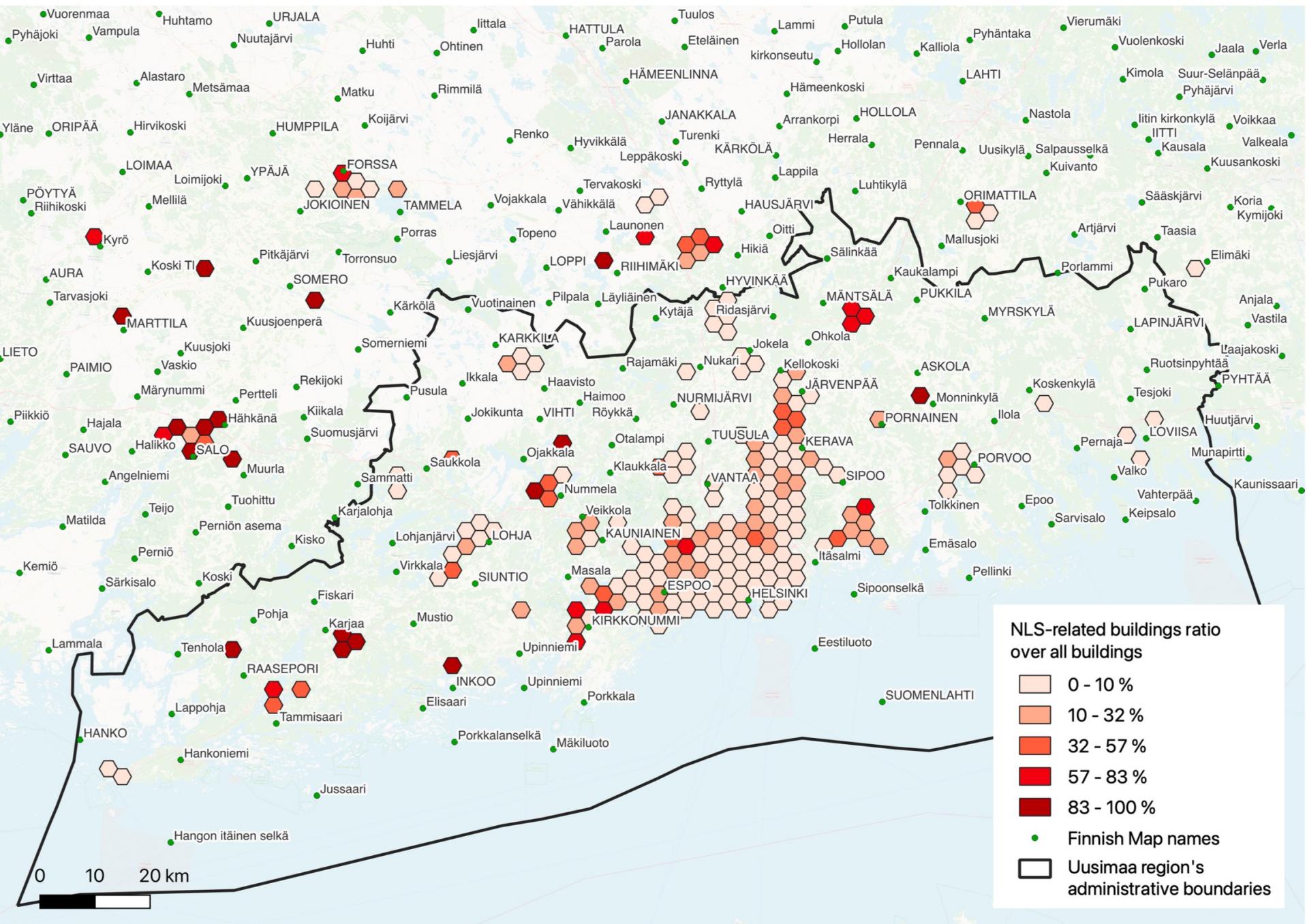
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(a) $\forall \text{hexagon} \in \text{grid}, \min(\text{nb}_{\text{buildings}}) = 20$



(b) $\forall \text{hexagon } \in \text{grid}, \min(\text{nb}_{\text{buildings}}) = 100$



(c) $\forall \text{hexagon} \in \text{grid}, \min(\text{nb}_{\text{buildings}}) = 500$

