National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

Urban Air Quality Maps & Apps

Development and challenges

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Content

Urban Air Quality Maps & Apps

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  - New data
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- Discussion
- Questions

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Maps: EU/NL → Street corner

Large scale

LML → RIO → 4x4 km²
Lotos-Euros → 7x7 km²

Background 1x1 km²
PM10/NO2/O3

Calibration (LML)

Contributions roads

Emissions (est.)

Actual meteo

HIRLAM meteo

Detailed AQ maps
PM10/NO2/O3
at 125x125 m²
and 40x40 m²

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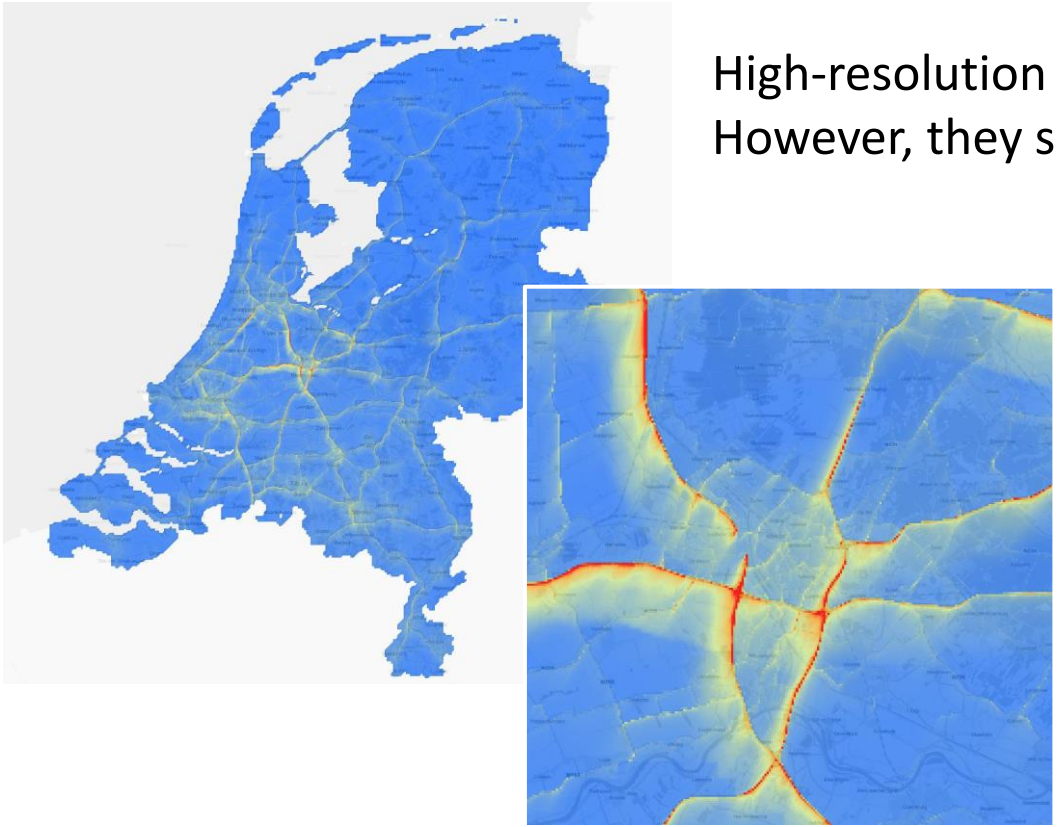
New challenge: Resolution



High-resolution figures are impressive and sexy.
However, they suggest an accuracy that is not there.

The input for hourly calculation of concentrations is never complete or accurate.

The exact hourly emissions/locations of cars, factories, offices, houses, livestock farms, etc. etc. are **never** exactly known.

