RINGLAND ACADEMIE

CURIEUZE NEUZEN

NO_2

Citizen Science air quality project

VUB VRIJE UNIVERSITEIT BRUSSEL

Universiteit Antwerpen

KU LEUVEN HIVA RESEARCH INSTITUTE FOR WORK AND SOCIETY

wetenschapswinkel.be

STAD ANTWERPEN

Doelstellingen CurieuzeNeuzen

Wetenschappelijk

1. Kwantitatief in kaart brengen van **buurt-tot-buurt variatie in luchtkwaliteit** in grote stad.
2. Meten is weten. **Ground truthing van computer modellen** voor de verspreiding NO2 concentraties in de stad

Maatschappelijk

1. **Bewustmaking** rond belang van goede stedelijke luchtkwaliteit.
2. Aantonen dat via **citizen science werkt**: hoge kwaliteit data kan vergaard worden

Concreet doel: internationale wetenschappelijke publicatie

Initiating the project

- Group of expert volunteers gathered (vacancies festival)
- Several brainstorm meetings
- Talking with experts

- Literature study on sensors
- Design of sensor boxes
- Online data transfer
- Website design
- PR and communication

Measurement set CurieuzeNeuzen

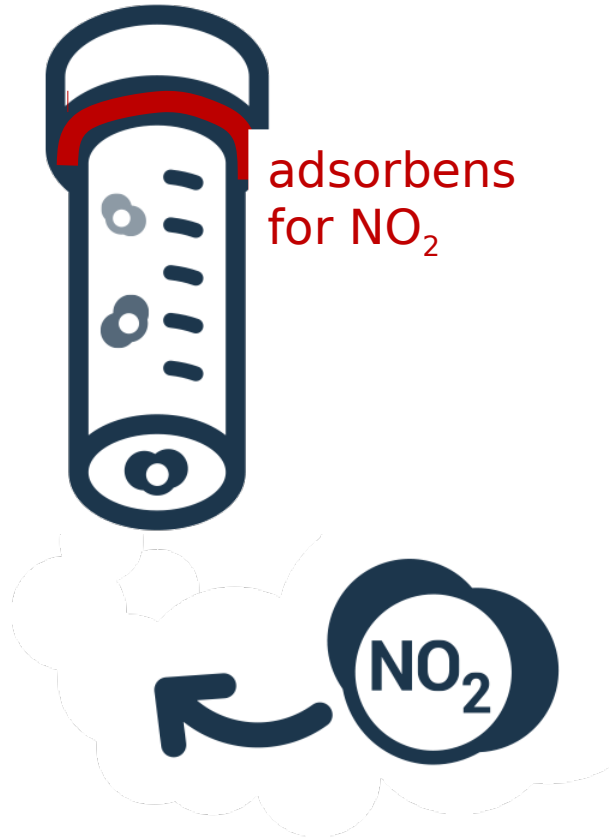
Measuring nitrogen dioxide concentrations (NO_2)

Determination of dust settling on the board

Measurements during 4 weeks in May 2016

Measurement method: passive samplers

Diffusion tube



- NO_2 can be **measured precisely** with Palmes diffusion tubes
- NO_2 is an important **indicator for air pollution** related to traffic (diesel-gate!)
- NO_2 has an impact on the **environment** (formation of smog and acid rain) and **health** (irritation of the respiratory system, asthma)