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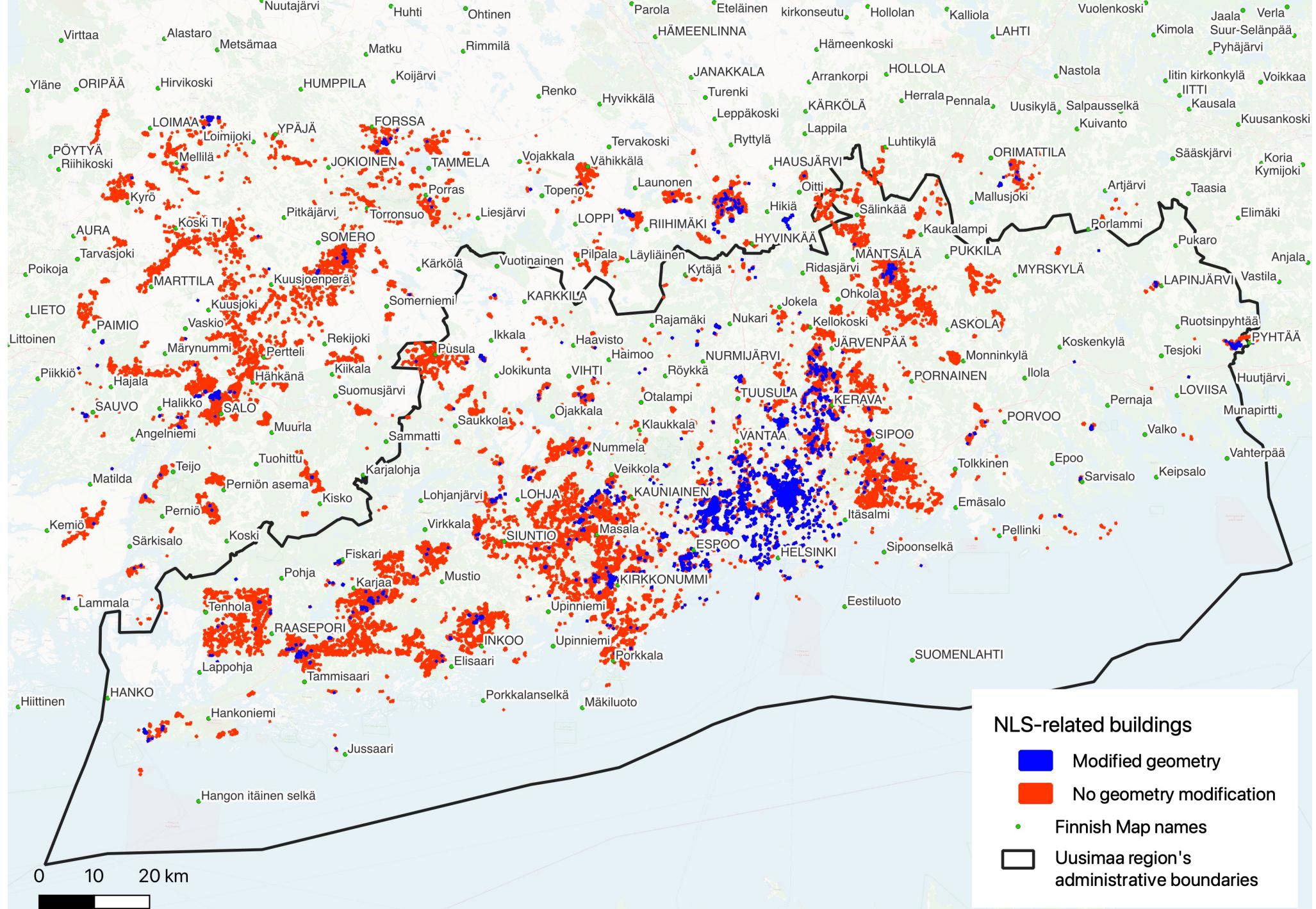


```
In [3]: runfile('/Users/alexsren/Desktop/test3/nls_buildings_multipolygons_geometry_modif/typology_modif_encoding_copy.py', wdir='/Users/alexsren/Desktop/test3/nls_buildings_multipolygons_geometry_modif')
100%|██████████| 118810/118810 [12:25<00:00, 159.45it/s]
```

```
----- Geometry modification statistics -----
```

```
Feature count: 118810
Among the 118810 features
- 8240 underwent geometric modifications ( 6.9 % )
- 110555 have not been modified ( 93.1 % )
- 15 could not be analysed ( 0.0 % )
*   Average number of geometry modifications per feature: 0.1
*   Max number of geometry modifications: 24.0
```

```
In [4]:
```



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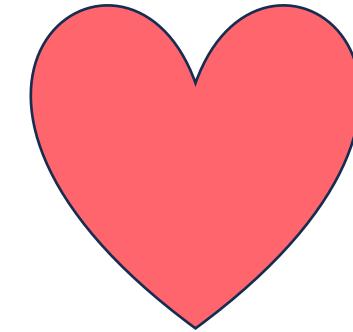
Conclusion & Outlook

- Uncertain nature of our identification process
- NLS massive contributions located for most in the west of the Uusimaa region

Outlooks

- Are any NLS features missing?
- Quality assessment
- Artificial Intelligence
- Considering a bigger study area

Acknowledgements



Thank you for your attention!

