A wide-angle photograph of a modern cityscape at sunrise or sunset. The sun is low on the horizon, creating a bright lens flare and casting a golden glow over the scene. In the foreground, there is a lush green lawn and a small, winding stream or canal. In the background, several high-rise apartment buildings are visible, including a prominent curved tower on the left and several rectangular blocks to the right. The sky is a clear, vibrant blue with some light clouds.

**IFDM-TRAFFIC, AN OPERATIONAL MODELLING SYSTEM FOR
HARMONIZED LOCAL AIR QUALITY PLANS:
LOOKING BACK AT 5 YEAR OPERATIONAL SERVICE AND
OUTLOOK TO THE FUTURE**

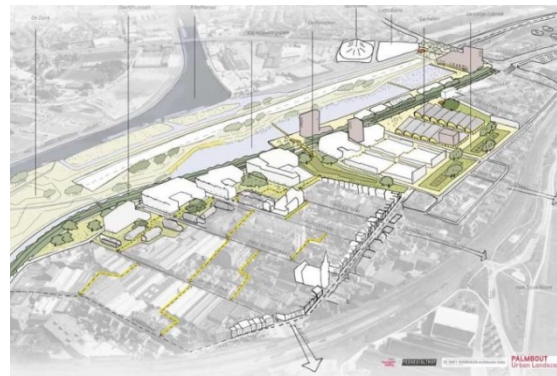
Stijn Janssen, Wouter Lefebvre, Bino Maiheu, Stijn Vranckx,
Filip Lefebvre and Lisa Blyth

CONTENT

- IFDM-Traffic
 - Motivation
 - Concept
 - Lessons learnt
- ATMOSYS-Planning
 - Motivation
 - Concept
- Conclusions & outlook

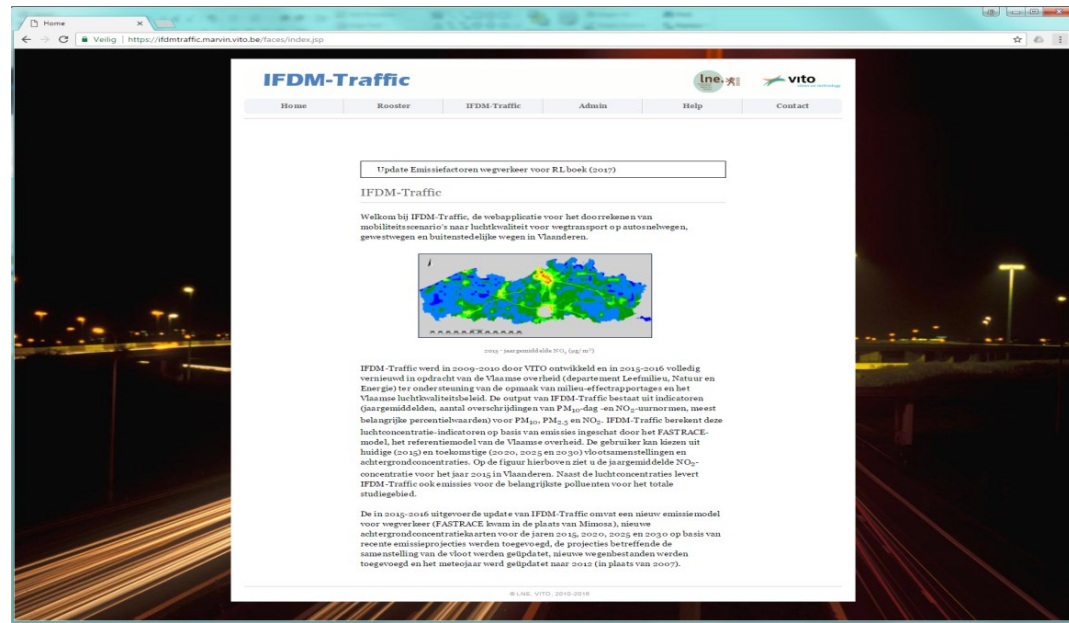
MOTIVATION

- Air quality is a theme in many Environmental Impact Assessments (EIA)
- In many cases large financial, legal and even political consequences are involved
- **Transparency** and **objectivity** are essential
- Government sets out the receipt for “proper” assessment → **IFDM-Traffic** in Flanders, Belgium

