AIRQMAP:
MAPPING THE EXPOSURE TO AIR POLLUTION

SENSORTESTEN

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Collect AQ measurements
by bike or on foot.
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do-it-yourself airQualitymapping
a powerful platform
for people without air quality expertise
to produce airQualitymaps.

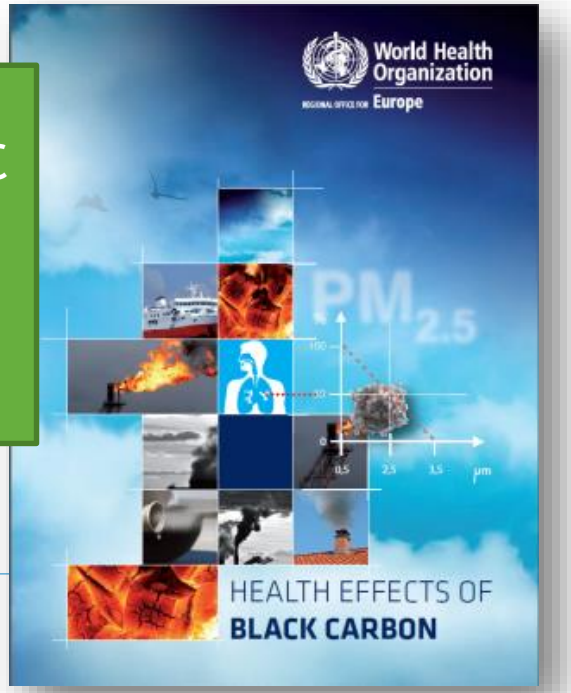
WHY MONITORING AIR QUALITY, BC?

Citizens are increasingly concerned about air pollution and its influence on their health.

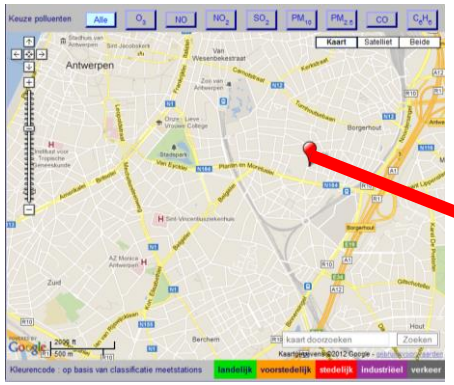
Black Carbon (BC):

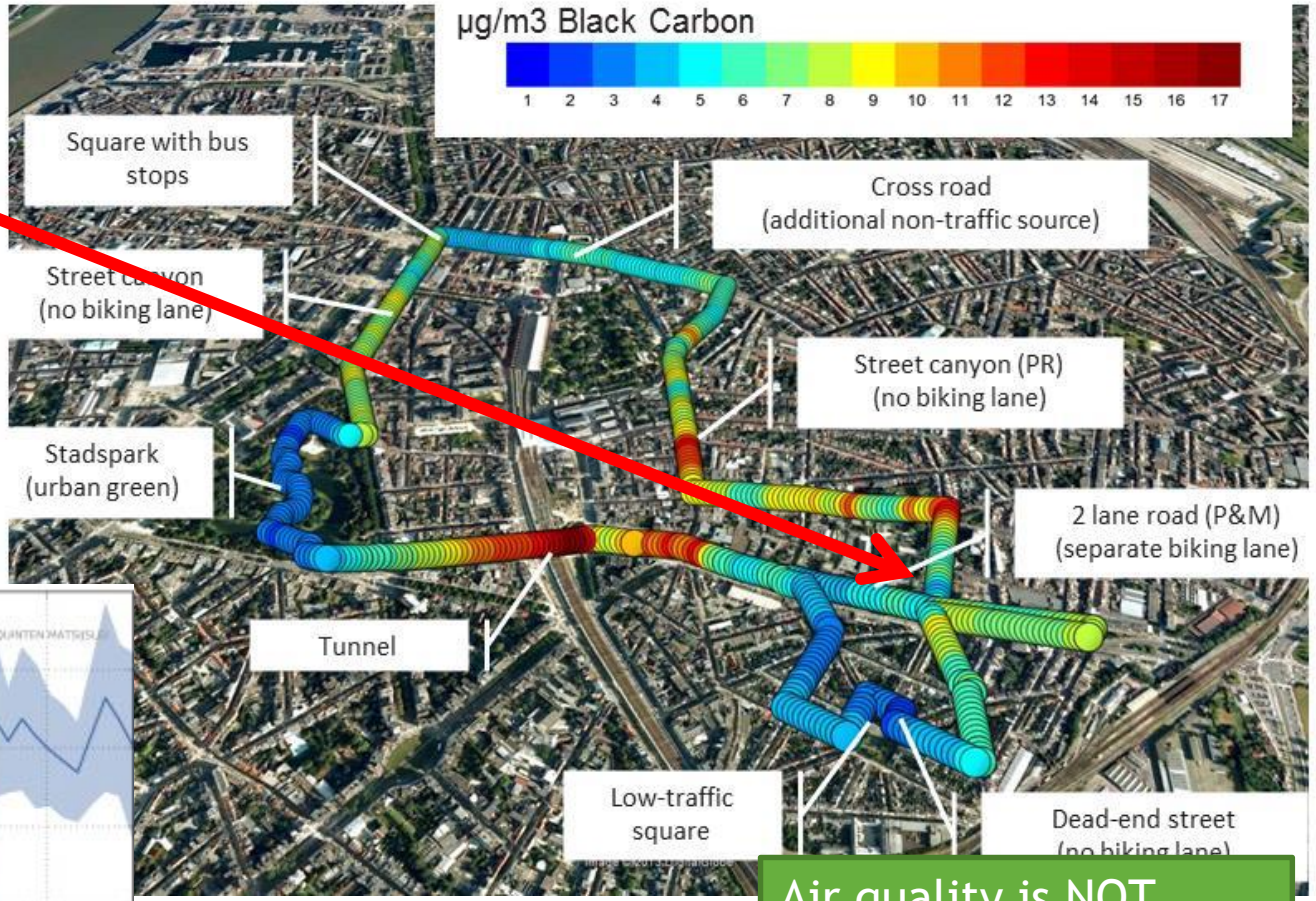
- Indicator of combustion-related air pollution
- Association with cardiovascular and cardiopulmonary health effects