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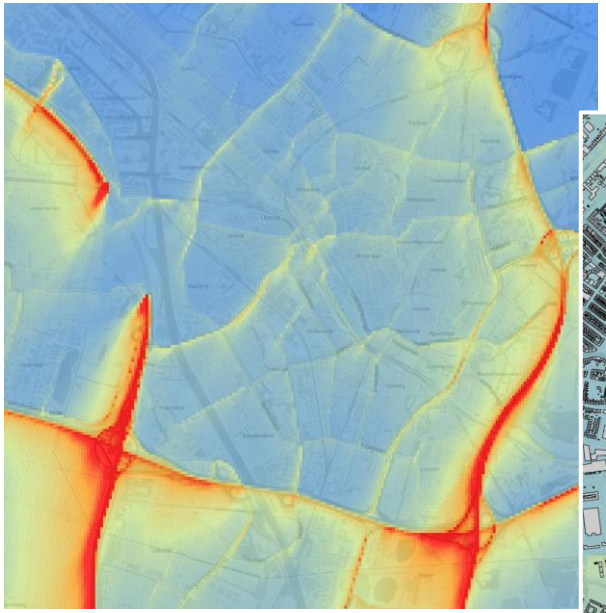
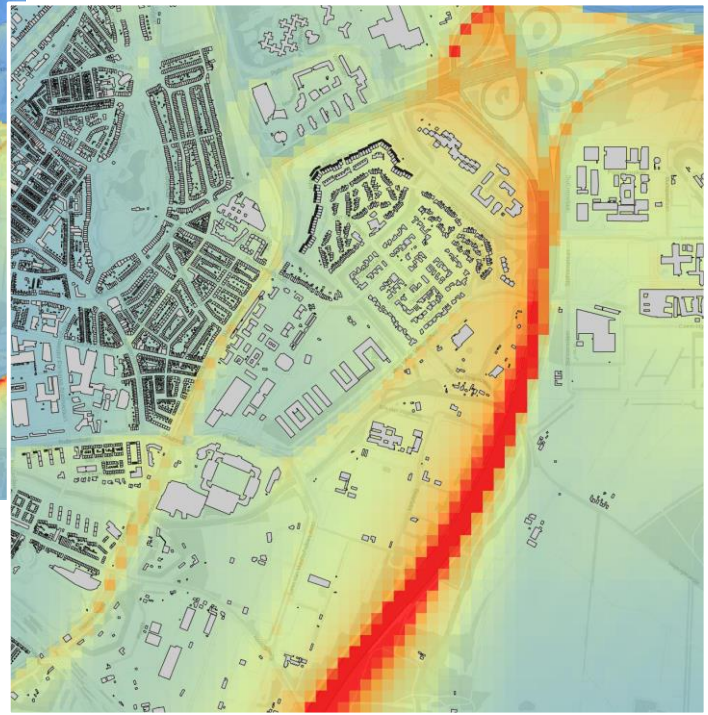
New challenge: Resolution

