

FROM LOCAL TRAFFIC DATA TO EVIDENCE-BASED ENVIRONMENTAL POLICIES

CityTRAQ final conference 18/06/2026



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From local traffic data to evidence based environmental policies



How can **traffic data** help to gain deeper insight into air quality hotspots and other **environmental challenges** at the **local scale**? How can co-creative **traffic measurements and modelling** lead to more data-driven urban **traffic and air quality policy** planning?

In this session, the **CityTRAQ pilot in Antwerp** serves as an example to explore these questions. The Antwerp pilot combined traffic counts using **Telraam** indoor and outdoor devices with the Flemish **Flomovia traffic propagation model** to improve **air quality maps and CO₂ emission calculations**, with a focus on logistics and heavy traffic.

Main takeaways

- Insights into Antwerp's approach to **improving air quality modelling** with strategic traffic measurements
- Exploring how **school-powered traffic counts** using Telraam devices support urban mobility and air quality planning
- Learning how detailed **traffic propagation models** can be used for better air quality modelling and environmental policy planning



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Speakers



Raf Verbruggen
Project Manager Air Quality and Environmental Sound
City of Antwerp

Raf Verbruggen is project leader on air quality and environmental noise at the City of Antwerp (Belgium), department of Climate & Environment, since 2018. He coordinates the CityTRAQ project in Antwerp and has experience in various monitoring and participation projects on air quality, often in collaboration with Antwerp schools. In addition, Raf works on urban sound planning and tranquil urban spaces.



Kris Vanherle
Co-owner
Telraam

Kris Vanherle is the co-founder of Telraam, a citizen science initiative that enables residents to collect and share traffic data using low-cost sensors and open data technologies. With a background in environmental sciences and transport policy research, he has extensive experience in mobility modelling, emissions analysis and the evaluation of transport policies. Through Telraam, he works at the intersection of technology, data and citizen engagement, supporting cities and communities to better understand mobility patterns and contribute to more sustainable and people-centred transport systems.



David Roet
Air Quality Modelling Researcher
Flanders Environment Agency

David Roet is specialised in different aspects of air quality modelling. These focus mainly on preparing the necessary model input data and validation of the model outputs by comparing them to available measurements. He also likes to explore the possibilities of using low-cost IoT air quality sensors, both in gathering and processing the data along with exploring their usefulness i.e. to further improve air quality modelling.



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Agenda



Presentations:

- Telraam: Traffic data in collaboration with local citizens
- The Flomovia traffic propagation model: Base layer for the Flemish air quality maps
- CityTRAQ pilot Antwerp: Improving air quality maps through traffic counting

Discussion: From local traffic data to evidence based environmental policies



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Telraam



FLOMOVIA traffic propagation model

Base layer for the Flemish air quality maps



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ATMO-Street: evolution of AQ modeling

RIO

- interpolation AQ measurements
- background (4x4 km²)

+

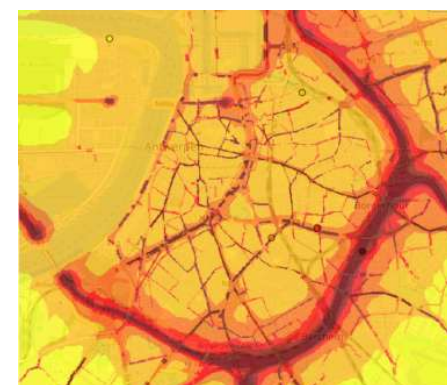
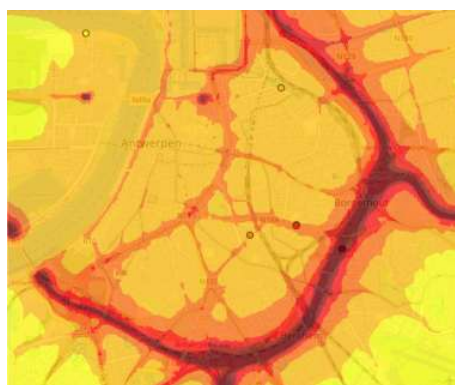
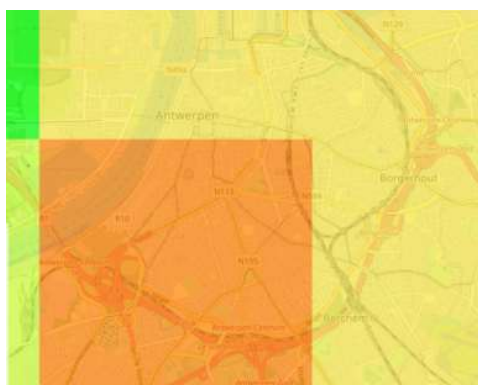
IFDM

- Gaussian plume model
- local contributions: emissions traffic, shipping and industry

+

OSPM

- accounting for *street canyons* (increment)



