



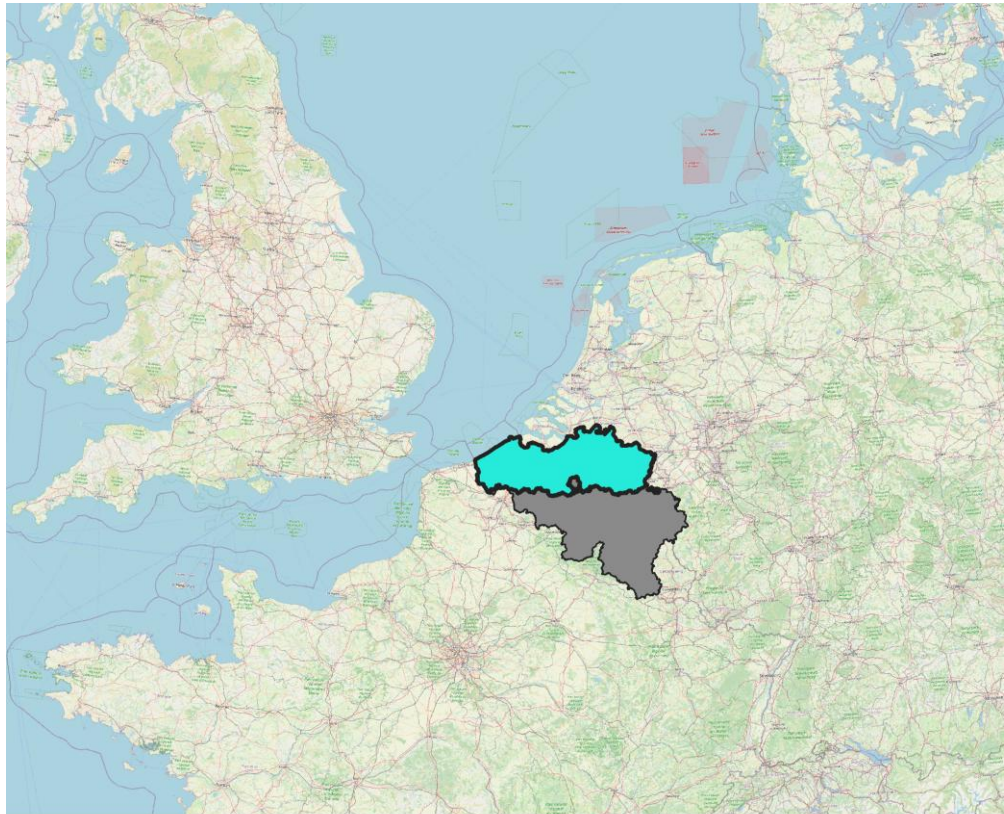
Vlaanderen
is milieu

AGATE workshop

I. Van Vynckt, D. Roet
13th of February 2025,

VLAAMSE
MILIEUMAATSCHAPPIJ

About VMM





 Flanders  Belgium


▶ Flemish Environment Agency

→ *Vlaamse Milieumaatschappij (VMM)*

→ Mission:

 Ensuring clean, attractive, and sufficient water

 Achieving healthy **air** quality

 Guiding climate adaptation

▶ Belgium, 3 regions:

→ **Flanders**

→ Brussels Region

→ Walloon Region

About us – Department Air



David Roet

→ Team Integrated Projects and Modeling

× Air quality modelling (deposition)

Inge Van Vynckt

→ Team Emission inventory Air

× Teamleader

Estimating NH_3 , NO_x and CH_4 emissions

- ▶ Model for NH_3 and NO_x “*Emission Model Agriculture Flanders*” (EMAV)
 - Region specific model
 - On the level of the farm
 - Taking into account the N-flow throughout the farm
- ▶ Different emission stages:
 - Stable
 - Grazing
 - Manure storage
 - Application on land – animal manure, compost and synthetic fertilizer
 - Manure processing
- Methodology description in Informative Inventory Report (IIR)
 - <https://www.irceline.be/nl/emissies/IIR2024.pdf>