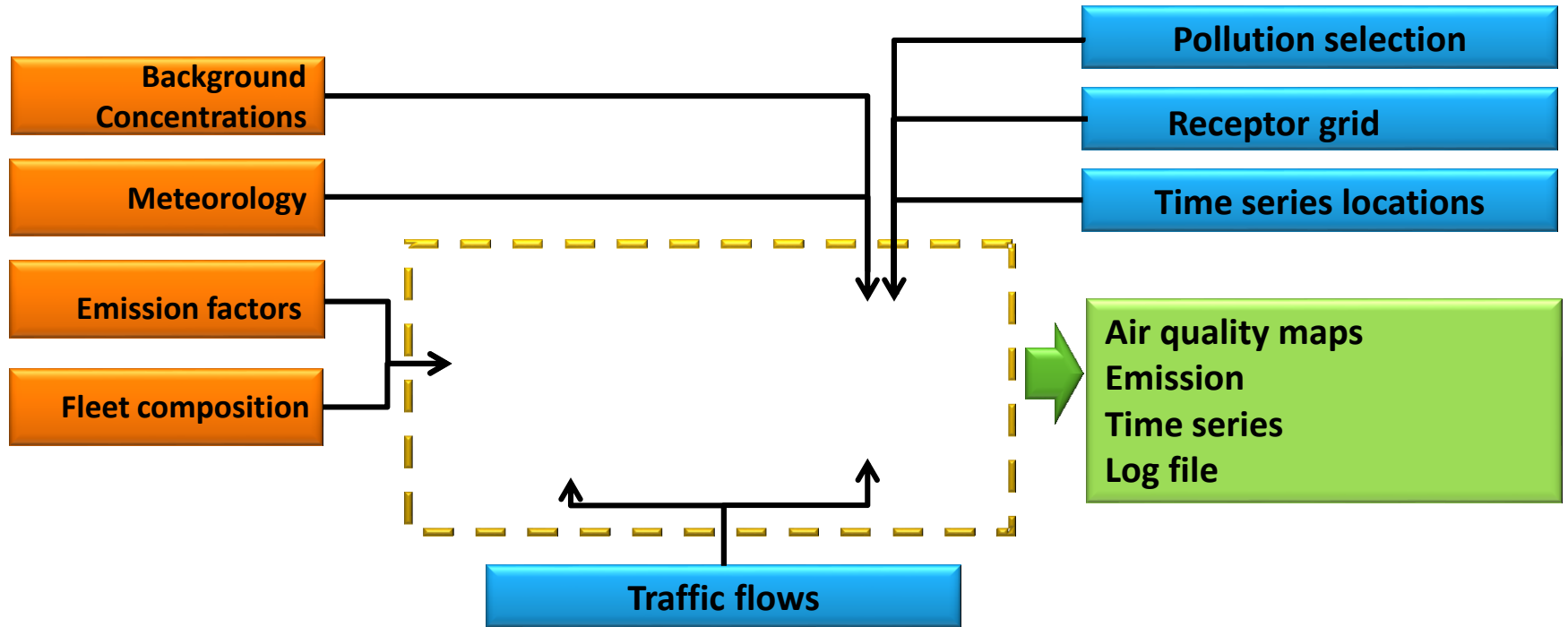


IFDM-TRAFFIC: AN IMPACT ASSESSMENT TOOL FOR ROAD TRANSPORT SCENARIOS

- Main objective: **harmonization** and **transparency** in Environmental Impact Assessments (EIA)
- Standardized application:
 - *AQ model*
 - *Road transport emission factors*
 - *Background concentrations*
 - *Meteorology*
- Owned by the Flemish Environmental Agency
- **Freely available** for environmental consultants
- Developed by VITO as a **web-application**
- Up and running since 2011