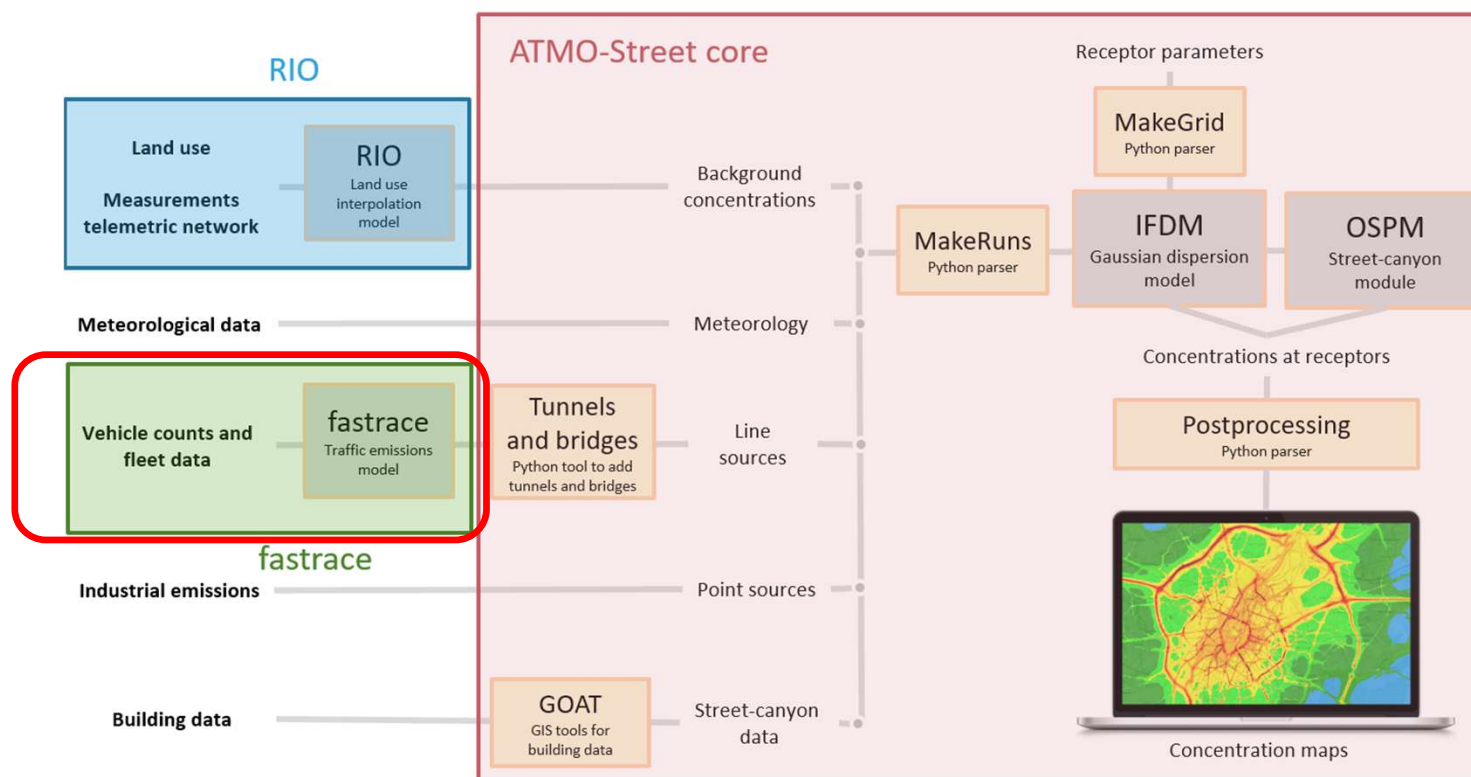
=ATMOStreet

→ high resolution 10x10 m²



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FLOMOVIA in ATMO-Street



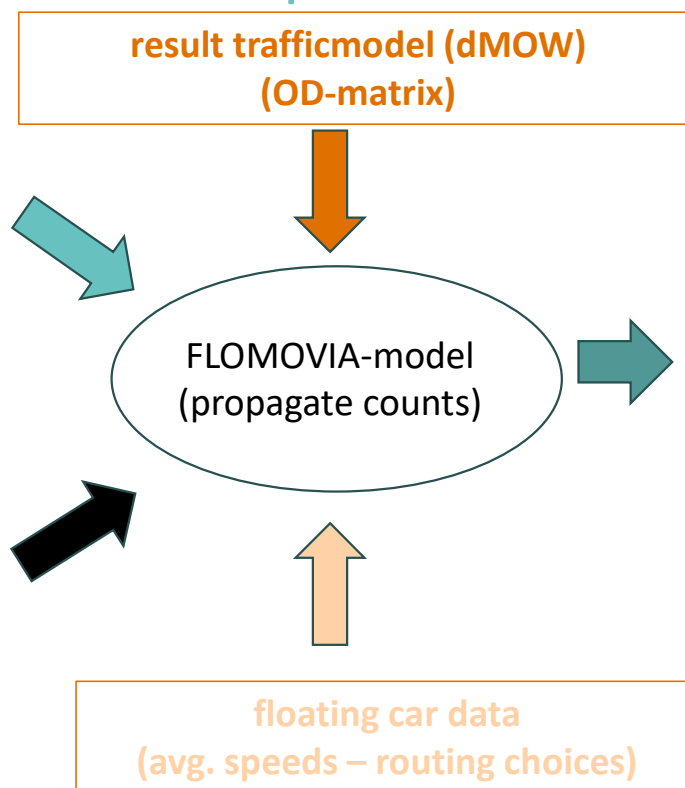
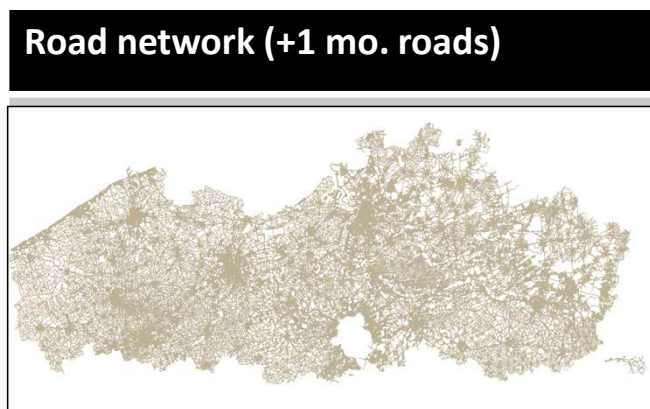
(credits:ATMO-Street scheme courtesy of VITO)



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FLOMOVIA input & output

Traffic counts	
highway: tellussen (VVC)	
regional roads: telcampagne (AWV)	
local roads: Telraam data (citizens)	
+ OBU-data trucks (VVC)	★
+ public transport schedules	★



For each road (segment)
Traffic volume light vehicles ("car")
Traffic volume heavy vehicles ("truck")
F-scores
...

What is the F-score ?

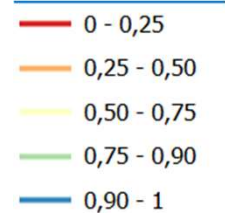
degree of traffic volume based on traffic counts

F-score = 0 → purely model based (“synthetic”)

F-score = 1 → fully based on traffic counts

available for both car and truck

per road segment



F-score car 2025



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What is the F-score ?

yearly variations in F-scores are possible due to changes in ...

- (local) traffic measurement network
- the road network (infrastructure, directions, ...)
- traffic routing changes (influenced by avg. speeds i.e. FCD)
- big changes in traffic volumes (due to improved/new data sources)

good candidates for additional traffic measurements?