Estimating NH₃, NO_x and CH₄ emissions

- ▶ 'Model' for CH₄-emissions
 - On the level of the region
 - Based on IPCC 2006 Guidelines
 - Different Tier levels ~ key-source
- ▶ Different emission stages:
 - Enteric fermentation
 - Manure management – storage and handling of manure
- Methodology description in National Inventory Report (NIR)
 - <https://klimaat.be/doc/nir-2024.pdf>

Estimating NH₃, NO_x and CH₄ emissions

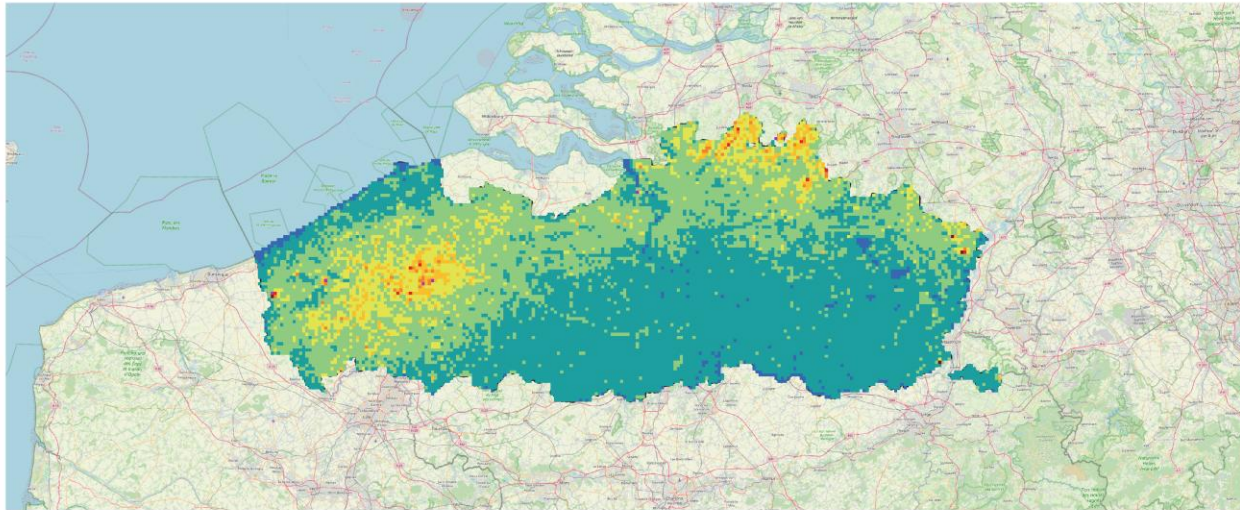
▶ Inputdata

- Flemish Land Agency (VLM) → Manure Bank
 - Animal number
 - N-production
 - Stable type (also NH₃-emission poor stables)
 - Manure transport
- Agency for Agriculture and Fisheries (ALZ)
 - Synthetic fertilizer
 - Geographical information e.g. coordinate stable, crops ~ linked to Manure Bank data

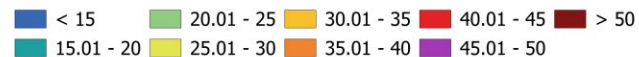
▶ Calculation factors = region specific or defaults from guidelines

- Scientific institutions
 - Institute for Agriculture, Fishery and Food
 - University Ghent
- Assumptions e.g.
 - Share of manure & fertilizer application technique

Modelling N-deposition



Modelled nitrogen deposition with VLOPS in kgN/ha.y for 2022



- ▶ using OPS-model adapted for Flanders (*VLOPS*)
- ▶ for whole of Flanders on 1x1 km²
- ▶ timeseries of **yearly averages** 2015-2022
- ▶ inputs used:
 - detailed spatial emissions (~W-Europe)
 - land use map (9 categories)
- ▶ calibration of model output with available measurements