IFDM-TRAFFIC: METHODOLOGY



IFDM-TRAFFIC: LESSONS LEARNT

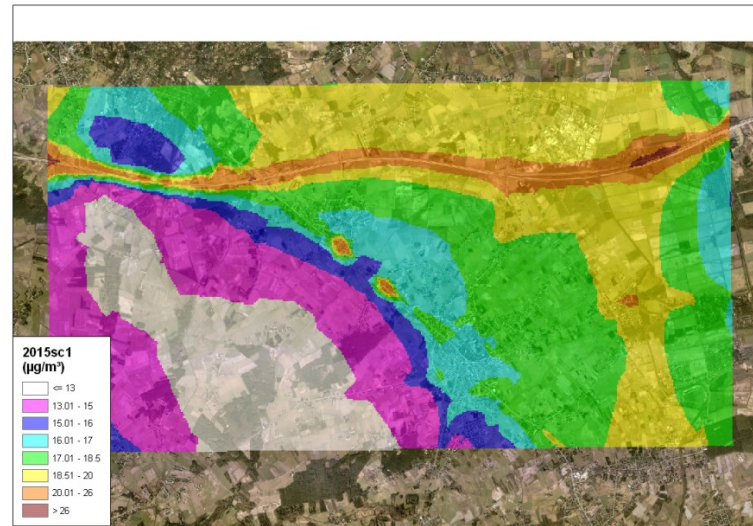
- Since 2011, almost all environmental impact assessment (EIA) studies in Flanders have used IFDM-Traffic for the “air” theme (in total > 1300 simulations)
- Benefits for the users:
 - **State-of-the-art** modelling system **certified** by the Flemish government
 - **Free of charge** and available as a **web application** → no installation and upgrades required
 - **No hassle** of preparing up-to-date emission factors, background concentration, meteo records
- Benefits for the administration:
 - Model simulation are produced by a **known** and **validated system**
 - **Harmonisation & standardization** in the way air quality is dealt with in EIA
 - **Log files** of a specific runs give all relevant information of the input data used
 - In case of doubts, they are able to **redo the runs** easily and check the maps given in the EIA

IFDM-TRAFFIC: LESSONS LEARNT (CONT...)

- An operational service such as IFDM-Traffic comes with some maintenance and an operational costs
- The **HPC cluster** in the **backend** as well as the **IFDM-Traffic front end** require monitoring
- **Regular upgrades** are required to make sure that the system is working with most up-to-date input data sets (emission factors, background concentrations...) and on a secure computer infrastructure → small updates annually and in 2015 one major upgrade

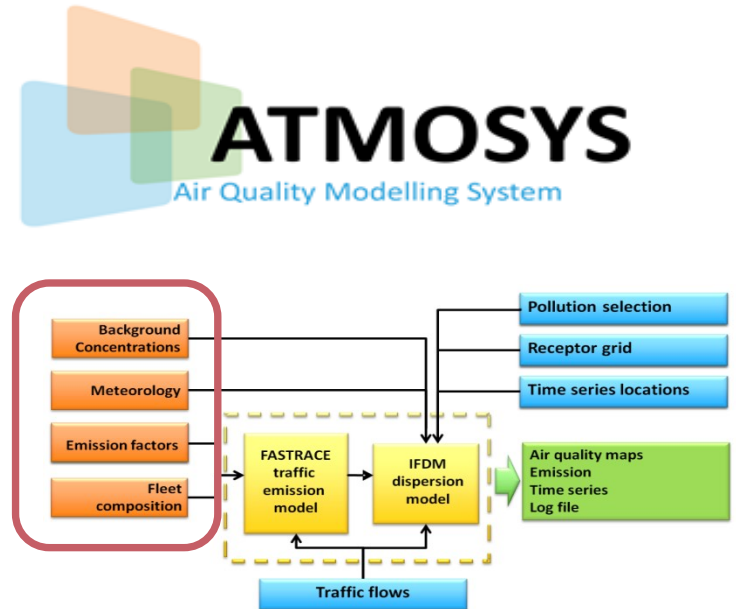
IFDM-TRAFFIC: LIMITATIONS

- Output available as ASCII files → has to be **visualized offline** in a GIS system
- IFDM-Traffic is (by design) not very flexible and is setup **for Flanders only**
- No street canyons (yet)



ATMOSYS PLANNING

- International interest in IFDM-Traffic approach → **ATMOSYS Planning**
 - Not only traffic: also point and area sources
 - Modernized user interface
 - Improved emission manager (e.g. LEZ functionality)
- Requirements in other regions:
 - **Local data sources** (e.g. fleet compositions)
 - Reliable **background concentrations** (e.g. available from CAMS)