- high traffic volumes + low F-score → biggest potential



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CityTRAQ pilot Antwerp

Improving air quality maps through traffic counting

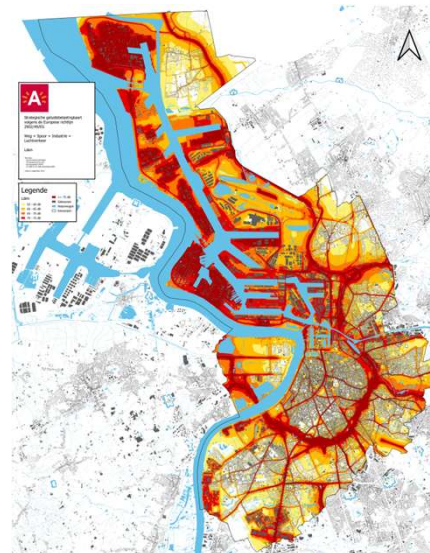
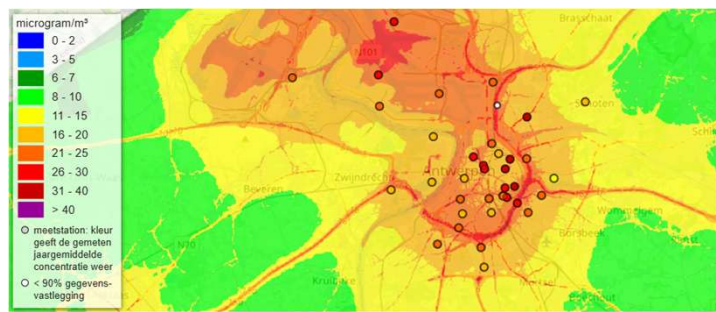


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Challenge

Lack of high resolution and reliable **local traffic data** is a bottleneck for more reliable ...

- ATMO-Street **air quality maps**
- **Noise maps**
- Calculations of local **CO₂-emissions**



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Goal

- Improving ATMO-Street **air quality maps, noise maps** and calculations of **CO₂-emissions** for Antwerp ...
- Through improving the reliability of the underlying **FLOMOVIA** traffic propagation model via targeted traffic measurements ...
- With a focus on contributions of **heavy traffic flows**



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Selection of traffic measurement locations



- Improving **Flomovia** traffic propagation model:
 - Locations where Flomovia is **based on calculations** rather than traffic counts: low F-scores heavy traffic and person cars (2022-23)
 - Roads with **high expected traffic intensities**: road categories of Antwerp mobility plan
- Official **air quality measuring stations** and NO₂-sampling locations: validation



F-scores heavy traffic 2022



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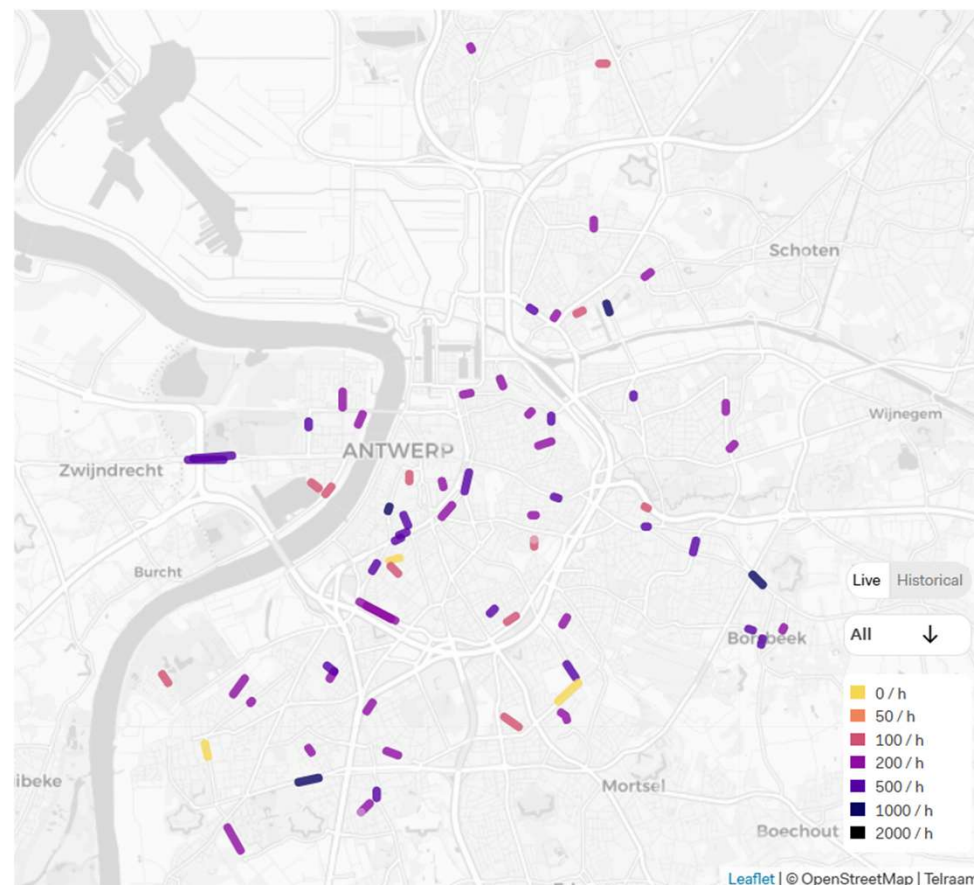