CurieuzeNeuzen: the project

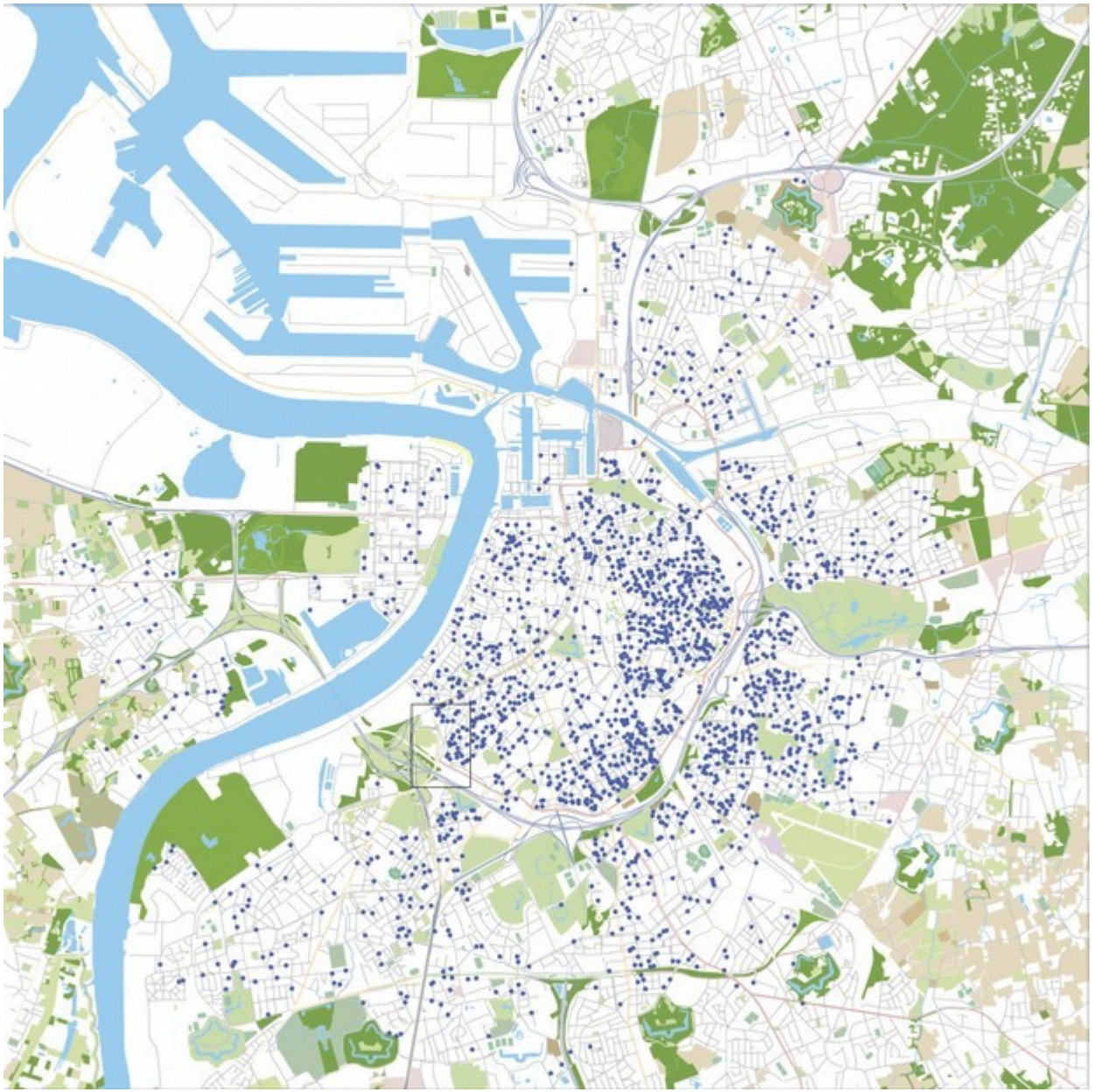
- Passive NO2 sampler: Palmes tube
- Principle:
  - Diffusion and absorption of NO2
  - TEA (triethanolamine) converts absorbed NO2 to nitrite
  - Afterwards, measurement of nitrite in labo

Quality control

- **Quality control**: comparison with VMM stations
  - Measurement set placed at 8 VMM stations in the study area

- Data processing: duplicate measurements, rescaling based on comparison with VMM

Air quality measurements at 2000 locations



CurieuzeNeuzen: the project

- Citizen Science project to map the air quality in Antwerp
- Project by volunteers, initiative of Ringland Academie, in collaboration with VUB, UA, KUL and city of Antwerp
- Participation of almost 2000 citizens/households
- Using passive NO2 samplers (Palmes tubes) mounted on bords