Measuring nitrogen (deposition)



automated NOx-analyzer (T200 API)

mini-DOAS



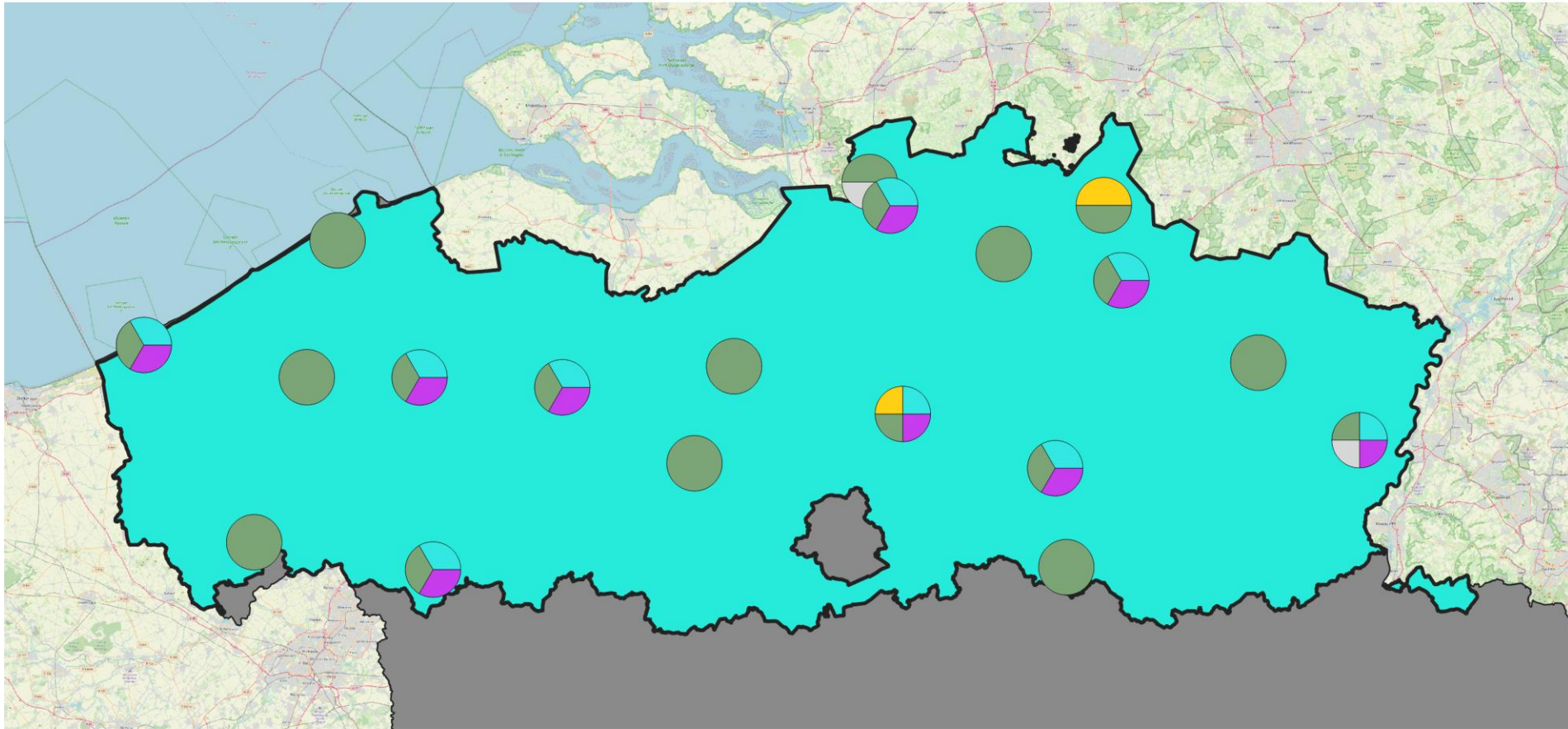
wet-only



passive samplers (4-weekly)