Traffic measurements with Telraam

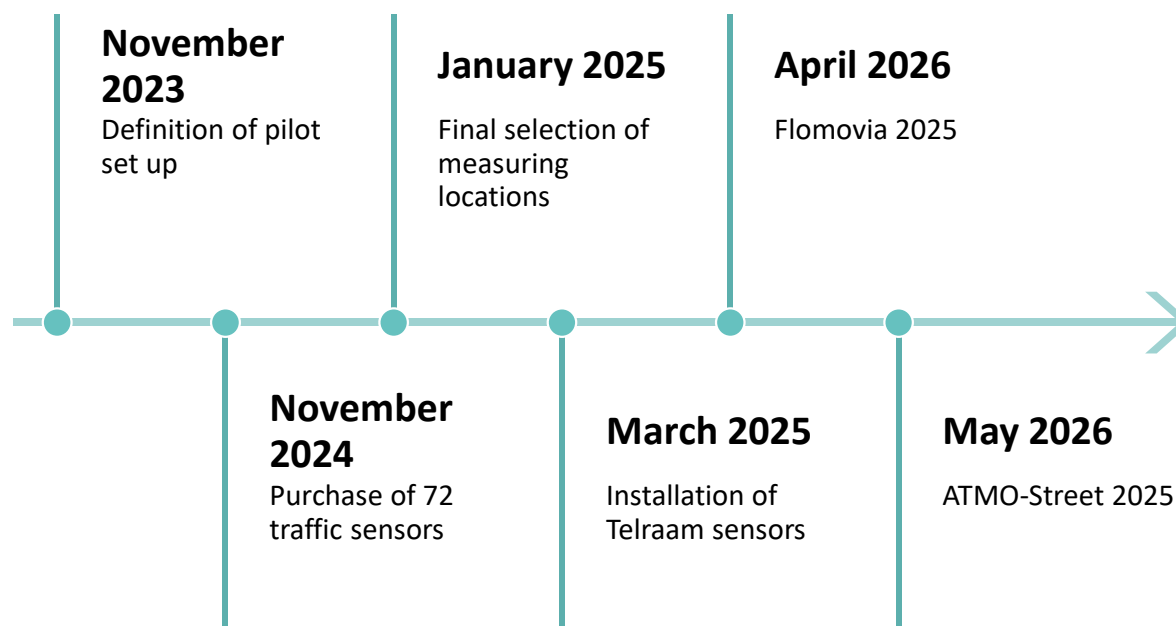
- **Tender** for traffic counters
- Purchase and installation of **72 Telraam** traffic sensors:
 - 37 indoor sensors
 - 35 outdoor sensors with battery and solar panel
- Telraam data used for **calculation of Flomovia 2025**



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Timeline



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Outdoor traffic sensors



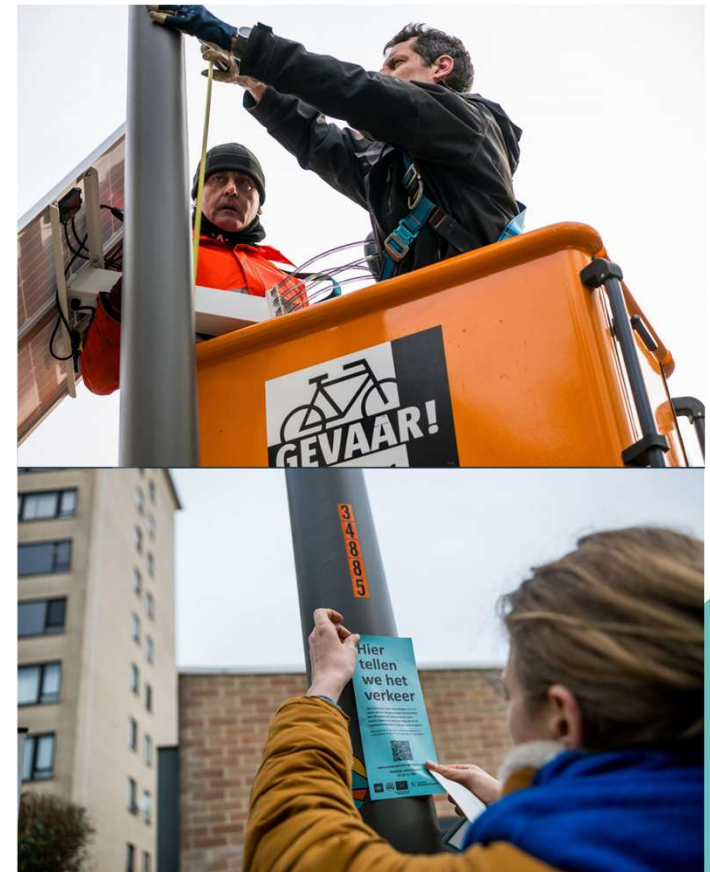
Installation:

- Heightworker necessary for installation
- Permits for installation at lighting poles (Fluvius / AWV)
- Parking permits for heightworker
- Information stickers

=> **Smooth co-operation:** VMM, Telraam, different city departments (mobility, communication, special assignments ...)

Annual maintenance:

- Cleaning of solar panel and sensor lens
- Security check of mounting materials
- Battery replacement if necessary
- Continuous data follow-up and quality control via Telraam portal



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Indoor traffic sensors



- Co-operation with **23 schools and 12 other public institutions** (libraries, fire stations, cultural institutions, hospital ...)
 - Easy installation
 - Sometimes sensors are unplugged
- Support for schools who wanted to use **Telraam for education**: not much response
 - Online information session with inspiration for educational projects with Telraam (*School op de Teller*)
 - Coaching and subsidies for school climate projects on sustainable mobility, support for school streets ...



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The overall Antwerp traffic counting network