CurieuzeNeuzen – first results

CurieuzeNeuzen – course of the project

- Large response: > 2800 people volunteered
- Selected locaties: 1840 households, 51 schools, 70 enterprises, 35 locations in urban greens and close to ringroad
- Measurement period: 4 weeks (April 30 – May 28)
- Active participation: 1955 out of 1996 measurement sets brought back
- Limited problems: fallen bords, broken tubes, spiders in tubes, …
- First results

CurieuzeN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Linkeroever
Antwerpen
Borgerhout
Deurne
Berchem
Ringlandfestival
oboken
Mortsel

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CURIEUZE NEUZEN

Citizen Science air quality project

Thanks!

VRIJE UNIVERSITEIT BRUSSEL

Joris Van den Bossche
Prof. Dr. ir. Filip Meysman
+ many volunteers!

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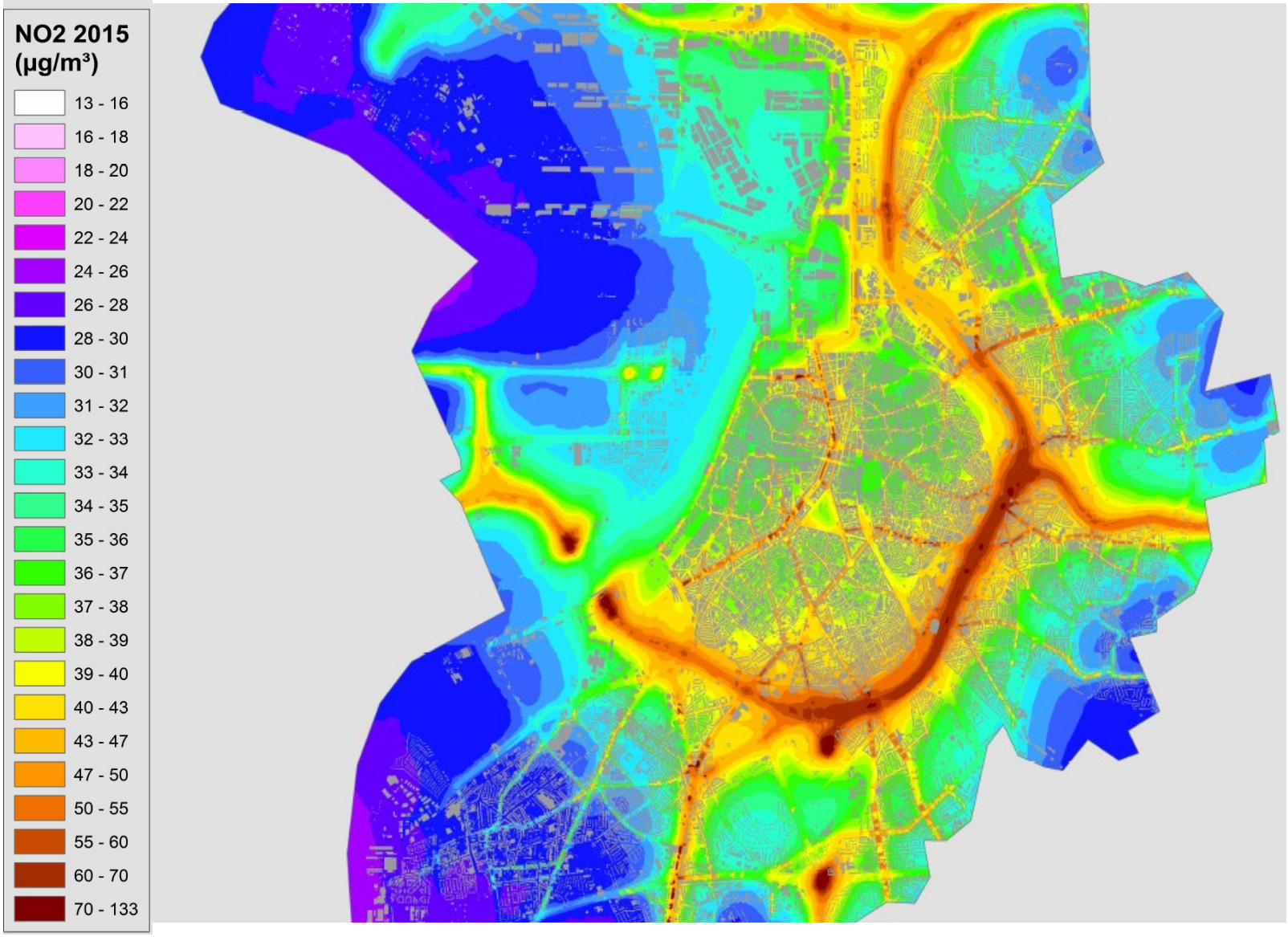
STAD ANTWERPEN