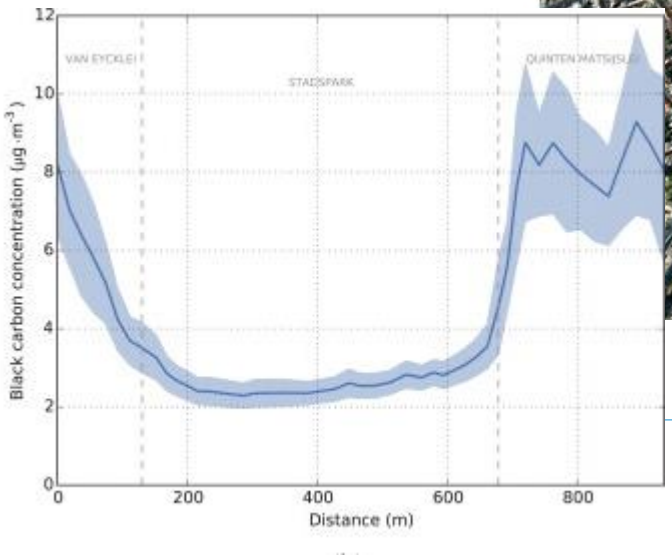
World Health Organization claims: "Studies of short-term health effects suggest that BC is a **better indicator** of harmful particulate substances from combustion sources (especially traffic) than undifferentiated particulate matter (PM) mass."



WHY MOBILE AIR QUALITY MONITORING?







Air quality is NOT homogeneous in urban environments!

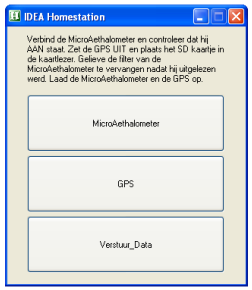
AIRQMAP

» airqmap (www.airqmap.com) is a tool to collect large amounts of mobile BC measurements and process them into street-level BC exposure maps. It contains two parts:

- Easy to use measurement devices to allow city personnel and volunteers to collect mobile BC measurements in a 'cost-effective' way

The measurement devices: GPS and microAeth

volunteers



The Home station (left) and its easy-to-use software (right) to read out the measurement devices, transmit the data and to synchronize clocks