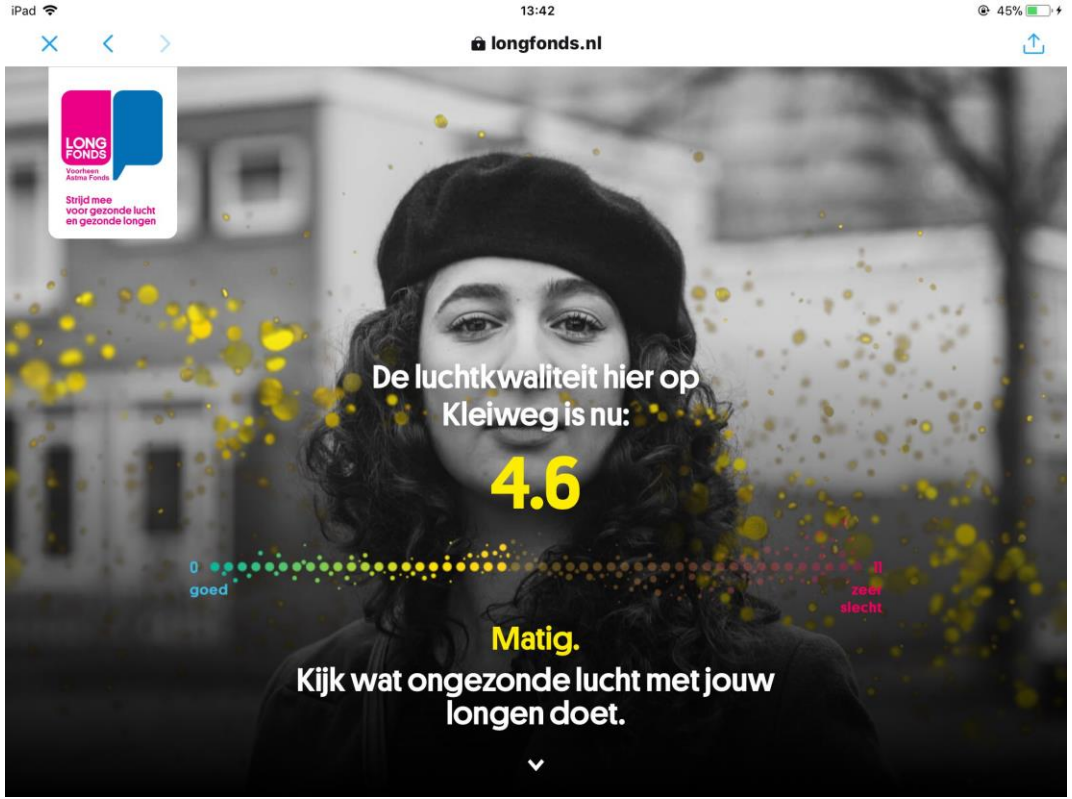




How to communicate the relative uncertainty of figures we want to look as nice as possible?

How to deal with unrealistic statements, claims and/or figures → warn the public?

New applications: Long fund



The data from AQ maps can be used to feed campaigns from others.

Many more people than usual profit from the information → more than 1.000.000 requests.

The data and reactions from the public are used to confront local authorities.

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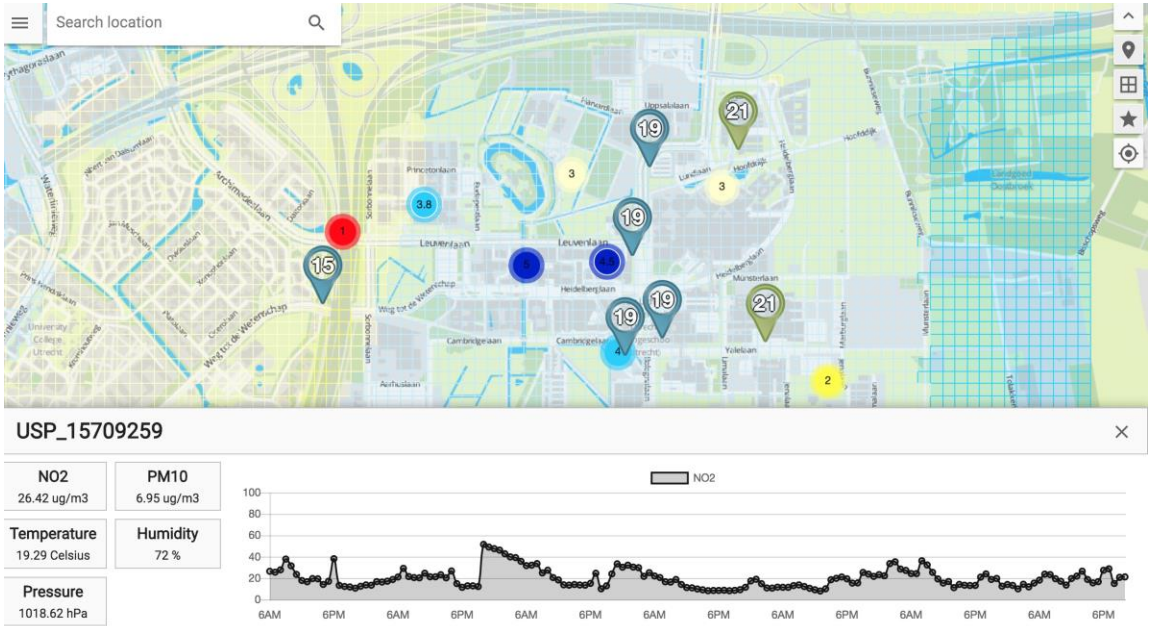
New applications: App UU



The data from AQ maps can be disseminated using the tools (sites/apps) from others.