Air quality: large spatial variability



RIO-IFDM air quality model for NO2 (VITO, http://opendata.antwerpen.be/datasets/luchtkwaliteits n-no2)

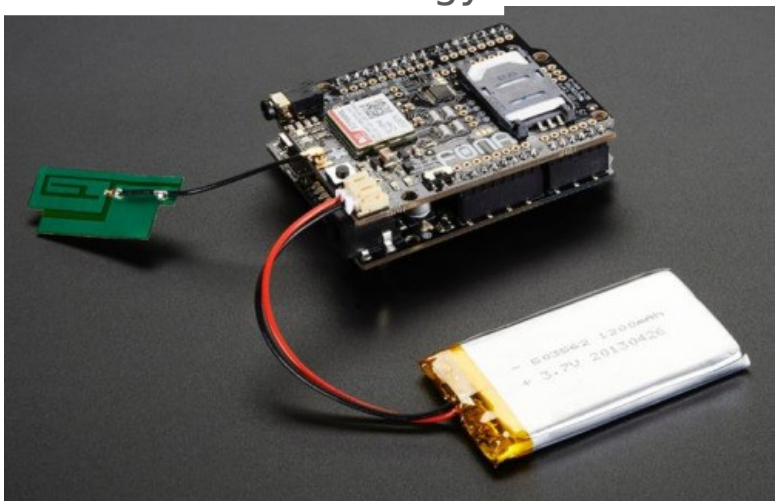
Conditions Citizen Science project

1. Good science: high quality, meaningful data
2. Relevant for Ringland
3. Sensitizing, educational

Citizen science: De Ringland Snuffel

+

Off the shelf technology



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Internet of things

Some first ideas ...

Problem: data quality NO2 sensors

Passive samplers!

CurieuzeNeuzen: call for participants

CurieuzeNeuzen – course of the project

- Large response: > 2800 people volunteered
- Selected locations: 1840 households, 51 schools, 70 enterprises, 35 locations in urban greens and close to ringroad

Effectieve meetlocaties

- Locaties: 1840 huizen, 51 scholen, 70 bedrijven, 35 parken en bruggen

Quality control

- **Quality control**: comparison with VMM stations
  - Measurement set placed at 8 VMM stations in the study area

- Data processing: duplicate measurements, rescaling based on comparison with VMM

Organisation and logistics: huge volunteer effort

- Preparation
- Communication
- Database of participants
- Questionnaires
- Distribution and bring back of measurement sets
- …


EXIT

Organisation and logistics: huge volunteer effort

- Preparation
- Communication
- Database of participants
- Questionnaires
- Distribution and bring back of measurement sets
- …

CurieuzeNeuzen – first results

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Further steps

- Further analysis
  - Comparison with dispersion model VITO
  - Scientific publication