Telraam devices inner city = citizen science

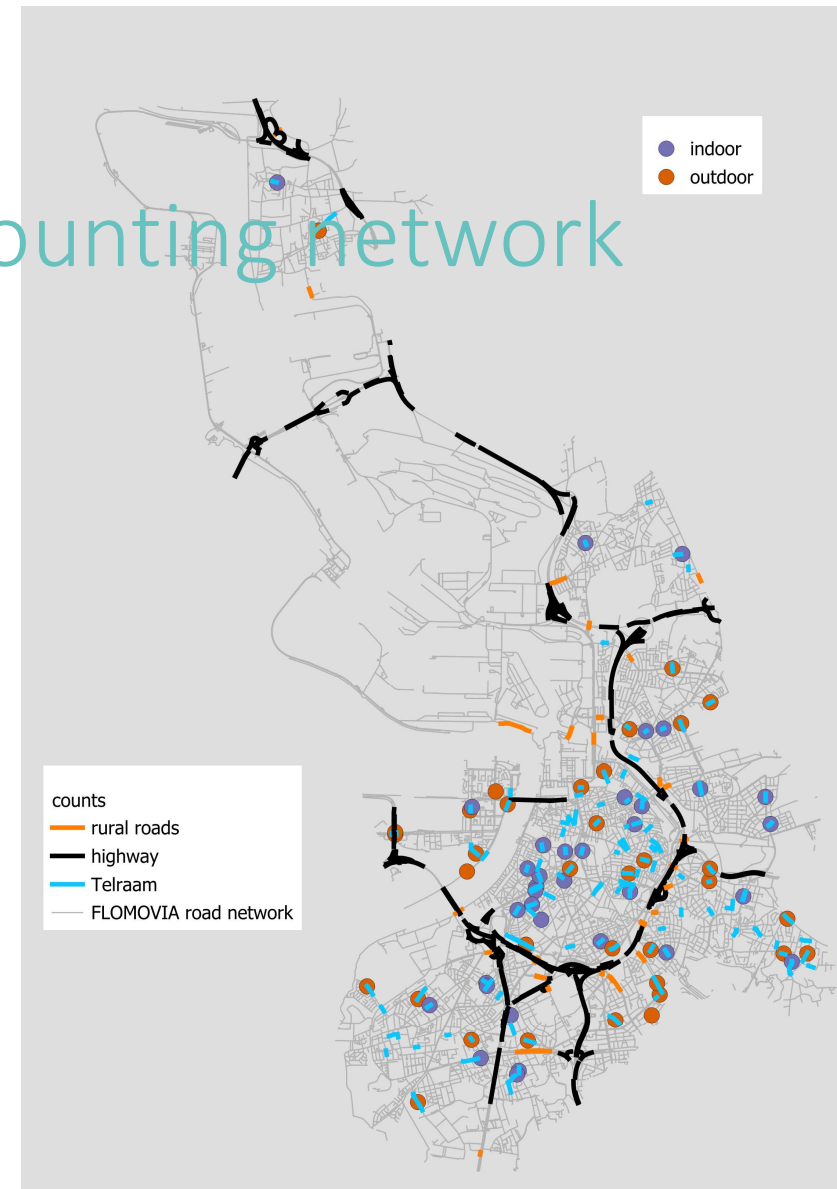
CityTRAQ devices are only one part of the Antwerp network
(72 out of 192)