SETUP A CASE: REFERENCE AND SCENARIOS

Atmosys Planning Case Composer Background Meteo Test

ATMOSYS Atmosphere Monitoring Service Copernicus

demo

Grid

POI

reference

Emissions

Background

Background concentrations (download template)

ID	Name	Is predefined	Status	Created	Action
15	BackgroundTest	false	finished	2017-09-15 09:18:09	Select Edit
10	CAMS 2015	false	finished	2017-09-13 09:45:20	Select

Define case: Ref., scenario 1...

Define regional background

Atmosphere Monitoring Service

SETUP A CASE: METEOROLOGICAL DATA

Atmosys Planning Case Composer Background Meteo Test

demo Grid POI reference Emissions Background Meteo Low emission zones Concentrations

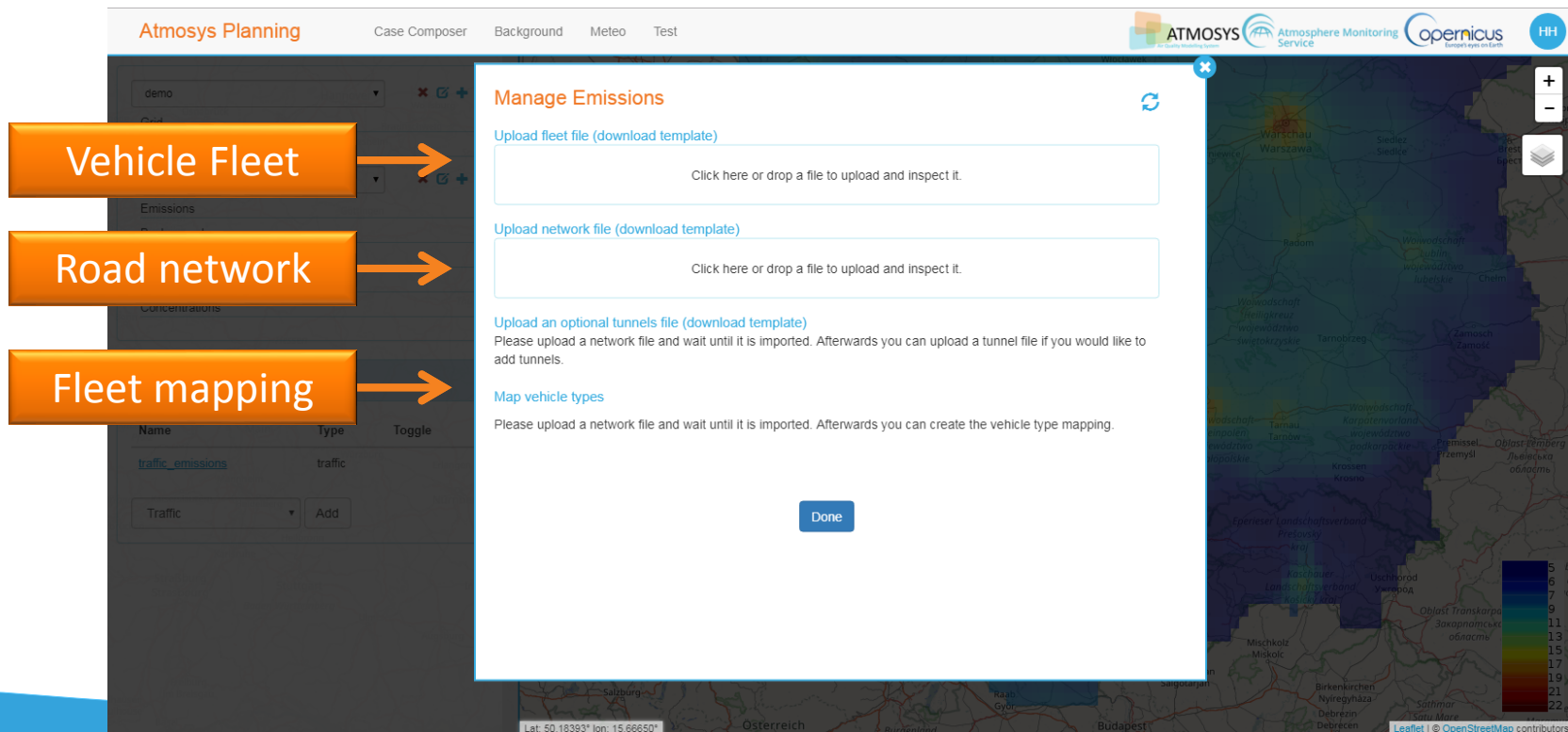
Meteo data (download template)