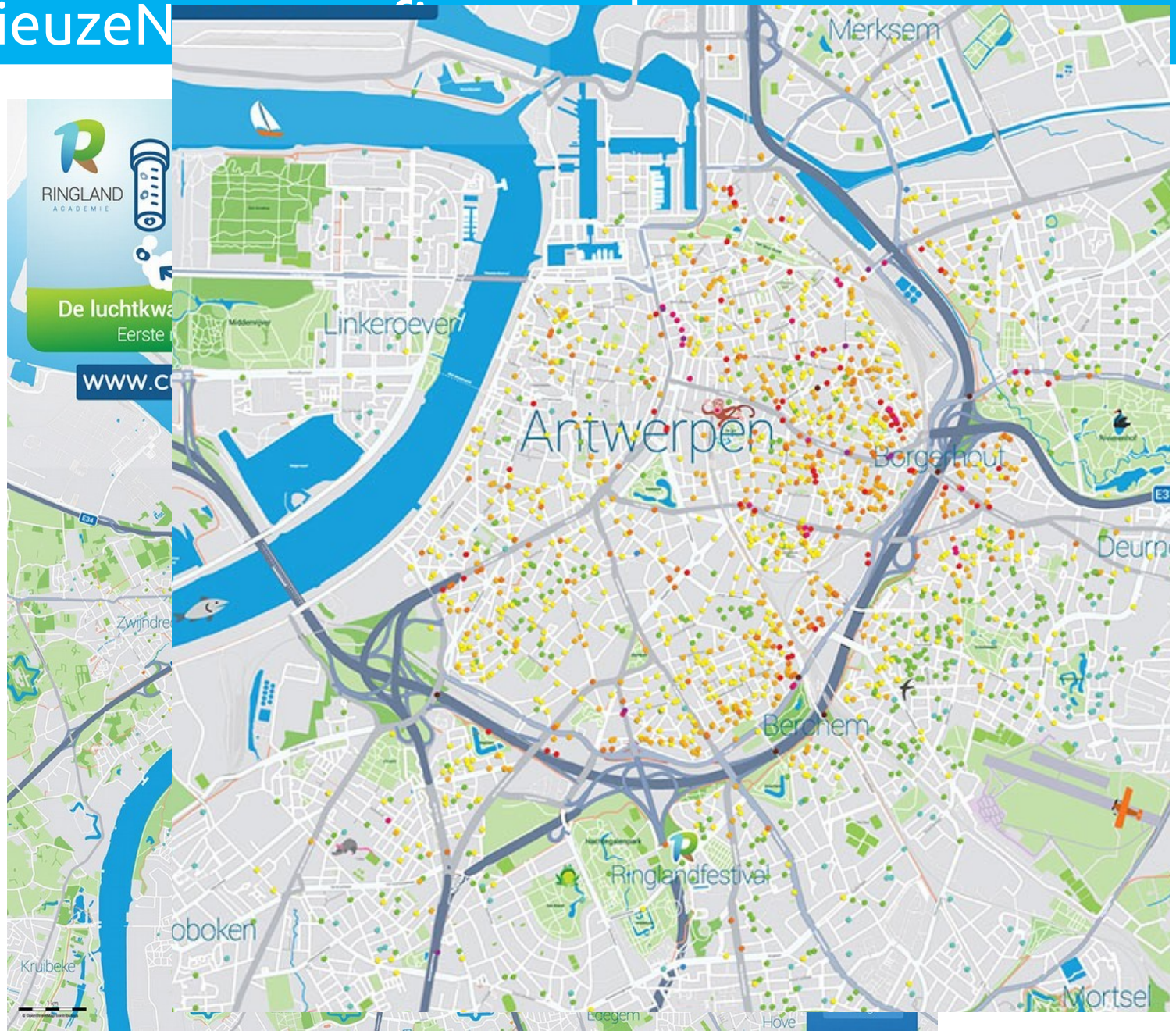
- October 23: “Roma-dag”: presentation of the results

- After that?

Conclusion

- What is data quality?
- What is an acceptable uncertainty?
- Trade-off between higher accuracy and higher spatial coverage
    - Both give important information
    - Indicative measurements can be used supplementary to fixed measurements

CurieuzeN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