Efficient mapping of the maps into other formats is required.

Open data is important for efficient dissemination of AQ information.

New applications: Stookwijzer

The data from AQ maps can be disseminated using the tools (sites/apps) from others.

Efficient mapping of the maps into other formats is required.

New tools will require more detailed AQ information.

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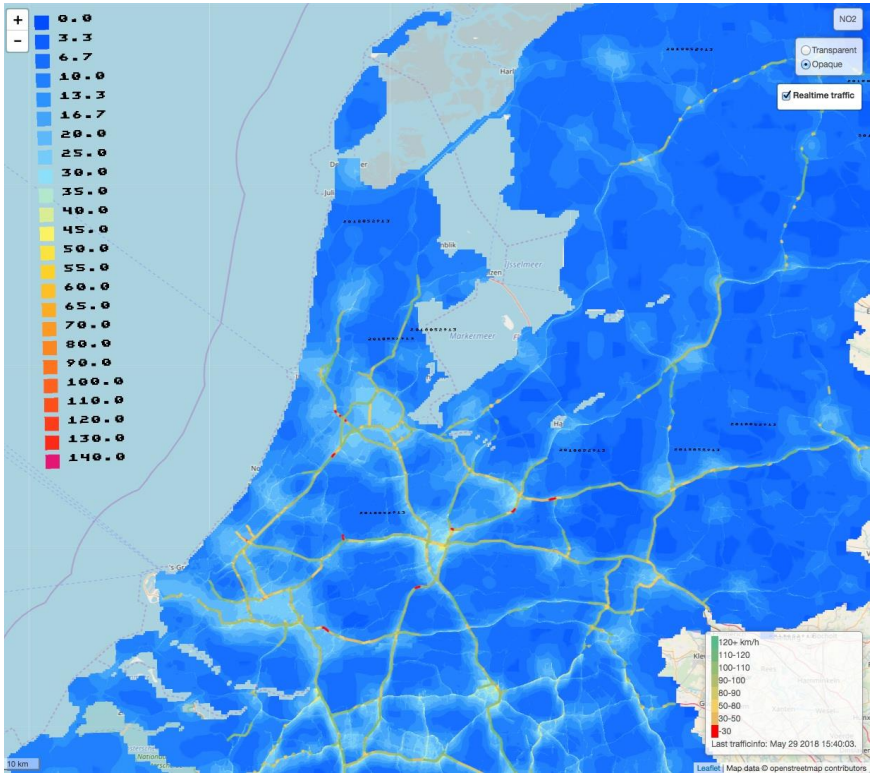
New data: real-time traffic



The Dutch NDW (National Data Warehouse for Traffic Information) provides traffic data at roughly 24.000 locations. Real time (~minutes) and also historic data.

These data enable generic modelling of air quality: NDW traffic data, AQ details from surrounding areas, national data for surroundings, houses, …

Interesting opportunity for machine learning to generate in-/out-put.