ID	Name	Status	Created	Action
9	MeteoTest	finished	2017-09-15 09:17:55	Select Edit
7	CAMS 2015	finished	2017-09-13 09:45:21	Selected

Define meteo data (local data upload or ECMWF)

©VITO – Not for distribution

SETUP A CASE: EMISSION MANAGER



Vehicle Fleet →

Road network →

Fleet mapping →

Manage Emissions

Upload fleet file (download template)

Click here or drop a file to upload and inspect it.

Upload network file (download template)

Click here or drop a file to upload and inspect it.

Upload an optional tunnels file (download template)

Please upload a network file and wait until it is imported. Afterwards you can upload a tunnel file if you would like to add tunnels.

Map vehicle types

Please upload a network file and wait until it is imported. Afterwards you can create the vehicle type mapping.

Done

EMISSION MANAGER: LINE SOURCES

Visualizing individual line sources

Atmosys Planning Case Composer Background Meteo Test

ATMOSYS Atmosphere Monitoring Service Copernicus BM

emission zones
concentrations

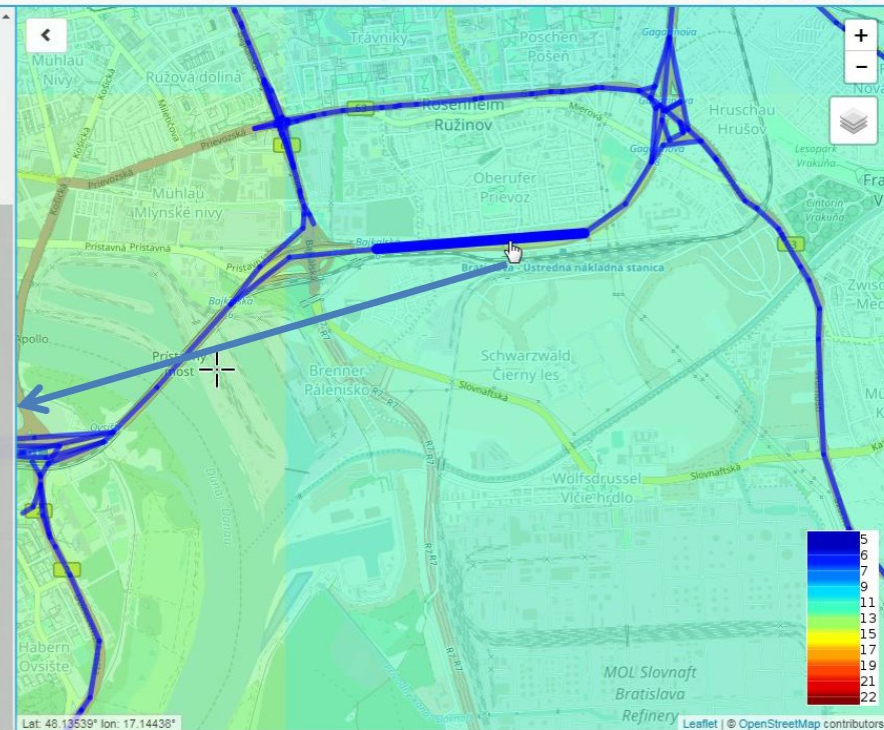
mission data

Name	Type	Toggle
traffic_baseline	traffic	Hide

Traffic Add

Segment metadata and counts

Name	Value
Count: OSD	99854
Count: ND	11844
Count: BUS	8646
roadType	H
height_m	2
speed_km_h	90
length_m	1903.748706