Telraam is (currently) our only source for local traffic counts
in FLOMOVIA

Telraam is only used after quality control

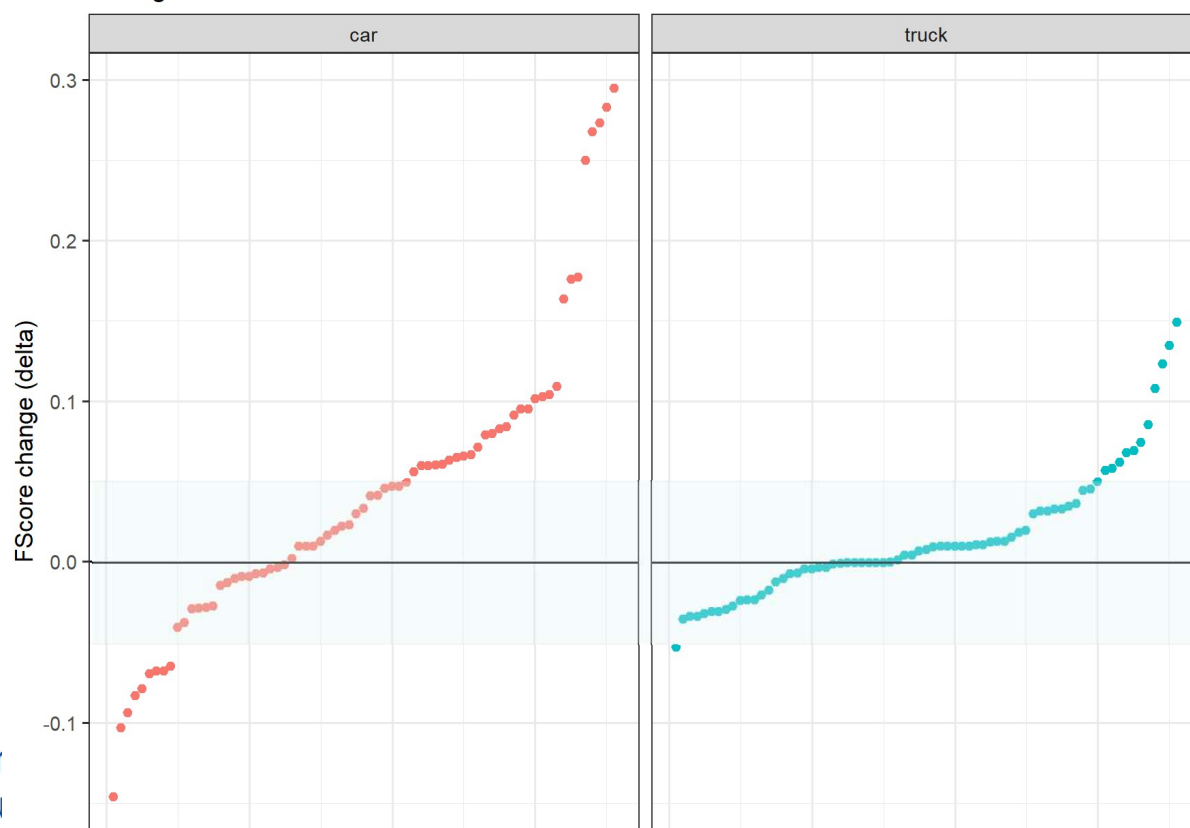


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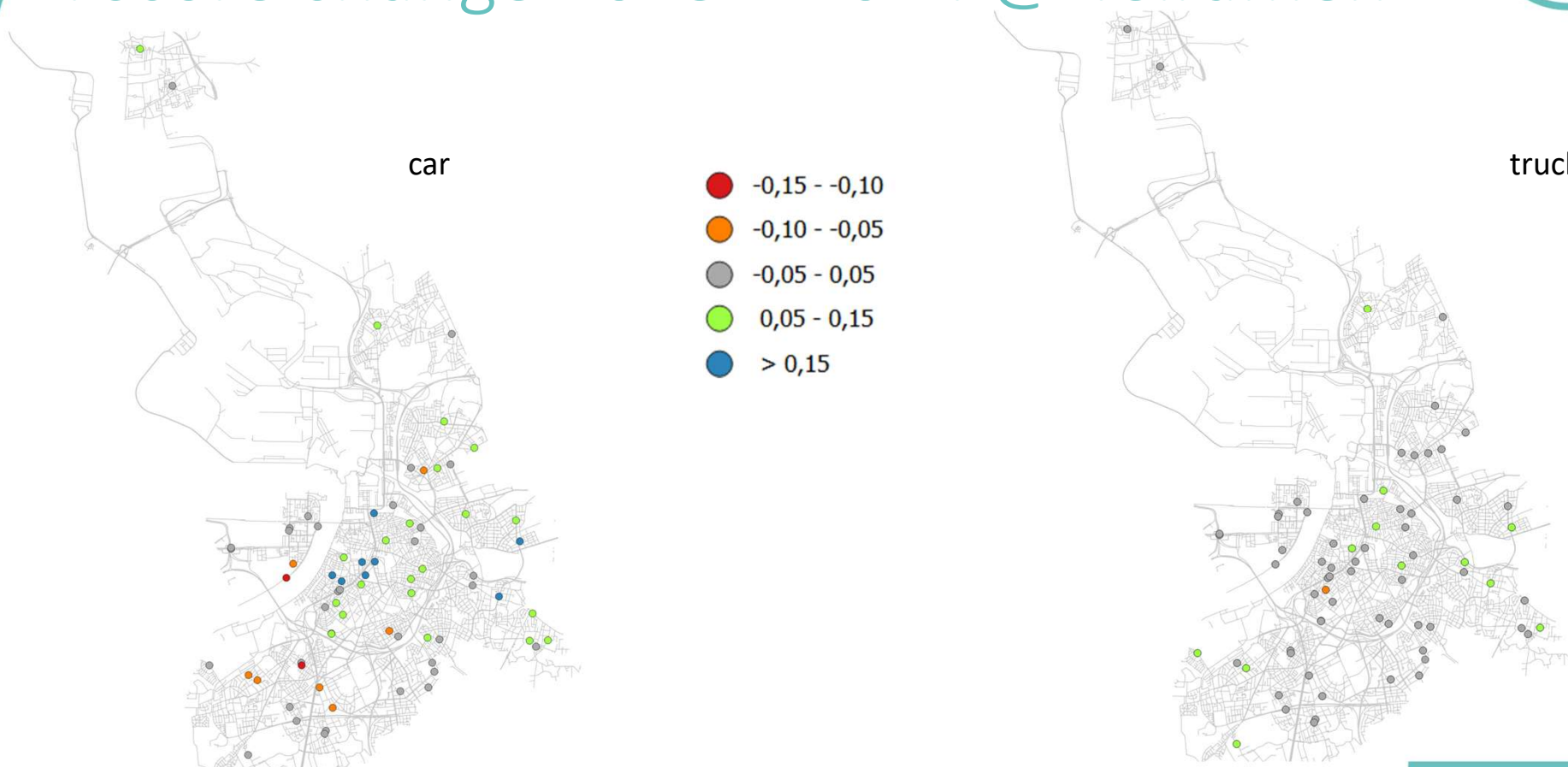
Fscore changes 2025-2024 @Telramen

Change in FLOMOVIA FScore between 2025 to 2024



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Fscore change 2025 – 2024 @ Telramen



Evolution Antwerp's traffic counting network

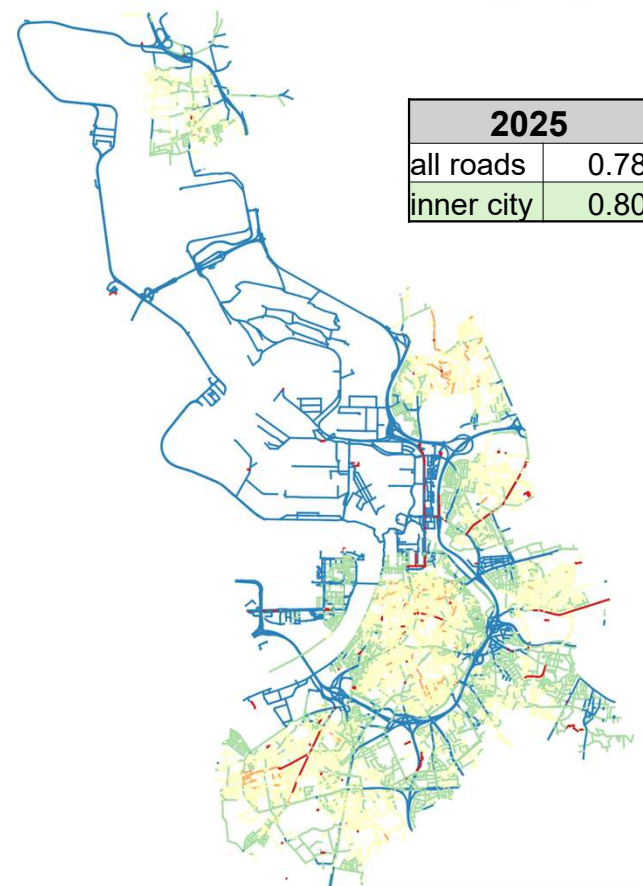
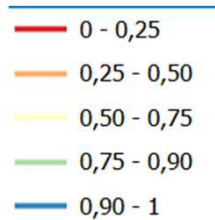
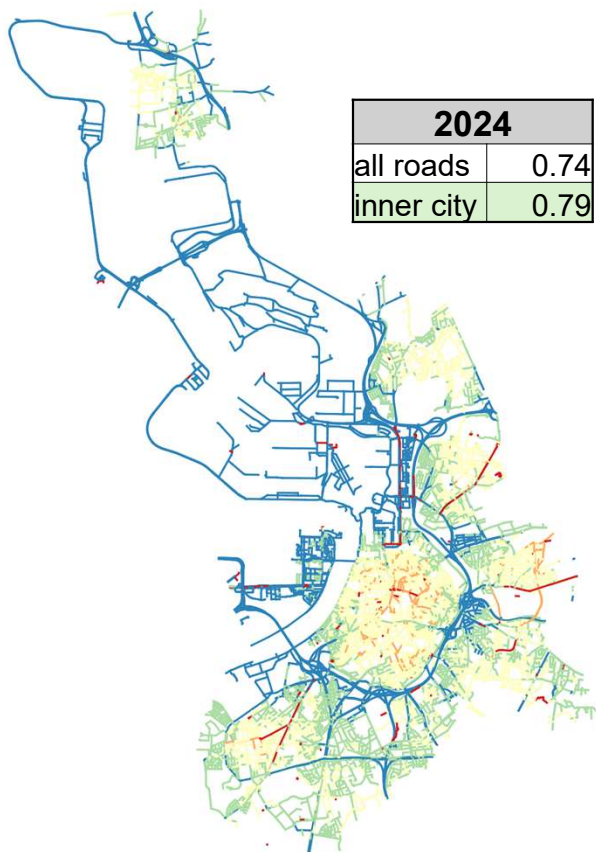
... and what was used in FLOMOVIA