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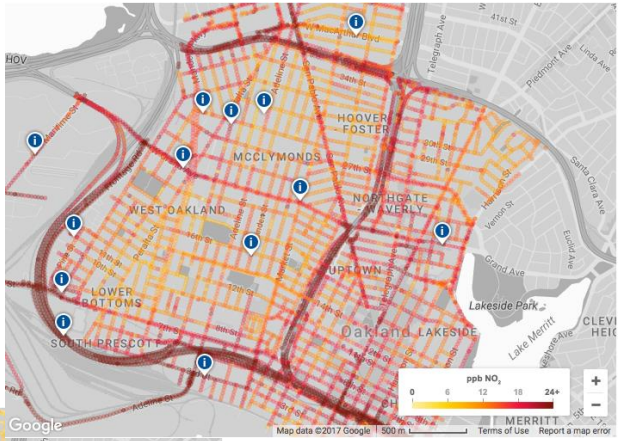
New data: Mobile measurements



In several cities Google has mounted air quality sensors on the camera cars. Collaboration with EDF and Aclima.

Translate concentrations on the roads to the surroundings.

Later also methane mapping.

New projects in Europe.

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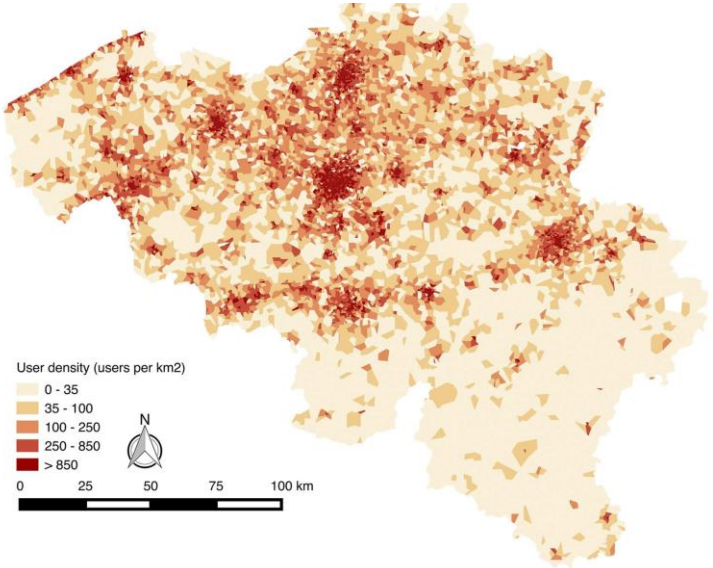
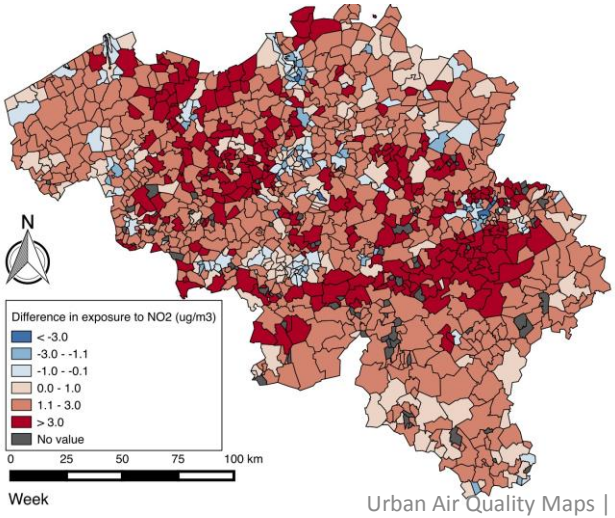
New data: Cellular/Network





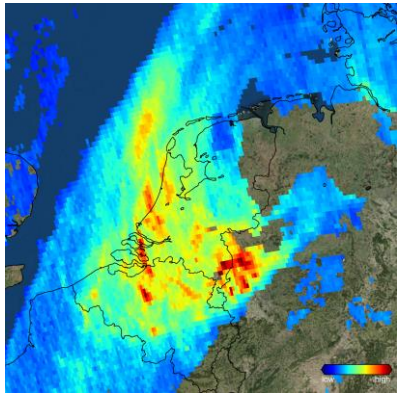
Cellular data in Belgium.