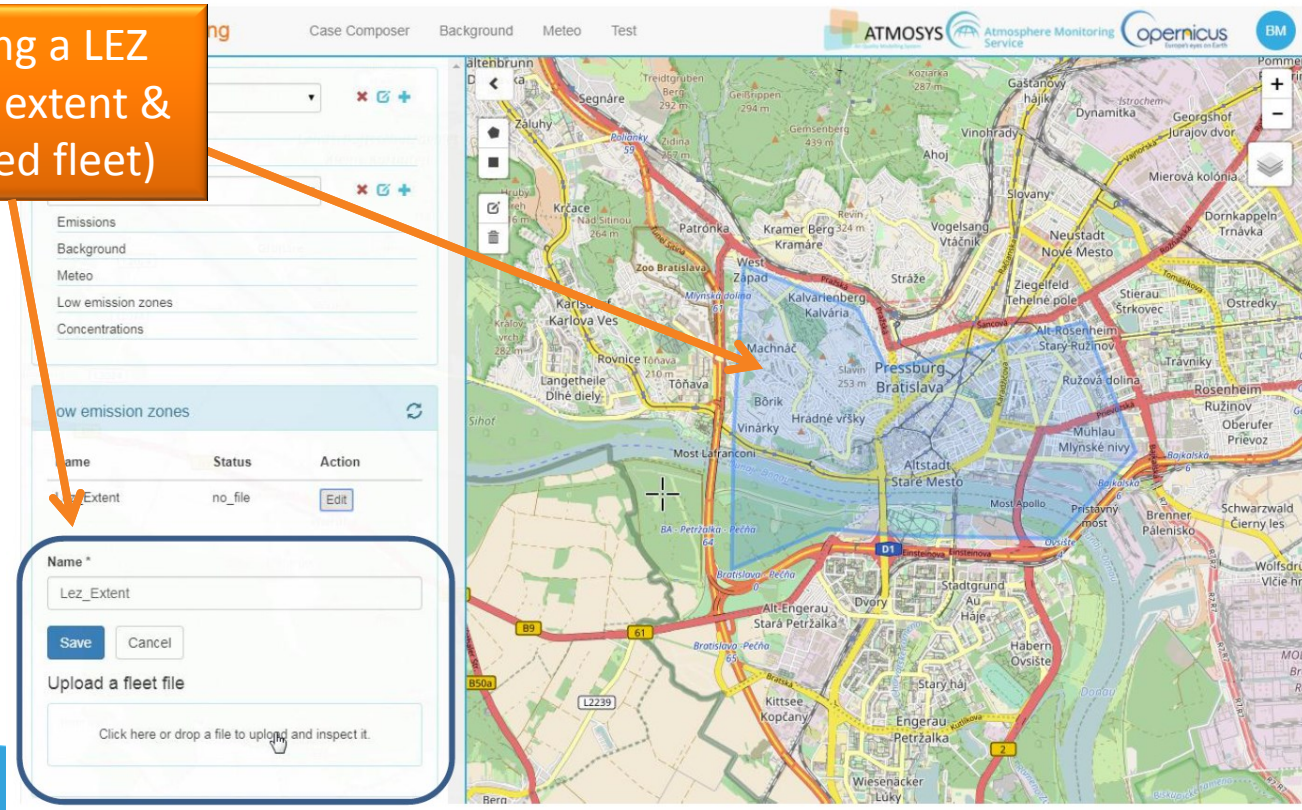
Lat: 48.13539° Ion: 17.14438°

MOL Slovnaft Bratislava Refinery

Leaflet | © OpenStreetMap contributors

EMISSION MANAGER: LOW EMISSION ZONE

Defining a LEZ
(spatial extent & modified fleet)



The screenshot shows the 'Low emission zones' configuration panel on the left and a map of Bratislava on the right. The map displays a red-shaded area representing the Low Emission Zone (LEZ) in the city center, with various districts and landmarks labeled. The configuration panel includes a table of existing zones and a form for creating a new one.