- An automated data processing infrastructure to construct and update the BC map

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AIRQMAP DATA PROCESSING

1. Data transmission and storage

Data transmission

BC

GPS

Raw data in SensorView DB

PostGIS

Data is transmitted over the Internet and stored in the DB

Data queries

2. Quick data visualization

The progress of the measurement campaign is monitored at VITO

The data is pre-processed

Step 1: Measurement enhancement

Step 2: Data validation

Step 3: Background correction

Step 4: Data aggregation

Data pre-processing

Pre-processed data in GDI DB

PostGIS

3. Automated data pre-processing chain

Data queries

4. Data visualization and analysis

Interactive air quality map as web applications and as WMS service

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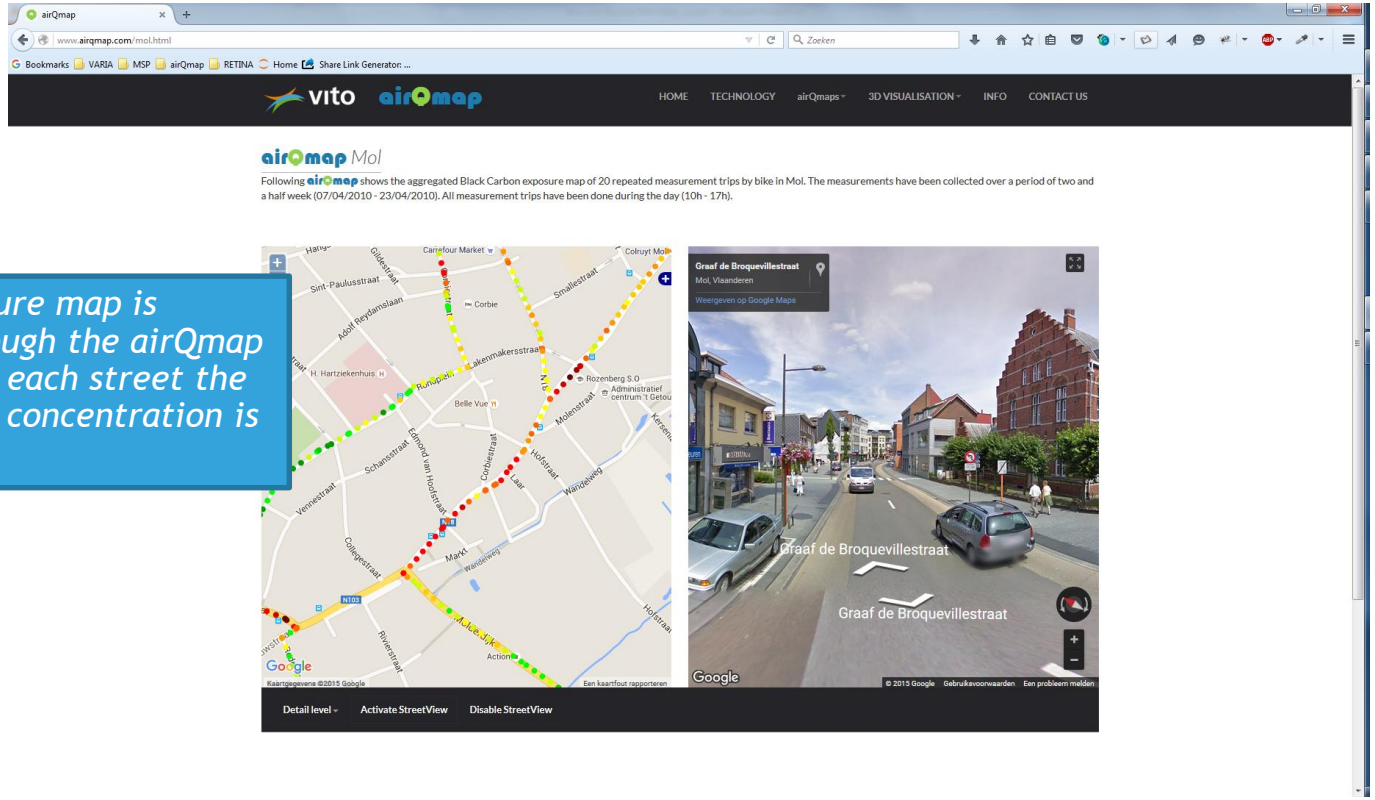
AIRQMAP WEB APPLICATION

An interactive exposure map is constructed and through the airQmap web application. For each street the average BC exposure concentration is determined.



The integration of Google street view makes it possible to bring a "virtual visit" to the different measurement locations.

http://www.airqmap.com/

AIRQMAP BASED ON A SOUND SCIENTIFIC METHOD

Atmospheric Environment 105 (2015) 148–161

Contents lists available at ScienceDirect

Atmospheric Environment

journal homepage: www.elsevier.com/locate/atmosenv

Mobile monitoring for mapping spatial variation in urban air quality: Development and validation of a methodology based on an extensive dataset

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[c] Faculty of Engineering and Architecture, Ghent University, 9000 Ghent, Belgium

HIGHLIGHTS

- Mobile monitoring of BC is performed in an urban environment using a bicycle.
- Mapping the local BC concentration at a high resolution of up to 20 m is possible.
- A large number of repeated measurements are required to obtain representative results.
- The number of runs could be reduced by background normalisation and trimmed mean.
- Guidelines for mobile monitoring campaigns are proposed.

Atmospheric Environment 92 (2014) 31–43

Contents lists available at ScienceDirect

Atmospheric Environment

journal homepage: www.elsevier.com/locate/atmosenv

Cyclist exposure to UFP and BC on urban routes in Antwerp, Belgium

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HIGHLIGHTS

- Mobile monitoring with a bicycle is performed in an urban environment.
- Large spatial and temporal variations in UFP and BC concentrations are observed.
- Traffic and street topology are determinant for cyclist exposure to air pollution.
- Localized peak events have significant impact on the integral cyclist exposure.

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AIRQMAP USAGE

airQmap can be used to:

- Get an overview of the air quality (BC) at street level
- Get better insights in differences at street level
- Sensitise the local population and create support for necessary adaptations to the traffic plan to reduce polluting traffic
- Inform people about the air quality in their street
- Check if the local air quality is enhanced after the introduction of a new traffic measure (new traffic light, new one direction street, …)
- Prove a certain bike or walking route is a healthy route

airQmap can be used :

- by e.g. volunteers, city personnel without scientific or technical background
- after a short training and with support of VITO staff

airQmap has already been used in:

- Large cities such as Antwerp, Ghent, Brussel, Liège, Amsterdam and Oslo
- Smaller cities and municipalities such as Mol, Beringen, Kortrijk, Leuven and Zutendaal

http://ringtv.be/nieuws/fietsvrijwilligers-meten-luchtkwaliteit-kampenhout

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