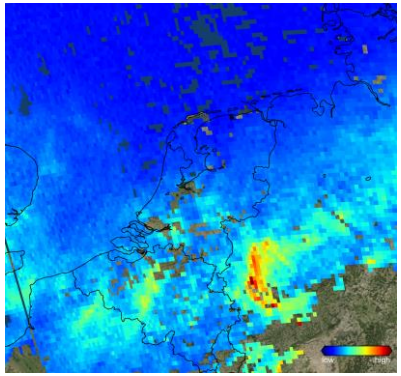
Static versus dynamic exposure models → differences?

WiFi-traffic, Bluetooth-traffic, …

Dewulf et al. Int J Health Geogr (2016) 15:14
DOI 10.1186/s12942-016-0042-z

New data: Tropomi





New data: Sensors

The number of parties using air quality sensors is still increasing: provinces, cities and (groups of) citizens.

In order for the sensors to have an impact on the local or national monitoring (i.e. maps) the numbers and quality are important.

Detailed calculations should be calibrated using measurements.

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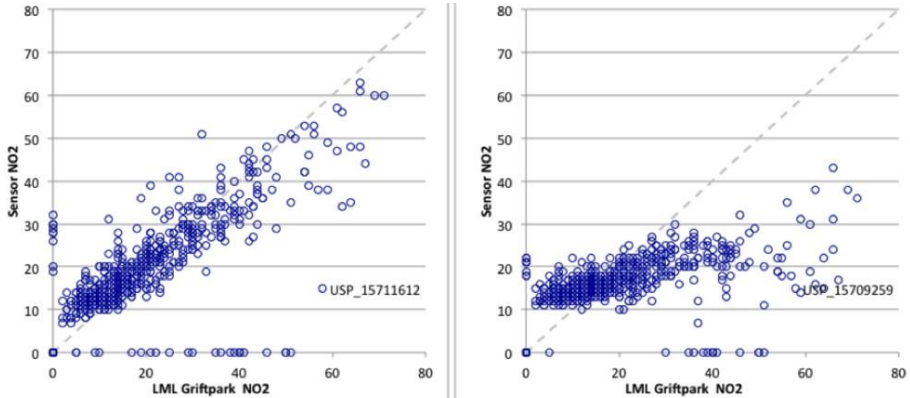
New data: Sensors

The data-quality provided by sensors varies significantly.
Calibrations are only valid for several weeks/months.



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New challenge: *Different* data

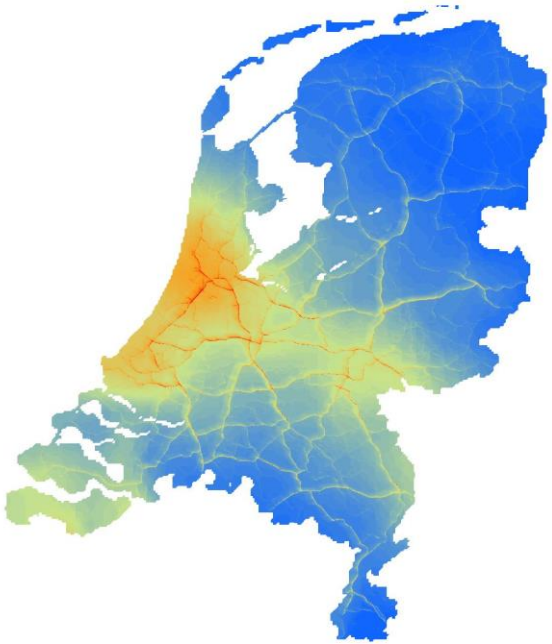
How to deal with the different sets of data, i.e. perceived realities?

How realistic are claims regarding detailed knowledge of real-time emissions?