Name	Status	Action
Lez_Extent	no_file	Edit

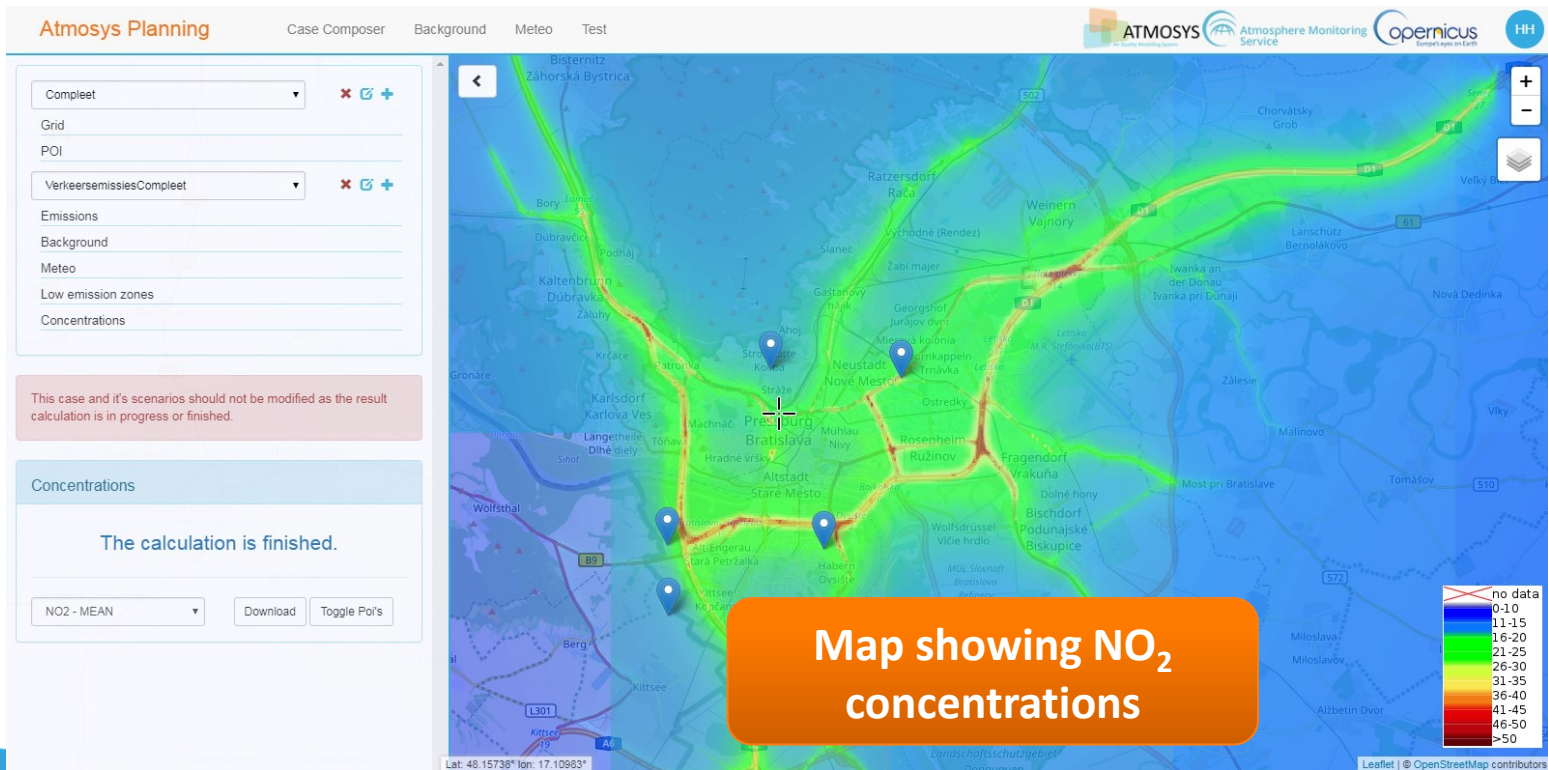
Name *
Lez_Extent

Save Cancel

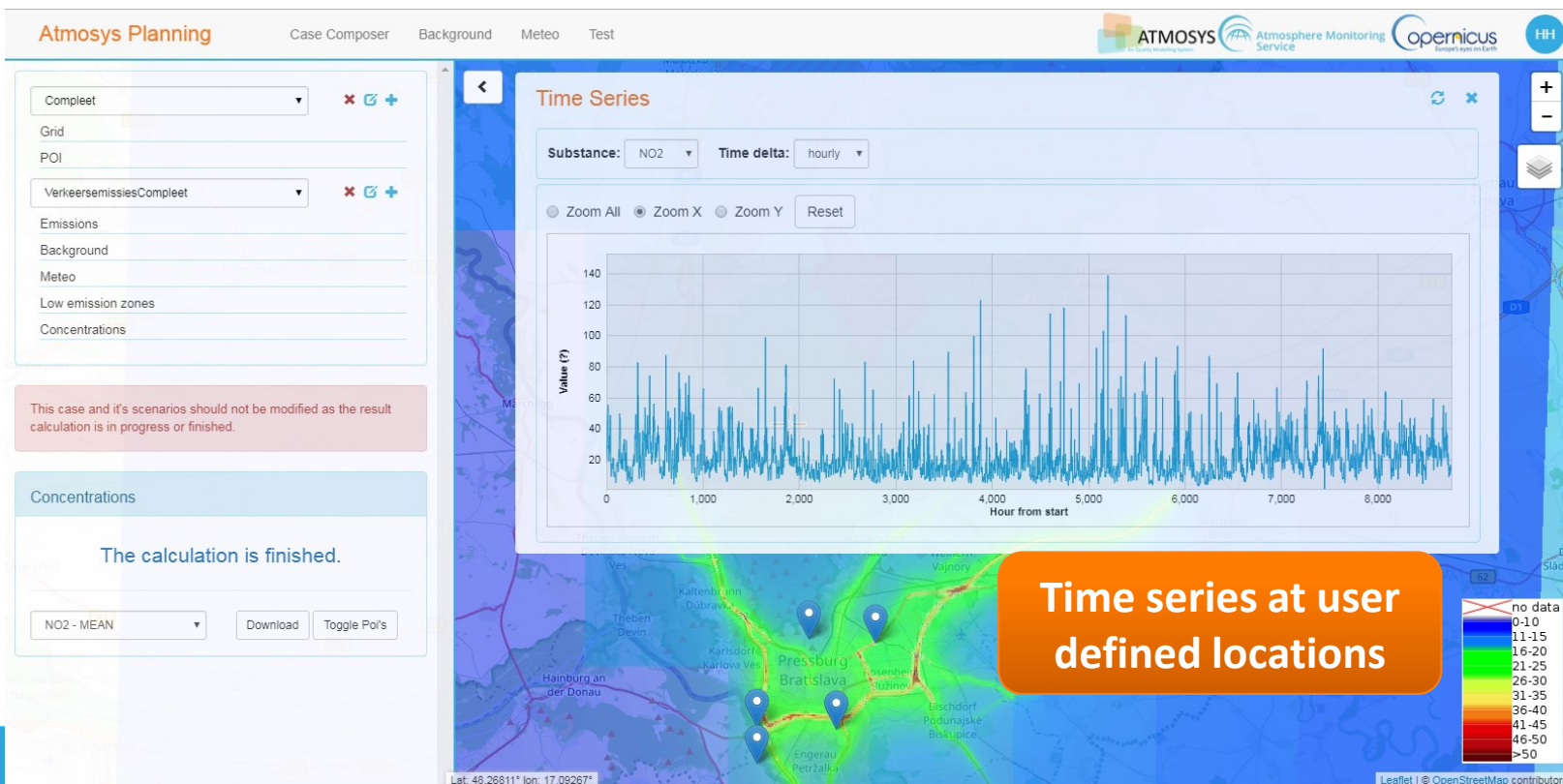
Upload a fleet file

Click here or drop a file to upload and inspect it.

VISUALISATION



VISUALIZATION & ANALYSIS



Time series at user defined locations

CONCLUSIONS & OUTLOOK

- IFDM-Traffic is being used for more than 5 years as **operational tool** for EIA
- Consultants and civil servants in the administration greatly appreciate the standardized and harmonized approach
- ATMOSYS-Planning is an upgrade version of IFDM-Traffic with more functionalities and flexibility
- ATMOSYS-Planning is now being setup in Bratislava, Slovakia & Krakow, Poland. Interest expressed by other cities, regions and countries world wide
- A harmonized and standardized methodology (embedded in a software tool) is a **guaranty** for **objective** environmental impact assessment

THANK YOU!

stijn.janssen@vito.be