	year	#road segments	mean F-score		mean traffic volume (M vehicles)	
			car	truck	car	truck
Telraam	2024	58	0.76	0.91	0.67	0.02
Telraam	2025	127	0.79	0.92	0.92	0.03
rural roads	2024	47	0.94	0.95	2.79	0.12
rural roads	2025	46	0.94	0.96	2.74	0.11
highway	2024	169	0.98	0.97	7.91	1.51
highway	2025	176	0.98	0.98	7.67	1.49
-	2024	16365	0.78	0.86	1.16	0.10
-	2025	16471	0.78	0.88	1.19	0.11

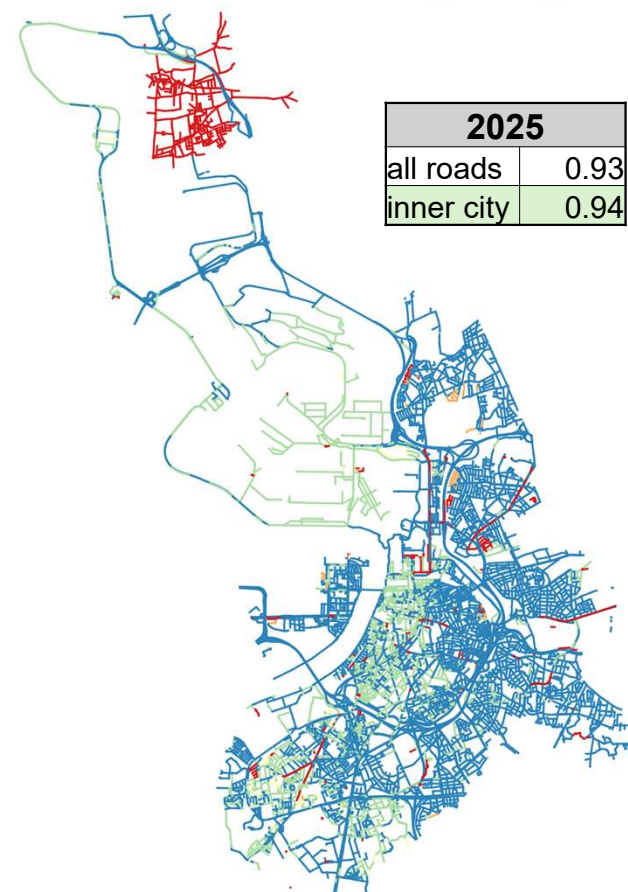
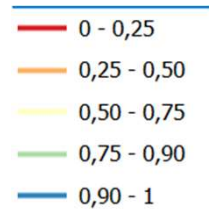
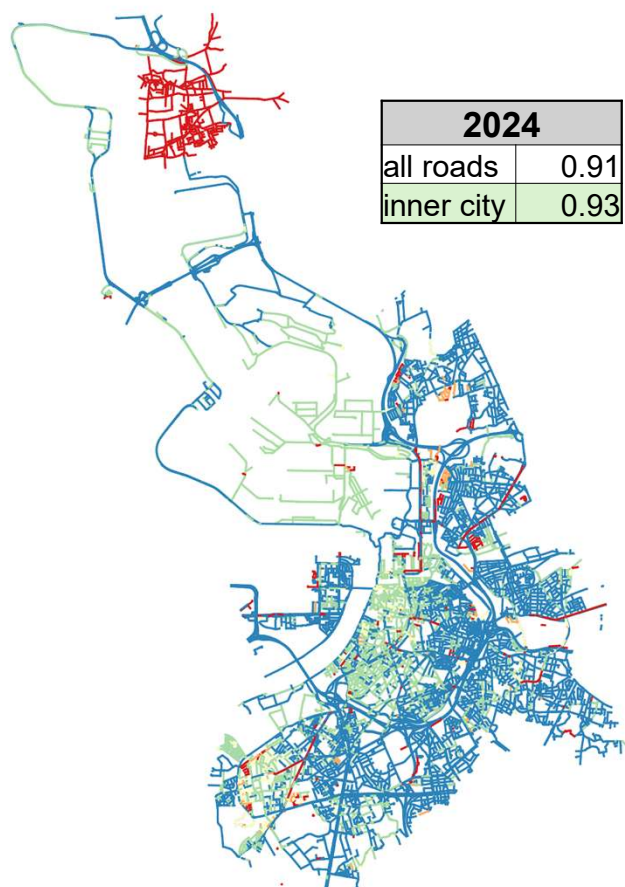