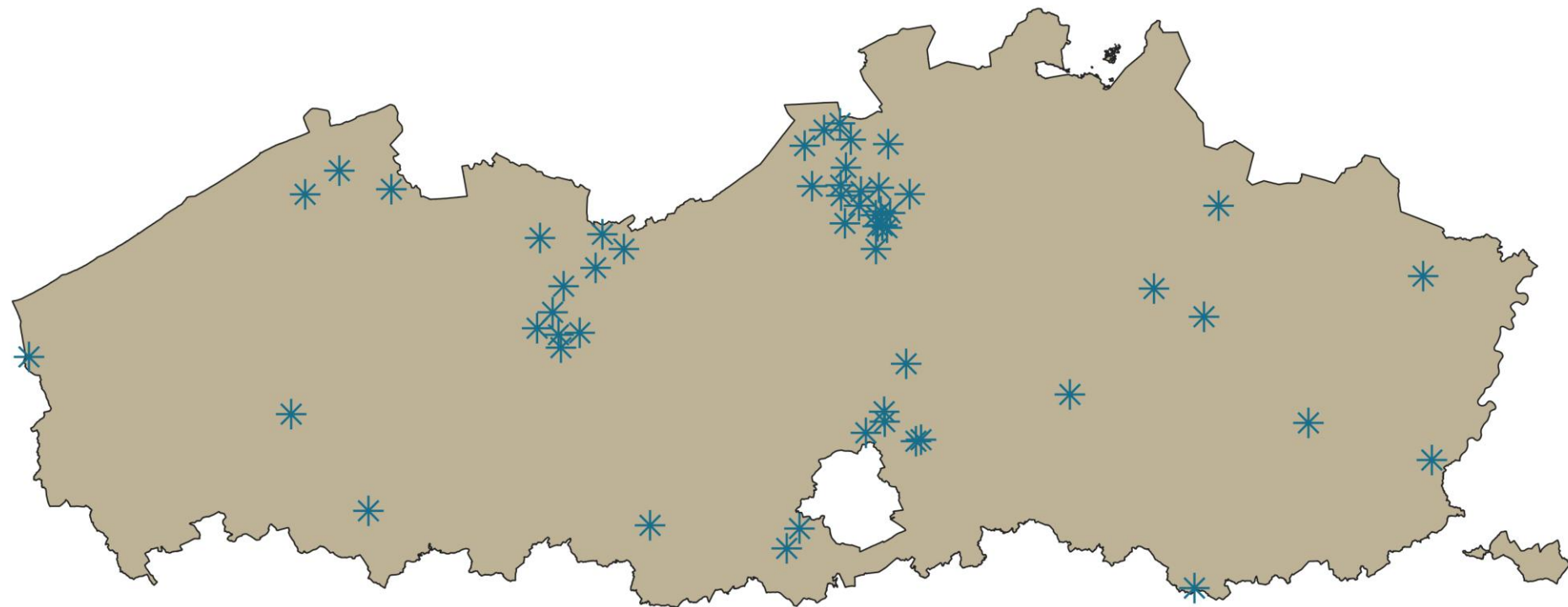


COTAG (experimental)



Overview semi-automated nitrogen network VMM (2024)

- Fill legend
- wet-only
- dry deposition NH3 (COTAG)
- NH3 passive sampler (4-weekly)
- NH3 hourly (DOAS)
- NO2 passive sampler (4-weekly)



Overview automated NO_x measurement stations VMM (2023)

Our requirements

- ▶ **AGATE → additional high-quality data to (further) benchmark and validate our results**
- ▶ Which AGATE products are you (most) interested in?
 - High resolution emission inventories → Hotspots? Spatial variability?
 - Modelled and derived nitrogen depositions (fluxes)
- ▶ VMM reports measurements and emissions to the EU/UN
 - Air pollutants & greenhouse gases
- ▶ Our data (emissions, model results) are used by national policy makers
 - Lots of attention for nitrogen on Natura-2000 protected habitats
 - × Programmatic Approach to Nitrogen = Nitrogen reduction plan
 - Covenant Enteric Emission Cattle (CEER)
 - × Reduce CH₄ emissions form enteric fermentation

Technical specifications

- ▶ **AGATE -> a dedicated webviewer with the possibility of WMS/WFS/API services**
- ▶ temporal components
 - NH₃-concentration variations in time
 - × i.e. manure application
 - Methane conversion factors for storage and handling of manure ~ temperature
- ▶ formation of secondary PM
 - (if in-scope) near-realtime maps of NH₄⁺ aerosols
 - would be interesting & helpful for interpreting PM episodes