Modelling and planning tool for all levels of governance
Air quality strategy 2020
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Air quality strategy 2020

• Three main parts:
  – National plan for emission decrease
  – Regional plans for air quality improvements (10)
  – Financial analysis

• Analytical part, focused on emission inventory, air quality assessment and air quality modelling

• More than a year of work on strategy
Structure of strategy documents

According to DPSIR model

• **D** – Driving Forces – Sector analysis (energetics, traffic, agriculture, industry),
• **P** – Pressure - Emissions of pollutants,
• **S** – State – concentrations of pollutants in atmosphere (concentrations, atmospheric deposition),
• **I** – Impact – Impacts on health and ecosystems,
• **R** – Response - System of air quality assessment and management (strategy, legislation, institutions, AQ monitoring systems, emissions balancing, measures, financing, science and research, education and awareness)
Air quality model

• Directive 2008/50/EC – assessment based on monitoring, but can be completed by modelling (especially for maps)
• Using linear regression model with spatial interpolation (IDW, kriging)
• Separate mapping of rural, urban background (and possibly transport) pollution
• Cross – validation – location where is monitoring is modelled and then verified
Map construction

ETC/ACM Technical Paper „European air quality maps of PM and ozone and their uncertainty“
Particulate matters - PM
Pole roční průměrné koncentrace PM$_{10}$ v roce 2013
*Field of annual average concentration of PM$_{10}$ in 2013*
Pole 36. nejvyšší 24hod. koncentrace PM$_{10}$ v roce 2013
Field of the 36th highest 24-hour concentration of PM$_{10}$ in 2013
PM10 - 36.MAX – different years

Field of the 36th highest 24-hour concentration of PM10 in 2013

Pole 36. nejvyšší 24hod. koncentrace PM₁₀ v roce 2010

Pole 36. nejvyšší 24hod. koncentrace PM₁₀ v roce 2013
PM10 emission sources

- 1A4cii – Zemědělství, lesnictví, rybolov: Nesilniční vozidla a ostatní stroje
  - Agriculture/Forestry/Fishing: Off-road vehicles and other machinery
- 1A4bi – Lokální vytápění domácností
  - Residential: Stationary plants
- 1A2fi – Spalovací procesy v průmyslu a stavebnictví

Měrné emise [t.km².rok⁻¹]
- 0.5
- 0.5–1
- 1–2
- 2–5
- 5–10
- 10–20
- > 20

Obr. IV.1.21 Vývoj emisí PM
Fig. IV.1.21 The development of PM emissions

Obr. I.1.7 Emisní hustoty tuhých látek ze čtverců 5x5 km, 2011
Pole roční průměrné koncentrace PM$_{2.5}$ v roce 2013
Field of annual average concentration of PM$_{2.5}$ in 2013
Pole roční průměrné koncentrace benzo(a)pyrenu v ovzduší v roce 2013
Field of annual average concentration of benzo(a)pyrene in the ambient air in 2013
Pole roční průměrné koncentrace NO₂ v roce 2013
Field of annual average concentration of NO₂ in 2013
Vyznačení oblastí s překročenými imisními limity pro ochranu zdraví bez zahrnutí přízemního ozonu, 2013

Areas with exceeding of the health protection limit values, ground-level ozone excluded, 2013
Regional level – AQ plans

• 10 zones and agglomerations, every one prepares AQ plan

• combination of AQ model and dispersion model
  – AQ model set values – calibrates
  – dispersion model calculates the contribution of individual sources, can go to detail

• Two dispersion models used – for transportation and background, also chemical transportation model for secondary atmospheric aerosols
AQ models

PM10 (d)

B(a)P
CAMex – secondary aerosols
Transboundary modelling
Transboundary modelling
Transboundary modelling
Dispersion model

The contributions of listed stationary sources to the average annual concentration of PM10
Measures modelling

Area with source contribution
PM10 > 4 μg.m⁻³ in annual average

QUARRY
Area: 1.63 -> 0.6 km²
Measures modelling

Area with source contribution PM10 > 4 µg.m\(^{-3}\) in annual average

Arcelor Mittal Steel
Area: 19.5 -> 13 km\(^2\)
Thank you for your attention!

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