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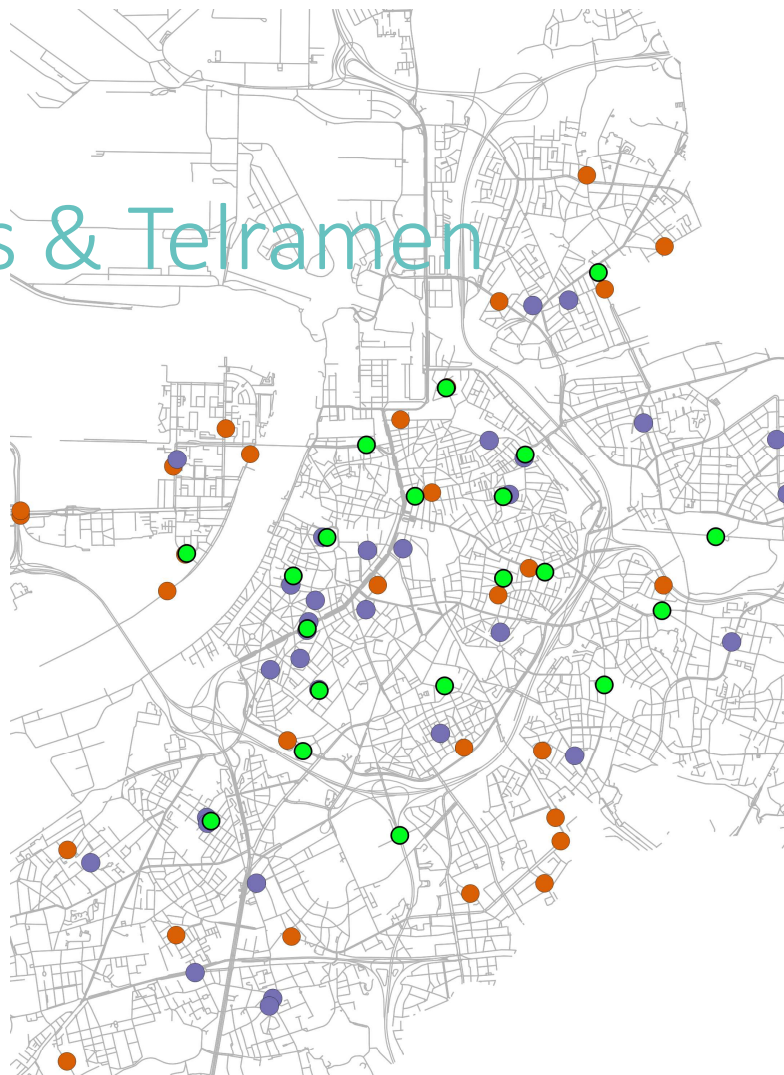
Fscores car 2024 -2025



Fscores truck 2024 -2025



NO₂ passive samplers & Telraam



Telraam

● indoor

● outdoor

● NO₂ passive sampler

— FLOMOVIA road network

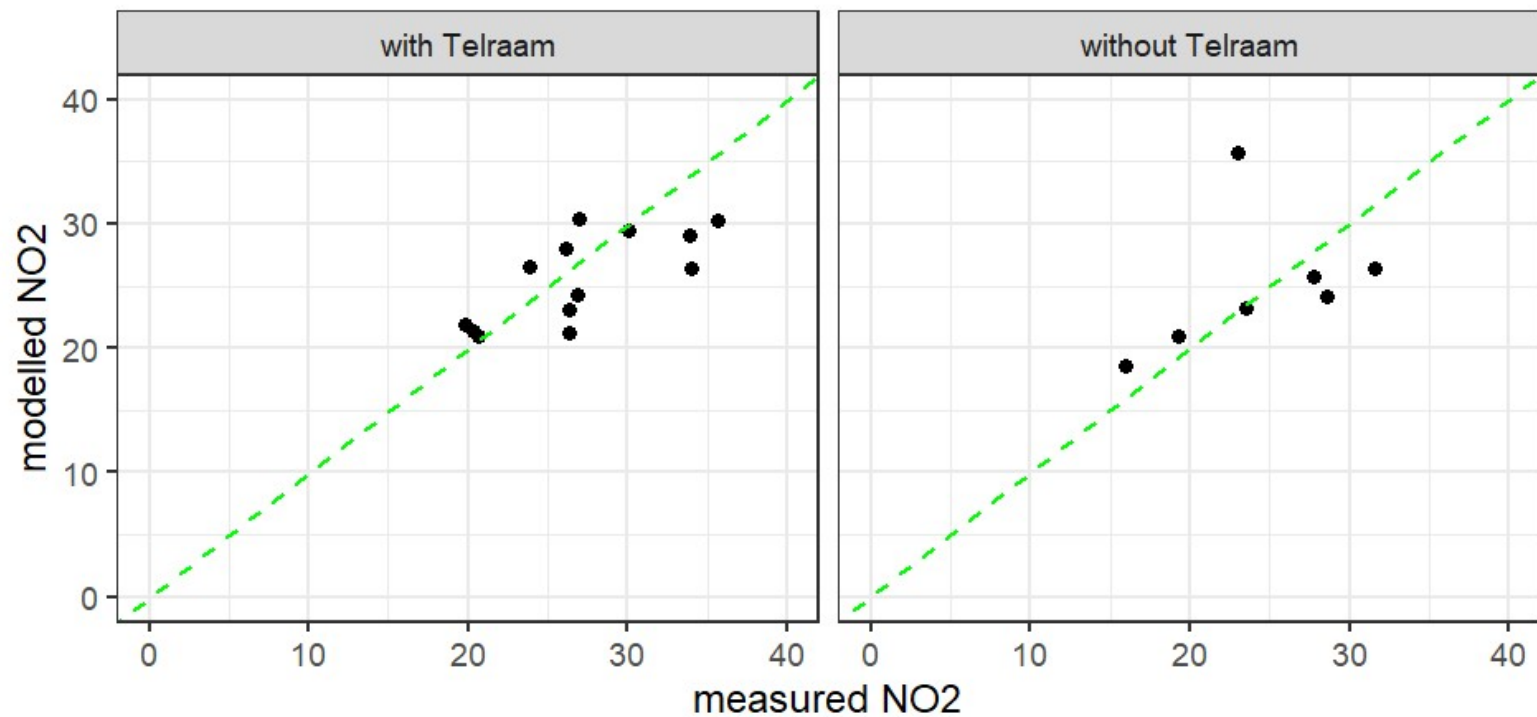
0 1 2 km



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Effect on ATMO-Street maps?

NO₂ ATMO-Street map voor 2025





Key take-aways & lessons learned

results are preliminary: further analysis is needed

improving Fscores using Telraam:

- trucks → modest network suffices (long avg. trip length)
- cars → dense & well-chosen locations are crucial (short avg. trip length)

our FLOMOVIA starting point for Antwerp before CityTRAQ was actually quite good already

- less low-hanging fruit
 - too high expectations of the outcome(s)
- certainly not the general case, i.e. other (EU) cities

during CityTRAQ we also improved FLOMOVIA ...

- models improve and evolve (luckily!)
- this overshadows some of the netto CityTRAQ outcomes of our case



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