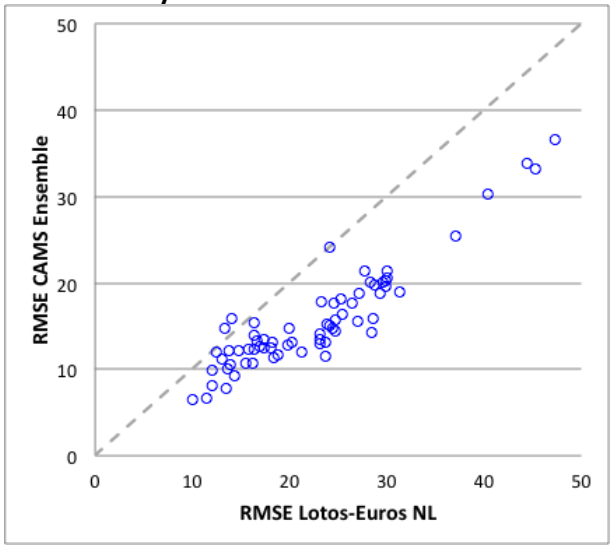
Can policy makers shop in politically convenient “solutions”?

Challenges!

New challenge: more of CAMS



Results of CAMS have been compared to those of the presently used version of Lotos-Euros. I.e. CAMS ensemble/measurements versus Lotos-Euros/measurements.



The results of the CAMS ensemble differ substantially less from measurements than the results of Lotos-Euros.

A new version of Lotos-Euros is expected to become operational soon.

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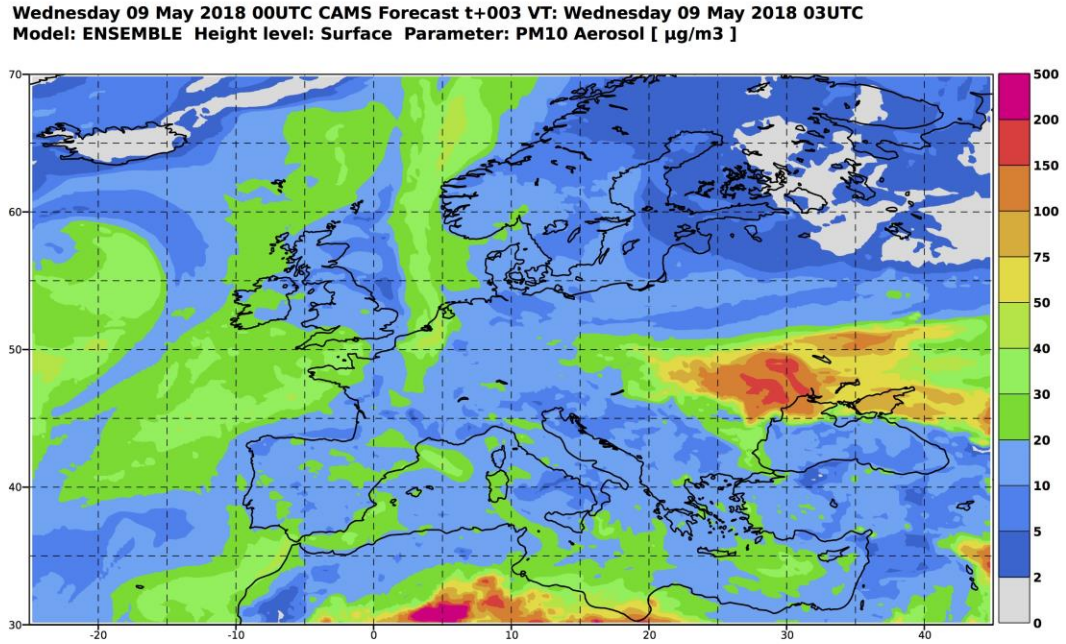
New challenge: more of CAMS



Can the results of CAMS forecasts be used on a more local scale?

I.e. real-time communications for specific regions of the Netherlands.

How to organize this in The Netherlands?

Discussion

- Results of detailed air quality maps are increasingly being used by other applications.
- Many potentially interesting data streams / proxy data are becoming available → Best use?
- How can we incorporate more of CAMS in practical communications about air quality?
- There is a mismatch between the perceived and actual accuracy of air quality maps → Actions?
- How to deal with the different sets of data, i.e. perceived realities, that are becoming available?

Questions?